NRDC

February 28, 2023

Assemblywoman Lesley Cohen, Chair
Natural Resources Committee
Nevada State Assembly
401 S. Carson Street
Carson City, Nevada 89701

RE: Testimony of NRDC in Support of AB162, as Amended

Dear Assemblywoman Cohen and Members of the Assembly Natural Resources Committee:

I write to submit the following testimony on behalf of the Natural Resources Defense Council (NRDC) and our 2,560 members in the state of Nevada in strong support of AB162, a bill to prohibit non-agricultural uses of bee-killing neonicotinoid insecticides, or "neonics."

The science is now unequivocal that neonics are a lead cause of dramatic losses of bees and other pollinators, which cut into farmers' bottom lines and threaten the viability of our food systems and ecosystems. Equally concerning is the profound scope and depth of the threat that neonic pollution poses to the state's broader environment and its people. Scientific evidence links widespread neonic contamination to mass losses of birds and fish, the hollowing out of ecosystems, and birth defects and death in white-tailed deer. Alarmingly, neonics are showing up in people's bodies—including over 95% of pregnant women—with research also linking neonics to neurological and developmental disorders in people, including malformations of the developing heart and brain.

While federal actors have failed to address what many hail as a neonic-driven "Second Silent Spring," this committee has the power to take action. As amended, AB162 would prohibit harmful and unnecessary non-agricultural uses of neonics. We urge the committee to advance the bill at its earliest opportunity, allowing the state to join others—including the European Union, and other states, like New Jersey and Maine, by enacting sensible restrictions on these harmful chemicals. We offer the following testimony in support of this action.

Neonics Are Toxic, Persistent, and All Around

Neonics are neurotoxic pesticides that kill insects by permanently binding to, overstimulating, and ultimately destroying their nerve cells.[1] Insects poisoned with neonics often exhibit twitching, followed by paralysis and then death.[2] There are three factors that make neonics especially problematic for the environment and public health.

First, neonics are extremely toxic to insects and other invertebrates. Just one square foot of lawn treated with a neonic product at EPA-approved rates can contain enough neonic to kill over one million bees.[3] And even at miniscule, non-lethal doses, neonics weaken critical functions, such as an insect's immune system, navigational ability, stamina, memory, and fertility—making it

harder or impossible for them to survive.[4] Recent research has shown that a single exposure to a neonic can reduce population growth rates for multiple generations.[5]

Second, neonics are exceptionally good at contaminating the entire environment. Unlike older, conventional insecticides, neonics designed to be "systemic," meaning they are absorbed by plant tissues in order to make the plant itself—including its nectar, pollen, and fruit—toxic. But much of the pesticides remain in the soil, where they are easily carried considerable distances by rain or irrigation water to contaminate new soil, the plants in that soil (as they absorb the chemicals and also become toxic), and water supplies.[6]

Third, neonics are the most widely used insecticides in the United States. The chemicals are approved for use on over a hundred crops, but are also very common in lawn, garden, and other turf and ornamental applications. The five major neonic chemicals approved for outdoor use—acetamiprid, clothianidin, dinotefuran, imidacloprid, and thiamethoxam—appear in more than a thousand products.

Because neonics build up in areas of year-after-year use[7] and spread out with each rainfall or watering, their extensive and continual use means that there are large portions of the country where neonic contamination of soil, water, and plant life is virtually ubiquitous.

Neonics Drive Pollinator Losses, Threatening Farmers' Bottom Lines and Food Security

Pollinators are critical to agricultural production. Yet, since the mid-2000s—when annual losses of honey bee colonies skyrocketed nationwide—Nevada beekeepers have lost up to 65% of their honey bee colonies annually.[8] While total bee colony levels remain steady due to the considerable, expensive, and potentially unsustainable efforts of beekeepers to breed and replace lost colonies, the same is not true for disappearing populations of the state's 1000+ wild bee species and other pollinators.

Among all the stressors affecting bees, only the dramatic uptick in the use of neonicotinoid pesticides in the mid-2000s matches the dramatic uptick in bee losses witnessed at precisely that time.[9] Since that time, a large and growing body of research confirms neonics are a leading cause of bee and other pollinator declines, including several comprehensive global literature reviews[10] and the largest neonic field study to date—actually funded by the pesticide industry itself.[11] In 2020, Cornell University published its own review of over 1,100 studies finding substantial harms from a broad variety of neonic uses, including non-agricultural turf and ornamental uses.[12]

Other research identifies how these neonic-driven bee losses are already harming farmers. A recent study estimates that inadequate pollinator populations are reducing production of fruits, vegetables, and nuts by 3-5% worldwide. Reduced production of these health foods is, in turn, leading to an estimated 427,000 additional preventable deaths annually.[13] And these deaths are disproportionately in wealthier countries like the United States, where reduced access to healthy foods is more likely to shift people's diets to cheaper, unhealthy alternatives.

Similarly, a major 2020 pollination study shows that many top fruit crops are "pollinator limited" across the nation, meaning that a lack of bees (including wild bees) and other pollinators is

currently lowering crop yields.[14] Aside from the immediate economic impacts to farmers, Dr. Winfree—a leading pollinator researcher and one of the study's authors—spoke about the long-term implications of the study's findings for food security:

> Honeybee colonies are weaker than they used to be and wild bees are declining, probably by a lot. . . . Even if honeybees were healthy, it's risky to rely so much on a single bee species. It's predictable that parasites will target the one species we have in these monocultural crop fields.
>
> The trends we are seeing now are setting us up for food security problems. . . . We aren't yet in a complete crisis now but the trends aren't going in the right direction. Our study shows this isn't a problem for 10 or 20 years from now – it's happening right now.[15]

Accordingly, the current impact to farmers' bottom lines and the cost and availability of fresh, healthy foods—both of which likely disproportionately harm already vulnerable and disadvantaged communities—will likely worsen given current trends.

Beyond pollination, neonics harm other beneficial insects essential for farming—such as nematodes,[16] earthworms,[17] and pest predators[18]—and can disrupt other key components of soil health. Pest predators are especially at risk from eating contaminated insects, as the harmful neonic levels can remain in insect prey,[19] leading to decreased yields as the beneficial predator populations die out.[20] Research also shows that neonics may harm soil health directly by changing the composition of soil microbial communities—harming beneficial bacteria crucial for plant growth and health and soil fertility and quality.[21]

Neonics Drive Losses of Birds and Other Pollinators and Hollow Out Ecosystems

Like bees, populations of other beneficial insects across the globe have rapidly declined in the time since neonics were first introduced—a trend sometimes likened to an "insect apocalypse"—and new research is increasingly identifying neonics as a leading cause.[22] For example, recent studies have connected neonic use with significant declines in butterflies,[23] as well as harms to monarch butterflies,[24] which can encounter harmful or deadly levels of neonics in farm fields or nearby wild plants that can absorb neonics and stay toxic for years. Contaminated soil itself may also pose a hazard to populations of ground-dwelling insects and organisms.[25]

As losses of insects multiply, insect-eating animals suffer too. Birds appear particularly vulnerable—96% of land-based birds feed insects to their young, with many species also relying on insect food sources as adults.[26] In North America, 30% of birds have disappeared in the past fifty years,[27] with research linking neonics to large losses in bird biodiversity, including annual losses of up to 12% in grassland species and 5% in insect-eating species.[28] Likewise in Europe, Dutch researchers have linked declining populations of insect-eating birds to the introduction of neonics—even in areas with exceptionally low neonic levels (20 parts per *trillion* in water)[29]—and the pesticides are also believed to play a key role in declines of French farmland birds.[30]

Neonics harm birds directly, too. Eating just one neonic-treated crop seed is enough to kill some songbirds.[31] And at nonlethal doses, neonics can damage birds' immune and reproductive systems, cause rapid weight loss, and impair navigation and migration ability—all reducing the

likelihood of their surviving and reproducing in the wild.[32] With hundreds of millions of acres of U.S. farmland sown with neonic-treated seeds every year, birds are broadly at risk—particularly when, as commonly occurs, piles of seed are left out in the open or planted shallowly enough for birds to eat.[33]

Neonics are also devastating for aquatic ecosystems because they are highly toxic to aquatic invertebrates that fish and other species rely on for food. One study in Japan found that the introduction of imidacloprid—a neonic commonly used on lawns and gardens—to the area surrounding a longstanding fishery caused the collapse of that fishery in just one year.[34] Researchers found that after neonics contaminated the water, plankton populations plummeted, along with the valuable fish species that fed on that plankton.

Similar effects may be felt across America. Surveys by the U.S. Geological Survey have detected neonics in a about half of stream samples nationwide,[35] and state sampling often detects neonics even more frequently.[36]

Neonics Threaten Nevadans' Health, Especially Children

Neonicotinoids are chemically similar to nicotine, attacking nerve sites that insects and humans share, and which play a central role in the operations of our brain and nervous systems.[37] More specifically, critical parts of the brain are populated with nerve cells containing the particular nicotinic acetylcholine (nACh) receptor area targeted by neonics (the α4β2 subunit of the receptor), including: the cortex (responsible for planning, judgment, creativity, inhibition, attention, memory, language); the thalamus (emotion, memory); and the cerebellum (posture, balance, coordination, speech).[38]

Health experts have long been concerned about the impact of nicotine-like substances on the developing brain—a reason physicians warn pregnant women to avoid nicotine.[39] Perhaps unsurprisingly, then, a growing body of research now links neonic exposures to elevated risk of developmental or neurological damage in humans, particularly in infants and young children.[40] These include malformations of the developing heart and brain, autism-like symptoms, and a cluster of symptoms including memory loss and tremors.[41] Rodent studies show an even broader range of risks with implications for human health, including: multiple birth defects and increased rates of death for the fawns of white-tailed deer fed "field realistic" (i.e., "real world") levels of neonics in water;[42] reduced thyroid functioning in deer;[43] and in toxicology experiments with pregnant rats exposed to neonics resulted in offspring with statistically significant deficits such as thinner brain cortexes and other brain abnormalities, altered behavioral reflexes, and decreased sperm and testosterone levels.[44]

These data likely raise concerns for all Nevadans. In 2019, the CDC published the updated results from data collected from 2015-16 from its national biomonitoring program, which measures pesticides in the urine of thousands of Americans age three and older.[45] The update was the first to include neonics, and the results show that roughly half of the U.S. general population is exposed to neonics on a regular basis, with children having higher levels than adults.[46]

More recent data suggests neonics exposures have gotten considerably worse in recent years. A 2022 multistate study of 171 pregnant women found that over 95% of these women had traces of neonics in their bodies.[47] Detection levels generally exceeded previous CDC findings and, alarmingly, detection also steadily increased over the course of the four-year study period (2017-2020)—both in frequency and in magnitude–with the highest levels in Hispanic women.

Recent research shows that pregnant women exposed to neonics will pass the pesticides to the fetus through the placental circulation, along with oxygen and critical nutrients, and then to all the fetal tissues including the developing brain and nervous system.[48] Previously, Japanese researchers had identified neonics in the urine of newborn babies, further supporting the idea that neonics pass from a pregnant mother to her developing fetus.[49]

People are commonly exposed to neonics through food and water.[50] Conventional chlorination alone, without carbon filtration treatment, generally fails to remove neonics from drinking water.[51] More concerning still, neonics break down in water, forming chemicals that can be several hundred times more toxic to people than the original neonic chemical, which then may be made more toxic still through the chlorination process.[52]

Emerging research links neonic exposures to elevated risk of developmental and neurological damage in humans, particularly in infants and young children.

Nevada's Legislature Must Act to Protect Nevada's People and Pollinators

The European Union has already banned outdoor use of three major neonic chemicals, while France has banned all five. The U.S. EPA, however, has proposed permitting continued widespread use.[53] Therefore, it's up to the states to take action. Just last year, New Jersey and Maine became the first states to prohibit most non-agricultural uses of neonics.[54] The California legislature passed a similar bill last year, and legislatures in New York, Minnesota, Connecticut, and other states are currently considering similar restrictions. With more damage done every day and no help in sight, Nevada's legislature must act.

AB162 Targets High-Risk, Low Benefit Uses of Neonics

This bill, as amended, would prohibit outdoor, non-agricultural uses of neonics that pose significant risks to pollinators and contribute to neonic contamination in urban and suburban areas where people live, work, and play. Non-agricultural uses, like those on lawns and gardens, are frequently approved at rates that far exceed those in agriculture, meaning these areas are intensely contaminated. In its 2020 human health risk assessment, EPA found that certain lawn uses of neonics especially pose risks to children.

These non-agricultural neonic uses are also unnecessary. Because of neonics' systemic mode of action, they are nearly always applied preventatively before there is any evidence of a pest problem. As a result, neonics are often used where no insecticide is needed. But even where pest

control is desirable, there are numerous organic and minimum risk products available to control pests, as well as cultural practices that effectively reduce pest populations.

In sum, AB 162 is a carefully tailored bill that prohibits neonic uses that are both harmful and unnecessary—a win-win for pollinators, pollinator-dependent farmers, and all Nevadans that value clean water and a healthy environment. **For these reasons, NRDC strongly supports this bill.**

Respectfully,

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Natural Resources Defense Council

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