



MONARCH JOINT VENTURE

JULY 2009 – MAY 2014

Prepared September 2014 by Wendy Caldwell, Program Coordinator

Partnering to conserve the monarch butterfly migration

TABLE OF CONTENTS

Contents

Introduction	1
Financial Summary	5
Partner Projects Summary	6
Cibolo Nature Center	6
Iowa Department of Natural Resources	7
Monarch Alert	7
Monarch Lab (University of Minnesota)	8
Monarch Watch (University of Kansas)	11
North American Butterfly Association	13
Pollinator Partnership	13
Tallgrass Prairie Center (University of Northern Iowa)	14
University of Georgia and Monarch Health	15
University of Maryland	16
Wild Ones: Native Plants, Natural Landscapes	17
The Xerces Society for Invertebrate Conservation	17
Project Alignment with North American Monarch Conservation Plan	21
MJV Program Coordination and Program Building	22
Appendix 1	25
References	27
Contact Information	29

MONARCH JOINT VENTURE 2009-2014

Introduction

The monarch migration was identified by the International Union for Conservation of Nature as a threatened phenomenon in 1983, and the World Wildlife Fund named monarchs as one of the “Top 10 Species to Watch”, in need of heightened monitoring and conservation efforts in 2010.

Recognizing the need for conservation action to protect the North American monarch and its tri-national migration, a number of organizations came together to form the Monarch Joint Venture (MJV), a partnership-based organization focused on furthering monarch conservation across the continental United States, through a coordinated, collaborative effort.

Our priorities are:

1. Monarch habitat conservation on public and private lands, including enhancement and improved management of milkweed and nectar resources throughout monarch breeding and migration habitat, as well as improved management of overwintering groves located along the California coastline.
2. Education and outreach to increase interest, awareness and engagement in monarch conservation efforts.
3. Research and monitoring to track monarch populations and to inform our conservation work.



Photo: Wendy Caldwell

PARTNERSHIP STRUCTURE

The MJV is broadly inclusive with regard to forming partnerships with organizations interested in monarch conservation, including federal, state and local government agencies, tribes, private conservation groups, and others; current partners are listed in Appendix 1. Some partner organizations make up a smaller MJV steering committee, also listed in Appendix 1. This committee provides general oversight and guidance for the MJV, in accordance with the North American Monarch Conservation Plan (Commission for Environmental Cooperation 2008)¹ and other national or continental monarch conservation initiatives. Each MJV partner contributes extensive knowledge of and experience with monarch conservation, research, monitoring, or outreach; together, these partners are working to ensure that the monarch migratory phenomenon that is such a part of North American culture, scientific discovery, science education, and conservation attention is not lost for future generations.

A half-time program coordinator manages MJV operations, including management of MJV funded partner projects and contracts, organizing partnership meetings and priorities, outreach and communication to various stakeholders, and general maintenance and development of the MJV website, published materials, social media, and other media requests.

The MJV steering committee meets as needed, but at a minimum of two times per year. MJV also holds an annual meeting for all partners and potential stakeholders to attend. Smaller working committees meet throughout the year as needed, primarily by teleconference.

MONARCH JOINT VENTURE 2009-2014

FINANCIAL AND STRATEGIC HIGHLIGHTS

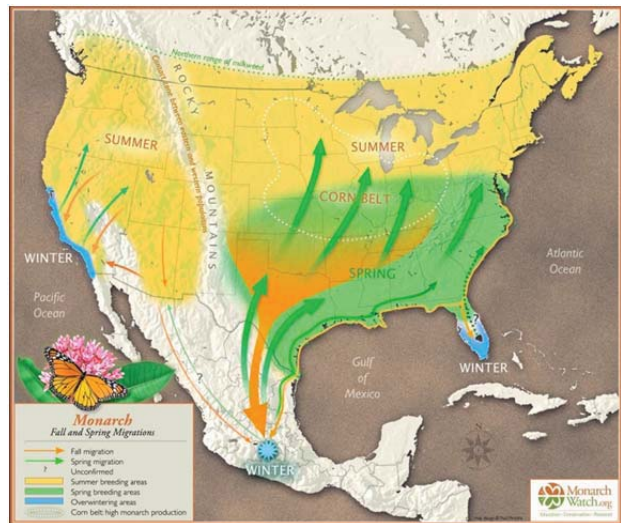
From 2009-2014 the Monarch Joint Venture has engaged 18 partners and allocated over \$1.2 million for science-based monarch conservation projects. In addition, over \$350,000 were reported as in-kind support by partner organizations to carry out these projects. Our conservation actions are fully aligned with the goals, objectives, and target actions outlined in the North American Monarch Conservation Plan.

SCIENCE-BASED CONSERVATION APPROACH

MJV's science-based approach to monarch conservation builds on three focus areas: Monarch habitat conservation, maintenance, and enhancement; education to enhance awareness of monarch conservation issues and opportunities; and research and monitoring to inform monarch conservation efforts.

Monarch Habitat Conservation, Maintenance and Enhancement

The primary threat to monarchs in the United States is widespread loss of breeding habitat, which must include milkweed (*Asclepias* spp.), the only viable food source for monarch larvae. While breeding and migratory habitat has been lost throughout the country, the MJV has prioritized the Corn Belt region (primarily Iowa, Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Nebraska, Kansas, Missouri, and near surrounding states) for breeding habitat restoration efforts. This region has historically produced a high percentage of the population that migrates to the overwintering grounds in Mexico each fall (Oberhauser et al. 2001)². Additionally, Texas is a high priority state for MJV conservation efforts because it plays a significant role in supporting both the spring and fall migrations.



Our approach to mitigating breeding and migratory habitat loss in the U.S. is to identify partners and other motivated parties willing to take action in creating or restoring habitat. We are working with partners to better understand the native milkweed seed market, increase the availability (and demand) for milkweed seeds throughout the U.S., and equip partners with management tools and guidelines for successful habitat restoration and enhancement. We have supported on-the-ground conservation efforts across the state of Iowa by providing funding for native milkweed and forb seed purchases which can be included in existing restoration efforts. We have also provided resources to support the distribution of milkweed plugs, using locally-sourced seed from important monarch host species, at key sites throughout the monarch breeding range.

In addition, we have prioritized overwintering habitat conservation in California. The western monarch population has also experienced an overall downward trend since the mid-1990s. MJV

MONARCH JOINT VENTURE 2009-2014

partners in the western states are working with land managers to restore and protect known overwintering locations throughout the state.

Education to Enhance Awareness of Monarch Conservation Issues and Opportunities

The monarch migration is one of the most magnificent and intriguing of all natural phenomena. For this reason, we are promoting monarchs as a flagship species for pollinator conservation. Monarchs can inspire people to get involved in creating and restoring habitat beneficial to a wide variety of organisms.

Education is a key component of successful conservation. Our science-based approach to monarch conservation allows us to target our education and outreach efforts to maximize impact on monarch populations. By providing citizen science and conservation trainings in priority areas, including the Corn Belt region, Texas, and California, we are building a strong network of volunteers and other entities working to not only create or restore habitat for monarchs, but also to help spread the pollinator conservation message and collect data that inform ongoing conservation efforts.

Additionally, the MJV has produced a dynamic website and numerous outreach materials which are free to download. These materials provide recent and relevant science-based information about monarchs and their conservation. MJV partners also reach a wide audience through media interviews and articles and through social media postings.

Research and Monitoring to Inform Monarch Conservation Efforts

The MJV draws together monarch biologists, conservation leaders, academic programs, and citizen scientists all working towards the ultimate goal of conserving the monarch butterfly migration. Through research and monitoring, these groups help us to understand monarch populations and habitat availability, which then inform how the MJV prioritizes areas of greatest conservation need.

Monarch and butterfly citizen science efforts engage thousands of volunteers each year in real science. These volunteers, young and old, not only contribute to our understanding of monarch populations and habitat distribution, they inspire others to do the same.



Photo: Wendy Caldwell

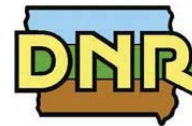
Through MonarchNet, an aggregation of butterfly citizen science monitoring data, we are able to gain even further insight into monarch population trends. This has helped us to prioritize geographic areas to focus our conservation and/or monitoring efforts. We have conducted numerous training workshops in these priority areas, including California, Texas, and the Midwest, and more are planned for the upcoming breeding, migrating, and overwintering seasons.

In addition to citizen science monitoring, MJV partners engage in research and analyses to better understand disease in monarchs, impacts of non-native species, qualities of prime monarch habitat, milkweed propagation methods, and best land management practices for monarchs.

MONARCH JOINT VENTURE 2009-2014

A GROWING PARTNERSHIP

When the MJV was initiated in December 2008, there were 10 partners. We have expanded the partnership to 18 partners, and numerous others have expressed interest in partnering with the MJV to promote monarch conservation in the U.S. In February 2014, President Barack Obama (U.S.A), Prime Minister Stephen Harper (Canada) and President Enrique Peña Nieto (Mexico) agreed to create a working group to protect monarchs between the three countries. In June 2014 a Presidential Memorandum – Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators – was issued by President Barack Obama. Both of these events have boosted interest in the Monarch Joint Venture and we are exploring partnership with numerous agencies and other institutions. Many key monarch and pollinator conservation organizations are involved in the MJV, providing a strong base for expansion of conservation efforts across the U.S.



MONARCH JOINT VENTURE 2009-2014

Financial Summary

FINANCIAL SUMMARY

From 2009-2014 the U.S. Forest Service, International Programs sponsored the Monarch Joint Venture in the amount of \$1,201,060.33. These funds were used to support a program coordinator and assistant, general program operations, and partner monarch conservation or education projects. Staff for the MJV includes a full time coordinator (2009-2013), a 50% time assistant (2011-2012), and a 50% time coordinator (2013-2014). As prioritized and approved by the MJV steering committee, most funds were allocated for partners to conduct monarch conservation, education, or research projects. These projects are summarized by partner in the next section. In total \$765,164 of the USFS sponsored funds were used for monarch conservation projects from 2009-2014. Other funds (see summary below) have been provided by other MJV partners or sought by the MJV coordinator. These do not include partner in-kind contributions.

OTHER FUNDS SUMMARY

	FY 10	FY11	FY 13	FY 14
U.S. Fish and Wildlife Service	\$ 2,000	\$ 750		
Commission for Environmental Cooperation	\$ 20,300	\$ 6,400		
Monarch Butterfly Fund		\$ 10,000	\$ 10,000	\$ 20,000
Audubon/Toyota Together Green			\$ 10,000	
Private Donations			\$ 640	\$ 13,416

U.S. Fish and Wildlife Service funds were received through Texas Parks and Wildlife Foundation to support the MJV coordinator's travel to a monarch monitoring workshop at Cibolo Nature Center in Boerne, TX and to attend the Texas Native Plant Conservation Conference. The 2011 U.S. Fish and Wildlife Service funds were reimbursed directly to the coordinator for travel to D.C.

The Commission for Environmental Cooperation funds supported the integration, analysis, and dissemination of monarch monitoring data in North America (MonarchNet).

The Audubon/Toyota funds supported leadership training and development of outreach materials through the Wild for Monarchs campaign (Wild Ones).

Funds from the Monarch Butterfly Fund and private donors will be allocated for monarch conservation, education, and research projects as prioritized by the MJV steering committee.

MONARCH JOINT VENTURE 2009-2014

*Includes only USFS Funds	FY 09	FY10	FY11	FY12	FY13	FY14	**FY 15	**FY 16
USFS funds	\$ 200,178	\$ 300,357	\$ 300,240	\$ 400,285			279,989.56	
Total available funds	\$ 200,178	\$ 500,535	\$ 740,910	\$ 1,010,091	\$ 756,902	\$ 508,242	\$279,989.56	
MIJV Staff and Program								
Coordinator & Assistant		41,137.86	53,208.99	71,891.88	75,956.81	25,876.34	25,876.34	26,523.25
Registration/Sponsorship		285.00	1,540.00	1,490.00	375.00	1,595.00	300.00	300.00
Printing & Shipping		410.48	2,593.45	5392.94	8166.38	12541.80	10,000.00	10,000.00
Website & Branding		90.09	2,092.54	247.20	10,340.35	6,417.12	2,250.00	2,250.00
Equipment & Supplies		1,301.65	537.02	319.55	619.05	1226.40	625.00	625.00
Travel (coordinator & other)		6,544.20	1,288.48	541.48	11,386.00	1,540.38	2,750.00	2,750.00
Staff and Program Subtotal		49,769.28	61,260.48	79,883.05	106,843.59	69,490.34	41,801.34	42,448.25
Partner Projects								
Cibolo Nature Center (\$34,700)		1,795.79		1,366.38	2,800.00	28,737.88		
Iowa DNR (\$67,242.80)				13,500.00	15,057.63	34,645.80		
Monarch Alert (\$9100)						1,759.40		
UMN Monarch Lab (\$153,891)		590.43	2,026.03	37,674.03	-598.57	114,199.47		
Monarch Watch (\$144,070)			6,739.49	11,627.83	26,177.23	99,525.45		
NABA (\$10,802)					4,550.00	6,252.00		
Pollinator Partnership (\$52,300)				5,283.57	14,590.00	32,426.43		
Tallgrass Prairie Center (\$5,493)						5,493.00		
Univ. of Georgia (\$39,837)		3,200.00	12,464.85	4,678.92		4,004.10		
Univ. of Maryland (\$30,553)			15,014.06	277.65				
Wild Ones (\$23,500)						21,000.00		
Xerces Society (\$238,306)			24,041.23	80,151.45	60,758.98	73,353.95		
Partner Projects Subtotal		5,586.22	60,285.66	154,559.83	123,335.27	421,397.48	175,000.00	
Indirect costs (8%)		4,509.14	9,558.13	18,746.00	18,481.51	37,647.65	17,344.11	3,395.86
Total funds expended		59,864.640	131,104.270	253,188.880	248,660.370	508,242.170		
Balance	\$ 200,178	\$ 440,670	\$ 609,806	\$ 756,902	\$ 508,242	\$ (0)	**Current budget	

*USFS income and expenditures only listed in this table, other funds are summarized on the previous page.

MONARCH JOINT VENTURE 2009-2014

Partner Projects Summary

FUNDING PROCEDURE FOR PARTNER CONSERVATION PROJECTS

From 2009-2014 MJV issued contract awards for 12 partner organizations to conduct monarch conservation, education and research projects. In total, \$765,164 was awarded for monarch conservation, education, and research activities throughout the United States. The MJV bases calls for proposals on recommendations laid out in the North American Monarch Conservation Plan, from which it developed an implementation plan for conservation, education, and research priorities which would most benefit monarchs. After a request for proposals is issued by the MJV, current partners submit project proposals and budgets for further review. A proposal review committee is responsible for reviewing the submitted proposals and providing recommendations to the MJV steering committee. Partners are encouraged to collaborate in their conservation efforts.

This section includes descriptions of each of the projects that MJV partners have undertaken with funding from the Joint Venture, listed alphabetically. The amount in parentheses next to each partner name is the total amount contracted to that partner for monarch conservation work over the five year period. Note that each project described is not necessarily funded in full by the MJV, as partners often used additional funds to support their work.

PARTNER PROJECT DETAILS

CIBOLO NATURE CENTER (\$34,700)

Promoting Citizen Science Monitoring in Texas. In early spring, eastern monarchs leave their overwintering grounds in central Mexico and head towards Texas. It is here that the vast majority of these monarchs will breed, and where the monarchs that subsequently populate the rest of the eastern U.S. will be born. Monarch reproductive performance in Texas thus plays a significant role in determining the size and success of the eastern monarch population through the rest of the season (Zipkin et al. 2012)³. In the fall, monarchs migrating to Mexico all funnel through Texas, where they must find nectar to fuel their flight and build fat reserves that will help them survive through the winter. Data from Texas are of great value for understanding eastern monarch population trends, and we need more monarch citizen scientists in the Lone Star state!

The MJV has partnered with the Cibolo Nature Center (CNC) in the Texas Hill Country to recruit and train new volunteers to participate in monarch citizen science programs, through two-day workshops. At each workshop, approximately 30-50 citizen scientists learn how to find and monitor monarchs as citizen scientists in the Monarch Larva Monitoring Project, the Monarch Watch tagging program, Journey North, Project Monarch Health, and the North American Butterfly Association. CNC volunteers also conduct workshops for Texas Master Naturalists to encourage and inform their participation in monarch citizen science. These workshops emphasize monarch biology, life cycle, habitat, behavior, milkweed cultivation, as well as both national and international threats to monarch survival.

CNC staff and volunteers hosted and delivered well-received monarch monitoring workshops in April and September 2010, April 2011, April and September 2012, May and October 2013, and May 2014

MONARCH JOINT VENTURE 2009-2014

(October 2014 planned). Also with MJV support, volunteers from CNC and from the Spring Creek Nature Center in Houston coordinated and implemented a monarch monitoring workshop in Houston, TX in June 2011. Kip Kiphart and Cathy Downs have conducted numerous educational events outside of these intensive 3-6 hour workshops with support from MJV, reaching over 7700 people in 2014 so far.

IOWA DEPARTMENT OF NATURAL RESOURCES (\$67,242.80)

Bringing Back the Prairie, Building Habitat for Monarchs. The U.S. Corn Belt is the heart of the eastern monarch's breeding ground, and abundant milkweed is needed in this region to maintain and increase monarch numbers. Every year across Iowa, the Iowa DNR Prairie Resource Center supports restoration of 1,500 – 2,700 acres of tallgrass prairie habitat on land recently acquired and managed by the state. The MJV has partnered with the Iowa DNR to create prime monarch habitat by including seeds of milkweed and key nectar plants in these prairie reconstruction projects. Adding plants helpful to monarchs is an easy and cost-effective way to improve these prairie plantings while building valuable monarch habitat. In 2012, the Iowa DNR added regionally-sourced seeds of five milkweed species to their planting mixes and created over 2,000 acres of improved monarch habitat. In 2013, they continued their efforts by including four species of milkweed, two blazing star species, and other native seeds in up to 2,700 acres of tallgrass prairie reconstructions across Iowa. During the winter/spring of 2014 they purchased 55.76 lbs of *Asclepias* seed and 38 lbs *Liatris* seed for use in restoring/enhancing over 1700 acres. With 65 lbs of *Asclepias* seed and 52 lbs of *Liatris* seed, they are equipped for even more planting during the fall of 2014 and spring 2015!



Photo: Iowa Dept. of Natural Resources

Using the monarch magnet habitats created by the Prairie Resource Center, the Iowa DNR hosts an annual monarch tagging event to capture and tag monarchs during the fall migration.

MONARCH ALERT (\$9,100)

Analysis of Native vs. Non-native trees in California overwintering sites. Monarch Alert, in collaboration with MJV and the Xerces Society, studied patterns of tree use at five overwintering locations along the California coast and prepared a document describing overwintering site management recommendations based on their findings. The goal of this research was to determine whether or not monarch butterflies prefer using non-native eucalyptus trees or native trees, like Monterey cypress or Monterey pine, for their winter roosts. Each of the five sites that were monitored over the course of three different overwintering seasons contained



Photo: Wendy Caldwell

MONARCH JOINT VENTURE 2009-2014

some mixture of native and non-native tree species. While there was variation within a given site between years and seasonal timing, monarchs clustered disproportionately on native conifers in years when the overwintering population was relatively high; in most years and at most sites, they clustered less than expected on eucalyptus and more than expected on native trees; and in several cases, monarchs switched from clustering on eucalyptus at the beginning of the season to clustering on native conifers later in the season.

These findings suggest that a long term management outlook for these sites should include a mixture of tree species. Monarch Alert recommends planting native conifers such as Monterey cypress or Monterey pine around the perimeter of overwintering sites and in any areas where trees are down or are likely to fall. The full report is available on the MJV website (Griffiths and Villablanca 2013)⁴.

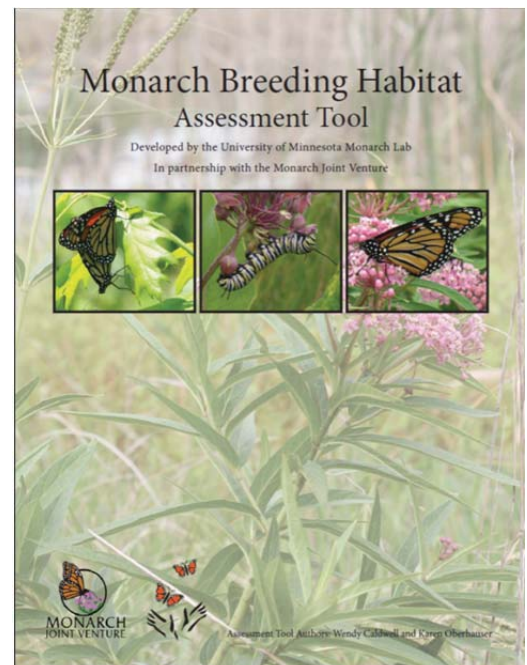
Analysis of Western Population Trends. Monarch Alert has analyzed existing data to determine if the peak western overwintering population size can be estimated by the Thanksgiving Count, or if the population of overwintering monarchs increases in size after the Thanksgiving sampling period. These studies involved weekly counts for three falls (2009-2011), and three winters (2010-2012) at a subset of the sites that are sampled for the Thanksgiving count. These 17 sites are located within San Luis Obispo and Monterey counties. Analysis of these findings will support recommendations on whether the Thanksgiving counts should continue to be used as the sole estimators of population size, or whether they should be supplemented by an additional survey period.

Xerces Society staff will use the Thanksgiving Count data set to apply the International Union for Conservation of Nature (IUCN) Red List criteria to the overwintering western subpopulation of monarchs in order to understand their conservation status and extinction risk. This process will be informed by the analyses of the western monarch population trend conducted by Monarch Alert (described above), and will be completed in collaboration with Monarch Alert.

Monarch Alert has also collaborated with the University of Georgia on a study of the impacts of exotic milkweeds on disease spread in monarchs.

UNIVERSITY OF MINNESOTA MONARCH LAB (\$133,598)

Monarch Breeding Habitat Assessment Tool. As we work to improve and create new monarch breeding habitat, we need metrics to gauge the quality and effectiveness of our habitat conservation efforts. Currently, no standard protocol exists with which to evaluate and characterize monarch breeding habitat quality. Using citizen science data from the Monarch Larva Monitoring Project (MLMP) regarding monarch use of and survival in milkweed habitats with different characteristics, University of Minnesota researchers have identified key characteristics of quality monarch habitat, and have developed an easy-to-use assessment tool to be used throughout the monarchs' breeding range.



MONARCH JOINT VENTURE 2009-2014

This tool is being distributed to land managers, monarch conservation volunteers, and any other interested parties to evaluate and improve their monarch habitat(s). It is available for download from the MJV website⁵. Data collected using this tool will help us better understand the availability of quality monarch habitat in various regions of the country, and evaluate the effectiveness of monarch habitat improvement efforts and monitoring programs, such as the MLMP or Monarch Waystation program.

Monarch Success Stories Program. The University of Minnesota Monarch Lab has developed a monarch habitat recognition program, including categories for monarch gardens, agricultural habitats, restored or natural areas, and managed areas. The "Success Stories" habitat recognition program can be found on main navigation menu of the MJV website. The goal of the program is to recognize successful habitats with a map and more information about each habitat, and, possibly, award outstanding efforts in the categories identified. As more habitats are submitted to the online map, users can explore what others have done in their area and across the country to help monarchs. To help improve monarch habitat, we encourage the use of the Breeding Habitat Assessment Tool, which provides more information about steps that people have taken to create, assess, and improve their habitat(s). Recognitions will be displayed and posted on social media pages to inform and encourage future monarch habitat conservation projects.

Monarch Citizen Science Training and Outreach: Citizen scientists play an important role in our understanding of monarch biology, distribution, and abundance. We rely on volunteer-submitted data to assess long term trends in monarch populations, diseases and habitat availability. There are many different citizen science programs which focus specifically on one or many aspects of the monarch annual life cycle of breeding, migrating, and overwintering. A summary of these projects can be found on the Study Monarchs: Citizen Science Opportunities page of the MJV website.

The University of Minnesota Monarch Lab is spearheading citizen science workshops to recruit and inform potential volunteers about opportunities to get involved in monarch monitoring. Locations for these workshops were chosen based on analyses done by Karen Oberhauser and Leslie Ries that identified locations that were important to monarchs and where gaps in the data reported may exist.

In December 2013, Monarch Lab and Monarch Alert staff coordinated a 1.5 day workshop in San Luis Obispo, California. This workshop focused on monitoring overwintering monarchs in California by conducting counts and tagging butterflies. It also introduced opportunities to participate in Project Monarch Health, an initiative to sample adult butterflies for the monarch parasite *Ophryocystis elektroscirrha*, and the Monarch Larva Monitoring Project, a program aimed to track the distribution and abundance of monarch eggs and caterpillars.

In spring 2014, Monarch Larva Monitoring Project and Southwest Monarch Study staff put on an MJV sponsored workshop at the Riverfork Ranch near Minden, Nevada. This workshop focused on



Photo: Wendy Caldwell

MONARCH JOINT VENTURE 2009-2014

monitoring milkweed patches for monarch eggs and larvae and on tagging monarchs to help us understand the western monarch population.

To help promote citizen scientists and the efforts that they put forth, the Monarch Lab has also developed a citizen science newsletter, MonarchNet news. The goal of the newsletter is to promote collaboration of ideas and findings amongst the various monarch and butterfly citizen science programs in North America. The first edition provided an overview of the different citizen science projects and information on the part of the monarch annual life cycle they study. Interested individuals can sign up to receive this bi-monthly newsletter and other updates from the Monarch Joint Venture on our website. All newsletters can be viewed on the MJV Resources/Publications page.

Monarch Larva Monitoring Project Online Training. Most monarch monitoring programs rely heavily on data collection by citizen scientists. It is important that these citizen scientists are well-informed about expectations and protocols and have easy access to educational resources about monarchs, monitoring, and conservation. Trained volunteers will feel more confident in their monarch monitoring abilities and data they collect are generally more accurate than if they had not received training. The University of Minnesota Monarch Lab has developed an online training tool for the Monarch Larva Monitoring Project (MLMP) that is available on the project website⁶. The training covers basic monarch information and major MLMP activity protocols. It uses a combination of video footage and photographs along with narration to demonstrate different aspects of monarchs and the MLMP. Each section of the training is ten minutes or less so that volunteers can complete the training at their own pace or repeat sections with ease.

Understanding the Value of Monarch Larva Monitoring Project Sites and Monarch Waystations. Since 2005, Monarch Watch has worked with people around the country to plant monarch habitat through the Monarch Waystation program. To date there are over 8000 registered Monarch Waystations, and this number is growing daily. Waystations provide not only habitat for monarch breeding and migration, but also opportunities for engagement with nature and conservation, and education on monarch biology. Many Monarch Waystations are used by citizen scientists to monitor monarch eggs and caterpillars via the Monarch Larva Monitoring Project (MLMP), yielding an opportunity to quantify monarch use of these habitats. University of Minnesota Monarch Lab researchers have surveyed Monarch Waystation owners and MLMP volunteers to help quantify monarch habitat variables, habitat management activities, and broader human-use benefits of these sites. They will couple this information with MLMP monitoring data to quantify the contributions that Monarch Waystations make to breeding monarch populations and to the lives of the people who enjoy these sites.



Photo: Candy Sarikonda

MONARCH JOINT VENTURE 2009-2014

Monarch Biology and Conservation Meeting. The University of Minnesota Monarch Lab organized the Monarch Biology and Conservation Meeting that was held in June 2012 at the University's Landscape Arboretum. Over 150 monarch conservationists, monarch scientists, citizen scientists, and land managers attended the meeting to share information and attend workshops on monarch biology, successful conservation efforts, monitoring, and population trends. A keynote address was delivered by Dr. Lincoln Brower, who spoke on his “58 Year Journey with Monarchs”, and his many insights regarding monarch biology and conservation that have developed along the way. Presentations and posters can be viewed at the meeting website⁷.

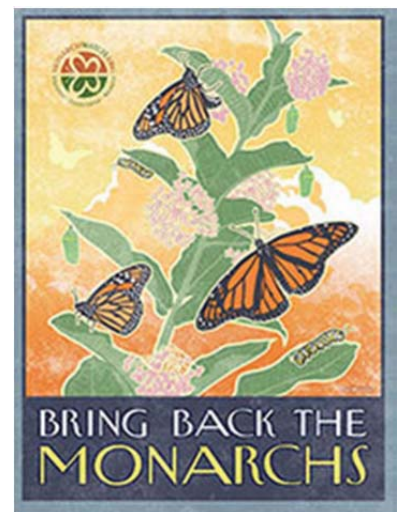
Monarch Monitoring Training Assessment. During the spring and fall migration, monarchs travel through Texas, which makes it an extremely important region to focus our efforts to increase awareness and monarch conservation activities. The University of Minnesota has assessed the impact that Texas monarch monitoring workshops have on participants and their engagement in monarch monitoring programs and conservation activities. The assessment provided feedback for trainers on aspects of the trainings that were well-received and also provided suggestions for how to improve future trainings. Overall, the Texas monarch monitoring trainings were a huge success.

Hands-on learning in monarch trainings can be a very powerful tool. Seeing and identifying monarchs and visiting local habitats was by far the most influential part of monarch monitoring trainings in Texas. Participants had high marks for the workshop trainers, who have hands-on experience with monarch monitoring programs and are enthusiastic about the work that they are doing. Strong trainers have helped to create a large network of volunteers throughout Texas who are helping to spread passion for monarchs in this very important region.

The training assessment will continue as these workshops persist, and will continue to inform future workshops. Cibolo Nature Center, the main venue for these trainings, is increasing their effort each year to train monarch enthusiasts, and trainers are reaching out to other audiences, such as students, teachers, and Master Naturalist groups.

MONARCH WATCH (\$144,070)

“Bring Back the Monarchs” Native Milkweed Campaign. Limited milkweed plant and seed availability is often cited by monarch enthusiasts and restoration practitioners as a barrier to creating habitat for monarchs. This is especially true when seeking native plants that are not horticultural cultivars, and are derived from locally-sourced seeds. Such plants and seeds are essential for large-scale restoration efforts, and preferred by many conservation-minded gardeners. Monarch Watch is taking a novel approach to building the commercial availability of regionally-sourced milkweed plants, while concurrently creating a demand for these plants so that native plant suppliers are motivated to support this effort long term. Monarch Watch staff are collecting, processing, storing, and shipping milkweed seeds and plants, recruiting milkweed buyers, coordinating production and sales of milkweed, and producing and distributing promotional



MONARCH JOINT VENTURE 2009-2014

materials. Individuals who would like to gather and send milkweed seeds, organize a plant sale, or otherwise get involved can find more information at www.bringbackthemonarchs.org.

Buying locally-sourced, native milkweed can be a daunting task. Monarch Watch has compiled information on species of milkweed sold and seed sources on the Bring Back the Monarchs website so that gardeners looking for milkweed can find a local commercial source. This information was collected from online inventories and conversations with nursery managers. A Milkweed Market reference guide aids in the distribution of milkweed. Monarch Watch staff are also fielding questions and providing information to land managers to match individual habitat restoration projects with the best possible milkweed seed source.

In spring 2013, Monarch Watch was successful in the propagation of 25,000 milkweed plugs, and distributed nearly 20,000 of those to locations across the U.S. Over 50,000 plugs were distributed in spring 2014.

Expanding the Monarch Waystation Program. The Monarch Waystation Program, established in 2005 by Monarch Watch, engages citizens in science and habitat restoration by providing instruction and materials to create habitat for monarchs. Through this program, a broad range of municipalities, nature centers, zoos, businesses, and individuals have registered over 8000 Monarch Waystations in 46 states, and many more have been created but are not registered. Expanding the Monarch Waystation Program throughout the United States, including the West, is one way to increase monarch habitat availability and to draw attention to the need to change the way habitats are managed for monarchs, pollinators and other wildlife. To support this increased focus on the use of regionally-sourced native plants, and overall increase in demand for milkweeds, Monarch Watch has engaged native plant nurseries to increase the availability of milkweeds for use in pollinator gardens. They have developed and distributed outreach materials to encourage monarch conservation, including a new Bring Back the Monarchs poster and t-shirt.

Monarch Watch Conservation Specialists. Monarch Watch has recruited 15 volunteers to promote monarch conservation across the U.S. These volunteers serve as liaisons to engage local land managers, decision makers, and concerned citizens in monarch conservation efforts. All of them have been highly engaged in discussing monarch conservation issues via an active monarch listserv and are engaged in numerous educational activities supported by the MJV and Monarch Watch. These effective, enthusiastic, and knowledgeable individuals provide information about monarch biology and conservation needs to many audiences. Learn more about each of the Conservation Specialists or ask for their advice at the Monarch Watch website⁸.

Tracking the Migration – Data Verification and Analysis.

Monarch Watch manages a large citizen science effort to tag monarchs from the eastern population during their fall migration, and to recover these tagged butterflies at their overwintering sites in Mexico the following winter. Citizen scientists record the date, location, monarch gender, and unique tag number for each fall-migrating monarch that they tag and then submit these data to Monarch Watch. Tags are recovered in Mexico by residents of the



Photo: Wendy Caldwell

MONARCH JOINT VENTURE 2009-2014

community surrounding the overwintering sites. The data resulting from this collaborative research effort have the potential to answer many important questions regarding monarch biology and conservation. Monarch Watch staff have completed data verification and entry of approximately one million data records, with approximately 200,000 remaining.

NORTH AMERICAN BUTTERFLY ASSOCIATION (\$10,802)

Expanding Participation in NABA Butterfly Counts. The North American Butterfly Association (NABA) manages an extensive citizen science effort to monitor butterflies across the U.S. Due to the substantial amount of land covered and the extended duration of these counts, the data obtained through this effort can add to our understanding of monarch population trends. NABA has expanded their counts in key locations where data are most needed to inform monarch population trends, most notably in Texas and throughout the western U.S. They have compiled contact information for naturalists in over 40 states, with a focus on these priority areas, and have contacted them to encourage participation in NABA's Butterfly Count Program. Thanks to these efforts, the number of butterfly counts grows every year. NABA has provided their Butterfly Count data to MonarchNet for use in their monarch biology and population trend research.

NABA Website Update. With support from MJV, NABA has improved their Butterfly Garden and Habitat website⁹, and expanded the content to include more information about monarch conservation and the Monarch Joint Venture. An expansion of the current website's information places a clearer emphasis on the use of regionally native plants, including milkweeds, for the creation of butterfly habitat. Particular emphasis is placed on habitat for monarchs. NABA currently provides 43 regional butterfly garden guides for locations throughout the US. These regionally specific guides are available on the Butterfly Garden and Habitat website as downloads. This website emphasizes the need to use native vs. non-native plants in restoration or gardening efforts, which is reflected in the regional planting guides. Within each downloadable PDF, monarchs are specifically targeted as a species of concern.

POLLINATOR PARTNERSHIP (\$52,300)

Creating Habitat in Corporate and Utility Right-of-Way Areas. Monarchs can find resting points along their long migration route in unlikely places. Utility rights-of-way, the large swaths of land cleared for power lines and pipelines, are ideal for planting monarch habitat. To help utility land managers transform their rights-of-way (ROW) into monarch habitat the Pollinator Partnership, in partnership with the Monarch Joint Venture, has recently published a series of regionalized Monarch Habitat Development Manuals.

The Monarch Habitat Development Manuals offer step-by-step guidance for land managers to transform their ROWs into beneficial monarch habitat. The manuals contain regionalized planting guides to assist with the plant selection process. The planting guides list native



Photo: Monarch Watch

MONARCH JOINT VENTURE 2009-2014

species that will provide nectar resources to help fuel the monarch's migration. Additionally, the manuals provide site evaluation rubrics to help aid land managers in making an objective decision about which potential site will have the least barriers to developing monarch habitat.

The manuals are available free for download from the Pollinator Partnership website¹⁰. Pollinator Partnership has been working with the Wildlife Habitat Council to spread the word about monarchs and the free manuals. Numerous corporations have been planting for monarchs. While the manuals are geared for ROW managers, the tips and planting recommendations can be used to transform many types of settings into valuable monarch habitat.

To encourage corporate entities to engage in monarch conservation efforts, the Pollinator Partnership has collaborated with the Wildlife Habitat Council to develop a Corporate Monarch Conservation Award, guidelines for creating monarch habitat, and informational materials to promote engagement in monarch conservation.

Nectar Plant Recommendations for Monarchs. Monarchs rely on nectar from a variety of flowers to provide energy through their breeding season and migrations. The energy demands of flight are significant, and inadequate food sources timed with key flight periods can decrease the number of monarch butterflies successfully arriving at overwintering sites. Development, habitat conversion and competition from invasive species have reduced the availability of natural food sources. Changes in climate can also dissociate bloom time from monarch arrival. One way that we can assist monarchs along their challenging migration is to provide nectar-rich flowers that bloom where and when monarchs need them.

Currently, monarch conservationists have lists of butterfly nectar plants that can be used to inform their gardening and habitat restoration efforts, but these lists are not designed to ensure nectar supply timed with monarch breeding within or migration through each region. Thus even recommended plantings may not adequately support monarchs through critical periods. The Pollinator Partnership has



Photo: Candy Sarikonda

synthesized data on bloom phenology of native monarch nectar plants with timing of monarch breeding and migration through the eastern U.S. and has developed nectar plant recommendations to support the eastern monarch migration. This nectar plant selection to support monarchs can be used by home gardeners, land managers and other concerned individuals to select nectar plants that will support monarchs from their spring arrival through their fall migration in each region. Eco-regional "Fueling Zone" guides can be downloaded from the Pollinator Partnership website¹¹.

TALLGRASS PRAIRIE CENTER (\$5,493)

Mapping the Milkweed Marketplace. Historically, *Asclepias syriaca* (Common milkweed) has earned a cultural stigma as a nuisance species in agricultural and developed land. Common milkweed and

MONARCH JOINT VENTURE 2009-2014

its eradication have been included in university publications such as: Iowa State Weed Identification Field Guide, Missouri Weed Guide, and Weeds of Nebraska. With the development of Roundup ready crops in 1996, common milkweed that used to grow between rows of corn and soybeans have virtually disappeared. Recent findings and recommendations indicate *A. syriaca* as not only a critical species for monarch butterfly survival, but recommend its re-establishment as a means of further expanding viable habitat for the migratory pollinators (Pleasants and Oberhauser 2012). There are eight native seed producers and vendors involved with native grass and wildflower production at a commercial scale in the state of Iowa. Within this community, *Asclepias* sp. seed is available for purchase. Unfortunately, the prices are high. This sets up a market stalemate: little demonstrated demand for seed that is too expensive to purchase, and little commercial production capacity due to low demand. Demand for native grass and wildflower seed has evolved over the past three decades in Iowa. State and federal support subsidize the purchase and planting of native prairie species, including milkweed, in Iowa roadside plantings. According to Iowa DOT, 1,093 pounds of milkweed seed have been seeded on 8,102 acres along Iowa's roadsides from 2011 to 2013 alone. While roadside plantings along state and county roads have incorporated milkweed species, plantings in non-linear, more expansive land parcels tend to lack the same diversity. Common milkweed is not included in any native seed mix sold commercially in Iowa for use on Federal USDA-NRCS Conservation Reserve Program acres. If MJV and Xerxes Society efforts at the federal level succeed in changing NRCS specifications on Conservation Reserve Program plantings, this market may be even more economically viable for seed producers. But first, we need to understand how commercial producers perceive the demand for milkweed, and any difficulties associated with growing plants and harvesting seed. We also need to counteract the "weedy" stigma of common milkweed by actively recommending it in high quality prairie plantings

UNIVERSITY OF GEORGIA/MONARCH HEALTH (\$39,837)

Assessment of Exotic Milkweeds and the Spread of Disease in Monarchs: Monarch Alert and the University of Georgia/Monarch Health are collaborating on a project to examine how the presence of tropical milkweeds (*Asclepias curassavica*) and year-round monarch breeding activity affect the prevalence and transmission of OE (*Ophryocystis elektroscirrha*), and to evaluate the potential effectiveness of cutting back tropical milkweeds during the winter months for reducing monarch infections. They will expand and maintain the Monarch Health: Southern Initiative project through recruiting new volunteers to non-destructively test adult monarchs for OE in the southern Atlantic and Gulf areas during the fall, winter and spring months at sites with and without tropical milkweed. They also plan to launch a new Monarch Health: Western Initiative program to recruit volunteers to test adult monarchs for OE at sites in coastal California with and without tropical milkweed and in close proximity to overwintering colonies. They will undertake intensive monthly field monitoring in tropical milkweed patches at 5 sites within each region (FL-TX and CA) and will conduct a field experiment to test whether cutting back



Photo: Kip Kiphart

MONARCH JOINT VENTURE 2009-2014

milkweeds at periodic intervals across a subset of monitoring sites will help lower OE transmission and prevalence at those sites and in wild monarchs.

MonarchNet. University of Georgia researchers have also been involved in the development of the MonarchNet program. See description for this project under University of Maryland.

UNIVERSITY OF MARYLAND (\$30,533)

Sharing What We Know – Tri-national Data Exchange and Monitoring Program Analyses: For decades, monarchs have been monitored in many locations and with many different methods. Citizen scientists--armed with data sheets and pencils, hand lenses, butterfly nets, and binoculars--are key players in almost all monarch monitoring programs. With the help of these programs, we are able to answer basic questions about how and when monarchs use available habitat, how population numbers change within and between years, how habitat degradation affects these changes, and how monarch populations are responding to human-driven environmental change and conservation efforts. Over the past few years, monarch researchers and other population biologists have compiled and analyzed data from a number of butterfly- and monarch-focused monitoring programs. This work has yielded many new insights into monarch habitat and population trends, but it has also revealed limitations in the data available to document monarch population trends and guide monarch conservation work.

MonarchNet¹² was established in 2009 to create a centralized resource of monarch monitoring data for researchers and citizen scientists. Today this partnership is reflected as a website that serves as a database of monarch population size and movement data from several organizations around the country. MonarchNet allows site visitors to view charts showing trends in monarch abundance from most of our partnering programs, both in the east and west. In addition to specific data sets, MonarchNet is also home to several other resources, such as peer-reviewed research papers and links to useful websites. The collective data have been used by scientists in publications about monarch population trends, habitat and conservation, and contributions of citizen scientist programs in understanding this incredible insect.



Photo: Wendy Caldwell

MJV partners at the Universities of Minnesota and Maryland are identifying and prioritizing geographic gaps in citizen science monitoring programs addressing different life history and migration stages. These prioritizations will be used to help motivate and guide monarch monitoring expansions.

The MJV is also supporting monarch scientists who are analyzing existing population data to better understand trends in monarch numbers and the causes behind patterns of population decline. Early publications evaluating population data have begun to appear in peer-reviewed journals, and others are currently in review. These findings will help us to target conservation efforts to maximize our positive impacts on monarch populations.

MONARCH JOINT VENTURE 2009-2014

WILD ONES: NATIVE PLANTS, NATURAL LANDSCAPES (\$23,500)

Wild for Monarchs Campaign. Wild Ones has partnered with the MJV and Monarch Watch's Bring Back the Monarchs program to endorse the use of locally-sourced, native milkweed and nectar plants in monarch habitat restoration efforts and to boost education and outreach efforts for monarchs. In addition, the Wild for Monarchs campaign is distributing educational resources and materials to their chapters throughout the nation. The Wild for Monarchs campaign website¹³ provides links to milkweed and monarch resources, as well as downloadable materials, such as a bookmark and brochure. Wild Ones members and others across the country are using the Wild for Monarchs PowerPoint presentation to reach out to local Wild Ones chapters and other groups to promote monarch conservation.

Through the Wild for Monarchs campaign, Wild Ones has also launched a Butterfly Garden or Habitat Recognition Program for Wild Ones members to register their butterfly habitats and be recognized for their efforts to help pollinators.

THE XERCES SOCIETY FOR INVERTEBRATE CONSERVATION (\$238,306)

Creating Habitat in Agricultural Areas. There are a number of opportunities through Farm Bill conservation programs to improve habitat for pollinators, including monarchs. Milkweeds are nectar-rich plants that benefit not only monarchs, but many bee species and other butterflies. Through programs such as the Conservation Stewardship Program and Environmental Quality Incentives Program, the Xerces Society and NRCS have engaged land owners in installing large-scale pollinator habitat on farms in California, Oregon, Wisconsin, Pennsylvania, New Hampshire, New Jersey, and Minnesota.

Overwintering Habitat Management Plans for Los Padres National Forest.

An overwintering site must not only contain the right tree species, with branches at the appropriate height and correct orientation, but must also provide correct groundcover, so that monarchs may find insulated pockets of habitat during storms. Additionally, it should contain branches that are buffered from coastal winds, patches of sunshine within which monarchs can warm themselves, adequate moisture to allow monarchs to hydrate, and adequate nectar sources, so monarchs can maintain the energy resources required to survive until the next breeding season.

There are four documented monarch groves on lands managed by the U.S. Forest Service in the Los Padres National Forest in southern California. Xerces Society staff surveyed the overwintering sites and trained Forest Service employees to monitor monarch overwintering sites on Forest Service lands. In addition to surveying the four documented sites, they searched for undocumented monarch groves within the forest and developed a site-specific land management plan to ensure that these sites are not damaged by future activities.



Photo: Wendy Caldwell

MONARCH JOINT VENTURE 2009-2014

The Xerces Society collaborated with a leading monarch habitat specialist, Stuart Weiss (of the Creekside Center for Earth Observation, Menlo Park, CA), to develop a handbook for management and maintenance of western monarch overwintering sites. It is available to download from the MJV website¹⁴.

Workshops for Overwintering Site Land Managers and Citizen Scientists in California.

Land manager workshops conducted by the Xerces Society educate landowners who manage monarch overwintering sites in California. The trainings include key concepts in overwintering habitat management. The Xerces Society has also teamed up with other western monarch experts to organize and host workshops to train citizen scientists to monitor monarch overwintering sites. The workshops include training on how to count monarch clusters and estimate the monarch population size at a specific site, how to utilize the habitat assessment protocol, as well as information on monarch biology and migration. They invigorate current citizen scientists, and engage new ones in monarch monitoring.



Photo: The Xerces Society

Protecting and Monitoring California Overwintering Sites. Most western monarchs migrate to specific overwintering locations along the Pacific coastline of California. To better understand the status of western monarchs and the condition of their California overwintering sites, the Xerces Society created databases with detailed information on dozens of sites. Based on commonly recognized overwintering site characteristics, they developed a protocol to help quantify attributes that are critical to monarch overwintering survival. This tool will enable assessment of threats to monarch overwintering sites, document changes over time, and inform overwintering site restoration and management strategies.

To put their newly developed protocol and databases to the test, Xerces identified priority overwintering areas to visit and assess. They monitored 71 overwintering sites during the 2012/2013 overwintering season to estimate monarch abundance and assess the habitat. Xerces and Monarch Alert staff surveyed an additional 16 monarch overwintering sites on private lands during the 2013 Western Monarch Thanksgiving Count. Many of the privately owned sites that were monitored in 2013 gave ongoing permission for volunteers to return for an annual monarch count and habitat assessment. At each site, scientists are evaluating the condition of the overwintering habitat using the monarch habitat assessment protocol, conducting counts to estimate monarch abundance, collecting location and land ownership information, and determining potential threats to each site. Monitoring sites were selected based on past cluster size, time since last visit, occurrence on public and private lands, and presence of native tree species.

To aid land managers in monarch conservation, Xerces has developed land management guidelines for California overwintering groves. They are also targeting outreach efforts to citizen scientists, U.S. Forest Service biologists, and others to encourage conservation of monarch breeding and overwintering sites.

MONARCH JOINT VENTURE 2009-2014

Overwintering habitat reports are available to download from the MJV website resources and publications page.

Review of laws and policies regarding western overwintering sites. Legal protections for monarchs involve a patchwork of city ordinances, coastal zone management plans, and state and federal law. However, since the extent to which these laws protect monarch overwintering sites is not known, there is no way to give straightforward answers to questions about what developments or other land management practices are allowed at monarch overwintering sites.

The Xerces Society has worked with the Lewis and Clark Law School's International Environmental Law Project to review all laws and regulations that govern management of California overwintering sites. The review was completed in the fall of 2011 and is available on the MJV website¹⁵. By aggregating the legislation and ordinances of cities, counties, and the State of California as they relate to California monarch overwintering sites, we will be able to present monarch conservationists, park managers, private landowners, and other interested parties with a comprehensive and accessible summary of the legal tools available to protect these sites.

Documenting known and potential breeding areas in the western U.S. Limited information is available about where and when western monarchs breed following their departure from California overwintering sites each spring. To address this data gap, the Xerces Society launched an online survey¹⁶ to gather information about milkweed locations in the western U.S. that may serve as important monarch breeding sites. The survey initially targeted state and federal resource agency staff, natural resource consultants, native plant scientists, and citizen scientists in California, Oregon, Washington, and Nevada, but has now expanded to include many western states. To aid survey participants in recognizing milkweeds, basic milkweed identification guides were created for each of these states.

Xerces has now compiled and mapped over 6,900 milkweed records from this online survey and from the published literature, unpublished reports, online herbaria, and knowledgeable researchers and citizen scientists. Approximately 2,800 additional records from key breeding states are currently being geo-referenced and will be added to the map and database when complete. The dataset will then be analyzed to determine which areas of the west have the largest numbers of milkweed records and monarch breeding observations. Xerces will identify land owners and managers with large numbers of milkweed records and reach out to these groups to determine if they currently manage for monarchs and milkweed breeding habitat. Those identified will be encouraged to consider the needs of monarch butterflies in their management plans and will be provided with the Monarch Breeding Habitat Assessment Tool that was developed by the University of Minnesota Monarch Lab.



Photo: Eric Eldredge, USDA NRCS

Increasing Native Milkweed Seed Availability. To offset the loss and degradation of monarch breeding habitat, the *North American Monarch Conservation Plan* recommends planting regionally appropriate native milkweed species. However, a scarcity of milkweed seed in many regions of the United States has

MONARCH JOINT VENTURE 2009-2014

limited opportunities to include the plants in habitat restoration efforts. To address this seed shortage, the Xerces Society launched *Project Milkweed*, in collaboration with the native seed industry, the USDA-NRCS Plant Materials Program, and community partners, to produce new sources of milkweed seed in California, the Great Basin, Arizona, New Mexico, Texas, and Florida. In addition to increasing seed availability, Xerces is raising awareness about the wildlife value of milkweeds, expanding markets for seed, and encouraging the inclusion of milkweeds in nationwide pollinator conservation efforts.

Xerces developed a comprehensive document, *Milkweeds: A Conservation Practitioner's Guide*¹⁷, that features information on milkweed ecology; the plants' value to monarchs, pollinators, and other beneficial insects; guidelines for milkweed propagation, establishment, and seed production; and recommendations of which milkweeds are appropriate for planting on a regional basis.

This guide is available to native seed producers, monarch conservationists, natural resource agencies, and organizations involved in habitat conservation and ecological restoration from the Xerces website.



Photo: John Anderson, Hedgerow Farms

Promoting the Planting of Native Milkweed in the Central U.S. The Central United States, an important part of the eastern monarch's breeding range, has received notable attention for the loss of milkweed across large portions of the landscape. There is an urgent need to protect existing milkweed populations and increase the abundance of milkweeds through restoration activities. One immediately available opportunity to increase the planting of milkweed is to encourage their inclusion in regional USDA-contracted conservation easements. The Xerces Society collaborated with the NRCS and Monarch Watch through the MJV to produce a plant guide ("Technical Note") profiling the region's native milkweeds and the benefits they provide to monarchs and other pollinators. NRCS Technical Notes provide a crucial link in shaping the way USDA-contracted conservation easements are managed, and have a direct influence on the seed mix recommendations made by agency staff to landowners. This comprehensive guide to using the native milkweeds of the lower Midwest and Central U.S. in monarch butterfly and pollinator habitat restoration efforts describes the importance of milkweed to wildlife, provides an overview of milkweed establishment practices, and profiles numerous species that are commercially available and can be incorporated into seed mixes and planting plans. The document is available for download from the Xerces Society, Monarch Joint Venture, and NRCS websites¹⁸.

1. Threats, Prevention, Control and Mitigation		
	A. Overwintering	MJV Partners
	Assessment and monitoring of more than 140 priority CA overwintering sites from 2011-2013	Xerces Society, Monarch Alert
	Assessment of western monarch population trend and listing of western monarchs using IUCN Red List criteria	Xerces Society, Monarch Alert
	Completed analysis of native vs. non-native tree use in CA overwintering sites and provided recommendations for management to promote native tree growth.	Monarch Alert
	B. Flyway	
	Nectar plant recommendations for Eastern migratory corridor identified, project expansion planned	Pollinator Partnership
	C. Breeding Areas	
	Mapped/identified over 7,000 western breeding areas (milkweed sites) in 7 western states	Xerces Society
	Coordinated wild seed gathering from volunteers and production and distribution of milkweed plugs across the US, ~22,000 plugs distributed in 2013 and anticipate over 60,000 in 2014.	Monarch Watch
	Enhanced state restoration projects throughout Iowa by providing native milkweed and forb seeds. Impacted ~6,000 acres from 2012-2014, ~200 lbs milkweed and forb seed.	Iowa DNR, Tallgrass Prairie Center
	Launched production of 11 milkweed species in CA, AZ/NM, Great Basin, TX and FL. Over 35 million seeds produced for promoting habitat creation in agricultural and other areas.	Xerces Society, NRCS
	Assessment of milkweed availability and marketing in the Midwest	Tallgrass Prairie Center
	Monarch breeding habitat assessment tool development and distribution	Monarch Lab
	D. Across Annual Life Cycle (climate, invasives, etc.)	
	Assess potential risks of growing exotic milkweeds for monarchs in southern and western US, including disease spread	Monarch Health, Monarch Alert
	Research control methods for exotic <i>Vincetoxicum</i> species	USFS, Superior Watershed Partnership
2. Innovative Enabling Approaches		
	Development and distribution of monarch habitat creation guidelines for corporate and utility ROW land managers.	Pollinator Partnership
3. Research, Monitoring, Evaluation and Reporting		
	Citizen science and conservation trainings in known data gaps and priority conservation areas. Intensive workshops in TX, CA, MN 2011-2014 along with various volunteer-led trainings throughout the US.	Cibola Nature Center, Monarch Lab, Monarch Alert, Monarch Health, Xerces Society, North American Butterfly Assoc.
	Aggregation of data and development of MonarchNet for use in identifying priority conservation/data gap areas.	Monarch Lab, Xerces Society, Monarch Health, University of Maryland
	Monarch tagging data curation	Monarch Watch
4. Education, Outreach and Capacity Building		
	Over 10,000 habitats registered through MJV partner monarch/pollinator habitat recognition programs	Monarch Watch, North American Butterfly Assoc., Wild Ones, Xerces Society
	Monarch, pollinator, and gardening outreach campaigns by partners and volunteers (2009-2014) impacting thousands.	Wild Ones, Monarch Watch, North American Butterfly Assoc.
	Development of online resources including MJV website and outreach materials, Monarch Larva Monitoring Project online training, e-newsletters, and social media. Xerces proposed development of WMTC online resource center.	Monarch Lab, MJV coordinator
	Monarch Biology and Conservation Meeting held in 2012 for 175 researchers, land managers, citizen scientists, and the general public.	Monarch Lab, MJV coordinator

MONARCH JOINT VENTURE 2009-2014

MJV Program Coordination and Program Building

In addition to numerous administrative tasks (project proposal review, contract management, project tracking, grant reporting, etc.), Monarch Joint Venture program staff have focused on outreach to increase awareness of and engagement in monarch conservation activities, and to build and strengthen the MJV partnership. This has been accomplished through strategic meetings, presentations, and development and distribution of outreach materials via print and web. Finally, MJV staff have led or participated in the building of new monarch conservation efforts, as well as a compilation of information regarding the status of monarch habitat conservation efforts across North America.



Photo: Candy Sarikonda

STRATEGIC OUTREACH MEETINGS AND PRESENTATIONS

From 2009-2014, Monarch Joint Venture program staff participated in a number of strategic meetings and events to increase engagement in monarch conservation work, and to grow the Monarch Joint Venture partnership. Some of these outreach efforts included:

2009-2010: MJV wrote articles for the 'American Butterflies' magazine and the All-Bird Bulletin. We have also held outreach meetings with: the Monarch Butterfly Fund board; attendees of the North American Pollinator Protection Campaign meeting; Pheasants Forever staff; USFWS staff in Sacramento, CA; NRCS staff in Davis, CA; USFS staff in Region 6; the Minnesota Association of Soil and Water Conservation Districts; the Minnesota Department of Natural Resources; Texas Master Naturalists and other citizen scientists; Texas Parks & Wildlife Department staff; National Native Seed Conference attendees (including native plant growers and federal agency staff); BLM Seeds of Success staff; and scientists and land managers working on pollinator conservation in MN and WI.

2011: To promote monarch conservation and the MJV, we held outreach meetings and / or delivered presentations or posters about monarch conservation and the MJV at: the Iowa Roadside Conference; the Texas Plant Conservation Alliance Meeting; the Ladybird Johnson Wildflower Center; the Wildlife Habitat Council's Annual Symposium; the Society for Ecological Restoration's Midwest – Great Lakes Chapter Meeting; the Tallgrass Prairie Center; the National Conference on Ecological Restoration; and a meeting of the Trilateral Committee for Wildlife and Ecosystem Conservation and Management.

2012: Meetings which MJV was represented at by program staff include a meeting of the Minnesota DNR education committee, Como Park Zoo and Conservancy, Wild Ones Native Landscapers national meeting, Wild Ones Twin Cities Chapter meeting, National Conference on Ecological Restoration,

MONARCH JOINT VENTURE 2009-2014

National Landscape Conservation Cooperatives Meeting, North American Pollinator Protection Campaign meeting, strategic meetings with Cigna Health representative to explore potential partnership opportunities with this and several other corporate entities, Minneapolis Monarch Festival, and the International Monarch Biology & Conservation meeting (including co-leadership of habitat conservation workshop).

2013: Meetings which MJV was represented at by program staff include the North American Pollinator Protection Campaign meeting, Minneapolis Monarch Festival, and strategic habitat implementation meetings with Minneapolis International Airport Foundation. The MJV coordinator and co-chair also wrote an article for Louisiana Wildlife Insider Magazine.

2014: Meetings which MJV was represented at by program leaders/staff so far include: Midwest Region of the Society for Ecological Restoration meeting, Trilateral Committee meeting of Wildlife Agencies in North America, special presentation for USFWS Region 3 staff, WWF Canada-sponsored Monarch Week "Google Hangout", strategic outreach meeting at Chicago Botanical Garden, phone meetings with federal agency stakeholders who may play a future role in MJV efforts, a hack-a-thon to promote monarch conservation strategies, a Powell Center working group focused on identifying geographic targets for monarch conservation, many news media presentations (including NPR and NBC nightly news), and strategic planning with University of Minnesota Foundation for annual fundraising efforts for MJV.

DEVELOPMENT AND DISSEMINATION OF PRINT AND WEB OUTREACH MATERIALS

In 2013 we redesigned and expanded the MJV website (www.monarchjointventure.org) to allow for more dynamic and graphically-rich content. The new interface allows MJV staff to easily add to and edit website content.

Monarch Joint Venture and partner materials can be downloaded from the MJV website as PDF documents. This resources page¹⁹ provides a comprehensive yet succinct set of documents for private landowners, citizen scientists, land managers, and others. In 2013-14, the MJV coordinator created a series of two page information sheets detailing different aspects of monarch biology and conservation. To date we have distributed over 115,000 fact sheets or brochures to partner organizations or others interested in promoting monarch conservation. MJV two page information sheets include:

- Monarch Joint Venture fact sheet: a quick introduction to the monarch migration, monarch conservation issues, and the Monarch Joint Venture.
- Milkweed information sheet: photos with habitat information for milkweed species common to each U.S. region allow readers to find species known to be well-used by monarchs, and easy to establish in gardens and fields throughout the U.S.
- Gardening for monarchs: tips for creating a garden that will attract monarchs and other butterflies and pollinators.
- Invasive species alert – Swallow-wort: background on native and non-native swallow-wort species that may impact monarchs and provides information about management to help control them.
- Monarch rearing instructions: directions for successfully raising wild collected eggs or caterpillars to adult monarch butterflies.

MONARCH JOINT VENTURE 2009-2014

- Monarch conservation talking points: major monarch conservation talking points that describe the value of the monarch migration, the benefits of conserving monarchs, and the steps needed to conserve the monarch migration.
- Potential risks of growing exotic milkweeds for monarchs: risks of growing exotic milkweed for monarchs, including the spread of the monarch parasite OE in locations where exotic milkweed can grow year-round.

Additionally the North American Monarch Conservation Plan, “Plant Milkweed for Monarchs” bookmark, “Celebrating Monarchs” poster, MJV supported publications, and other relevant management resources are available to download from this page.



Photo: Wendy Caldwell

Appendix 1

CURRENT STEERING COMMITTEE:

Monarch Butterfly Fund/UMN Monarch Lab: Karen Oberhasuer
Monarch Watch: Chip Taylor
Natural Resources Conservation Service: Doug Holy
North American Butterfly Association: Dennis Olle
Pollinator Partnership: Laurie Adams
Tallgrass Prairie Center: Laura Jackson
U.S. Fish and Wildlife Service: Donita Cotter
U.S. Forest Service: Greg Butcher
Wild Ones: Native Plants, Natural Landscapes: Donna VanBuecken
Xerces Society for Invertebrate Conservation: Scott Black

CURRENT MJV PARTNER ORGANIZATIONS

U.S. Forest Service
U.S. Fish and Wildlife Service
U.S. Geological Survey
Natural Resources Conservation Service
Iowa Department of Natural Resources
Cibola Nature Center
Journey North
Monarch Alert
Monarch Butterfly Fund
Monarch Health
Monarch Watch
University of Minnesota Monarch Lab
North American Butterfly Association
Pheasants Forever and Quail Forever
Pollinator Partnership
Tallgrass Prairie Center
Wild Ones: Native Plants, Natural Landscapes
Xerces Society for Invertebrate Conservation

MONARCH JOINT VENTURE 2009-2014

MJV MISSION AND VISION

Mission. Recognizing that North American monarch (*Danaus plexippus*) conservation is a responsibility of Mexico, Canada and the U.S., as identified in the North American Monarch Conservation Plan, this Joint Venture will work throughout the U.S. to conserve and protect monarch populations and their migratory phenomena by implementing science-based habitat conservation and restoration measures in collaboration with multiple stakeholders.

This goal will be achieved through a combination of habitat conservation, enhancement and restoration; education; research and monitoring.

Vision. The vision of this Joint Venture is abundant monarch populations that can be sustained into perpetuity, and more broadly to promote monarchs as a flagship species whose conservation will sustain habitats for pollinators and other plants and animals.

References

- ¹Oberhauser, K. S., D. Cotter, D. Davis, R. Décarie, A. E. Behnumea, C. Galino-Leal, M. P. Gallina Tessaro, E. Howard, J. Lauriault, W. Macziewski, S. Malcolm, F. Martínez, J.M. González, M. McRae, D. Nernberg, I. Pisanty Baruch, I. Ramírez, J. J. Reyes, and A. Wilson. 2008. North American Monarch Conservation Plan. Commission on Environmental Cooperation. Montreal, Canada.
- ²Oberhauser, KS, MD Prysby, HR Mattila, DE Stanley-Horn, MK Sears, G Dively, E Olson, JM Pleasants, WF Lam, R Hellmich. 2001. Temporal and spatial overlap between monarch larvae and corn pollen. *Proceedings of the National Academy of Science* 98(21):11913-11918.
- ³Zpikin, E.F, Ries, L., Reeves, R., Regetz, J., Oberhauser, K. 2012. Tracking climate impacts on the migratory monarch butterfly. *Global Change Biology* 18, 3039–3049, doi: 10.1111/j.1365-2486.2012.02751.x
- ⁴Griffiths and Villablanca. 2013. Management of Monarch butterfly (*Danaus plexippus*) overwintering habitat: recommendations based on patterns of tree use. Monarch Joint Venture: http://monarchjointventure.org/images/uploads/documents/Monarch_Alert_Native_vs._non-native_tree_preference_Griffiths-Villablanca-2013.pdf.
- ⁵Caldwell and Oberhauser. 2013. Monarch Breeding Habitat Assessment Tool. Monarch Joint Venture: http://monarchjointventure.org/images/uploads/documents/Habitat_Assessment_Tool_Final_test.pdf
- ⁶Monarch Larva Monitoring Project Online Training: <http://mlmp.org/Training/Videos.aspx>
- ⁷Monarch Biology and Conservation Meeting webpage: <http://www.monarchlab.org/mn2012/>
- ⁸Monarch Watch Conservation Specialists: www.monarchwatch.org/cs/
- ⁹North American Butterfly Association Butterfly Garden and Habitat Website: www.nababutterfly.com
- ¹⁰Pollinator Partnership Habitat Development Manuals: www.pollinator.org/monarchs.htm
- ¹¹Pollinator Partnership Monarch Fueling Zones: <http://pollinator.org/monarchfueling.htm>
- ¹²Monarch Net: www.monarchnet.org
- ¹³Wild for Monarchs Campaign Website: <http://www.wildones.org/learn/wild-for-monarchs/>
- ¹⁴Fallon, C., Hoffman Black, S., Voight, C. 2013. Monarch Overwintering Site Management Plan for Plaskett Creek Campground, Los Padres National Forest, CA. Monarch Joint Venture: http://monarchjointventure.org/images/uploads/documents/XS_Plaskett_Creek_Management_Guidelines_FINAL_2013Mar.pdf
- ¹⁵International Environmental Law Project. 2012. The Legal Status of Monarch Butterflies in California. Monarch Joint Venture: <http://monarchjointventure.org/images/uploads/documents/legal-status-of-california-monarchs.pdf>

MONARCH JOINT VENTURE 2009-2014

- ¹⁶Borders, B., Lee-Mäder, E. 2014. Milkweeds: A Conservation Practitioner's Guide. The Xerces Society for Invertebrate Conservation: http://www.xerces.org/wp-content/uploads/2014/06/Milkweeds_XerSoc_june2014.pdf
- ¹⁷Western Milkweed Survey: <http://www.xerces.org/milkweedsurvey/>
- ¹⁸The Xerces Society for Invertebrate Conservation. 2013. Pollinator Plants of the Central United States: Native Milkweeds (*Asclepias* spp.). Monarch Joint Venture: http://monarchjointventure.org/images/uploads/documents/Milkweeds-of-Central-US_plus-vendors_XercesSociety.pdf
- ¹⁹Monarch Joint Venture Resources Page: <http://monarchjointventure.org/resources/publications/>

MONARCH JOINT VENTURE 2009-2014

Contact Information

For more information on MJV or partner projects, contact the MJV Program Coordinator, Wendy Caldwell.

Email: monarchs@monarchjointventure.org or **Tel:** 612-624-8706

PARTNERSHIP INFORMATION

Monarch Joint Venture

2003 Upper Buford Circle, 135 Skok Hall

St. Paul, MN 55108

Tel: 612-624-8706

www.monarchjointventure.org

