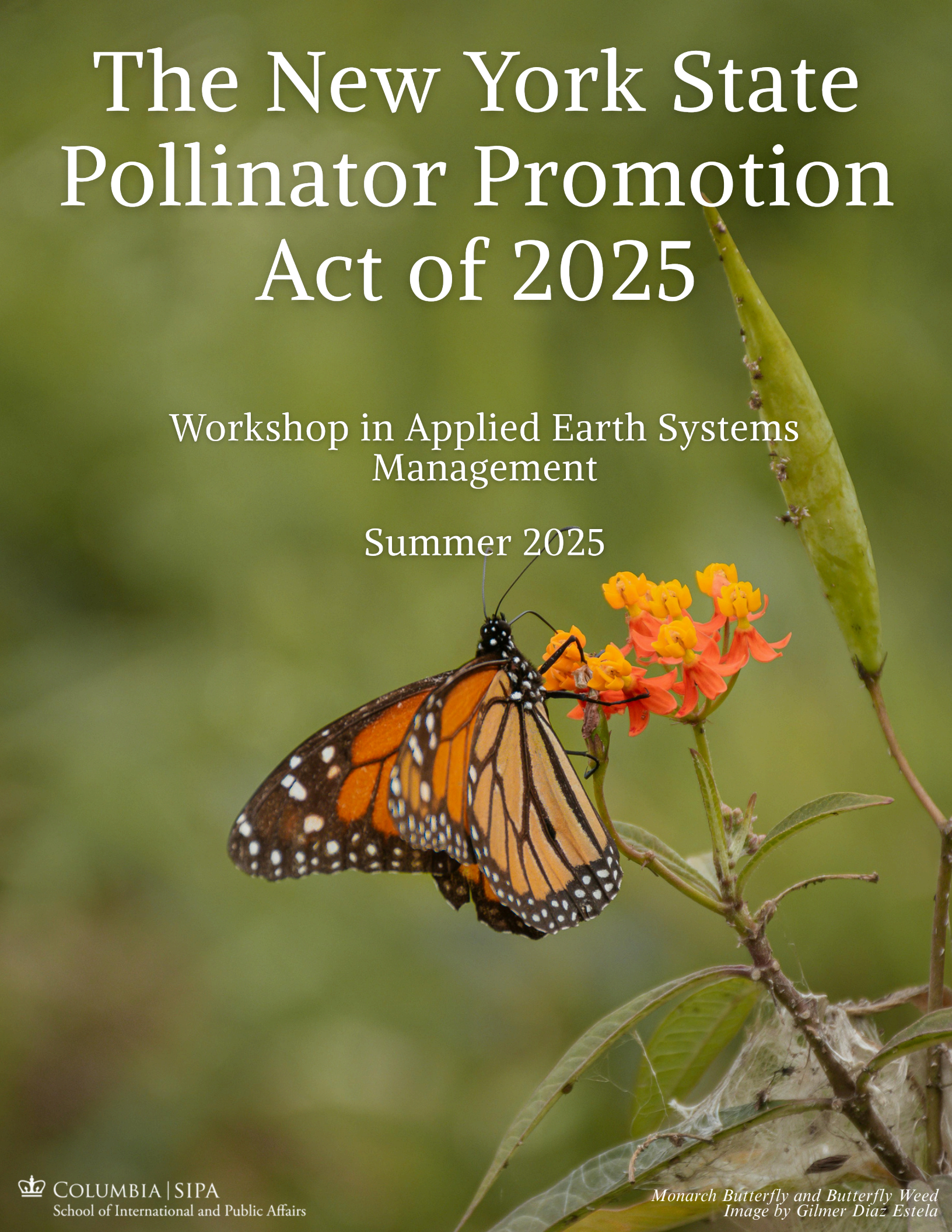
The New York State Pollinator Promotion Act of 2025

Workshop in Applied Earth Systems Management

Summer 2025



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Monarch Butterfly and Butterfly Weed
Image by Gilmer Diaz Estela

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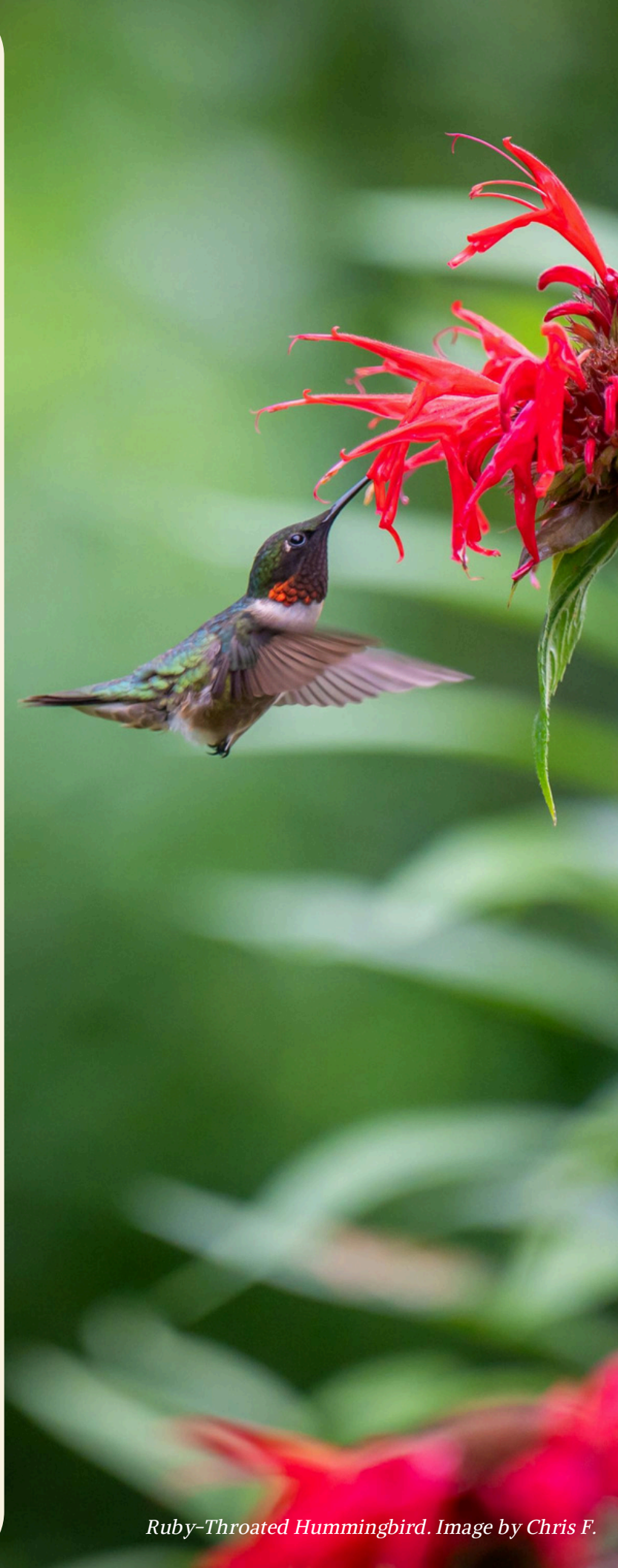

Ruby-Throated Hummingbird. Image by Chris F.

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Bumblebee. Image by Roman Odintsov

Executive Summary

Insect pollinator populations are experiencing steep declines due to habitat loss, climate change, and pesticide use. The decline of insect pollinators worldwide is a critical issue for ecosystems and the economy, with the global economic benefit of pollination valued at over $235 billion. In New York State (NYS), as many as 60% of insect pollinator species are declining. As a result, NYS legislature introduced the New York State Pollinator Promotion Act (NYSPPA) to reduce insect pollinator decline and protect the health of native pollinators across the region.

The NYSPPA adjusts three state laws to better incorporate pollinator health into NYS law. In its amendments to the New York State Environmental Conservation Law, the NYSPPA focuses on pollinator-friendly land management on state owned lands. First, pollinators are added to the mission of the Department of Environmental Conservation (DEC), and the DEC is encouraged to promote pollinator habitats and educate the public on their importance. On state-owned lands, the DEC, in partnership with other state organizations, are encouraged to increase the use of native plants, modify mowing schedules, and reduce pesticide use. It also makes municipal pollinator protection projects eligible for state funding under the Climate Smart Communities grant program.

Next, the bill amends the Education Law by introducing comprehensive pollinator curricula into state schools. The Department of Education and the DEC are empowered to make guidelines for pollinator-friendly landscaping on the grounds of New York public schools; this includes increased native plants and less pesticides. Additionally, this section of the bill directs the State University of New York system to create a committee on each campus to advise pollinator-friendly practices on grounds, to manage campuses for pollinator health, and to offer related educational opportunities to students and community members.

Finally, the NYSPPA amends the Highway Law to expand the area on highways that is managed for pollinator health. Currently, highway medians in NYS are maintained with consideration for pollinator health. This includes a focus on pollinator-friendly plants and reduced mowing. The NYSPPA adds highway verges (the soft, vegetated surfaces that border roads) into this method of practice as well. This aspect of the bill encourages the DEC and the Department of Transportation to work in tandem to develop roadside maintenance that prioritizes both human and pollinator health.

The NYSPPA uses a multi-pronged approach to protect vital pollinators throughout the state through a coordination of departmental efforts. Here, the bill is analyzed by the three affected bills individually. For each, we evaluate the ecological problems and their solutions proposed by the Pollinator Promotion Act, controversies the bill may face with these proposed solutions, and how success can be measured.

1.0 Introduction

Cercropia Moth. Image by Marvin Smith

Pollinators are defined as any animal that transfers pollen between plants, enabling fertilization and the production of fruits (USDA, n.d.). According to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services report on *Pollinators, Pollination, and Food Production*, 90% of all flowering plants rely on animal pollination to reproduce (IPBES, 2016). Thus, insect pollinators are essential both to the functioning of ecosystems worldwide and the global economy through their contributions to agricultural production. In fact, pollinators provide $335 million worth of critical ecosystem services for New York; approximately 17% of NYS crop production rely on pollinators (NYS DAM, n.d.). All in all, insect pollinators are among the many types of species in decline, with their populations, and the plants that rely on them, declining at alarming rates, largely from anthropogenic causes (Nath et al., 2022).

There's been a global decline in pollinator abundance of around 25% between 1990 and 2015 according to a conservative estimate focused primarily on commonly-studied bees (Zattaro and Aizen, 2021). In North America, similar estimates of around 23% of pollinating species have an elevated risk of extinction. Certain species, such as the Blue Orchard Bee (*Osmia lignaria*) in NYS, show population decline upwards of 15% per year over a 15 year period (Cornelisse et al., 2025; LeCroy et al., 2020). Within NYS, the rate of pollinator decline is unclear; the absence of consistent population sampling as well as a narrow set of species with sufficient data limits in-depth analysis of pollinator trends (a critical component of understanding the efficacy of the bill). Moreover, the Empire State Native Pollinator Survey, a four-year study completed in 2022, found that at least 38% – and as many as 60% – of the state's pollinators evaluated are rare or declining (White et al., 2022).

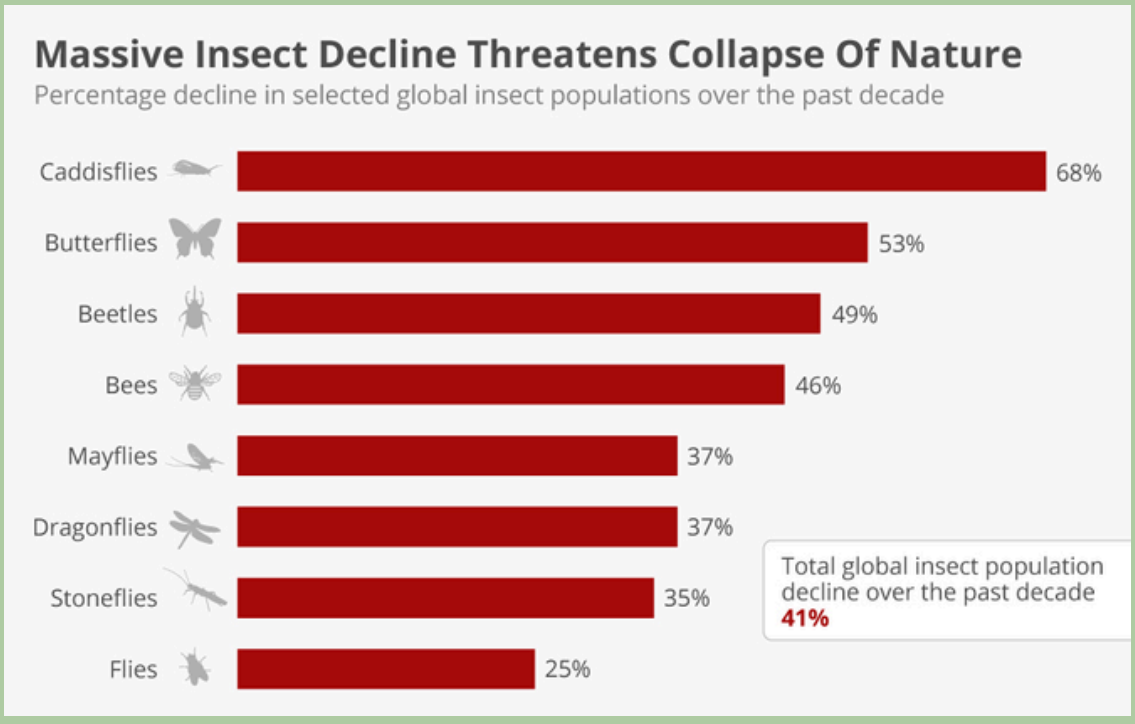


Figure 1: Rates of decline of global insect populations, (McCarthy., 2019; data from Sanchez-Bayo and Wyckhuys 2019).

The study includes species of various levels of risk as well as species that had been historically observed but not present in the survey, raising additional concerns of unknown extirpation events in the state. There are several key drivers of pollinator decline in New York: habitat loss, the conversion of landscapes for agriculture, housing, transportation, industry, and other infrastructure, has destroyed or degraded millions of acres of native vegetation that sustains pollinators in the wild. The largest component of habitat loss is agriculture, with land conversion for farming and grazing taking up approximately 21.6% of state land (NY Comptroller, 2024). While farmland has been on the decline in the past decades (decreased by 14% between 2010 and 2022) the threats to pollinators have remained: farmland and grazing fields take up large portions of former habitats for native pollinators, often replanted with one crop at a time (monocropping) which limits which pollinators can survive on or around these farms (Fijen et al., 2025). Additionally, while urban infrastructure only makes up 5% of land nationally, it represents 10% of New York's land and is expected to expand up to 18.5% by 2050 (Nowak and Greenfield, 2009). Finally, pesticide usage in both agricultural, residential, and public spaces can keep undesirable plants and pests away from farmland or urban greenspaces, but will hurt pollinators and other insects in the process (Paoli & Giurfa, 2024). Pesticide usage has been on the decline over the last decades, but as more compounds are phased out or banned entirely, new pesticides take their place, often ignoring the health impacts on pollinating species (Schulz et al., 2021).

Together, these threats to pollinators make up a substantial portion of historic pollinator decline, and adapting our land management and education policies to account for pollinator needs is a critical first step towards supporting their well-being in NYS.

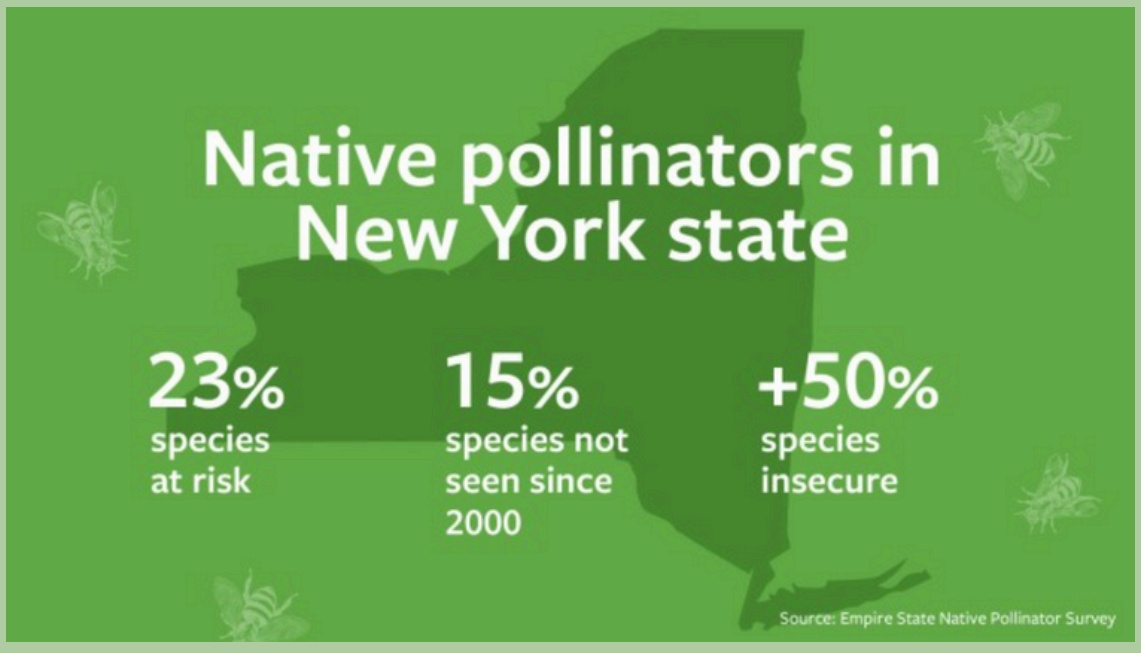


Figure 2: Selected results from the Empire State Pollinator Survey, a study conducted by Cornell University to evaluate pollinators in New York State (White et al., 2022).

2.0 The NYS Pollinator Promotion Act

Apple Tree Branch. Image by Laura Farber

The **New York State Pollinator Promotion Act, hereafter NYSPPA,** was originally introduced in June 2023 by Senator Rachel May as Senate Bill S7582A, but did not pass in the legislative session. The current version for the 2025-2026 legislative term was introduced again by Senator Rachel May and applies the framework of the original bill. The NYSPPA makes specific amendments to the existing **Environmental Conservation Law (ECL)**, **Education Law (EL)**, and **Highway Law (HL)**. An updated Bill S2162 was referred to the Environmental Conservation Committee on January 15, 2025, and a companion bill, A6618, was introduced by assembly woman Anna Kelles, in the NYS Assembly on March 6th. The bill was referred to the NYS Assembly's Environmental Conservation Committee and is currently awaiting action. The amendments within the NYSPPA are to be effective 90 days after the bill is enacted.

The NYSPPA establishes pollinator-friendly habitats within public lands within the NYS with a goal to create and maintain pollinator-friendly lands and management practices that also integrate educational opportunities. It requires the addition of signage to public lands, changes in mowing practices, and a switch to non-chemical pest management methods where feasible. The bill also calls for the creation of bodies of management within each State University of New York (SUNY) campus that will hold responsibility for pollinator habitats on campus and encourages long-term projects centered around the management of these habitats.

The third and final initiative clarifies the addition of **verges**, grassy strips of land in between the roadway and adjacent lands, to existing policy that incorporates native plant species and other pollinator friendly management practices on traffic **medians**. The following report discusses the actions in each of the three sets of amendments, along with an analysis of the relevant science, discussion of controversies, and consideration of metrics to evaluate the success of the NYSPPA's proposed solutions.

3.0 The Environmental Conservation Law

Wild Hyacinth. Image by HVNY

The first section of amendments adds to New York's **Environmental Conservation Law (ECL)**, Chapter 43-B of the Consolidated Laws of New York. Two additions to Section 3-0301 specify dedication to habitat protection and increasing public awareness for pollinators. Habitat protection and increasing public awareness for pollinators would be accomplished through the incorporation of **pollinator-friendly landscaping** in all state-owned lands. The original subsection addresses the control of pests and regulates the use of pesticides and other chemicals. The amendment in the NYSPPA mandates the consideration of pollinators in land management, calling for increased use of native plants, cutting back on the use of chemical pesticides and frequent mowing, and placing educational signage that highlights the importance of pollinator-friendly areas. Under these amendments, all lands owned and maintained by the state would be managed with pollinator-friendly landscaping, with a exception for lands where these practices are deemed impractical by the department.

The NYSPPA further amends Section 54-1523 of the ECL, outlining what municipal "climate action and mitigation" projects qualify for state funding. The proposed amendment allows **climate-resilient landscaping projects** focused on green spaces, native species, and pollinators to apply for this funding. Currently, the grant can only be used for projects related to marsh migration, wetlands, flood risks, and greenhouse gas emissions. The proposed amendment expands the grant to pertain to "climate resilient landscaping and land maintenance" for the overall benefit of pollinators.

3.1 Solutions within the Conservation Law

Under the ECL amendments, the NYSPPA adds pollinators to the mission of the NYS Department of Environmental Conservation (DEC), and emphasizes the need for the agency to promote pollinator habitats, protect pollinator species, and raise public awareness about pollinators. Additionally, the NYSPPA encourages **pollinator-friendly land management** on state-owned lands by increasing the use of native plants and reducing pesticide use. By making pollinators a priority focus within the DEC, the DEC are required to consider pollinator health throughout their operations moving forward.

The pollinator-friendly land management section of the bill directs managers of state owned-lands, such as parks, forests, primitive areas, golf courses, and other lands to incorporate pollinator-friendly landscaping unless otherwise deemed impractical, incompatible, or illegal. The NYSPPA urges managers of state lands to incorporate native plant species into existing or new green spaces. Beyond the cultural significance and aesthetic appeal of planting New York native plants on state-managed land, native flora offer ecological benefits to local pollinators.

3.1.1 Native Plants

The NYSPPA amendments to the ECL encourage the implementation of native plants and creation of guidelines and land management plans to facilitate their usage.

Native plants provide critical resources for pollinators, but many land management practices result in non-native plants and invasive species dominating landscapes. Many native pollinator and plant species have undergone a process of **coevolution**: both pollinator morphology, behavior and flower shapes changed over time to make nectar extraction and pollen attachment more efficient, boosting pollination rates (Gashler, 2011). As a result, native pollinators may not be as attracted to non-native plants, and these non-native plants may not provide the required resources native pollinators need to survive. Native plants are traditionally well-suited to NYS climate, seasonality, and soils contrast to non-native plants which lack these benefits (National Parks Service, n.d.). Furthermore, landscaping with natives reduces costs for maintenance and care, including fertilizer, watering, and weeding (Mody et al., 2020). Native flora support not only pollinators, but all native species in New York, supporting the biodiversity and overall ecosystem resilience of the region (Norton et al., 2019).

Non-native plants compete with native species for sunlight, water, nutrients, and space. Invasive species, such as Japanese Knotweed (*Reynoutria japonica*) and Giant Hogweed (*Heracleum mantegazzianum*), take advantage of native conditions to out-compete native plants. Direct management of invasive species, such as physical removal or herbicide spraying, is required to protect native flora. Without intervention, there can be dramatic changes in vegetation coverage and species composition of plants, requiring increased funding and resources.

Figure 3: Native pollinators can use native habitats to nest and feed, such as pithy-stemmed plants (A), logs (B,C), patches of undisturbed soil (D), and leaf litter (E,F). Image from the Xerces Society.

Despite the benefits of native species over non-native and invasive species, humans often prefer non-natives. Due to familiarity, intentionally planted non-natives are often viewed as more aesthetically pleasing. Non-natives such as tulips, daisies, and poppies are often the default for plantings in parks and gardens (Lampinen et al., 2021). The ability of native species to attract pollinators is frequently viewed as a limitation for landscape planning, rather than a benefit. Community pushback is likely if children are getting stung by bees or if insects are crawling on picnic blankets.

If native plants are utilized on state-owned lands rather than non-natives, native flora can vastly improve pollinator resources. Thus, supporting native plants, particularly pollen-producing species, provide required habitats and resources for insect pollinators within the state and thereby increase insect pollinator population.

3.1.2 Pesticides

The amendments to the ECL encourage decreased use of pesticides as an aspect of pollinator-friendly land management.

The widespread application of pesticides poses a serious threat to the destruction of pollinator populations by impacting pollinator health as well as their habitats. **Pesticides** are commonly used in agricultural, commercial, and residential landscapes to control **pests**, such as aphids and mites, that damage crops and ornamental plants (Guzman et al., 2024). As pesticide use continues on crops and flora that native pollinators depend on, these species are increasingly at risk of continued population decline.

According to the Food and Agriculture Organization of the Untied Nations, pesticides are among the top three global drivers of pollinator decline, alongside habitat loss and intensive agriculture (FAO, 2022). Insect pollinators interact with pesticides in various ways: pollinators may have direct contact with pesticides during spraying, or pesticide residue may be on plants that pollinators visit. Pollen and nectar that pollinators collect may be contaminated with pesticides, or the nesting material pollinators use may be tainted (Xerces Society for Invertebrate Conservation, n.d.). Application methods of pesticides—whether aerial, vehicle-based, or manual—often lead to immediate exposure to pollinators (FAO, 2022; Chmiel et al., 2020).

Systemic pesticides are absorbed within a plant posing a long-term threat to pollinators as the pesticide persist in pollen and nectar throughout the plant's life cycle (Guzman et al., 2024). Additionally, **pesticide drift** contaminates nearby soil, water, and vegetation, expanding the impact of pesticides beyond the target area (Chmiel et al., 2020).

Pesticides result in both lethal and sublethal effects on insect pollinators through exposure of chemical species such as carbamates, organophosphates, synthetic pyrethroids, chlorinated cyclodienes, and neonicotinoids (Beyond Pesticides, n.d.). Furthermore, chemical exposure impair foraging, navigation, and reproduction of insect pollinators (Beyond Pesticides, n.d.; FAO, 2022). Commercially available pesticides have damaging but nonlethal effects on insect pollinators including behavioral impairment. For example, repeated exposure of the common insecticide, imidacloprid on solitary bees across multiple stages of development led to a fourfold reduction in bee reproduction (Stuligross & Williams 2021). These effects are not isolated to insects immediately after direct contact with pesticides. Carryover effects of previous exposure reduces reproduction rates by an additional 20% in exposed individuals, lasting for multiple generations (Stuligross & Williams, 2021). Furthermore, insect pollinator larvae exposed to moderate levels of certain pesticides develop into smaller adults with deformities due to mutation (Dorneles et al., 2021). For example, stingless bee larvae exposed to organophosphorus pesticides led to 28% of emerging adults showing a reduction in wing size, reducing their ability to fly. Thus, the bees were vulnerable to predation and limited their ability to provide pollination services. In 2002, certified commercial applicators and technicians in NYS applied 16 million pounds of solid pesticides and 2.4 million gallons of liquid pesticides. By 2021, those figures had over

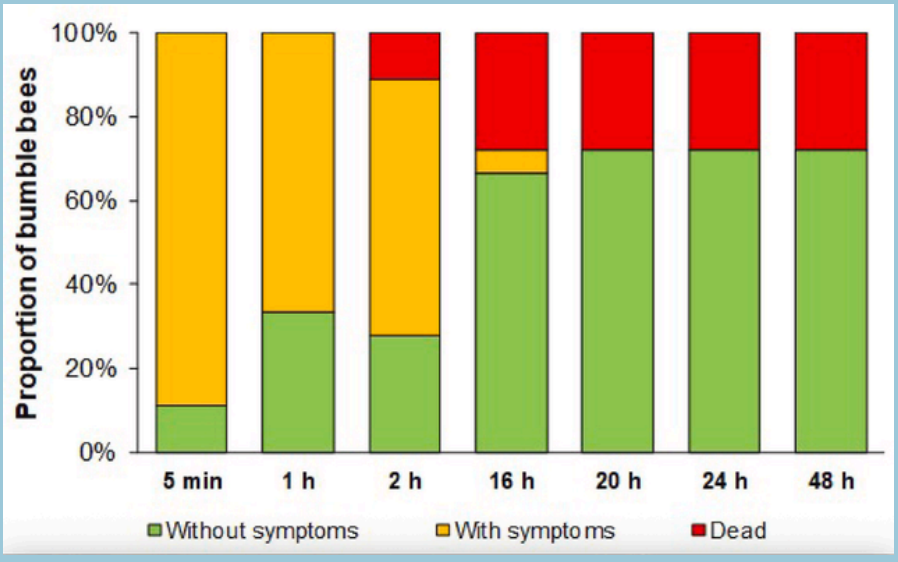


Figure 4: A study on the effects of pesticides on non-target insects found insecticides used for controlling cotton mealybug pose a threat to non-target bumble bees. Researchers observed five minutes after exposure, 88.89% of the bumble bees presented neurotoxic symptoms. And 31.25% of the symptomatic bumble bees died within 20 hours of exposure (Theodoropoulou et al., 2024).

31 million pounds of solid pesticides and 4.4 million gallons of liquid pesticides. Thus, the following outcome represents an average annual increase of 3.56% for solid pesticides and 3.21% for liquid pesticides (New York State Department of Environmental Conservation, 2023).

The NYSPPA encourages the managers of New York's state-owned lands to reduce or replace chemical pesticides with **non-chemical integrated pest management strategies**. Reducing pesticide use on state-managed lands decreases mortality among foraging insects, supports higher reproduction rates, and fewer deformities during metamorphosis compared to populations chronically exposed to synthetic pesticides. Reducing pesticide use on the 11.1 million acres of land owned and managed by the State of New York, approximately 36% of the state's total land area, could have a substantial positive impact on native pollinators (Natural Resources Council of Maine, n.d.). Beyond ecological gains, such as improved biodiversity and population growth to pollinator insects, there may also be significant economic benefits. Although the savings of statewide cost are complex to quantify due to varying agency practices, in 2023, New York City (NYC) agencies applied 1,472 gallons and 58,984 lbs. of insecticides, costing about $217,000 (Division of Environmental Health, 2024, See Appendix). Moreover, NYC accounts for 0.55% of NYS total land area (US Census Bureau, 2023). Therefore, because there is significantly more land under NYS jurisdiction, reduced pesticide usage statewide could result in meaningful cost reductions while simultaneously advancing pollinator health and ecosystem integrity.

Figure 5: Pesticides being applied in a Monroe County park. Image from (Orr, 2016).

3.1.3 Mowing Practices

NYSPPA amendments to the ECL encourages reduced mowing on **state-managed lands**. State land managers often mow lawns and fields numerous times per year, especially in peak growing season, to maintain an appearance of cleanliness, allow area for recreational play, and reduce tick-borne disease (Lampinen et al., 2021). However, reducing the number of flowering plants that can fully grow and bloom each season leads to severely reduced pollen and nectar available to pollinators (Smithsonian Gardens, n.d.).

The ECL mandates that agencies "modify and reduce mowing operations" on all properties owned by the State. The NYSPPA has similar mowing restrictions for state-owned highways, which will be discussed later in the report (see page 22).

3.2 Controversies within the Conservation Law

Despite the potential benefits, there are a number of challenges that may arise with the altered land management on state-owned lands. **Plant palette** is important to consider when utilizing plants for specific purposes. When choosing vegetation to help with erosion control, plants vary in their ability to secure soil through differences in root depth, density, and structure, as well as their height relative to water levels (Espeland and Kettenring, 2018). Considering what proportion of a landscape needs to be made up of native plants is also important; it is recommended that 50% to 70% of gardens consist of native vegetation to properly provide multi-season resources for pollinators (Phillips, 2024). Thus, an almost complete overhaul of gardens and lawns in some parks would be required if the “native plant campaign” were to be most effective. There are challenges to sustain native populations year-round, especially due to changing climate conditions and the limited budget many state-owned lands operate under (Phillips, 2024). Additionally, reducing mowing and pesticide use poses the risk of facilitating invasive species spread, requiring further management effort and resources. These factors raise concerns about the increased workload, higher costs of changing management practices, and the extended timeline before the benefits of such changes are realized. Moreover, NYSPPA’s approach to native landscaping does not set benchmarks for coverage, site selection, or maintenance (Phillips, 2024).

Without these parameters, agencies may opt for minimal plantings and creating isolated patches that provide minimal pollinator habitat (Audubon, 2024).

The provisions on pesticide use are limited in scope; While the NYSPPA encourages non-chemical pest management on state lands, it does not address **agricultural pesticide use**, the largest source of pollinator exposure (FAO, 2022; Guzman et al., 2024), or set reduction targets, monitoring, and enforcement mechanisms. **Agricultural pesticides**, including systemic types that contaminate pollen and nectar, remain outside the bill's reach, thus major exposure pathways are unaddressed (Grozinger et al., 2022). The NYSPPA overlooks **ingredient transparency**; many commercial pesticide formulations contain undisclosed "inert" ingredients that harm pollinators at low concentrations (Cox and Surgan, 2006). These omissions weaken the bill's ability to mitigate one of the main drivers of pollinator decline as well as risk continued conflict with farming stakeholders and pesticide industry groups (Bass et al., 2024).

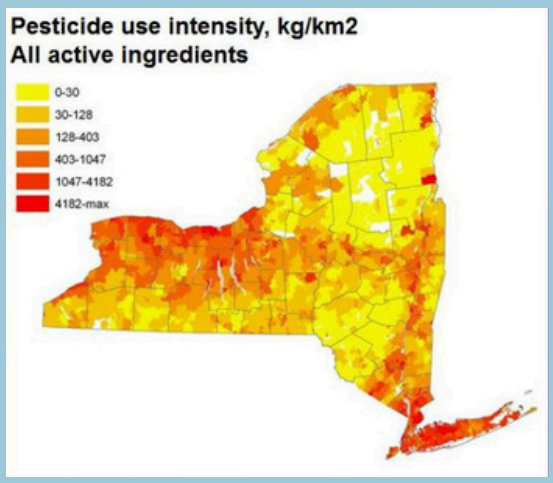


Figure 6: Map depicting pesticide use in NYS (Cornell University, 2025).

3.3 Measuring the Conservation Law's Success

Measuring the true efficacy of the NYSPPA requires outcome metrics and thresholds such as native cover percentage, pollinator richness, and pesticide load. Measurements must account for uncertainty in the data and report changes compared to a baseline, not simply raw totals. To understand the effectiveness of the NYSPPA, analysts must have a set of metrics that can be used to understand the bill's impact after implementation.

Measuring native plant coverage on state-owned lands requires cooperation from staff who work on these lands. An increase in native plants could be measured by taking surveys of land and measuring the percentage of native plant cover, native habitat connectivity and invasive plant cover. However, surveying and measuring requires staff training to ensure data is being collected accurately and consistently. Currently, the data collection through surveying and measuring plant cover and have not occurred because this method is too expensive and laborious to conduct.

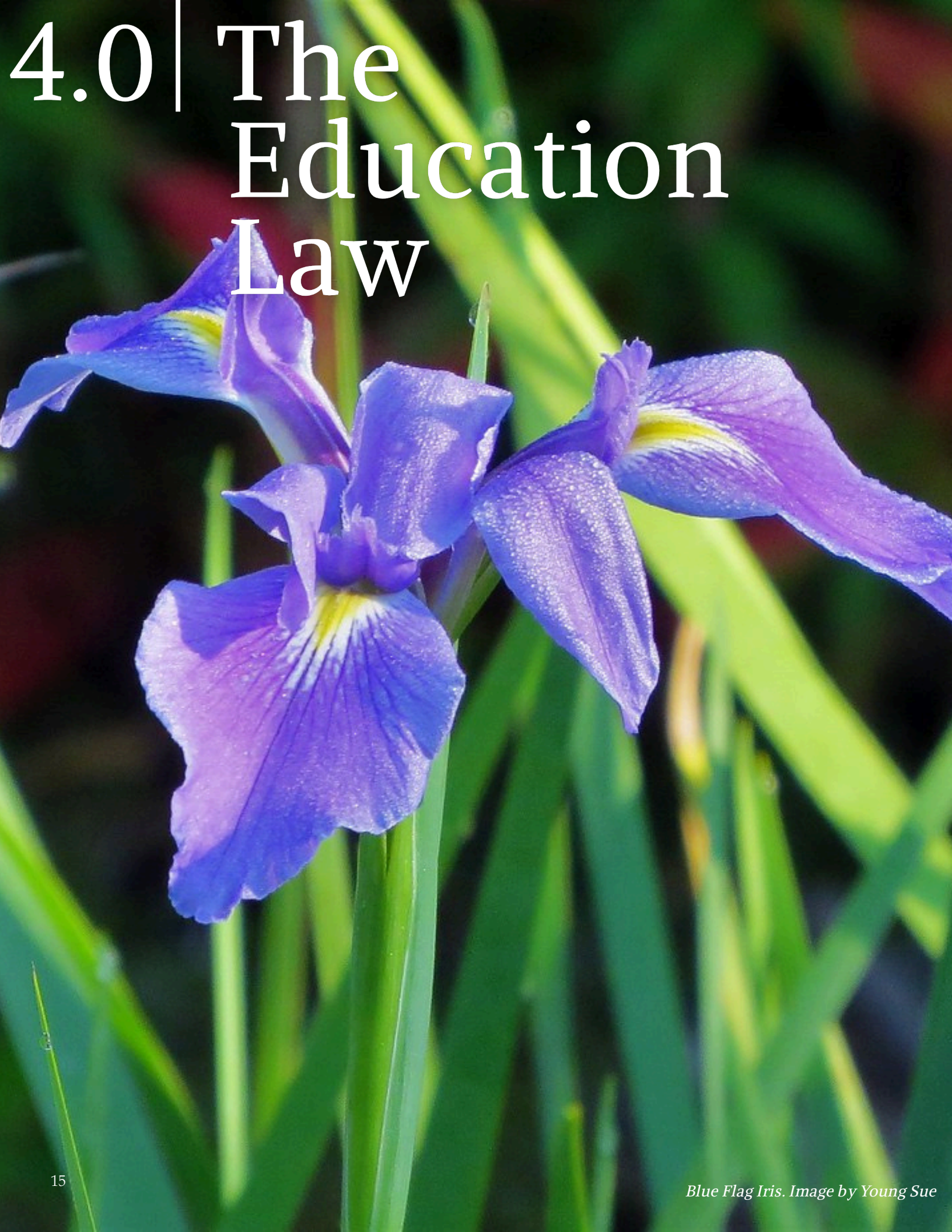
Measuring the reduction in pesticide use could be aided by New York's pesticide registry. New York's pesticide registry tracks every pesticide distributed, sold, or offered for sale in NYS by type and amount (Bekarian et al., 2006). Thus, analysis of these records allow for assessing decreases in pesticide application as a compliance reporting scoreboard.

Four overall key scientific indicator categories that need measurement are: (1) pollinator abundance and diversity, (2) native floral resources, (3) land management stressors, and (4) pollinator health. Abundance and diversity of pollinators can be assessed through transect walks, traps, eDNA collection and automated monitoring on state-owned lands. However, each surveyed site costs between $100 and $1,500 to construct, and is made more difficult by the specialized skillset required to properly identify collected insects. Outside a few scattered projects in the state, there is no systematic statewide pollinator monitoring, leading to little to no baseline ability to detect and track changes. Thus, there is a strong need to develop a baseline that contains standardization protocols and centralized data management. Currently, machine classifiers are increasingly relieving this burden. AI models are able to automatically identify insects from photos and sounds to reduce the time needed to manually identify species; these methods have expert-level accuracy on images (Valan et al., 2019).

As a combination of each of the changes enacted in the NYSPPA's amendments to the ECL, habitat assessments should note how much of the area consists of nectar-or-pollen-producing native flowers, the density of the floral resources, what diversity exists in flowering, and whether plants are offered throughout the blooming season. **Land-cover mapping** is a method that needs to be replicated with flower assessments to determine if meadows coming to full bloom are increasing in prevalence. While land-cover maps show the presence and location of meadows, they do not indicate the number of flowers meadows produce nor the duration of the blooms.

By pairing mapping of the seasonal flower surveys (floral counts, bloom duration, and pollen indices) a **floral resource layer** may be created to track changes (Tew et al., 2021; Baude et al., 2016). Evaluations would start with a pollinator-friendly site with minimal stressors—reduced pesticide use, reduced lawn-mowing, reduced intensity of landscaping. By performing novel assessments for disease and mortality for under-studied solitary natives (current health assessments focus mainly on managed honey bees), agencies can accurately map the relationships of healthy floral resources with native pollinators. Agencies and researchers should continue to monitor mowing frequency, mowing area, and pesticide application as success measures alongside the ecological changes.

4.0 The Education Law



Blue Flag Iris. Image by Young Sue

The NYSPPA amendments to the **NYS Education Law (EL)** with the primary goal of promoting pollinator health by increasing public awareness. The NYSPPA adds to the existing NYS EL with section 235-c. Furthermore, The NYSPPA directs each campus in the **SUNY campus system** to consider five actions: (1) to create a standing committee on every campus in the New York State University system to advise on the best practices for establishing pollinator-supportive environments; (2) to increase the number of native plants and complementary habitats on SUNY-managed lands; (3) to develop a coherent and integrated pest management program to reduce pesticide use and to increase the usage of non-chemical pest management; (4) to offer educational opportunities to college students and other community members to teach about pollinators and their conservation; (5) to run yearly service-learning projects to enhance pollinator habitat.

Additionally, the bill adds section 409-o, directing the New York State Department of Education, in conjunction with the DEC, to develop, but not mandate the adoption of, guidelines for public schools to incorporate pollinator-friendly landscaping and groundskeeping. Thus, increasing the practice of native planting, pollinator-friendly practices, and less pesticide use in school gardens.

4.1. Solutions within the Education Law

Amendments to the EL aims to increase pollinator habitat in state-owned K-12 and college campuses. However, while supporting pollinator-friendly habitat on school campuses is part of this amendment, the larger-scale ambition is education of students and the general public. While the amendments to the Environmental Conservation Law cover various means of promoting pollinator health directly, a majority of the general public is not aware of concerns relating to pollinator health. The EL seeks to remedy this lack of awareness and enable the general public to take steps to individually support pollinators. By increasing pollinator education on SUNY campuses, the public can learn about pollinator-friendly practices and implement them in their own lives. The EL aspect of the NYSPPA is vital as it contributes to not just pollinator decline, but also our lack of data and research into pollinators as a whole.

4.1.1 General Perception of Insects

Widespread habitat loss, pesticide use, and the lack of scientific study are driven by a general aversion and distaste for insects (Fukano & Soga, 2023). Many insects are viewed as unpleasant or undesirable, especially in homes or in large numbers, since they are often seen as pests and a threat rather than essential organisms. The following public perception leads to insects being undervalued and concerns for their welfare being easily dismissed. People are quick to eradicate insects and spray pesticides indiscriminately to repel them, both indoors and outdoors. As society becomes more urbanized, people, especially youth, increase in **entomophobia**, the fear of insects (Fukano & Soga, 2021). As people spend less time outdoors, they simultaneously reduce their knowledge of insects and, only viewing insects as unwelcome guests in their homes, reinforce negative attitudes towards them (Fukano & Soga, 2021). Moreover, the average person can only name 13 species of insects, with the large majority of those being either attractive species such as ladybugs, or bothersome pests such as mosquitoes (Shipley & Bixler, 2017). When presented with images of unfamiliar insects, the fascinating and the beautiful are frequently the only categories of insects that inspire people to support insect conservation (Shipley & Bixler, 2017).

Improved education about pollinators has the potential to reduce these negative attitudes and promote pollinator health. Hostile attitudes toward insects often stem from a perceived lack of similarity with humans. Research consistently shows that people tend to have greater empathy towards animals that are physically and phylogenetically closer to humans (Kellert, 1993; Prguda & Neumann, 2014). A study of attitudes towards insects in Connecticut found that the general public and farmers are likely to view invertebrates with aversion, anxiety, fear, avoidance, and ignorance (Kellert 1993). In contrast, scientists and conservation organization members had far more positive attitudes toward invertebrates. Kellert's results show that individuals with substantial knowledge of and exposure to insects, such as scientists and conservation organization members, consistently view insects with greater appreciation and empathy. Thus, education is a powerful tool for protecting pollinator health and habitat. Over the past decade, demand for native plants has increased, driven by rising awareness of sustainable landscaping and a preference for ecologically-responsible plant

Figure 7: Students learning about native plants from a Park Ranger. Image from Barber, 2016.

production (Rihn et al., 202S2). Studies also indicate that most people are eager to support pollinator health, and that education can help fill the gap in turning this willingness into action. According to a study conducted by the National Recreation and Parks Association (NRPA), 95% of Americans believe that communities should make intentional, concerted efforts to create designated native plant areas to support the health of pollinators (Nicholls, 2020). However, only 34% of those respondents felt confident in their knowledge of how to help pollinators (Nicholls, 2020). This gap between action and concern highlights the broader lack of pollinator understanding, which the second set of amendments to the EL proposed in the NYSPPA seeks to address. Several research studies indicate that youth experiences in the outdoors were the most influential factor in leading adults to pursue conservation work (Palmer & Suggate, 1996; Tanner, 2014). Palmer and Suggate's (1996) findings are consistent across studies; simply being able to name some insect species increases appreciation for those species in children (Lindemann-Matthies, 2005).

Some SUNY campuses and NYS K-12 schools have already taken action. Notable initiatives include planting native species in parking lot medians (St. Albans City School, n.d.) and establishing pollinator-friendly gardens and outdoor classrooms (Finn, 2024). In 2019, SUNY New Paltz introduced its "Campus Pollinator Habitat Plan", which installed new pollinator meadows to supplement existing pollinator-friendly sites (Wyeth, 2019). These illustrate practical implementation and ways students can be involved in pollinator-friendly activities.

4.1.2 Impact on Data Availability

There is a lack of public knowledge about pollinator species and their importance (Nicholls et al., 2020) stemming from a lack of research that has been conducted about insects. Insects are inconspicuous and difficult to meaningfully track, making insect-focused research technically and financially demanding (Cuff et al. 2024). According to a study conducted at Queen Mary University, scientists currently have reliable population data for just 1% of known insect species (Queen Mary University of London, 2025). Furthermore, there are suspected to be over 2 million more insect species yet to be discovered (Smithsonian Institution, 2025). This lack of knowledge leads to a broader disconnect between insect species and humans, which has dangerous implications for the fate of insect species. Insects are incredibly diverse and are found in nearly every ecosystem, yet historically, they have been underrepresented in scientific research (Jarvis, 2018). Attention has typically focused on insect species with aesthetic appeal or agricultural value, such as the monarch butterfly and honeybees, respectively. Consistent, long-term monitoring is essential to understand population trends and how human activity impacts these species. While the 'insect apocalypse' has sparked new research initiatives into studying insect populations, data is still critically lacking. With limited data on species behavior and population dynamics, it is difficult to aid insect pollinator populations (Davis, 2025). Moreover, general public's dislike of insects contributes to a lack

of funding for insect and pollinator research.

Public pressure for wildlife conservation is critical, leading to increased traction for research and donations to support this work (Gaston et al., 2023). Minimal public interest in insect research can make this more rare and in turn, pollinator insect conservation becomes more challenging.

Nevertheless, the NYSPPA's amendments to the EL includes a set of changes that encourage schools and students to consider pollinators in their daily lives, leading to a better understanding of how this critical group of species can be protected.

Figure 8: Students at St. Albans City School stand with their native plant species parking lot medians. Image from St. Albans City School, n.d.

4.2 Controversies within the Education Law

The NYSPPA's success ultimately depends on how the public perceives the changes the bill promotes. Shifting to native vegetation and reducing mowing challenges long-standing expectations for ultra-neat spaces. Native habitats often appear "messier," with taller grasses, uneven growth, and dense plantings that can be misread as neglected rather than intentionally restored (Remmele and Lindemann-Matthies, 2023). Even when ecological benefits are explained, studies show that many people continue to favor '**the familiar**', the symmetrical look of ornamental species (Audubon, 2024). This aesthetic preference means native plants may not be welcomed on highway verges, schoolyards, or state lands if they do not align with conventional ideas of beauty.

There is also a strong cultural aversion to insects that complicate the implementation of pollinator-friendly landscapes. While these habitats are intended to support beneficial insect pollinators species, they also provide favorable conditions for species perceived as undesirable, including wasps, ticks, and mosquitoes. Such species raise public concerns about stings, disease transmission, and nuisance, particularly in sensitive settings like schools (Shipley & Bixler, 2017; Fukano & Soga, 2021). Research shows that negative perceptions of insects, especially those associated with health risks, can significantly reduce public support for biodiversity initiatives, even when ecological benefits are substantial (Gaston et al., 2025; Remmele & Lindemann-Matthies, 2023).

Addressing these concerns through education, targeted outreach, and proactive risk-mitigation measures, such as strategic plant placement, integrated pest management, and regular monitoring, are essential to sustaining community acceptance (IPBES, 2016; Xerces Society, 2016).

Beyond public perception, practical challenges also arise on the institutional side. There is no additional funding provided to SUNY or school campuses for the implementation of the changes in the EL. Many schools already operate with limited budgets, and further increasing the amount of work that must be done without an increase in funding could place a strain on these institutions. There is also no mechanism to enforce these new guidelines. While the success of this bill aspect can be measured by keeping in close contact with schools, there is no preset reporting platform for the state to easily access pollinator habitat and education data from schools.

4.3 Measuring the Education Law's Success

Assessments for habitat change on school grounds would be similar to those listed in the previous section. However, scientific assessments of habitats or pollinator populations are not enough. Institutional implementation and community engagement serve as social indicators that show whether habitat-altering policy levers have been applied. NYS could set up a platform for schools to report on their pollinator education and habitat changes. The state could then analyze the percent increase in these programs. However, the education aspect of the bill also strives to reach a wider audience, with students taking actions to protect pollinators themselves, and explaining what they have learned at home to their families, further increasing public knowledge of pollinator importance. For communities, measuring attendance at workshops, exposure to signage, and uploads to *iNaturalist* or *Bumble Bee Watch* can all provide a numerical assessment of awareness. Previous studies have indicated that although public awareness of human-caused risks to pollinators is relatively high, people do not feel confident in their knowledge of individual actions they can take (Nicholls, 2020). This is where the bill has an opportunity to create change.

The NYSPPA provides no dedicated assessment budget and thus compiling data will be costly and administratively cumbersome. However, without data, policymakers are not able to make informed decisions for success. An in-depth, multi-tiered assessment will give insight into the successes or failures of the bill and set future best practices for restoring pollinator populations in New York.

5.0 The Highway Law

Purple Coneflower. Image by Tushar Mahajan

The final law amended by the bill is the **Highway Law (HL)**. The amendments in the NYSPPA affect Article II, which outlines the roles and responsibilities of the NYS Commissioner of Transportation, with Section 19-a of the HL assigning the expansion of pollinator habitat in the state highway system to the commissioner.

Working with the DEC, the commissioner is asked to develop a set of policies that encourage the increased use of native, pollinator-friendly plant species in **medians** and **verges** (see figure 9) along highways under the department's jurisdiction. Further, the commissioner is in charge of providing technical assistance to villages, towns, cities, and counties seeking to increase the use of these plant species along highways in their respective jurisdictions.

The commissioner shall alter procedures to reduce intensive mowing on highway green spaces; while still prioritizing the safety of pedestrians, cyclists, and motor vehicle operators, medians and verges shall be left to grow native species where feasible.

5.1 Solutions within the Highway Law

To maintain highway safety, allowing cars to see around turns on and leaving room for disabled vehicles to pull to the side of the road, the NYS Department of Transportation (NYSDOT) maintains short vegetation along highway verges. **Verges** are the the non-road surfaces that border roads, while **medians** are the dividing barriers between either direction of traffic on major roads.

Despite the advantages, maintaining short vegetation on roadsides is harmful for native pollinators. If these areas are routinely mowed, flowering plants never bloom. Contextualized, this 242,000 miles of highways, tollways, and roads in NYS, that fragment habitats that once may have served pollinators (FHA, 2014). High-frequency mowing, like the NYSDOT currently practices on verges, directly causes insect mortality, especially through loss of eggs and larvae, which further decrease insect populations (Xerces Society, n.d.).

Mowing on highways is heaviest in summer, which is the peak growth season for roadside vegetation and therefore pollinator activity. Thus, mowing during these periods leads to higher rates of insect pollinator mortality. Currently, NYSDOT staff mow the entire width and length of most highway verges multiple times per year, most often in the spring and summer months (NYSDOT, 2025). Thus, the NYSDOT mowing practices have serious implications for pollinators, who are less likely to feed and reproducing on the frequently mowed highway verges (Xerces Society, 2016).

The NYSPPA proposes the adoption of **modified mowing regimes** on state-managed lands, which involve reducing mowing frequency to between zero and two times per year and restricting it entirely in some areas or during certain seasons (Phillips et al., 2020; Subedi, 2024). The following approach allows flowering plants to mature, increasing the availability of nectar and pollen, while also creating more favorable habitat conditions for pollinators (Subedi, 2024). This is beneficial for the roadside ecosystem as a whole, allowing for more complex vegetation structure, habitat growth, and a healthier ecosystem than a mowed lawn.

The NYSPPA sets out to modify mowing practices on state-managed lands through alterations to the HL. The amendment proposed is an addition of "verges" to subsection 19-A of the HL by adding two words, "and verges". Although the wording-change is minimal, it significantly expands available habitat for pollinators. NYS has 113,559 miles of state or locally government-managed roadways (NSYDOT, 2018). By managing the border and edges along roadways with native planting, and reducing mowing, and use of pesticides, NYS could significantly increase the area available for pollinator habitat. It would also create long connected corridors, "pollinator highways", which could support species movement and ecosystem health.

Modified mowing routines would consist of mowing verges less frequently and later in the year. In addition, adjusting management practices to avoid mowing peak flowering periods and high pollinator activity is essential, as seasonal patterns strongly

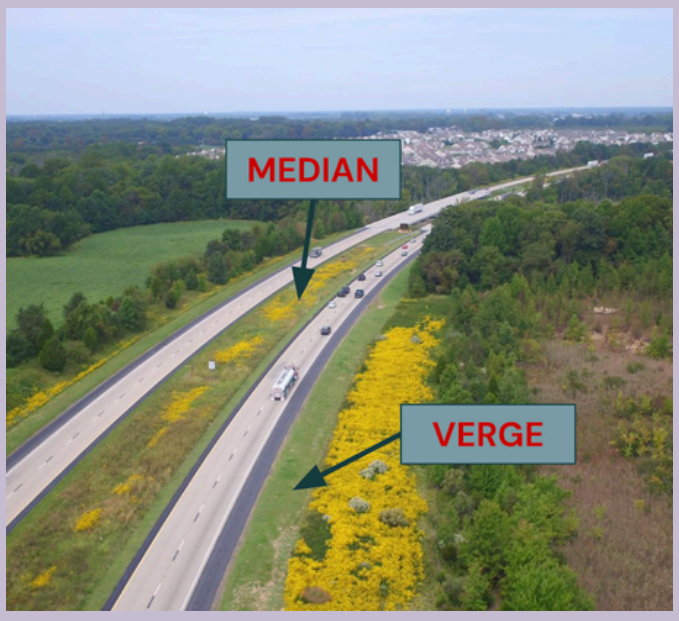


Figure 9: Image depicting a roadside median and verge. Image from (Delaware Department of Transportation, 2018).

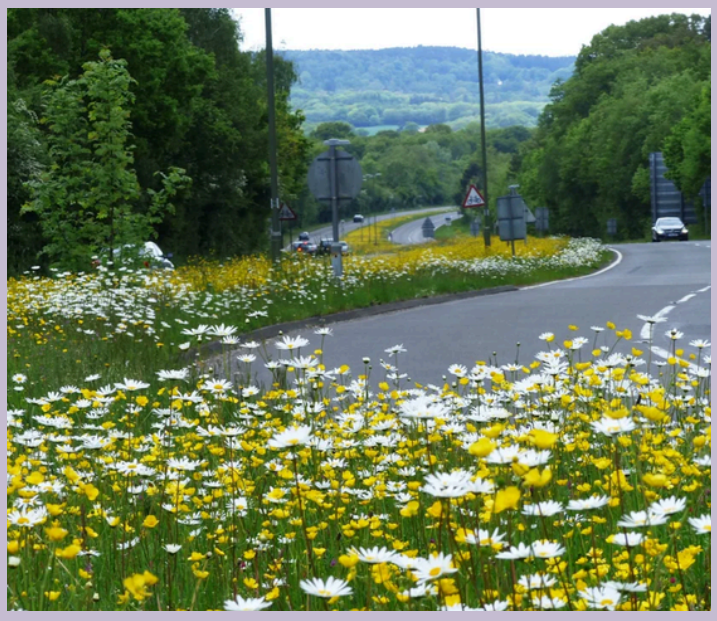


Figure 10: Image depicting a roadside verge with blooming flowers due to a low-mow schedule. Image from (The Guardian, 2019).

influence plant and pollinator species richness and abundance (Austrheim, 2024). Frequent mowing also disrupts plant life cycles, reducing floral resources and degrading nesting habitats. In contrast, un-mowed grasslands offer shelter that supports pollinator reproduction and provides protection from predators and environmental stressors. As a result, pollinator populations are significantly higher in these areas than in frequently-mown lawns (Sun Prairie, WI, 2023). One study found that in un-mowed grasslands, total pollinator counts were approximately eight times higher, with bumblebee populations seven times higher and butterfly populations three times higher than in regularly mowed grasslands (Austrheim, 2024).

Mowing later in the year, such as in autumn, would have a similar effect to reduced mowing regimes. By delaying mowing timelines, larval stages of insects such as caterpillars have the time to develop, and pollinators can spend the peak seasons of spring and summer pollinating flowers on roadside verges without threats from mowing. Reduced frequency of mowing also helps lower local carbon emissions and increase soil organic matter, which reduces reliance on chemical fertilizers (University of New Hampshire, 2022). Reduced mowing also improves the landscapes ability to absorb and retain water, alleviating pressure on stormwater infrastructure. Additionally, low-mow regimes decrease the need for groundskeeping labor and maintenance on state-managed land, contributing to long-term cost savings (University of New Hampshire, 2022).

5.2 Controversies within the Highway Law

Reduced mowing introduces both ecological uncertainty and public safety concerns. For instance, a 2023 NYSDOT study found that modifying mowing schedules increased flowering plants and slightly improved insect diversity, but the change did not produce a significant increase in pollinator numbers (Whitney, 2023). Reduced mowing also raises safety concerns, as mowed verges are maintained to preserve sight lines and space for stopped vehicles (Xerces Society, 2016). Longer intervals between mowing allow taller vegetation, prompting fears of obstructed views and a neglected appearance, even where a narrow safety strip is left. Additionally, if NYSDOT follows a modified mowing routine, when mowing is completed, it will have increased wear on equipment since plant growth will be more dense and difficult to mow, increasing costs for the department.

Reduced mowing on highway verges may also result in public pushback. Native habitats can be perceived as disheveled and poorly maintained. Most people prefer to see tidy, uniform natural areas which is associated with very short trimmed grasses. If the public is not aware of the benefits of reduced mowing, the NYSDOT may receive complaints from drivers about the unkempt look of highways, making this program even more challenging to manage.

5.3 Measuring the Highway Law's Success

To measure the success of the amendments to the HL, similar steps to the Environmental Conservation Law (ECL) would need to be taken. One example of this would be transect studies of roadside verges, which would provide an effective understanding of whether or not reduced mowing positively affects pollinator resources. This would require cooperation from and training of NYSDOT staff, or hiring of outside ecological professionals to measure the outcomes of any changes to roadside management. Success would mean an increase in native plants on verges, found by taking surveys of the land and measuring the percentage of native plant cover and invasive plant cover.

Additionally, the amount of pollinators found on verges with a modified mowing schedule could be measured. A **transect study** could be used to determine if the number and species diversity of pollinators increased on verges, compared to a status quo mowing routine. These requirements face similar challenges as those in the ECL, requiring trained professionals and funding to accurately identify native plants and insects. Without dedicated resources to collect these data, there is limited opportunity to measure the success of the program.

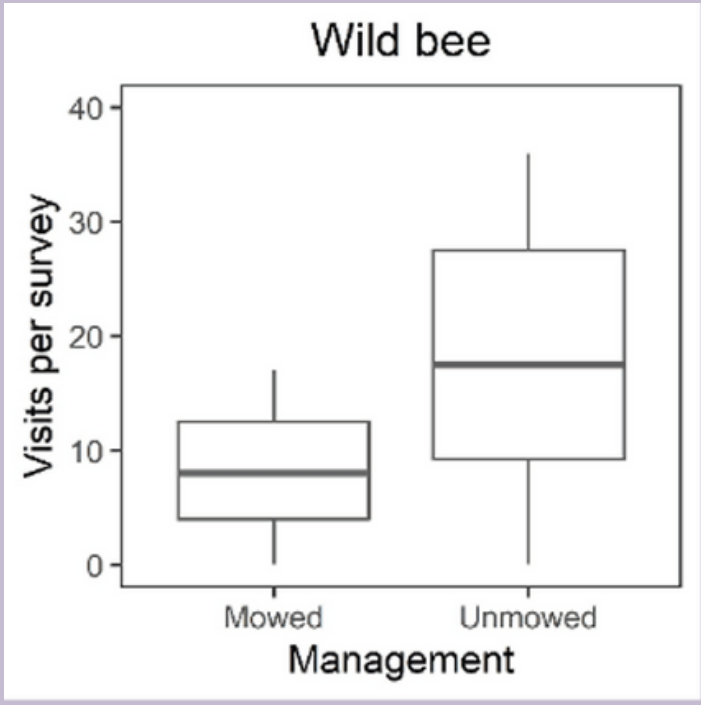


Figure 11. Visits by wild bees to unmowed lawns were far higher than those that were frequently mowed (Sun Prairie, 2023).

6.0 | Conclusion

Flower: Canadian Anemone. Image by North Creek Nursery

The NYSPPA represents an ambitious attempt to reverse pollinator decline through coordinated changes to land management, pesticide use, and public education. By embedding its core mandates - increased native planting, reduced mowing, and integrated pest management - into state policy, the bill establishes a unified framework for pollinator-friendly practices across New York State.

Effectiveness of the NYSPPA depends on addressing several critical gaps and limitations. From a scientific perspective, the bill lacks clear benchmarks for native plant coverage, and provides limited direction on mowing practices. Without resolving these issues, the legislation risks delivering only fragmented or symbolic improvements rather than driving meaningful, systemic change.

Public perception is critical to the success of the NYSPPA. Surveys and community engagement efforts indicate that many residents express strong support for pollinator conservation and an interest in incorporating more native plants into public and private landscapes. Positive attitudes create momentum for habitat restoration and strengthen community participation in maintenance and monitoring. However, a shift toward native landscapes may conflict with traditional expectations for orderly, ultra-neat public spaces. Widespread discomfort with the insects that thrive in these native spaces could generate resistance to the habitats the NYSPPA intends to promote, making program continuation all the more challenging. For these reasons, comprehensive outreach and education is a critical component of this bill.

Studies show that the public generally expresses strong support for pollinator conservation and native habitats (Nicholls, 2020). However, public knowledge of how to make these changes is not always present. Positive attitude communities combined with education can create momentum for habitat restoration and strengthen community participation in maintenance and monitoring within NYS.

The NYSPPA establishes an important foundation for advancing pollinator conservation in NYS, yet legislation alone does not ensure meaningful outcomes. Achieving lasting results depends on setting clear standards and targets, providing reliable funding for research and monitoring, and fostering broad public support. Increasing public awareness, in tandem with land management changes, is critical to the success of the bill. Overall, the NYSPPA has the potential to serve not only as a tool for protecting pollinators, but as a model for strengthening ecological resilience more broadly.

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Appendix

Type of Insecticide	Insecticide	Unit Weight (gal)	Cost per Unit	% of Total Used	Approx total Weight	Approx. Cost
Organophosphate	Dylox 420 SL Turf and Ornamental Insecticide®	2.5	$200	2%	29.44	$2,355
Organophosphate	Alco Fly Fighter Insect Spray Pressurized	1.88	$160	1%	14.72	$1,253
Organophosphate	Lesco Sevin SL	2.5	$395	1%	14.72	$2,326
Pyrethrins and pyrethroids	STERI-FAB	4	$215	7%	103.04	$5,538
Pyrethrins and pyrethroids	Demand CS Insecticide®	2	$139	6%	88.32	$6,138
Pyrethrins and pyrethroids	Temprid SC Insecticide®	0.25	$205	1%	14.72	$12,070
Pyrethrins and pyrethroids	Suspend SC Insecticide®	0.15	$53	1%	14.72	$5,201
Pyrethrins and pyrethroids	Conquer Residual Insecticide Concentrate	0.13	$17	1%	14.72	$1,925
Mosquito larvae insecticide	VectoBac 12AS Mosquito Larvicide	5	$165	74%	1089.28	$179,731
				94%	1,472	$216,537.96

*Table 1: Estimated costs of insecticides used by New York City, calculated using the percentage and total weights of each insecticide type reported by the NYC Division of Environmental Health, combined with average industrial prices.**

**Estimated costs of insecticides used by New York City, calculated using the percentage and total weights of each insecticide type reported by the NYC Division of Environmental Health, combined with average industrial prices. (All values are estimates.)*