



LAND-USE TOOLS TO PROTECT POLLINATORS

CURRENT APPROACHES AND POTENTIAL POLICY PATHWAYS

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USDA photo by Christophe Paul

Introduction

In recent years, the significance of pollinators to our agricultural system has become increasingly clear.¹ Pollinators are integral to agricultural production, and increasing declines in their populations could have catastrophic effects.² According to one study, flying insects were essential for pollinating 87 of the world's major food crops, including most fruits, coffee, squash, and cacao—the indispensable ingredient in chocolate.³ Beyond their importance to agriculture, pollinators play key roles in protecting ecosystem health⁴ and, in turn, human health.⁵

The more humanity comes to understand the role of pollinators in preserving our way of life, the more it becomes clear that our current mode of existence is incompatible with a healthy pollinator population. Ongoing environmental challenges to pollinator populations⁶ include the impacts of habitat loss on insect biodiversity⁷ and the omnipresent effects of climate change,⁸ which are partially responsible for colony collapse disorder in bee colonies.⁹ Acknowledging these developments has led some lawmakers to focus on legislative strategies that promote population health.¹⁰ Despite this recognition, however, the pollinator crisis has often failed to receive sufficient media (or policy) attention.¹¹

To examine how policy can influence pollinator health, this paper first provides background information on pollinators and the environmental challenges they face before summarizing existing efforts to protect pollinators through federal, state, and local policies.¹² It explores ways that these land-use tools and interventions could be improved to promote pollinator populations, as well as options for additional policy innovations to support pollinator health.



Understanding Pollinators and the Pressing Environmental Challenge

Before considering the potential for land-use-related policy interventions to address declining pollinator populations, some background is necessary. This section provides a high-level summary of the importance of pollinators and the major causes of pollinator population decline across the world.¹³



USDA/FPAC photo by Preston Keres

What Are Pollinators?

At a basic level, a pollinator is “anything that helps carry pollen from the male part of the flower (stamen) to the female part of the same or another flower (stigma).”¹⁴ This transfer of pollen is critical to the reproduction and health of seed plant species.¹⁵ Pollinators, as the term suggests, support plant populations by pollinating these species,¹⁶ and include birds, bats, butterflies, and, perhaps most critically, bees.¹⁷ With more than 20,000 species globally, bees “are an essential component of functioning ecosystems.”¹⁸ Because pollinators play such a crucial role in ecosystem function, decreases in pollinator populations can have ripple effects on food and other environmental systems.¹⁹



Native pollinators are naturally occurring species that include wild insects (such as bees, flies, moths, and beetles), bats, birds, and hummingbirds.



Managed honeybees are honeybees managed by beekeeping operations (either personal or commercial).

See Vermont’s Pollinator Protection Committee, Final Report. Feb. 2017, at B1
<https://agriculture.vermont.gov/sites/agriculture/files/documents/Pollinator%20Protection%20Report-FINAL.pdf> (last visited June 22, 2022)

Why Are Pollinators Essential for Agriculture?

Pollinators are critically important to the health of our agricultural economy.²⁰ According to the United States Forest Service, more than 80 percent of the world's 1,400 crop plants require pollination.²¹ “A very small number of mostly wild bee species provide the majority of bee-related crop pollination services, [but] other insects, such as flies, wasps, beetles and butterflies, have an important, underemphasi[z]ed role in crop pollination.”²² Pollinators add an average of \$18 billion in value to annual crop production,²³ which can be directly attributed to their contributions to crop yields.²⁴

What Is the Current State of Pollinator Health?

Recent declines in many pollinator species have brought populations to crisis levels.²⁵ Most of the limited attention to pollinator health, however, has focused on declining bee populations. Populations of other key pollinators, such as butterflies, are also on the decline.²⁶ Scientists are only beginning to understand the true magnitude of these losses and their potential impact on environmental health.²⁷ In Vermont, for example, beekeepers have reported increasing difficulty in keeping hives alive and devastating winter die-offs,²⁸ which, in the view of many involved in this sector, is magnified by pesticide use.

What Is Causing Declines in Pollinator Populations?

Research into the causes of colony collapse disorder (CCD), as well as population declines more broadly, is ongoing.²⁹ Myriad issues have caused declines in pollinator health and population, ranging from “inadequate diets, natural habitat loss, mite infestations, loss of genetic diversity and exposure to potentially harmful pesticides.”³⁰ This subsection examines the most common causes of declining pollinator populations. These factors do not work in isolation; rather, the cumulative effect of these impacts is what leads to population decline.³¹



Colony collapse disorder “is the phenomenon that occurs when the majority of worker bees in a colony disappear and leave behind a queen, plenty of food and a few nurse bees to care for the remaining immature bees and the queen.”

See US EPA, Colony Collapse Disorder at <https://www.epa.gov/pollinator-protection/colony-collapse-disorder>

It should be noted that although most pollinator research to date has focused either exclusively or predominantly on bees, and rightfully so, the role of non-bee pollinators in providing ecosystem services should not be overlooked. While they are less effective pollinators than bees per flower visit, non-bee pollinators—which include flies, beetles, moths, butterflies, wasps, ants, birds, and bats—tend to make more visits overall (comprising about 25-50 percent of total pollinator flower visits), largely cancelling out their lower efficiency.³² Further, studies have suggested that non-bee pollinators are not as reliant as bees on the presence of remaining natural or seminatural habitat in the surrounding area, indicating that these organisms are probably more

resilient to habitat loss and changing landscapes than bees.³³ In that sense, then, non-bee pollinators provide a sort of insurance against declines in bee populations, and their well-being merits more attention than it currently receives.

NATURAL HABITAT LOSS

Land-use change has played a substantial role in pollinator decline.³⁴ The conversion of natural landscapes to farmed landscapes and other more developed uses has particularly harmed wild bee populations.³⁵ The nature of current farming practices, including the adoption of more effective herbicides and weed management regimes, has reduced the number of pollinator-friendly species present on the landscape.³⁶

Changes in forest structure have also played a hand in pollinator decline.³⁷ Specifically, bees and other pollinators prefer more open forests. The lack of natural fire disturbance resulting from contemporary forest management practices, and particularly the prevention of natural fire disturbance,³⁸ have led to forests that are denser, with closed canopies and heavy shrub layers—all of which is less conducive to pollinator use.³⁹

Related to habitat decline, inadequate diets play a role in pollinator decline.⁴⁰ Because a bee's diet comes from nectar and pollen gathered from the environment, often from specific plants,⁴¹ if these plants are unavailable, these pollinators will starve.⁴² The loss of habitat driven by monocultures in contemporary agriculture has affected biodiversity more broadly, and in turn, has affected pollinator populations.⁴³

Certain migratory pollinators, such as monarch butterflies, hummingbirds, and bats, are especially threatened by habitat loss because of their reliance on “nectar corridors,” which consist of frequent patches of flowering plants that provide “refueling sites” for weary pollinators.⁴⁴ Consequently, many of these migratory pollinators face a unique risk to habitat loss; soon, migration may no longer be possible for some species. Because migration is a part of many of these species' mating cycles, a reduction in their refueling sites means not just a reduction in habitat but potential extinction.

INVASIVE SPECIES

A number of invasive species have also impacted pollinators.⁴⁵ Varroa mites, for example, “are essentially a modern honeybee plague.”⁴⁶ By attaching to bees and sucking their hemolymph fluid (bees' equivalent of blood), these mites function much like ticks.⁴⁷ Like mosquitos, Varroa mites also transmit an array of pathogenic viruses to bees, making them among the greatest threats to bee colonies today.⁴⁸ Various invasive pathogens, such as the Israeli acute paralysis virus (identified in 2004) and *Nosema ceranae* fungi (2005), have also impacted bee populations in the United States.⁴⁹

Outside of the direct harm they inflict on pollinators, invasive species can also undermine pollinators in more insidious



USDA photo by Tom Witham

ways. For example, the West Virginia White butterfly, a pollinator, uses native toothwort at its host plant, and the compounds needed for its eggs to develop are unique to that species.⁵⁰ Garlic mustard, an invasive species closely related to toothwort, also occupies the same habitat as toothworts, and female butterflies are often unable to distinguish between the two.⁵¹ As a result, they inadvertently lay many of their eggs on the wrong plant. These eggs are then unable to develop. This has had negative impacts on the species population.

PESTICIDE EXPOSURE

Pesticides may also affect pollinator populations. The Environmental Protection Agency (EPA), through its Office of Pesticide Programs, has established a platform for providing tips or information on pesticide impacts on pollinator species due to misuse or misapplication.⁵² This platform is intended to address any misuse of the restrictions applicable to existing pesticides.

Beyond direct impacts, the pesticide group known as neonicotinoids has been associated with “damaging or killing honeybees or being the cause of CCD even when the exposure is below the level expected to be toxic.”⁵³ The Xerces Society’s research posits that these chemicals are killing bees or changing their behavior.⁵⁴ As explored in more detail below, environmental organizations are increasingly calling for limits or outright bans on the uses of this class of pesticides, considering its potential impacts to pollinators.⁵⁵ According to the United States Department of Agriculture (USDA), scientific evidence of the impacts of neonicotinoids is mixed, but the agency notes that “sublethal effects” (impacts on bees that are not fatal, but impact bee health) are difficult to study, given the many variables that influence bee health and the methods with which these insecticides are applied.⁵⁶



Neonicotinoids are a type of synthetic neurotoxic insecticide that attaches to the nerve cells of insects, which overstimulates and eventually kills the insect. “These are the single most popular insecticide class in the United States.”

See National Resource Defense Council, *Effects of Neonicotinoids on Humans and Bees*, <https://www.nrdc.org/stories/neonicotinoids-101-effects-humans-and-bees>

CLIMATE CHANGE

Climate change also plays a role in reducing bee populations.⁵⁷ As global temperatures rise, the resulting habitat modification and additional stress impact pollinator populations.⁵⁸ Additionally, the changing climate impacts pollinators by altering growing seasons, blooming seasons, and migration patterns (such as for the monarch butterfly).⁵⁹

Overall, the number of factors driving pollinator loss complicates the policy approaches needed to address these issues. For example, tackling pesticide exposure may prove only a partial solution if issues around land-use change are not addressed. A comprehensive, multifaceted approach tackling multiple root sources of pollinator decline is likely required to make meaningful progress in securing long-term pollinator health across multiple ecological systems.

Existing Policy Interventions Designed to Address Pollinator Population Decline

Policymakers at all levels have engaged in efforts to promote pollinator populations to varying degrees.⁶⁰ While this paper primarily focuses on land-use intervention as a possible policy mechanism, it is worth noting the range of efforts that have attempted to protect pollinators at the federal, state, and local levels.

Federal Efforts

Federal environmental and land management agencies have attempted to address pollinator declines,⁶¹ including most agencies with a focus on either working lands or public land management issues.⁶²

This section summarizes a few of the lead agencies involved in this work, specifically:

The United States Department of Agriculture (USDA): as a funder on private working lands through the work of the Natural Resources Conservation Service (NRCS) and as a land manager on multi-use public lands through the USDA Forest Service (USFS)

The Environmental Protection Agency (EPA): as a regulator

The National Park Service (NPS): as a land manager

The Fish and Wildlife Service (FWS): as having principal responsibility for the Endangered Species Act

An agency's mandate and the types of resource concerns it addresses shape the policy tools at its disposal for promoting pollinator health. Exploring these agencies' efforts shows how the federal government can and has intervened in this area.

UNITED STATES DEPARTMENT OF AGRICULTURE

The USDA is the federal agency largely focused on issues in rural America and in securing and safeguarding the country's food supply.⁶³ Established in 1862, the agency's programs range from the Supplemental Nutrition Assistance Program to providing subsidized crop insurance to farmers.⁶⁴ The majority of USDA funding comes from the farm bill. The farm bill is the legislative package, typically enacted every four to five years, to adopt policy priorities and funding for programs impacting rural America.⁶⁵ Within the larger farm bill, Title II (the conservation-focused title) provides funding for the full suite of federal programming primarily related to agricultural production and management of the rural landscape.⁶⁶ USDA implements the farm bill through its various agencies, such as the Natural Resources Conservation Service (NRCS).⁶⁷ Apart from the Forest Service, USDA's work generally applies to privately owned working lands (specifically, encouraging better stewardship of privately owned farmland), which, considering the important intersection between pollinators and working farmland, gives the agency an important role.



Pollinators have been an increasing focus in the farm bill.⁶⁸ Since roughly 2008, USDA has addressed pollinators as a significant policy priority and has mandated coordination between its various agencies in carrying out pollinator-related work.⁶⁹ This has led USDA to devote increasing attention toward incorporating pollinator protection into its existing conservation programs, which this section briefly explores with a specific focus on land-use practices on working lands within the conservation title.⁷⁰

USDA's conservation title includes programs that fit within three principal buckets:

- **working lands programs**
- **land retirement programs**
- **conservation easements**

From farm bill to farm bill, the mix of funding dedicated to one type of conservation program ebbs and flows, with a general trend towards continued increases in the amount of working land programs over the past few cycles.⁷¹ Each of the programs fitting into these categories impacts pollinator health and populations in different ways based on programmatic design.

Working Land Programs

Working land programs are designed to provide financial and technical support to farmers in implementing conservation practices on their lands.⁷² For example, NRCS might give a farmer a grant to install a buffer strip along a riverway to prevent runoff.⁷³ Since agriculture is generally exempt from most environmental laws, such as the Clean Water Act,⁷⁴ these programs are critical in addressing agriculture-related environmental concerns.⁷⁵ Notably, there are limitations; these programs are voluntary and rely on farmers to opt in and install the conservation measure (and sometimes even to contribute by providing some degree of match).⁷⁶ There are two principal working lands programs: the Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP).⁷⁷



USDA photo by Lance Cheung



The Environmental Quality Incentives Program (EQIP) is a voluntary conservation program that offers farmers and ranchers financial cost-share and technical assistance to implement conservation practices on working agricultural land. Projects available to farmers and ranchers under EQIP include improving irrigation efficiency, restoring pasture land, and making pest management more eco-friendly.



The Conservation Stewardship Program (CSP) offers farmers the opportunity to earn payments for actively managing, maintaining, and expanding conservation activities like cover crops, rotational grazing, ecologically based pest management, buffer strips, and the transition to organic farming—even while they work their lands for production.

EQIP is the classic example of an NRCS program; it is designed to provide financial and technical support to a farmer implementing a conservation practice on the landscape.⁷⁸ Through EQIP, NRCS provides cost-share funding and technical assistance in carrying out practices on the land.⁷⁹ Depending on the practice being installed, NRCS will cost-share 25 to 75 percent of the installation cost, with the farmer bearing the remaining expense.⁸⁰

Several EQIP practices, such as contour strips and cover crops, are well-suited to promoting pollinator health.⁸¹ For example, Conservation Cover (327), Contour Strips (332), and Cover Crops (340) can all supply pollinator habitat while benefiting soil health. Wetland Restoration (657), Critical Area Planting (342), Windbreak Establishment (380), and Range Planting (55) can include pollinator plants while improving habitat, forage, and site stability. Riparian Forest Buffer (391) and Tree or Shrub Establishment (612) can increase pollinator nesting habitat while stabilizing sites prone to wind or water erosion.⁸²



Photo by Petr Ganaj

CONSERVATION PRACTICE NAME	POLLINATOR NOTES
Cover Crop	Can include diverse legumes or other forbs that provide pollen and nectar for native bees. Look for a diverse mix of plant species that overlap in bloom timing to support pollinators throughout the year. Some examples of cover crops that are utilized by bees include clover (<i>Trifolium</i> spp.), phacelia (<i>Phacelia</i> spp.), and buckwheat (<i>Fagopyrum</i> spp.). Many “beneficial insect” cover crop blends include plant species that will also provide forage for pollinators.
Early Successional Habitat Development/ Management	This management practice is important for maintaining prime open and sunny habitat for pollinators. Note: To minimize damage to pollinator populations, disturbance practices should be implemented only every two to three years and, ideally, on only 30 percent or less of the overall site. This allows for recolonization from nontreated habitat. For example, mowing or burning one-third of the site every two or three years, on a three-year cycle. In addition, when possible, disturbance practices should be implemented when most pollinators are inactive, such as in late fall or winter.
Integrated Pest Management	Biological pest management can include plantings that attract beneficial insects that predate or parasitize crop pests. These plantings can also benefit pollinator species. Plants commonly used for pest management that also benefit bees include: yarrow (<i>Achillea</i> spp.), phacelia (<i>Phacelia</i> spp.), and sunflowers (<i>Helianthus</i> spp.). Can include legumes or other forbs that provide pollen and nectar for native bees. Look for a diverse mix of plant species that come into bloom at different times throughout the year.

Source: NRCS, *Pollinator Biology and Habitat*, MICHIGAN BIOLOGY TECHNICAL NOTE No. 20 (2013), https://efotg.sc.egov.usda.gov/references/public/MI/Biol_TN_20_Pollinator-Biology-and-Habitat_v1-1_honey_bee_preferences.pdf.

EQIP is the single largest farm bill conservation program,⁸³ and while it has been utilized to support pollinator health, it could further direct funds to specific conservation practices that directly benefit pollinators. The program could also be streamlined to make these resources available for pollinator-friendly projects, such as building capacity by hiring additional staff or training more technical service providers.

CSP, the other working lands program under the farm bill, was designed as a green payment program to reward farmers who are already farming in an environmentally friendly manner, as well as to encourage the adoption of additional beneficial land management practices.⁸⁴ Under CSP, the more beneficial the practice is, the larger the payment the farmer is eligible to receive; a variety of these practices can promote pollinator health.⁸⁵ For example, a farmer can receive compensation for planting conservation cover to provide pollinator habitat.⁸⁶

By engaging with farmers to install pollinator-friendly conservation practices on their lands, working lands programs are one policy pathway USDA has used to address the pollinator crisis.





The Inflation Reduction Act of 2022 (IRA) allocated an additional \$3.25 billion for CSP between FY2023-2026, but with a limitation: to receive funding, an agricultural conservation practice must, as determined by USDA, directly improve soil health by sequestering greenhouse gases. It also expressly supports organic producers, as well as those transitioning to organic farming, which can have a direct benefit for pollinators.

The IRA also provided \$8.45 billion in new funding for the EQIP between FY2023 and 2026. Like the CSP funding, this money also comes with climate guardrails that prevent spending on agricultural practices that harm pollinators. Critically, the IRA waived the prior requirement that 50 percent of all EQIP funds must be spent on livestock operations—a provision that resulted in money flowing disproportionately to confined animal feeding operations (CAFOs.)

See, e.g., *Inflation Reduction Act*, USDA: NRCS, <https://www.nrcs.usda.gov/about/priorities/inflation-reduction-act> (last visited Feb. 16, 2024).

Land Retirement Programs

The second category of farm bill conservation programs relates to land retirement.⁸⁷ Land retirement programs operate how they sound: they take land out of agricultural production by paying farmers not to farm it, which can have conservation as well as economic benefits.⁸⁸

These programs have a long history within USDA,⁸⁹ but the Conservation Reserve Program (CRP) is the most prominent example of current land retirement efforts.⁹⁰ CRP is a land retirement program that pays farmers not to farm, generally for a period of 10 years, in exchange for a rental payment.⁹¹ In addition to removing land from production, CRP requires that the fallowed land be converted to tree or grass cover.⁹² This program design is intended to limit soil erosion, but it also benefits pollinators through the establishment of supportive habitat.⁹³ These lands are usually grasslands containing a mix of pollinator-friendly flowering species, particularly in agricultural areas.⁹⁴ Additionally, supplemental payments are occasionally available to compensate the maintenance of pollinator-friendly land.⁹⁵

This program provides significant benefits to pollinators in that farmland—and particularly monocultured land—is not being farmed, but instead conserved.⁹⁶ As of 2022, up to 25.5 million acres of farmland across the country were eligible to enroll in CRP.⁹⁷

Given that these programs take land out of production, break up areas of monoculture production, and can provide important habitat for pollinators, land retirement programs are another important tool for USDA to address pollinator decline.



NRCS photo by Brandon O'Connor



Conservation Easement Programs

The third and final category of NRCS conservation programs is conservation easements.⁹⁸ Conservation easements are a property law tool whereby a landowner retains ownership of their land but conveys a property interest to a particular easement holder (in this case, NRCS or a land trust, depending on the design of the program).⁹⁹ This results in a landowner giving up certain rights in their property (the right to subdivide or develop the property, for instance), typically in exchange for a monetary benefit.¹⁰⁰ In sum, conservation easement programs support farmers financially by facilitating the sale of these interests in land to the USDA or its partner organizations, thereby securing a long-term conservation objective.¹⁰¹

Under the farm bill, these programs are consolidated into the Agricultural Conservation Easement Program (ACEP).¹⁰² ACEP consists of two primary prongs.¹⁰³ First, the Wetland Reserve Easements (ACEP-WRE) component restores cropland that has been converted from wetland use (often improvidently so) back to its original wetland function.¹⁰⁴ For ACEP-WRE easements, NRCS pays the farmer 100 percent of the property value plus the costs of carrying out the restoration.¹⁰⁵ These restoration-based projects, including the reestablishment of native

grasses and the creation of new habitat, often involve benefits to pollinators.¹⁰⁶ The second prong is the Agricultural Land Easement (ACEP-ALE) component.¹⁰⁷ ACEP-ALE allows the federal government to fund state agencies' and land trusts' efforts to acquire conservation easements that protect working farms.¹⁰⁸ Like ACEP-WRE, these programs can also benefit pollinators by preventing farms from being converted to a more intensive land use.¹⁰⁹

In addition to these three categories, one other program is worth mentioning. The Regional Conservation Partnership Program (RCPP) has additional flexibility to meet targeted conservation concerns in carrying out NRCS's work.¹¹⁰ First established by the 2014 Farm Bill, the RCPP was designed to consolidate various regional and focused conservation initiatives (such as the Great Lakes and Chesapeake Bay initiatives) into a single program and to design a more flexible program that could be tailored to work with partners to achieve desired conservation outcomes.¹¹¹ For just one example of how RCPP can benefit pollinators, in FY2018, RCPP funded a project in Kentucky that focused on improving pollinator habitat in the state through a partnership with Kentucky State University, primarily using EQIP and CSP to restore pollinator habitat in this area.¹¹² Given the flexibility of RCPP to fund a variety of potential project types, this program could be further used to address issues of pollinator concern.



USDA photo by Josh Colligan

ENVIRONMENTAL PROTECTION AGENCY

EPA primarily serves as a regulatory agency focused on protecting air, land, and water resources (as well as public health) and develops regulations to protect these resources.¹¹³ For example, EPA may bring litigation to ensure that regulated emitters are in compliance with the Clean Air Act.¹¹⁴ EPA also has the responsibility to regulate and approve the use of pesticides.¹¹⁵

In 2020, EPA issued a proposed interim decision on neonicotinoids to add management requirements and additional restrictions to try to limit the impacts of these insecticides on pollinators.¹¹⁶ The agency has also developed policies to protect bees from agricultural spraying activities and has worked with pesticide manufacturers to lessen the impacts of their products.¹¹⁷ EPA's work demonstrates the potential for environmental regulation to address one factor associated with pollinator decline through its pesticide control division.

NATIONAL PARK SERVICE

Federal land managers play an important role in promoting pollinator populations.¹¹⁸ The federal government owns roughly 640 million acres of land nationally.¹¹⁹ These lands, in turn, are stewarded by agencies who manage them as directed by Congress through legislative mandates.¹²⁰ These mandates vary from agency to agency but generally are designed to encourage long-term stewardship of land as a public resource.¹²¹

One example of a federal land management agency is the National Park Service (NPS).¹²² NPS is responsible for the management of some of the nation's most iconic resources, ranging from Maine's Acadia National Park to California's Yosemite National Park.¹²³ Beyond the National Parks, NPS also is responsible for stewarding 19 other forms of management areas, including National Monuments, National Seashores, and National Battlefields.¹²⁴



USDA/FPAC Photo by Preston Keres

This land base provides NPS (and other land managers) a wide platform and clear authority to manage these lands to protect pollinators. For example, NPS has conserved pollinator habitats through improved management practices in Manassas National Battlefield Park, where the agency converted 1,000 acres from non-native to native grassland.¹²⁵ Depending on the natural resource concern and the state of the property, there are many ways to benefit pollinators through a comprehensive land-use management plan.

FISH AND WILDLIFE SERVICE

Last on the federal agency front, the Fish and Wildlife Service (FWS) has a role to play.¹²⁶ In addition to its work as a land manager,¹²⁷ FWS is responsible for implementing and enforcing the Endangered Species Act (ESA), which provides legal protections designed to protect at-risk species.¹²⁸ Under the Act, FWS creates protections for listed species and develops plans to promote species recovery.¹²⁹ The Biden Administration has recently indicated that if more progress is not made to address pollinator decline, specifically for the monarch butterfly, FWS may move to list this species.¹³⁰

Overall, federal agencies have thoroughly considered the challenges pollinators are facing. Depending upon their area of interaction with pollinators, many have designed efforts to address pollinator decline—from working with private landowners, to regulating pesticides, to improving pollinator habitat on their own lands, to considering whether to invoke the ESA to provide additional protections.



USDA Photo by Preston Keres

State Efforts

States have also focused on improving pollinator health. According to the National Conference of State Legislatures,¹³¹ states have used the following strategies: study legislation, pesticide regulation, creation of habitat, promotion of beekeeping, and public awareness campaigns.¹³² Many states use some combination of these strategies in concert to address the issue across their landscapes.¹³³

STUDY LEGISLATION

Given the rapid collapse of bee populations and the relative uncertainty around its causes, many states have started to devote research resources to understand the reasons for the decline and what can be done to blunt pollinator losses.¹³⁴ For example, in 2016, Vermont set up a task force, coined the “Pollinator Protection Committee,” to study issues related to pollinator health.¹³⁵ This approach—forming a committee to study the challenge and what can be done to address it—has been implemented in Connecticut and Virginia as well.¹³⁶

PESTICIDE REGULATION

Given concerns about the impacts of certain pesticides, at least 13 states have developed some form of legislation addressing pesticide use.¹³⁷ These range from developing best practices for using certain pesticides to encouraging additional enforcement for failure to properly apply pesticides. Few states, however, have taken action to ban certain pesticides outright.¹³⁸ Vermont, though, provides a good example of how some state legislatures have approached pesticide issues; the state recently passed legislation directing the Agency of Agriculture, Food and Markets to develop rules regulating the use of neonicotinoid pesticides.¹³⁹ While this legislation falls short of an outright ban on neonicotinoids—the end goal of environmental and beekeeping communities in the state—it directs the state to develop pesticide rules by 2024.¹⁴⁰

In December 2023, New York became the first state in the country to enact a law restricting the use of corn, soybean, and wheat seeds treated with neonicotinoids. The law, entitled the Birds and Bees Protection Act, also prohibits the use of neonicotinoids for “outdoor ornamental plants and turfs.”

See Governor Hochul Signs “Birds and Bees” Act, Nation-Leading Legislation to Protect New Yorkers and Wildlife From Harmful Pesticides, NEW YORK STATE (Dec. 22, 2023), <https://www.governor.ny.gov/news/governor-hochul-signs-birds-and-bees-act-nation-leading-legislation-protect-new-yorkers-and>



HABITAT CREATION AND PROTECTION

States have also attempted to protect pollinator habitat by integrating more consideration of pollinators into their existing efforts to improve private land management.¹⁴¹ For example, Kentucky passed legislation in 2010 to encourage coal licensees reclaiming former mining sites to restore these lands for pollinator habitat.¹⁴² Similarly, Michigan created a program designed to provide seeds and other support for landowners looking to restore lands to native prairie cover.¹⁴³

BEEKEEPING PROMOTION

Another way states have tried to address declining bee populations is to encourage beekeeping, which benefits bee populations and, because of the pollination services they provide, results in outsized benefits to agriculture).¹⁴⁴ Legislation in this category ranges from limiting civil liability for registered apiarists, to minimizing regulatory burdens on beekeepers, to providing tax incentives to beekeepers.¹⁴⁵ Basically, by providing protections to beekeepers and allowing more freedom of operations, states are using commercial and home beekeeping to supplement native pollinators.

PUBLIC AWARENESS CAMPAIGNS

Lastly, educating the public about the importance of pollinators has been a popular policy initiative at the state level. New Mexico, for example, has a license plate program promoting pollinator protection.¹⁴⁶ Vermont's Agency of Agriculture Food and Markets, meanwhile, has encouraged participation in No Mow May (encouraging homeowners to reduce lawnmowing and to push back the beginning of the mowing season to allow for increased flower growth) on its website.¹⁴⁷ By educating the public and encouraging them to take personal action, states can provide additional support to imperiled pollinator populations.¹⁴⁸



Local Efforts

Finally, local government has played a role in promoting pollinator health.¹⁴⁹ These efforts include addressing community land management through local policies (such as regulating the use of certain chemicals, planting flowers, and encouraging residents to create pollinator-friendly habitat).¹⁵⁰ One example is the city of Boulder, Colorado, which barred the use of neonicotinoid pesticides on city-managed lands in 2015 and committed to taking additional steps to address pollinator decline.¹⁵¹

Improving Current Land-Use Options and Programming

As described above, there are a range of policy pathways at all levels of government that aim to address pollinator decline. In comparison to many of these examples, land-use tools are a lesser-utilized option to address pollinator health.



Land-use tools generally include various options that government can utilize to achieve desired land-use objectives. These tools range from zoning (regulating land use) to provide incentives (such as promoting the use of conservation easements to secure targeted lands).

There are a few efforts underway in land-use policy that are worth exploring; specifically: management of federally owned lands, short-term leasing/land retirement programs, and conservation easements. This section examines these options and, where applicable, offers suggestions of how to improve these mechanisms to further benefit pollinators.

Improving Stewardship of Federally Owned Lands

This analysis of land-use tools primarily focuses on privately owned land, but it is worth taking into account methods of increasing pollinator populations on federally owned land. Considering how pollinator health concerns could be incorporated into federal land-management decisions—including when to log, whether to adopt prescribed burns, and what habitat to promote or establish—could yield significant benefits.¹⁵² For instance, land-management decisions could prioritize the promotion of habitats that serve as sources of nectar and pollen, including the creation of complexes of flowers that are in continuous bloom from spring to fall.¹⁵³ Creating shelterbelts, which protect critical pollinator species against wind and weather conditions and sun exposure, could also have positive benefits on pollinators.¹⁵⁴

Expanding Conservation Leases and Short-Term Land Retirement to Obtain Conservation Outcomes

Another way to promote pollinator habitat is for landowners to enter into short-term land rental agreements (i.e., securing non-perpetual land use protection). An example of this type of program is the existing CRP described above. Under CRP, farmers are paid a rental fee to not farm their land, and instead plant it with native grass or a similar management regime.¹⁵⁵ This type of program benefits pollinators because farmland is not being farmed and is set aside for environmental reasons.¹⁵⁶ Additional state- or local-level programs could replicate these benefits within a more targeted region. Conservation organizations could also use short-term rental agreements to provide similar, albeit temporary, habitat gains.

Tailoring and Adapting Conservation Easements to Better Benefit Pollinators

Conservation easements can benefit pollinators, primarily indirectly, by protecting pollinators' habitats. This section explores opportunities and challenges for the use of conservation easements to promote pollinator health.

THE POTENTIAL OF CONSERVATION EASEMENTS TO ADVANCE POLLINATOR HEALTH

Conservation easements are a useful tool for promoting pollinator health for a few reasons.

First, conservation easements are flexible and can be tailored to a specific property.¹⁵⁷ This allows a conservation organization and a landowner to examine a given property and determine what measures might be most beneficial for pollinators on that land.¹⁵⁸ A conservation easement may also create an opportunity for a land trust to discuss pollinator issues with the landowner and see if there are any minimally impactful ways to balance current land use with their protection goals.¹⁵⁹

Second, conservation easements frequently leverage funding to secure land management objectives on privately owned land.¹⁶⁰ This protective option is often less expensive than acquiring the parcel and allows for different land-management regimes to exist on protected lands.¹⁶¹ It also may allow government to reach lands that are otherwise inaccessible through regulatory mechanisms (for example, farming, which is currently exempt from many environmental laws).¹⁶²

Third, conservation easement agreements are generally perpetual in duration, which allows a land trust to protect a property without having to pay for its ongoing carrying costs while still binding future owners to its terms.¹⁶³ This perpetual term is attractive to land trusts seeking to protect lands, but also creates significant challenges in both drafting the conservation easement and stewarding a protected property.¹⁶⁴



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CHALLENGES OF USING CONSERVATION EASEMENTS TO ADVANCE POLLINATOR HEALTH

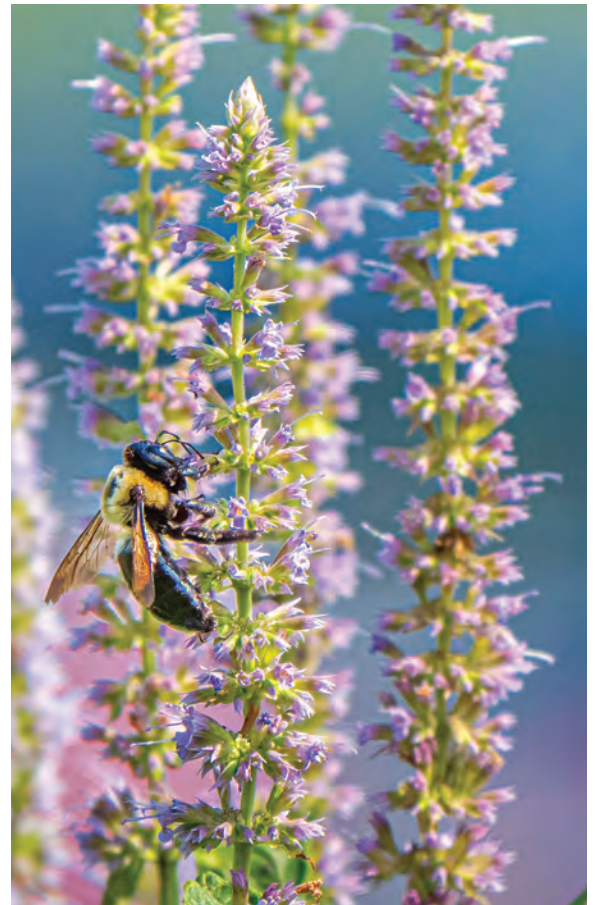
There are, however, some features of conservation easements that could limit their effectiveness in addressing pollinator concerns.¹⁶⁵

First, conservation easements are almost exclusively a voluntary tool (which has both positive and negative aspects).¹⁶⁶ Land trusts and easement holders are only able to work with landowners who want to work with them.¹⁶⁷ This means that these organizations are conserving the lands offered up for conservation and not necessarily the highest-value conservation land.¹⁶⁸ Relatedly, this voluntary nature means that the land trust or easement holder cannot unilaterally set the terms for the conservation easement, which impacts how restrictive its terms may be (and could therefore limit the ability of the easement to protect pollinators).¹⁶⁹

Second, the conservation easement is only as effective as the agreement that has been reached with the landowner.¹⁷⁰ If the conservation easement fails to address pollinator-related concerns, it may be difficult to add these in after the fact (or to make similar changes to conservation easements conveyed in the past).

Third, the effectiveness of the protection hinges on the monitoring and enforcement of the conserved land.¹⁷¹ It takes time and resources to appropriately monitor a conservation easement, and this can present challenges over the longer term.¹⁷²

Finally, if the land trust or easement owner does not have expertise related to pollinator issues, it may be difficult for the organization to appropriately tailor and design a conservation easement to address them. It may be advantageous for a pollinator-related group to create some adaptable conservation easement terms that land trusts can use while drafting their templates.



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POTENTIAL FOR EXPANDED USE OF CONSERVATION EASEMENTS TO ADVANCE POLLINATOR HEALTH

Conservation easements generally have not expressly focused on pollinators. Typically, they have been designed to protect working farms, forests, and relatively natural habitats.¹⁷³ To the extent that a parcel is being protected, pollinator health may be considered, but that consideration has not driven many of these transactions nor been the primary goal. There are, however, some options for expanding the impact of this tool.

Management provisions, such as a clause requiring pollinator-friendly affirmative land management, could be incorporated into an easement agreement to expressly protect or promote pollinator health.¹⁷⁴ For example, a conservation easement protecting a working farm could specifically call out areas for pollinator habitat protection, such as a stream buffer (which could also have multiple co-benefits, including preventing soil erosion and pesticide runoff).¹⁷⁵ Designing conservation easements with provisions addressing pollinator health (such as a provision requiring a minimum number of flower strips or specifying that a pollinator-friendly seed mix be used in other buffer strips) helps address population declines.

Beyond affirmative management or provisions mandating the maintenance of pollinator habitat, the Xerces Society recommends conducting surveys of rare species to inform land management decisions,¹⁷⁶ which could be incorporated into baseline documentation for the conservation easement (or the document spelling out a property's condition at the time of the easement's conveyance as well as the conservation attributes for which it is being managed). Additional provisions around mowing, grazing, fire, and pesticide use could also be considered to minimize impacts on pollinator species.

Some land trusts are already considering how to use their conservation lands to benefit pollinators.¹⁷⁷ For example, The Nature Conservancy's Kentucky chapter has recently carried out projects designed to plant pollinator habitat on its preserves as well as a conserved farm.¹⁷⁸ These types of efforts, while promising, may require conservation organizations to contribute funding in addition to acquiring the protective interest in the property.¹⁷⁹

Overall, conservation easements could play a larger role in pollinator protection by promoting pollinator health as a mechanism for protecting lands, imposing negative restrictions against adverse activities, and potentially requiring affirmative beneficial land management.



USDA/FPAC Photo by Preston Keres

Options for Future Policy Innovation within Land-Use Policy

Legislatures have enacted pollinator-related laws since the early 2010s, but to date, the issues contributing to pollinator declines have not been materially addressed. Additional policy intervention focused expressly on pollinators could yield further benefits. This section focuses on the role that land-use policy programming could play, specifically by: adopting mandatory buffer programs, expanding integration within USDA programming, developing ecosystem services models supportive of pollinator health, modifying conservation compliance to extend to pollinator health, and prioritizing pollinator health when making land acquisition or conservation decisions.



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Incorporate Mandatory Conservation Buffer Programs

Some states have explored mandatory buffers to address specific conservation concerns.¹⁸⁰ A buffer is a vegetated area adjacent to a waterway (such as a river, stream or lake). These buffers are important for filtering out phosphorous, nitrogen, and sediment in areas adjacent to agricultural operations. For example, in 2017, Minnesota passed legislation mandating buffers on specified waterways to prevent erosion and runoff.¹⁸¹ While this buffer requirement did not have a pollinator focus, it is a model that could be tailored or designed to ensure pollinator habitat within an agricultural landscape. Alternatively, initiatives aimed at pollinator protection could be layered on top of existing buffer programs like this one to provide co-benefits.¹⁸²

Expand Integration within USDA Farm Bill Conservation Programs in the 2023 Farm Bill

Additional promotion of pollinator health within the farm bill conservation programs discussed in this white paper could also have an impact on working lands.¹⁸³ Directing funds to this objective and using pollinator benefit as a material ranking factor could allow more conservation benefits to expressly flow to pollinators.

Experiment with Payment for Ecosystem Services Models

Policymakers may consider developing programs that create ecosystem services.¹⁸⁴ There are multiple ways this can work.¹⁸⁵ One example is a market-based mechanism where a private entity creates pollinator habitat and quantifies the number of baseline pollinator species before and after to show the positive impact of the company's efforts.¹⁸⁶ Hypothetically, a governmental body or company subject to mitigation requirements through a regulatory market mechanism, or that voluntarily seeks to mitigate its impacts, could then contract with the company that created the habitat to offset its impacts on pollinators.¹⁸⁷ Focusing a Conservation Innovation Grant on developing the architecture or background science for such a program could be highly beneficial for developing these markets.¹⁸⁸

Another potential approach for state governments is to use conservation financing approaches. Maryland, for example, recently passed environmental markets legislation aimed at incorporating these concepts into state policy across government.¹⁸⁹ Maryland's Comprehensive Conservation Finance Act strengthened the state's commitment to using green and blue infrastructure to meet various goals (and clarified the ability of these projects to leverage state purchase programs and grants).¹⁹⁰ This type of legislation could be expanded to incorporate creative state approaches to pollinator protection, either directly or as a co-benefit of environmental market-based approaches.



Indiana NRCS photo by Brandon O'Connor

Consider Expansion of Conservation Compliance

In the 1985 Farm Bill, restrictions against farming highly erodible lands without a conservation plan (“Sodbuster”) and filling in wetlands (“Swampbuster”) were added as a requirement to remain eligible for most USDA payments.¹⁹¹ In short, in exchange for these subsidies and benefits (which have since been expanded to cover crop insurance subsidies), a farmer must provide a base level of environmental stewardship.¹⁹² Failure to comply can result in significant financial penalties (both forward-looking and in requiring the return of prior payments).¹⁹³

While there have been challenges in the administration of these programs,¹⁹⁴ as well as persistent calls to strengthen these protections,¹⁹⁵ these programs have been beneficial. Given the increasing concern over pollinator health, perhaps it is time to consider whether conservation compliance could be extended to require basic stewardship related to pollinators. This program could require maintenance of grass strips (with wild grasses) to promote pollinator health by leveraging existing federal investment and infrastructure.

Integrate Pollinator Protection into Land Acquisition

Finally, pollinator protection could be better integrated into the acquisition of conservation-related lands. A signature effort of the Biden Administration includes the 30 by 30 program, which is designed to conserve and protect 30 percent of the American landscape by 2030.¹⁹⁶ Federal land-management agencies and states are looking to incorporate its mandate into their efforts.¹⁹⁷ To the extent that more federal funding becomes available to protect important conservation lands, attention should focus on how to incorporate pollinator health and population support in these efforts.¹⁹⁸ Using pollinator population data and support for these species as a goal of this ambitious conservation initiative could help protect more of the nation's open space as well as some of its most critical inhabitants.



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Conclusion

Given the various factors contributing to the decline of key pollinating species, a broad-based, multi-pronged policy intervention at all levels of government is needed to bolster pollinator populations and to prevent further decline. This will require creative thinking about the roots of the problem and targeted policy solutions. Different types of policy intervention are needed to address and solve the different types of problems facing pollinators. For example, policies designed to promote wild pollinators like native bees, hummingbirds, and bats will be different than those designed to boost non-native honeybees. Designing programs that advance all types of pollinators will be required to make significant progress.

Existing land-use policies are proving insufficient for preserving pollinator populations, but they may serve as a useful foundation for the development of new policies. Additional focus on the land-use strategies that

can bolster pollinator populations could potentially modify strategies and policies from existing conservation playbooks (designed to achieve other conservation benefits) for use towards this related environmental goal. As this paper suggests, these efforts can range from slight modifications to existing programs (such as re-prioritizing conservation easement programs to target pollinators) to the implementation of innovative policies (like using market incentive programs to achieve environmental successes on the working landscape). Land conservation efforts designed to promote the functioning of whole ecological systems can also produce important co-benefits related to overall environmental health, which can extend the impacts of these efforts beyond just pollinators.

While land-use tools may not be able to address all the issues facing pollinators, they do squarely address habitat loss and must therefore be included as part of a comprehensive effort to ensure that these critical species continue to thrive. Additionally, flexible land-use tools like conservation easements can be negotiated to include specific terms prohibiting pollinator-harming pesticides and the planting of invasive species, two other leading inhibitors of pollinator health.

Given the critical importance of pollinator populations to environmental and human health, considered alongside the sheer variety of threats to pollinators, it will take a constellation of government policy, corporate action,¹⁹⁹ and individual decision-making to implement land management techniques that adequately protect pollinators.²⁰⁰



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Authors and Acknowledgements

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The authors would like to thank Laurie J. Beyranevand, Whitney Shields, and the Vermont Law and Graduate School's Center for Agriculture and Food Systems team for their careful review and commentary on this white paper.

This project was funded by a grant from the USDA National Agricultural Library to the Vermont Law and Graduate School's Center for Agriculture and Food Systems.



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- 71 *See* MEGAN STUBBS, CONG. RSCH. SERV., *2018 FARM BILL PRIMER: TITLE II CONSERVATION PROGRAMS* (2019), <https://sgp.fas.org/crs/misc/IF11199.pdf> (depicting relative conservation title funding by category over the past four farm bills and describing the gradual shift in favor of working lands programs).



- 72** *A Closer Look at the 2018 Farm Bill: Working Lands Conservation Programs*, NAT'L SUSTAINABLE AGRIC. COAL.: BLOG (NSAC) (JAN. 14, 2019), <https://sustainableagriculture.net/blog/a-closer-look-at-the-2018-farm-bill-working-lands-conservation-programs/> (explaining that working lands programs “help farmers to enhance the sustainability of their operations while keeping lands in production.”).
- 73** See, e.g., *USDA Funding Available to Help Control Soil Erosion on Cropland*, OCIA INT'L (JUNE 29, 2020), <https://ocia.org/2020/06/29/usda-funding-available-to-help-control-soil-erosion-on-cropland>.
- 74** Agriculture either enjoys express exceptions from many, if not, most environmental laws or is otherwise exempted based on the characteristics of its production as a non-point source of pollution. See, e.g., J.B. Ruhl, *Farms, Their Environmental Harms, and Environmental Laws*, 27 *ECOLOGY*. L. Q. 263 (2000) (exploring these issues).
- 75** *Farm Bill*, NAT'L WILDLIFE FED., <https://nwf.org/Our-Work/Our-Lands/Farm-Bill> (last visited Aug. 21, 2022).
- 76** *Programs*, THEODORE ROOSEVELT CONSERVATION P'SHIP, <https://www.trcp.org/farm-bill/> (last visited Aug. 21, 2022).
- 77** See NSAC, *supra* note 72.
- 78** *Id.*
- 79** *Environmental Quality Incentives Program*, USDA: NRCS, <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/> (last visited June 20, 2022).
- 80** See, e.g., *Environmental Quality Incentives Program in Massachusetts*, USDA: NRCS MASSACHUSETTS, https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_013847.pdf (last visited June 23, 2022). For more information on the rate schedules (which are set annually), see *State Payment Schedules*, NRCS, <https://www.nrcs.usda.gov/getting-assistance/payment-schedules> (last visited June 23, 2022).
- 81** See *Biology Technical Note: Creating and Enhancing Habitat for Pollinator Insects*, NRCS 2 (Dec. 2018), https://efotg.sc.egov.usda.gov/references/public/MT/Creating_and_Enhancing_Pollinator_Habitat.pdf.
- 82** *Id.* The numbers referenced in the text refer to NRCS's internal numbering system by conservation practice type.
- 83** MEGAN STUBBS, CONG. RSCH. SERV., *ENVIRONMENTAL QUALITY INCENTIVES PROGRAM (EQIP): STATUS AND ISSUES 1* (2010), https://www.everycrsreport.com/files/20100813_R40197_96c50b61fbf16db685182bad3fdcf5cc02179856.pdf.
- 84** *Conservation Stewardship Program (CSP)*, USDA, <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp/> (last visited June 20, 2022).
- 85** See *CSP Enhancements and Bundles*, NRCS, <https://www.nrcs.usda.gov/csp-enhancements-and-bundles> (last visited June 20, 2022).
- 86** *Conservation Stewardship Program*, NAT'L SUSTAINABLE AGRIC. COAL., <https://sustainableagriculture.net/publications/grassrootsguide/conservation-environment/conservation-stewardship-program/> (last visited Aug. 21, 2022).
- 87** See MEGAN STUBBS, CONG. RSCH. SERV., *CONSERVATION RESERVE PROGRAM (CRP): STATUS AND ISSUES* (2014), <https://nationalaglawcenter.org/wp-content/uploads/assets/crs/R42783.pdf>.
- 88** See NRCS, *supra* note 81.
- 89** See generally, Zachary Cain & Stephen Lovejoy, *History and Outlook for Farm Bill Conservation Programs*, CHOICES (2004), <https://www.choicesmagazine.org/2004-4/policy/2004-4-09.pdf> (exploring the history of this type of policy intervention).
- 90** *Conservation Reserve Program*, USDA FARM SERV. AGENCY, <https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/index> (last visited June 20, 2022).
- 91** *Id.*
- 92** *Conservation Reserve Program*, NAT'L SUSTAINABLE AGRIC. COAL., <https://sustainableagriculture.net/publications/grassrootsguide/conservation-environment/conservation-reserve-program/> (last visited June 29, 2022) (explaining requirements for CRP eligibility).
- 93** See Jack Hennessy, *CRP: Achieving Conservation Goals on Private Lands for 30 Years*, PHEASANTS FOREVER (Dec. 22, 2015), <https://www.pheasantsforever.org/BlogLanding/Blogs/Field-Notes/CRP-Achieving-Farming-and-Conservation-Goals-on-Pr.aspx>
- 94** See *Pollinator Habitat Planting: CP42*, USDA, https://www.fsa.usda.gov/Internet/FSA_File/pollinator_fact_sht.pdf (last visited Aug. 21, 2022) (explaining the importance of grassland habitat for pollinators and providing a planting mix supportive of these species).
- 95** See *id.*
- 96** CRP's purposes are multiple. The program intends to achieve environmental benefit by paying farmers to not plant environmentally sensitive lands. The program also is intended to have an economic effect by taking farmland out of production, which historically was intended to address supply-side imbalances and raise the price of commodity crops.



- 97 *USDA Announces Conservation Reserve Program Signups for 2022*, USDA (Jan. 26, 2022), <https://www.fsa.usda.gov/newsroom/news-releases/2022/usda-announces-conservation-reserve-program-signups-for-2022>.
- 98 *See Easements*, NRCS, <https://www.nrcs.usda.gov/programs-initiatives/easements> (last visited Aug. 21, 2022).
- 99 *See* Jessica Owley Lippmann, *Exacted Conservation Easements: The Hard Case of Endangered Species Protection*, 19 J. ENV'T L. & LITIG. 293, 298 (2004) (“A conservation easement is in essence taking a stick out the bundle and giving it to someone else.”).
- 100 *See What We Do*, LAND TR. ALL., <https://www.landtrustalliance.org/what-we-do> (last visited Aug. 21, 2022).
- 101 *See, e.g.*, Ashley Miller, *5 Million Acres in Conservation Easements*, USDA (Apr. 8, 2021), <https://www.farmers.gov/blog/5-million-acres-in-conservation-easements>.
- 102 *See Agricultural Conservation Easement Program*, NRCS, <https://www.nrcs.usda.gov/programs-initiatives/acep-agricultural-conservation-easement-program> (last visited Sept. 4, 2023).
- 103 *Id.*
- 104 NRCS, *RESTORING AMERICA’S WETLANDS 2* (2023), https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=nrcseprd1398820&ext=pdf.
- 105 *Areawide Market Analysis (AWMA) Statement of Work (SOW) and Specifications for the Wetland Reserve Easements Component of the Agricultural Conservation Easement Program Guidance for Fiscal Year 2022*, NRCS (May 13, 2021), <https://directives.sc.egov.usda.gov/viewerFS.aspx?hid=46713> (explaining compensation for this type of conservation easement).
- 106 USDA, *HOW NRCS WETLAND RESERVE EASEMENTS WORK 5* (2022), <https://www.nrcs.usda.gov/sites/default/files/2022-11/How%20Wetland%20Reserve%20Easements%20Work%20-%20VT%20version.pdf>.
- 107 *See* NRCS, *ENSURING THE FUTURE OF AGRICULTURE* (2022), https://www.nrcs.usda.gov/sites/default/files/2022-11/ALE_magazine_1.pdf.
- 108 *See ACEP-ALE for Entities*, AM. FARMLAND TRUST: FARMLAND INFO. CTR., <https://farmlandinfo.org/acep-ale-for-entities> (last visited June 20, 2022).
- 109 *See, e.g.*, David M. Mushet & Cali L. Roth, *Modeling the Supporting Ecosystem Services of Depressional Wetlands in Agricultural Landscapes*, 40 NATURE: WETLANDS 1061, (2020) (examining the pollinator benefit of wetland projects).
- 110 *Regional Conservation Partnership Program*, NRCS, <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/rcpp/> (last visited June 22, 2022).
- 111 *Regional Conservation Partnership Program*, NAT’L SUSTAINABLE AGRIC. COAL. (last updated July 2019), <https://sustainableagriculture.net/publications/grassrootsguide/conservation-environment/cooperative-conservation-partnership-initiative/>.
- 112 USDA, *REGIONAL CONSERVATION PARTNERSHIP PROGRAM: FISCAL YEAR 2018 PROJECTS BY STATE 16* (2018), https://www.nrcs.usda.gov/sites/default/files/2022-10/List_of_FY2018_Projects_-_Final_12202017.pdf.
- 113 *See Our Mission and What We Do*, U.S. EPA (last updated May 23, 2023), <https://www.epa.gov/aboutepa/our-mission-and-what-we-do>.
- 114 *See, e.g., Civil Cases and Settlements by Statute*, U.S. EPA, <https://cfpub.epa.gov/compliance/cases/index.cfm?templatePage=12&ID=3&sortBy=TITLE> (last visited Sept. 5, 2023).
- 115 *Pesticides*, U.S. EPA, (last updated Sept. 5, 2023) <https://www.epa.gov/pesticides>.
- 116 *EPA Actions to Protect Pollinators*, U.S. EPA (last updated June 29, 2023), <https://www.epa.gov/pollinator-protection/epa-actions-protect-pollinators>.
- 117 *Id.*
- 118 *See Best Management Practices for Federal Lands*, NAT’L PARK SERV. (last updated June 5, 2017), <https://www.nps.gov/subjects/pollinators/best-management-practices-for-federal-lands.htm>.
- 119 CAROL HARDY VINCENT ET AL., *CONG. RSCH. SERV., FEDERAL LAND OWNERSHIP: OVERVIEW AND DATA 1* (2020), <https://sgp.fas.org/crs/misc/R42346.pdf>.
- 120 *See, e.g.*, Jessica Owley & Jess Phelps, *Federal Land Conservation in Rural Areas*, 86 BROOKLYN L. REV. 839 (2021) (exploring federal land management agency mandates generally).
- 121 *See id.*
- 122 *About Us*, NAT’L PARK SERV. (last updated Aug. 18, 2023), <https://www.nps.gov/aboutus/index.htm>.
- 123 *Find a Park*, NAT’L PARK SERV. (last updated Sept. 1, 2023), <https://www.nps.gov/findapark/index.htm>.



- 124** *National Park System: Units/Parks*, NAT'L PARK SERV. (last updated July 25, 2023), <https://www.nps.gov/aboutus/national-park-system.htm> (explaining the wide variety of park units that NPS manages; as of July 2023, that included 425 units covering more than 85 million acres).
- 125** *Prospering Pollinators in Manassas Grasslands*, NAT'L PARK SERV. (last updated Feb. 17, 2022), <https://www.nps.gov/articles/000/prospering-pollinators-and-manassas.htm>.
- 126** U.S. FISH & WILDLIFE SERV., <https://www.fws.gov> (last visited June 23, 2022).
- 127** *How the U.S. Fish and Wildlife Service Helps Pollinators*, U.S. FISH & WILDLIFE SERV., <https://www.fws.gov/initiative/pollinators/how-fws-helps> (last visited Sept. 5, 2023) (profiling FWS's initiatives to help pollinators on both its refuges and on private lands through partnerships).
- 128** *Endangered Species*, U.S. FISH & WILDLIFE SERV., <https://www.fws.gov/program/endangered-species> (last visited Sept. 5, 2023).
- 129** *Endangered Species Act*, U.S. FISH & WILDLIFE SERV., <https://www.fws.gov/law/endangered-species-act> (last visited Sept. 5, 2023).
- 130** See Michael Doyle, *Biden Admin Warns of Monarch Protections as Summit Begins*, GREENWIRE (June 22, 2022, 1:40 PM EDT), <https://subscriber.politicopro.com/article/eenews/2022/06/22/biden-admin-warns-of-monarch-protections-as-summit-begins-00041332>; see also Dino Grandoni, *Why Monarch Butterflies, Now Endangered, Are on the Edge of Collapse*, WASH. POST (July 21, 2022, 10:58 AM EDT), <https://www.washingtonpost.com/climate-environment/2022/07/21/monarch-butterfly-endangered-iucn/> (summarizing the IUCN's decision to list monarch butterflies as endangered).
- 131** See NAT'L CONF. OF STATE LEGISLATURES, *supra* note 30.
- 132** *Id.* (providing examples of the five basic categories of policy approaches to help pollinators).
- 133** In Vermont, for example, the state conveyed a study committee to look into pollinator issues and make recommendations for policy intervention (which adopted some of these specific strategies). See VT.'S POLLINATOR PROT. COMM., REPORT TO THE VERMONT LEGISLATURE AS REQUIRED BY ACT 83 OF 2016 SESSION (2017), <https://agriculture.vermont.gov/sites/agriculture/files/documents/Pollinator%20Protection%20Report-FINAL.pdf>.
- 134** See NAT'L CONF. OF STATE LEGISLATURES, *supra* note 30.
- 135** See VT.'S POLLINATOR PROT. COMM., *supra* note 133.
- 136** See NAT'L CONF. OF STATE LEGISLATURES, *supra* note 30.
- 137** See *id.*
- 138** See *id.*
- 139** See Abagael Giles, *Gov. Scott Signs Environmental Justice Policy and 2 Other Major Environmental Bills into Law*, VT. PUB. (June 1, 2022, 11:45 AM EDT), <https://www.vermontpublic.org/vpr-news/2022-06-01/gov-scott-signs-environmental-justice-policy-and-other-major-environmental-bills-into-law>.
- 140** Act effective July 1, 2022, No. 145, H.626, <https://legislature.vermont.gov/Documents/2022/Docs/BILLS/H-0626/H-0626%20As%20Passed%20by%20Both%20House%20and%20Senate%20Official.pdf>; see also Christopher Ross, *Pesticides Threatening Pollinators, Lawmakers Punt on Limit to Bee-Killing Poisons*, ADDISON CNTY. INDEP. (May 19, 2022), <https://www.addisonindependent.com/222/05/19/pesticides-threatening-pollinators-lawmakers-punt-on-limit-to-bee-killing-poisons/>.
- 141** In addition to private lands, state governments also manage their own lands to better support pollinators, from parks to rights-of-way. See *New Hampshire Fish and Game Department Awarded Grant to Increase Pollinator Habitat*, N.H. FISH & GAME (Nov. 4, 2019), <https://nhfishgame.com/2019/11/04/new-hampshire-fish-and-game-department-awarded-grant-to-increase-pollinator-habitat/>.
- 142** 2010 Ky. Acts 52.
- 143** See Ana Heck & Jeremy Rhodes, *Somewhere for the Pollinators to Go: A Case Study of Establishing Large-Scale Pollinator Habitat*, MICH. STATE UNIV. EXTENSION (Nov. 22, 2021), <https://www.canr.msu.edu/news/case-study-of-establishing-large-scale-pollinator-habitat>.
- 144** See NAT'L CONF. OF STATE LEGISLATURES, *supra* note 30.
- 145** See *id.*
- 146** Mike Cook, *State's First-Ever 'Pollinator Protection' License Plate Now Available*, LAS CRUCES BULL. (May 1, 2020, 2:00 AM MT), <https://www.lascrucesbulletin.com/stories/states-first-ever-pollinator-protection-license-plate-now-available,3812>.
- 147** See Brooke Decker, *'No-Mow-May' Lets Pollinators Play!*, VT. AGENCY OF AGRIC. FOOD & MKTS., <https://agriculture.vermont.gov/%E2%80%98no-mow-may%E2%80%99-lets-pollinators-play> (last visited Sept. 5, 2023).
- 148** These state efforts often connect to robust efforts being made by conservation organizations. See, e.g., Sid Bewlay, *'Bee the Change' Working Hard to Create Pollinator Habitats Across Vermont*, NBC: WPTZ BURLINGTON, (last updated June 20, 2022, 6:24 PM EDT), <https://www.mynbc5.com/article/bee-the-change-working-hard-to-create-pollinator-habitats-across-vermont/40353111>.



- 149** See, e.g., *Xerces Model Policy to Protect Pollinators from Harmful Pesticide Exposures*, XERCES Soc’y, <https://xerces.org/pesticides/model-local-resolution> (last visited June 10, 2022); see also BEE CITY USA, <https://beecityusa.org/> (last visited June 10, 2022) (providing support to towns and cities looking to become more pollinator-friendly).
- 150** See, e.g., XERCES Soc’y, *supra* note 149.
- 151** CITY OF BOULDER, COLO., RESOLUTION No. 1159: A RESOLUTION CONCERNING THE USE OF NEONICOTINOID PESTICIDES IN THE CITY OF BOULDER (May 5, 2015), <https://bouldercolorado.gov/media/564/download?inline>. Examples of other law and policy aimed at protecting pollinators, including municipal laws, can be found by applying relevant filters to the Healthy Food Policy Project policy database. See HEALTHY FOOD POL’Y PROJECT, *Policy Database*, <https://healthyfoodpolicyproject.org/policy-database> (last visited Sept. 4, 2023).
- 152** WILL GLENNY ET AL., BIODIVERSITY & CONSERVATION, A REVIEW OF MANAGEMENT DECISIONS ON INSECT POLLINATORS ON PUBLIC LANDS IN THE UNITED STATES 8-9 (Mar. 2, 2022) (Incorporating pollinator concerns with other federal land management considerations may result in some counterintuitive solutions, such as allowing problematic weeds to promote pollinator health); See, e.g., Nicholas Balfour & Francis L.W. Ratnieks, *The Disproportionate Value of ‘Weeds’ to Pollinators and Biodiversity*, 15 J. APPLIED ECOLOGY 1209 (Mar. 2022).
- 153** *Pollinators: How You Can Help*, U.S. FOREST SERV., <https://www.fs.usda.gov/wildflowers/pollinators/friendlypractices.shtml> (last visited Sept. 6, 2023).
- 154** See *id.*
- 155** See generally HARPER McMINN-SAUDER ET AL., INSECTS, FLOWERS IN CONSERVATION RESERVE PROGRAM (CRP) POLLINATOR PLANTINGS AND THE UPPER MIDWEST AGRICULTURAL LANDSCAPE SUPPORTING HONEY BEES 1 (June 30, 2020) (describing the use of CRP to benefit pollinators in the Midwestern U.S.).
- 156** CRP has multiple purposes. The program intends to achieve environmental benefit by paying farmers to not plant environmentally sensitive lands. The program also is intended to have an economic effect by taking farmland out of production, which historically was intended to address supply-side imbalances and raise the price of commodity crops. See Jonathan Coppess, *Historical Background on the Conservation Reserve Program*, FARMDOC DAILY (May 4, 2017), <https://farmdocdaily.illinois.edu/2017/05/historical-background-on-the-crp.html>.
- 157** See John L. Hollingshead, *Conservation Easements: A Flexible Tool for Land Preservation*, 3 ENV’T LAW 319 (1997).
- 158** See Adena Rissman et al., *Land Management Restrictions and Options for Change in Perpetual Conservation Easements*, 52 ENV’T MGMT. 277 (2013).
- 159** See, e.g., *Conservation Easement Enables Landowners to Restore Wetland, Help Protect Fish*, NRCS (Mar. 24, 2014), <https://www.usda.gov/media/blog/2014/03/24/conservation-easement-enables-landowners-restore-wetland-help-protect-fish> (explaining the use of conservation easements as a tool to build a partnership between a landowner and the USDA in promoting fish habitat).
- 160** See, e.g., *Agricultural Conservation Easement Program*, NRCS, <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/acep/> (last visited June 20, 2022).
- 161** See, e.g., Dominic P. Parker, *Land Trusts and the Choice to Conserve Land with Full Ownership or Conservation Easements*, 44 NAT. RES. J. 483 (2004) (exploring land trust calculations generally).
- 162** J.B. Ruhl, *Agriculture and the Environment: Three Myths, Three Themes, Three Directions*, 25 ENVIRONS: ENV’T L. & POL’Y J. 101 (2002); see also MEGAN STUBBS, CONG. RSCH. SERV., ENVIRONMENTAL REGULATION OF AGRICULTURE (2014), <https://sgp.fas.org/crs/misc/R41622.pdf> (exploring these exemptions and examining where agriculture is regulated).
- 163** See generally Laurie A. Wayburn, *Conservation Easements as Tools to Achieve Regulatory Environmental Goals*, 74 LAW & CONTEMP. PROBS. 175 (2011).
- 164** See Jessica Owley, *Changing Property in a Changing World: A Call for the End of Perpetual Conservation Easements*, 30 STAN. ENV’T L. J. 121 (2011).
- 165** There are other potential issues around conservation easements, such as valuation of tax-incentivized conservation easements and syndicated conservation easements, which have led this tool to receive periodic criticism. This white paper will not explore these issues, but for a summary of some of the principal concerns, see Nancy A. McLaughlin et al., *Some Dirty Realities About Syndicated Conservation Easements*, 167 TAX NOTES 1729 (2020).
- 166** See ELIZABETH BYERS & KARIN M. PONTE, THE CONSERVATION EASEMENT HANDBOOK 14-22 (2d ed. 2005).
- 167** See J.B. Ruhl, *Farms, Their Environmental Harms, and Environmental Laws*, 27 ECOLOGY L. Q. 263, 340-41 (2000).
- 168** Nancy A. McLaughlin, *A Constructive Reformist’s Perspective on Voluntary Conservation Easements*, LANDCAN, <https://www.landcan.org/article/A-Constructive-Reformists-Perspective-on-Voluntary-Conservation-Easements/162> (last visited Sept. 6, 2023) (discussing this and other issues related to voluntary easements).



- 169** See Jessica Owley & Adena R. Rissman, *Trends in Private Land Conservation: Increasing Complexity, Shifting Conservation Purposes and Allowable Private Land Uses*, 51 *LAND USE POL'Y* 76, (2016).
- 170** JEFF PIDOT, LINCOLN INST. OF LAND POL'Y, *REINVENTING CONSERVATION EASEMENTS: A CRITICAL EXAMINATION AND IDEAS FOR REFORM* 18 (2005).
- 171** See Sydney Bezanson, *Monitoring Conservation Easements*, THE NATURE CONSERVANCY (Feb. 18, 2021), <https://www.nature.org/en-us/about-us/where-we-work/united-states/north-carolina/stories-in-north-carolina/conservation-easements/>.
- 172** See ELIZABETH BYERS & KARIN M. PONTE, *THE CONSERVATION EASEMENT HANDBOOK* 143-168 (2d ed. 2005).
- 173** See *How We Work: Private Lands Conservation*, THE NATURE CONSERVANCY, <https://www.nature.org/en-us/about-us/who-we-are/how-we-work/private-lands-conservation/> (last visited June 20, 2022).
- 174** Dianne Stroman & Urs P. Kreuter, *Factors Influencing Land Management Practices on Conservation Easement Protected Landscapes*, 28 *SOC'Y & NAT. RES.* 891, 902 (2015).
- 175** ELIZABETH BYERS & KARIN M. PONTE, *THE CONSERVATION EASEMENT HANDBOOK* 201 (2d ed. 2005).
- 176** *Managing Natural Lands for Pollinators*, XERCES SOC'Y, <https://xerces.org/pollinator-conservation/natural-lands> (last visited June 2, 2022).
- 177** See Kirsten Ferguson, *Saving Hairy Belly Bees and Other Pollinators*, 38 *SAVING LAND* 6 (2019) (describing the emerging coalition of land trusts around the country working to protect pollinators) <https://www.landtrustalliance.org/blog/saving-hairy-belly-bees-and-other-pollinators>.
- 178** See *Stories in Kentucky: Planting for Pollinators*, THE NATURE CONSERVANCY (July 2, 2019), <https://www.nature.org/en-us/about-us/where-we-work/united-states/kentucky/stories-in-kentucky/planting-for-pollinators/>.
- 179** Additionally, many land trusts have focused on educational efforts, including creating “pop-up gardens” and finding other creative ways to inform landowners how to support pollinator species. See, e.g., *Pollinator Pop-Up*, WESTCHESTER LAND TR., <https://westchesterlandtrust.org/caring-for-the-land/pollinator-pop-up/> (last visited Aug. 24, 2022).
- 180** A buffer is a vegetated area adjacent to body of water that is critical for filtering out phosphorous, nitrogen, and sediments from agricultural runoff. See, e.g., *Buffer Lands*, JOHN MUIR LAND TR., <https://jmlt.org/our-places/buffer-lands/> (last visited Sept. 6, 2023).
- 181** See *Minnesota Buffer Law*, MINN. BD. OF WATER & SOIL RES. (last visited Aug. 3, 2023) (describing Minnesota’s requirement of perennial vegetative buffers of up to 50 feet along lakes, rivers, and streams).
- 182** See generally Matthias Albrecht et al., *The Effectiveness of Flower Strips and Hedgerows on Pest Control, Pollination Services, and Crop Yield: A Quantitative Synthesis*, 23 *ECOLOGY LETTERS* 1488 (2021) (describing the potential co-benefits of changing planting techniques for both crops and pollinators).
- 183** See, e.g., USDA, BIOLOGY TECH. NOTE No. 78, *USING 2014 FARM BILL PROGRAMS FOR POLLINATOR CONSERVATION*, <https://xerces.org/sites/default/files/publications/15-043.pdf>.
- 184** See ROSE ET AL., BERKELEY FOOD INST., *supra* note 10, at 4-5.
- 185** See James Salzman et al., *The Global Status and Trends of Payments for Ecosystem Services*, 1 *NATURE: SUSTAINABILITY* 136 (Mar. 12, 2018) (providing overview of conservation finance strategies generally).
- 186** *Biodiversity Offsets*, FOREST TRENDS, <https://www.forest-trends.org/bbop/bbop-key-concepts/biodiversity-offsets/> (last visited June 29, 2022).
- 187** See J.B. Ruhl et al., *Connecting Ecosystem Services Science and Policy in the Field*, 19 *FRONTIERS ECOLOGY & ENV'T* 485, (2021) (providing an overview of the function of these markets).
- 188** *Conservation Innovation Grants*, NRCS, <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/cig> (last visited Aug. 24, 2022).
- 189** See *Conservation Finance Act Passes in the Maryland General Assembly*, CHESAPEAKE CONSERVANCY (Apr. 6, 2022), <https://www.chesapeakeconservancy.org/2022/04/06/conservation-finance-act-passes-in-the-maryland-general-assembly/>; see also Tim Male, *Maryland Enacts Nation’s First Conservation Law Focused on Private Finance*, ENV'T POL'Y INNOVATION CTR. (Apr. 21, 2022), <https://www.policyinnovation.org/blog/cfa-signed>.
- 190** *Maryland’s Comprehensive Conservation Finance Act*, ENV'T POL'Y INNOVATION CTR. ET AL., <https://www.chesapeakeconservation.org/wp-content/uploads/2021/06/Comprehensive-Conservation-Finance-Act-Summary-2pg-1-1.pdf> (last visited Sept. 6, 2023).
- 191** See *Conservation Compliance: Highly Erodible Lands and Wetlands Provisions*, NRCS <https://www.nrcs.usda.gov/getting-assistance/financial-help/conservation-compliance> (last visited June 29, 2022).
- 192** MEGAN STUBBS, CONG. RSCH. SERV., *CONSERVATION COMPLIANCE AND U.S. FARM POLICY* 1 (2016), <http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R42459.pdf>.



- 193 *Id.* at 7.
- 194 See NAT'L SUSTAINABLE AGRIC. COAL., ENFORCEMENT OF CONSERVATION COMPLIANCE FOR HIGHLY ERODIBLE LANDS 3-7 (2018), <https://sustainableagriculture.net/wp-content/uploads/2018/06/CFRA-NSAC-Conservation-compliance-special-report.pdf>.
- 195 See, e.g., Laurie Ristino & Gabriela Steier, *Losing Ground: A Clarion Call for Farm Bill Reform to Ensure a Food Secure Future*, 42 COLUM. J. ENV'T L. 59 (2019).
- 196 See Benji Jones, *The Biden Administration Has a Game-Changing Approach to Nature Conservation*, Vox (May 7, 2021), <https://www.vox.com/2021/5/7/22423139/biden-30-by-30-conservation-initiative-historic> (providing overview of the 30 by 30 program. There also may be potential to tie into the Biden administration's priorities around promoting agriculture if production and conservation goals can be aligned).
- 197 Vermont, for example, recently passed legislation supporting the 30 by 30 initiative and committing state resources to support it. See *Environmentalists Celebrate as Phil Scott Allows Conservation Bill to Become Law Without His Signature*, VTDIGGER (June 12, 2023, 7:10 PM EDT), <https://vtdigger.org/2023/06/12/environmentalists-celebrate-as-phil-scott-allows-conservation-bill-to-become-law-without-his-signature/>. Governor Scott vetoed a similar bill in 2022. See *Vermont Gov. Phil Scott Vetoes Land Conservation Bill*, AP (June 3, 2022, 10:00 AM EDT), https://www.caledonianrecord.com/news/state/vermont-gov-phil-scott-vetoes-land-conservation-bill/article_9d64c24c-cdf8-52a8-b346-5c2e85e5af44.html.
- 198 The recent Inflation Reduction Act provides considerable funds for conservation acquisitions—some of which could be used for pollinator-related priorities in acquisition and beyond. See, e.g., Benji Jones, *Hidden Inside the Inflation Reduction Act: \$20 Billion to Help Fix Our Farms*, Vox (Aug. 16, 2022), <https://www.vox.com/science-and-health/2022/8/15/23301352/inflation-reduction-act-farms-climate-wildlife>.
- 199 See, e.g., *How We're Protecting our Pollinators*, WHOLE FOODS MARKET, <https://www.wholefoodsmarket.com/mission-in-action/environmental-stewardship/pollinator-health> (last visited June 3, 2022) (providing one example of corporate action on this issue).
- 200 See, e.g., Ryan P. Smith, *How to Protect Pollinators in Ten Easy Ways*, SMITHSONIAN MAG. (May 17, 2018), <https://www.smithsonianmag.com/smithsonian-institution/honor-world-bee-day-protect-your-local-pollinators-these-ten-east-ways-180969111/>.

