February 24, 2020

Lucas Rhoads
Staff Attorney, Nature Program
Natural Resources Defense Council

Comments to the New Jersey Senate Environment and Energy Committee in Support of Senate Bill 1016

Dear Chairman Smith and Members of the Senate Environment and Energy Committee:

On behalf of our 74,500 New Jersey members and online activists, the Natural Resources Defense Council (NRDC) writes to support Senate Bill 1016 (S1016), which directs the New Jersey Department of Environmental Protection (DEP) to classify neonicotinoid insecticides (neonics) intended for outdoor use as restricted use pesticides. The bill also prohibits outdoor non-agricultural neonic uses—with a limited exception for addressing invasive species. This bill will substantially reduce neonic contamination of soil, water, and plants in New Jersey, working to safeguard the state's pollinators, aquatic ecosystems, and people from the harms of that contamination.

Pollinators—Critical to New Jersey's Environment and Agricultural Economy—Are Dying at Alarming Rates

Pollinators—including honeybees, wild bees, butterflies, birds, and bats—are vital to New Jersey. While pollinators help produce three out of every four crops[1] and are responsible for one out of every three bites of food globally, [2] they are particularly important to New Jersey agriculture. Of the state's top ten most valuable food crops, pollinators play a key role in the production of seven—blueberries, tomatoes, apples, peaches, cranberries, cucumbers, and squash—worth over $250 million in 2017 alone.[3] Further, roughly 85% of wild flowering plants—including those that produce the fruits, seeds, and nuts that birds, mammals, and other wildlife depend on—require animal pollination,[4] making pollinators essential to the health and viability of New Jersey's environment.

---

[1] Food and Agriculture Organization of the U.N., *FAO's Global Action on Pollination Services for Sustainable Agriculture*, http://bit.ly/2ETQLMW (last visited June 5, 2019).
[2] Alexandra-Maria Klein et al., *Importance of Crop Pollinators in Changing Landscapes for World Crops*, Proceedings of the Royal Society B Biological Sciences, 274, 303–313 (Oct. 27, 2007), http://bit.ly/2HX6q05; Buchmann S, Nabhan GP (1996) The Forgotten Pollinators. Island Press, New York.
[3] N.J. Dep't of Agriculture, *2018 Annual Report and Agricultural Statistics* 30, http://bit.ly/2QJM2SY; Pollinator Partnership, *List of Pollinated Food*, http://bit.ly/2W9TvvL (last visited June 4, 2019).
[4] Jeff Ollerton et al., *How Many Flowering Plants are Pollinated by Animals?*, 120 Oikos 3, 321-326 (Feb 21, 2011); U.S. Forest Service, *Plant Pollination Strategies*, http://bit.ly/2ZcMDQ9 (last visited June 4, 2019).

State pollinator populations, however, have experienced dramatic losses in recent years. In winter of 2018-2019, the average beekeeper in New Jersey reported losing just over 51% of their honeybee colonies.[5] In recent years, such high loss rates have become common, though beekeepers historically reported acceptable losses below 20%.[6] The numbers mark a new and disturbing norm, unthinkable only a generation ago, which also raises concerns that the state's 400+ species of wild bees may be suffering from similar catastrophic losses. The now-endangered rusty patched bumble bee, for example—one of the most common bumble bees in New Jersey as recently as the early 1990s—hasn't been seen in the state since the year 2000.[7] These documented pollinator declines in New Jersey also coincide with a broader insect declines worldwide, sometimes dubbed the "insect apocalypse."[8]

Neonics Are a Leading Cause of Pollinator Declines

A widespread and growing scientific consensus confirms that neonic use is a leading and preventable cause of pollinator and insect losses worldwide. This includes comprehensive assessments conducted by the European Food Safety Administration (EFSA),[9] the Canadian Pest Management Regulatory Agency (PMRA),[10] and the U.S. Environmental Protection Agency (EPA),[11] as well as two comprehensive literature reviews of the current and extensive academic research.[12] Even a recent pesticide-industry-funded field study of the effects of neonics on bees—the largest to date—found that neonics reduced the ability of both wild and managed bees to establish new colonies.[13] This came on the heels of another study which found that neonics reduced the survival of wild bee populations over the 18-year study period.[14]

---

[5] Bee Informed Partnership, *National Management Survey*, http://bit.ly/2Xt6SbA (last visited February 20, 2020) (select Loss by Year, States > New Jersey, Operation Size > all, Average Beekeeper Loss).
[6] Bee Informed Partnership, *Honey Bee Colony Losses 2017-2018: Preliminary Results*, http://bit.ly/2QPtT6f (last visited June 5, 2019).
[7] *See* U.S. Fish and Wildlife Service, *Rusty Patched Bumble Bee Status Assessment* 62, http://bit.ly/2Wl7qnA.
[8] Brooke Jarvis, *The Insect Apocalypse Is Here: What Does It Mean for the Rest of Life on Earth?*, New York Times Magazine (Nov. 27, 2018), https://nyti.ms/2Aq0jMX.
[9] EFSA, *Q&A: Conclusions on Neonicotinoids 2018* (Feb. 28, 2018), https://bit.ly/2jsXsdN\
[10] PMRA, *Proposed Re-evaluation Decision PRVD2018-12, Imidacloprid and Its Associated End-use Products: Pollinator Re-evaluation* (May 31, 2018), https://bit.ly/2QlLHVI; PMRA, *Proposed Re-evaluation Decision PRVD2017-23, Clothianidin and Its Associated End-use Products: Pollinator Re-evaluation* (Dec. 19, 2017) https://bit.ly/2LbpY0b; PMRA, *Proposed Re-evaluation Decision PRVD2017-24, Thiamethoxam and Its Associated End-use Products: Pollinator Re-evaluation* (Dec. 19, 2018), https://bit.ly/2wNo5DK.
[11] *See, e.g.*, EPA, *Preliminary Terrestrial Risk Assessment to Support the Registration Review of Imidacloprid*, 8-9 (Nov. 28, 2017), https://bit.ly/2s7spLK; EPA, *Preliminary Bee Risk Assessment to Support the Registration Review of Clothianidin and Thiamethoxam*, 14-23 (Jan. 5, 2017), https://bit.ly/2jfMFon; EPA, *Preliminary Aquatic Risk Assessment to Support the Registration Review of Imidacloprid*, 8-9 (Dec. 22, 2016), https://bit.ly/2r3Uuyy.
[12] *See* Lennard Pisa et al., *An Update of the Worldwide Integrated Assessment (WIA) on Systemic Insecticides. Part 2: Impacts on Organisms and Ecosystems*, Envtl. Sci. Pollution Research Int'l (Nov. 9, 2017), https://bit.ly/2HqqHwB; Thomas James Wood and Dave Goulson, *The Environmental Risks of Neonicotinoid Pesticides: A Review of the Evidence Post 2013*, 24 Environ. Sci. Pollution Research Int. 21, 17285-17325 (2017), http://bit.ly/2QxKJ9y.
[13] Ben A. Woodcock et al., *Country-specific Effects of Neonicotinoid Pesticides on Honeybees and Wild Bees*, 356 Science 6345, 1393-1395 (Jun. 30, 2017), https://politi.co/2HrEnDl.
[14] Ben A. Woodcock et al., *Impacts of neonicotinoid use on long-term population changes in wild bees in England*, 7 Nature Communications 12459 (Aug. 16, 2016), https://go.nature.com/2EU6Xho.

Most recently, EPA released its Proposed Interim Registration Review Decisions for neonics, finding that numerous applications of neonics present serious risks to insect pollinators.[15] For instance, EPA found that imidacloprid, the most common neonic used in residential settings, is "very highly toxic to adult honeybees." Further, it found that use of imidacloprid on ornamental plants and turf present risks to entire bee colonies, with evidence of risk from various application methods ranging from "moderate" to "strong."[16]

The hazards neonics pose to pollinators are intuitive. Neonics are extremely toxic to bees[17]—with one neonic-coated corn seed containing enough active ingredient to kill 300,000 honey bees[18] —and can persist in the environment for years after use.[19] Neonics are also "systemic," a relatively new class of insecticides designed to be absorbed into the tissues of target plants, making the plant itself—including its pollen, nectar, and fruit—poisonous to insects. These same properties also make neonics highly water soluble compared to other pesticides,[20] allowing them to move easily in rain or irrigation water through soil (where they can be absorbed by wild plants) and into water supplies. Given neonics' incredible popularity and extensive prophylactic use, they are virtually ubiquitous in large areas of New Jersey soil and water as well as across the country.[21]

In light of the risks and outpouring of scientific evidence, the European Union banned all outdoor uses of the three most commonly use neonics,[22] with Canada's PMRA also recommending similar action.[23] Recently, France went one step further, moving to ban outdoor uses of all five registered neonics.[24] In the U.S., despite its acknowledgment that neonic use present numerous risks, EPA under the Trump administration has proposed taking only minimal action that will fail to mitigate the grave threat neonics pose to pollinators.[25] But Connecticut,

---

[15] *See generally* EPA, Proposed Interim Registration Review Decision for Neonicotinoids, http://bit.ly/31sfv96 (last visited Feb 20, 2020).
[16] *See* EPA, *Proposed Interim Registration Review Decision for Imidacloprid* 24, 26-27 (Jan. 22, 2020), available at http://bit.ly/31B7dfz.
[17] *See* Wood & Goulson, *supra* n. 12.
[18] U.S. EPA, Registration for Imidacloprid (Mar. 10, 1994), http://bit.ly/2XtCnlS (finding LD50 for honey bees = .0039µg/bee); J.K. Pataky et al., *Rates of Seed Treatment Insecticides and Control of Stewart's Wilt in Sweet Corn*, 89 Plant Dis. 3, 262-68, (Mar. 2005), http://bit.ly/2IjO8oU (up to 1.25mg imidacloprid per seed).
[19] Jean-Marc Bonmatin et al., *Environmental Fate and Exposure: Neonicotinoids and Fipronil*, 22 Environ. Sci. Pollut. Res. Int., 35-67 (Aug. 7, 2014), http://bit.ly/2wFlcSN.
[20] *See* Wood & Goulson, *supra* n. 12.
[21] *See, e.g.*, USGS, *Pesticide National Synthesis Project*, https://on.doi.gov/2KvsbFZ (last visited June 5, 2019) (map showing widespread use of neonics).
[22] European Commission, *Protecting Bees: EU Set to Completely Ban Outdoor Use of Pesticides Harmful to Bees* (Apr. 27, 2018), https://bit.ly/2HwtNee.
[23] *See* PMRA, *Proposed Special Review Decision PSRD2018-01, Special Review of Clothianidin Risk to Aquatic Invertebrates* (Aug. 15, 2018), https://bit.ly/2x2MHGk; PMRA, *Proposed Special Review Decision PSRD2018-02, Special Review of Thiamethoxam Risk to Aquatic Invertebrates* (Aug. 15, 2018), https://bit.ly/2wZbYQZ; PMRA, *Proposed Re-evaluation Decision PRVD2016-20, Imidacloprid* (Nov. 23, 2016), https://bit.ly/2Ky4iu4.
[24] Henry Samuel, *France Becomes First Country in Europe to Ban All Five Pesticides Killing Bees*, The Telegraph (Aug. 31, 2018), http://bit.ly/2Kruutw (last visited June 5, 2019).
[25] *See generally* EPA, Proposed Interim Registration Review Decision for Neonicotinoids, http://bit.ly/31sfv96 (last visited Feb 20, 2020).

Maryland, and Vermont have enacted bills that, similar to S1016, restrict neonic use to certified applicators.[26]

Neonics Threaten Aquatic Environments

Neonics' extensive presence in the environment and high insect toxicity also make them a particular threat to aquatic ecosystems. As mentioned, neonics routinely make their way into streams, lakes, and other waters—and often at concentrations that pose risks to aquatic insects, the foundation of water-based ecosystems. A comprehensive review of water testing worldwide found that 81% of surface water studies detected maximum neonic concentrations posing acute risks to aquatic invertebrates, with 74% percent of studies detecting average concentrations posing a chronic risk.[27]

Preliminary testing indicates substantial cause for concern about neonic contamination in New Jersey. In 2016, the U.S. Geological Survey (USGS) conducted sampling in two locations in Bergen County, finding the neonic imidacloprid in nearly 90% of samples.[28] All detections found imidacloprid already above EPA's chronic toxicity benchmarks for aquatic invertebrates.[29] Moreover, DEP recently incorporated neonics into its surface water quality testing, detecting imidacloprid in 41 percent of samples. And imidacloprid levels met or exceeded EPA's chronic toxicity benchmark for aquatic invertebrates in about a third of all samples. This means that neonic use in New Jersey is likely to be impacting aquatic life throughout the state.

Neonic impacts on aquatic invertebrates have ripple effects throughout entire ecosystems. For instance, a study published last year in *Science* found that introduction of imidacloprid into a Japanese fishery caused the collapse of the fishery in about a year.[30] Once farmers in surrounding rice fields began using neonics, populations of zooplankton, an important food source for fish, plummeted. With no prey remaining, the fish that had supported local fishermen for decades vanished. It is possible that water contamination in New Jersey and throughout the country may be having similar indirect effects on fish, amphibians, birds, and other wildlife that rely on invertebrates for food.

Neonics Threaten Birds

---

[26] *See* C.G.S. § 22a-50; MD Code, Agriculture, § 5-2A-02; Vermont General Assembly, H.205(Act 35), http://bit.ly/2EQPruo.

[27] Christy A. Morrissey et al., *Neonicotinoid Contamination of Global Surface Waters and Associated Risk to Aquatic Invertebrates: A Review*, Environment Int'l, 291-303 (Jan. 2015), https://bit.ly/2rwIeIT.

[28] *See* USGS, *Regional Stream Quality Assessment (RSQA)*, https://bit.ly/2Bbfc64 (click on "Download Data"—then select "New Jersey" under the "States" field and "Imidacloprid" under the "Constituents" field and click "Download.")

[29] EPA, *Aquatic Life Benchmarks and Ecological Risk Assessments for Registered Pesticides*, https://bit.ly/2zY0SxV (last visited Mar. 18, 2019).

[30] Masumi Yamamuro et al., *Neonicotinoids Disrupt Aquatic Food Webs and Decrease Fishery Yields*, Science (Nov. 1, 2019), https://bit.ly/34rKCSG.

Scientific research increasingly identifies neonics as a contributor to mass bird losses—such as the 30% decline in North American birds in the last 50 years.[31] Eating just one neonic-treated seed is enough to kill some songbirds, and even low doses can harm birds' immune systems, fertility, and navigation and cause rapid weight loss—reducing birds' chances of surviving in the wild.[32] As neonics kill insect populations, birds also starve. In Europe, for example, declining bird populations were linked to with very low levels of neonics in water and neonics are a suspected cause of the steep declines in French farmland birds. [33]

Emerging Research Suggests Neonics May Harm Human Health

Emerging research raises concerns that chronic exposure to neonics through food and drinking water may also pose a risk to human health. While more research needs to be conducted, recent studies have linked neonic exposure during prenatal development to neurological and developmental problems such as autism spectrum disorder, cognitive impairments, memory loss, finger tremors, and malformations of the brain and heart.[34]

These risks are particularly concerning because of the substantial risk of exposure to neonics in everyday life. Just last year, the Center for Disease Control and Prevention released the results of a survey finding that half of Americans had been recently exposed to neonics. The highest concentrations were found in young children.[35] Neonics are commonly found in food,[36] with a recent nationwide survey detecting neonics in 80% of spinach and 73% of applesauce sampled. [37] Likewise, DEP sampled produce in New Jersey from 2013-15 and found neonics in at least a third of samples.[38] And because neonics permeate plant tissues, they cannot be washed off.

---

[31] *See* Stephen Leahy, *Huge Decline in Songbirds Linked to Common Insecticide*, Nat. Geo. (Sep. 12, 2019), https://on.natgeo.com/2mpTQy1; John Fitzpatrick & Peter Marra, *The Crisis for Birds Is a Crisis for Us All*, New York Times (Sep. 19, 2019), https://nyti.ms/2kTTrnc.

[32] *See* Pierre Mineau & Cynthia Palmer, Am. Bird Conservancy, *The Impact of the Nation's Most Widely Used Insecticides on Birds*, 3 (2013), https://bit.ly/1jmQ7u0; Ana Lopez-Antia et al., *Imidacloprid-Treated Seed Ingestion Has Lethal Effect on Adult Partridges and Reduces Both Breeding Investment and Offspring Immunity*, Envtl. Research (Jan. 2015), https://bit.ly/2kwUdWS; Margaret Eng et al., *A Neonicotinoid Insecticide Reduces Fueling and Delays Migration in Songbirds*, Science (Sep. 13, 2019), https://bit.ly/2kGS1MA; Margaret Eng et al., *Imidacloprid and Chlorpyrifos Insecticides Impair Migratory Ability in a Seed-Eating Songbird*, Scientific Reports (Nov. 9, 2017), https://go.nature.com/2my5OW4.

[33] *See* Caspar A. Hallmann et al., *Declines in Insectivorous Birds Are Associated with High Neonicotinoid Concentrations*, Nature (Jul. 17, 2014), https://go.nature.com/2NUV26w; Jason Bittel, *Second Silent Spring? Bird Declines Linked to Popular Pesticides*, Nat. Geo. (Jul. 9, 2014), https://bit.ly/2HbC4bE; Laurianne Geffroy, *Where Have all the Farmland Birds Gone?*, CNRS News (Mar. 21, 2018), https://bit.ly/2GcNCL4.

[34] Andria Cimino et al., *Effects of Neonicotinoid Pesticide Exposure on Human Health: A Systematic Review*, 125 Envtl. Health Perspectives, 155-162 (2017), https://bit.ly/2NVA1LR (reviewing studies).

[35] Maria Ospina et al, *Exposure to Neonicotinoid Insecticides in the U.S. General Population: Data from the 2015-2016 National Health and Nutrition Examination Survey*, 176 Environ. Res. (Sept. 2019), http://bit.ly/2OP7R34.

[36] *See, e.g.*, Olga Naidenko, *Neonic Pesticides: Banned in Europe, Common on U.S. Produce, Lethal to Bees*, Envt'l Working Group (Jul. 26, 2018), https://bit.ly/2EejbSx.

[37] Friends of the Earth, Toxic Secret: Pesticides Uncovered in Store Brand Cereal, Beans, Produce, http://bit.ly/2IlE26V (last visited May 31, 2019).

[38] N.J. DEP, New Jersey Food Monitoring & Evaluation Program, http://bit.ly/2KfLlQ1 (last visited May 31, 2019).

Drinking water also presents an exposure route of concern, as conventional water treatment methods do not remove most neonics.[39] Neonics have been routinely found in finished drinking water in both Iowa and Ontario, Canada.[40] Worse still, neonics degrade in the environment and can react with chlorine during water treatment to form potentially more toxic substances.[41] Neonic degradates, some of which can be more than 300 times more toxic to humans than the parent compound alone, have also been found in finished drinking water in areas of heavy neonic use.[42] Additional information on neonics' risks to human health is contained in the written testimony of NRDC scientist, Dr. Jennifer Sass, also signed by a collection of leading health experts.

Non-Agricultural Outdoor Neonic Uses Are Harmful and Unnecessary

As detailed in the testimony of Dr. Pierre Mineau, non-agricultural uses of neonics account for the vast majority of their use in New Jersey—with certified applicators reporting nearly 30,000 pounds of neonic use in lawn care in 2016,[43] compared with a total estimated yearly agricultural use of about 10,000 pounds.[44] Further, statistics from certified applicators fail to capture the extensive use of neonics by consumers applying any one of the numerous EPA-approved neonic home and garden products. As these products can allow for neonic applications anywhere from ten to a hundred times higher than the application rate typically approved for agriculture, neonic misuse and overuse by consumers presents considerable ecological concerns.

While neonics in non-agricultural settings are often used prophylactically, without any actual pest pressure, in situations where pests are present, numerous less harmful alternatives to neonics exist—such as neem oil concentrate, diatomaceous earth powder, and beneficial nematodes and insects.[45] Other conventional lawn care products are also available. For example, in 2016, Ortho, the maker of the popular Scott's Miracle Grow line of products, announced they would be phasing out neonics from those products completely by 2021.[46] More information on neonic alternatives is available in the testimony of Dr. Pierre Mineau.

Neonic Restrictions Help Protect New Jersey's Pollinators, Aquatic Environments, and People

S1016 would help protect the pollinators that undergird New Jersey's environment and agricultural economy, as well as its waters and its people, by working to reduce neonic pollution

---

[39] *See, e.g.*, Kathryn L. Klarich et al., *Occurrence of Neonicotinoid Insecticides in Finished Drinking Water and Fate During Drinking Water Treatment*, Envtl. Sci. and Tech. Letters (Apr. 2017), https://bit.ly/2PMRunk; Tamanna Sultana et al., *Neonicotinoid Pesticides in Drinking Water in Agricultural Regions in Southern Ontario, Canada*, Chemosphere 202, 506-13 (July 2018), http://bit.ly/2JZawXI.

[40] *Ibid.*

[41] Kathryn L. Klarich et al., *Chlorinated Byproducts of Neonicotinoids and Their Metabolites: An Unrecognized Human Exposure Potential?*, Envtl. Sci. and Tech. Letters (Jan. 2019), https://bit.ly/2sZnydm.

[42] *Ibid.*

[43] DEP, Pesticide Publications, https://www.nj.gov/dep/enforcement/pcp/pcp-pubs.htm (last visited May 31, 2019) (scroll to Pesticide Use Survey Reports and select Lawn Care > 2016).

[44] Testimony of Dr. Pierre Mineau 2-3.

[45] Strategist Editors, *The Best (Nontoxic) Pesticides and Insecticides, According to Gardeners*, Slate.com (May 28, 2019), https://bit.ly/2Z9GlAx.

[46] *See* Tess Stynes, *Scotts Miracle-Gro to Remove Certain Insecticides from Ortho Products*, Wall Street Journal (Apr. 12, 2016), https://on.wsj.com/2wzIvxl.

in the state. Non-agricultural use constitutes the vast majority of neonics entering New Jersey's environment. Where insecticide use may be warranted, less harmful alternatives are readily available.

NRDC strongly supports S1016 and urges its passage.

Respectfully,

Lucas Rhoads
Natural Resources Defense Council