

Helping Monarch Conservation Take Flight

With three decades of experience of monarch protection, the Xerces Society is now at the center of many monarch conservation efforts at local, state, national, and international levels.

Our work has led to the creation of tens of thousands of acres of monarch habitat and empowered thousands of people to take action for monarchs.

The Xerces Society was one of the pioneers of monarch butterfly conservation. In the early 1980s, Xerces founder Dr. Robert Michael Pyle and monarch expert Dr. Lincoln Brower worked with the International Union for Conservation of Nature (IUCN) to classify the monarch migration as a threatened phenomenon.

Since the monarch migration was highlighted by the IUCN in 1984, both the eastern and western monarch populations have declined substantially, and there has been a rising wave of support for monarch conservation. In response, the Xerces Society has built one of the largest monarch conservation teams in the United States (currently the equivalent of 9 full-time staff) and has amassed decades of experience and rigorous, science-based expertise in all aspects of monarch conservation. Our work now extends to protecting and managing the habitats that support all stages of the monarch's lifecycle throughout the transcontinental range of the butterfly's migration.



The Xerces Society first became involved in protecting the monarch's migration and overwintering sites in the 1980s. (Photograph: The Xerces Society/Carly Voight.)

National and International Reach

To ensure the monarch butterfly recovers, we are working with government agencies and monarch scientists at the highest levels in the United States, Mexico, and Canada. Through our involvement in the Federal Monarch Butterfly High Level Working Group, the Monarch Joint Venture, and both the National and Tri-National Monarch Conservation Science Partnerships, we are advancing the science and practice of monarch conservation, and shaping monarch conservation priorities at all levels.

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.

We are working with North America's Commission for Environmental Cooperation (CEC) and the University of Minnesota Monarch Lab to develop a comprehensive guide for private landowners in all three countries on habitat management best practices, financial incentive programs, and other conservation tools.

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We provide guidance, technical support, and monarch expertise to federal agencies such as the USDA Natural Resources Conservation Service, U.S. Forest Service, U.S. Fish and Wildlife Service, DOI Bureau of Land Management, U.S. Geological Survey, and the U.S. State Department.

Working with States to Inform Monarch Conservation Efforts

Xerces Society staff 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 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. We are also providing input to states as they develop pollinator and monarch conservation plans.

Monarch Habitat Restoration in Agricultural Landscapes

Monarchs are a flagship species. Habitat restored for monarchs also benefits native bees and other pollinators as well as additional beneficial insects, birds, and other wildlife. In farm communities, our habitat restoration efforts include expansive flowering wildflower meadows, restored prairies, and hedgerows that extend for miles creating a vital habitat corridor through otherwise inhospitable terrain. 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 ranches. We also work with these farmers to protect habitat areas from insecticides.

The efforts we have supported since 2008 have culminated in the restoration or protection of pollinator habitat on more than 245,000 acres—with 45,000 acres in the last year alone. Much of that land has been planted with millions of milkweed seeds for monarchs.

By including milkweed in habitat restoration and creation projects, tens of thousands of acres of monarch habitat have been created in working agricultural landscapes across the country. (Photographs: left, The Xerces Society/Anne Stine; right, The Xerces Society/Jessa Kay Cruz.)



Supporting Monarch Conservation Through Farm Bill Programs

The Farm Bill provides considerable opportunity to support monarch conservation through existing programs and new initiatives. Xerces Society staff work under a cooperative agreement with the USDA Farm Service Agency to develop improved guidelines for “mid-contact 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 of management of CRP for monarchs.

Also in partnership with the NRCS, Xerces 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 by using multiple NRCS programs to provide additional cost share to farmers and ranchers who create high-quality habitat. The NRCS dedicated \$4 million for this effort in FY2016. This partnership will lead to thousands of acres of new or improved habitat for monarchs.

In partnership with the NRCS and the Monarch Joint Venture, Xerces staff developed evidence-based recommendations for key nectar plants for on-farm habitat that will provide good food sources for migrating monarch butterflies, and regional guides for evaluating habitat and planning conservation projects. With these guides in hand, NRCS staff will be able to help ranchers in southern Great Plains states and farmers in the Midwest identify, protect, and restore monarch habitat.

Monarch Demonstration Sites Across the U.S.

Demonstration sites on working lands can be a powerful tool to engage private landowners in monarch and pollinator conservation. The Xerces Society has worked with farmers to implement demonstration sites in a variety of agro-ecosystems that showcase successful conservation methods. In addition to habitat on farms, we have overseen plantings at food company processing facilities, community gardens, NRCS Plant Materials Centers, and on airport properties.

In the Midwest we are working with the Tallgrass Prairie Center and the Monarch Joint Venture to install a series of monarch habitat demonstration sites on farms. These concrete examples show that pollinator conservation is an achievable and beneficial activity for farmers. Field days at each of these farms not only motivate farmers to take action for monarchs and other pollinators, but also give participants the technical information needed to make their future habitat installations succeed.



A new initiative from the USDA Natural Resources Conservation Service brings technical support and cost-share funding to help farmers create monarch habitat. Xerces staff helped develop the initiative. (Photograph: NRCS/Eric Eldredge.)



The Xerces Society partners with native seed companies to develop successful seed production techniques and collaborates with agencies and other conservationists to encourage inclusion of high-value nectar species such as meadow blazingstar (*Liatris ligulistylis*) and tall thistle (*Cirsium altissimum*) in habitat. (Photographs: left, Minnesota Native Landscapes/Keith Fredrick; right, The Xerces Society/Jennifer Hopwood.)

Flowers for Monarchs

Restoring habitat for monarch butterflies means using the native plants upon which monarchs depend. As interest grows in monarch habitat restoration, the supply of key plants has not always kept up with the demand, especially for milkweed seed. In less than five years, through Project Milkweed, our work with the native seed industry to increase the supply of this essential plant, we helped bring more than 60 million additional milkweed seeds to market in regions where no milkweed seed had previously been available.

Native milkweeds are not the only plants with high value to monarchs but with limited commercial availability. We continue to identify important but overlooked nectar species. Partnering with native seed producers, we collect wild seed for these plants; establish production plots and monitor them for seed predation, disease, and insect damage; and document propagation practices. One example is our work with Minnesota Native Landscapes, a native seed company based in Minnesota, where we are working to produce meadow blazingstar (*Liatris ligulistylis*) and native thistles (e.g., *Cirsium altissimum*), both of which have high value as nectar sources for monarch butterflies.

We are also producing a series of evidence-based monarch nectar plant guides for each of 14 regions of the U.S. These guides will provide the information gardeners, land managers, and farmers need to better restore monarch habitat (not just milkweed) in the landscape.

Engaging Food Companies in Conservation

Xerces works hand-in-hand with leading food companies on monarch conservation. Beyond simply providing funding for our programs, these companies have acted on our guidance to engage their customers in pollinator conservation and to restore habitat on supplier farms. For example, Whole Foods Market has promoted pollinator (including monarch) conservation to millions of customers since 2012 through their annual Share the Buzz campaign. Working with General Mills, we recently launched a partnership to improve both habitat and reduce pesticide use in their supply chain. 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, Cascadian Farm, Annie's, and other General Mills brands.

Helping Monarchs on the Road to Survival

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 urbanized and intensely farmed regions, roadsides may provide the only natural or semi-natural habitat.

In collaboration with ICF International, the Xerces Society has developed tools for the Federal Highway Administration to help practitioners provide habitat for monarchs and other pollinators. These include a review of the science surrounding pollinators on roadsides as well as decision-making documents for managers and maintenance staff. We are also working with the Rights-of-Way as Habitat Working Group, facilitated by the University of Illinois–Chicago, to promote sound management and restoration for monarchs and other pollinators.

In December 2015, we participated in the White House Pollinator Transportation Summit and provided evidence-based guidance on managing habitat for monarchs and other pollinators along roadsides.

As part of a multi-agency team, we are 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.

Protecting Pollinators from Pesticides

Among the causes of monarch decline, insecticide use may be an important yet overlooked 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, and new research reveals that some of these compounds are toxic to monarch caterpillars. 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.

Monarchs in the West

The smaller monarch population in the western U.S.—part of which migrates to the California coast to overwinter, and part of which migrates to Mexico—is frequently overlooked in mainstream monarch conservation efforts. An analysis in Xerces' newly released report, *State of the Monarch Butterfly Overwintering Sites in California*, shows a 74% decline in the California overwintering population in less than 20 years, comparable to declines observed in the monarch population that overwinters in Mexico. The Xerces Society has been working to ensure that the western population is included in monarch conservation efforts.

Monarch Breeding Habitat in the West

Compared with the eastern population, little is known about the most important breeding areas in the western U.S.; this information is crucial for effective conservation and successful recovery. We are working with the U.S. Fish and Wildlife Service (USFWS), Idaho Department of Fish and Game, Washington Department of Fish and Wildlife, DOI Bureau of Land Management, U.S. Forest Service, the Monarch Joint Venture, university research partners, and hundreds of citizen scientists to identify where western monarchs breed and to develop guidance to effectively manage those habitats.

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 the 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 being used to develop in partnership with the USFWS 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. Through a partnership with the states of Idaho and Washington, Xerces is involving more citizen scientists in gathering data on milkweed and monarch breeding locations via an interactive website, to be launched in December 2016, which will also serve as a resource for monarch monitoring and conservation efforts throughout the West.

The Xerces Society is providing a series of Monarch Conservation and Management Short Courses to federal, state, local, and tribal land managers in Idaho, Washington, Oregon, California, Nevada, Colorado, and Utah. These courses have educational value and will create local, cross-agency connections around monarch conservation. In addition to these benefits, our goal is to 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.

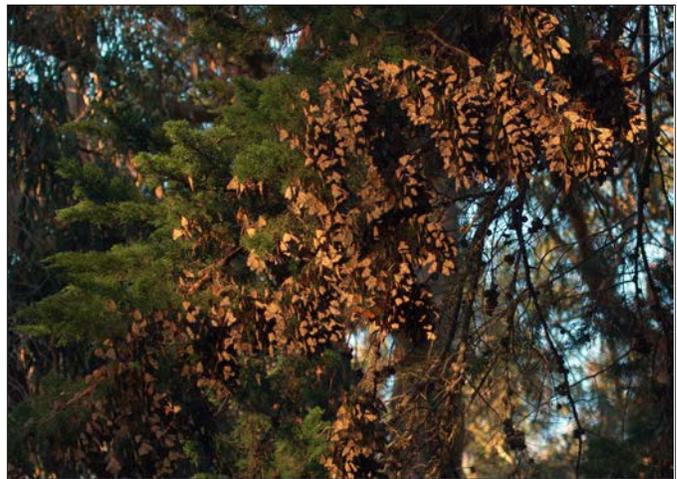
Restoring Monarch Overwintering Sites

Since the late 1990s, the Xerces Society has managed a volunteer effort to monitor the western monarch population and the condition of California overwintering sites. The Western Monarch Thanksgiving Count has engaged hundreds of volunteers in tracking the monarch population over time, and through this effort, we have learned that western monarchs have undergone a 74% decline since 1997.

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 overwinter-



Through citizen science programs and partnerships with federal and state agencies, the Xerces Society has mapped, protected, and enhanced milkweed in western states. (Photograph: The Xerces Society/Ashley Taylor.)



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



There are fewer opportunities to experience the magic of overwintering monarchs in California. Xerces scientists used the data gathered over nearly two decades of monitoring by the Western Monarch Thanksgiving Count to assess the health of the monarch population and the condition of the overwintering sites.

ing sites to restore. We are currently working with the U.S. Fish and Wildlife Service and land managers at two of these high-priority sites—Ardenwood and Lighthouse Field—by developing site management plans for restoration. We are also developing guidance that will help managers at overwintering sites all along the California coast restore and manage their groves for monarchs. Lastly, we provide resources and guidance to policy makers, public agencies, and advocates who are working to protect monarch overwintering sites in California.

Engaging the Public in Monarch Conservation

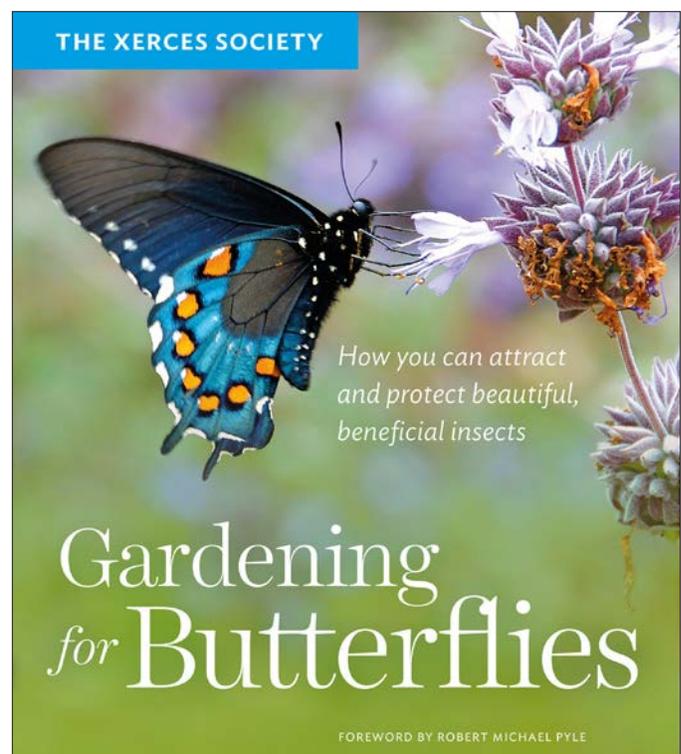
We directly reach tens of thousands of people per year with our monarch conservation message. We have reached farmers in every state through our signature Pollinator Conservation Short Course. We also reach land managers across the west through similar courses that are specifically designed to help agencies such as the U.S. Forest Service, U.S. Fish and Wildlife Service, and Bureau of Land Management, as well as state wildlife agency staff, understand, protect and manage monarch habitat. We reach many more people through talks at botanic gardens, grange halls, farm walks, and conferences.

Recruiting New Pollinator Conservationists: 5,000 and Counting

An important part of our outreach is to provide 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. In total, they have committed to installing or protecting over 59,000 acres of habitat for the benefit of pollinators. To support people in their pollinator conservation efforts, the Xerces Society maintains a pollinator conservation resource center on our website, with links to regional guides on habitat establishment, plant selection, and more. Last year people visited our pollinator conservation resource center 38,000 times.

Gardening for Butterflies

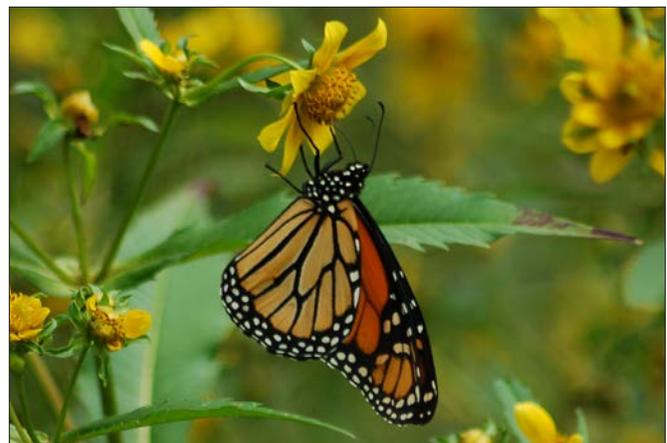
This year, our latest resource to encourage gardeners to participate in butterfly conservation was published. Released by Timber Press in March 2016, *Gardening for Butterflies: How You Can Attract and Protect Beautiful, Beneficial Insects* describes the natural history of butterflies and moths, details their habitat requirements, and explains the practical steps to design, install, and maintain a butterfly garden. It also contains useful information for applications beyond the garden fence, explaining how to nurture butterflies in a range of environments such as parks, farms, corporate campuses, roadsides, and green roofs.



Thank you!

The Xerces Society's work to protect monarch butterflies and other pollinators has been made possible with generous support from the Alice C. Tyler Perpetual Trust, Audrey & J.J. Martindale Foundation, Aveda, Cascadian Farm, Ceres Trust, Cheerios, Clif Bar Family Foundation, CS Fund, Disney Conservation Fund, Endangered Species Chocolate, LLC, Gaia Fund, General Mills, Hind Foundation, Idaho Department of Fish and Game, Iowa Department of Transportation's Living Roadway Trust Fund, Irwin Andrew Porter Foundation, J.Crew, National Co+op Grocers, National Fish and Wildlife Foundation, Nature Valley, Nestlé Dreyer's Ice Cream Company, Sarah K. de Coizart Article TENTH Perpetual Charitable Trust, SeaWorld & Busch Gardens Conservation Fund, Swimmer Family Foundation, The Bay and Paul Foundations, The Dudley Foundation, The Edward Gorey Charitable Trust, The Elizabeth Ordway Dunn Foundation, The Monarch Joint Venture, The New-Land Foundation, Inc., The Oregon Zoo Foundation, The White Pine Fund, Turner Foundation, Inc., U.S. Department of Agriculture Natural Resources Conservation Service, U.S. Department of Agriculture Sustainable Agriculture Research and Education, U.S. Department of the Interior Fish and Wildlife Service, U.S. Geological Survey, Whole Foods Market and its vendors, the Whole Systems Foundation, and Xerces Society members.

In the three decades since first standing up for monarchs, the Xerces Society has gained extensive experience and accumulated expertise in all aspects of monarch conservation. Our work now extends to protecting and managing the habitats that support all stages of the monarch's lifecycle throughout the transcontinental range of the butterfly's migration. Visit www.xerces.org for details of our conservation programs.



(Photographs: clockwise from top left, NRCS/Eric Eldredge, The Xerces Society/Candace Fallon, Carly & Art/WikiMedia Commons, The Xerces Society/Carly Voight.)