

Bring Back the Pollinators

Annual Report

The Xerces Society for Invertebrate Conservation
Summer 2014



THE XERCES SOCIETY
FOR INVERTEBRATE CONSERVATION



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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, Minnesota, Nebraska, New Jersey, North Carolina, and Texas.

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Front Cover Photograph by Jennifer Hopwood, The Xerces Society.

Xerces staff developed organic site preparation and seeding techniques to create this and other habitat strips on Vilicus Farm in Montana.

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Oregon · California · Minnesota · Nebraska
New Jersey · North Carolina · Texas

www.xerces.org

Introduction



This pollinator habitat at Captain Blueberry Farm in Oregon was planted to support the pollination of adjacent blueberries. The Xerces Society's pollinator team added clarkia, lupine, two species of meadowfoam, selfheal, and tiny amounts of blanketflower and California poppy to the site. Photo by Eric Lee-Mäder, The Xerces Society.

With the support of foundations, government agencies, corporate partners, and individuals, our *Bring Back the Pollinators Campaign* is working to restore natural habitat for our native crop-pollinating bees, helping farmers reduce negative impacts on pollinators, and increasing food security by helping farmers take full advantage of the native pollinators that are already present on and around farms across the country and internationally.

Recent Achievements

- Since 2008, our efforts have culminated in the restoration or protection of pollinator habitat on over 169,000 acres of U.S. farmland, with thousands more acres in development.
- Through full day ‘bee-safe farming’ workshops, farm field days, and our Pollinator Conservation Short Course, we have trained over 38,500 farmers, agricultural professionals, and others interested in pollinator conservation in all 50 states, as well as researchers and rural development professionals in India and Europe. 90.7% of participants who responded to post-workshop surveys said that they are adopting ‘bee-safe’ farming practices.
- Our 2011 book, *Attracting Native Pollinators*, sold more than 45,000 copies and recently went into its fourth printing—making it one of the publisher’s best-selling titles.
- We launched a social media component to our *Bring Back the Pollinators Campaign* that encourages ordinary people to reduce pesticide use, plant flowers for bees and butterflies, and create dialogue in their own communities around pollinator conservation. Thousands of people from all 50 states have taken a formal pledge to protect pollinators as part of this campaign and registered their pollinator habitat on a nationwide map of pollinator corridors.
- In June 2012, 2013, and 2014 we launched a month-long public awareness campaign with Whole Foods Market stores. This campaign exposed hundreds of thousands of Whole Foods customers to web-based public service announcements and in-store signage about pollinator conservation and educated WFM vendors through workshops.
- We developed several new publications including: *Beyond the Birds and the Bees, Effects of Neonicotinoid Insecticides on Agriculturally Important Beneficial Insects*; *Protecting Bees from Neonicotinoid Insecticides in Your Garden*; and *Pollinator Conservation Habitat Installation Guidelines* for every region of the country.
- We worked to design and carry out the first large-scale pilot project that integrates pollinator habitat into organic tomato farm systems, and have initiated a new project to integrate bee habitat into commercial almond orchards.
- We launched Bumble Bee Watch, a continent-wide citizen science project to track and conserve North America’s bumble bees (www.BumbleBeeWatch.org). More than 1,300 photos from across North America have already been posted. This project will help us prioritize the habitat conservation of North America’s most imperiled bumble bees.
- We have successfully worked with native seed growers to produce native milkweed seed for sale in Texas, Arizona, and California, areas where it was not previously available. This work allows for restoration of monarch habitat in key areas that are needed for monarch migration.
- We helped draft the “Saving America’s Pollinators Act” (a bill that was introduced into the U.S. House of Representatives), worked with the province of Ontario to tighten regulations on pesticides, and provided



In 2013, we published *Beyond the Birds and the Bees*. This report moves the spotlight from the risks neonicotinoids pose to bees to the impacts of neonicotinoids to invertebrates such as earthworms or lady beetles.

assistance and feedback on state legislation and local regulation in Oregon, Maine, Vermont, Minnesota, and Tucson, Arizona. Our work has led to new pesticide labeling improvements and a ban on the use of two neonicotinoids on *Tilia* trees in Oregon. (*Note: no foundation funds are used for lobbying purposes.*)

- We continue to support pollinator conservation around the world through our work with the International Union for Conservation of Nature (IUCN) Butterfly and Bumble Bee Specialist Groups and through our work with Food and Agriculture Organization of the United Nations (FAO).
- In April 2014, Scott Black, Xerces' executive director, met with White House staff in a multi-stakeholder meeting to brief them on the current state of pollinator conservation efforts. The final Presidential Memorandum, issued during 2014's Pollinator Week (June 16-20), includes many of the key recommendations that Scott presented, and directs agencies like the USDA to further expand support for bee conservation.



A Presidential Memorandum issued in June 2014 directing federal agencies to act to protect bees includes many of the key recommendations presented by Xerces' executive director, Scott Black, during a multi-stakeholder meeting at the White House in April. Official White House Photo by Pete Souza.

Restoring Pollinator Habitat on Farms Coast-to-Coast



Pollinator habitat installed at a California almond orchard. Photo by Eric Lee-Mäder, The Xerces Society.

To date, over 169,000 acres of pollinator habitat have been created or improved in the United States due to our work. To ensure that such pollinator habitat restoration efforts are successful, we are working with university scientists and USDA conservationists to research and document region-specific systems of wildflower restoration. This work, being conducted from New England to California, has included direct recruitment of farmer participants, the creation of local research and demonstration projects, and the hands-on establishment of native wildflower meadows and hedgerows.

Through these research and demonstration projects, we are evaluating multiple approaches to wildflower seedling establishment and weed management. These habitat projects are designed to support and increase the pollinators adjacent to croplands while providing maximum benefit to important crops such as almonds, apples, cranberries, blueberries, and pumpkins. The successes of these efforts are being recorded through a rigorous screening process.

The findings from these projects have been used to develop a series of easy-to-use habitat installation guides for farmers in multiple regions of the country. These guides provide a critical link to the widespread adoption of pollinator habitat restoration. Specific scientific collaborators have included researchers from Penn State, the University of California (Berkeley and Davis campuses), the University of Florida, the Michigan State University, Rutgers, and Oregon State University.

Incentivizing Pollinator Protection

We are working with Whole Foods Market to incentivize pollinator protection. We helped Whole Foods develop a credible, science-based, easily understood sustainability rating system for fresh produce. The Market Produce Sustainability Index metrics for “bee-safe” farm products will provide a “Good”, “Better”, “Best” ranking system. These rankings are based on pesticide restrictions and protecting and restoring habitat for bees.

Training Agricultural Professionals

Throughout the last five years, we have provided nationwide training for NRCS staff, Cooperative Extension educators, crop consultants, farmers, and others to ensure that they remain aware of the latest findings on how to best conserve pollinator habitat. We have had direct contact with more than 38,500 farmers, agricultural professionals, and others interested in pollinator conservation through our Short Courses, workshops, conference talks, exhibits, and other events.

Pollinator Conservation Short Courses

We have now conducted Short Courses in all 50 states. Our Pollinator Conservation Short Course has proven to be highly effective. Short Course participants are instructed in basic bee biology and identification, the economic impact of insect pollination, trends in pollinator declines, conserving and developing pollinator habitat (including wildflower selection and planting techniques), pesticide reduction strategies, long-term habitat management, and opportunities through USDA conservation programs to help to offset habitat restoration costs. Upon completion, participants have the ability to plan and implement native pollinator conservation practices and build sustainable resident bee populations on working farms.



Participants during a Pollinator Conservation Short Course in Kingston, Rhode Island in September 2013. Photo by Heather Faubert, Dept. of Plant Sciences and Entomology at The University of Rhode Island.

A few highlights of recent Short Courses include:

- In March 2013, Xerces held two Short Courses in Louisiana for over 50 attendees, including NRCS staff and farmers. The field site for one of the courses was at a restored native prairie.
- In June 2013, Xerces held two Short Courses in Tennessee for over 150 people, mainly NRCS planners.
- 120 people attended the Short Course held in Menoken, North Dakota, at the Menoken Demonstration Farm in July 2013.
- In August 2013, Xerces staff led a Short Course in State College, Pennsylvania, for 106 people. This training targeted NRCS conservation planners as well as those attending the Penn State University Bee Health Conference. Our audience was very diverse and international in composition.
- Nearly 100 people travelled from multiple islands in February 2014 to attend a Short Course held in partnership with the Hawaii Organic Farming Association. This event was preceded by a webinar for other audiences in the region who could not travel to Hilo to attend the Short Course. The webinar was broadcast to audiences across Hawaii, American Samoa, Micronesia, and the Northern Marianas Islands.
- In March 2014, despite winter weather that closed most major roads in the region, 108 participants attended our Short Course in Asheville, North Carolina as part of the Southeast Organic Growers School.

Conferences and Annual Meetings

Xerces scientists made presentations at many conferences across the country and even internationally. Highlights include:

- On March 16, 2013, Xerces staff gave a keynote talk at the Prairie Enthusiasts Conference in Mankato, Minnesota. “Will Prairie Restoration Save the Pollinators? Or Will Pollinator Conservation Save the Prairies?” was attended by more than 150 people, including many state and federal natural resources agency staff and rural landowners from across the Midwest.
- In June 2013, Xerces staff gave a talk called, “Roadsides as habitat for pollinators: managing for bees and butterflies.” The presentation was part of the Integrating Ecology in Planning and Design session at the International Conference on Ecology and Transportation. The audience was composed of representatives from state and federal agencies related to transportation, including DOTs, EPA, DNRs, Depts. of Fish and Wildlife, and others.
- Staff from the U.S. Forest Service, the Bureau of Land Management, USDA Natural Resources Conservation Service, and numerous native plant nursery representatives attended a talk on “Bringing Biodiversity Back to the Farm: The Role of Functional Native Plants in Supporting Agriculture” as part of the 6th Annual Western Native Plants Conference in Washington State in February 2014. The general session talk was attended by more than 200 people, and represents the largest gathering of its kind for natural areas land managers and native plant specialists in the western U.S.
- In January 2014, Xerces staff presented two, 90-minute “Farming for Beneficial Insects: Conservation of Native Pollinators, Predators, and Parasitoids” presentations at the Southern Sustainable Agriculture Working Group’s annual conference. There were 82 and 72 attendees at the programs. Xerces also manned a booth throughout the conference and had about 85 requests for additional pollinator conservation resources.
- More than 200 seed farmers from across the United States attended a session on “Pollinator Conservation for Organic Seed Producers” at the national Organic Seed Conference in Corvallis, Oregon. In follow-up conversations, not only are those farmers now working to protect pollinators on their farms, but several are now interested in growing native wildflowers as part of their product line for sale to other farmers who are working to increase pollinators on their land.

Workshops, Field Days, and Other Public Events

Xerces conservation staff made many presentations, a number of which were organized by local groups. A few highlights include:

- In April 2013, we collaborated with Washington State University and the Tilth Producers of Washington to lead a farm tour in the Columbia River Gorge highlighting native plants that have been incorporated into commercial vineyards and orchards.
- In June 2013, we held a full-day field tour and training in Corvallis, Oregon, where we brought participants to wildflower meadow and hedgerow demonstrations and field trials, and looked at beneficial insects on wildflower plots. We then discussed the restoration process, including site preparation, weed abatement, plant choices, planting techniques, and use of a seed rate calculator. There were 30 people in attendance for the training.
- The Xerces Executive Director gave a series of talks in Colorado, California, and Oregon, reaching over 900 people in October 2013.
- In November 2013, Xerces staff held a 90-minute lecture titled, “Bring Back the Pollinators” at a nursery in Portland, Oregon. 45 people attended the talk, including gardeners and the public.
- We conducted two workshops at the MOSES Organic Farming Conference in February 2014, including “Farm Planning for Pollinators, Beneficials, and Biodiversity,” and “Getting Started in Native Seed Production.” Collectively, approximately 300 people attended these sessions, with an additional several thousand conference attendees visiting our exhibit booth for one-on-one advice and guidance.
- We spoke with 150 County Weed Superintendents in Nebraska during April 2013. This audience has the specific mandate of overseeing weed control on public rights-of-way adjacent to cropland. This engagement provided an opportunity to educate them about the value of some of those plants to beneficial insects and to offer recommendations on how to reduce harmful impacts of herbicide on natural habitat.
- In early April 2014, we co-conducted a native plant field day at the USDA Plant Materials Center (PMC) in California. More than 100 federal, state, and local farm agency staff learned about native plant selection and establishment for pollinator conservation and cover cropping for pollinators.



The Lockeford PMC in California is frequently used in trainings and demonstrations for federal, state, and local farm agency staff. Photo by Jim Cairns, CA USDA-NRCS.

Comments from Workshop and Short Course Participants

"I attended last weekend's Prairie Enthusiasts' conference in Mankato and was very moved by your presentation. Thank you for your clarity and eloquence in synthesizing so many critical ecological issues and for inspiring the community of doers taking positive stewardship action."

- Farmer, Minnesota Workshop

"I just wanted to thank you for your inspiring talk at the Prairie Enthusiasts Conference. I wanted to let you know that at an ag landowners meeting last night where we are trying to put forth recommendations to clean up the water in a degraded watershed, another attendee to your talk stressed the importance of including pollinator habitat in the mix of BMPs we recommend. As a speaker, you never really learn the ripple effects of what you're sharing with an audience."

- Farm Agency Employee, Minnesota Workshop

"Expectations met and exceeded. This was fantastic! I want to help you offer this in my area too!"

- Farmer, beekeeper, Ohio Workshop

"I wanted to learn more about bee pollination and you covered all my expectations. Thanks!"

- Biologist/Entomologist, South Dakota Workshop

"I had really had an eye opening experience... This was an excellent presentation and benefited me greatly. Thank you!"

- SWCD Employee, Michigan Workshop

"Excellent program, great information! Jennifer does a wonderful job."

- Agricultural Support Staff, South Dakota Workshop

"To further enhance my knowledge of pollinators and pollinator plants. Absolutely loved it—definitely want to study, learn and practice more in depth. Thank you!!"

- Gardener, Florida Short Course

"My expectations were to become more aware of and informed on pollinator biology, habitat, and threats. My expectations were far exceeded!"

- Biologist/Entomologist, Oregon

"I wanted to learn enough to provide support to local volunteer efforts to conserve pollinators—and I feel much better prepared now. Thanks."

- State Agency Employee, Illinois Workshop

Providing Technical Expertise to the USDA

Through several shared staff positions, the Xerces Society is providing technical consulting to the USDA Natural Resources Conservation Service (NRCS), the largest government agency supporting conservation on private lands. We are supporting the NRCS by creating and disseminating “how-to” information for habitat installation.

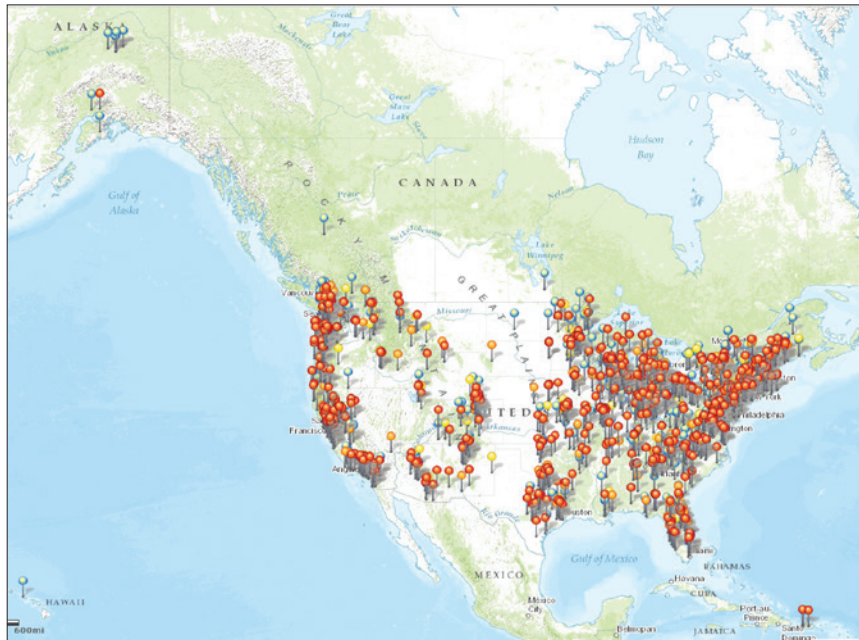
- **Wildflower Establishment Guides:** These guides, based on test projects in 11 states, provide step-by-step instructions for restoring or enhancing pollinator habitat. Information on where to buy wildflower seed, what species to plant, and how to control weeds in the habitat is covered in detail.
- **Pesticide Risk Mitigation Technical Note:** This document, developed for NRCS staff, provides instructions on how they can help farmers adopt practices that reduce the potential threats of pesticides to pollinators. These practices include techniques for capturing pesticide runoff, reducing conditions that encourage pest outbreaks, and the management of pesticide sprayers to reduce over-application of chemicals.
- **Conservation Biological Control Guidelines:** This publication details low-cost, science-based strategies for reducing crop pests on farms by creating habitat for the beneficial insects that prey upon them. When provided with simple habitat enhancements (such as wildflower strips), wild beneficial insect populations can be increased exponentially. Even without being factored into traditional conservation efforts, in the United States alone, the contribution of such beneficial insects to crop pest control has been estimated to be at least \$4.5 billion annually. By encouraging the conservation of these beneficial insects, Xerces and the NRCS can help farmers reduce the need for pesticides and protect pollinators in the process.
- **Pollinator Conservation in Pacific Agroforestry:** To support the unique needs of NRCS staff and farmers in Hawaii, American Samoa, Micronesia, and the Northern Marianas Islands, we worked with Extension and native plant specialists to develop a comprehensive guide to habitat restoration for regionally important pollinator species (including bees, butterflies, bats, and birds).

Bring Back the Pollinators Campaign

Launched in April 2012, the Bring Back the Pollinators Campaign encourages ordinary people to reduce pesticide use, plant flowers for bees and butterflies, and create a dialogue in their own communities around pollinator conservation. The pollinator gardens they are creating are being documented on a dynamic GIS map and displayed over the web as a growing, nationwide network of pollinator corridors. To date, thousands people from all 50 states have taken the pledge, which states:

To bring back the pollinators, I will:

1. Grow a variety of pollinator-friendly flowers which bloom from spring through fall,
2. Protect and provide bee nest sites and caterpillar host plants,
3. Avoid using pesticides, especially insecticides, and
4. Talk to my neighbors about the importance of pollinators and protecting their habitat!



When a person signs the Pollinator Protection Pledge, a pin is added to the map, illustrating how the community of pollinator enthusiasts has spread to all fifty U.S. states.

We have also partnered with Whole Foods Market (WFM) to promote pollinators through their Share the Buzz Campaign. In June 2012, 2013, and 2014, we launched a month-long public awareness campaign with Whole Foods Market stores. This campaign exposed hundreds of thousands of Whole Foods customers to web-based public service announcements and in-store signage about pollinator conservation and educated WFM vendors through workshops.

Reducing Pesticide Use in Agriculture

Xerces is working to reduce the impact of pesticide use in agriculture on several fronts. To date, we have developed a successful four-part strategy that uses science, advocacy, education, and the development of pesticide alternatives to improve farmlands for pollinators.

Building a Scientific Case for Pollinator Protection

In the last two years, Xerces has published two of the most comprehensive reports that are changing the debate about neonicotinoids and pollinators. *Are Neonicotinoids Killing Bees?* and *Beyond the Birds and the Bees* are both increasingly used by policymakers and government agency staff to guide recommendations on pollinator protection.

In fact, *Are Neonicotinoids Killing Bees?* was one of the documents cited by the European Parliament in background research leading up to the European Union's restriction on the further use of several neonicotinoid insecticides. Various state governments and municipalities across the U.S. are also using the report to draft local regulations that reduce or restrict unnecessary use of these chemicals. These reports provide the scientific justification for insecticide reform, and do so through easy-to-understand language that can be quickly interpreted by non-scientific audiences. Unlike other scientific papers, our reports include clear recommendations for lawmakers.

In this same timeframe we have worked with scientists from across the world to design a new pesticide risk assessment process for bee protection. Currently, before a new pesticide is approved for use, the Environmental Protection Agency (EPA) requires pesticide manufacturers to assess the risk that a pesticide poses to bees. Under the current risk assessment process, the scientific community has raised concerns about significant knowledge gaps and loopholes that allow dangerous insecticides to be brought to market. This new risk assessment procedure, if adopted by the EPA, will require a greater degree of scrutiny before pollinator-killing insecticides are allowed for sale.

The design of this new testing process is the culmination of several years of collaboration with researchers and regulators from both Europe and the United States (including the EPA itself). In the past, the risk assessment process was largely influenced by the chemical companies. To remedy this, we fought for the inclusion of ourselves and other science-based conservation stakeholders in the initial EPA discussions around a possible change in the risk assessment process. While there will continue to be gaps in the version the EPA finally approves, we see the adoption of this new process as a victory and first step in broader pesticide reform.

Finally, we continue to identify major policy shortfalls and knowledge gaps that require more research. For example, Xerces has recently uncovered vast discrepancies in the approved application rates of the certain insecticides. In the case of some neonicotinoids, household versions allow for significantly higher application rates than their agricultural product counterparts. Questions posed by Xerces regarding these discrepancies immediately led to an inquiry by the Oregon Department of Agriculture, which is now meeting with the EPA to ask for a nationwide resolution to this enormous regulatory oversight.

Advocating for Pollinator Protection

Xerces is a national leader in pesticide reform. Working with a broad coalition of organizations, we regularly testify at hearings and briefings in Washington, D.C. As part of this strategy, in early 2014, we worked with

Rep. Earl Blumenauer to draft the “Saving America’s Pollinators Act.” The Act calls on the EPA to suspend the use of imidacloprid, clothianidin, dinotefuran, and thiamethoxam (four of the most toxic neonicotinoids) for uses that could significantly impact pollinators, until additional research demonstrating they can be used safely is available. (*Note: no foundation funding is used for lobbying purposes.*)

Because of the many pressures they are now facing, the EPA has committed to performing an environmental review of neonicotinoids by 2018. We will use this opportunity to ensure that the EPA considers all science demonstrating negative environmental impacts as part of the process. While this is an important opportunity to remove high-risk insecticides from the marketplace, the review process must be accelerated. One of our national priorities is to push for a review process that takes no more than two years and suspends the use of chemicals until the review is complete. (The European Union has suspended the three most toxic neonicotinoids for two years while they study these chemicals’ impact. We will push EPA to follow a similar model.)

National action is also needed to mandate better labeling that informs pesticide users of a product’s possible risks. Currently, insecticides sold in nurseries and hardware stores are not required to have clear labels warning of possible harm to pollinators, and labels for farm products are often difficult to understand. If consumers know that these products kill pollinators, some will not use them, and others will moderate their use.



Xerces is working at both the state and local level to restrict and regulate the use, sale, and labeling of neonicotinoid insecticides (like those pictured here). Photo by Matthew Shepherd, The Xerces Society.

Working at the State and Local Levels

Xerces has been contacted by people across the country to help in efforts to reduce the use of neonicotinoids and protect pollinators from pesticides. Xerces is engaging in many state and local efforts, including the following:

Providing technical support to people across the country

- We have helped people from Arizona, California, Colorado, Florida, Maine, Minnesota, North Carolina, Oregon, Tennessee, Texas and Vermont by giving them the information they need to create pollinator-safe habitats. Some of these efforts—namely in Arizona, Minnesota, Maine and Oregon—could lead to local or state policy changes.
- Xerces staff submitted input to the Minnesota State Department of Agriculture’s Pesticide and Fertilizer Management Division’s draft review of neonicotinoids.
- We are helping a Maine legislator craft meaningful legislation to protect pollinators from pesticides, which will be presented during the 2015 legislative session.

Helped pass a new law in Oregon that seeks solutions to protect pollinators from pesticides

- Oregon House Bill 4139, enacted into law, requires education and testing on pollinator protection as part of the State’s pesticide applicator licensing procedures.
- The law also created a task force to look into potential legislation and/or other remedies to better protect pollinators from neonicotinoid pesticides. The Xerces Pesticide Program Coordinator was recently contacted to become a member of the task force.

Promoted federal review of some neonicotinoid labels

- In conversations with the Oregon Department of Agriculture (ODA), Xerces staff raised the issue of how products intended for backyard use allow significantly higher rates of neonicotinoid to be applied, in comparison to agricultural rates. ODA staff brought the issue up with EPA staff members, who are currently working to correct this egregious discrepancy. This issue will require Xerces’ vigilance to maintain momentum.
- Our work has led to new pesticide labeling improvements and a ban on the use of two neonicotinoids on *Tilia* trees in Oregon. (*Note: No foundation funds are used for lobbying purposes.*)

Educating Farmers and Farm Agency Staff to Reduce Pesticide Risks

To support our *Pollinator Conservation Short Course* and workshop-based training, we developed a new publication on pesticide risk-reduction for the USDA’s Natural Resources Conservation Service (NRCS). This manual provides NRCS staff and their farmer-clients with design instructions for pesticide capture systems (such as spray buffers and windbreaks) that reduce chemical movement into nearby natural areas and watersheds. As a next step, we will incorporate this information into our *Short Course* curriculum and make it accessible through our other workshop and web media, which reach tens of thousands of additional people each year.

To further support farmers, in the next year we hope to hire a full-time Integrated Pest Management (IPM) specialist. The IPM specialist will work with the USDA and leading research entomologists across the country to design IPM plans for multiple crops that reduce pesticide impacts to bees while still effectively controlling crop pests.

Advancing the Science of Conservation Biological Control

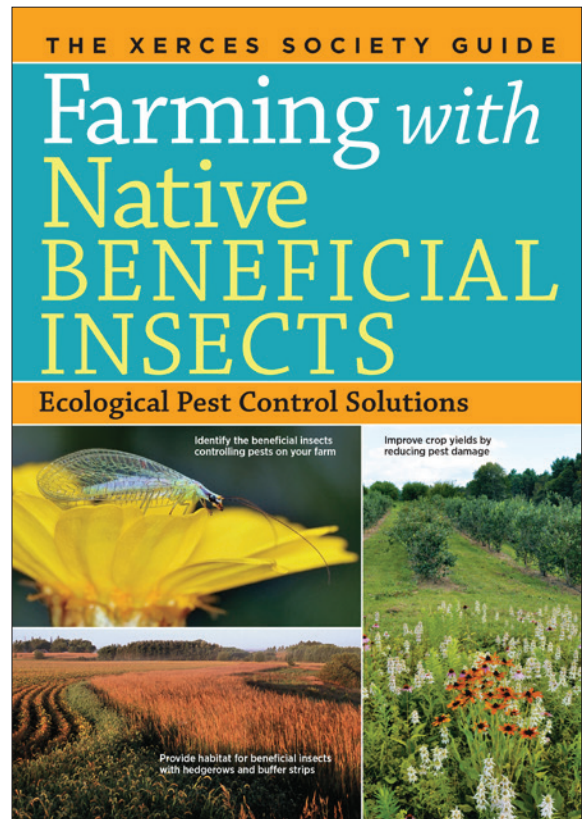
Beneficial insects that prey on crop pests are an overlooked resource in agricultural systems. Although vast numbers of such beneficial species are already at work on farms across the world, they are eclipsed in farm education by a comparatively smaller diversity of pest species. Yet, as a large body of research now demon-

strates, a diversity of farmers—from Christmas tree growers in Illinois to tomato growers in California—benefit from natural pest control. In fact, when provided with simple habitat enhancements, wild beneficial insect populations can be increased exponentially.

In mid-2014, Storey Publishing will release our new book, *Farming with Beneficial Insects: Ecological Pest Management Solutions*, the most in-depth book of its kind ever developed for farmer audiences on the subject of ‘conservation biological control’ (the process of managing farm habitat to increase predators of crop pests). This publication (an outgrowth of our research on California farms over the past six years with UC Berkeley scientists) highlights proven, low-cost, real-world strategies for reducing crop pests on farms by creating habitat for the beneficial insects that prey upon them. We have spent the previous year completing this book and preparing it for release this summer.

Key information from *Farming with Beneficial Insects* was also summarized in a companion manual we developed for USDA staff titled *Conservation Biological Control: Providing Habitat for Predators and Parasitoids of Crop Pests*.

These publications will support future workshops and training to farmers and farm agency staff. For example, in 2014 we will begin offering the *Ecological Pest Management Short Course*, a full day training session that synthesizes research around this topic and offers realistic implementation strategies for increasing natural pest control on farms. Specific course topics include beneficial insect biology, designing habitat improvements, pesticide risk mitigation, securing financial support through USDA programs, and real world case studies. The audience for the Short Course includes farmers, IPM specialists, Extension personnel, USDA staff, Soil and Water Conservation District technicians, state Departments of Agriculture, crop consultants, and sustainable agriculture organizations.



Our new book, *Farming with Native Beneficial Insects*, will be published in mid-2014. It highlights proven, low-cost, real-world strategies for reducing crop pests on farms by creating habitat for the beneficial insects that prey upon them.

Project Milkweed



Milkweeds are the required larval host plants for the monarch butterfly, and the loss of milkweed plants from the North American landscape is believed to be a major factor contributing to monarch population declines. Photo by Eric Eldredge, USDA NRCS Great Basin Plant Materials Center.

Milkweeds, a group of native perennial wildflowers, are the required larval host plants for the monarch butterfly. Additionally, milkweeds attract and support a diversity of pollinators including native bees, honey bees, butterflies, wasps, and beetles. However, the loss of milkweed plants from the North American landscape is believed to be a major factor contributing to the monarch population declines that have been documented at overwintering sites in California and Mexico.

The restoration of native milkweeds is critical to reversing these downward population trends, but a scarcity of milkweed seed in many regions of the United States has limited opportunities to include the plants in habitat restoration efforts. To address this seed shortage, the Xerces Society launched *Project Milkweed*, a collaboration with the native seed industry, the USDA NRCS Plant Materials Program, and community partners to produce new sources of milkweed seed in key areas of the U.S. where native milkweed seed had not been reliably available.

In addition to increasing seed availability, Xerces is raising awareness about the wildlife value of milkweeds, encouraging the inclusion of milkweeds in pollinator conservation efforts nationwide, and expanding markets for milkweed seed. Through distributing publications and conducting outreach via workshops, trainings, and presentations, we have educated thousands of people about the need for monarch and milkweed conservation and milkweeds' value to pollinators.

In just over three years:

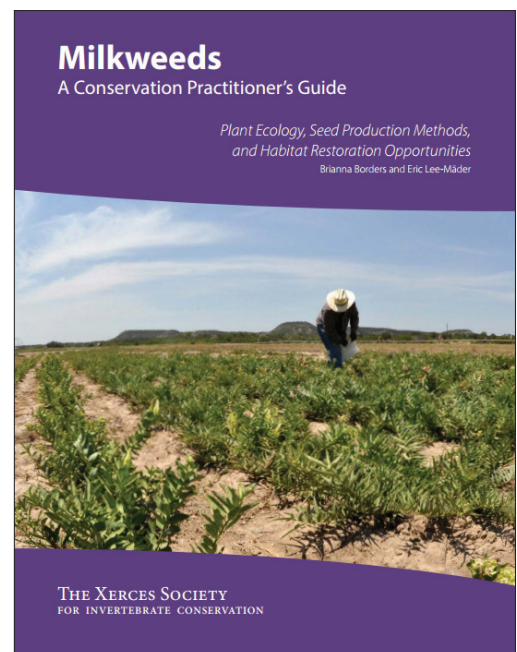
- We have worked with farmers and land managers to restore tens of thousands of acres of habitat across much of the monarch's breeding range.
- We launched seed production for milkweed species in California, Arizona, New Mexico, the Great Basin, Texas, and Florida—key areas of the monarch's breeding range where native seeds had not been available.
- Xerces staff coordinated the sustainable collection of over 3 million seeds to start this effort, which has so far resulted in the production of more than 35 million seeds!



Xerces' Milkweed Seed Finder is a searchable web directory that connects people with milkweed seed suppliers in their region.

To connect people with milkweed seed suppliers in their region, we launched our Milkweed Seed Finder in March 2014, a searchable web directory of seed vendors across the country (please see: www.xerces.org/milkweed-seed-finder). This directory is a one-of-its-kind resource, which has been met with enthusiasm from both the public and the native seed industry. The Seed Finder is currently the most-visited page on the Xerces Society website, with several thousand unique visitors received to date.

We have finalized the publication *Milkweeds: A Conservation Practitioner's Guide*. This comprehensive document includes information on milkweed ecology; the plants' value to monarchs, pollinators, and other beneficial insects; guidelines for milkweed propagation, establishment, and seed production; guidance on pest and pathogen identification and management; and recommendations of which milkweeds are appropriate for planting on a regional basis. This publication is a major component of our strategy to develop milkweed seed production technology and to provide conservation agencies, land managers, and landowners with the information they need to incorporate milkweeds into their revegetation and habitat restoration efforts.



Project Bumble Bee

To preserve wild bumble bees, Xerces uses science and citizen science to evaluate the conservation status, threats, and conservation needs of these animals, advocacy to engage state and federal agencies in the protection of these species, and outreach and education to land managers and public agencies to directly protect and manage sites for the benefit of imperiled bumble bees.

Science

Beginning with a status review of three formerly common species of bumble bees in 2008, we continue to engage the scientific community in bumble bee conservation. In 2010, we worked with partners to organize an international meeting of approximately 50 researchers, policy makers, bumble bee industry representatives, land managers, and other stakeholders to outline threats to North American bumble bees and remedies to address those threats. The resulting conservation strategy, based on recommendations from that meeting, provides guidance for bumble bee research, conservation and management.

In 2011, Xerces staff developed a proposal to initiate a Bumblebee Specialist Group under the International Union for Conservation of Nature's (IUCN) Species Survival Commission, and then worked with Dr. Paul Williams of the Natural History Museum in London and other bumble bee researchers to engage the world's leading bee researchers. This group is currently evaluating the conservation status and extinction risk of all 250 species of bumble bees worldwide using the IUCN criteria. As part of this group, Xerces staff members have completed IUCN conservation status analyses for all 46 species of North American bumble bees and concluded that one third are at risk of extinction: five species are Critically Endangered, two are Endangered, five are Vulnerable, and three are Near Threatened. We are currently preparing to publish these results in a research journal.

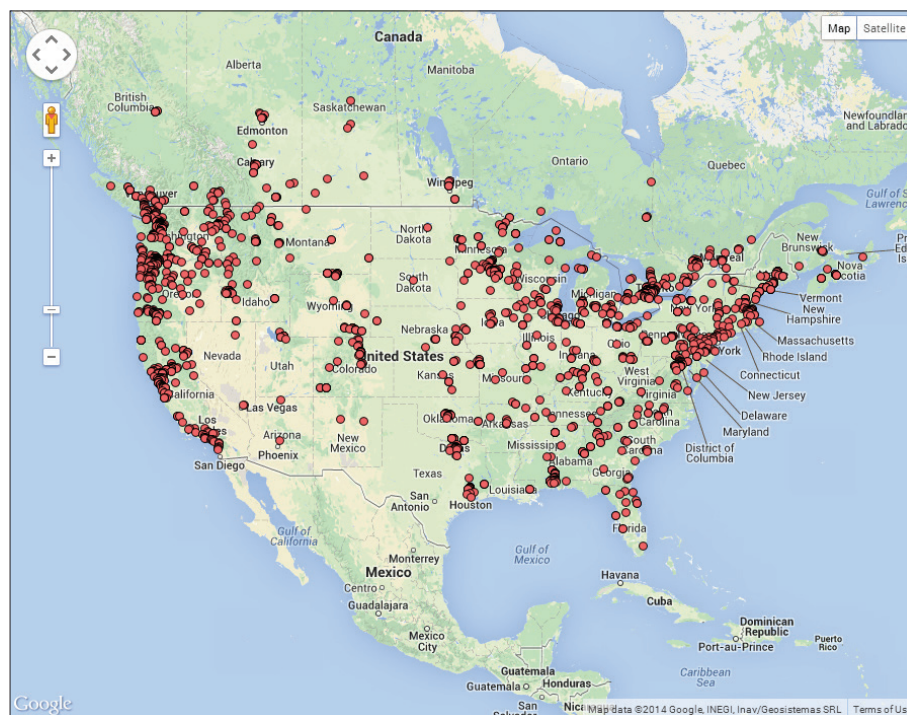


Xerces Society scientists have worked to document the status of rare North American bumble bees like the western bumble bee (*Bombus occidentalis*), pictured here. Photo by Rich Hatfield, The Xerces Society.

Citizen Science

Citizen science can be a powerful way to obtain information on a broad scale, while simultaneously educating the public. In 2007, we initiated a citizen science project to track the status of three formerly widespread but declining bumble bees. We developed pocket identification guides and ‘Wanted’ posters to encourage participation in this project. Thousands of people have participated in this project, resulting in 85 photo-documented observations of very rare species of bumble bees. Information about the current distribution of imperiled bumble bee species has been used in advocacy and outreach efforts directed at both public agencies and private landowners to gain protection for those species.

Building on the success of this initial project, we collaborated with partners to launch an expanded citizen monitoring website in January 2014. Bumble Bee Watch (please see: www.BumbleBeeWatch.org) aims to track and conserve all species of North American bumble bees, and includes a state-of-the-art web portal to submit photos of bumble bees, use identification guides, and have experts verify photos. This project will give us a much greater understanding of which bumble bees are most imperiled and where they can be found—information essential in targeting conservation efforts. We have announced this project to more than 20,000 individuals through e-newsletters and listservs. Already, more than 1,300 bumble bee photos have been uploaded across North America and news stories have been written about this project in numerous media outlets, including *Discover* and *National Wildlife* magazines and the *San Francisco Chronicle*.



Each pin on the BumbleBeeWatch.org map represents a citizen scientist's bumble bee species sighting. As of Spring 2014, photos of over 1,300 sightings have been uploaded across North America.

Advocacy

Over the last several years, we completed and filed scientific petitions presenting substantial information that Franklin's bumble bee and the rusty patched bumble bee warranted being listed as Endangered under the U.S. Endangered Species Act. This year, after more than one year from the date we submitted the rusty patched bumble bee petition, we filed a complaint against the Fish and Wildlife Service for their failure to

respond to the petition within the time frame required by law. If protection is granted, the bee's habitat will be protected and a recovery plan will be developed.

In 2010, we petitioned the USDA Animal and Plant Health Inspection Service (APHIS) to protect wild bumble bees from disease by regulating commercial bumble bees. We continue to put pressure on APHIS to establish new regulations. To this end, we recently sent two letters to the agency (in December 2013 and January 2014) asking them to respond to our petition submitted in January 2010. We received an initial response from APHIS stating that the agency agrees with our petition and is looking into developing the specific regulations that we requested. In April 2014, we received a second letter directly from the Secretary of Agriculture. In this letter, the Secretary invited us to meet with Dr. Wager-Page, the Branch Chief of Pest Permitting for the APHIS Plant Protection and Quarantine program to discuss our concerns and possible solutions. The meeting will happen in June of this year.

Outreach and Education

In 2012, Xerces published *Conserving Bumble Bees: Guidelines for Creating and Managing Habitat for America's Declining Pollinators*, a comprehensive guide for landowners and land managers to create and manage high-quality bumble bee habitat. In 2013, we completed a fully illustrated companion brochure, *Bumble Bee Conservation*. To date, we have distributed more than one thousand copies of the guidelines and brochure to land managers, including many individuals who harbor populations of at-risk species on their properties. (Many of these landowners were identified in our citizen-science project.)

We have reached out to more than 100 wildlife agency professionals at the U.S. Forest Service and state agencies that manage wildlife to encourage them to list at-risk species of bumble bees on relevant sensitive species lists. This has led the U.S. Forest Service to list the western bumble bee as a 'sensitive species' in Oregon, California, and Washington, which means the western bumble bee must now be considered in Forest Service projects that require Environmental Assessments. Also as a result of our outreach, at least nine states have added rare or declining species of bumble bees to the lists of animals that natural heritage programs track and to their State Wildlife Action Plans, which will make these species eligible for monitoring, conservation, and management funds.



Xerces Endangered Species Conservation Biologist Rich Hatfield searches for the western bumble bee near Oregon's Mt. Hood. Photo by Margo Conner, The Xerces Society.

Partnerships

There are many organizations and scientists with whom we partner on a regular basis. These include scientists from Rutgers University, University of California (at both Berkeley and Davis), University of Minnesota, Michigan State University, San Francisco State University, University of Massachusetts, Cornell University, Simon Fraser University, University of Florida, staff from the Natural Resources Conservation Service and Resource Conservation Districts, Wild Farm Alliance, apple and cranberry growers associations, the National Organic Tree Fruit Growers Association, the Midwest Organic and Sustainable Education Service, Sustainable Agriculture Coalition, the Organic Farming Research Foundation, the Native Pollinators in Agriculture Working Group, the Atlanta Botanic Garden, and the Greater Atlanta Pollinator Partnership, among many others.

We also work with a broad coalition of more than forty leading businesses to make pollinator conservation an increasingly mainstream practice. These businesses encompass a diverse set of leaders in multiple industries, including General Mills, Whole Foods Market, Aveda, Ernst Conservation Seeds, and many more.

Pollinator Program Supporters

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Whole Foods Market's Share the Buzz

Beginning in 2012, for two weeks each June, Whole Foods Market and its vendor companies host *Share the Buzz*, a bee conservation and awareness initiative. Proceeds from the initiative are donated to Xerces, and we would like to recognize the generous support of the following *Share the Buzz* participating vendors:

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The Hain-Celestial Group
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Cascadian Farm
Celestial Seasonings Tea
Dream Non-Dairy Beverages and
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Maisie Jane's
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THE XERCES SOCIETY

FOR INVERTEBRATE CONSERVATION

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