BEYOND PESTICIDES
701 E Street, SE ■ Washington DC 20003
202-543-5450 phone ■ 202-543-4791 fax
info@beyondpesticides.org ■ www.beyondpesticides.org

Full Statement of
Drew Toher, Community Resource and Policy Director,
Beyond Pesticides
on
HB646
to
New Hampshire House Environment and Agriculture Committee
February 12, 2019

Spoken Statement

Esteemed members of New Hampshire's House Environment and Agriculture Committee, thank you for the opportunity to provide testimony in support of HB646. I am Drew Toher, the Community Resource and Policy Director at Beyond Pesticides, a national nonprofit membership organization that aims to educate the public on the hazards of pesticides and promote alternatives to their use. On behalf of our members and supporters in New Hampshire, we urge the passage of HB646 through this committee.

The last two years saw New Hampshire beekeepers lose over 50% of their hives. This is much higher the national average over the past decade, which has hovered around an already unsustainable 30%. Imagine if another agricultural industry, like New Hampshire's dairy or poultry farmers, lost over 50% of their livestock not just once, but year over year for the past decade.

This is a pollinator crisis. And it's not only beekeepers and their hives that are affected. A recent UNH report found that four of the state's 16 wild bumblebee species have experienced significant declines.

This crisis has important implications. We need honey bees and native pollinators for one in three bites of our food.

The science is now clear that neonicotinoids and other bee-toxic pesticides defined within HB646 are significant drivers of this crisis. These chemicals are whole plant poisons; once applied onto a seed or sprayed on a plant they make their way into the pollen, nectar and dew droplets the plants produce and pollinators feed upon. Exposure impairs pollinator navigation, foraging, and learning behavior, and also suppresses the immune system, making them more susceptible to disease and pathogens like the varroa mite.

HB646 removes bee-toxic chemicals from the market, but the bill also acknowledges realities on the ground. To address the need to balance pollinator protection with crop protection, HB646 tasks state agencies with establishing best practices for residents and farmers transitioning away from these

insecticides. You may hear from the pesticide industry that alternatives are more toxic, but there are sustainable management practices and also less toxic products compatible with the ecosystem, such as pyrethrins, neem oil, and other natural insecticides, that can readily replace bee-toxic pesticides.

The legislation further acknowledges that other insecticides and herbicides may be either directly or indirectly harming pollinators or the habitat they rely on. So to ensure lasting protections, HB646 establishes an expert panel in farming, pollinator health, and ecosystems that will conduct an annual review of relevant scientific literature on pesticides and pollinator health, and submit their findings in a report to the legislature.

There is a critical need for New Hampshire to help reverse the pollinator crisis by passing this important legislation. I thank the committee again for this opportunity and am happy to answer any questions you may have on this issue.

Support HB646

Beyond Pesticides supports HB646 to restrict the use of bee-toxic pesticides, establish best practices for farmers and residents, and create an expert panel on pollinator protection. As a national, grassroots membership organization, Beyond Pesticides represents beekeepers, community-based groups, farmers, and a range of other individuals seeking to improve protections from toxic pesticides. Our membership includes residents of New Hampshire and spans the 50 states and groups around the world.

In the absence of adequate federal action to safeguard New Hampshire's critical managed and native pollinator populations, the time is right for the state to act to protect these species from the hazards of pesticide use, and advance alternative land management practices. We sit at a crossroads where inaction by the state legislature allows the escalation of the pollinator crisis, and at a time when we could be using productive sustainable practices and materials that support biodiversity while sustaining high yields. **We urge the committee to vote yes on HB646.**

Pesticides and the Decline of Pollinators

Since 2006, honey bees and other pollinators in the U.S. and throughout the world have experienced ongoing and rapid population declines. The continuation of this crisis threatens the stability of ecosystems, the economy, and our food supply, as one in three bites of food are dependent on pollinator services. Pollination services are valued at over $125 billion globally. According to a 2014 Presidential Memorandum, pollinators provide $24 billion annually to the US economy.[1]

---

[1] White House Blog: New Steps to Protect Pollinators, Critical Contributors to Our Nation's Economy http://www.whitehouse.gov/blog/2014/06/20/new-steps-protect-pollinators-critical-contributors-our-nation-s-economy.

A recent national survey indicates that U.S. beekeepers experienced a 30.7% annual mortality rate with their hives during 2017/18.[2] In New Hampshire, beekeepers lost 55.24% of their colonies during 2017/18,[3] well beyond upper ends of the replacement limit beekeepers have traditionally experienced, which is 15%.

Bee-toxic Pesticides: Neonicotinoids

Systemic pesticides such as the neonicotinoid class of insecticides have been shown, even at low levels, to impair foraging, navigational, and learning behavior in bees, as well as suppress their immune system to the point of increasing their susceptibility to pathogens and disease.[4-7] Multiple studies have confirmed that the levels of neonicotinoid pesticides that bees encounter in the environment are toxic enough to impair their brain cells, resulting in poor navigation and foraging, and eventually colony declines.[5,6,7,8] A 2018 meta-analysis of 23 independent studies concluded that field-relevant pesticide exposure has a significant negative effect on bee memory and learning.[7] These individual impacts are compounded at the level of social colonies, weakening collective behavioral resistance to parasites, pathogens and temperature stress, and thus leading to colony losses.[8] Recent studies of managed and wild bees in the field have shown significant colony and population declines as a direct result of neonicotinoid crop treatment.[9,10,11] There is widespread consensus in the scientific community that neonicotinoids are responsible for pollinator declines and need to be restricted, as evidenced by a 2018 "Call to restrict neonicotinoids" published in Science and signed by 233 scientists.[12]

Concentrations of neonicotinoids in soils, waterways, field margin plants, and floral resources overlap substantially with concentrations that control pests in crops, and commonly exceed

---

[2] vanEngelsdorp, Det al. 2018. Preliminary Results: Honey Bee Colony Losses in the United States, 2017-2018, for the Bee Informed Partnership. https://beeinformed.org/results/honey-bee-colony-losses-2017-2018-preliminary-results/

[3] vanEngelsdorp, D et al. 2018. 2017/18 Total Annual All Colony Loss https://bip2.beeinformed.org/loss-map/

[4]Pamminger et al. 2018. A mechanistic framework to explain the immunosuppressive effects of neurotoxic pesticides on bees. *Functional Ecology* doi:10.1111/1365-2435.13119. Table 1: Evidence for immunosuppressive effects of neonicotinoid pesticides in pollinators.

[5] Moffat C, Pacheco, J G, et al. 2015. Chronic exposure to neonicotinoids increases neuronal vulnerability to mitochondrial dysfunction in the bumblebee (*Bombus terrestris*). *FASEB J fj.14-267179. doi:10.1096/fj.14-267179.*

[6] Palmer et al. 2013. Cholinergic pesticides cause mushroom body neuronal inactivation in honeybees. *Nature* doi:10.1038/ncomms2648.

[7] Siviter, H et al. 2018. Quantifying the impact of pesticides on learning and memory in bees. *Journal of Applied Ecology* doi 10.1111/1365-2664.13193.

[8] Crall, JD et al. 2018. Neonicotinoid exposure disrupts bumblebee nest behavior, social networks, and thermoregulation. *Science* doi:10.1126/science.aat1598.

[9] Woodcok et al. 2016. Impacts of neonicotinoid use on long-term population changes in wild bees in England. *Nature Communications* doi: 10.1038/ncomms12459.

[10] Ciaran, E et al. 2017. The Neonicotinoid Insecticide Thiacloprid Impacts upon Bumblebee Colony Development under Field Conditions. *Environmental Science and Technology* doi: 10.1021/acs.est.6b04791

[11] Tsvetkov, N et al. 2017. Chronic exposure to neonicotinoids reduces honey bee health near corn crops. *Science* doi: 10.1126/science.aam7470.

[12] Goulson, D et al. 2018. Call to restrict neonicotinoids. *Science* doi: 10.1126/science.aau0432.

levels that are known to kill beneficial organisms.[13] Because these chemicals are broad-spectrum insecticides, beneficial soil dwelling insects, benthic aquatic insects, grain-eating vertebrates, along with pollinators are also victims of these systemic chemicals. Birds are also at risk from neonicotinoids as one study demonstrates that a single corn kernel coated with a neonicotinoid is toxic enough to kill a songbird.[14] Further, research from the Netherlands has showed that the most severe bird population declines occurred in those areas where neonicotinoid pollution was highest.[15] To compound these findings, new research by the U.S. Geological Survey (USGS), also documents similar risks from neonicotinoids in the rivers and streams of the Midwest.[16] Recently, Morrissey et al. confirms all this in a review which finds that neonicotinoid concentrations detected in aquatic environments pose risks to aquatic invertebrates and the ecosystems they support.[17]

In 2014, an international meta-analysis of approximately 800 peer-reviewed studies on the impact of systemic pesticides, was conducted by the International Union for the Conservation of Nature, known as the Task Force on Systemic Pesticides (IUCN Task Force). It found that:[18]

- Neonicotinoids are present in the environment "at levels that are known to cause lethal and sublethal effects on a wide range of terrestrial (including soil) and aquatic microorganisms, invertebrates and vertebrates."
- The active ingredients persist, particularly in soils, with half-lives of months and, in some cases, years, and they accumulate. This increases their toxicity by increasing the duration of exposure of non-target species.
- The metabolites of neonicotinoids are often as or more toxic than the active ingredients.
- The weight of the published evidence is very strong that the acute and chronic effects pose a serious risk of harm to colonies/populations of honey bees, bumblebees and other pollinators.
- The most affected group of species include soil invertebrates and insect pollinators, with high exposure through air and plants and medium exposure through water. Invertebrates exposed to contaminated pollen, nectar and fluids are harmed at "field-realistic" concentrations.

---

[13] Goulson, D. 2013. REVIEW: An overview of the environmental risks posed by neonicotinoid insecticides. *Journal of Applied Ecology.* 50: 977–987. doi: 10.1111/1365-2664.12111

[14] Mineau P, Whiteside M. 2013. Pesticide Acute Toxicity Is a Better Correlate of U.S. Grassland Bird Declines than Agricultural Intensification. PLoS ONE 8(2): e57457.

[15] Hallmann CA, et al. 2014. Declines in insectivorous birds are associated with high neonicotinoid concentrations. *Nature* doi:10.1038/nature13531.

[16] Hladik ML, et al. 2014. Widespread occurrence of neonicotinoid insecticides in streams in a high corn and soybean producing region, USA. *Env. Poll.* 193:189-196.

[17] Morrissey, C. et al. 2015. Neonicotinoid contamination of global surface waters and associated risk to aquatic invertebrates: A review. *Environment International*. doi:10.1016/j.envint.2014.10.024.

[18] Van der Sluijs JP, et al. 2014. Conclusions of the Worldwide Integrated Assessment on the risks of neonicotinoids and fipronil to biodiversity and ecosystem functioning. *Environ Sci Pollut Res.* doi:10.1007/s11356-014-3229-5.

The European Food Safety Authority determined that the most widely used neonicotinoids: imidacloprid, clothianidin and thiamethoxam, pose unacceptable hazards to bees, prompting the European Union to suspend their use on agricultural crops in 2013. This agency also published an opinion report linking two neonicotinoids to adverse effects on the developing human nervous system.[19] According to the report, data suggests that the neonicotinoid chemicals (imidacloprid, acetamiprid) under review are responsible for the excitation or desensitisation or both of nicotinic acetylcholine receptors (nAChRs), which may affect the developing mammalian nervous system, as is known to occur with nicotine. The agency concludes that the two neonicotinoid compounds may affect neuronal development and function.

A follow up assessment by the European Food Safety Authority in 2018 confirmed that bee-toxic neonicotionoids pose risks to bees.[20] As a result of this comprehensive re-assessment of these chemicals, the European Commission backed a proposal to make permanent current restrictions and extend the ban to all outdoor use areas in order to protect pollinators.[21] Under these new laws, neonicotinoid use is limited to only indoor pest management.

Bee-toxic Pesticides: Sulfoximines, Butenolides and Phenylpyrazoles

In addition to neonicotinoids, HB646 identifies three other systemic, bee-toxic classes of insecticide associated with pollinator declines: sulfoximines, butenolides and phenylpyrazoles. This list is not comprehensive and represents a minimum set of bee-toxic pesticides that require restriction to prevent continued mass pollinator declines.

Sulfoximines and butenolides, most prominently sulfoxaflor and flupyradifurone, have the same mode of action and therefore share toxic properties with the closely related neonicotinoids. Sulfoximines have even been termed “fourth-generation neonicotinoids” due to their highly similar structures, modes of action, and toxic properties to insects, including pollinators.[19] Sulfoximines, butenolides, and all other synthetic analogs of nicotine, including those labeled as neonicotinoids, are selective agonists of insect nicotinic acetylcholine receptors. Several research findings on the sub-lethal effects of sulfoximines and butenolides on pollinators corroborate the need to regulate sulfoxaflor, flupyradifurone, and related insecticides:

- Sulfoxaflor has a mode of action and toxic effects identical to the neonicotinoid insecticide imidacloprid[22], implicated in wild and managed bee

[19] EFSA Panel on Plant Protection Products and their Residues (PPR). Scientific Opinion on the developmental neurotoxicity potential of acetamiprid and imidacloprid. EFSA Journal 2013;11(12):3471. doi:10.2903/j.efsa.2013.3471.
[20] EFSA. 2018. Neonicotinoids: risks to bees confirmed. https://www.efsa.europa.eu/en/press/news/180228
[21] European Commission. 2018. Protecting bees: EU set to completely ban outdoor use of pesticides harmful to bees. http://europa.eu/rapid/press-release_MEX-18-3583_en.htm
[22] Cutler, P et al. 2012. Investigating the mode of action of sulfoxaflor: a fourth-generation neonicotinoid. *Pest Management Science* doi: 10.1002/ps.3413

declines.

- ❖ Environmentally-relevant doses of sulfoxaflor exposure in the field reduce bumblebee colony size and reproductive output.[23]
- ❖ Flupyradifurone impairs memory and learning in Asian honey bees.[24]

The phenylpyrazole class of broad-spectrum insecticides, including fipronil, are formulated as systemic pesticides and have been shown to impair brain function and behavior in native bees and honey bees, even at low doses.[25,26][cite Delso and Pisa]

- ❖ Low doses of fipronil impair olfactory memory in honey bees, a behavior which is critical to foraging and therefore colony survival.[27]
- ❖ Sublethal doses of fipronil cause motor difficulty and paralysis in native pollinators.[28]
- ❖ Fipronil increases honey bee susceptibility and mortality from common honey bee parasites.[29]

Complexities Elevate the Need for HB646

There is no doubt that there are complexities associated with declining bee and pollinator health. The causes of the devastating losses have interrelated factors. Many of those complexities start with the pollinators' exposure to the toxic, persistent and systemic bee-toxic pesticides. The scientific data on bees' exposure to neonicotinoids shows that bees are highly stressed, according to Goulson et al., due to continuous exposures, including impacts on their brain cells and neuronal (nervous system) function. As a result, bees become highly vulnerable to parasites (varroa mites) and viruses.[30]

One study at the University of California San Diego shows that exposure to the neonicotinoids changes bees' eating behavior and reduces their level of sustenance or nutrition. Because of loss of habitat for pollinators, it is even more important that the lands on which bees pollinate

---

[23] Siviter, H et al. 2018. Sulfoxaflor exposure reduces bumblebee reproductive success. *Nature* doi: 10.1038/s41586-018-0430-6

[24] Tan, K et al. 2017. The pesticide flupyradifurone impairs olfactory learning in Asian honey bees (*Apis cerana*) exposed as larvae or as adults. *Nature* doi: 10.1038/s41598-017-18060-z.

[25] Pisa, LW et al. 2015. Effects of neonicotinoids and fipronil on non-target invertebrates. *Environ Sci Pollut Res* doi: 10.1007/s11356-014-3471-x.

[26] Simon-Delso, N. et al. 2014. *Environ Sci Pollut Res* doi: 10.1007/s11356-014-3470-y.

[27] El Hassani, AK et al. 2009. Glutamatergic and GABAergic effects of fipronil on olfactory learning and memory in the honeybee. *Invertebrate Neuroscience* doi: 10.1007/s10158-009-0092-z.

[28] de Morais, C et al. 2018. Ecotoxiclogical effects of the insecticide fipronil in Brazilian native stingless bees Melipona scutellaris (Apidae: Meliponini). *Chemosphere* doi: 10.1016/j.chemosphere.2018.04.153.

[29] Aufauvre, J et al. 2012. Parasite-insecticide interactions: a case study of *Nosema ceranae* and fipronil synergy on honeybee. *Scientific Reports* doi: 10.1038/srep00326.

[30] Goulson et al. 2015. Bee declines driven by combined stress from parasites, pesticides, and lack of flowers. *Science.* Vol 347, Issue 6229 27 March 2015. http://science.sciencemag.org/content/347/6229/1255957

and forage are not contaminated with poisons that adversely affect their health.[31]

Similarly, the focus on habitat loss as a contributing factor in declining pollinator health only strengthens the urgent call for action on neonicotinoids in order to ensure that the shrinking food sources for pollinators are not contaminated. In fact, nursery plants and habitat in urbanized and residential areas can play a large role in providing protection from bee-toxic pesticides –that is, if the nursery stock that people buy and their chemical use do not include these chemicals. The suggestion that additional research is necessary (more research is always helpful) does not justify state inaction now based on the preponderance of scientific information that we currently have. In fact, a 2015 review of the science by Pisa et al. concludes that "… enough knowledge exists to conclude that existing levels of pollution with neonicotinoids. . .resulting from presently authorized uses. . .are thus likely to have large-scale and wide ranging negative biological and ecological impacts on a wide range of non-target invertebrates. . ."[32]

Bee-toxic Pesticides Are Ineffective: HB646 Does Well to Incentivize Alternatives

In a 2014, the U.S. Environmental Protection Agency released a report detailing that soybean seed treatments with neonicotinoid insecticides provide little to no overall benefits in controlling insects or improving yield or quality in soybean production.[33]. Independent reviews have subsequently buttressed EPA's assessment, concluding that in many contexts bee-toxic pesticides do not provide significant yield benefits regarding canola, corn, dry beans, soybeans, wheat, and other major U.S. crops.[34]

A 2015 study by Furlan and Kreutzweiser concludes, "In the agricultural setting, it is becoming increasingly clear that prophylactic insecticide treatments with neonicotinoids are often not needed and result in unnecessary contamination of the environment thereby increasing risks to non-target organisms and may increase the likelihood of developing resistance among insect pests….Continued research into alternatives is warranted, but equally pressing is the need for transfer and training of IPM technologies for farmers and other practitioners by public agencies and the need for policies and regulations to encourage the adoption of IPM strategies and their alternative pest control options."[35] HB646 works towards accomplishing this goal.

---

[31] Tosi et al. 2017. Neonicotinoid pesticides and nutritional stress synergistically reduce survival in honey bees.
[32] Pisa et al. 2015. Effects of neonicotinoids and fipronil on non-target invertebrates. *Environmental Science and Pollution Research International.* 22(1):68-102. doi: 10.1007/s11356-014-3471-x. Epub 2014 Sep 17. https://www.ncbi.nlm.nih.gov/pubmed/25223353
[33] USEPA. 2014. Benefits of Neonicotinoid Seed Treatments in Soybean Production. https://www.epa.gov/sites/production/files/2014-10/documents/benefits_of_neonicotinoid_seed_treatments_to_soybean_production_2.pdf
[34] Center for Food Safety. 2014. Heavy Costs: Weighing the Value of Neonicotinoids in Agriculture. http://www.centerforfoodsafety.org/files/neonic-efficacy_digital_29226.pdf
[35] Furlan and Kreutzweizer. 2015. Alternatives to neonicotinoid insecticides for pest control: case studies in agriculture and forestry. *Environmental Science and Pollution Research.* Volume 22, Issue 1, pp 135–147 https://link.springer.com/article/10.1007/s11356-014-3628-7

Attention to the availability of alternative non-toxic practices and products is minimized despite a deficient regulatory process that struggles unsuccessfully with attempts to reduce risk (see Appendix A for additional detail). As the restrictions on bee-toxic pesticides are improved by HB646, alternatives will be used. Alternatives include both changes in management practices to improve soil and plant health and the use of least-toxic materials, including insecticidal soaps, neem oil (azadirachtin), diatomaceous earth dusting, biological controls (beneficial insects), and natural pyrethrins.

The role of the state of New Hampshire is clear. Tighten up on the use of bee-toxic pesticides that are linked to the decline of bees. Take these chemicals off the market, and provide best practices for residents and farmers. Because there are alternative products and practices that are effective and available, HB646 will lead to a strong coalition of science and state agencies that has the opportunity to incentivize the adoption of these best practices in growing both ornamental and food crops–plants that bees, butterflies and birds visit for nourishment.

Home and Garden Sector Already Adopting Alternatives

In the horticultural sector, several nurseries and retail outlets have already begun to transition from using systemic neonicotinoids to grow their plants. National hardware chains, including Lowe's, Home Depot, and ACE Hardware have all committed to removing neonicotinoids and neonicotinoid-treated plants from their store shelves. In April 2015, after pollinator health advocates delivered nearly one million petition signatures to Lowe's, the company indicated it would phase out neonicotinoid pesticides within 48 months and stock more organic compatible products.[36] Later in 2015, Home Depot followed suit. After initially only proposing to label plants sprayed with neonicotinoids, the company announced it would phase-out neonicotinoid use on its plants by the close of 2018. Home Depot said in a statement, "Our live goods suppliers have reduced the number of plants that they treat with neonicotinoids, so that now over 80% of our flowering plants are not treated with neonicotinoids. We will continue this decrease unless, 1) it is required by state or federal regulation, or 2) undisputed science proves that the use of neonicotinoids on our live goods does not have a lethal or sub-lethal effect on pollinators. Otherwise, we will have a complete phase-out of neonicotinoid use on our live goods by the end of 2018."[37] Additionally, BJ's Wholesale Club (over 200+ locations) is asking its vendors to discontinue neonicotinoid use.

States and Localities Adopting Pollinator Protective Policies

In 2016, Connecticut lawmakers enacted a comprehensive package of pollinator protections,

[36] Lowe's Social Responsibility Report. 2014. http://responsibility.lowes.com/2015/wp-content/uploads/Lowes_2014_SR.pdf.
[37] Home Depot Eco Options. 2015. http://www.ecooptions.homedepot.com/healthy-home/organic-gardening/.

establishing bee-toxic neonicotinoids as restricted use, and creating a process to develop best practices for fostering pollinator habitat on farms and resident backyards.[38] Maryland also enacted a pollinator protection act in 2016, restricting consumer use of bee-toxic neonicotinoids.[39] In recognition of the continued threat these chemicals pose, that law was expanded in 2017 to prohibit the use of not only neonicotinoids but also other pesticides toxic to bees on state-owned pollinator habitat.[40] At least 45 communities throughout the United States have passed policies that restrict the use of bee-toxic pesticides. Dover and Portsmouth, NH have both passed laws encouraging alternative pest management approaches that do not utilize bee-toxic pesticides on their public lands. [41]

Conclusion

The risks bee-toxic pesticides pose to pollinators and the wider environment warrant state action. Restricting the use of these toxic pesticides, alongside the development of best management practices, will restore native and managed pollinator populations. Thank you for the opportunity to provide testimony in support of HB646. We remain available at 202-543-5450 or dtoher@beyondpesticides.org should any member of the committee have additional questions on this important issue.

---

[38] Connecticut General Assembly. 2016. SB 231- An Act Concerning Pollinator Health. https://www.cga.ct.gov/2016/TOB/s/2016SB-00231-R02-SB.htm

[39] Maryland General Assembly. 2016. HB0211 - Neonicotinoid Pesticides - Restrictions on Sales and Use (Pollinator Protection Act of 2016). http://mgaleg.maryland.gov/webmga/frmMain.aspx?pid=billpage&tab=subject3&id=hb0211&stab=01&ys=2016RS

[40] Maryland General Assembly. 2016. HB0830 - Pollinator Habitat Plans - Plan Contents - Requirements and Prohibition. http://mgaleg.maryland.gov/webmga/frmMain.aspx?pid=billpage&tab=subject3&id=hb0830&stab=01&ys=2017RS

[41] Beyond Pesticides. 2019. Map of U.S. Pesticide Reform Policies. https://www.google.com/maps/d/viewer?mid=1VLpVWvifO2JOrgxf1-d1DLyDruE&ll=39.03573413957713%2C-94.19459570507814&z=5

Appendix A.

Failures of the Federal Regulatory System

EPA pesticide registration does not ensure that no harm will come to non-target insects such as honey bees. Pesticides are, by their very nature, poisons. The Federal Insecticide Fungicide and Rodenticide Act (FIFRA), the law governing pesticide use in the U.S., relies on a risk-benefit statute, which allows the use of pesticides with known hazards, based on the judgment that certain levels of risk are acceptable. However, EPA, which performs this risk assessment, assumes that a pesticide would not be marketed if there were no benefits to using it and therefore a risk/benefit analysis is not evaluated by EPA as part of the pesticide registration process. The registration of a pesticide by EPA does not guarantee that the chemical is "safe." In fact, the limitations in the registration process create the responsibility of states, which have explicit authority under federal law to adopt standards that exceed the federal standards,[42] and in so doing provide more protective measures. Below are examples of regulatory deficiencies that threaten pollinators.

Conditional Registration. EPA often approves the use of a chemical without all of the necessary data required to fully register the chemical, and will assign it a "conditional" registration. The agency assumes that while it waits for additional data the product would not cause adverse impacts that would prevent an eventual full registration. A recent report (2013) of the Government Accountability Office, entitled *EPA Should Take Steps to improve Its Oversight of Conditional Registrations,* strongly criticizes this process, citing poor internal management of data requirements, constituting an "internal control weakness." The report states, "The extent to which EPA ensures that companies submit additional required data and EPA reviews these data is unknown. Specifically, EPA does not have a reliable system, such as an automated data system, to track key information related to conditional registrations, including whether companies have submitted additional data within required time frames." However, these recommendations do not go far enough. Pesticides without all the data required for a full understanding of toxicity to wildlife species such as pollinators should not be allowed on the market.

Pesticide Mixtures, Synergism Untested. There is a broad weakness in the federal review process when it comes to analyzing the environmental impacts of full pesticide formulations, as opposed to individual active ingredients. Pesticide products are made up of mixtures of pesticides and other ingredients used to form the liquid, dust, or granule in which the pesticide is delivered. Other ingredients, or so-called inert ingredients, that are not disclosed on the product label can be as or more toxic than the active ingredient. In addition, EPA does not

[42] U.S. Supreme Court. Ruckelshaus v. Monsanto Co., 467 U.S. 986, 1984.

consider the effect of exposures to mixtures of pesticide active ingredients and formulations.

In 2014, researchers looked at the cumulative impact the numerous pesticides that may be found in honey bee hives in the 2014 paper *Four Common Pesticides, Their Mixtures and a Formulation Solvent in the Hive Environment Have High Oral Toxicity to Honey Bee Larvae*.[43] The findings of the study sent no mixed messages —pesticides, whether looked at individually, in different combinations, or even broken down into their component parts have serious consequences on the bee larvae survival rates. The synergistic effects in most combinations of the pesticides amplified these mortality rates around the four-day mark.

Label Restrictions Inadequate. From a public health and an environmental protection perspective, an inadequate regulatory system results in a pesticide product label that is also inadequate, failing to restrict use or convey hazard information. Although, as a result of growing scientific evidence showing harm to pollinators from neonicotinoid pesticides, EPA released revised labels to protect honey bees, their changes are widely criticized by beekeepers and environmentalists as inadequate. The agency has also proposed temporary prohibitions on spraying when managed bees are present.

Under new guidelines, the label prohibits the use of some neonicotinoid pesticides when bees are present, and includes a "bee advisory box" and icon with information on routes of exposure and spray drift precautions. As mentioned above, scientists question the efficacy of the label change in curtailing a systemic pesticide that contaminates nectar and pollen, poisoning bees indiscriminately, and the enforceability of the label language, which is geared to managed, not wild bees. EPA is aware that label compliance problems in the real-world. Many beekeepers can attest to this and have repeatedly communicated their concern to EPA enforcement and registration officials. Unrealistic and/or unenforced label requirements do not offer proclaimed protections. For instance, after specifying that, "The product may not be applied while bees are foraging. Do not apply this product until flowering is complete and all petals have fallen," EPA adopts the loophole: *"If an application must be made when managed bees are at the treatment site, the beekeeper providing the pollination services must be notified no less than 48-hours prior to the time of the planned application so that the bees can be removed, covered or otherwise protected prior to spraying."* This puts the onus on the beekeepers to make sure their bees are safe. With such inadequate restrictions at the federal level, it is critical that New Hampshire lawmakers take swift action to lessen the impact on the state's fragile pollinator populations.

[43] Zhu, Wanyi et al. 2014. Four Common Pesticides, Their Mixtures and a Formulation Solvent in the Hive Environment Have High Oral Toxicity to Honey Bee Larvae. *PLOS One.* http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0077547.