



# Bring Back the Pollinators

Annual Report  
2016





### **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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Protecting our pollinators begins with providing access to flowering plants, pesticide free habitat, and places to nest. The next step is spreading the word, which is at the heart of the Xerces Society's successful Bring Back the Pollinators campaign.

# Bring Back the Pollinators Annual Report

The Xerces Society for Invertebrate Conservation

August 2016



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[www.xerces.org](http://www.xerces.org)



# Overview

Thanks to your committed support for the Bring Back the Pollinators campaign, the Xerces Society is successfully leveraging the nation's focus on pollinators to make pollinator conservation a mainstream practice. Over the last year, we have continued to expand our pollinator conservation training and guidance for farmers and farm agencies while also reaching beyond agricultural lands to address the needs of bees and butterflies. By expanding our outreach and technical assistance, and seeking out strategic opportunities for conservation, we are building support for pollinator conservation among the public and within government agencies, reducing pesticide use, and developing long-term commitments to pollinator conservation. Pollinators gained powerful advocates in the White House and sparked a new federal focus on pollinator conservation across all federal agencies. We are at the center of federal, state, and local efforts to realize this vision. Our successes are possible only because of the generosity from our many partners, and we thank you for joining us in protecting these essential animals.

The ultimate success of the Bring Back the Pollinators campaign will be full, lasting protection for pollinators. To assess our progress toward this long-term goal, we define success by:

- ⇒ Acres of pollinator habitat restored or protected
- ⇒ The number of people we involve in pollinator conservation through our trainings and educational events, citizen science projects, publications, and online resources
- ⇒ New science on practical solutions for creating, enhancing, and managing pollinator habitat, and on the status of at-risk pollinator species
- ⇒ Policy interventions that protect pollinators and/or limit pesticide uses

Highlights of our recent accomplishments toward this goal include the following:

- ⇒ More than 150,000 additional acres of pollinator habitat restored or protected, bringing our total to almost 400,000 acres since 2008
- ⇒ More than 19,000 people in the last year attending in-person or online events where Xerces Society staff helped them learn about how to protect pollinators and how to take advantage of beneficial insects as pest control
- ⇒ Continued refinement of the best ways to create and then maintain pollinator habitat over the long term, in landscapes from California to New Hampshire
- ⇒ Helping municipalities around the country develop pesticide policies that are better for pollinators, reaching 18 locations since we started this work in 2014
- ⇒ New research partnerships with the U.S. Fish and Wildlife Service and state agencies in Idaho and Washington to answer fundamental questions about the western population of monarch butterflies
- ⇒ Ground-breaking national guidance on pollinator conservation for roadside managers

In this report, we provide additional details about these accomplishments and more over the past year.

Thank you again for taking action to promote pollinator conservation.

# ***Establishing Pollinator Habitat on the Ground***

There are a lot of ways for all of us to help bees, but farmers are in a unique position to make a huge impact. About 40% of the land on our planet is used for agriculture. Farmland was once considered idyllic and pastoral, but modern agricultural land is often environmentally unfriendly and can be the source of everything from polluted water to pollinator declines.

Our efforts since 2008 have culminated in the restoration or protection of pollinator habitat on nearly 400,000 acres—with more than 150,000 acres in the last year alone. At farm sites across the U.S., we are helping farmers install and manage habitat, and protect pollinators from pesticides. This work literally spans the country from Maine to California and includes an enormous spectrum of farm operations from organic dairies and large-scale conventional grain farms, to almond orchards and cattle ranches. We also work with these farmers to protect habitat areas from insecticides. And our collaboration with the USDA Natural Resources Conservation Service (NRCS) to restore pollinator habitat is paving the way for hundreds of thousands of additional acres of pollinator habitat in key regions. Other landscapes also provide opportunities for pollinator conservation, and we work with a variety of landowners, including government agencies, to create new habitat.

We also recognize that there are barriers to engaging in pollinator conservation. The availability of seed to create pollinator habitat has been limited, and installing the habitat can be expensive. To address these barriers, we're working with the native seed industry to increase the supply of seed for pollinator habitat restoration, and we're developing a certification system that will provide farmers and food companies with market-based incentives to create and protect pollinator habitat.

## **Partnership with the USDA's Natural Resources Conservation Service**

When it comes to increasing habitat on farms, ranches, and private forest lands in the U.S., our partnership with the NRCS is one of our most important. The Xerces Society and the NRCS host joint partner biologist positions at all three of the NRCS National Technology Support Centers. These staff help with developing and refining national conservation programs and practices that support pollinator habitat, as well as state-specific strategies and national initiatives targeting monarch butterflies and honey bees. Our partner biologists also help to train NRCS conservationists on the habitat needs of pollinators, monarch butterflies and other beneficial insects. We have reached thousands of NRCS staff through our outreach events over the past eight years.

## **Consulting on the Farm**

In addition to technical support and outreach, Xerces Society staff members also provide one-on-one conservation support to farmers and other agricultural professionals, frequently in collaboration with NRCS field office conservationists. Providing this direct individual support helps landowners and conservation planners address the unique opportunities and challenges associated with individual farms. Over the past year, we provided technical assistance and advice to 72 farmers across the country, and we completed 16



Xerces Society teams up with the farm crew to seed new pollinator and beneficial insect habitat at this Montana farm. Photo: The Xerces Society/Sarah Foltz Jordan.

comprehensive farm conservation plans for sites ranging from cattle ranches, to organic walnut orchards, and mixed vegetable farms. Our conservation plans provide a comprehensive blueprint designed to improve pollinator habitat, enhance crop pollination, and/or increase natural pest suppression. Once a plan is complete, an eligible farmer can apply for financial support from the NRCS to implement the plan's recommendations.

### **Taking Habitat Restoration to Scale**

In California, we are continuing to enhance two large-scale habitat demonstration projects in cropping systems for almonds and tomatoes that we previously helped plan and install. At the 1,500-acre almond orchard, for example, there are now a total of six hedgerows consisting of nearly 3,000 blooming shrubs and perennials, planted throughout the orchard, as well as two very large wildflower borders. Over the last year, we have helped this habitat thrive by developing irrigation and weed management plans, inter-seeding previously established wildflower areas with promising new wildflower species, and providing guidance on the replacement of plants damaged by vehicles or environmental factors. In the fall of 2015, we collaborated with the orchard staff to implement 42 acres of pollinator cover crops, designed to attract pollinators and other beneficial insects that are natural predators or parasitoids of crop pests. As part of this effort we also have developed a reduced-risk pesticide plan that will help manage pests and reduce harm to pollinators and other beneficial insects. This farm serves as a large-scale demonstration of how we can bring habitat and native bees into almond orchards.

### **Demonstrating On-Farm Conservation Methods**

In the fall of 2015, we launched a new project to design farm-specific conservation plans on New Hampshire vegetable farms that will help increase beneficial insect populations for natural pest suppression. These

farms will also serve as demonstration sites for other nearby farms. Over the next year, we will host field days and workshops at these farm sites in order to expand the adoption of natural (non-chemical) pest management within the region.

## **Making a Flight Path for Pollinators**

In 2015, the Port of Portland and the Xerces Society capped off two years of planning and site preparation by creating a 50-acre native wildflower meadow for bees on an island in the middle of the Columbia River. This site is in the flight path of the Portland International Airport, and thanks to the seed mixes we designed to support dozens of local species of bees and butterflies, this landscape is being transformed into thriving habitat for pollinators. We monitored the bee and butterfly communities at this site prior to restoring it, and we are continuing to track the pollinators over time to understand how effective this restoration project is at bringing back the pollinators.



This roadside habitat in Michigan provides valuable pollen and nectar resources for pollinators. Photo: The Xerces Society/Jennifer Hopwood.

## **Helping Pollinators on the Road to Survival**

The Xerces Society is increasingly focusing on the conservation opportunities presented by roadsides, which can connect otherwise isolated patches of pollinator habitat and create habitat corridors. Roadsides form an extensive network of habitats that crisscross our landscapes, with an estimated 17 million acres of roadsides in the care of state transportation agencies in the United States. In many areas, particularly urban and intensely farmed regions, roadsides may provide the only natural or semi-natural habitat.

Roadside managers, maintenance staff, and landscape designers can all take steps to improve the quality of roadside vegetation to benefit pollinators. In collaboration with environmental consultants at ICF International, the Xerces Society has developed tools for the Federal Highway Administration to help these prac-



tioners do just that. Two initial publications, *Literature Review: Pollinator Habitat Enhancement and Best Management Practices in Highway Rights-of-Way* and *Pollinators and Roadsides: Best Management Practices for Managers and Decision Makers*, will guide restoration and management on roadsides across the U.S. Additional tools specifically for maintenance staff are in development, which will make it easy for them to protect pollinators.

As part of a multi-agency team, we are also in the process of updating *Roadside Revegetation: An Integrated Approach to Establishing Native Plants*, the premier revegetation manual from the Western Federal Lands Highway Division of the Federal Highway Administration. Updates will include guidance about revegetation and management to benefit monarchs and other pollinators.

Our role also includes providing guidance to planning efforts. In December 2015, we participated in the White House Pollinator Transportation Summit. At this meeting with federal and state transportation officials, we provided research-based guidance on managing habitat for monarchs and other pollinators along roadsides. We are also working with the Rights-of-Way as Habitat Working Group, facilitated by the University of Illinois–Chicago, to promote sound management of roadsides and restoration of habitat for pollinators.

## Meeting the Need for Local Native Plants

Restoring habitat for pollinators means using the native plants on which native bees and butterflies depend. As interest grows in pollinator habitat restoration, the supply of key plant species has not kept up with the demand, especially for milkweed seed. Through Project Milkweed, our collaboration with the native seed industry to increase the supply of this essential plant, in less than five years, we helped bring more than 60 million additional milkweed seeds to market in regions where no milkweed seed had previously been available.

During this project, we learned that pest control is a major issue for commercial milkweed production. Responding to this situation, we are developing a first-of-its-kind, reduced-risk integrated pest management (IPM) system for the management of several common milkweed pests. Once complete, this IPM system will 1) provide the first-ever standardized methodology for estimating milkweed crop damage through formal crop scouting protocols, 2) establish recommended economic thresholds for crop damage, and 3) provide a system of recommended treatments to reduce herbivore damage while at the same time increasing protection for monarchs, crop pollinators, and predatory and parasitoid insects in milkweed seed production fields.



In partnership with native seed nurseries, we are increasing the supply of native thistles. Photo: The Xerces Society/Sarah Foltz Jordan.

Native milkweeds are not the only plants with high value to pollinators but limited commercial availability. In 2015, we continued to identify overlooked species and the barriers to increasing seed supply. We partnered with native seed producers to collect wild seed; establish production plots and monitor them for seed predation, disease, and insect damage; and document propagation practices.

We are currently working with 13 native species that help fill specific gaps. For example, in California, most wildflowers bloom in the spring, leaving us few planting options for the fall. To remedy this, we have worked with a leading native seed nursery in the region to bring a fall-blooming aster species that is very attractive to pollinators into production, making it more available to conservation practitioners.

We have also identified several species of native thistles that are valuable pollinator plants. However, their benefits are not well recognized and they are often confused with invasive non-native thistle species. To encourage their conservation and use in pollinator plantings, we are developing a guide, *Conserving and Growing Native Thistles*. This publication describes their pollinator value and conservation status, and it provides information about thistle propagation, seed production, and ways to control non-native thistle species. Two other guides culminating from our native seed production work are also in development: *Expanding On-Farm Pollinator Plantings: A Handbook for Collecting and Using Your Own Wildflower Seed* and *Increasing Seed of Wildflowers Valuable to Pollinators*.

## **Creating a Marketplace Incentive Program for Pollinator Conservation**

In partnership with major food companies such as General Mills, as well as agricultural investors and conservation-minded farmers, the Xerces Society will soon launch a first-of-its-kind certification program that incentivizes the large-scale adoption of pollinator conservation through a marketing-driven platform.

This program, known as Bee Better, will leverage scalable investments from the private sector to develop clearly defined pollinator conservation metrics that will be rewarded with a formally recognized certification (similar to certification programs such as Fair Trade and Rainforest Alliance). The Bee Better certification program will bring our extensive knowledge and expertise to farmers and companies who are looking to protect pollinators and sustain crop pollination levels. The Bee Better badge will inform consumers about management practices that support pollinators.

This certification will accelerate and expand conservation on private lands, creating a new model for rewarding biodiversity protection by some of the largest food companies in the world, while simultaneously providing new marketing opportunities for farmers of all sizes. In addition to providing a new market-based framework for pollinator conservation, Bee Better will also complement organic certification requirements for natural resource protection recently clarified by updated guidance from the National Organic Program. Similarly, many of the certification criteria established through Bee Better certification will overlap with existing NRCS conservation practices standards. As a result, we anticipate this project will expand the value of and demand for NRCS pollinator conservation planning.

Bee Better is already in development, with drafts of the following program components in progress:

- ⇒ Advisory board recruitment
- ⇒ Certification standards
- ⇒ Requirements for use of the Bee Better Farming label and product sourcing
- ⇒ Recruitment of initial demonstration farms to test the Bee Better certification concept

We expect to launch Bee Better certification by early 2017.

# ***Building Conservation Skills around the Country—and the World***

Through workshops, field days, short courses, one-on-one consulting, and publications, we encourage farmers to adopt sustainable agricultural methods that benefit pollinators and restore biodiversity to agricultural landscapes. We also provide education and training to agencies that manage public lands, and to the general public. We reach thousands directly each year through educational events and presentations, while our train-the-trainer educational model and comprehensive conservation guides allow us to reach even more people.

The Xerces Society builds the base of pollinator allies by working with many audiences. We spread the word about the importance of pollinators and their habitat needs, and we also convey concrete steps that people can take to protect these animals. Since 2008, through “bee-safe farming” workshops, farm field days, pollinator conservation and natural pest management short courses, webinars, presentations at conferences, and other events, we have reached more than 71,000 agricultural professionals and other interested audiences in all 50 states, as well as researchers and rural development professionals in India and Europe, with 19,000 people reached through these avenues in the past year. Tens of thousands more accessed our online and print publications and followed us on social media. To help us better meet the demand for our trainings and expertise on pollinators, in the last year, we added five new staff members. Our growing team continues to expand our impact across the U.S. and internationally.

A sampling of the audiences that we reached during this period includes:

## **Organic Farmers in the Midwest**

Pollinator Program Co-Director Eric Lee-Mäder was invited to be the keynote speaker at the 2016 Midwest Organic and Sustainable Education Service (MOSES) Organic Farming Conference. His presentation, “Organic Farms: Last Best Hope to Save Earth’s Wildlife”, shared the latest science and real-world examples to demonstrate how organic farms can sustain pollinators, beneficial insects, and other wildlife, and how wildlife can sustain organic farming. As the country’s largest conference on organic and sustainable farming, drawing over 3,000 attendees each year, MOSES presents an important opportunity to encourage pollinator conservation among organic farmers.

## **International Conservation Experts**

We participated in the 2015 meeting of the International Union for Conservation of Nature (IUCN) in Abu Dhabi, where 150 representatives from around the world came together to share ideas and wisdom on how we can address the global decline in species. At the meeting, we shared our work regarding global conservation efforts for bumble bees and butterflies through the IUCN Butterfly and Bumblebee Specialist Groups, respectively chaired and vice-chaired by Xerces Society staff. In April 2016, the Xerces Society was the only non-governmental agency to give a presentation at the XXI Meeting of the Canada/Mexico/U.S. Trilateral Committee for Wildlife and Ecosystem Conservation and Management, in Ottawa, Canada.

## **Ranchers in the West**

In September 2015 the Xerces Society’s Executive Director gave a talk at the 2015 Quivira Conference to over 300 ranchers from across the West on how to integrate monarch conservation into their ranching operations. The presentation generated a tremendous amount of interest from ranchers, who requested

additional resources and advice on how to move forward. This talk led to an opportunity to present to county and state officials in western Colorado who want to include monarchs in their conservation planning.

### **High School Students from Across the Country**

The Xerces Society presented “Plants, Pollinators, and People: What Pollinators Do for Us and What We Can Do for Pollinators” as part of the National Biodiversity Teach In, a series of webinars focused on biodiversity for high school students, with 600 students from schools across the country joining us for this webinar.

### **Tribal Governments**

The Xerces Society was invited by Washington State University Cooperative Extension to participate in a three-day training for 40 people from more than 20 tribes from throughout the country on implementing a Managed Pollinator Protection Plan and incorporating native bee protection as part of these plans. We presented on native bee ecology and conservation, and technical and financial resources available to support efforts on the ground, and we led a field tour of local pollinator habitat plantings.

## **Comments from Event Participants**

*“I had no idea, before your talk, how many wild pollinators we had working for us - We will be more attentive to our wild helpers after your presentation at this year’s Orange County Ag Summit.”*

– Attendee, Orange County Agricultural Summit, North Carolina

**“Thank you for a truly inspiring talk. The absolute best of the conference.”**

- Attendee, Master Gardener Advanced-Education Conference, Washington

*“This training was a critical start to our pollinator habitat projects in Maryland State Parks. Thank you!”*

–Superintendent, Maryland Park Service

**“I just received the seedling guides and Wings publication from you, THANK YOU! I was paging through the seedling guides and it feels like a whole new world has unfolded for me!”**

- Farmer, Wisconsin Farm Field Day

*“Very inspiring. I hope to use the resources and information I gathered today for our own small farm.”*

- Participant, National Webinar, NRCS and Wildlife Habitat in Urban Environments: Linking Farm, School, and Community Agriculture

*“Great Job!! This is an area that is finally being recognized for it’s potential.”*

–USFWS staff, Opportunities for Pollinators Along Rights-of Way webinar

## Farmers at Field Days

Demonstration sites are one of the most convincing ways to communicate the achievability and value of pollinator and beneficial insect conservation. With our farmer partners, in the past year we co-hosted 20 field days and farm tours, so that more than 500 people could see real-world successes for on-farm conservation. As just one example of the impact of these events, at the second annual Farming with Beneficial Insects and Pollinators Field Day in Idaho, several farmers who had attended the previous year's farm tour returned and reported that they are now in the process of creating habitat projects on their farms.

## Transportation Agencies

The Xerces Society is increasingly being recognized as a leader on the subject of pollinators and roadsides. Over the last year we delivered eleven presentations and webinars to an audience of more than 900 staff from state departments of transportation, federal agencies, utility company representatives and other stakeholders on the opportunities for pollinator conservation on roadsides and other rights-of-way. We presented on this topic at the White House for White House staff, staff of federal agencies and leadership from transportation departments across the U.S., and at an international meeting in Ottawa, Canada, for agency staff from Canada, the United States, and Mexico.

## Promoting Ecological Pest Management

This past year, we increased our capacity to engage farmers in ecological pest management by creating a new position specializing in conservation biological control. Working with the USDA and university research entomologists, our specialist is developing model pest management systems for multiple crops that reduce pesticide impacts to bees, other pollinators and beneficial insects such as predators of crop pests.

In 2015, farmers planted more than 174 million acres of corn and soybeans in the United States. Reducing the amount of insecticides used on these acres would have a profoundly positive impact for pollinators and other beneficial insects. To this end, we are developing a reduced-risk pest management model for soybean and corn, emphasizing reduced reliance on neonicotinoid insecticides to minimize impacts to bees and beneficial insects, not to mention water quality. Our crop scouting and integrated pest management guidelines are designed to help growers reduce pesticide impacts to bees and other beneficial insects while still effectively controlling crop pests. These guidelines will be incorporated into trainings for certified crop advisors and farmers organized by Iowa State University.

Another primary initiative is the development of a model IPM system for almonds and an effort to work with some of the largest growers in California to implement reduced-risk plans. This model pest management system includes habitat management for predatory insects that attack crop pests, feedback on the risks of insecticides currently in use, research



On-farm habitat can reduce the need for insecticides by attracting beneficial insects like this brown lacewing that prey on soybean aphids in their larval stage. Photo: The Xerces Society/Thelma Heidel-Baker.

## After the Event: A Success Story



Andrew Dunham, owner of Grinnell Family Farms, has established several acres of pollinator habitat on the family's 80-acre organic farm. Photo: Grinnell Heritage Farm.

At times, it can seem like the impact of speaking at a conference is unknowable. After people leave the room, what do they do with their knowledge? Over the years, we have conducted follow-up surveys with workshop participants, so we know that people take action with what they've learned. One of the best examples of the long-term impact of our educational efforts comes from Andrew and Melissa Dunham, owners of Grinnell Heritage Farm in central Iowa.

Andrew and Melissa first learned of the Xerces Society at the 2010 Midwest Organic & Sustainable Education Service (MOSES) farm conference where they met Eric Lee-Mäder, who co-directs our pollinator conservation team. On an 80-acre organic farm that has been in Andrew's family for five generations, they grow fruits and vegetables, many of which are dependent on pollinators for fruit and seed set, as well as herbs and flowers. The Dunhams left the conference motivated to take action on their farm.

Since then, Andrew, Melissa, and their team at Grinnell Heritage Farm have established several

acres of habitat for pollinators and beneficial insects, including pollinator strips and beetle banks, and have planted about 1,500 flowering shrubs around the farm. Today, the results are tangible. As Andrew reported in a blog article on the Whole Foods Market website: "With squash and some of our other bee-pollinated crops, our yields per acre are going up. We're able to get more out of less acreage. So there's economic incentive to put in some of these features as well as ecological benefits."

This farm has been in Andrew's family for over 150 years. Andrew views the habitats they've incorporated as a critical component of the health and resilience of their farm, and a way to sustain the farm for future generations. We're looking for more ways to work with Andrew and Melissa, and we're hoping to involve them in a USDA NRCS grant that would demonstrate how farms can add habitat for pollinators, monarch butterflies, and other beneficial insects. In a letter of support for that federal grant, Andrew expressed his commitment to insect-friendly farming: "I strongly believe that this model of agriculture of utilizing on farm wildlife and beneficial insect habitat gives my children their best opportunity to continue in the family tradition and stay involved in farming as active farmers."

from the University of California on the use of organic alternatives, and the exploration of non-chemical control strategies such as mating-disruption pheromones of key pests. Working with one of the largest almond growers in California, we are documenting the efficacy of these pest management practices and developing model recommendations that can be shared with the almond industry.

## **Increasing Adoption of Conservation Biological Control**

Predatory insects were the primary means of pest control on farms in the past, and they remain critically important today. With the advent of chemical insecticides, pest problems have not disappeared; in fact, crop losses due to pests have increased during the past 40 years.

In order to integrate beneficial insects back onto our farms for natural pest control, we developed a series of short courses on conservation biological control. This science-based pest management strategy incorporates farm habitat that attracts natural predators of crop pests, reducing or eliminating the need for pesticides. Modeled on our successful pollinator conservation short course, our conservation biological control short course covers beneficial insect biology, habitat design to attract beneficial insects, pesticide risk mitigation, financial support available through USDA programs, and real-world case studies. Over the last year, we have delivered courses in the Upper Midwest and the Northeast, and will be presenting the course to farmers and agricultural support staff nationwide over the next three years.

## **Sharing Techniques in New Publications**

In the fall of 2015, we released a new bulletin called *Cover Cropping for Pollinators and Beneficial Insects* in collaboration with the USDA Sustainable Agriculture Research and Education (SARE) program. We developed this publication to provide national guidance on which cover crops to plant and how to manage them for the benefit of pollinators and other beneficial insects.

We also helped the USDA's National Agroforestry Center with the production of a new guide called *Working Trees for Pollinators* on how practices that incorporate trees and shrubs into farms and rangelands can be modified to support pollinators. The new guide gives specific advice on how hedgerows, windbreaks, silvo-pasture, forest farms, alley cropping, and riparian buffers can be designed and managed to support pollinators, including monarch butterflies.

## **Engaging People in Bumble Bee Conservation**

In 2015 and 2016, the Xerces Society taught sixteen bumble bee identification and survey courses in California, Massachusetts, Minnesota, Oregon, and Washington. Over four hundred agency biologists, land managers, citizen scientists, master gardeners, and home gardeners learned about bumble bee identification, biology, ecology, conservation status, threats, conservation needs, and steps they can take to conserve bumble bees. Many of these courses were geared especially for federal biologists and provided them with training to better manage federal lands to support bumble bees and other pollinators. As a result of these courses, private and public lands in the West and Midwest have become much safer for bumble bees.

## Recruiting New Pollinator Conservationists: 5,500 and Counting

An important part of our outreach is providing meaningful opportunities for people to take action in their own backyard or garden through our Bring Back the Pollinators pledge. By taking the pledge, individuals commit to providing flowers and host plants, as well as eliminating pesticides in their yards, gardens, farms, or in nearby natural areas or public spaces. We have surpassed our goal for 2016 of 5,000 people signing onto our Bring Back the Pollinators pledge, with 5,500 signers to date. **In total, they have committed to installing or protecting over 73,000 acres of habitat for the benefit of pollinators.** To support people in their pollinator conservation efforts, we maintain a pollinator conservation resource center on our website, with regional information and guides on habitat establishment, pollinator plants, bee identification and more. Last year people visited our pollinator conservation resource center more than 25,000 times.



Workshop participants practice identifying bumble bees in the field. Photo: The Xerces Society/Rich Hatfield.

## Spreading the Word

Our media reach keeps growing and growing. With a somewhat conservative estimate of the readership of the publications that mentioned our work in 2016, we've already reached half a billion people this year alone. We'll be reaching an even broader audience this year, thanks to the release of a new book for home gardeners and a short film on the endangered rusty-patched bumble bee.

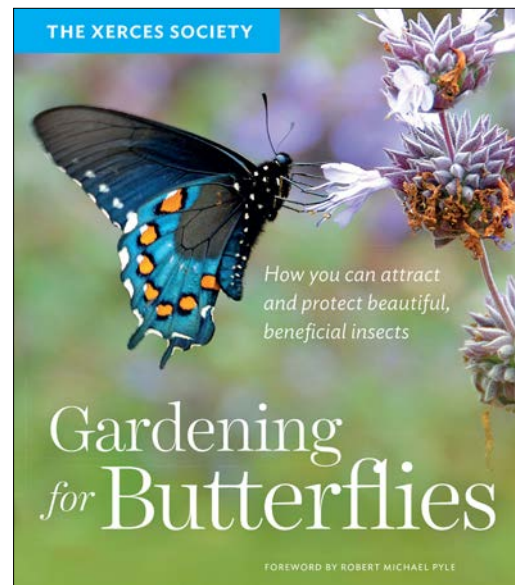
### Gardening for Butterflies

This year, we developed our latest resource to encourage gardeners to participate in pollinator conservation. Released in March 2016, our book *Gardening for Butterflies: How You Can Attract and Protect Beautiful, Beneficial Insects* will inspire home gardeners to account for the needs of butterflies (and by extension other pollinators) by planting diverse, locally appropriate, and pesticide-free native wildflowers that bloom



throughout the growing season. *Gardening for Butterflies* describes the natural history of butterflies and moths, details their habitat requirements, and explains the practical steps to design, install, and maintain a butterfly garden. It also contains useful information for application beyond the garden fence, explaining how to nurture butterflies in a range of environments such as parks, farms, corporate campuses, roadsides, and green roofs.

Already a Timber Press bestseller, *Gardening for Butterflies* is receiving positive reviews from gardeners, conservationists, and critics alike. According to Grow Native Massachusetts, “The text strikes the delicate balance between being expertly detailed, yet still accessible to the typical gardener. And the pages are rich with gorgeous photographs of plants and insects alike, enough to inspire anyone to start converting their lawn into habitat.”



### **A Ghost in the Making: Searching for the Rusty-Patched Bumble Bee**

The Xerces Society collaborated with National Geographic filmmaker Neil Losin and natural history photographer Clay Bolt on the film *A Ghost in the Making: Searching for the Rusty-Patched Bumble Bee*. This film takes a look at one of our most imperiled bumble bees and explores the chances for its survival. *A Ghost in the Making* premiered at film festivals in April 2016 has been screened in four U.S. cities to date, was featured on *The Atlantic* and *National Geographic* websites, and was awarded Best Short Film by the G2 Gallery Green Earth Film Festival. To encourage people to watch the film and take action, the Xerces Society posted a short version of the film and a petition on Change.org asking the U.S. Fish and Wildlife Service to extend protection to the rusty patched bumble bee. To date, this petition has been signed by more than 120,000 people, and the film has been viewed more than 20,000 times.

With this film, our aim is to raise the profile of the plight of the rusty-patched bumble bee and provide additional venues to engage people in pollinator conservation. At the end of the film, we encourage people to become engaged in our citizen science project, Bumble Bee Watch, that provides researchers with bumble bee observations from people across North America in order to track the status of these important pollinators.

# Applying Our Scientific Approach

Science is the foundation of all of our work. In addition to using research results and scientifically tested methods established by our colleagues, we also contribute to the knowledge base about pollinators. We undertake applied research to determine the extent of decline for bumble bees, butterflies, and other pollinators, and work with landowners and land management agencies to determine where these at-risk species occur. We monitor habitat restoration sites to make sure that our efforts produce effective results. Beyond our own studies, we collaborate with scientists at universities around the world to advance the science of pollinator conservation. More and more, we are also relying on a growing base of citizen scientists who contribute valuable on-the-ground information about the pollinators in their area. Whether it is working to protect bees from toxic pesticides, improve habitat for the maximum benefit of pollinators, or understand the influence of climate change on butterflies, we embrace evidence-based policies and practices.

## Advancing the Science of Habitat Restoration for Pollinators

Through a four-year Conservation Innovation Grant from the USDA Natural Resources Conservation Service (NRCS), the Xerces Society has been refining techniques for restoring pollinator habitat. As the award period for this government funding nears its end, we are wrapping up our work on two important areas of applied research.

### Pollinator Habitat for the Long Term

The Xerces Society has been helping farmers establish pollinator habitat since 2008. Based upon observations of maturing meadow habitat, we have found that the right time to begin evaluating which plant species have been most successful in establishing on each site is not in the first year of a project, but two or three years after planting (in the “ongoing management” phase). These observations are critical for informing any future steps to maintain plant diversity, and we made them a focus of this USDA-funded project. Ongoing management strategies we developed early on in the project are continuing to be refined and documented in our target regions of California, New England, and the Pacific Northwest. Consecutive years of observational data allow us to assess the efficacy of our management strategies in a robust manner.

We will continue to develop technical guides that provide step-by-step assessment and decision making tools, to help provide guidance on the long-term management of wildflower sites, such as our soon-to-be-released *Long-term Management of Native Wildflower Plantings for Pollinator Conservation*. This technical guide will help growers perform maintenance and operations on existing pollinator plantings. The guide outlines management techniques that sustain and increase diversity of wildflowers in existing stands of vegetation, and includes case studies from across the country.

### Restoration Practices for Organic Producers

It's difficult to overstate the importance of site preparation for a habitat restoration project. With good site preparation, weed management over the long term is easier and pollinator plantings can thrive. In recognizing the enthusiasm of organic growers to provide pollinator habitat, the Xerces Society identified a need for organic site preparation techniques (instead of the standard techniques, which emphasized herbicides). Over the past three years we have evaluated a range of organic site preparation practices in California, Minnesota, Montana, New Hampshire, Oregon, and Wyoming. We have found that solarization and deep moldboard plowing have offered the most consistent success. While smother cropping areas and the use of organic herbicides

(e.g., horticultural vinegar) offered initial promise, both have proven to be too variable in efficacy thus far. Other techniques under investigation include solarization with mowing, solarization with tillage, swine grazing, direct seeding into land coming out of conventional row crops, and sheet mulching. Our efforts to understand the advantages and challenges of these methods are ongoing, so that we can capture the full range of regional variations in our guidance for organic producers.

To share what we've learned so far, we've developed our soon-to-be-released *Wildflower Establishment: Organic Site Preparation Methods*. This guide summarizes the primary organic site preparation techniques to establish pollinator habitat. The guide provides timelines for each technique and highlights situations in which each is most effective.



Xerces has been pioneering new site preparation techniques for organic growers, such as the use of clear, UV-stable solarization plastic to heat soil to temperatures that kill weeds and weed seeds. Field day participants seeded an area that was solarized in 2015 (left), and prepared a new area for solarization (center). Soon, this farm will have ½ acre of high-quality monarch habitat adjacent to their organic cropland. Photo: Kerry Lynch.

## Investigating Farmers' Options for Pollination Services

Coupled with our ongoing collaborations and field trials with the NRCS and individual farmers, we continue to partner closely with university scientists in conducting research on the benefits of adjacent habitat, permanent pollinator habitat plantings, and cover cropping practices designed to increase populations of pollinators in and around farms. This work is part of the coordinated Integrated Crop Pollination (ICP) Project, with research partners from a dozen universities in the U.S. and Canada. The project partners define ICP as the combined use of multiple pollinator species (wild native bees, managed honey bees, and other species of managed bees), habitat augmentation, and crop management practices to provide reliable and economical pollination of crops.

With our partners at several major universities, we are also establishing demonstration sites to investigate the performance, economics, and farmer perceptions of different approaches to bee pollination for various fruit and vegetable crops. We provided technical guidance on wildflower management or direct management of sites including blueberry farms in Florida, Michigan and Oregon, a pumpkin farm and an apple orchard in Pennsylvania, a cherry orchard in Michigan, and an almond orchard and a watermelon farm in California.

In addition to working on habitat demonstration sites, we are working with these partners to communicate the results of this project to growers and researchers alike, through workshop presentations, online resources, and videos (posted at the Integrated Crop Pollination YouTube Channel at [https://www.youtube.com/channel/UCN0Z\\_G59MEi7IW4e1IfvkgA](https://www.youtube.com/channel/UCN0Z_G59MEi7IW4e1IfvkgA)).

## Empowering Citizen Scientists

We harness the power of thousands of citizen scientists across North America to gather valuable conservation data. Engaging others to participate in this essential work is vital to our conservation success, as it vastly increases the amount of data available. It also helps build an ever larger constituency for pollinator conservation. To support our citizen scientists and involve more people in these efforts, we continue to develop user-friendly web platforms and communications tools to facilitate increased participation.

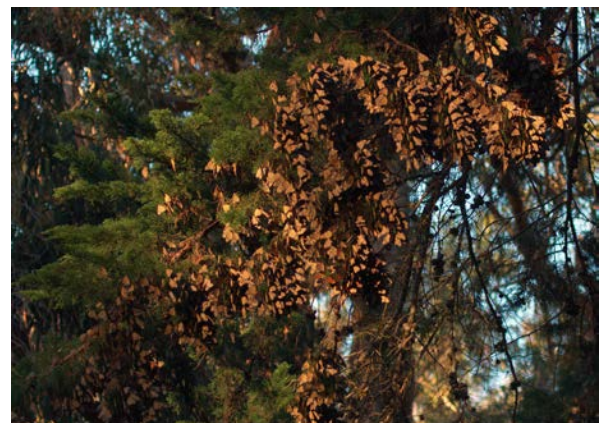
### Bumble Bee Watch

In 2014, in collaboration with several partners, we launched Bumble Bee Watch, a citizen science project to track and conserve North America's bumble bees. At [BumbleBeeWatch.org](http://BumbleBeeWatch.org) participants can check their bumble bee observations against online identification guides and submit photos to a network of bumble bee experts that have been enlisted to help verify the accuracy of bumble bee identifications. We now have over 9,100 confirmed sightings of bumble bees with observations submitted from all 49 states that have bumble bees (only Hawaii does not) as well as most Canadian provinces and territories. These observations are informing our outreach to landowners, and state and federal stakeholders regarding opportunities for on-the-ground conservation work, and will help address questions about changes in these species' life cycles and shifts in their distribution due to climate change.

### Western Monarch Thanksgiving Count

One of our longest-running projects—the Western Monarch Thanksgiving Count—has engaged volunteers in data collection about the status of monarch populations overwintering along the California coast since 1997. Monarchs from as far away as Idaho and Arizona converge on tree groves along the California coast to spend the winter. Because so many monarchs from the western United States are clustered together on the coast, the Xerces Society's Western Monarch Thanksgiving Count provides one measurement of the health of western monarch populations. During our 2015 count, volunteers visited 187 sites and tallied a total of 271,924 monarchs. The data collected through this effort helped us make a scientific case for protection under the Endangered Species Act for the monarch butterfly in our 2014 petition to the U.S. Fish and Wildlife Service.

In 2016, we summarized the past 19 years of information gathered by Western Monarch Thanksgiving Count volunteers about the number of monarchs at overwintering sites and the quality of their habitat to produce the report: *State of the Monarch Butterfly Overwintering Sites in California*. This report found that monarchs overwintering in California have declined by 74% in less than 20 years and prioritized the top 50 sites that should be actively restored.



## State of the Monarch Butterfly Overwintering Sites in California

Report to the U.S. Fish and Wildlife Service  
by the Xerces Society for Invertebrate Conservation



In order to better support the Western Monarch Thanksgiving Count volunteers, we worked with a developer to design an app for citizen scientists to submit monitoring data from phones or tablets for the Thanksgiving Count and several other monarch citizen science monitoring projects. Monarch SOS, the first monarch app developed by scientists, covers monarch identification in all life cycle stages, confusing look-alikes, and numerous milkweed species (monarchs' larval host plants) frequently encountered in North America.

### **Milkweed and Monarchs in the West**

Very little is known about where the western population of monarchs disperses in the spring and summer to breed; the presence (or absence) of milkweed, the key plant for monarch caterpillars, is a primary indicator for breeding locations of monarch butterflies. To help address this data gap, we recently initiated a program to gather information on milkweeds and breeding monarchs in the western United States in partnership with the Idaho Department of Fish and Game and the Washington Department of Fish and Wildlife. This project will involve citizen scientists in gathering data on milkweed via an interactive website, to be launched in December 2016, which will serve as a resource for monarch conservation efforts throughout the West. This project will help us understand the habitats most essential to monarchs in the western U.S. and identify opportunities for improved management, enhancement, and restoration.

### **Evaluating the Risk of Extinction**

The Xerces Society collaborates with scientists to address the worldwide issue of pollinator decline, and plays a leadership role in both the Bumble Bee and Butterfly Specialist Groups for the International Union for Conservation of Nature (IUCN). In 2016, the IUCN Bumble Bee Specialist Group completed extinction risk assessments of all bumble bees that occur in North, Central and South America. These assessments are already allowing us to focus conservation efforts and call attention to the plight of at-risk species. For example, we have reached out to state wildlife agencies in every state to ask them to include at-risk bumble bees in their revised state wildlife action plans. Our efforts resulted in the inclusion of endangered bumble bees in 26 state plans, making the included species eligible for federal funding to further their conservation.

The IUCN Butterfly Specialist Group is completing assessments of species throughout the Mediterranean and endeavoring to better understand species status in the tropics of Africa and South America. Together with our international partners, we are assessing the species at most risk across the globe and then prioritizing actions for their conservation.

In 2015, the Xerces Society was invited to join the National Monarch Science Partnership, a consortium of researchers and conservationists led by the U.S. Geological Survey. One of the first projects of this group was to conduct an extinction risk analysis. This study, which was recently published in a peer-reviewed journal, concluded that monarch butterflies face a substantial risk of extinction in the near future.

### **Researching Monarch Habitat on Public Lands in the West**

With heightened attention on monarchs and the habitat that has been lost, many people are eager to restore milkweed stands. However, existing habitat also needs our attention, especially in the western United States. Working with the U.S. Fish and Wildlife Service (USFWS), the Xerces Society conducted milkweed surveys on twenty wildlife refuges in western states during the summers of 2015 and 2016 to better understand the distribution of key breeding areas for the declining western population of monarch butterflies. We collected thousands of new high accuracy data points for milkweed locations. These data have been included in a joint USFWS/Xerces Society western monarch habitat suitability model, which identifies the specific areas of the western U.S. that are most important to monarchs, in order to prioritize monarch management and land restoration.

# ***Promoting Policies for Pollinators***

In the past year, we were part of major policy efforts that will protect pollinators and their habitat. In addition to working with federal agencies as they increase their pollinator conservation efforts, we also work at the state and local levels, providing advice on planning and implementation. Pesticides continue to be a central focus for our policy work, again, at the national and local levels.

## **Leveraging the White House Pollinator Strategy**

In May 2015, pollinators were launched into the national spotlight with the White House's release of the *National Strategy to Promote the Health of Honey Bees and Other Pollinators*. Following on the 2014 presidential memorandum that established pollinator conservation as a federal priority, the 2015 national strategy has set the stage for comprehensive approaches to protecting bees, butterflies, and other pollinators. The national strategy has three goals:

1. Adding 7 million acres of pollinator habitat;
2. Increasing monarch populations to 225 million; and
3. Reducing honey bee hive losses.

The Xerces Society contributed to the development of the White House strategy, and as part of our active role in its implementation, our work is ensuring that these opportunities lead to the creation of high-quality pollinator habitat that can be well managed for the long term. At the same time, we are advocating for protection and management of existing habitat that provides benefits for pollinators.

## **Supporting New Legislation**

In response to the release of the *National Strategy to Promote the Health of Honey Bees and Other Pollinators*, Senator Jeff Merkley of Oregon reached out to Xerces Society staff for input on the development of the Pollinator Recovery Act of 2016 that would require federal agencies to coordinate efforts to expand the acreage of beneficial forage and habitat for pollinators by a total of 3 million acres, increase funding for research into pollinator habitat and protection, expand incentives for conservation biological control and reduced-risk pest management practices, and dramatically expand efforts to monitor the health of native pollinator populations. This legislation is currently in a draft stage and will serve as the basis for continued debate in Congress about impactful, long-term policy solutions that protect vulnerable pollinator species across America. (Note: No foundation funds are used for lobbying purposes.)

## **Supporting State and Local Efforts for Pollinator Protection**

In response to a recent EPA mandate directing states to create pollinator protection plans, the Xerces Society wrote a summary set of recommendations for states to use when creating these plans. In August 2015, we sent our recommendations to key staff at over 30 state agriculture departments as well as 25 tribes and many partner organizations across the country. That work paid off when Wisconsin finalized a pollinator protection plan this year that included most of the priority issues we identified. We are now encouraging other states to use

Wisconsin's plan as a model. We have been asked by a number of state agencies to participate in the creation of their plans, and are currently engaged in the planning processes of Massachusetts, North Carolina, Pennsylvania, and Washington.

Last year, we advised the Colorado Department of Transportation on how they can incorporate monarchs into roadside management, as part of our larger effort to improve roadside habitat for pollinators. We also presented a workshop on monarchs and other pollinators to staff and commissioners from Boulder County, Colorado. Our input led to a pollinator conservation plan that phases out toxic chemicals on Boulder County lands and provides habitat for all pollinators including monarchs.

## Achieving Endangered Species Act Protection for Bees

Requesting Endangered Species Act protection for invertebrates has long been part of our approach, and last year, for the first time, native bees received protection under the ESA. Seven species of Hawaiian yellow-faced bees reached this conservation milestone in 2015 and are now considered endangered species. Through a petition to the U.S. Fish and Wildlife Service six years ago, the Xerces Society asked for these bees to be protected. Although it has taken a considerable amount of time to reach this achievement, we view the U.S. Fish and Wildlife Service's decision as a positive step for all at-risk pollinator species.

In the fall of 2015, the rusty-patched bumble bee received a positive 90-day finding from the U.S. Fish and Wildlife Service in response to a scientific listing petition authored and submitted by the Xerces Society and prominent bumble bee biologists in 2013, and a subsequent lawsuit filed by the Xerces Society and partners in 2014. The U.S. Fish and Wildlife Service's finding supported the assertion by the Xerces Society that the rusty-patched bumble bee is threatened with extinction as a result of diseases, habitat loss, and pesticide use. The agency is currently conducting a thorough 12-month status review of the species, and will determine whether or not this bumble bee warrants protection as an endangered species. To inform this review, the Xerces Society submitted comprehensive comments to the agency, including summaries of the recent scientific literature demonstrating the extent and type of threats that pesticide use—specifically neonicotinoid insecticide use—and diseases from managed pollinators pose to this species.



*Hylaeus assimulans*, one of seven species of Hawaiian yellow-faced bees now protected by the Endangered Species Act. Photo: John Kaia.



The rusty patched bumble bee (*Bombus affinis*) is an important pollinator of prairie wildflowers as well as numerous crops including cranberries, blueberries, apples, and alfalfa. Previously common across the Upper Midwest and Eastern Seaboard, this bee has been lost from 87% of its historic range in recent years. Photo: The Xerces Society/Rich Hatfield.

## **Protecting Pollinators from Pesticides**

Among the causes of pollinator decline, pesticide use is a key factor. Research continues to show the ways in which neonicotinoids, the most widely used group of insecticides in the world, are having devastating effects on pollinator species. To end reliance on toxic pesticides, we provide support to individuals and organizations with pesticide-related questions. We are assisting federal agencies in their evaluations of pesticides' impacts on native species and working with state and tribal governments to develop pollinator protection plans. At the same time that we are working with government agencies, we are also joining forces with local campaigns seeking to protect their communities from pesticides and with a coalition of nonprofits advocating for pesticide reform nationally.

### **Delivering the Best Science on Pollinators to Federal Governments**

The Xerces Society continues to maintain regular communication with federal decision makers including staff at the White House's Office of Science and Technology Policy as well as the EPA's Office of Pesticide Programs, and responds to key opportunities for public comment. Some of this federal advocacy work is having an effect. For example, last year the EPA accelerated the neonicotinoid review processes, promising to have them completed by 2017, and promised to correct the excessive use rates currently allowed for household products.

Earlier this year, the EPA's first Preliminary Pollinator Risk Assessment for the use of the neonicotinoid imidacloprid was released. While the agency acknowledged some potential risks to pollinators, our review of the documents showed severe shortfalls in the methods, as well as omissions in the evaluation, which will allow continued risks to both native pollinators and to honey bees.

The assessment looked only at the risk to honey bees, ignoring the risks to some 3,600 species of bees native to the United States and the potential risks of imidacloprid to declining monarch butterflies. The Xerces Society provided formal comments in response, detailing these deficiencies, providing relevant scientific research, and urging the EPA take into account the dangers that native and managed pollinators face from the use of this insecticide in their final risk assessment as well as in the pollinator risk assessments for the other three neonicotinoids which they plan to release in late 2016.

In May 2016, 38 members of Congress sent a letter to the EPA outlining their concerns with the agency's draft pollinator risk assessment for imidacloprid. Their message closely follows the concerns detailed in the Xerces Society's letter to the EPA.

On a related note, the Xerces Society has been participating the Trilateral Committee for Wildlife and Ecosystem Conservation and Management, a committee made up of wildlife agencies from Canada, the U.S. and Mexico. The Trilateral Committee is currently discussing monarch butterfly protection. In these conversations, Xerces Society Executive Director Scott Hoffman Black brought up pesticide concerns. Without our involvement in these high-level agency meetings, the issue of pesticides as a stressor for monarchs would not have been discussed. After the most recent meeting in May, a staff member from Environment Canada (a federal agency) requested that the Xerces Society help revise Canada's Monarch Butterfly Management Plan to ensure the risks of neonicotinoids were addressed. In June we supplied them with draft language for the revised plan.

### **Informing Local Policies to Halt Neonicotinoid Use**

In the past year, we have assisted dozens of community members and local government staff in their efforts to protect pollinators from highly toxic, long-lived, systemic insecticides. Our latest victory took place this spring when Milwaukie, Oregon, passed a resolution to eliminate the use of neonicotinoid pesticides toxic to pollinators on city-owned properties. Xerces Society Pesticide Program Director Aimée Code played a key role in working with the City of Milwaukie to see this policy through. In total, since we started working on local



policy change in 2014, the Xerces Society has helped 18 cities and counties enact policies to protect pollinators from neonicotinoids and other pesticides. Our involvement in these local efforts varies. In some cases Xerces staff helped craft the policies and actively worked for their passage, as was the case in Portland and Milwaukie. In other cases, local decision makers and activists used our materials to move their efforts forward, as was the case in Boulder and Lafayette, Colorado.

### **Building a Robust Activist Network for Pesticide Reform**

As a founding and guiding member of a pollinator protection network, the Xerces Society provides technical support and empowers the members to take action to protect pollinators from pesticides. The Xerces Society regularly fields questions from member organizations around the country as they prepare local- and state-level efforts, and is acting as the facilitator of a new work group that provides the network with up-to-date science on the risk of pesticides to pollinators. To move the network's agenda forward, in 2015 we wrote a comprehensive letter to the White House Task Force on Pollinator Health that summarized recommendations to protect pollinators from neonicotinoids and other similar chemicals. Not only did that letter galvanize support from 128 organizations and garner significant media attention, it also has served as a template for numerous other letters submitted to the federal government from the network. Most recently, we spearheaded an effort to design a local policy template that moves beyond banning neonicotinoids to promoting sustainable pest management, reflecting the network's new purpose statement of supporting ecological pest management rather than trading one toxic pesticide for another.

# Ensuring Monarch Conservation Takes Flight

Although we have been proponents of monarch butterfly conservation for decades, we took on an unprecedented number of monarch projects last year, thanks largely to increased federal attention on this species. Using monarchs as a flagship species, we are pushing for habitat improvements on farms, natural areas, and urban landscapes. These improvements provide for much more than just monarchs. All acres restored, managed, and maintained for these animals also benefit native bees and other pollinators as well as other beneficial insects, birds, and other wildlife.

The White House strategy, coupled with the 2014 petition to list the monarch butterfly under the Endangered Species Act (submitted by the Xerces Society, a monarch biologist, and two other nonprofits), has heightened attention on monarchs. In response, federal agencies are focusing on monarchs like never before, and this momentum has led to policy changes and millions of dollars in funding for restoration.

With decades of experience in monarch conservation, the Xerces Society is contributing a rigorous scientific approach as well as expertise in habitat restoration and conservation education to cooperative efforts for monarch recovery. We have restored and protected tens of thousands of acres for the monarch butterfly. With the precipitous decline in its populations—up to 90% across the continent—we have ramped up our efforts to protect, manage, and restore monarch habitat in all landscapes from farmland to wildlife refuges and now have staff working on monarch conservation across the United States.



With national attention focused on monarch conservation the Xerces Society took on an unprecedented number of monarch projects last year. Photo: Justin Wheeler.

In the last year alone, we have provided guidance, technical support, and pollinator expertise to federal agencies such as the USDA Natural Resources Conservation Service, U.S. Forest Service, U.S. Fish and Wildlife Service, Bureau of Land Management, U.S. Geological Survey, National Park Service, and the U.S. State Department. Through our involvement in the Federal Monarch Butterfly High Level Working Group, both the National and Tri-National Monarch Conservation Science Partnerships, and the Monarch Joint Venture, we are advancing the science and practice of monarch conservation, and shaping state, national, and international monarch conservation priorities.

## Supporting the USDA's Promotion of Monarch Habitat on Farmlands

The Farm Bill provides considerable opportunity to support monarch conservation through existing programs and new initiatives. Xerces Society staff are beginning work with the USDA Farm Service Agency to develop

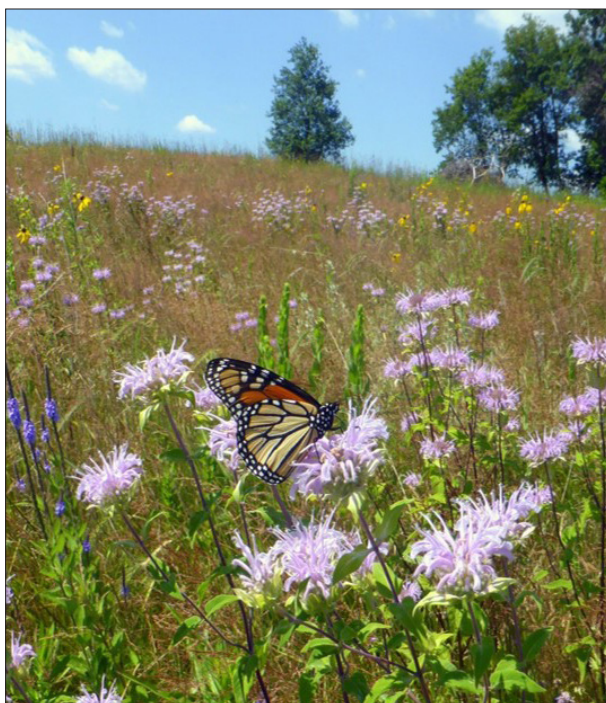
improved guidelines for ongoing management of Conservation Reserve Program (CRP) lands to improve wildflower abundance and diversity. In addition, we are developing improved strategies for interseeding milkweeds and other wildflowers into grass-dominated CRP lands, as well as conducting webinars and farm conference workshops for rural landowners about the CRP Pollinator Habitat (CP42) practice to encourage new program enrollments and enhanced management of CRP lands for monarchs and other pollinators. This work is focused on Midwestern states within the primary monarch migration corridor. In collaboration with USDA Natural Resources Conservation Service (NRCS) specialists and other conservation practitioners, we are developing improved technical guidance for management of CRP for monarchs.

Also in partnership with the NRCS, the Xerces Society helped develop a new initiative to support monarch conservation on private farmlands. The Monarch Butterfly Habitat Development Project, announced in November 2015, aims to increase monarch habitat in 10 states in the core of the monarch's migration corridor. Thanks to the \$4 million that the NRCS dedicated to this program in fiscal year 2016, this initiative uses multiple NRCS programs to provide additional cost share to farmers and ranchers who create high-quality habitat for monarchs. Already, farmers have signed up to install plants for monarch butterflies on 13,000 acres. This partnership will lead to thousands of additional acres of new or improved habitat for monarchs.

In partnership with the NRCS and the Monarch Joint Venture, Xerces Society staff developed evidence-based recommendations for key nectar plants for monarch butterflies, for 15 different regions of the country. Using these lists of good food sources for migrating monarchs, we are producing regional guides for two key audiences. Our lists that focus on the needs of large landscapes will help people like ranchers in southern Great Plains states and farmers in the Midwest identify, protect, and restore monarch habitat. Our lists for backyard gardeners will provide information on monarch habitat needs, especially in gardens.

## **Demonstrating the Possibilities for Monarch Habitat on Farms**

Demonstration sites on working lands can be a powerful tool to engage private landowners in monarch and pollinator conservation. Over the last year, the Xerces Society partnered with the Tallgrass Prairie Center and the Monarch Joint Venture to install a series of monarch habitat demonstration sites in one of the areas that needs it most: the agricultural Midwest. The Xerces Society worked with five farms in Minnesota and Wisconsin to create plots of quality habitat for monarchs, providing concrete examples that pollinator conservation is an accessible, successful, and beneficial activity for farmers. We engaged Midwest farming communities surrounding our demonstration farms by hosting field days at each of the participating farms where we not only motivated farmers to take action for monarchs and other pollinators, but also gave them the technical information needed to make their future habitat installations succeed. We anticipate that these sites and the information gained by field day visitors will help inspire people to pursue monarch conservation under the new NRCS monarch initiative.



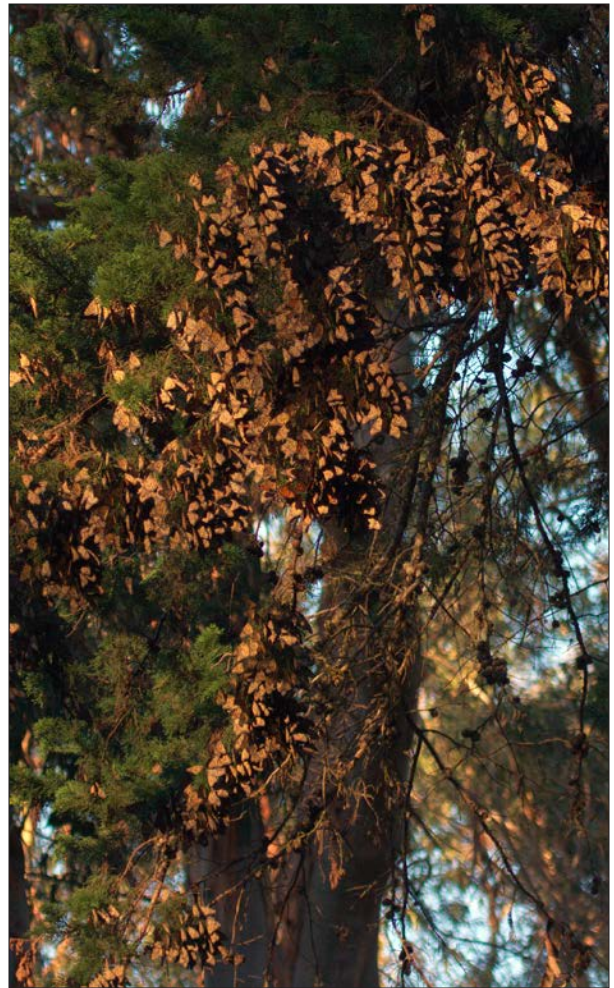
Monarch nectaring in newly created habitat. Photo: The Xerces Society/Sarah Foltz Jordan.

## Restoring Monarch Overwintering Sites

To help managers understand the conservation needs at monarch overwintering sites in California, the Xerces Society analyzed monarch overwintering data and established a list of the 50 highest priority California monarch overwintering sites to restore, where large numbers of monarchs face the most pressing threats. We are currently working at two of these high-priority sites—Ardenwood and Lighthouse Field—by developing site management plans and actively partnering with the landowners and the U.S. Fish and Wildlife Service on restoration. Xerces Society staff traveled to California in December 2015 to meet with land managers of both of these sites and collect data that will inform the site management plans.

Earlier this year, we conducted a workshop at the Ardenwood site, providing training to managers of overwintering sites who wish to restore habitat. Participants learned about monarch habitat requirements, population status, overwintering site management, monitoring, and conservation, and toured the Ardenwood monarch grove.

In addition to providing resources and guidance to policy makers, public agencies, and advocates who are working to protect monarch overwintering sites in California, we are also developing guidance that will help managers at overwintering sites all along the California coast restore and manage their groves for monarchs.



Monarch butterfly overwintering groves in California are aging and in increasing need of thoughtful management to ensure that they continue to support migrating populations. Photo: The Xerces Society/Carly Voight.

## Partnering with North America's Commission for Environmental Cooperation

The Xerces Society has been invited to be one of a few nongovernmental partners in a tri-national effort of North America's Commission for Environmental Cooperation (CEC). The goal of this initiative is promote habitat restoration and enhancement in key breeding grounds and migration corridors of the monarch butterfly in Canada, Mexico, and the United States. We have been able to shape the discussions so that all aspects of monarch conservation are considered—including the use of the herbicide glyphosate on corn and soy and large-scale use of toxic insecticides.

In a related CEC project, this year, we worked with the University of Minnesota Monarch Lab to compile information on best practices, incentive programs, and tools that will help private landowners adopt conservation practices for the monarch butterfly throughout the continent. This compendium of information demonstrates existing effective strategies for monarch habitat restoration and management at the regional, national, and continental scales, and illustrates how monarch-friendly practices can be adopted and landscapes managed over the long term.

## Informing Agencies about Monarch Conservation

Last year, the U.S. Fish and Wildlife Service announced plans to restore 100,000 acres on and around national wildlife refuges. To ensure that these restoration projects endure for the long term, the Xerces Society is training U.S. Fish and Wildlife Service (USFWS) staff in restoration methods via webinars and workshops. Xerces Society staff presented a webinar, “Conservation of Monarchs in the Western U.S.,” this winter as part of the USFWS and Monarch Joint Venture’s Monarch Butterfly Conservation Webinar Series, reaching more than 300 land managers and others. The webinar discussed factors contributing to the observed population decline at California overwintering sites, and provided an overview of the biology, life history, and conservation status of monarchs in the western U.S. as well as current habitat management and enhancement efforts, applied research, and citizen science programs in the region.

The Xerces Society is also working closely with the NRCS to train staff in monarch conservation methods, and helped them prepare for the new Monarch Habitat Development Project. Prior to the launch of this new NRCS initiative, we conducted two webinars for NRCS field office staff. Additional webinars introduced over 300 NRCS field staff to region-specific monarch habitat evaluation tools, which the Xerces Society helped to develop.

## Understanding and Protecting Monarch Breeding Habitat in the West

In addition to our partners at the Idaho Department of Fish and Game and the Washington Department of Fish and Wildlife, as well the citizen scientists who are gathering information on milkweed in western states, we are also working with the U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management, U.S. Forest Service, the Monarch Joint Venture, and university research partners to identify where western monarchs breed and to develop guidance to effectively manage those habitats. These efforts build on years of data that we have accumulated.

In 2011, Xerces began using a crowdsourcing approach to gather information on the location of milkweed species and breeding monarchs in the western United States. More recently, we have expanded this program through partnerships with USFWS and other federal and state agencies, creating a large database of milkweed and monarch breeding locations and conducting surveys on public lands throughout the western U.S. The data generated through these projects is used to develop habitat suitability models for monarchs and key milkweed species, which are directly informing where conservation, management, and restoration efforts are likely to be most effective. To this end, the Xerces Society is developing a set of best management practices for monarchs on public lands in the western U.S.



Ashley Taylor, Regional Monarch and Pollinator Conservation Specialist, conducts milkweed surveys at the Umatilla Wildlife Refuge. Photo: The Xerces Society/Sarina Jepsen.

The Xerces Society is providing a series of monarch conservation and management short courses to federal, state, local, and tribal land managers in California, Colorado, Idaho, Nevada, Oregon, Utah, and Washington. These courses will create local, cross-agency connections around monarch conservation, and will help

us gather information about the management challenges and opportunities land managers face. To complement these trainings and expand our outreach we produced a guide, *Milkweeds and Monarchs in the Western U.S.*, designed for land managers. This publication covers monarch butterflies' basic biology and the threats they currently face, and outlines how public and private land managers can become involved with managing, protecting, and enhancing milkweed stands on their land.

### **Working with States to Inform Monarch Conservation Efforts**

The federal government's interest in pollinator conservation has filtered down to state governments, and the Xerces Society is also working at the state level on meaningful conservation opportunities for pollinators. For instance, we were invited to be a part of strategy development for monarch recovery in multiple states in the central U.S. monarch flyway, along the Interstate 35 corridor. These efforts included the Missouri Conservation Federation Monarch Strategy Session, the Nebraska Monarch Planning Summit, and a collaborative effort to develop monarch conservation strategies in Texas, in conjunction with a range of agencies and organizations including the U.S. Fish and Wildlife Service, the USDA NRCS, the Missouri Department of Conservation, Texas Parks and Wildlife Department, the Fort Worth and Dallas Zoos, the Botanical Research Institute of Texas, and many more.

Xerces Society staff also helped the Texas Parks and Wildlife Department develop guidance on how private landowners can manage habitat for monarchs and other pollinators, as part of a tax incentive program to provide pollinator habitat on their land. We are actively partnering with the states of Idaho and Washington to integrate monarch butterfly conservation into their respective state wildlife action plans by filling critical data gaps and providing trainings to state land managers and citizen scientists. In addition, we worked with the Monarch Joint Venture to successfully promote the inclusion of monarch butterflies as Species of Greatest Conservation Need in the state wildlife action plans of twenty-three states. Lastly, we have also provided conservation advice and technical information to many state departments of natural resources and departments of transportation.



The Xerces Society works extensively with state agencies to identify and manage the milkweed patches that are being used by breeding monarchs. Photos: (left) The Xerces Society/Anne Stine, (right) The Xerces Society/Candace Fallon.

# 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 both Berkeley and Davis), University of Minnesota, Michigan State University, Iowa State University, University of Florida, Simon Fraser University, Franklin and Marshall College, University of Vermont, Washington State University, staff from the USDA Natural Resources Conservation Service, Soil and Water Conservation Districts, the U.S. Fish and Wildlife Service, U.S. Forest Service, Bureau of Land Management, Idaho Department of Fish and Game, Washington Department of Fish and Wildlife, the Commission for Environmental Cooperation, the Monarch Joint Venture, World Wildlife Fund Mexico, United Nations Food and Agriculture Organization, International Union for Conservation of Nature, ICF International, Great River Greening, Northwest Center for Alternatives to Pesticides, native seed companies in multiple regions, the Midwest Organic and Sustainable Education Service, Cape Cod Cranberry Growers Association, Oregon Tilth, and the National Sustainable Agriculture Coalition, among many others.

We also work with a broad coalition of more than forty businesses and brands to make pollinator conservation an increasingly mainstream practice. These businesses encompass a diverse set of organic, natural, and sustainability leaders, including High Mowing Seeds, Endangered Species Chocolate, Cascadian Farm, Annie's Homegrown, and many more.

# Evaluation

We use multiple types of evaluation to assess our impact. When testing and refining habitat installation and maintenance techniques, we often work with academic researchers who are applying standardized protocols that allow for objective assessment of results. These partnerships with researchers often lead to articles in scientific journals, providing a layer of peer review as well as a method for disseminating results. For all of our trainings and educational events, we distribute a standardized evaluation form that helps us assess the effectiveness of our materials; for short courses, we also conduct a one-year follow-up survey to gauge participants' adoption of course topics and techniques.

With all of our work, we fine-tune our approaches and priorities on an ongoing basis. We assess our effectiveness internally and rely on input from our many partners.

# Looking Ahead

Your support has helped us make significant gains for pollinators and has set the stage for continued progress. In the next phase of our work, we will deepen the nation's commitment to pollinator conservation so that proven methods will be even more widely adopted, across all landscapes. To achieve this, we will draw on our extensive experience, capitalize on recent government attention on pollinators, and leverage popular interest in reversing pollinator declines. Over the next year, we will be continuing our existing efforts and launching several new projects that will expand our education programming and help us broaden the movement for pollinator conservation and agricultural biodiversity. These new initiatives include:

## *Creating a Supply Chain Built on Pollinator Habitat*

Over the next nine years we will be working to integrate large-scale habitat development and pesticide reduction projects across 300,000 acres of farms that supply ingredients for Cheerios, Muir Glen, Cascadian Farm, Annie's, and other General Mills brands.

## *New Volunteer Speakers' Bureau*

We will develop a new program to train volunteers across the U.S. to spread our pollinator conservation message. We will conduct a series of volunteer trainings through workshops and webinars, and develop a package of resources to support volunteers' outreach activities. After these trainings, volunteers will be able to give talks, host informational tables at conferences and other events, and connect with people one on one. This approach will allow us to reach many more people at more pollinator conservation events than ever before.

The volunteer speakers' bureau will enable us to fulfill many more invitations for presentations and multiply our current reach. Photo: The Xerces Society/Matthew Shepherd.





### *Promotion of Natural Pest Control*

We will expand the use of conservation biological control and other sustainable pest practices, with a goal of reaching at least 8,000 farmers and farm agency staff through our conservation biological control short course, field days, and other educational programs.

### *Pollinator-Safe Gardening*

In response to numerous requests from home gardeners and local activists interested in pollinator protection, we will create and deliver an educational program in at least three cities that will provide information and support to this audience on creating healthy, safe pollinator habitat in urban and suburban communities across the U.S.

### *Roadside Habitat Trainings*

We are developing two new short courses based on feedback from roadside restoration professionals across the country on the issues of roadsides management for pollinators. The Roadside Landscape Design and Pollinator Conservation Short Course will provide technical guidance to help landscape architects and the roadside operations managers they work with plan for practices that benefit pollinators, and the Roadside Vegetation Management and Pollinator Conservation Short Course will provide technical guidance to help roadside maintenance staff adopt management practices that benefit pollinators. We will begin offering these courses in 2017.

### *2018 Farm Bill on the Horizon*

While the next Farm Bill still seems far in the future, Xerces Society staff are already thinking about it and collaborating with partners to ensure that pollinator protection stays at the forefront. Some of the critical goals we are focused on include reinstating the 9 million acres of Conservation Reserve Program lands lost in the last Farm Bill, increasing research funding available for university partners to study how to create better pollinator habitat and better integrated pest management practices for protecting pollinators from pesticide exposure, and ensuring that pollinators remain a priority for Farm Bill conservation programs.

Wildflower-rich habitat is the fundamental building block for bringing pollinators and other beneficial insects back into the landscape. Photo: The Xerces Society/Jessa Kay Cruz.



# ***Pollinator Conservation Supporters***

Many organizations and businesses have stepped up to protect pollinators by supporting our work, as have the Xerces Society's many members. The Xerces Society values gifts in support of our mission, and we appreciate the significant support for our pollinator conservation efforts provided by the following:

## **Foundations**

Alice C. Tyler Perpetual Trust  
Audrey & J.J. Martindale Foundation  
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## **Corporate Supporters**

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Rudi's Organic Bakery, Inc.  
The Republic of Tea  
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Zerene Systems LLC

## **Government & Nonprofit Agencies**

Bureau of Land Management  
Idaho Department of Fish and Game  
International Union for Conservation of Nature  
Iowa Department of Transportation Living Roadway Trust Fund  
The Monarch Joint Venture  
North Central Sustainable Agriculture Research and Education  
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