



MONARCH JOINT VENTURE

2015 ANNUAL REPORT

Prepared November 2015 by Wendy Caldwell, Program Coordinator

Partnering to conserve the monarch butterfly migration

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Introduction

Recognizing the need for conservation action to protect the North American monarch and its tri-national migration, a number of organizations came together in 2008 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.

The monarch migration was identified by the International Union for Conservation of Nature as a threatened phenomenon in 1983. More recently, 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. In August 2014, a petition was issued to the U.S. Fish and Wildlife Service to protect monarchs as a threatened species under the Endangered Species Act. The Service found that a species status review was warranted and this review is currently underway.

Monarch Joint Venture priorities are threefold:

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: Gail Morris

PARTNERSHIP STRUCTURE

The MJV is broadly inclusive, and has formed partnerships with many organizations interested in monarch conservation, including federal, state and local government agencies, 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) and other national or continental monarch conservation initiatives. Each MJV partner contributes 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 full-time Program Coordinator manages MJV operations, including management of MJV funded partner projects and contracts, organizing and facilitating partnership meetings and priorities, outreach and communication to partners and other stakeholders, grant writing and fundraising, and general maintenance and development of MJV resources and publications.

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In 2015, the MJV allocated funds to support a new Science Coordinator position to build and maintain a more robust science framework within the MJV. The Science Coordinator will work closely with various science and research efforts currently underway, will help establish and prioritize research needs, and will help pair existing research or scientific knowledge with ongoing partner projects in an effort to maximize conservation efficiency and minimize duplication of efforts. This position will officially begin in January 2016.

In May 2015, MJV partnered with the U.S. Fish and Wildlife Service and the 21st Century Conservation Corps of Minnesota and Iowa to hire a full-time Communications Assistant. The Assistant works with the Program Coordinator to maintain a communications plan for the MJV and its partners, assists with implementing actions identified in the communications plan (updates, website content, new partner communication, etc.) and manages social media posting and follower interaction. If funding is available, this one-year position will be extended.

The MJV steering committee meets quarterly, primarily by teleconference. MJV also holds an annual meeting for all partners and potential stakeholders. Smaller working committees meet throughout the year as needed, primarily by teleconference.

FINANCIAL AND STRATEGIC HIGHLIGHTS

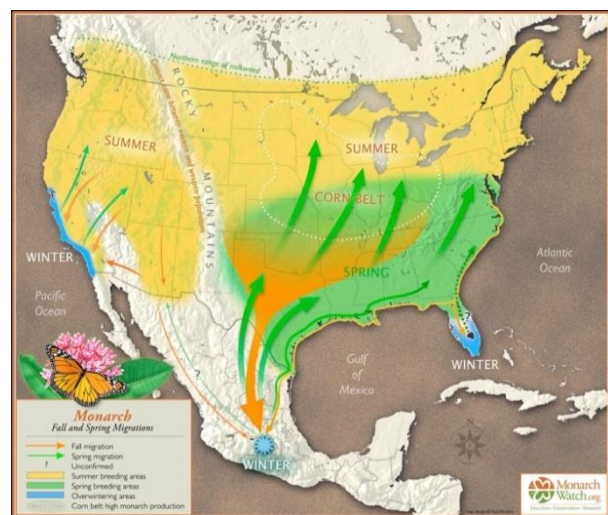
From 2009-2015 the MJV has engaged 37 partners and allocated over \$1.9 million for science-based monarch conservation and coordination projects. In addition, over \$400,000 were reported as in-kind support by partner organizations to carry out these projects. Our conservation actions are fully aligned 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

There is good evidence that the primary threat to monarchs in the United States is widespread loss of breeding habitat (Pleasants and Oberhauser 2013, Pleasants 2015), 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, and Missouri) for breeding habitat restoration efforts. This region has historically produced a high percentage of the population that



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migrates to the overwintering grounds in Mexico each fall (Wassenar and Hobson 1998, Oberhauser et al. 2001). 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 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 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. We have supported the development of an integrated pest management system for native milkweed seed production, and the creation of milkweed seed production plots.



Photo: Mary Holland

In addition, we have prioritized overwintering habitat conservation in California. The western monarch population, for which the vast majority of habitat is within the United States, has also experienced an overall downward trend since the mid-1990s. MJV partners in the western states are working with land managers to restore and protect known California overwintering locations.

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 conservation by 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 central flyway and western sites, 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, articles, webinars, and social media postings.

Research and Monitoring to Inform Monarch Conservation Efforts

The MJV draws together monarch biologists, conservation leaders, academic programs, and citizen scientists working toward the ultimate goal of conserving the monarch butterfly migration. Through research and monitoring, these groups help us to understand monarch populations and

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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.

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



Photo: Wendy Caldwell

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.

The MJV and its partners are also engaged in the Monarch Conservation Science Partnership, an effort led by the U.S. Geological Survey. MJV is involved in the various objectives of this group, including development of a national monarch and milkweed monitoring strategy, a geospatial modeling effort to help target restoration projects that will have the greatest potential impact for monarchs, analyses to better understand the relative importance of annual cycle phases and a minimum viable population size, and identifying and addressing other research priorities.

A GROWING PARTNERSHIP

When the MJV was initiated in December 2008, there were 10 partners. We have expanded the partnership to 37 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 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.

A summary of monarch conservation, education, and research activities that each of our partners have undertaken is included in Appendix 2.

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Financial Summary

FINANCIAL SUMMARY

From 2009-2014 the U.S. Forest Service, International Programs was the primary federal agency sponsor of the MJV. These funds (totaling \$1.2 million from '09-'14) were used to support a program coordinator and assistant, general program operations, and partner monarch conservation or education projects. As of November 2015, MJV's total income equals \$1,967,541. As prioritized and approved by the MJV steering committee, most funds were allocated for partner monarch conservation, education, or research projects.

Additional sponsors have contributed to the MJV beginning in fiscal year 2015. All MJV direct financial income (not including in-kind support) is reported in table 1.

MJV funded projects are summarized in Table 2. In total \$989,335 of MJV's program funds have been allocated for monarch conservation projects from 2009-present.

TABLE 1. MJV INCOME SUMMARY

	FY 10	FY11	FY 12	FY13	FY 14	FY15	FY16*	Total
U.S. Forest Service	\$ 500,535	\$300,240	\$400,285			\$280,000		\$ 1,481,060
U.S. Fish and Wildlife Service	\$ 2,000	\$ 750					\$126,774	\$ 129,524
U.S. Geological Survey							\$50,006	\$ 50,006
Bureau of Land Management							\$50,000	\$ 50,000
Audubon/Toyota Together Green				\$ 10,000				\$ 10,000
Commission for Environmental Cooperation	\$ 20,300	\$ 6,400						\$ 26,700
Monarch Butterfly Fund		\$ 10,000			\$ 30,000	\$ 15,000		\$ 55,000
New York Community Trust						\$110,000		\$ 110,000
Donations				\$ 460	\$ 13,187	\$16,180	\$5,424	\$ 35,251

*FY2016 is currently underway, so final budgets subject to change with additional income.

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TABLE 2. MJV FUNDED PROJECTS		FY 09-FY10	FY11	FY12	FY13	FY14	FY15 (final expenditures)	*FY16+ (current allocation)
	Income	\$522,835	\$317,390	\$400,285	\$10,460	\$43,187	\$421,180	\$232,204
Funds Expended	MJV Staff and Program							
	Coordinator & Assistant	\$41,138	\$53,209	\$76,892	\$75,957	\$25,876	\$51,753	\$135,180
	Registration/Sponsorship	\$285	\$1,540	\$1,490	\$375	\$1,595	\$1,435	\$165
	Printing & Shipping	\$410	\$2,593	\$5,393	\$8,166	\$12,542	\$4,572	\$19,028
	Website & Branding	\$90	\$2,093	\$247	\$10,340	\$6,417	\$445	\$4,143
	Equipment & Supplies	\$1,302	\$537	\$320	\$619	\$976	\$2,341	\$9,781
	Travel (coordinator & other)	\$8,544	\$2,038	\$3,041	\$11,386	\$1,790	\$3,653	\$8,877
	Staff and Program Subtotal	\$51,769	\$62,010	\$87,383	\$106,844	\$49,197	\$64,199	\$177,174
	Partner Projects							
	Cibolo Nature Center (\$46,700)	\$1,796		\$1,366	\$2,800	\$28,738		\$12,000
	Cincinnati Nature Center (\$3,000)							\$3,000
	Iowa DNR (\$77,043)			\$13,500	\$15,058	\$34,646	\$3,800	\$10,000
	Monarch Alert (\$8,741)					\$1,759	\$1,482	\$5,500
	UMN Monarch Lab (\$153,470)	\$590	\$2,026	\$37,674	-\$599	\$82,087		\$31,691
	Monarch SOS App (\$9,000)							\$9,000
	Monarch Watch (\$159,070)		\$6,739	\$11,628	\$26,177	\$99,525		\$15,000
	NABA (\$10,802)				\$4,550	\$6,252		
	Pollinator Partnership (\$55,800)			\$5,284	\$14,590	\$32,426		\$3,500
	Superior Watershed Partnership (\$10,000)						\$6,354	
	Tallgrass Prairie Center (\$48,953)					\$5,493		\$43,460
	Univ. of Georgia (\$33,592)	\$3,200	\$12,465	\$4,679		\$4,004	\$4,050	\$5,195
	Monarch Net (UMD) (\$41,991)		\$15,014	\$26,978				
	USGS Milkweed Surveying (\$25,000)						\$3,118	\$16,575
	Wild Ones (\$33,500)			\$2,500		\$21,000		\$10,000
	Xerces Society (\$357,509)		\$24,041	\$80,151	\$60,759	\$73,354		\$119,204
	Unallocated project funds							\$55,635
	Partner Projects Subtotal	\$5,586	\$60,286	\$183,760	\$123,335	\$389,285	\$18,804	\$339,760
	Indirect costs (8-17.5%)	\$4,509	\$9,558	\$18,746	\$18,482	\$37,648	\$2,818	\$66,791
	Total funds expended	\$61,865	\$131,854	\$289,889	\$248,660	\$476,130	\$85,820	(incomplete)
Balance		\$460,970	\$646,506	\$756,902	\$518,702	\$85,759	\$421,118	(incomplete)

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Partner Projects Summary

FUNDING PROCEDURE FOR PARTNER CONSERVATION PROJECTS

From 2009-2015 MJV issued contract awards for 17 organizations to conduct monarch conservation, education and research projects. Each year, the MJV allocates funds to support monarch conservation projects carried out by our partners. The full partnership updates our implementation plan annually, and priority actions for MJV funding in this plan are established each year by the MJV steering committee. MJV and its partners have engaged in various monarch conservation projects in addition to the projects listed here, but these are those that MJV has directly provided funding for.

This section includes descriptions of each of the projects that MJV has allocated support for during fiscal year 2015. The amount in parentheses next to each partner name is the total MJV funding contracted to that partner for the particular project. Note that each project described is not necessarily funded in full by the MJV, as partners often use additional funds to support their work, or may have received MJV funding for this work in previous years.



Photo: Candy Sarikonda

CURRENT YEAR ALLOCATIONS

Education and Outreach

[Promoting Citizen Science Monitoring in Texas](#) – Cibolo Nature Center (\$12,000)

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 is thought to play a significant role in determining the size and success of the eastern monarch population through the rest of the season. In the fall, monarchs migrating to Mexico all funnel through Texas, where they need nectar to fuel their flight and build fat reserves that will help them survive the winter. Data from Texas are of great value for understanding eastern monarch population trends. 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 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.

[Monarch Citizen Science Training and Outreach](#) – UMN Monarch Lab (\$21,031)

Citizen scientists play a very 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

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specifically on one or many aspects of the monarch annual life cycle of breeding, migrating, and overwintering. The University of Minnesota Monarch Lab is spearheading a number of different 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. These analyses determined locations that were both important to monarchs and where gaps in the data reported may exist. To date, workshops have taken place in California, Nevada, Idaho, Wisconsin and Minnesota. 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.

[Wild for Monarchs Campaign: Citizen Science](#) – **Wild Ones (\$10,000)**

Wild Ones launched their Wild for Monarchs Campaign 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. 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 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. A new addition in 2015 to the Wild for Monarchs Campaign is development of a program to promote monarch citizen science opportunities more broadly through the Wild Ones membership. They will promote citizen science activities such as Journey North, the Monarch Larva Monitoring Project, Monarch Watch tagging, and Project Monarch Health, and encourage their members and the local community to participate through web outreach and on-site trainings.

[Workshops for Federal Agency Staff in the Western U.S.](#) – **Xerces Society (\$12,244)**

The Xerces Society conducts a wide array of educational workshops for various audiences important to protecting the monarch migration. Training land managers, federal agency staff and citizen science monitors in key regions is essential to long term habitat restoration and conservation. Land manager and citizen science workshops conducted by Xerces educate landowners and volunteers about concepts in monarch biology and ecology, habitat management, and protocols for monitoring monarch habitats. Current Xerces efforts have been planned to educate federal agency staff working in natural areas in key breeding areas of the Western U.S. While there is a need to establish new monarch habitats, it is important to also ensure that existing monarch habitat is protected. In the breeding range of the smaller western monarch population, there is a significant amount of milkweed on federally managed lands. Targeting education efforts towards federal staff to effectively protect, restore, and monitor these habitats is a priority of Xerces and MJV. Through partnerships with federal agencies and ongoing education efforts, we can work together to ensure that the management strategies employed on publicly owned lands are compatible with the survival and recovery of monarch populations.

Habitat Restoration and Enhancement

[Milkweed to Monarchs Restoration](#) – **Cincinnati Nature Center (\$3,000)**

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The Milkweed to Monarchs program, launched in 2014 by the Cincinnati Nature Center, works to enhance monarch habitat across Ohio, educate the public and aggressively distribute native milkweed seeds. Native prairie areas, which have nearly been eliminated from Ohio, provided vital native milkweeds and nectar sources for pollinators. From May to December 2015, the Nature Center is actively restoring a 10 acre abandoned agricultural field on their property to native prairie. The seed mix used will include native milkweeds to attract monarchs. Once mature, this Monarch Waystation will be used for native seed collection, and will provide an outdoor learning space for monarch conservation and monitoring workshops or demonstrations. These opportunities will teach visitors about seed collection, the importance of using native plants, citizen science monitoring, and more.



Photo: Wendy Caldwell

[Iowa: Bringing Back the Prairie, Building Habitat for Monarchs](#) – Iowa DNR (\$10,000)

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 (PRC) 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. Since 2012, the Iowa DNR has added regionally sourced seeds of milkweed and nectar plants to their prairie planting mixes, and created more than 6,400 acres of improved monarch habitat. They have included a wide diversity of habitat plants including five milkweed species, two blazing star species and other native seeds. Using the habitats restored by the PRC, the Iowa DNR hosts an annual monarch tagging event during the fall migration. They have begun two partnerships with Iowa universities to improve monarch habitat restoration and bolster native milkweed availability. They are working jointly with Iowa State University on a retrospective look at prairie reconstructions, to make the link between what seed was planted and which species are present 5-10 years later, and to develop guidelines for prairies managers. The collaboration between the Iowa DNR PRC and University of Northern Iowa Tallgrass Prairie Center will involve propagation of *Liatris ligulistylis* (Meadow blazing star) from northern Iowa region and *Asclepias tuberosa* from central zone in Iowa. This project will help to build the commercial seed industry as well as providing seed for the Iowa DNR prairie reconstruction efforts.

[Monarch and Milkweed Habitat Restoration in Eastern Oklahoma](#) – Monarch Watch (\$15,000)

Large scale restoration will be required to offset annual monarch breeding and migratory habitat losses. Restoration priorities, given that funds are limited, should involve regions that have a high probability of producing large numbers of monarchs. Eastern Oklahoma is such a region: a prime area for the production of first generation monarchs and a corridor for monarchs moving north out of Texas. Monarch Watch is partnering with Native tribes in Oklahoma to restore milkweeds to large acreages in the eastern part of the state. The project will establish the capacity and infrastructure required for milkweed and native flowering plants restoration by training Native youth to produce plugs of

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milkweeds and native nectar sources, harvest seeds, create demonstration sites and seed production plots. Ongoing educational materials will be produced to educate future students, tribes and the general gardening community about monarch conservation. Reverence for the land is part of the Native culture and a Native-led habitat restoration program is likely to gain strong tribal support state-wide.

[Monarch Wings Across Ohio: Transforming Urban Areas](#) – **Pollinator Partnership (\$3,500)**

Degraded urban areas, such as empty lots and underdeveloped public spaces provide a great opportunity for habitat restoration and community engagement. In partnership with the MJV, the Pollinator Partnership has begun work to convert underused urban areas into monarch research stations. They have been working since 2010 throughout Northeast Ohio to raise awareness about pollinators. With their new program *Transforming Urban Areas*, degraded areas will be transformed into monarch research gardens, resulting in monarch habitat restoration as well as ongoing training and research opportunities. The program will hire and train local student interns in planting and monitoring monarch habitats, thereby increasing capacity for monarch habitat planting in the area. *Monarch Wings Across Ohio: Transforming Urban Areas* is one component of the larger program which is working across multiple land use types; urban areas, gardens, corporate lands, and agriculture to research methods for creating monarch habitat.

[Pollinator Habitat Demonstration Sites in Agricultural Areas](#) (project supported by New York Community Trust) – **Xerces Society, Tallgrass Prairie Center, University of Minnesota Monarch Lab (\$85,898)**

Partners have installed a series of monarch habitat demonstration sites in one of the areas that needs it most: the agricultural Midwest. With support from the New York Community Trust, we are creating monarch conservation demonstration sites on six farms in three key Corn Belt states, Minnesota, Wisconsin, and Iowa. The project will result in quality habitat for monarchs, but more importantly it will educate and engage private landowners in long term conservation. We are partnering with local farms of various types and working with them to create plots of pollinator habitat, providing concrete examples that pollinator conservation is an accessible, successful and beneficial activity for farmers to engage in. The main project goals are to design and install six high-quality monarch habitat demonstration sites, produce resources to encourage landowners and managers to adopt practices that will help the monarch population recover, host field days to train landowners, and develop model seed mixes and determine significant gaps in the commercial availability of native milkweed and nectar sources compatible with the agricultural landscape. The installation process at each of our six locations is well underway. The Xerces Society, Tallgrass Prairie Center, and the University of Minnesota Monarch Lab are facilitating the habitat restoration and outreach in these states. Acres of diverse pollinator-friendly habitat will be planted, and grassroots involvement in planting parties and field demonstration days will engage local communities throughout 2015 and 2016.

Research and Monitoring

[Monarch Breeding Habitat Assessment Tool, Online Version](#) – **UMN Monarch Lab (\$4,895)**

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

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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 that can be used throughout the monarchs' breeding range. An online version of this tool is currently being developed. This online tool will be more interactive with the end user, offering suggestions for how to improve their habitat for monarchs. As habitats are submitted this way, MJV will grow a dataset to better understand relative habitat quality, especially when paired with citizen science monitoring data.

[Assessment of Exotic Milkweed and Spread of Disease](#) – **Monarch Health, Monarch Alert (\$10,695)**

Monarch Joint Venture has partnered with Monarch Alert and Monarch Health in a collaborative effort 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. Successes of the previous years of research include expanding and maintaining the *Monarch Health: Southern Initiative* and *Western Initiative* projects through recruiting new volunteers to non-destructively test adult monarchs for OE in the southern Atlantic, Pacific coast and Gulf areas during the fall, winter and spring months at sites with and without tropical milkweed. The program performed intensive monthly field monitoring in tropical milkweed patches at 5 sites within each region (FL-TX and CA) and conducted a field experiment to test whether cutting back milkweeds at periodic intervals across a subset of monitoring sites will help lower OE transmission and prevalence at those sites and in wild monarchs. This work will continue from 2015-2016, directly examining the role of tropical milkweed on monarch migratory behavior and parasite dynamics to better inform management strategies. The research will produce scientifically-informed recommendations for the gardening community on how to better manage tropical milkweed to minimize parasite transmission.

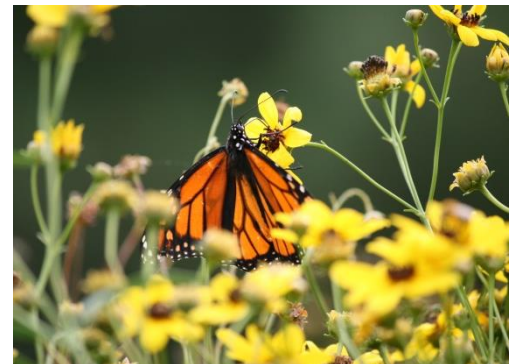


Photo: Candy Sarikonda

[Regional Monarch Nectar Plant Lists](#) – **Xerces Society (\$12,000)**

Monarchs need milkweed to feed on as larvae as well as plentiful nectar plants as adults to fuel their reproduction and migration. As interest in creating monarch habitat continues to grow, land managers and gardeners are looking for guidelines of what plants should be included to make the best habitats possible. Some guidelines exist regarding recommended species to plant for pollinators in general, and what species of milkweeds are recommended for monarchs, but monarch specific nectar plant recommendations for all regions are not readily available. In collaboration with NRCS and other MJV partners, the Xerces Society is developing regional nectar plants lists to provide a comprehensive, regional guide to plants that are highly attractive to monarchs, bloom at the times when monarchs need them, locally appropriate, commercially available, and hardy. Work has begun in partnership with NRCS and the Monarch Joint Venture to create 14 regionally specific lists of native nectar plants for monarchs for use by restoration practitioners, other land managers, gardeners and landscape professionals. These recommendations will be available by spring 2016, and will be available for anyone to use.

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[Developing IPM System for Milkweed Seed Producers](#) – Xerces Society (\$50,000)

Increasing the availability of milkweed seed is a major component of our recovery strategy for restoring the monarch butterfly population. However, milkweed seed availability continues to be a problem for restoration managers and gardeners looking for the appropriate, local milkweed to plant. The Xerces Society has been working with commercial native seed producers and experts in 11 states across the country to identify the challenges of milkweed seed production. The Xerces Society is developing and pioneering an Integrated Pest Management strategy to address seed production issues. This system will allow growers to accurately estimate how much crop they are losing to pests, recommend a reasonable threshold at which to take action on pest-induced damage, and provide a system of recommended treatments to reduce damage while increasing protection for monarchs and other beneficial insects in seed production fields. This initial IPM framework to be completed in 2016 will provide milkweed seed growers with the most comprehensive pest management decision-support tool ever developed for their industry. This tool will also simultaneously help protect monarchs from insecticides. We look forward to seeing this important milkweed and monarch conservation resource developed.

PREVIOUS ALLOCATIONS

This list can be found on the [MJV Funded Projects](#) webpage, with descriptions of each listed project. 2014-2015

Education and Outreach

Promoting Citizen Science Monitoring in Texas – Cibolo Nature Center (\$11,982)

Creating Monarch Habitat in Corporate Landscapes – Pollinator Partnership (\$1,980)

Wild for Monarchs Campaign – Wild Ones (\$9,000)

Monarch Citizen Science Training and Outreach – University of Minnesota Monarch Lab (\$20,653)

Development of Western Monarch Online Resource Center – Xerces Society (\$5926)

Habitat Restoration and Enhancement

Increasing Native Milkweed Seed Availability – Xerces Society (\$8,741)

Iowa: Bringing Back the Prairie, Building Habitat for Monarchs – Iowa DNR (\$18,800)

Research and Monitoring

Assessment of Exotic Milkweeds and Spread of Disease – Monarch Health, Monarch Alert (\$8,000)

Mapping the Milkweed Marketplace – Tallgrass Prairie Center (\$5,493)

Invasive Swallow-wort Control at Peninsula Point – Superior Watershed Partnership (\$10,000)

Western Breeding Habitat Loss Analysis – Xerces Society (\$7,000)

2013-2014

Education and Outreach

Monarch Success Stories Habitat Recognition Program – UMN Monarch Lab (\$8,000)

Workshops for Overwintering Site Land Managers and Citizen Scientists – Xerces Society (\$2,000)

Increase Monarch Outreach to Corporate Partners – Pollinator Partnership (\$4,900)

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Wild for Monarchs Campaign – Wild Ones (\$12,000)

NABA Gardening Website and Material Update – North American Butterfly Association (\$6,252)

Promoting Citizen Science Monitoring in Texas – Cibolo Nature Center (\$11,996)

Habitat Restoration and Enhancement

Native Milkweed Seed Purchase for Use in Restoration Projects – Xerces Society (\$11,770)

Bring Back the Monarchs Milkweed Campaign; Milkweed Market – Monarch Watch (\$42,210)

Iowa: Bringing Back the Prairie, Building Habitat for Monarchs – Iowa DNR (\$20,000)

Research and Monitoring

Sharing What We Know: Tri-national Data Exchange and Population and Monitoring Program Analyses – University of Minnesota Monarch Lab, Monarch Alert, Xerces Society (\$34,911)

Documenting Monarch Breeding Areas in the Western US – Xerces Society (\$12,721)

Assessment of Exotic Milkweeds and Disease – Monarch Health and Monarch Alert (\$6,600)

2012-2013

Education and Outreach

Workshops for Overwintering Site Land Managers and Citizen Scientists – Xerces Society (\$13,530)

Promoting Citizen Science Monitoring of in Texas – Cibolo Nature Center (\$7,889)

Habitat Restoration and Enhancement

Iowa: Bringing Back the Prairie, Building Habitat for Monarchs – Iowa DNR (\$15,000)

Bring Back the Monarchs Milkweed Campaign; Milkweed Market – Monarch Watch (\$48,910)

Promoting the Planting of Native Milkweeds in the Central United States – Xerces Society (\$3,993)

Research and Monitoring

Assess Western Monarch Overwintering Sites and Fill Data Gaps – Xerces Society (\$31,219)

Analysis of Native vs. Non-native Trees in CA Overwintering Sites – Xerces, Monarch Alert (\$6,455)

Eastern Nectar Plant Recommendations for Monarchs – Pollinator Partnership (\$15,000)

Monarch Breeding Habitat Assessment Tool – UMN Monarch Lab and Xerces Society (\$15,771)

Understanding the Value of Waystations and MLMP Monitoring Sites – UMN Monarch Lab (\$4,358)

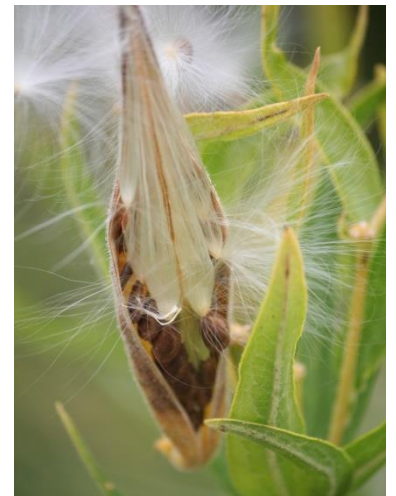


Photo: Wendy Caldwell

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2011-2012

Education and Outreach

Monarch Citizen Science Training and Outreach – University of Minnesota Monarch Lab (\$7,504)

Bring Back the Monarchs Campaign; Expanding Waystation Program– Monarch Watch (\$13,350)

Corporate and Utility ROW Areas: Manual Development – Pollinator Partnership (\$30,340)

Monarch Biology and Conservation Meeting – University of Minnesota Monarch Lab (\$25,308)

Habitat Restoration and Enhancement

Increasing Native Milkweed Seed Availability – Xerces Society (\$23,275)

Western Monarch Habitat Conservation, Outreach, and Monitoring – Xerces Society (\$54,726)

Research and Monitoring

Tracking the Migration: Tagging Data Entry, Verification and Analyses – Monarch Watch (\$12,900)

Milkweed Habitat Quantification – Monarch Watch (\$2000)

2010-2011

Education and Outreach

NABA Gardening Website and Material Update – North American Butterfly Association (\$5,000)

Bring Back the Monarchs Campaign; Expanding Waystation Program– Monarch Watch (\$24,400)

Monarch Citizen Science Training and Outreach – NABA, Cibolo Nature Center (\$12,050)

Habitat Restoration and Enhancement

Increasing Native Milkweed Seed Availability – Xerces Society (\$18,943)

Western Monarch Habitat Conservation, Outreach, and Monitoring – Xerces Society (\$21,636)

Research and Monitoring

Sharing What We Know: Tri-national Data Exchange and Monitoring Program Analyses – University of Georgia, Andy Davis, University of Minnesota Monarch Lab, University of Maryland (\$42,100)



Photo: Wendy Caldwell

MJV Communications

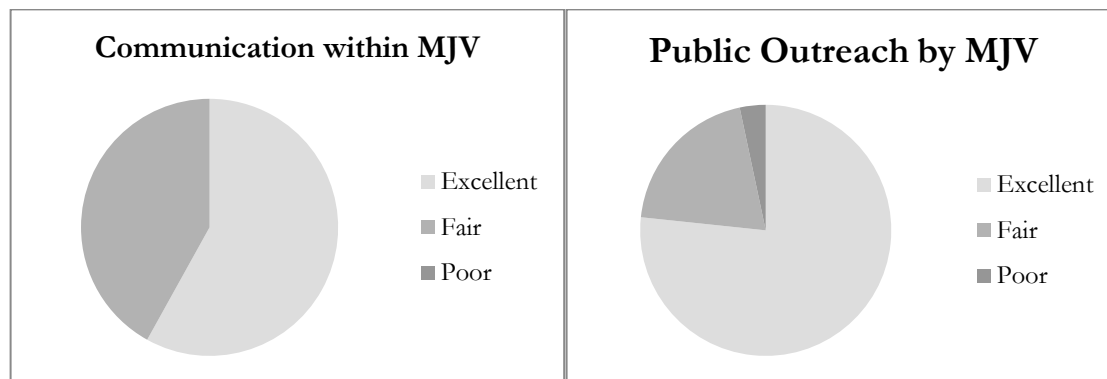
Introduction

Since 2014, the MJV has grown by over a dozen partners, and the public interest in monarchs has risen exponentially. With these changes, MJV staff identified a need for a comprehensive communications plan. MJV hired a Communications Assistant to aid in the maintenance of MJV communications and develop a working communications plan. MJV drafted an initial plan in June 2015, and asked a selection of 65 partner representatives to participate in a communications survey to inform and update the plan to account for current partnership needs, wants, and expectations. The survey collected 34 responses.

Summary of Key Results

The survey responses provided helpful insight and reinforced the importance of ongoing MJV communications projects. We found that partner responses aligned well with existing communications goals and staff ideas for the website and inter-partner communications. MJV staff will prioritize those actions identified as important by the survey results.

There is general consensus that MJV has effective communication to the public and to our partners, but that there is room for improvement.



The MJV resources most frequently used by surveyed partners are:

- The downloadable resources on the MJV website
- The monarch conservation webinar series

The most important communications goals & services to pursue, according to survey, are:

- Regularly send project updates out to all MJV partners
- More publicly shareable tools such as presentations, photos, signs etc.

Common themes of suggestions to improve MJV communications:

- Maintain a list of all current and previously funded MJV projects (completed and currently available on website)

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- Improve communications about partner activities through regular updates
- Improve accessibility of website to specific audiences such as farmers, ranchers, educators, gardeners, and the general public.

Action items

MJV actions proposed to implement feedback from the Communications Survey:

- Improve partner awareness of outreach and communications services provided by the MJV:
- Invite partner point of contacts (POCs) to the MJV Conservation Planning Facebook Group
- Publicize webinars to all partner POCs
- Create a 'welcome packet' for all new MJV partners with information about MJV and partnership expectations
- Continue with ongoing plans to improve website accessibility by creating specific "Get Involved" menus for target audience (i.e. farmers, teachers, gardeners, etc.)
- Schedule regular news posts highlighting partner project updates.
- Encourage and facilitate partner collaboration for funding, research and project opportunities.
- Initiate communication with potential partners as identified in the survey to identify and inform their current and future monarch conservation activities, and possibly pursue partnership.

Partner actions proposed to implement feedback from the Communications Survey:

- All partners submit brief yearly summary of monarch conservation activities for distribution. MJV supported projects submit quarterly progress reports for all funded work.
- Partners identify staff members of their organization to actively participate in MJV working groups as needed. Additionally, partners are encouraged to develop an internal communications structure to disseminate monarch and MJV updates to their staff and public network.
- Partners follow/like MJV and partner social media outlets, and share relevant posts and activities with their social media networks.
- Partners regularly share current projects, products, links, or resources relevant for the MJV to promote on website and through other communications mechanisms.
- Partners keep MJV up-to-date with information about ongoing and planned projects to minimize duplication and improve coordination of conservation activities nationwide.

MJV COORDINATION AND PROGRAM BUILDING

In addition to numerous administrative tasks (project proposal review, contract management, grant reporting, etc.), MJV staff have focused on outreach to increase awareness of and engagement in 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. 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: Wendy Caldwell

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STRATEGIC OUTREACH MEETINGS AND PRESENTATIONS

From 2009-2015, 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 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.



Photo: Wendy Caldwell

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, 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 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

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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.

2015: Meetings which MJV was represented at by program leaders/staff so far include: Society for Ecological Restorations Midwest Region Meeting, webinars for parks professionals through National Recreation and Parks Association, webinar to National Association of County Ag Agents, Midwest and southern NRCS planning meetings for monarch strategy development, National Recreation and Parks Association Annual Conference, North American Pollinator Protection Campaign Annual Conference, Texas Pollinator PowWow, America's Grasslands Conference, meetings of the Keystone Monarch Collaborative, strategic meeting to develop a framework for the FWS to use citizen science, Monarch Conservation Science Partnership meetings, Private Lands MN annual meeting, MAFWA conference, NAPPC steering committee, National Pollinator Garden Network planning meeting, Entomological Society of America annual conference, Chicago Field Museum and USFWS Urban Monarch Conservation Meeting, FFA National Expo, Minneapolis Monarch Festival and various outreach programs, including local SWCD pollinator workshops and local citizen science workshops.

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 page](#) provides a comprehensive yet succinct set of documents for private landowners, citizen scientists, land managers, and others. In 2013-15, 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 200,000 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
- Schoolyard butterfly gardens: similar to gardening, but includes information specifically applicable to schoolyards
- Invasive species alert – Swallow-wort: background on native and non-native swallow-wort species that may impact monarchs and information about management to help control them
- Rearing monarchs responsibly: directions for successfully raising wild collected eggs or caterpillars to adult monarch butterflies
- 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

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- 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.
- Monarch citizen science: provides an overview of the main monarch citizen science programs and provides information about how to learn more

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

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Appendix 1

CURRENT STEERING COMMITTEE:

Bureau of Land Management: Carol Spurrier
Monarch Butterfly Fund/UMN Monarch Lab: Karen Oberhauser
Monarch Watch: Chip Taylor
National Wildlife Federation: Mary Phillips
Natural Resources Conservation Service: Lisa Bertelson
North American Butterfly Association: Dennis Olle
Pollinator Partnership: Laurie Adams
Southeastern Association of Fish and Wildlife Agencies: David Eichler
Tallgrass Prairie Center: Laura Jackson
U.S. Fish and Wildlife Service: Tom Melius
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	Missouri Prairie Foundation
U.S. Fish and Wildlife Service	Monarch Alert
U.S. Geological Survey	Monarch Butterfly Fund
Bureau of Land Management	Monarch Health
National Park Service	Monarch Watch
Natural Resources Conservation Service	University of Minnesota Monarch Lab
Iowa Department of Natural Resources	National Recreation and Parks Association
Minnesota Department of Natural Resources	National Wildlife Federation
Southeastern Association of Fish & Wildlife Agencies	Native Plant Society of Texas
Back to Natives Restoration	North American Butterfly Association
Texas Parks and Wildlife Department	Pacific Grove Museum of Natural History
Cibola Nature Center	Pheasants Forever and Quail Forever
Cincinnati Nature Center	Pollinator Partnership
Desert Botanical Garden	Southwest Monarch Study
Green Schools Alliance	Tallgrass Prairie Center
Journey North	Three Rivers Park District
Lady Bird Johnson Wildflower Center	Wild Ones: Native Plants, Natural Landscapes
Loudoun Wildlife Conservancy	Xerces Society for Invertebrate Conservation
Make Way for Monarchs	

Appendix 2

MONARCH CONSERVATION SUMMARIES BY PARTNER

United States Forest Service: The US Forest Service focuses on habitat enhancement and public engagement to build awareness of the conservation of monarchs and pollinators. Working closely with MJV partners, the Forest Service is exploring solutions, both biological and social, that would increase survivability and create healthy habitats. Milkweed and flowering nectar plants are added to Forest Service restoration areas to convert marginal land into pollinator habitat, and demonstration gardens have been cultivated at Forest Service facilities. Another approach is to support monarch habitat management with partners along the eastern and western flyways. During 2015, the Forest Service published monarch brochures for different geographical areas of the U.S. and issued a critically needed document, *Conservation and Management of Monarch Butterflies: A Strategic Framework*. This framework will guide the Forest Service to effectively and efficiently use available resources and engage public and private partnerships in taking action for the conservation of the monarch butterfly.

Public engagement also is a key component of Forest Service efforts. Since 2010, the North American Monarch Institute, a collaboration between the US Forest Service and the University of Minnesota Monarch Lab, has convened teachers and nature educators to attend workshops designed to study monarchs and build networks along its flyway route. Experts in the science and conservation of monarch butterflies train the participants on implementing an inquiry-based curriculum and developing experiential approaches to learning. Teachers learn about creating schoolyard habitats that would support monarch conservation and using these gardens as a resource to carry out other types of science inquiry investigations. To date, more than 500 teachers have been trained, with many returning to train other teachers in their own schools and communities. Teams of teachers from urban, rural, and tribal areas are brought together from across the U.S.; and relationships built in this course will serve to connect conservation projects, educational programs, and citizen-science monitoring along the flyway.

United States Fish and Wildlife Service: Over the past year domestic actions by the USFWS included significant investments for monarchs. In FY15, USFWS completed over 200,000 acres of habitat restoration and enhancement for the monarch through existing and planned projects on public and private lands, including support for 750 schoolyard habitats and pollinator gardens. Conservation delivery was completed on Service-owned lands, through partnerships on state-owned lands, and on private lands through the Partners for Fish and Wildlife program. The Service has and will continue to acquire thousands of acres in the Midwest and Mountain Prairie Regions, which although primarily aimed at protecting priority bird habitats, will have secondary benefits for monarchs and other pollinators. USFWS allocated an additional \$2 million for projects in key geographic breeding and migration areas. Many projects focused on the eastern migratory corridor from Texas to Minnesota using I-35 as an anchor point. These projects focused on additional habitat restoration, native seed strategies, and education and outreach to target audiences. The USFWS seeded the Monarch Butterfly Conservation Fund with a \$1.2 million investment to the National Fish and Wildlife Foundation which was leveraged through public and private donors. NFWF awarded the first round of grants which were matched by more than \$6.7 million in grantee contributions and will support the restoration of up to 33,000 acres of habitat. This year the Service declared monarch butterfly an agency priority, dedicating \$4 million each year for the next five years towards conservation efforts. The Director of the Fish and

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Wildlife Service is the U.S. lead for the Tri-national Working Group and tasked with leading an Interagency High Level Working Group (HLWG) to coordinate U.S. monarch conservation activities with Mexico and Canada. We are also collaborating with Canada and Mexico through the Trilateral Committee to enhance our efforts internationally to save this species.

United States Geological Survey: The USGS, operating through the John Wesley Powell Center for Analysis and Synthesis hosted two meetings of monarch researchers, restoration ecologists, policy implementers, and organizers of citizen science to identify means of characterizing the state of the eastern migrating population of monarch butterflies and steps necessary for recovering them to former levels of abundance. To this end, individuals within the group developed spatially explicit demographic models for identifying vital stages in the annual life cycle of monarchs; extinction risk analyses to help understand the status of the species and inform population targets; geospatial data and tools for conducting expert-based scenarios of milkweed restoration; and a (inter-)national monitoring strategy for coherently organizing citizen science effort, more rigorously assessing species status and, ideally, determining conservation effectiveness. This Monarch Conservation Science Partnership was adopted by the Trilateral Committee for Wildlife and Ecosystem Conservation and Management and now includes a nascent partnership with members from Canada and Mexico.

Bureau of Land Management: The BLM has been focused on inter-agency coordination through the White House Pollinator Task Force and The High Level Working Group for Monarchs to implement the DOI Pollinator Protection Plan. We have been working with the federal committee of the Plant Conservation Alliance to implement the National Seed Strategy and reviewing policy to see how we might make it more pollinator friendly.

National Park Service: In fulfilling the 2014 Presidential Memorandum and the National Strategy to Promote the Health of Honey Bees and Other Pollinators, the National Park Service (NPS) is currently reviewing land management practices to incorporate pollinator friendly landscaping, developing education materials and wayside exhibits, and participating in international initiatives to protect and restore pollinator habitat. NPS is currently funding over 50 monarch/milkweed projects Service-wide and has provided funding and support for citizen science and at risk species conservation efforts for several years. Current priority areas for NPS monarch conservation include: habitat restoration, inventory and monitoring, and education/outreach. The Milkweeds of the National Park Service project on iNaturalist.org was designed to enlist resource managers, citizen scientists, and professional scientists to help map native milkweed species in park units throughout the United States. The data collected will help support milkweed seed collection for future monarch butterfly recovery efforts. Additionally, the NPS along with its partners in the National Pollinator Garden Network are calling on teachers to participate in the Million Pollinator Garden Challenge and install pollinator education and awareness as part of their classroom activities this school year. The NPS is also encouraging the public to plant pollinator gardens and register them on the SHARE website to help meet the Million Pollinator Garden challenge. In May of 2016, the NPS will advance pollinator education and conservation through our NPS Centennial BioBlitz, which will provide hands-on opportunities for citizens to participate in pollinator education and inventory events across the nation.

National Resources Conservation Service: USDA NRCS recently launched a targeted effort in two regions/a total of 10 states that will invest \$4 million in fiscal 2016 to help combat the monarch butterfly's decline. NRCS will provide technical and financial assistance to help producers and

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conservation partners plant milkweed and nectar-rich plants along field borders, in buffers along waterways or around wetlands, in pastures and other suitable locations. NRCS also will help producers manage their pastures in ways that increase critical populations of milkweed and nectar plants, all while improving the health of their rangelands. The Environmental Quality Incentives Program (EQIP) and remaining funds from the former Wetlands Reserve Program (WRP) provide funding for this work. Additionally, NRCS is offering enhancements through the Conservation Stewardship Program (CSP) to establish monarch habitat. These enhancements are available nationwide.

NRCS Plant Materials Centers in FL, NM, and NV completed native milkweed seed increase projects in cooperation with The Xerces Society. Seed has been distributed to growers in the hopes of making these regionally adapted milkweed species available in the near future. Milkweed species include: *A. humistrata* in Florida; *A. speciosa*, *A. latifolia*, and *A. asperula* in New Mexico; *A. fascicularis* and *A. speciosa* in Nevada. Plant Materials Centers, working with other NRCS staff and partners, have produced regional milkweed guides for the Southwest, the Great Basin, and the Central States. In addition, NRCS staff working with Xerces have developed regional plant lists, including milkweed and important nectar producing species, for the Midwest and Great Lakes region and the Southern Plains to support NRCS monarch habitat efforts. These documents may be found at:

<http://www.nrcs.usda.gov/wps/portal/nrcs/rpublications/plantmaterials/technical/publications/?ptype=mon>

Iowa Department of Natural Resources (DNR): Habitat Creation: The DNR produced seed for and restored over 1,989 acres to diverse prairie habitat on state-owned lands in 2015. Thanks to grants from MJV, the Prairie Resource Center has developed partnerships, and their own ability, to ensure that all planted mixes include a good proportion and diversity of milkweed seed. The DNR Private Lands program provided \$75,800 in funds and staff expertise/time to establish 516 acres of habitat on private land in a broad corridor along Interstate 35 using NRCS CP42 pollinator mixes. **Planning:** The DNR has taken a lead role in organizing planning efforts within the state, regionally and nationwide. The DNR is a primary partner in the Iowa Monarch Consortium, to bring all major stakeholders within the state together for coordinated monarch conservation efforts. In partnership with the Midwest Association of Fish and Wildlife Agencies, the DNR hosted a regional planning meeting for 14 state wildlife agencies in the central region to facilitate regional cooperative planning. Finally, the DNR has been invited to speak about state wildlife agencies monarch efforts at a Transportation and Pollinators Summit that will be hosted by the White House in December. **Outreach:** The DNR is a partner in the Blank Park Zoo's "Plant.Grow.Fly." program encouraging the establishment of pollinator gardens by Iowans. We hosted two public events in 2015, one focused on butterfly identification and conservation and one on monarch tagging. Staff also presented about monarchs at the Iowa State Fair. **Research:** The DNR is using monarch data collected between 2006-2014 on 376 sites as part of the Multiple Species Inventory and Monitoring project to perform an occupancy analysis using various covariates from large scale GIS variables to on- the-ground habitat metrics (i.e. canopy cover, amount of milkweed).

Minnesota Department of Natural Resources: MNDNR views monarch and pollinator conservation as important to the agency's goal to conserve and enhance Minnesota's natural resources. MNDNR manages millions of acres of land, and achieves benefits to monarchs through habitat protection, management, and restoration efforts, especially extensive native prairie activities. Staff have conducted and contracted a wide variety of surveys to improve our understanding of the distribution, abundance, and conservation status of Minnesota native pollinators.

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The Division of Ecological and Water Resources recently revised Minnesota's Wildlife Action Plan, a tool focusing efforts to conserve the state's at-risk wildlife. It identifies 345 Species in Greatest Conservation Need, including the monarch. Staff participated in planning and convening the October Monarch Conservation Workshop in Iowa, and will be providing leadership in subsequent efforts on a Minnesota Monarch/Pollinator Summit and development of a state conservation plan. The Nongame Wildlife Program includes the state's Project WILD Program, who is field testing activities related to monarch conservation that are being considered for future editions of Project WILD K-12 Curriculum. The Minnesota Biological Survey (MBS) conducts surveys for native bees and rare skippers. MBS plans and hosts annual bee identification workshops with the University of Minnesota and created and maintains the DNR's pollinator website (www.dnr.state.mn.us/pollinators). The Division of Parks and Trails is participating in the national "Parks for Monarchs" campaign, and has established a pilot interpretive program at Lac qui Parle State Park. The Division of Fish and Wildlife led the 2014 effort to create a MNDNR Operational Order on Pollinator Habitat and to develop Pollinator Best Management Practices and Habitat Restoration Guidelines to inform these activities.

Southeastern Association of Fish and Wildlife Agencies: The Southeastern Association of Fish and Wildlife Agencies (SEAFWA) is a recent partner addition to the MJV. As an organization representing 15 state fish and wildlife agencies from Florida to Texas, SEAFWA will bring significant knowledge and insight into the implementation of the North American Monarch Conservation Plan. The agencies have wildlife management expertise, valuable connections in key regions for monarch conservation and will increase the presence of state agencies in the MJV. There are 15 state agencies represented as members of SEAFWA who, respective to their state, are the primary agency responsible for management of fish and wildlife resources. The states in the region include Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. This region provides essential migrating habitat during the spring and fall migrations, and is critical for its role in providing breeding habitat (milkweed) for monarchs each spring. SEAFWA works with their agency partners to achieve goals benefiting fish and wildlife resources, including monarchs and other pollinators. They maintain committees consisting of professionals who explore and analyze a wide range of issues and factors affecting fish and wildlife resources and make recommendations to help mitigate those issues. Additionally, they sponsor cooperative fish and wildlife programs among member states and other entities to address issues of mutual interest and to benefit fish and wildlife resources.

Texas Parks and Wildlife Department: TPWD's Monarch and Native Pollinator Conservation Plan has been completed, including addendums describing complimentary activities being implemented by partner state agency and non-government organizations. TPWD, and Oaks and Prairie Joint Venture, was awarded \$244K by the National Fish and Wildlife Foundation for on-the-ground monarch conservation. 14,750 acres of restoration will occur on private lands through voluntary enrollment in the Grasslands Restoration Incentive Program. 160 acres of restoration will occur on five Wildlife Management Areas to be used as demonstration sites. TPWD has launched a citizen-science based effort that has garnered nearly 1000 observations of milkweeds by Texans around the state. To compliment this, TPWD has published a guide to the identification and distribution of Texas milkweed species. We have completed monarch and pollinator management guidelines for private landowners that are currently in external review. Carter Smith, along with former first lady Laura Bush (Texan by Nature), Dan Ashe (USFWS), and Collin O'Mara (National Wildlife Federation) hosted a joint press conference on

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October 13, at the George W. Bush Presidential Center in Dallas, Texas. These four presenters outlined current and future state monarch conservation efforts, highlighting how Texas activities fit within a larger, tri-national framework.

Back to Natives Restoration: Back to Natives (BTN) has been growing locally native milkweed and educating our community about using locally native milkweed at our volunteer run nursery in Santa Ana. We have 1100 *eriocarpa* and 1500 *fascicularis* seeded. We also have plans to cast seed in our habitat restoration areas. A grant for \$10,000 from the Orange County Community Foundation will help with habitat restoration at Santiago Park Nature Reserve, where we will sow some of our milkweed seed after the rains begin. We have at least 100 *Asclepias* plants dormant at the Nursery right now. We also recently initiated a class at the Nursery, “Propagation of Native Plants”, in which we will teach our students to grow a number of locally native plants, including milkweed. BTN was featured in the recent issue of AAA’s Westways magazine, which has driven more customers to our native plant nursery where they are purchasing many habitat providing plants, including locally native milkweed. We’ve included milkweed in our client’s landscape designs (we design native plant landscapes to raise funds for our habitat restoration and environmental education programs), and we continue to spread the word about using locally native milkweed when we present educational and service learning programs. Our most exciting bit of news is that we’re in the process of accepting a donation of land on which we will create a small wildlife reserve, which will become a sort of “monarch waystation” because we intend to plant quite a bit of *Asclepias* there. We hope that this is the first of many small suburban land donations that will create a series of habitat islands for birds and butterflies throughout Orange County and beyond.

Cibolo Nature Center: The Cibolo Nature Center & Farm continues to support monarch education efforts throughout the state of Texas. This includes intensive “Train the Trainer” programs to encourage others to spread the word, short presentations to garden and naturalist groups, booths with live specimens at festivals and conferences, as well as outreach to school children. Additionally, the Texas Wildlife Association (TWA) has been a terrific partner, enabling our educators to reach thousands of school children through their distance-learning program. In 2015 we are on track to educate over 14,000 individuals. The nature center is currently raising funds for a prairie restoration project that emphasizes milkweed production for monarch habitat, ecological restoration education and seed gleaning. We intend to document every step of the restoration process so that regional landowners can replicate it. Simultaneously, we are in the planning phase to install a “Restoration Agriculture” food system to demonstrate pollinator friendly and financially viable regenerative agriculture practices.

Cincinnati Nature Center: Cincinnati Nature Center’s Milkweed to Monarchs Regional Conservation Initiative has been a huge success. We are a new MJV partner, representing monarch habitat efforts along the monarch migration route’s eastern edge. We have engaged tens of thousands of people and organizations throughout the Greater Cincinnati region in planting native milkweed. Since October, 2014, we distributed over 160,000 packets of native milkweed. These packets helped to spread awareness about the plight of Monarchs and the importance of planting native milkweed. Over 2 million native milkweed seeds have been distributed. Our staff has made educational presentations; provided consultations on effective planting techniques; and cultivated partnerships with more than 120 local businesses as “Merchants for Monarchs”, each providing support including promotion, educational programs and/or milkweed seeds to their customers. Nearly 75 acres of CNC land old field habitat has been cleared of non-native invasive species and planted with native plants supporting monarchs and

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pollinators. *Milkweed to Monarchs* has touched the hearts of thousands of people in our region. Scout troops, churches, garden clubs, homeowners and farmers request seeds. Company presidents and golf course managers ask for our help in planting milkweed on their property, and teachers from every grade incorporated our Teacher Monarch Packet into their lesson plans, planted gardens and sent seeds home with their students by the thousands. In August this year CNC hosted a Pollinator Forum where nearly 100 area professionals and landowners attended to learn about the importance of pollinators, the plight of the Monarch, and what can be done to support all pollinators, including the monarch.

Desert Botanical Garden: The Desert Botanical Garden's monarch conservation mission has three main components. First, we raise public awareness and encourage planting of milkweed through our butterfly and caterpillar exhibits, butterfly walks and gardening classes. Second, we are launching a new program aimed at growing and planting new native milkweeds and collecting millions more native seeds, called the Great Milkweed Grow Out. This also has a public awareness element, and includes the selling of the Butterfly Garden in a Box at our bi-annual plant sale to make the planting of milkweed habitat easy and convenient for our members and visitors. Lastly, we are trying to better understand the interactions between native milkweeds of the Southwest and our local monarchs. For the last year, we have been conducting research on female egg-laying preference and larval survival on four species of milkweed. We will continue and expand this research over the next year.

Journey North: Journey North is an international citizen science project that tracks monarch migration each fall and spring as the butterflies travel to and from Mexico. Participants are based at over 60,000 sites across North America, including formal and informal educational settings. People report sightings from the field, track migration on real-time maps, and help scientists learn more about the critical migratory stage of the monarch's annual cycle. Monarch migration news is published weekly and incorporates sightings and images from the field. Journey North provides an easy entry point to citizen science, with relatively simple protocols, strong online support, and immediate results. Beyond its value to science, the project unites people across North America to celebrate monarchs and their migration.

Green Schools Alliance: Created by schools for schools in 2007, the Green Schools Alliance (GSA) is a coalition that has grown to nearly ten thousand public and private schools in 53 countries representing over seven million students and a billion square feet of school facilities. GSA launched its Pollinator Project, a campaign of the Student Climate & Conservation Corps, to encourage action on the issue and raise awareness through its global, peer-to-peer community. Outreach efforts include: a dedicated campaign page on our website with links and resources; a featured Pollinator Project block in our monthly newsletter; frequent posts to social media; sharing of best-practices by connecting schools with gardens to those who would like one; highlighting The Bella Garden Project, an exemplar member school garden, at the NAAEE National Conference in San Diego; and partnering with the E.L. Furr HS Green Institute and the US Forest Service to replicate and scale their East End Houston Greenbelt Initiative, a habitat restoration and urban garden project. In addition, participants in the GSA's and USFWS' annual Student Climate & Conservation Congress are encouraged to make pollinator gardens part of their Action Plans for projects that they complete when they return to their schools.

Lady Bird Johnson Wildflower Center: The Wildflower Center 279-acre campus is a monarch waystation with 650 native plant species and high concentrations of pollinator plants. Our Insectary raises eggs and caterpillars from the garden, which educates the public about monarchs and other pollinators year-round. The Ecosystem Design group performs landscape-scale native ecosystem

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restoration on and off-site to enhance pollinator habitat. We conduct research with USFWS to increase native milkweed seed ecotype availability. The goal is to enhance production of Texas milkweed by collecting all Texas milkweed species seeds, propagating plants and providing seed to growers. Germplasm from seeds across each's geographical range are collected, conserved, banked and available for future use. Our Nursery Program is growing 6,000 milkweed plants for Austin area schools in partnership with NWF's initiative to increase school monarch butterfly gardens this year, and developing milkweed plant propagation protocols for distribution to growers. Native pollinator plants are propagated year-round to enhance habitat in our botanic garden and for sale. Our education programs engage all levels with pollinator conservation outreach. Our Native Plant Information Network is one of the largest plant education information databases (<https://www.wildflower.org/explore.php>). We provide pollinator/plant education through University of Texas Informal Classes, Landscape for Life, and elementary and pre-school programs. Our family-oriented community outreach education programs feature native pollinator conservation. We train citizen scientists to collect milkweed seed and conserve and grow local milkweed. The training includes presentations, a webinar, obtaining milkweed seed ecotype collection best practices, and pollinator education. We work with Native Plant Society of Texas, Texas Master Naturalists, Master Gardeners, and community based volunteer organizations.

Loudoun Wildlife Conservancy: This was the third year of Loudoun county (VA) monarch program. Our 3 main components are building awareness, restoring habitat, and making connections. This year, however, we added developing a partnership with the Virginia Dept of Transportation. Building awareness - Developed an informed and enthusiastic base of citizens by reaching over 2000 people through speaker programs, workshops, fairs and special events for schools, scouts, 4-H, garden clubs, day care providers. Restoring Habitat - Held plant sales to distribute 5,500 Monarch Watch milkweed plugs and many native nectar plants to the public. Donated 300 milkweed plants to 8 local schools and supported them in creating Monarch Waystations; we have aided 43 schools since 2013. Making Connections - Helped over 100 people in our community raise monarchs found in their gardens, a connection that cannot be broken. Building partnership with VDOT - Briefed VDOT Commissioner and his leaders through a series of 5 meetings on the role VDOT could play in monarch recovery, developed recommendations, engaged leaders at both the central office and in a few key districts, developed preliminary business case on the costs, assumptions, savings for VDOT to implement our recommendations. Outcomes included Commissioner agreeing to implement our recommendations for changing mowing and herbicide application practices and restoring milkweed/native wildflowers to roadsides and medians on Virginia interstates and primary roadways. VDOT will establish large Monarch Waystations/pollinator plots at all 40+ rest areas throughout Virginia over the next 5 years. Two districts have engaged in pilot testing seed mixes for germination and planting methods.

Make Way for Monarchs: Make Way for Monarchs is a milkweed-butterfly recovery alliance of farmers, nurserymen, non-profits, universities, corporate partners, and faith-based communities and is co-facilitated by Dr. Gary Nabhan and Ina Warren. Among our primary goals: (1) to promote respectful dialogues and engagement with government agency officials, industry and farmer organization leaders including not only scientists and farmers, but ethicists, educators, faith-based leaders and sustainable agriculture leaders; (2) provide training workshops for farmers, ranchers, highway landscape designers and roadside maintenance crews on how to minimize harm to milkweeds/monarchs; (3) engage the general public through social media with imaginative messaging and networking. Our most recent

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publication is a full-color 20 page booklet entitled: “Monarch Recovery from a Milkweed’s Point of View: Milkweed Seed Supply Chains for Monarch Habitat Restoration. Available here:

MakeWayforMonarchs.org. Our Board of Advisors is an impressive group of scientists, researchers, writers, environmental educators and farmers.

Missouri Prairie Foundation (MPF) and its Grow Native! Program: A 49-year-old, volunteer-governed organization, MPF is the only organization in Missouri whose land conservation efforts are devoted exclusively to native grasslands. MPF’s mission is to protect and restore prairie and other native grassland communities through acquisition, management, education, and research. With the adoption of its Grow Native! program in 2012, MPF also promotes the use of native plants for wildlife and pollinator habitat, and many other applications in the built environment. The Grow Native! program’s service area is the lower Midwest, a key area for monarch habitat. Within this area, the program helps market the native plant products and services of its professional members such as nursery owners, native seed producers, landscape architects and land care professionals. It also drives demand for native plants by educating consumers of their benefits. In addition to the Grow Native! program, all of MPF’s conservation activities benefit monarch butterflies. MPF has acquired and stewards more than 3,000 acres of original and some reconstructed prairie in 20 tracts of land, which provides habitat for at least 11 species of *Asclepias* and dozens of native plants that are nectar sources for monarchs.

Monarch Alert: We collaborate on monitoring O.e. prevalence in diapaused and winter breeding monarchs across Coastal CA and use data from citizen science and native milkweeds to establish whether there is a year round breeding population of monarchs in Southern CA. We collaboratively sample monarchs for O.e. at 4-5 overwintering sites from Central to Southern CA. These samples provide a measure of the parasite load in the migratory (diapause) population. We provide tags to interested garden enthusiasts with milkweed in exchange for data on backyard monarchs, and encourage them to provide O.e. samples from their monarchs to Monarch Health. They are a measure of the parasite load in the non-diapause (breeding) population. We expect these data will allow us to test whether overwintering and winter breeding monarchs differ in O.e. prevalence, and whether winter and summer breeding monarchs differ in O.e. Anecdotal reports suggest a year round breeding phenomenon is occurring in Southern California. We are close to submitting a manuscript showing summer, winter, and year round breeding in several areas of Coastal CA. It doesn’t address O.e. prevalence. We’ve streamlined our tag distribution and developed an on-line data form hoping to collect more data. We have identified four sites in Malibu, CA., with large populations of native *A. fascicularis*. These sites are being monitored this winter for evidence of winter breeding. The results from this work should help us become better informed and develop more robust recommendations regarding planting/managing native and non-native *Asclepias* in the winter range of Western monarchs.

The Monarch Butterfly Fund: The Monarch Butterfly Fund (MBF) mission is to foster the conservation of the monarch butterfly and their migration through habitat restoration, research, monitoring, education and support for sustainable community development in and near the overwintering grounds in Mexico. We do this with a vision towards healthy ecosystems and sustainable communities that preserve North American Monarch butterflies and their spectacular migration in perpetuity. MBF focuses on forest restoration in the buffer zone of the Monarch Butterfly Biosphere Reserve. We have encouraged and established partnerships with local and international organizations to support comprehensive, science-based reforestation and projects that engage local communities. Trees for

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reforestation are carefully selected and monitored to track their survival rates. We have also participated in experiments applying organic fertilizer and planting trees at different altitudes to help us optimize planting. In addition, the Monarch Butterfly Fund coordinates environmental education and conservation workshops in the overwintering region and supports sustainable development projects such as the construction of fuel-efficient stoves and cisterns to capture rain water.

Monarch Health: Monarch Health is a citizen science program based at the University of Georgia and led by Dr. Sonia Altizer. We work with >150 volunteers across North America each year to track patterns in monarch disease caused by the protozoan parasite *Ophryocystis elektroscirrha* (OE). Citizen science data from Monarch Health allow us to observe changes in OE infection over time and geography – crucial information to monitor this natural enemy of monarch butterflies. We analyze these data to understand how monarch migration affects OE infection and to explore the drivers of disease in monarch populations. Citizen scientists helped to show how long-distance migration reduces disease in monarchs each fall, as reported in a scientific paper in 2011. More recently, citizen scientists demonstrated that non-migratory monarchs that breed year-round in areas with exotic milkweeds are at high risk of becoming infected. Monarch Health scientists and volunteers work together to both understand the role of infectious disease in monarch ecology and to develop recommendations for providing habitat that supports healthy monarchs.

Monarch Lab (University of Minnesota): The Monarch Lab is devoted to education, outreach, and research focused on monarch butterflies. In 2015, the Monarch Lab included six graduate students conducting monarch research, ten undergraduate students who assist in research and outreach projects or conduct their own independent research, and three staff members who focus their efforts on education and outreach. In summer 2015 the Monarch Lab hosted five workshops for K-12 teachers (reaching over 140 teachers) on monarch biology, ecology, conservation, schoolyard science, and citizen science. Citizen science topics focused on birds, dragonflies, phenology and other pollinators, in addition to monarchs. Each December the Monarch Lab hosts the Ecology Fair, a platform for teachers and their students to bring their own research projects to showcase. The students are interviewed by university scientists, have a chance to learn from their peers, and the opportunity to attend interactive breakout sessions with an ecology theme. The Monarch Lab also runs the Monarch Larva Monitoring Project, a citizen science project which just completed its 19th year, engages hundreds of adults and children in monarch monitoring, and has resulted in 19 peer-reviewed publications.

Monarch Watch: Grants: In 2015, Monarch Watch was granted funding to supply milkweeds to 300 schools and non-profits through NRDC, grow 200,000 milkweed plugs for restoration projects and to add our tagging data to the USGS database known as BISON. We were funded by MJV to initiate milkweed restoration in with Tribal Nations in Oklahoma and by NFWF to restore 350 acres of milkweed/pollinator habitat on tribal lands in eastern Oklahoma in 2016-2017. Programs: We added over 2500 Monarch Waystations to the registry. We issued over 230,000 tags to taggers. This is the highest number of requests for tags since 2003. Preliminary analysis of data returned to date suggest that at least twice as many monarchs were tagged in 2015 as in 2014 (46K). Connections: We worked with four nurseries to distribute over 100,000 milkweed plugs in 2015, nationwide. Our monarch diet is now being used in 4 laboratories to produce monarchs for research on the genetic basis for behavior and relationships between monarchs, plants, pathogens, and mycorrhizal fungi. We are continuing to develop and test a model that both explains and predicts monarch numbers from year to year.

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National Recreation and Park Association: NRPA is a national non-profit organization of 50,000 professional and citizen members from public parks across the nation. As part of NRPA's focus on conservation, the Association has worked to promote and coordinate monarch conservation activities in local, urban, regional, and state parks. Through articles in its national publication, Parks and Recreation Magazine; education sessions at its national conference; webinars; an online resources guide; social media; blog posts, and other social and print media, NRPA works to create an interconnected network of public parks for monarchs and other pollinators. NRPA recently launched a nationwide campaign, Parks for Monarchs, and hopes to engage 1,000 public park agencies over the next three years in monarch conservation activities. NRPA especially promotes the involvement of children and youth in monarch conservation in parks, the engagement of the public in citizen science projects, and the planting of milkweed and establishment of Waystations in suitable habitat in parks. For more information, visit www.nrpa.org/parks4monarchs

Native Plant Society of Texas: In August 2015 the Native Plant Society of Texas entered into a cooperative agreement with U.S. Fish & Wildlife Service and the Texas DOT to build Monarch Waystations at rest stops along Interstate Highway 35 in Texas. The Society will start work in 2016 on four waystations which will increase awareness of monarchs and help the public learn to identify and conserve the native plants that they depend on for survival. These gardens will also provide high quality monarch habitat along the migratory route and may inspire others to create Monarch Waystations. The Society is also making plans to expand its Bring Back the Monarch to Texas program. In 2015, this program awarded 56 grants totaling \$11,000 to schools and community groups to build or maintain Monarch Waystations. In addition members gave presentations and visited many of the groups that are building the sites, reaching an estimated 3500 children and adults. In 2016 we want to train more of our members to deliver these talks. The Society is also continuing with efforts to aid in milkweed conservation and propagation, including seed collection efforts and propagation of live plants.

National Wildlife Federation: NWF joined the MJV Steering Committee; signed an MOU with the USFWS to Save the Monarch and co-coordinated tremendous media response; passed an affiliate resolution addressing monarch habitat decline by continuing to create habitat through certified programs –that have 200,000 habitats estimated at 1.5 million acres. NWF distributed MJV partner brochures to over 40,000 people who pledged to plant milkweed in the Butterfly Heroes Campaign, including 2100 schools and community groups. NWF was a founder of the National Pollinator Garden Network which launched the Million Pollinator Garden Challenge. In the Central Flyway NWF regional offices are coordinating a Plan for Monarch Butterfly Conservation aimed to build capacity within select flyway cities and towns to take action on behalf of monarchs. These efforts include: 1) Launching a Mayor's Monarch pledge; successfully recruiting over 30 cities. 2) Convening state summits on monarch recovery in Missouri, Nebraska and Arkansas. NWF worked with TPWD to develop a statewide monarch recovery plan. 3) Partnering with the MAFWA and AFWA, convened a regional monarch summit for the central flyway and are working on a spring event bringing together those who have worked on state summits/plans to develop a regional monarch conservation plan. 4) Working with USFWS and White House to engage state highway DOTs and U.S. DOT to identify opportunities along the I-35 corridor supporting the federal intent to designate a Monarch Highway along the central flyway. 5) In the Eastern Flyway NWF affiliates have launched pollinator efforts to create a Butterfly Highway; are pursuing partnerships with utility companies; are proposing pollinator friendly legislation at the state level and supported long term monarch monitoring efforts in NJ. 6) NWF's Northeast regional office, has

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partnered to engage students in native plant restoration to help restore pollinator habitat and biodiversity in Jamacia Bay Refuge.

North American Butterfly Association: NABA works to conserve all butterflies, including monarchs. Through efforts at the national level and through its chapters at the local level, NABA brings ever-growing numbers of people into the world of butterflies, to create a constituency that cares about their conservation. In addition to these general efforts, NABA's Program for Butterfly Gardens and Habitats supports the creation of new habitats for monarchs and other butterflies, focusing on the use of native plants, including milkweeds. At the National Butterfly Center, owned and operated by NABA in Mission, Texas, 100 acres of land on the Mexican border are being converted from fallow fields to critical habitat for butterflies, including monarchs. NABA recently was awarded a \$200,000 grant by the National Fish and Wildlife Foundation to increase monarch habitat in the Lower Rio Grande Valley.

Pacific Grove Museum of Natural History: The PG Museum is supporting monarch conservation in a few different ways: 1) providing monarch school education programs at the Museum and the Pacific Grove Monarch Sanctuary 2) providing docents for the Monarch Sanctuary 3) handing out free seeds to residents of California 4) lead Xerces Society Western Monarch Thanksgiving Counts for Monterey County 5) Science Saturday- Monarchs (free family science event) and 6) developing pollinator gardens and education programs for 11 local elementary schools. Seeds program: For those near monarch overwintering sites, we have been supplying the seeds of native nectar plants to provide food sources during the overwintering season. For those that are more than 10 miles away from overwintering sites, we have been supplying milkweed seed packets and seed packets that are a mix of milkweed and nectar flower seeds. This is growing in large part because the increased partnership with the Master Gardener community and their outreach efforts. Pilot Program: During the 2014-15 overwintering season, the PG Museum took on a monarch tagging and parasite sampling project in partnership with Monarch Alert and Monarch Health Lab that was a success, but we didn't have funding to continue the program for the 2015-16 year. We are hopeful that in the next few years we will be able to continue this program to benefit resource managers and the larger monarch research community.

Pheasants Forever and Quail Forever: Pheasants Forever, Inc. and Quail Forever are nonprofit conservation groups with a mission statement that "is dedicated to the conservation of pheasants, quail and other wildlife through habitat improvements, public awareness, education and land management policies and programs". Through our structure of local chapters, we have grown since 1982 to 140,000+ members in 750+ chapters across the country. On an annual basis, our team of 130 Farm Bill Wildlife Biologists that are co-located in local USDA service centers work on 31,000+ individual landowner contacts and impact over 1 million acres by helping landowners enroll in USDA and state conservation programs, design high quality seeding mixtures and develop conservation plans. As an organization, we spent \$82 million on 1.4 million acres of habitat projects to deliver our mission last year. Because high quality pollinator habitat is so closely aligned with high quality wildlife habitat, the organization adopted a strategic initiative in 2015 to focus on the pollinator message and deliver high quality pollinator habitat throughout all aspects of the organization. Some of the impactful ways that PF can help deliver high quality pollinator habitat include: access to habitat equipment, the design of seeding mixtures, educational materials, youth pollinator habitat programs, access to pollinator seeding mixtures, incentive payments for habitat projects, development of innovative pollinator programs, the design and implantation of USDA conservation programs, etc. In 2015, PF launched the *Honey Bee &*

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Monarch Butterfly Partnership with a wide range of partners to establish high quality, high diversity pollinator habitat projects as a pilot program in ND and SD. This pilot program was so successful that it is already being expanded to 6 states in 2016 and has demonstrated strong landowner interest with innovative support from beekeepers, the design of the seeding mixtures and funding support.

Pollinator Partnership: In 2015 the Pollinator Partnership with support from The Kelvin and Eleanor Smith Foundation launched Monarch Wings Across Ohio (MWAO). In a few short months many other leading Northeast Ohio organizations joined as partners. During the inaugural spring planting season 7,000 milkweed and nectar plugs were planted across 13 monarch habitat research plots across the target monarch habitat site-types; urban areas, public gardens, farms and corporate lands including utility rights-of-way. An additional 2000 plugs were installed during fall planting to bring the total of monarch research plots up to 16. Data is being collected off of each of the plots to develop Ohio-specific monarch habitat planting manuals with plant lists for urban areas, farms, public gardens and corporate lands. Each of the MWAO partners has made significant contributions toward site preparation, providing volunteers, arranging for water, and site maintenance. MWAO is off to an excellent start and we are looking forward to collecting data from the plots in the coming field seasons. In addition, P2 awarded the first Monarch Advocate Award for corporations at the U.S. Business Council for Sustainable Development at Yale University in July. P2 is also involved in the Texas Monarch Plan and will continue this throughout the next year. In addition, this year we helped form the National Pollinator Garden Network which issued the Million Pollinator Garden Challenge introduced by First Lady Michelle Obama at the White House, and we reinstated the NAPPC Monarch Task Force under the leadership of Wendy Caldwell to support all activities of MJV.

Sand County Foundation: Sand County Foundation is a pending new MJV partner and a non-profit conservation organization dedicated to working with private landowners across North America to advance ethical and scientifically sound land management practices that benefit the ecological landscape. We support the recovery of monarchs and associate species by managers of farmland and private rights-of-way (electric transmission, gas pipelines, and rail corridors) within the eastern North American monarch migration region. Recent activities include: Funding to the Rainwater Basin Joint Venture to introduce milkweed on restored wetlands within cropped fields in Nebraska; Publication of stories about monarchs in the Wisconsin Farm Bureau and National Cattlemen Beef Association newsletters, written by farmers and ranchers who have received our Leopold Conservation Award; A meeting in April 2015 of eight electric, gas, and rail rights-of-way companies to learn about monarch butterflies and Integrated Vegetation Management (IVM); Articles about monarchs and IVM to soon be published in Edison Electric Institute and Utility Arborist Association newsletters; One-on-one meetings with several Midwestern utilities to encourage adoption of IVM and to offer third-party coordination and validation of habitat enhancement in collaboration with private landowners and rights-of-way easement holders.

Southwest Monarch Study: The Southwest Monarch Study is a citizen science project dedicated to monitoring and tagging *Danaus plexippus* in the Southwestern United States of Arizona, New Mexico, Utah, Nevada and the deserts of Southern California. Our mission is to: Identify and describe the migration flyways of monarch butterflies by tagging monarchs each fall. We encourage tagging monarchs in winter if monarchs are present and monitoring of any breeding activity. We monitor monarch breeding habitats and advocate for monarch conservation including native *Asclepias* seed

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collection and distribution. We offer educational programs on the monarch life-cycle in the Southwest and tagging/monitoring training. So far in 2015 we've conducted 48 workshops and presentations, as well as covering monarch awareness tables at 19 events. In addition we've participated in numerous planning meetings with NGOs and government agencies. We are proud to present our first published paper, "Status of *Danaus plexippus* in Arizona" available on our website. Lastly, we provide a meaningful research project for citizen scientists of all ages. Everyone is welcome with age related opportunities throughout the year.

Tallgrass Prairie Center: The Tallgrass Prairie Center restores native vegetation for the benefit of society and the environment. Our Natural Selections program has released 36 species of native nectar plants (2 milkweeds) for commercial seed producers. We are currently developing three new species of milkweed and a prime, late-summer nectar species, meadow blazingstar, for eventual release. We share hard-won knowledge about agronomic production methods for the benefit of tallgrass prairie restorations across the region. The Integrated Roadside Vegetation Management program applies for federal funding to purchase about 1500 acres worth of native, source-identified seed per year to Iowa counties each year. The seed mixes include generous helpings of swamp and butterfly milkweed, plus grasses and dozens of species of nectar plants. We also encourage county governments to develop an Integrated Vegetation Management plan for their roadways. Two new counties have "joined the club" lately. The Prairie on Farms project is extending habitat to prairie strips within crop fields. We have installed 12 acres of high quality prairie strips on working farms so far this year and have several more sites lined up for next year. Workshops, how-to manuals and on-line information are available for landowners, operators and conservation professionals.

Three Rivers Park District: Three Rivers Park District has been actively managing native habitats, especially our 2000 acres of prairies for a wide variety of wildlife, including invertebrates for over 40 years. We regularly seed our prairies and woodlands with up to 6 species of milkweed and numerous nectar plants. In 2015 we spread 250 pounds of forb seed on our existing prairies, of which, 6 pounds were milkweed species and 27 pounds were blazing stars. The District is increasing its prairies. We have 3 new initiatives totaling 500 acres with an additional 400 acres planned for the future. We are modifying our prescribed burn plans to be more insect friendly by adjusting burn locations, intervals between burns, and unit size. The District has also been involved in using monarchs in our environmental education programs for over 30 years. Some of the original monarch tags recovered from Mexico were from Lowry Nature Center. All of our Nature Centers are still involved with monarch tagging through Monarch Watch at Univ. of Kansas. They are also participating in the Monarch Larva Monitoring Project through the Monarch Lab at the Univ. of Minnesota.

Wild Ones: Wild Ones has put together a power point presentation that is shared with community groups, schools, the public and others to promote monarch education and awareness. Our Wild for Monarchs program has distributed thousands of milkweed seeds and plants at festivals, farmers markets, presentations, libraries, nurseries, schools, churches, and clubs. Wild Ones chapters throughout the country have partnered with other like-minded organizations to promote monarch waystations, provide bilingual workshops on monarchs, and have also encouraged law makers including the President and Governors to plant milkweed and other native plants to help monarchs. One of our chapters is involved in rehabilitating a 9½ acre abandoned landfill with native flowering forbs intending to recapture some vital habitat for pollinators in general and monarchs in particular. This year Wild

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Wild Ones promoted a Citizen Science Monitoring project to promote monarch butterfly conservation. For more information go to www.wildones.org/citizen-science. Our chapter members who attended our annual conference were trained how to be citizen scientists. Wild Ones offers grants through our Seeds for Education (SFE) program to non-profit organizations that are planning to develop an outdoor learning center using native plants. This year we had 40 applications from across the country. We also continue to publish a regular column in our Journal called Monarch Matters, as well as posting articles on our website, blog and twitter of monarch events and happenings.

The Xerces Society for Invertebrate Conservation

The Xerces Society has the world's largest pollinator conservation team, with 7 full time employees currently working on monarch conservation. Efforts include habitat restoration on farms throughout the country, national development of milkweed production best practices, restoration of overwintering sites in California, conservation and management of critical habitat across central and western U.S., and engagement of citizens in monarch research and protection. We partner or contract with university researchers, NGOs, and federal agencies (such as the Natural Resources Conservation Service, U.S. Geological Survey, U.S. Fish and Wildlife Service, U.S. Forest Service, Bureau of Land Management, and Federal Highway Administration) on monarch conservation and recovery projects. Executive Director Scott Hoffman Black co-chairs the Monarch Joint Venture, is an ex officio member of the Federal Monarch Butterfly High Level Working Group, and is a member of the USGS Monarch Science Partnership. Mace Vaughan, Pollinator Program Co-Director and a partner biologist with the NRCS, is working with the NRCS to develop their monarch conservation strategy. Sarina Jepsen, Endangered Species Program Director, serves on the Keystone Monarch Collaborative steering committee and is working with the USFWS to develop a monarch habitat suitability model that will guide management and restoration in the western U.S.

Other projects:

Monarch Conservation Monitoring Team: This multi-partner team is working through their institutions and the Monarch Joint Venture (MJV) to design and implement an integrated monitoring and research strategy. The purpose of the strategy is to document the effectiveness of efforts to conserve North American monarchs and identify alternative explanations if population increases fail to match expectations. Current objectives of the team are to 1) develop a North American sampling scheme that provides a spatially-balanced list of areas in which to focus monitoring and/or research; 2) finish a comprehensive protocol that incorporates existing methods and programs to guide monitoring of attributes related to monarch food plants, population ecology and phenology, management and analysis of these data, and how the results should be disseminated; 3) advise on research questions that can be integrated within the monitoring sampling design to determine the population impacts of non-food resources; 4) provide awareness and enlist participation of other MJV members into design and implementation of the this monitoring strategy.

Monarch Urban Conservation Project: The Field Museum is partnering with the USFWS Landscape Conservation Cooperatives and the Ecological Places in Cities (EPIC) Network to create an urban conservation plan for the monarch butterfly. Preliminary research from U.S. Geological Survey analysis suggests stabilizing monarch populations will require all land types – including urban areas. Our project seeks to address the following questions: what contribution can urban areas make to monarch

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conservation; where to focus this work to achieve the best ecological and social results; and how to best engage various urban sectors and residents in this project? The project has four steps: 1) develop an urban monarch conservation framework to help guide efforts across the flyway; 2) develop urban monarch landscape conservation designs (LCDs) for Chicago, Minneapolis/St. Paul, Kansas City, and Austin metropolitan areas; 3) implement and evaluate on-the-ground projects referencing the prototype LCDs; and 4) hold a workshop with a mid-continent migratory pathway focus to integrate individual LCDs into a cross-regional approach. In the end, we aim to describe the desired types, amounts, and distribution of monarch/pollinator habitat opportunities in urban settings across the eastern flyway.

Western Monarch Habitat Suitability Modeling effort: Throughout the summer and fall of 2015, the USFWS Pacific Region in partnership with the Xerces Society, led efforts to collect high resolution milkweed and monarch occurrence data across the eleven states west of the Rocky Mountains. Using MaxEnt software, a coarse-scale habitat model and suitability index will be created. Data collected in 2015 and high resolution pre-2015 datasets, along with key environmental variables the species depends on, will be used to train and validate this model. Modeling results will highlight key western monarch migration and breeding areas, thus allowing various agencies and organizations the ability to better prioritize monarch conservation efforts. If time and sufficient data allow, mid-scale or fine-scale models will be created for some regions, thus providing higher resolution landscape information for refining survey and restoration efforts. An emphasis will be placed on making all resulting data easy to discover and access online. Data layers resulting from the analysis will be accessible through an online geodata portal, along with a report detailing the project and findings. The initial modeling results will be available Spring of 2016.

Appendix 3

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.



Photo: Wendy Caldwell

References

Monarch Joint Venture Funded Projects Page: <http://www.monarchjointventure.org/our-work/mjv-funded-projects/>

Monarch Joint Venture Resources Page: <http://monarchjointventure.org/resources/publications/>

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Photo: Wendy Caldwell

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Contact Information

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

Email (preferred): 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

