Bring Back the Pollinators

Annual Report

2018

XERCES SOCIETY
for Invertebrate Conservation

Protecting the Life that Sustains Us

The Xerces Society for Invertebrate Conservation is a nonprofit organization that protects wildlife through the conservation of invertebrates and their habitat. Established in 1971, the Society is at the forefront of invertebrate protection, harnessing the knowledge of scientists and the enthusiasm of citizens to implement conservation programs worldwide. The Society uses advocacy, education, and applied research to promote invertebrate conservation.

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Regional offices in California, Connecticut, Indiana, Iowa, Maine, Massachusetts, Minnesota, Nebraska, New Jersey, New York, North Carolina, North Dakota, Oklahoma, Washington, and Wisconsin.

The Xerces Society is an equal opportunity employer and provider.

Front Cover Photograph Xerces Society / Matthew Shepherd

Flower-rich habitat created on a farm in California. Transforming landscapes so that bees have a safe place to live is at the heart of the Xerces Society's successful Bring Back the Pollinators campaign.

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The Xerces Society for Invertebrate Conservation

www.xerces.org

Overview

You are an important partner in our work to protect native pollinators, restore their habitats, and sustain biodiversity. Together, we are catalyzing the restoration and management of habitats in natural and human-altered landscapes to ensure long-term resilience of pollinator populations. With your support, we have been able to expand our successful model for conserving pollinators in agricultural landscapes and natural areas to more parts of the country, transforming more acres of farmland into diverse flowering habitats and preserving the habitats of our most threatened pollinators. We are reaching a growing number of people through our pollinator conservation trainings, outreach, and citizen science programs, and we are launching new initiatives to encourage the establishment of more high-quality habitat for pollinators and other beneficial insects in our neighborhoods.

Your support has made these recent accomplishments possible:

- Since 2008, 692,000 acres of pollinator habitat have been restored or protected with the Xerces Society's support, including over 250,000 acres in the last year.
- Two farms have become the first to receive Bee Better Certification and are supporting bees, butterflies, and beneficial insects with high-quality habitat protected from pesticides in accordance with science-based standards developed by the Xerces Society.
- More than 20,000 people during the last year learned about how to protect pollinators and adopt natural pest control methods that conserve beneficial insects.
- Our efforts have helped 23 communities pass policies that protect pollinators from neonicotinoids and other harmful pesticides since 2014, and we have convinced pesticide regulators in California to initiate an evaluation of water contamination from the most widely used neonicotinoid.
- Our effort to protect the rusty patched bumble bee has led to the protection of over 570,000 acres and may lead to improved management that benefits the bumble bee on another 2.5 million acres.
- Our advocacy, in partnership with conservation allies, has led to the restoration of over 1 million acres of monarch butterfly habitat on public and private lands.
- New tools and publications on monarch butterflies and milkweed habitat developed by the Xerces Society and our partners will guide monarch habitat management and restoration efforts in the West.
- Hundreds of volunteers across three states are collecting scientific data on bumble bees and searching for rare species as part of our newest citizen science project, the Pacific Northwest Bumble Bee Atlas.
- We launched a new initiative to engage urban and suburban residents in pollinator conservation so that more backyards, parks, and other public spaces become havens for native bees and butterflies, and we have joined forces with Bee City USA to expand pollinator habitat in cities and on college campuses.

Expanding Pollinator Habitat on Farms

Our work has culminated in the protection or restoration of 692,000 acres of pollinator and beneficial insect habitat since 2008. We have been successful in making pollinator conservation a priority of farm agencies like the Natural Resources Conservation Service (NRCS) and Farm Service Agency, as evidenced by increased enrollment from farmers in pollinator conservation programs.

In 25 states, we're working directly on the ground to install habitat for pollinators and other beneficial insects. Over the last year, we helped more than 300 farms with their pollinator and beneficial insect conservation projects. To support the increasing numbers of farmers installing pollinator habitat, in 2017 the Xerces Society added six new biologists based in rural NRCS field offices in California, Iowa, Maine, Minnesota, Nebraska, and North Dakota. This new team of biologists is supporting farmers with one-on-one pollinator conservation consulting and is providing technical assistance to regional NRCS staff.

Installing Pollinator Hedgerows on California Farms

Hedgerows composed of native plants and trees can provide invaluable habitat for pollinators and other wildlife, supplying forage and nesting sites and serving as corridors to help native bees and butterflies move across the landscape. Hedgerows can provide a special value to pollinators through their long-term lifespan. In fact, some European hedgerows have persisted for thousands of years, surviving shifts in climate and large-scale warfare while still providing wildlife habitat to this day.

Building on our previous work to establish large-scale pollinator habitats on California farms, in 2017 and 2018, we partnered with a broad community of almond growers and vegetable farmers in the Central Valley to plant over 25 miles of drought-tolerant, flowering, native-shrub hedgerows, in addition to 200 acres of wildflower meadows, cover crops, and other pollinator habitat.

Within almond orchards, hedgerows of flowering native shrubs are providing bee habitat around farm perimeters, while flowering cover crops between the rows of almond trees extend habitat deep into the orchards and make them more hospitable to bees. In order to protect this new habitat from exposure to pesticides, the Xerces Society has helped the orchards assess their pesticide use and adopt pesticide mitigation strategies.

Almonds are one of the many crops that rely on bees for pollination. To meet the pollination demands of the billions of blooms at California almond orchards, farmers import over 1 million honey bee hives. Nearly 90% of all commercial honey bee colonies in the U.S. journey to California every February, yet honey bees are facing numerous threats that cause beekeepers to routinely lose over 30% of their hives annually.

Fortunately, flower-rich habitat can help support ailing honey bee populations by providing additional nutrition, and at the same time sustain wild, native pollinator populations. Almonds that are grown in a monoculture leave little for bees to forage on before or after the almond trees bloom. When farmers provide habitat within and around orchards, all bees have a buffet of options that keep them healthy during almond pollination and, for honey bees, until they are moved to the next crop that requires their services.

Field day participants pose for a group photo after planting milkweed at a Minnesota farm demonstration site. Improving habitat can also help strengthen communities. (Photo: Xerces Society / Sarah Foltz Jordan.)

Farm Demonstration Habitats

Habitat demonstration projects are one of our most powerful tools for motivating farmers to create habitat for pollinators and other beneficial insects. Networks of demonstration farms are currently being developed in California, Iowa, New Hampshire, North Carolina, and other states. Some of these sites focus on supporting beneficial insect diversity to enhance crop pollination and reduce pest problems on organic farms, while other demonstration farms showcase how pollinator habitat can provide a wide range of conservation benefits, including improvements in carbon sequestration, soil health and water-holding capacity, and natural pest suppression.

Building Climate Resilience

Climate change is an increasingly significant stressor contributing to the decline of pollinators. Scientists predict that climate change will impact pollinators by changing the composition of bee and butterfly communities, adjusting the seasonal activity of some species, and impeding the ability of pollinator species to move across the landscape. These impacts are particularly important in the Central Valley of California—a region that produces one-sixth of the nation's agricultural output and relies heavily upon insect pollinators.

In response, we are embarking on a dedicated effort to make California's Central Valley more climate resilient for pollinators. Recent research indicates that existing linear areas, such as field borders, hedgerows, and roadsides may be particularly important in aiding the dispersal of species as they adapt to climate change. Potential linear habitats cover tens of thousands of acres of the Central Valley, spanning both rural and urban spaces.

Partnering with researchers at University of Nevada–Reno, we have initiated a project to model habitat connectivity for pollinators in the Central Valley. This model is helping us identify critical areas for habitat

restoration to create connected pollinator corridors that will allow a diversity of bees to thrive in this region under future climate scenarios.

We are restoring habitat with seed mixes that are adapted to future climate scenarios and working with land managers to alter habitat management methods in order to make the Central Valley more climate resilient for pollinators. Partnering with farmers, food companies, and the NRCS, we are creating hedgerow habitat

Midwest Farm Demonstration Sites Showcase Monarch Conservation Methods

In 2017, the Xerces Society partnered with farmers in Minnesota and Wisconsin to design and install high-quality monarch habitats at nine farm demonstration sites. Using the monarch butterfly as a flagship species, our approach was to work directly with farmers to install demonstration habitats on or near working lands to illustrate the feasibility and importance of these habitats across the agricultural landscape. On each farm, Xerces staff developed detailed strategies to improve habitat for monarchs and other pollinators, including plans for habitat placement, site preparation, seed mix design, planting approach, and short- and long-term management strategies. Habitat features at each farm ranged in size from 400 square feet to 27 acres. Highly diverse, regionally appropriate seed mixes were used at each site, including a variety of milkweed species and nectar plants for monarchs.

At four of these demonstration sites, we held farm field days to train other farmers, technical service providers, and rural landowners in monarch conservation techniques, including site selection, habitat design, site preparation, and planting, as well as how to access Farm Bill conservation programs. We also offered field days at two demonstration sites we helped established in 2015 and 2016, where participants had the opportunity to observe more mature habitat plantings and received training on evaluating restoration success and managing restored habitat sites for long-term quality.

A survey distributed to field day attendees showed that many of the participants have taken actions to conserve monarch butterflies. Over half of respondents reported planting or preparing areas for monarch and pollinator habitat, and over 80% had engaged in conversations with farmers, clients, colleagues, or neighbors about monarchs. A number of the field day participants have also taken steps to reduce pesticide exposure risks to habitat areas, enrolled their land in NRCS conservation programs for pollinators, and/or have given a presentation(s) on monarch conservation.

The demonstration sites established during this project will continue to be used to engage farmers, landowners, and conservation professionals working within agricultural landscapes to implement monarch and pollinator-friendly practices. Engaging agricultural landowners and land managers throughout the monarch butterfly's range—and particularly in the high-production areas of the Midwest—is critical to our success in recovering this iconic species.

and other linear habitat areas across thousands of farm acres in the Central Valley. We are also working with staff from the California Department of Fish and Wildlife, the Bureau of Land Management, the U.S. Fish and Wildlife Service, and state and local transportation agencies to provide technical guidance on incorporating pollinator habitat into existing restoration projects on public lands and increase pollinator habitat along roadsides and rights-of-way. We will leverage these opportunities to promote climate-resilient restoration and best management practices for pollinators at natural areas, wildlife refuges, and roadsides throughout the region. The resulting linear corridors and stepping stones of high-quality, climate-resilient plantings will provide habitat for pollinators now and into the future.

First Bee Better Certified Farms

Two almond orchards have become the first farms to achieve Bee Better Certification, Sran Family Farms and Harris Family Farms, both located in California. These producers are providing habitat and using farm management practices that support bees, butterflies, and beneficial insects, and protecting these animals from pesticides in accordance with science-based standards developed by the Xerces Society.

Bee Better Certified is the only third-party food and farming certification program in the world focused specifically on pollinator conservation. With the goal of giving bees a healthy place to live, the program was launched in June 2017 by the Xerces Society for Invertebrate Conservation in collaboration with national nonprofit organic certifier, Oregon Tilth.

In order to meet the Bee Better Certified requirements, Sran Family Farms installed pollinator habitat across 10 farm sites with over 2,000 acres of production land. Xerces Society staff provided conservation planning and technical support to Sran Family Farms through the certification process. In 2016 and 2017, the Xerces Society helped Harris Family Farm plant over 6 miles of native plant flowering hedgerows around their orchards, plus an additional 23 acres of cover crops. We are currently working with 11 other farms across the country to demonstrate the viability of this certification model, several of which will apply for certification later this year.

Pollinator Conservation Education

Educating people about the importance of pollinators and other beneficial insects is a core part of our conservation strategy. Through public talks, workshops, farm field days, conference presentations, webinars, and other events, we give people from all walks of life the knowledge they need to take action to conserve these vital animals. In addition to those we reach directly at events, we use traditional media, social media, and other communication channels to reach hundreds of millions of people each year with our pollinator conservation message.

To complement our in-person workshops and trainings, we produce how-to publications that provide detailed and practical conservation advice for farmers, farm agencies, land managers, gardeners, policy makers, and other audiences. In addition, we provide technical assistance to individuals and organizations to increase their capacity to effectively protect and provide habitat for pollinators and beneficial insects.

Xerces Society staff shared information about pollinator and invertebrate conservation at the 2018 March for Science in Portland, Oregon. (Photo: Xerces Society / Laura Rost.)

Training Pollinator Conservationists

Since 2009, we have reached over 110,000 people through short courses, presentations, field days, and other educational events, including over 20,000 people in the last year. The trainings we deliver are tailored to the needs of specific audiences and reflect the latest science in pollinator and beneficial insect conservation. Over the last year, we delivered educational programming on a variety of topics.

Bumble Bee Conservation

In addition to the field and classroom trainings on bumble bee identification and conservation we offer for land managers and citizen scientists, this year were able to engage a broader audience in bumble bee conservation through a webinar conducted in partnership with the Natural Resources Conservation Service (NRCS). In May 2018, Senior Conservation Biologist Rich Hatfield presented "Bumble Bee Ecology and Conservation," reaching nearly 1,000 NRCS staff and other participants from across the U.S. and Canada—the highest number of attendees for a non-required NRCS webinar ever recorded! During the webinar, Rich discussed the conservation status of North America's bumble bees, including the federally endangered rusty patched bumble bee, and the threats they face. The webinar covered the importance of habitat features and land management in supporting robust bumble bee communities and connected participants with resources for bumble bee identification and conservation.

Farm Habitat to Support Beneficial Insects

The Xerces Society organizes field days to give farmers and farm educators the opportunity to observe habitat sites as they are being established and hear directly from farmers about their experiences during the habitat planning and installation process. This spring we held a Cover Cropping for Beneficial Insects Field Day at a walnut orchard in California that had recently partnered with the Xerces Society to plant 10 acres of annual wildflowers and blooming cover crops for beneficial insects. The field day included a presentation by the Xerces Society on insect ecology, plant species selection, implementation and management as well as one from the landowner titled "A Farmer's Perspective: Why Do It and How Well Does It Work?". The 50 field day attendees also heard presentations from local Cooperative Extension, Resource Conservation District, and NRCS personnel on the benefits of cover cropping and NRCS cost-share programs and took a tour of the farm habitat.

Participants at the Cover Cropping for Beneficial Insects Field Day took a tour of the cover crops planted in the orchard understory. (Photo: Xerces Society / Angela Laws.)

Restoring Grasslands for Pollinators

The U.S. has millions of acres of grasslands, but most of these lands contain a low diversity of plants. Interseeding native plants on these lands could provide critical floral resources to pollinators as well as other wildlife. At the 2018 Northern Plains Sustainable Agriculture Society Winter Conference, we presented on ways to bring back flower diversity to grasslands and provided ranchers with practical guidance for interseeding grasslands and recommendations for wildflower species. We reached over 200 farmers and ranchers

from the Plains states and had the opportunity to talk with many producers at our conference booth who wanted more information on interseeding or creating pollinator habitat on their farms or ranches. We presented a webinar on this topic in July 2018, reaching an additional 125 people. The webinar covered the conditions that are appropriate for interseeding, how to approach a project, examples of how the interseeding process can be implemented, and the importance of ongoing management to maintain wildflower diversity.

Pollinator Conservation Policy

The Xerces Society delivers educational programs to policy makers and the general public that build support for policies that protect pollinators and increase high-quality habitat. Pollinator Program Co-Director Mace Vaughan presented a talk at the Garden Club of America National Affairs and Legislative Committee annual meeting in Washington, D.C., titled "Pollinator Conservation Policy: Next Steps Towards Protecting Pollinators in 2018," where 300 attendees learned about national agriculture policies and local policies that can protect pollinators. Executive Director Scott Hoffman Black was invited to be a keynote speaker at Colorado's 2017 Pollinator Summit, an event that brought together state and local agencies, businesses, educators, growers, land managers, researchers and interested individuals to actively work to preserve, conserve, and restore Colorado's rapidly declining pollinator populations and their habitats. Scott's presentation explained the drastic decline in pollinator invertebrate species worldwide and offered inspiring ideas for solutions to this crisis including actions cities and counties can take to reduce the use of systemic insecticides.

Xerces Society Pollinator Conservation Specialist Sarah Foltz Jordan conducts an evaluation of pollinator habitat at a vegetable farm. (Photo: Xerces Society / Karin Jokela.)

Conserving Monarch Butterflies Across North America

The Xerces Society participated in the 5th International Symposium on Research and Conservation of the Monarch Butterfly, a gathering of scientists and conservation leaders from Mexico, the U.S., and Canada to share the latest research on monarch butterflies and efforts to reverse the drastic declines faced by this species. Executive Director Scott Black coauthored a keynote presentation that was delivered by our partners at the Monarch Joint Venture, and Xerces Society Conservation Biologist Candace Fallon presented "Understanding and Conserving Monarch Butterflies in Western North America: Research, citizen science, education, advocacy, and restoration efforts by the Xerces Society for Invertebrate Conservation and Partners." These presentations were attended by a diverse audience of 130 policy makers, government officials, monarch researchers, village leaders, and university students.

Women, Food and Agriculture Network Conference

In November 2017, Xerces Society Pollinator Conservation Specialist Sarah Foltz Jordan and Conservation Biological Control Specialist Thelma Heidel-Baker presented a half-day workshop at the Women, Food and Agriculture Network (WFAN) annual conference titled "Sustainability and Conservation on the Farm: Focus on Integrated Pest Management and Soil Health." Thelma and Sarah explained the concept and rationale behind the practices of integrated pest management, including the use of beneficial insects as natural pest control. Workshop attendees learned the basics of beneficial insect ecology, general concepts for balancing the needs of those insects with farm practices, and principles for designing and implementing habitat features that support beneficial insects. Iowa demonstration farms were highlighted as case studies for how to incorporate beneficial insect habitat and participants were invited to our farm field days in the Midwest.

Xerces Society's Sarah Nizzi at a follow-up WFAN event in August 2018. (Photo: Xerces Society / Jennifer Hopwood.)

At the conference, we reached over 100 farmers from the Midwest and across the country. Our presentation generated a lot of enthusiasm among attendees, and provided farmers with the information and encouragement to take action, as these testimonials illustrate:

> *"You are so inspiring!! How lucky I was to connect with you both to present at our conference. I so enjoyed getting to know you (a little bit) and very much appreciate your time, enthusiasm, and great efforts for conservation."*

> *"Thanks for your fantastic presentation last weekend at the WFAN Conference. I'm glad I got to talk with you afterward. I am very interested in staying connected regarding possibilities for conservation work on our collaborative farm. I'm already envisioning possibilities for beetle banks, permanent pollinator strips, etc."*

To support healthy pollinator populations, this farmer in Princeton, Minnesota, partnered with the Xerces Society to plant wildflower strips in farm field borders, a quarter-acre of native wildflowers, and flowering cover crops. (Photo: Xerces Society / Sarah Foltz Jordan.)

One-on-one Support for Farmers

In addition to conducting trainings and workshops, Xerces Society staff members also provide one-on-one conservation support to farmers and other agricultural professionals. Providing this direct individual support helps landowners and conservation planners address the unique opportunities and challenges associated with individual farms.

We work with farms of all sizes at all stages of habitat creation. In the last year, we provided direct technical assistance and advice to over 300 farms across the country. While the type of assistance we offer varies

Xerces Society conservationists worked with students and researchers at North Carolina A&T State University on the installation of a diverse native hedgerow at the university's research farm which will support beneficial insects for organic production. (Photo: Xerces Society / Nancy Lee Adamson.)

depending on the needs of individual farms, for farms at the beginning stages of their habitat project our support often involves discussing options for creating on-farm habitat with the farmer; conducting site visits to assess baseline farm conditions for pollinators and beneficial insects; and working with famers to plan specific habitat features such as wildflower meadows, field borders, cover crops, or hedgerows. We provide guidance on site preparation and planting and offer recommendations to increase natural pest control and/or otherwise modify pesticide use. Once habitat has been planted, we help farmers adopt methods to maintain habitat over the long-term. At more mature sites, we help farms assess their habitat plantings for establishment success and pollinator presence, and we provide recommendations for improving habitat quality as needed.

Maine Pollinator Initiative

The Xerces Society partners closely with the NRCS to develop programs locally, regionally, and nationally that help farmers create habitat for pollinators on their land. In Maine, the Xerces Society has played a major role in shaping the new NRCS Maine Pollinator Initiative, which dedicates cost-share funding to establish, maintain, and protect pollinator habitat on farmlands across the state. This program helps farmers plant wildflower meadows and hedgerows that support imperiled species and help sustain crop pollination and establish windbreaks to protect habitat and flowering crops from pesticides. So far this year, the Xerces Society has helped over 30 farms learn about opportunities for pollinator conservation on their farm through the Maine Pollinator Initiative and has provided farmers with conservation planning assistance and customized support for their habitat projects.

The Maine Pollinator Initiative will help farmers plant habitat for at-risk native bees like the yellow-banded bumble bee while also helping farmers enhance the pollination of blueberries and other crops. (Photo: Xerces Society / Sarah Foltz Jordan.)

The Xerces Society helped bring together dozens of partners from federal and state agencies, conservation districts, farming groups, and conservation organizations across New England to build off of Maine's Pollinator Initiative and expand it regionally. This group is developing a new pollinator initiative through the Working Lands for Wildlife program designed to create and protect thousands of acres of on-farm habitat for at-risk pollinators such as the rusty patched bumble bee, the yellow banded bumble bee, and the monarch butterfly.

Providing Technical Assistance to Farm Agencies and Other Conservationists

The NRCS and county-level soil and water conservation districts (SWCDs) represent the front line in working one-on-one with farmers to protect natural resources. Because they are ideally positioned to reach farmers, we provide these farm conservation agencies with resources to empower their personnel to independently spearhead pollinator conservation projects. These resources include habitat establishment guides, pollinator plant lists, pollinator and beneficial insect monitoring and habitat assessment tools, and more.

In addition to providing technical assistance to agencies that support farmers like the NRCS, conservation districts, and extension offices, we advise many other groups who contact us seeking assistance with their pollinator conservation projects. For example, in the last year we provided technical support to:

- Land trusts,
- State departments of transportation,
- Tribes,
- Nurseries and garden centers,
- State fish and wildlife agencies,
- Schools and universities,
- Cities,
- Sustainable farming organizations,
- Beekeeping associations,
- Conservation groups, and
- Golf courses.

Advocating for Farm Conservation Programs for Pollinators

The Farm Bill contains a broad range of incentive-based conservation programs on agricultural land, including several programs that farmers rely on to create wildlife habitat for pollinators and other beneficial insects. The Xerces Society worked closely with senators and representatives to make pollinator conservation a priority in the 2008 and 2014 Farm Bills, expanding opportunities for habitat conservation and research funding for pollinators. However, other changes enacted in the 2014 Farm Bill led to the loss of more than 9 million acres of Conservation Reserve Program (CRP) lands. Many of these lands provided important habitat for pollinators, monarch butterflies, and other beneficial insects and this reduction of habitat has contributed to declines—especially for the monarch butterfly.

The Xerces Society is garnering support among farmers, food industry groups, beekeepers, and other conservation groups to strengthen pollinator conservation provisions in the 2018 Farm Bill, including the reconstitution of a multi-agency pollinator task force to coordinate pollinator conservation efforts among federal agencies, the assignment of a USDA pollinator research leader to help prioritize and manage federally supported research on important crop pollinators, and increased support for conservation biological pest control practices that reduce pesticide use. We also are advocating for an increase in the cap on CRP acreage and are opposing efforts to weaken pesticide and endangered species protections. In the current Farm Bill negotiations, we are working with a coalition of groups to protect existing Farm Bill conservation programs from cuts and to increase funding available to support sustainable agriculture research. Note: no lobbying is funded by our foundation supporters.

The Conservation Reserve Program has helped many farms like this one plant wildflower habitat to support pollinators and beneficial insects. (Photo: Xerces Society / Sarah Foltz Jordan.)

Promoting Ecological Pest Management

Each year, pesticides are applied on millions of acres of farmland, impacting native pollinators and the beneficial insects that provide natural pest control. By working with farmers, farm agencies, community members, and policy makers, we promote ecologically sound pest management practices that support diverse natural systems, manage pest problems, and reduce reliance on pesticides.

Farming with Beneficial Insects

Native insects that feed on crop pests are an overlooked resource in agricultural systems. Although vast numbers of such beneficial insects are at work on farms across the world, they are eclipsed in farm education by a smaller diversity of pest species. A growing body of research demonstrates that natural pest control benefits a wide array of farmers, from blueberry growers in Washington to row-crop farmers in Iowa.

We are helping farmers integrate beneficial insects back onto farms for natural pest control by organizing Conservation Biological Control Short Courses for farmers and farm agencies across the country. Since 2015, we have delivered 48 short courses, reaching more than 1,700 attendees. Through the use of follow-up surveys, we found that our train-the-trainer approach has improved the attendees' skills and capacity to implement beneficial insect habitat and adopt farm management practices, such as incorporating flowering cover crops, reducing tillage, and changing pest management practices to protect beneficial insects.

Due to a high level of interest in our Conservation Biological Control Short Courses, we delivered four short courses in Tennessee where attendees learned how to attract beneficial insects for natural pest control through a combination of classroom and field learning. (Photo: Xerces Society / Nancy Lee Adamson.)

In April 2018, we delivered a webinar for the Natural Resources Conservation Service (NRCS) and other conservation staff on using conservation biological control in vineyards. Nearly 200 attendees learned about beneficial insects that provide conservation biological control and how conservation practices such as flowering cover crops, insectary strips, flowering field borders, and more can sustain natural pest management.

To support farmers and farm educators in determining whether beneficial insects are present at specific farm sites we developed an easy-to-use tool for assessing the presence of predatory organisms where they hunt or rest—in soils, on vegetation, or on flowers. These guides are used during our conservation biological control short courses and other trainings to help participants gain hands-on skills in scouting for beneficial insects in the field.

Education for Conservation Planners on Beneficial Insects and Soil Health

It has been estimated that healthy soils may host more than 5,000 invertebrates per cubic foot. Soil invertebrates perform important functions such as nutrient cycling, carbon sequestration, pest management and weed-seed predation, and improvement of soil tilth. While interest in the topic of soil health is growing, these important organisms have generally been overlooked in the agricultural community, and few educational resources have been made available to farmers on this topic.

To address this gap, the Xerces Society partnered with the National Association of Conservation Districts to deliver a series of webinars on beneficial insect conservation and soil health. Staff from soil and water conservation districts across the country learned about soil invertebrates and their role in pest management and in sustaining biodiversity. During the webinars, Xerces Society staff also provided information on land management practices, such as reduced tillage, cover cropping, beetle banks, and permanent habitat plantings, that can support these invertebrates, as well as USDA Farm Bill conservation programs that can provide economic support to farmers.

In California, the Xerces Society participated in a day-long Soil Health Summit organized by the NRCS and resource conservation districts and delivered a presentation titled "Building Healthy Soil and Beneficial Insect Communities with Cover Crops" to a group of 50 farmers, conservation planners, and researchers. The presentation gave an overview of our current field trials at California farms where we are monitoring changes in carbon sequestration, soil health and water-holding capacity, and natural pest suppression in pollinator habitat.

Helping Farmers Move Away from Neonicotinoid Treated Seeds

The majority of soybean and corn crops in the U.S. are grown from seed treated with neonicotinoid insecticides. This has resulted in neonicotinoid use on millions of acres of farmland, even when no pests are present. This widespread use poses a threat to pollinators and other beneficial insects and contaminates our waterways, while the value of these treatments in pest management is questioned by numerous agricultural researchers.

Previously, the Xerces Society partnered with the Iowa NRCS to help corn and soybeans farmers assess if and when neonicotinoid-treated seeds are needed to manage pest species. This work demonstrated that neonicotinoid treated seed was only effective at managing a few infrequent pests and no common pests. Building off this work, the NRCS created a new incentive program for farmers to help them stop the routine unjustified planting of neonicotinoid treated corn and soybean seed.

The incentive is now being promoted throughout corn and soy country by Xerces Society staff as well as other farming organizations such as Practical Farmers of Iowa and Kansas Rural Center. Pesticide reform organizations are also leveraging the incentive to advocate that the U.S. Environmental Protection Agency take meaningful action on seed treatments. That is a valuable message since the U.S. Environmental Protection Agency's recent risk assessments for neonicotinoids have failed to find concern with seed treatments.

Promoting Policies and Practices to Reduce Pesticide Use

As a result of our efforts and those of our partners, the pressure to respond to the risks of neonicotinoids is mounting nationally and at the state level in California. We achieved a major milestone in April 2018 when the California Department of Pesticide Regulation (DPR) announced it will list the most commonly used neonicotinoid, imidacloprid, as a "pesticide of concern" and initiate an evaluation to determine how to reduce water contamination. DPR is also evaluating how it can track treated seed, a major use of neonicotinoids that currently goes unreported. DPR has also increased monitoring of all neonicotinoids to inform regulation. California is the state with the most comprehensive and advanced structure for pesticide regulation and can influence pesticide regulations in other states and at the federal level.

In addition to this focused effort to reduce neonicotinoid contamination in California, we continue to provide support to people around the country wanting to establish policies to reduce pesticide use and protect pollinators. To date, we have helped 23 communities pass pollinator protection policies and we are supporting efforts in six other communities. This spring, we also supported a successful campaign to stop state legislation that would preempt cities from regulating pesticide use on private lands. Activist Jody Spears, who previously worked with us to pass a comprehensive pesticide reform policy in South Portland, Maine, used our resources to combat this legislation: "I cited your wonderful report in testimony to a legislative committee recently, defending our local ordinance tradition (we prevailed)." Note: no lobbying is funded by our foundation supporters.

We also provide technical assistance on practices for reducing pesticide use and transitioning to sustainable pest management to farmers and gardeners as well as researchers, food companies, and natural resource management agencies. For example, we provided advice and materials to the Washington Department of Fish and Wildlife and the Idaho Department of Fish and Game on neonicotinoids, and these agencies are now considering whether to ban these pesticides from state lands. We continue to expand our Impacts of Pesticides on Invertebrates database (pesticideimpacts.org), a publicly accessible resource launched in 2017 to connect people with the latest available science on pesticides and their impacts on pollinators and other invertebrates. The database now contains over 100 summaries of research articles on pesticides, their effects on invertebrates, and pesticide movement in the environment.

Building the Network for Pesticide Reform

The Xerces Society is an active participant in a network of over 30 organizations committed to protecting pollinators from pesticides. Pesticide Program Director Aimée Code serves on the network's coordinating committee and co-facilitates the farm-focused workgroup. In the fall of 2017, we helped to organize a two-day meeting in collaboration with the Kansas Rural Center to build ties between agriculture and conservation, increase conservation groups' knowledge of native bees and their needs, and provide a forum where groups from all across the country could network and share ideas. At the event, the Xerces Society gave a presentation to a group of farmers, agricultural consultants, and environmentalists about native bees, drivers of their decline, and ways to support pollinators on the farm. We also helped organize and facilitate a panel of farmers who discussed their conservation efforts and co-facilitated a workgroup meeting of local activists.

Protecting Endangered Pollinators

The Endangered Species Act (ESA) is the most effective species conservation law in the world, and we have successfully invoked this law to protect imperiled pollinators. However, legal protection is only one piece in our efforts to address the declines of at-risk species. We leverage ESA listings and potential listings to catalyze large-scale habitat restoration and protection for endangered pollinators—conservation actions that also benefit many other pollinator species. Partnering with federal and state agencies, we develop recovery strategies for endangered bees and butterflies that prioritize high-quality habitat that is protected from pesticides.

Helping Recover the Rusty Patched Bumble Bee

The listing of the rusty patched bumble bee under the Endangered Species Act, in response to a Xerces Society petition, took effect in March 2017, making it the first bee in the continental U.S. to receive such protection. Since the listing, we have been working with the U.S. Fish and Wildlife Service and other agencies to plan and implement strategies to protect this species and conserve its habitat in the Midwest and Northeast. This effort has led to the protection of over 570,000 acres and may lead to improved management on another 2.5 million acres for the benefit of this bumble bee.

Scientists have identified reducing pesticides impacts in areas where the rusty patched bumble bee remains as a key recovery strategy. In the heart of the rusty patched bumble bee's range, we are working with local governments and community members to pass policies that encourage ecologically sound pest management and eliminate the use of the most bee-toxic insecticides. We are also planning a series of workshops for urban residents, natural area managers, and parks departments, to help them reduce pesticide use and change habitat management practices, targeting places with critical habitat where the rusty patched bumble bee is found.

After nearly a ten year effort by Xerces Society scientists and collaborators, the rusty patched bumble bee (*Bombus affinis*) was listed as an endangered species in 2017. (Photo: Xerces Society / Rich Hatfield.)

Assessing Farm Conservation Programs for At-Risk Butterflies

Private lands provide critical opportunities for establishing habitat for at-risk species. The Xerces Society has been a leader in developing best practices for establishing habitat on farms and other working lands, but also, just as importantly, assessing the efficacy and impact this habitat is having on pollinators. Pollinator Program Co-Director Eric Lee-Mäder recently co-authored a study with scientists from the University of Wisconsin that is the first to evaluate habitat created to recover the endangered Karner blue butterfly in Wisconsin through State Acres for Wildlife Enhancement (SAFE), a special initiative of the USDA Conservation Reserve Program. This paper and the research it summarizes highlight the results of the first, largest, and only example to date of a USDA farm conservation program specifically targeting a federally endangered insect—and the research reveals that this program is working!

A farm conservation program in Wisconsin shows promising results for recovering the Karner blue butterfly. (Photo: Joel Trick, USFWS.)

The results of this program are impressive given the odds stacked against this species. The challenges are already great when attempting to recover endangered butterflies on the lands where they are already present, but to re-create areas of habitat on retired agricultural lands and to have those restored areas colonized by a small butterfly that usually flies only short distances is remarkable. Where we are seeing small populations of Karner blues on these lands, the butterflies may have travelled for miles over intensively farmed fields, across highways, over water, through yards, and other obstacles to find these new habitats.

The Xerces Society contributed to the success of the USDA's SAFE program by providing technical assistance on planning and implementing habitat restoration. We will draw on this "proof of concept" to promote similar farm conservation programs targeting at-risk species such as the rusty patched bumble bee.

Endangered Species Act Protection Secured for Rare Butterfly

More than 15 years after the Xerces Society initially submitted a petition asking for federal protection for the island marble butterfly, in April 2018 the U.S. Fish and Wildlife Service (USFWS) announced that the butterfly warrants protection as an endangered species under the Endangered Species Act.

The Xerces Society petitioned the USFWS asking for ESA protection for this animal twice, first in 2002 and again in 2012. The island marble is among the most imperiled animals in the world, with fewer than 200 adults observed in 2017 and continued threats to its habitat. The butterfly has already been extirpated from Vancouver and Gabriola Islands in British Columbia and from Lopez Island in Washington State. It is now found only on Washington's San Juan Island. Because of the island marble's extremely small population size, isolation, and restricted distribution, its future is questionable, with Endangered Species Act protection the butterfly's only real hope for survival.

Conserving Monarch Butterflies

Monarch butterflies are perhaps the most well-known and beloved butterflies in North America. Renowned for their long-distance seasonal migration and spectacular winter gatherings in Mexico and California, the monarch butterfly population has recently declined to dangerously low levels. In response, we are advancing an "all hands on deck" strategy working with the Natural Resources Conservation Service, the U.S. Fish and Wildlife Service (USFWS), farmers, state agencies, and other conservation partners across the country to protect monarch habitat and engage key stakeholders in meaningful solutions for the butterfly's recovery.

Advancing Science-Based Solutions for Monarch Recovery

Last year, the Xerces Society joined other monarch scientists in providing expert input for the monarch species status assessment, a step in the USFWS review of the petition to list the monarch butterfly under the Endangered Species Act (ESA). The USFWS is developing a model to project the monarch's extinction risk under varying scenarios and elicited input from monarch experts to identify the parameters of the model. The USFWS is subject to a court-ordered agreement to decide by June 2019 whether or not to list the monarch butterfly.

Because the USFWS is actively considering the monarch butterfly's pending ESA petition, state governments and private interests are bringing significant dollars to the table to support monarch conservation in an effort to avoid listing. In February 2018 the USFWS reported that over 1 million acres have been restored for monarchs.

The Xerces Society is an active member of the U.S. Monarch Science Partnership and the Tri-National Science Partnership, made up of scientists, land managers, and conservation organizations who perform science related to the conservation of monarch butterflies. Our involvement in these groups led to insecticide use becoming one of the partnerships' seven science priorities. As a result, the USFWS has funded a study at Purdue University of the impact of insecticides that is likely to lead to new USFWS recommendations on creating larger buffer areas between crop fields and monarch habitat.

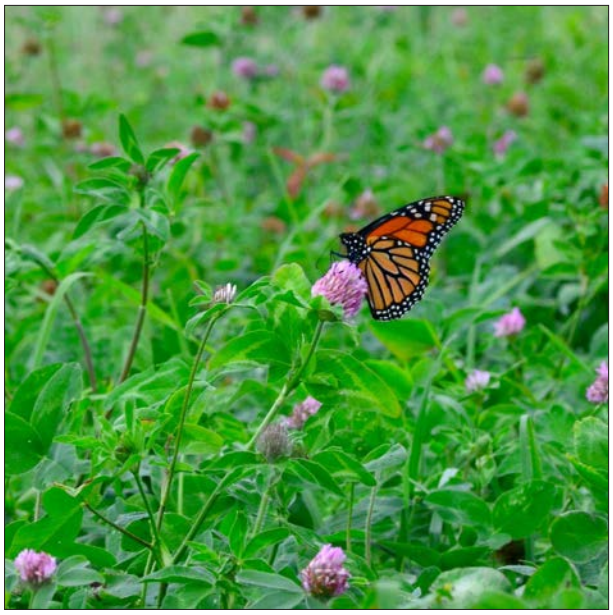
Supporting Regional and State Monarch Conservation Strategies

The Xerces Society was invited to be a part of strategy development for monarch recovery, including monarch protection plans and other state monarch planning processes in Iowa, Michigan, Minnesota, Nebraska, Oklahoma, and Wisconsin. In addition, we are participating in the development of the Mid-America Monarch Conservation Strategy, which brings together representatives from 16 states in the region to form a unified approach to monarch conservation activities on farms and ranches in the mid-America region, and we are providing information on monarch threats, conservation, and habitat management to inform the Western Association of Fish and Wildlife Agencies Monarch Conservation Working Group's monarch conservation plan.

We have continued to collaborate with the Natural Resources Conservation Service (NRCS) on their Monarch Butterfly Habitat Development Project, which aims to increase monarch habitat on private farmlands in 10 states within the core of the monarch's migration corridor. To date, the NRCS has provided $4 million for farmers and ranchers to conserve monarchs. In the Midwest region, the initiative focuses on habitat plantings for monarchs, whereas in the southern Great Plains land management and grazing practices that

benefit monarchs are emphasized. The Xerces Society played a key role in the development of this incentive program and is providing ongoing support by developing guidance and training for NRCS staff on evaluating habitat for monarchs, by creating state-specific information on nectar plants for monarchs, and providing technical review of conservation program policies to incentivize landowner adoption of monarch conservation practices.

The Xerces Society is also working closely with the NRCS to expand farm conservation programs for monarchs in other areas of the country. Our involvement has led to new efforts to target hundreds of thousands of dollars of financial assistance for farmers in California and Idaho to implement monarch and pollinator habitat projects on their land. We are supporting these efforts with state-level program guidance and training, including the development of habit evaluation guidance, information on nectar plants, and other technical resources.



Habitat on this Wisconsin farm and throughout the central monarch corridor sustains monarch butterflies as they complete their epic annual migration from Mexico to Canada each year. (Photo: Xerces Society / Thelma Heidel-Baker.)

Best Management Practices for Monarch Conservation on Western Lands

Monarch butterflies in western North America are in peril. Where millions of monarchs once converged on overwintering sites in coastal California, we now have just a few hundred thousand left. The number of butterflies has fallen by over 95% since the 1980s, with declines also observed in breeding populations during the spring and summer. To help reverse this trend, we need to improve protection and management of the butterfly's habitat across its western range.

To guide conservation efforts, in 2018, the Xerces Society published *Managing for Monarchs in the West: Best Management Practices for Conserving the Monarch Butterfly and its Habitat*. This document provides actionable, practical guidance that empowers western land managers to be part of the solution.

Managing for Monarchs in the West provides a summary of the known effects of frequently used land management practices—grazing, mowing, prescribed fire, and pesticides—on monarchs and their breeding and migratory habitat, followed by best management practices for how to integrate monarch conservation in management decisions. Guidance on timing of management activities gives managers the confidence of when they can mow, burn, or graze land without disrupting breeding monarchs. Invasive non-native and noxious plant management, recreation, and climate change impacts are also addressed.

Identifying Monarch Habitat in the West

Identifying, protecting, and appropriately managing existing high-quality monarch habitat are key strategies for conserving western monarchs. Over the last several years the Xerces Society has worked with state wildlife agencies and university researchers to survey lands across California, Idaho, and Nevada for milkweeds and monarch caterpillars. The data collected through these surveys have been included in a western monarch habitat suitability model, developed in partnership with the USFWS and the University of Nevada-Reno. This

modeling effort identifies the specific areas of the western U.S. that are most important to monarch butterflies in order to prioritize monarch management and restoration lands.

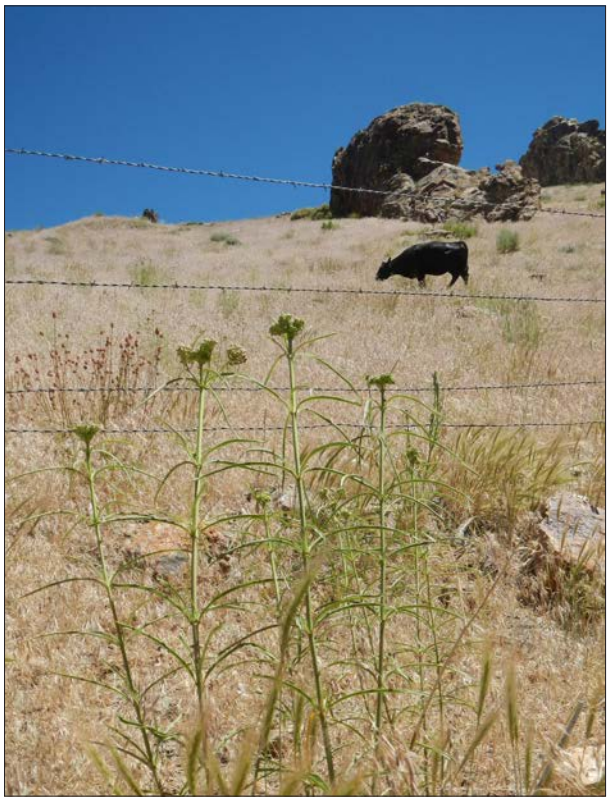
Modeling shows us that, consistent with the wide-ranging nature of the monarch butterfly, suitable breeding and migratory habitat is widespread across the West. We found concentrations of potentially highly suitable habitat in the Central Valley of California as well as in southern Idaho and eastern Washington. Smaller areas are evident across northern Nevada, southern Arizona, parts of Utah, and on most low-elevation lands in Oregon.

The models are being widely adopted as a useful tool for prioritizing areas for conservation, restoration, and monitoring in the West. Agencies like the Washington Department of Transportation and the California Department of Fish and Wildlife are using the models to incorporate monarch habitat in their planning efforts and to prioritize private and public lands for monarch conservation, and the NRCS is using this information for their new western monarch conservation initiative, which will promote Farm Bill conservation programs to farmers in these areas.

Restoring Monarch Overwintering Sites

Coastal development has degraded overwintering habitat in California; in the past few decades, more than 50 overwintering sites have either been destroyed or made unsuitable for monarchs, as housing has replaced native habitat. Many other sites have been degraded as trees have been trimmed, disrupting the delicate microclimate monarchs require. Most overwintering sites are made up of aging trees, and there is a significant need for active management that considers the needs of monarchs.

In response, we are embarking on an effort to restore and enhance three of the ten most important California overwintering sites (as identified in our recent report *State of the Monarch Butterfly Overwintering Sites in California*), in partnership with public and private overwintering site managers, including the California Department of Parks and Recreation, the Esalen Institute, and coastal habitat restoration ecologists from Groundswell Coastal Ecology. Through the restoration of these overwintering sites, our goal is to improve windbreaks (since wintering monarchs require shelter from high winds), reduce causes of monarch mortality, and increase native nectar resources. Our activities will lead to the restoration of overwintering sites across 29 acres of coastal monarch habitat.



Grazing is the dominant land use on rangelands of the western states. Xerces scientists prepared best management practices for grazing land management so that monarch butterflies would have better places to breed and migrate across the vast landscapes of the West. (Photo: Xerces Society / Stephanie McKnight.)

Bringing Monarch Habitat Back to the Central Valley

California's Central Valley was likely once a very important breeding ground for monarch butterflies, but now presents an inhospitable section of the landscape through which monarchs must travel twice a year. In the Central Valley ecoregion, we launched a new project to restore and enhance monarch habitat on public and private lands, partnering with the USFWS, Bureau of Land Management, California Department of Fish and Wildlife, and agricultural producers.

Through this project, we will fill one of the largest remaining gaps in overall monarch conservation: addressing the habitat needs of monarch butterflies in the western U.S. We will accomplish this by managing habitat for monarchs on western public lands and restoring habitat for monarchs on agricultural lands and natural areas in California's Central Valley—one region that western monarch researchers agree needs to be restored to support the western monarch migration. We are currently restoring monarch habitat on agricultural lands, which make up more than 70% of California's Central Valley, and working with public land managers to incorporate monarch habitat into existing restoration projects, providing guidance on restoration planning for monarchs, and organizing workshops for monarch habitat enhancement.

Much is known about where monarch butterflies overwinter, but for monarchs west of the Rockies little is known about their migration routes or where they breed. New research is helping to change that. (Photo: Xerces Society / Stephanie McKnight.)

Leveraging the Power of Citizen Science

Through citizen science programs, we are harnessing the power of thousands of people across North America to gather valuable conservation data. Our citizen science projects, the Western Monarch Thanksgiving Count and New Year's Count, the Western Monarch Milkweed Mapper, Bumble Bee Watch, and our latest project—the Pacific Northwest Bumble Bee Atlas—are getting more and more people out in nature to document pollinator observations and engage in the conservation of these vital animals. The information collected by these volunteers is making a substantial contribution to the science of pollinator conservation.

Western Monarch Counts

Since the late 1990s, the Xerces Society has managed the Western Monarch Thanksgiving Count (www.westernmonarchcount.org/), a program that engages hundreds of volunteers in counting the number of monarchs at overwintering sites in California each autumn. Data gathered by citizen scientists through the Western Monarch Thanksgiving Count were essential for new research published in September 2017 that analyzed the population viability of western monarchs. Co-authored by Xerces Society staff and our research partners, this analysis shows western monarch populations have declined by over 95% in the last 30 years and that migratory monarchs in the West could disappear in the next few decades if steps aren't taken to recover the population.

Xerces Society Senior Conservation Biologist Rich Hatfield teaches bumble bee survey methods at a Bumble Bee Atlas Volunteer Training in Idaho. (Photo: Ellen Homestead.)

At the 2017 Thanksgiving Count, less than 200,000 monarchs were counted across all overwintering sites. This is the lowest number counted since 2012, despite volunteers visiting nearly twice as many sites as they did in 2012. The 2017 count had a record number of volunteers covering 262 sites.

In January 2018, we organized the second annual New Year's Count which is helping us better understand the persistence of monarchs throughout the overwintering season. At the site level, the New Year's Count helps us identify which overwintering locations see big drops in monarch use over the season. These places may benefit from active management to make them more suitable for monarchs season-long and to reduce mortality.

Over the last year, we delivered six workshops for citizen scientists that provided training for current volunteers and encouraged new participation in the Western Monarch Thanksgiving and New Year's Counts, the Western Monarch Milkweed Mapper, and other monarch butterfly citizen science programs. Several of these workshops were designed for citizen scientists of all ages, and covered the steps everyone can take to help conserve monarch butterflies. Participants had the opportunity to practice using butterfly nets, identifying milkweed, and scouting for milkweed bugs and other milkweed visitors.

Bumble Bee Watch

Since 2014, thousands of people have contributed to the citizen science project Bumble Bee Watch (bumblebeewatch.org), submitting over 30,000 photographs representing 40 species of bumble bees. The data collected by these volunteers have played an important role in understanding the conservation status of bumble bee species, pinpointing locations of rare species, and tracking invasive species.

A survey conducted in February 2018 by York University researchers found that in addition to gathering valuable data for bumble bee conservation, Bumble Bee Watch is also providing educational benefits to participants. The 342 people from across Canada and the United States who responded to the survey represent people of various ages, locations, and years of participation in the citizen science project. Of these respondents, 77% stated that participating in Bumble Bee Watch increased their awareness of the diversity of bumble bee species and 84% reported improvement in their identification skills as a result of participation.

We also asked people why they join and stay involved in Bumble Bee Watch. An overwhelming majority of respondents participate in Bumble Bee Watch to contribute to scientific data collection (88%) and because they were worried about bees and want to help save them (83%). Over half participate to learn more about species on their property (63%) and region (56%), or because they have a personal interest in bumble bees (59%). Participants also told us what they liked best about the program, and there was a lot! A sample of responses are below:

> *"Being able to contribute to data and learn about Bumblebees. The App is nice too! I also feel hopeful that there is more of a connection between science and laypeople."*

> *"Ease of use and friendly design, ability to see records from everyday people instead of just scientists, and how it's helped find rare species."*

> *"What's not to like! I've learned a lot, I love the fact that it's contributing to citizen science and grows public awareness. Plus it's fun."*

Western Monarch Milkweed Mapper

The Western Monarch Milkweed Mapper citizen science project (monarchmilkweedmapper.org) was launched in December 2016 and is already providing important information on where milkweed and monarch caterpillars occur in the West. Professional scientists and amateur naturalists alike can submit photos of milkweeds and monarch breeding observations through the website's data collection tool. In addition, users can learn how to

identify 46 milkweed species that occur in the western U.S. with the website's interactive identification tool and learn about monarch conservation efforts in the West.

All data submitted through the website feed directly into a growing database of over 41,000 western monarch and milkweed records, ranging from 1900 to the present day. Since the website was launched, over 1,000 people have contributed 5,552 milkweed and monarch observations in western states, and we have used these data to identify a number of hot spots for monarch breeding habitat in the region.

Pacific Northwest Bumble Bee Atlas

Along with our partners in Idaho, Oregon, and Washington, this spring we launched a new project to harness the volunteer power of citizen scientists to help map bumble bees in the Pacific Northwest. This region is home to nearly thirty species of these charismatic and easily recognizable bees, and many of them face an uncertain future. While this project targets all species of bumble bees, there are three species whose population declines are of particular concern: the western bumble bee, Morrison's bumble bee, and the Suckley cuckoo bumble bee.

Volunteers are helping to gather data in each of these states, which will be used to map bumble bees' distribution, abundance, and habitat use. With the help of citizen scientists we will able to cover all three states, collect high-quality data, and contribute information that will aid in conservation. One of the goals of the project is to better understand where bumble bee species occur in remote parts of the region. Much of what we currently know about bumble bee distributions is focused on places where people live or travel—towns, cities, and near roads—as well as in key conservation areas like national parks. Getting better information about which species of bumble bees occur in remote areas will help researchers protect at-risk species and understand what types of habitat they are associated with, ultimately supporting the conservation of the most at-risk species.

This spring and summer we delivered a series of trainings for these volunteers to learn how to conduct surveys and collect information on bumble bee distribution, host plants, and their surrounding habitat. Over 400 citizen scientists have received hands-on training in the bumble bee survey protocol. We also created a series of training videos for people who were unable to attend a training, which have been accessed by over 200 people to date.

The western bumble bee (Bombus occidentalis) is considered Vulnerable to extinction, under the International Union for Conservation of Nature's Red List Criteria. (Photo: Xerces Society / Rich Hatfield.)

Protecting Urban Pollinators

Bees and butterflies have many of the same challenges in urban and suburban landscapes that they have elsewhere. They lack quality habitat and what habitat remains is often degraded or fragmented, limiting pollinators' ability to move between patches across the landscape. Pesticides are also a significant issue in these areas. Many studies have shown pesticide contamination in neighborhoods is equal to or higher than in some agricultural areas. Couple these issues with urban lighting, which negatively affects night-flying moths, as well as climate change, and you can see that there is plenty of work to do.

On the flip side, there is evidence that we can make a difference. Restoring areas of habitat in towns and cities and protecting these areas from pesticides leads to greater diversity and abundance of pollinators and other beneficial insects. A recent study showed that if urban parks are managed with biodiversity in mind they can have just as many pollinators as natural areas out in the countryside. In short, if you plant flowers and make sure they are protected from pesticides, these small but hugely important animals will come.

New Pollinator Conservation Programming for Urban Residents

We have launched a new initiative to engage urban and suburban residents in pollinator conservation so that more backyards, parks, and other public spaces become havens for native bees and butterflies.

This summer we hired a new Community Engagement Coordinator who will be dedicated to organizing and implementing our conservation programming in urban and suburban areas. With this new position, we will be able to develop a robust volunteer program to expand the reach of our pollinator education and outreach in key locations and support individuals in pursuing their own pollinator conservation projects.

To support this programming, we developed curriculum for a new day-long workshop for gardeners, educators, and other interested individuals who want to learn more about pollinator conservation in yards, neighborhoods, parks, and other urban and suburban spaces. The curriculum includes an overview of the importance and diversity of native pollinators, their life history, and the threats that they face. It covers where and how to create pollinator habitat in urban and suburban landscapes, how to develop local pollinator conservation policies, and other opportunities to engage in pollinator conservation through community efforts and citizen science. During the workshop, participants also have the opportunity to

Participants at the Sacramento short course received hands-on training on how to identify common pollinator groups and types of habitat. (Photo: Xerces Society / Angela Laws.)

practice identifying common groups of pollinators and are introduced to native pollinator plants in their area. We have already beta-tested the course in two California cities and Boulder, Colorado, and we plan to offer it Portland, Oregon, later this year.

Bee City USA Now Part of the Xerces Society

As of June 2018, the Xerces Society has joined forces with the organization Bee City USA to expand pollinator habitat in urban communities. Bee City USA brings a unique approach that encourages cities and college campuses across the United States to develop and implement a plan for helping pollinators and then receive recognition for their efforts through becoming a "Bee City" or "Bee Campus." Under the direction of Phyllis Stiles, a tireless advocate for pollinators who founded Bee City USA in 2012, scores of cities and campuses across the U.S. have become affiliates, each making a public commitment to support bees and improving their landscapes for these and other pollinators.

Bringing Bee City on as a dedicated Xerces Society initiative provides one more important avenue to make a difference in towns and cities across the U.S. Working together, we will be able to do much more to integrate pollinator conservation and all of the benefits it brings to communities big and small.

Partnerships

There are many organizations and scientists with whom we partner on a regular basis. These include scientists from Rutgers University, Pennsylvania State University, University of California (at Berkeley, Davis, and Riverside), University of Minnesota, University of Nevada–Reno, Michigan State University, Iowa State University, Oregon State University, University of Florida, Simon Fraser University, University of Vermont, Washington State University, staff from the USDA Natural Resources Conservation Service, USDA Farm Service Agency, Soil and Water Conservation Districts, the U.S. Fish and Wildlife Service, U.S. Forest Service, the Monarch Joint Venture, World Wildlife Fund Mexico, United Nations Food and Agriculture Organization, International Union for Conservation of Nature, ICF International, County of Boulder, Colorado, Portland Parks and Recreation, Metro (the metropolitan planning organization for the Portland region), native seed companies in multiple regions, Wild Farm Alliance, Community Alliance with Family Farmers, the Midwest Organic and Sustainable Education Service, Practical Farmers of Iowa, Kansas Rural Center, Women, Food and Agriculture Network, Tallgrass Prairie Center, Cape Cod Cranberry Growers Association, Great River Greening, Groundswell Coastal Ecology, Oregon Tilth, and the National Sustainable Agriculture Coalition, among many others.

We also work with a broad coalition of more than 40 businesses and brands to make pollinator conservation an increasingly mainstream practice. These businesses encompass a diverse set of organic, natural, and sustainability leaders, including General Mills, Danone North America, Endangered Species Chocolate, and many more.

Bring Back the Pollinators Supporters

Our accomplishments are only possible because of generous financial supporters like you. In addition to the thousands of Xerces Society members and donors, we would also like to thank the following organizations for their commitments to pollinator conservation during the past year.

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