



MONARCH WINGS ACROSS OHIO

Guide to *Monarch Habitat* on **RIGHTS-OF-WAY**



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Introduction

Monarchs used to number in the billions, but over the course of the last 20 years, their populations have decreased by nearly 90%. This is largely due to habitat loss, and a loss of milkweed, the host plant for their larva. To help monarchs recover, millions of native plants, especially milkweed, will need to be planted. With generous support from The Kelvin and Eleanor Smith Foundation and The J.M. Smucker Company, the Pollinator Partnership (P2) joined with a number of Northeast Ohio institutions to form Monarch Wings Across Ohio (MWAO). The goal of this exciting project was to find out how best to create new habitat for this iconic but imperiled butterfly.

Through the leadership of MWAO's partner organizations monarch habitat research plots were installed on 18 sites in four different types of land: farm, gardens, rights-of-way and corporate land. Over the course of three years, P2 scientists observed and analyzed how monarchs used these sites to gain an understanding of how best to create much needed new habitat on these land types. The guide you are reading is the culmination of these efforts. In it you will find a list of essential best management practices (BMP) that will help transform your right-of-way (ROW) into monarch habitat, while reducing maintenance costs and helping you engage with the public.

Unlike many of the environmental issues we are faced with on a daily basis, you can have a direct, positive impact on monarchs by creating habitat. You will know you are successful once you start seeing the caterpillars eating the milkweed leaves and the adult butterflies feeding on nectar from the wildflowers. Not only will you have helped the monarchs, you will have helped bees, birds, and other wildlife of Ohio.

Benefits of Managing for Monarchs

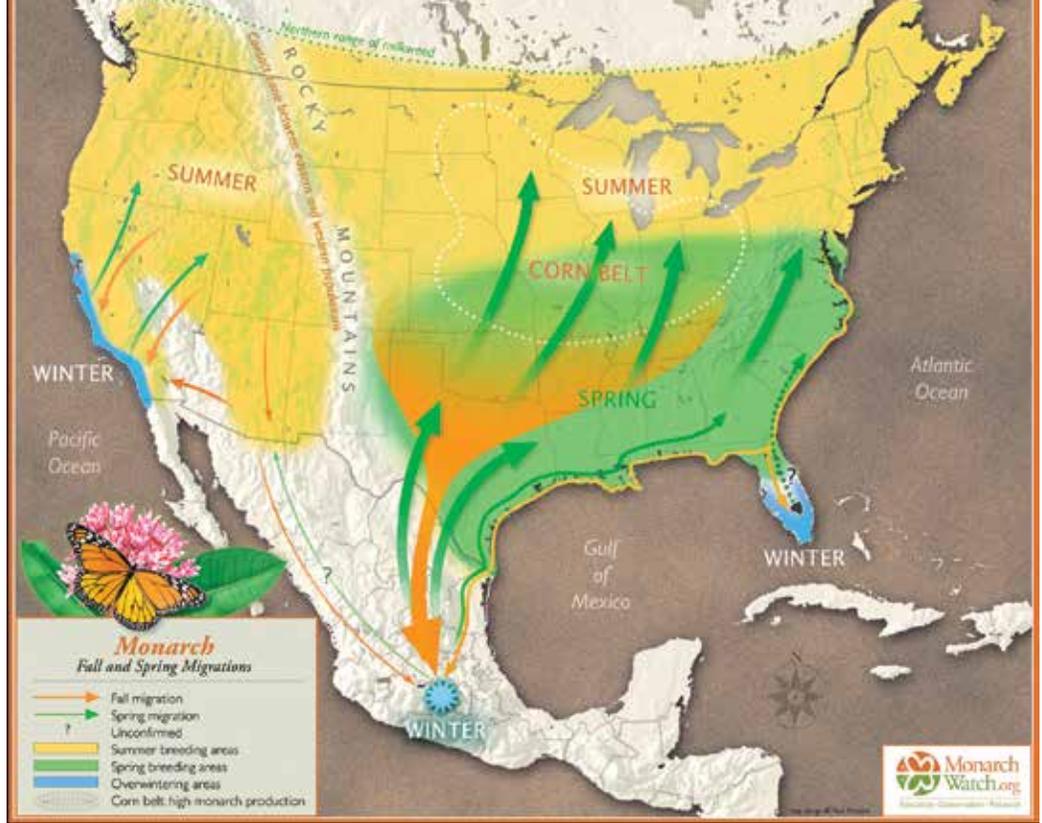
Fostering monarch habitat on a ROW entails decreasing actions like mowing and herbicide spraying, thus reducing costs. In addition to these financial benefits, the promotion of native flowers and grasses improves water filtration, prevents erosion, and reduces pollution runoff into waterways. Monarch habitat also provides much needed floral resources for other pollinators as well, supporting local farms and agriculture. By applying the following BMPs, ROW agencies can help not only monarchs and their bottom line, but also engage local communities and increase biodiversity in their jurisdiction.



Photo: Amber Barnes

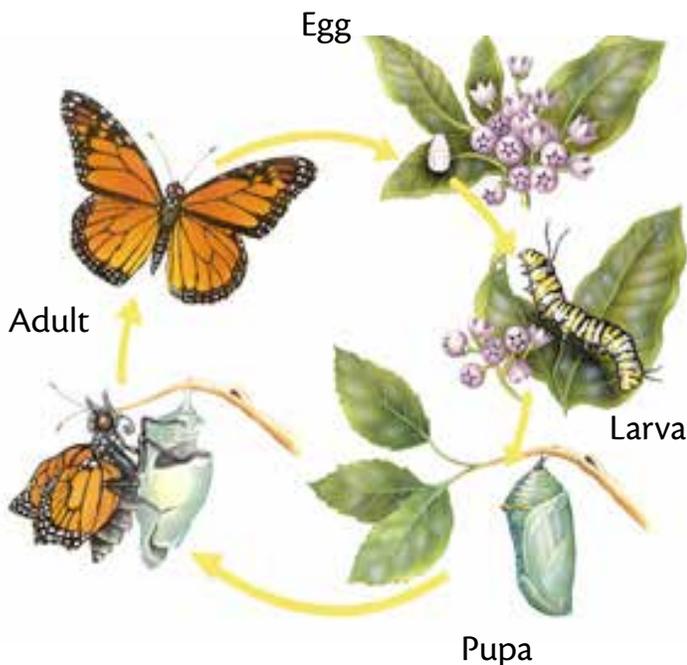
Monarch Habitat

Monarchs have a few basic habitat requirements; milkweed leaves for caterpillars and nectar and water for butterflies. Monarch habitat can take the form of a designed garden with native perennials, or it can take the form of a naturalized meadow that includes native grasses as well as flowers. Whether garden or meadow, providing milkweed is essential, because it is the only food monarch caterpillars can eat. Once the caterpillars have become butterflies, they need the nectar of many different wildflowers, blooming during the spring, summer, and fall to fuel their spectacular migration across the North American continent.



Monarch Life Cycle

A monarch egg is laid on a milkweed leaf. The egg hatches into a caterpillar within 3 to 6 days. The caterpillar feeds and grows, eating only milkweed leaves, over a 2-week period. Once fully grown, the caterpillar forms a chrysalis and, after about 10 days, emerges as an adult and begins feeding on nectar.



Monarch Migration

The monarch is probably the most recognizable butterfly in the United States, yet this beautiful creature is experiencing massive declines. The number of monarchs making the annual migration has plummeted; in the 1990s, close to 700 million monarchs made the journey each fall, now this population has experienced a decline of nearly 90%. This alarming decline is due in large part to the loss of milkweed, on which monarchs lay their eggs, and other native plants that provide nectar to fuel their migration. According to Monarch Watch (<https://www.monarchwatch.org/>), approximately 2.2 million acres of milkweed habitat is lost each year in the United States due to land conversion and agricultural pesticide use.

There are two populations of monarchs, one located east of the Rocky Mountains and the other located west. This guide will focus on the eastern monarch population, which includes Ohio. The eastern monarch migration starts in March as the butterflies overwintering in Mexico start traveling north. Two, three, and sometimes even four generations are produced as they move from Texas into southern Canada. It is the great grandchildren, or great-great grandchildren of the overwintering monarchs that we see in Ohio.

In mid-August, the last generation of the year begins migrating south on an epic journey of over 3,000 miles to central Mexico, thus beginning the migratory generation. Summer generations typically live for two to six weeks as adults; however, adults in the migratory generation can live for up to nine months! As monarchs from the eastern U.S. and southern Canada migrate toward Mexico, they need areas of refuge (high quality nectar sources and shelter from harsh weather) along the way, making Ohio an essential part of the monarch migration.

Creating Monarch Habitat on Rights-of-Way

Rights-of-way, whether roadside or utility, provide a great opportunity to create habitat for monarchs and other wildlife. This can be done not only while maintaining safety as a top priority, but also while reducing costs associated with ROW management. These six best management practices (BMPs) will help guide your actions to creating monarch habitat.

BMP 1: MAINTAIN EXISTING MONARCH HABITAT

BMP 2: REDUCE MOWING

BMP 3: PRACTICE INTEGRATED VEGETATION MANAGEMENT (IVM)

BMP 4: USE NATIVE PLANTS IN ROW DESIGN AND RE-VEGETATION

BMP 5: TRAINING YOUR STAFF AND CONTRACTORS

BMP 6: RAISE PUBLIC AWARENESS



Photo: Ohio Department of Transportation (ODOT)

1 BMP: MAINTAIN EXISTING MONARCH HABITAT

Oftentimes, ROW pass through sensitive, rare or remnant habitats composed of native vegetation, such as remnant tallgrass prairie. These sites host more biodiversity than sites with non-native grasses and are important parts of the conservation landscape. To protect these sites, it is critical to know their exact locations, as well as their vegetation composition and which vegetation treatments are used.

To effectively steward these important sites, make detailed vegetation inventories. Integrate this data with GPS (global positioning system) and GIS (geographic information system) to create high resolution, dynamic spatial data.

Once the locations of these sites are known and vegetation inventories are conducted, site-specific management plans can be created. The vegetation treatment methods, the timing of treatments and the effects on vegetation composition should all be recorded and integrated into GIS records. With this information, not only will you be able to effectively protect the habitats when planning maintenance activities, but analysis of this data will enable you to monitor the effects of your management over time as well as associated costs.

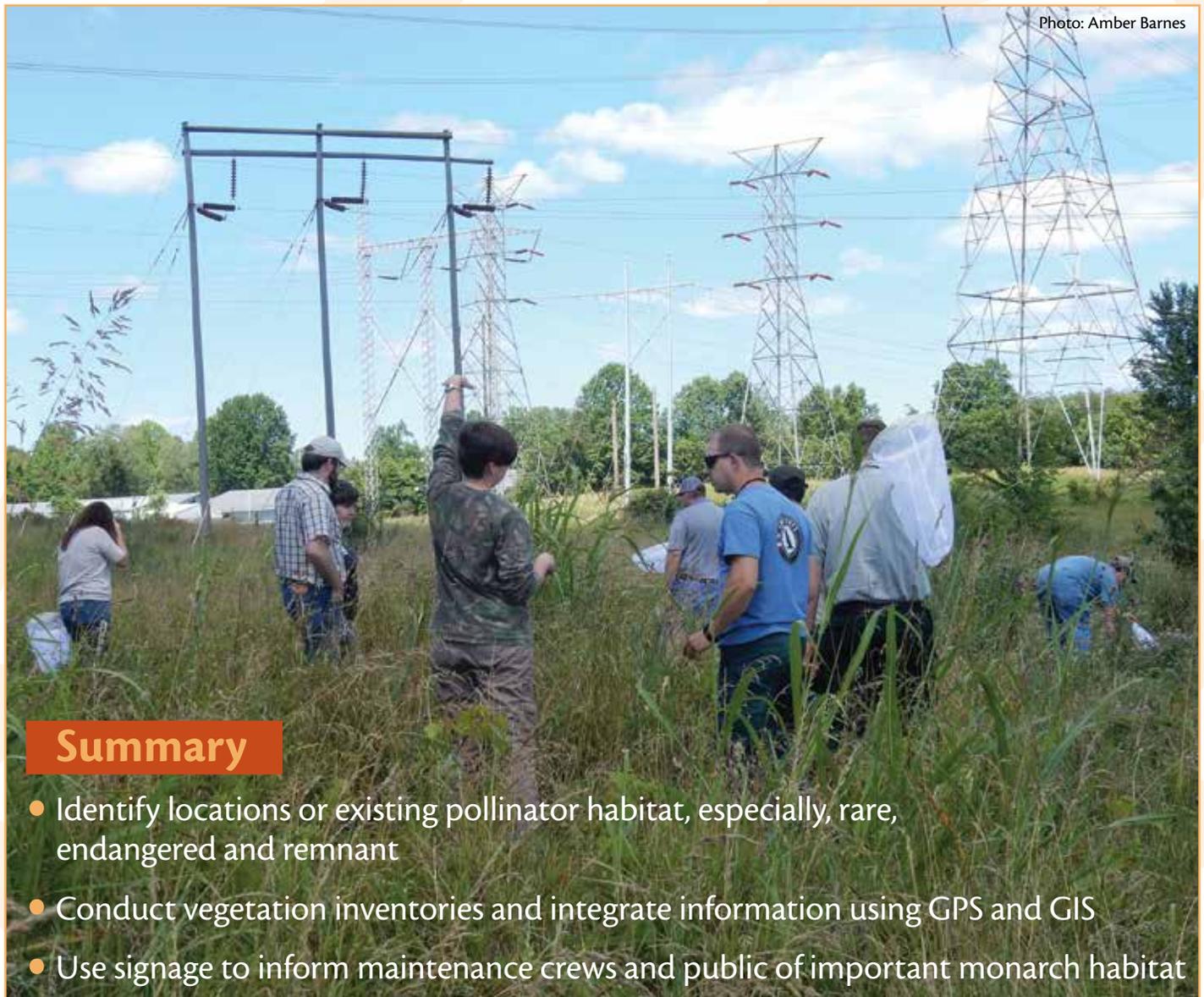


Photo: Amber Barnes

Summary

- Identify locations or existing pollinator habitat, especially, rare, endangered and remnant
- Conduct vegetation inventories and integrate information using GPS and GIS
- Use signage to inform maintenance crews and public of important monarch habitat

2 BMP: REDUCE MOWING

Reducing and adjusting mowing practices is perhaps the single most important change ROW managers can make to benefit monarchs and other pollinators. Mowing less often also reduces maintenance costs without impacting safety.

Mowing eliminates the flowers and shelter that pollinators need, and the impacts on habitat are more severe with increased frequency. Mowing kills butterfly eggs and caterpillars on the vegetation, and bumblebee and bird nests are also at risk from mowing. Fortunately, adjusting the timing and the frequency of mowing regimes can minimize these impacts.

The management requirements of roadside ROW and utility ROW are different, yet in both ROW types, reducing mowing offers benefits. In rights-of-way, reducing mowing and increasing the use of selective, targeted herbicide treatments is the best method to encourage low-growing, desirable native plants. Not only is this open, early-successional plant community excellent monarch habitat, it also reduces the establishment of tall-growing, undesirable tree and shrub species which could interfere with transmission lines along utility ROW.

On roadsides, maintaining the clear zone adjacent to the road is a top safety priority. Beyond the clear zone, however, reducing mowing is a simple and effective way of increasing monarch habitat, beautifying roadsides, and reducing maintenance costs. Along roads bordered by large open areas, such as agricultural fields, maintaining a vegetated buffer of grass, flowers, and shrubs can act as a snow shield and prevent drifting snow and ice from accumulating on the road surface, thus increasing safety and reducing clearing costs.

When making the choice to mow and how often, studies show that less is better, but annual mowing (once a year) is better than no mowing. Mowing in late autumn, after flowers have bloomed and when pollinators are not flying, may have the least negative impact on pollinators. Simple changes like adjusting the height of the blades and the speed of mowing can also help monarchs and other pollinators. Conduct mowing trials and consult with local experts to determine which mowing frequency is best suited to the ROW ecosystem in question. This could be as much as twice a year or as little as once every three years.



Photo: Jake Tobin Garrett

Summary

In all ROW, consider the frequency, timing, and techniques of mowing to benefit pollinators:

- Mow to maintain the clear zone
- Reduce or eliminate routine mowing beyond the clear zone
- Mow once or twice a year
- Mow in late autumn, after monarchs have passed Ohio on their southbound migration
- Always leave an un-mowed patch to serve as refuge
- Mow at a height of 10 inches or more, to allow plants to recover more quickly and to provide more cover for wildlife
- If mowing during spring, summer and early autumn, mow during hot, sunny days when pollinators are more active and able to escape
- Use a flushing bar to help adult pollinators escape the mower blades



Photo: Amber Barnes

Summary

- Practice IVM
- Maintain vegetation inventories and treatment histories within a GPS-GIS system
- Analyze treatment data and vegetation inventories to monitor and adjust practices
- Use herbicides selectively and in a targeted way to reduce unwanted impacts on pollinators

3 BMP: PRACTICE INTEGRATED VEGETATION MANAGEMENT (IVM)

INTEGRATED VEGETATION MANAGEMENT (IVM) PROVIDES ROW MANAGERS ALL THE TOOLS THEY NEED TO MOST EFFECTIVELY AND EFFICIENTLY MANAGE VEGETATION. IVM ALSO BENEFITS MONARCHS AND OTHER WILDLIFE BY REDUCING THE UNWANTED IMPACTS OF HERBICIDES AND MOWING.

One of the key features of IVM is the combination of treatment methods. These can be mechanical (such as mowing or pruning), biological (such as promoting the growth of desirable species, using grazing or even controlled burns) and chemical (selective and targeted herbicide use). The decision to apply a treatment relies on the establishment of management thresholds and a sound understanding of a given site. By establishing vegetation goals (e.g. proportion of native vegetation, abundance of weedy or invasive species, etc.), managers are able to respond to conditions at a site rather than treating large tracts of land indiscriminately. This also helps reduce maintenance cost by eliminating unnecessary treatments.

Chemical treatments are part and parcel of IVM, and the use of herbicides in ROW is often necessary. In utility ROW where tall-growing vegetation is undesirable, the selective and targeted use of herbicide has been found to be a crucial component of maintaining a community of low-growing native vegetation, which helps crowd out tall growing trees and shrubs that might interfere with transmission lines. Careful use of herbicides can therefore benefit pollinators by controlling weedy, woody, or invasive species that compete with the native plants they depend on.

Indiscriminate use of herbicides, however, eliminates the food and shelter sources monarchs and other wildlife rely on. Some herbicides can even be lethal when pollinators come into direct contact with them. Using herbicides selectively and in a targeted way, within an IVM framework, prevents these unwanted impacts on pollinators and helps maintain desirable plant communities.

The New York Power Authority manages 1200 miles of electrical transmission lines. It has developed a GPS-GIS integrated IVM program that runs over a four-year treatment cycle. In the third year after treatment, ROW managers and technicians record vegetation inventories in real time on tablets, in the field. In the fourth year, this data informs the herbicide treatments, which are selective and targeted – only undesirable species are spot sprayed. Over 14 years and four treatment cycles, the NYPA has collected data that demonstrates an overall reduction in undesirable species as well as a lower herbicide application rate. This selective

use of herbicides in combination with spatial data and monitoring has created an open, early successional community where monarchs and other pollinators thrive and where electricity is safely and reliably transmitted.

The NYPA is now taking the next step and are including pollinator monitoring into their field data collection. ROW supervisors and technicians will now be able to include their pollinator observations into the GIS vegetation inventories. This intelligent leveraging of existing resources to benefit pollinators is a great example of how thoughtful management can benefit monarchs.



Photos: New York Power Authority.

4 BMP: USE NATIVE PLANTS IN ROW DESIGN AND RE-VEGETATION

Planting ROW with native vegetation after construction or maintenance is a key strategy for monarch recovery. Long tracts of mowed, non-native grasses are essentially ecological deserts for pollinators and other wildlife. Turning this valuable land over to native species of grasses, flowers and shrubs whenever the opportunity arises is an effective strategy to increase biodiversity and reduce maintenance costs in the long-term. In fact, many State Departments of Transportation include native-only seed mixes in their standards, and the Arizona DOT has successfully used only native seed mixes since the 1990s. Consult the plant list in Appendix 1, as well as local experts and native plant producers to develop seed mixes that meet both safety requirements (such as short stature grasses and non-deer palatable plants) and provide benefits to monarchs.

On transportation ROW, medians, clover-leaf exchanges, and rest areas provide habitat opportunities in addition to the roadsides themselves. Flowering trees and shrubs can also benefit pollinators by providing places to nest and shelter in addition to pollen and nectar. Incorporate these into living snow fences as well as into ornamental plantings.



Photo: ODOT

Benefits of Diverse Plantings of Native Plants

Though using native plants involves higher up-front costs, in the long-term there are savings compared to using conventional, non-native grass mixes, mostly due to reduced maintenance costs. There are many other benefits to native plants as well, and their use in ROW can serve multiple goals: financial, environmental, agricultural, and aesthetic.

Benefits include:

- Reduced mowing and herbicide costs from established, diverse communities that prevent erosion and weed encroachment
- Native plants are more tolerant of drought than non-native plants
- Deep root systems of native plants increase water filtration, and reduce run-off, erosion, and water pollution
- Native plant communities foster local identity and beautify landscapes
- Native plants support more wildlife than non-native, hybrid, and exotic plant species
- Native plants can be used in landscape elements like snow fences
- Native plants sustain populations of native pollinators which can increase crop pollination in nearby agricultural lands

Photo: Amber Barnes



Selecting Native Plants

Diversity is a key element of successful monarch habitat. Choosing a variety of bloom times, colors and shapes will ensure there is a constant source of food for pollinators between early spring and late fall. Milkweed is an essential part of monarch habitat, as it is the host plant for this butterfly. There are several milkweed species to choose from in Ohio to fit your site's needs. Make sure to also include nectar sources to fuel their migration such as coneflower, beebalm, goldenrod and asters, to name a few. Consult the Plant List in Appendix 1.

Native grasses and sedges form the backbone of meadow and prairie habitats: their long roots sequester carbon, allow water infiltration, reduce erosion, provide shelter for bumble bees and other wildlife, and are larval hosts for various butterfly species. They are important to include in any naturalized planting, and in ornamental plantings, bunching grasses like little and big bluestem can also be effectively included. Native grasses tend to be less expensive than native flowers, so a strategy for keeping costs down while keeping diversity high is to increase the proportion of grasses in the mix while maintaining a large number of flower species (which are then included in smaller proportions).

When choosing seed mixes and native plant species for ROW design and re-vegetation, the following criteria will ensure you are providing high quality habitat for monarchs and other pollinators:

- Include at least 1-2 locally native milkweed species as a host plant for monarchs.
- Choose at least three flowering species for each season (spring, summer and fall).
- Include as many species of flowering plants as possible.
- Look to local plant communities to inform species selection.
- Select a variety of bloom colors and shapes.
- Include native grasses and sedges.
- In ornamental plantings, clumping plants of a single species together in patches increases aesthetic effect and facilitates pollinator foraging.

I-35 - the Monarch Highway

In 2015, the “Monarch Highway” initiative was launched to create a multi-state partnership composed of state transportation agencies and other interested partners along the Interstate-35 (I-35) corridor. This partnership aims to catalyze conservation actions along I-35 and the adjacent communities which will enhance habitat and engage the public. This “Monarch Highway” is located within part of the central flyway of the eastern monarch population’s migratory path through Minnesota, Iowa, Missouri, Kansas, Oklahoma, and Texas.

The idea for the I-35 effort resulted from a federal strategy to promote the health of honey bees and other pollinators, which called on the U.S. Department of Transportation to work with state departments to promote pollinator-friendly practices and corridors. As a result of the federal strategy, the I-35 partnership and many others have been working toward establishing rights-of-way best practices and promoting public awareness of monarch and other pollinator conservation.

Ohio Department of Transportation (ODOT) has taken initiative to manage their roadsides with monarchs and other pollinators in mind. With over 19,000 miles of roadsides under their jurisdiction, ODOT recognized that they had the ability to create much needed pollinator habitat throughout the state. Through their partnership with the Ohio Pollinator Habitat Initiative (OPHI), ODOT has created a State-wide Pollinator Conservation Plan and in addition to modifying their mowing practices, have begun identifying sites and creating roadside pollinator habitat utilizing native seed mixes which include milkweeds and other nectar sources for monarchs. To ensure the proper implementation of these efforts, they have also carried out education/outreach events and held workshops for maintenance crews and district officials. After just one year of implementing a reduced mowing regime, ODOT has enhanced over 50,000 acres of roadside habitat for monarchs.

Of course, driver safety is a critical component to any project led by a State Department of Transportation (DOT), and as such, clear zones and open lines of sight are always priorities. ODOT has experienced firsthand that reduced mowing and other monarch habitat management techniques can be a win-win-win when carried out correctly. Using native vegetation creates pollinator habitat and monarch corridors that reduce snow drift, erosion, and storm water runoff, while increasing the potential for pollination services to nearby crops; roadside maintenance costs are decreased as a result of a reduction in fuel, personnel hours, and chemicals; and worker safety is improved by requiring fewer maintenance crews on roadsides.

To learn more about what actions are being taken by over 20 State DOTs throughout the U.S., including Ohio, visit: <https://monarch-jointventure.org/i-am-a/departement-of-transportation>



Photos: ODOT

Monarch Migration

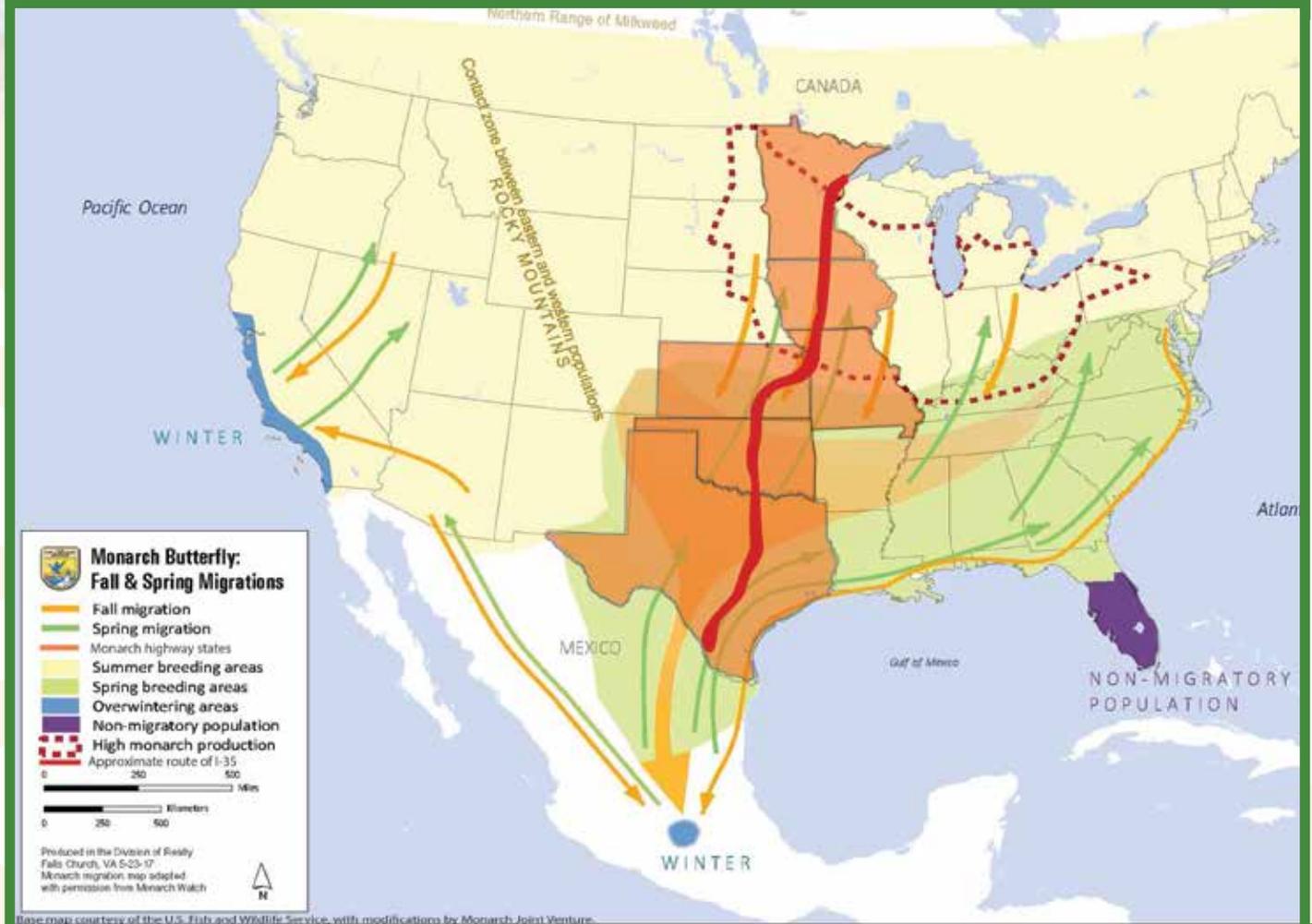


Photo: Amber Barnes



5 BMP: TRAIN YOUR STAFF AND CONTRACTORS

Getting all staff and contractors familiar and on board with these best management practices is crucial to their success. All too often, a lack of communication within a ROW agency, or between ROW managers and contractors, can lead to setbacks when monarch habitat is accidentally sprayed or mowed. Including engineers, maintenance staff, public relations and marketing departments in integrating BMPs within an agency ensures that their benefits, financial and otherwise, are fully realized.



Summary

- Conduct workshops to train staff on monarch and pollinator ecology as well as the important role ROW can play in monarch butterfly conservation
- Communicate the benefits of reduced mowing, selective herbicide applications, and native plants to staff
- Train staff on native plant identification
- Engage staff from all levels and departments on integrating these new BMP into regular operations and conduct practical workshops on each BMP



Photo: ODOT

6 BMP: RAISE PUBLIC AWARENESS

The creation of monarch habitat on ROW through these BMPs is an excellent opportunity to demonstrate your community engagement with the public. Changes in a landscape, however, can sometimes be met with misunderstanding or resistance. Communicating with stakeholders, whether the general public or adjacent landowners, can help mitigate negative reactions.

For example, while most people find wildflowers and meadows aesthetically pleasing, some do not. Communicating the benefits to wildlife, soil, and water quality that these areas provide can help increase acceptance. Some might be wary of herbicide use and prefer mowing. Explaining the benefits of selective and targeted herbicide use on invasive species, as compared to indiscriminate mowing, can help the public better understand the value to monarchs and other wildlife. Communicating with the public and adjacent landowners throughout the planning, planting, and establishment of a new monarch habitat site can also mitigate concerns when new plantings appear scraggly before they are fully established, or when previously mowed areas are allowed to grow in.

Simple actions like creating signage to indicate monarch habitat and wildflower plantings can help raise your profile within the community. This signage also provides context and indicates intention when formerly mowed or highly managed areas are allowed to return to a more naturalized look. Engaging with the public through commu-

nity meetings in advance of plantings can help gain local support for monarch habitat.

Partnering with local groups and other organizations (state, private, or non-profit) has multiple benefits. Volunteers can be recruited to help with plantings and funds can be leveraged to support the costs of diverse native seed mixes or signage. Hosting monarch monitoring and tagging events with local naturalists clubs or schools can take place in naturalized areas, further engaging community partners. These types of community events are an excellent way to showcase your commitment to the environment and its support of local communities.

Outreach

- Install signage to indicate the presence of monarch habitat and your commitment to the environment.
- Organize a monarch monitoring or tagging event on your ROW to engage local citizens and community groups.
- Provide information about how you are supporting monarchs on your website.

The Pollinator Partnership (P2) has a wide variety of outreach materials available at www.pollinator.org. Many of the materials can be customized with your organization or agency's logo.



Certification

Contact organizations such as the Wildlife Habitat Council (WHC) if you are interested in taking part in the Habitat Certification process. P2 can assist in connecting your company to these types of organizations. Certification ensures that your habitat sustains pollinators and monarchs and also puts your company and your project in the national spotlight. Being part of the WHC will connect you to other land management professionals that can share in your successes and offer guidance for future projects.

Monitor and Research

P2 has partnered with many land managers to conduct monitoring and research. Contact P2 if you are interested in including your ROW in a scientific study that can aid in pollinator conservation.

Your newly created monarch habitat will provide an excellent learning opportunity for everyone, from school children to other land management professionals. It can also engage existing employees and attract new hires. Educational visits are also a great way to showcase your commitment to the community and connect with others. Registering your site as a S.H.A.R.E. (Simply Have Areas Reserved for the Environment) site and holding an event during National Pollinator Week (both at P2's website: www.pollinator.org) will ensure that others outside of your community will learn about the work you are doing to promote pollinators.



Photo: ODOT



Monarch Habitat Actions

The monarch migration is in peril but you can help! Here are key actions you can take on your land to support the iconic butterfly and keep the migration a natural wonder for generations to come.

Key actions:

-  Increase nectar species
-  Increase milkweed
-  Ensure bloom during key migratory periods
-  Reduce pesticides
-  Reduce impact of mowing
-  Communicate with neighboring landowners about pesticide application

Plant or seed nectar
milkweed and



Plant milkweed and nectar plant flowering strips around crops



Reduce wind speed by planting windbreaks



Plant or seed utility rights-of-way with milkweed and nectar species



Minimize mowing roadsides, margins and lawns to maintain bloom and ensure of caterpillars and



Adjust mow utility right-of-way to minimize impact on eggs and caterpillars



Roadsides with nectar species

Plant milkweed and nectar species on marginal lands



of marginal lands to maintain safety eggs



Minimize pesticide use near pollinator habitat



Working schedule in rights-of-way to impact monarch caterpillars

Plant a monarch garden at home or school



Ohio Monarch Habitat Planting List

From 2015 through 2017 P2 monitored adult monarch butterfly use of candidate nectar plants in Ohio to develop practical monarch habitat plant lists supported by data. Three years of data collection have been analyzed and provide insight into adult monarch feeding and preference patterns. The monarch recommendations below are based on data collected from 18 native Ohio plant species planted at 18 sites throughout Ohio. The early blooming pollinator species will help maintain floral resources through most of the growing season.

Nectar Recommendations

Botanical Name	Common Name	Light	Water	Height	Bloom Time	Flower Color
MONARCH NECTAR ALL-STARS						
<i>Asclepias incarnata</i>	Swamp Milkweed	Full Sun	Medium Wet to Medium	4 feet	June-August	Pink/Rose
<i>Eutrochium purpureum</i>	Joe Pye Weed	Partial Shade	Medium Wet to Medium Dry	Up to 7 feet	July-September	Pink
<i>Symphotrichum novae-angliae</i>	New England Aster	Full Sun	Moist to Medium Dry	5 feet	August-October	Purple
GOOD MONARCH NECTAR PLANTS						
<i>Asclepias tuberosa</i>	Butterfly Weed	Full Sun to Partial Shade	Medium to Medium Dry	2 feet	June-August	Orange
<i>Echinacea purpurea</i>	Purple Coneflower	Full Sun to Partial Shade	Medium	Up to 4 feet	July-September	Pink/Purple
<i>Liatrix aspera</i>	Rough Blazing Star	Full Sun	Medium	3 feet	July-October	Pink/Purple
<i>Lythrum alatum</i>	Winged Loosestrife	Full Sun	Moist to Medium Wet	3 feet	June-September	Pink/Purple
<i>Parthenium integrifolium</i>	Wild Quinine	Full Sun	Medium to Medium Dry	4 feet	June-September	White
<i>Pycnanthemum tenuifolium</i>	Narrowleaf Mountain Mint	Full to Partial Sun	Moist to Medium Dry	2 feet	June-September	White
<i>Solidago rigida</i>	Stiff Goldenrod	Full to Partial Sun	Moist to Medium Dry	4 feet	August-October	Yellow
<i>Symphotrichum laeve</i>	Smooth Aster	Full Sun	Dry to Medium	Up to 4 feet	September-October	Purple
EARLY BLOOMING POLLINATOR FRIENDLY PLANTS						
<i>Penstemon digitalis</i>	Foxglove Beardtongue	Full to Partial Sun	Medium to Medium Dry	5 feet	May-July	White
<i>Tradescantia ohiensis</i>	Ohio Spiderwort	Full to Partial Sun	Medium	3 feet	April-July	Purple
<i>Zizia aurea</i>	Golden Alexanders	Full to Partial Sun	Medium	3 feet	April-June	Yellow

Milkweed Recommendations

Ohio has 13 native milkweed species (*Asclepias* spp.). P2 tested these four milkweed species for their nectar attractiveness, but not for larval preference: *Asclepias incarnata*, *A. syriaca*, *A. tuberosa*, and *A. exaltata*. *Asclepias incarnata* (swamp milkweed) proved to be the most attractive of the four milkweeds to adults seeking nectar. However, it is highly encouraged that you plant the right milkweed species for your site, all are beneficial to monarchs. Below are the most commonly available milkweed species and their growing conditions. *Asclepias incarnata* can tolerate regular watering, making it easy to incorporate into display gardens that are watered frequently.

Botanical Name	Common Name	Light	Water	Height	Bloom Period	Flower Color
<i>Asclepias exaltata</i>	Poke Milkweed	Partial Shade, Shade	Medium to Medium Dry	5 feet	June-July	White
<i>Asclepias incarnata</i>	Swamp Milkweed	Full Sun	Medium Wet to Medium	4 feet	June-August	Pink/Rose
<i>Asclepias syriaca</i>	Common Milkweed	Full Sun	Medium to Medium Dry	3 feet	June-August	Pink/Rose
<i>Asclepias tuberosa</i>	Butterfly Weed	Full Sun	Medium to Medium Dry	2 feet	June-August	Orange

Additional Monarch Resources

This list of resources will help you get started with plants and seeds for your new habitat site or with additional information on the monarch migration and how you can get involved. There is an ever growing body of knowledge on monarchs. The list below is just a sample of what is available.

Plants

Nurseries

Ohio Prairie Nursery, Hiram, Ohio
Scioto Gardens, Delaware, Ohio
Keystone Native Flora, Cincinnati, Ohio
Natives in Harmony, Marengo, Ohio
Indigenous Landscapes (Pioneer Landscapes), Loveland, Ohio
The Wilderness Center, Wilmot, Ohio
Natural Communities, Native Plants, Illinois
Nodding Onion Gardens, Columbia Station, Ohio
Milkweed Market, Kansas
North Creek Nursery, Pennsylvania
Applied Ecological Services, Wisconsin

Plant Sales

Holden Arboretum
Nature Center at Shaker Lakes
Cleveland Museum of Natural History

Migration Information

Journey North

Organizations with Additional Resources

Lake Erie Allegheny Partnership (LEAP)
Monarch Watch
Monarch Joint Venture
Wild Ones
Pollinator Partnership
David Suzuki Foundation
ROW Stewardship Council
Make Way for Monarchs
Xerces Society

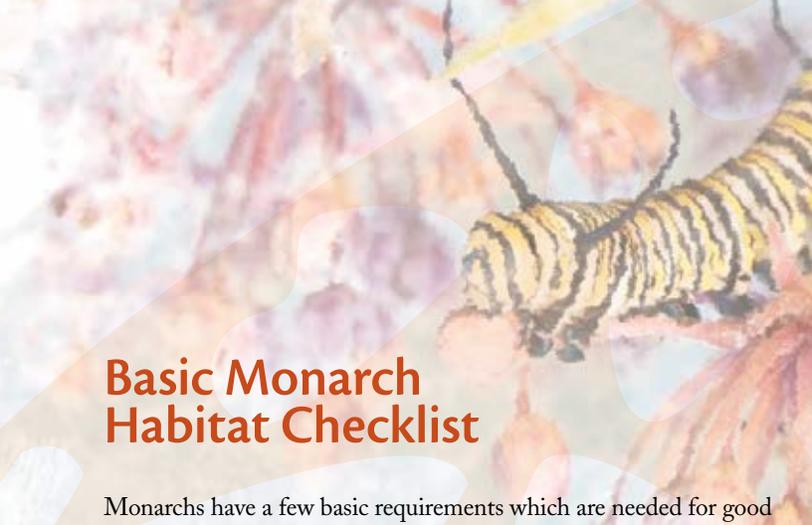
Ohio Monarch Initiatives

Monarch Wings Across Ohio
Ohio Pollinator Habitat Initiative

Regional and National Initiatives

Monarch Wings Across the Eastern Broadleaf Forest
Project Wingspan
Integrated Monarch Monitoring Program (IMMP)
Mid-America Monarch Conservation Strategy
Rights-of-Way as Habitat Working Group
The Bee & Butterfly Habitat Fund
S.H.A.R.E





Basic Monarch Habitat Checklist

Monarchs have a few basic requirements which are needed for good health and reproductive success. Below is a checklist for you to use to make sure these needs are being met by your monarch habitat project.

Food

- ✓ **Milkweed:** Female monarchs lay eggs on milkweed plants because the caterpillars (that hatch from the eggs) only eat milkweed leaves.
- ✓ **Nectar Plants:** Incorporate a variety of native flowers that provide nectar like goldenrod, bee balm, and asters. Adults need fuel (nectar) throughout the spring, summer and into fall, especially during peak migratory periods. Strive to maintain a continuous bloom from late April into mid-October. Use the Planting List on page 20.

Sun

- ✓ Adult monarchs need warm, sunny areas to regulate their temperatures or bask. Add a few rocks to your planting project to provide a warm resting area where adult monarchs can bask.

Shelter

- ✓ Windbreaks help slow wind speed and can create desirable areas for adult monarchs to feed. A windbreak can be a fence, hedge, or just a shrub.

Water

- ✓ Some butterflies and other pollinators benefit from having a fresh source of water available. This can take the form of mineral rich moist soil from which they can extract water (known as “puddling”) or a pond, birdbath, or shallow bowl of water with stones, pebbles and/or sand in it which rise above the water surface to provide them with a perch from which to drink. While much of the water that a butterfly needs comes from the flower nectar they consume, additional water and the minerals that it can contain can provide key hydration and nutrients. Remember to change the water frequently to reduce mosquito larvae or other contaminants.



Photo: Amber Barnes

Notes





RIGHTS-OF-WAY

