POLLINATOR PARTNERSHIP
MonarchWings AcrossOhio

Monarch Wings Across Ohio

Guide to *Monarch Habitat* on Corporate Land

Authors

Mary B. Galea and Kathleen Law

Contributors

Amber Barnes, Roger Downer, Elizzabeth Kaufman, Isaac Lisle, Lora Morandin, Michael Retterer, Jamie Sherman, and Jennifer Lotz

Research Team

Vicki Wojcik, Ph.D., Mary B. Galea, Amber Barnes, Zach Murray, Jennifer Davit, Nicholas Karousis, Samantha Hodgson, and Julia Mitchell

Photo Credits

Amber Barnes

Design

Marguerite Meyer

Monarch Wings Across Ohio Partners

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The Wilderness Center
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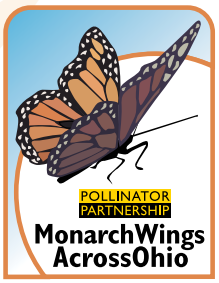

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Introduction

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: farms, gardens, rights-of-way, and corporate lands. 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 detailed road map to creating a successful monarch habitat project for your corporate land.

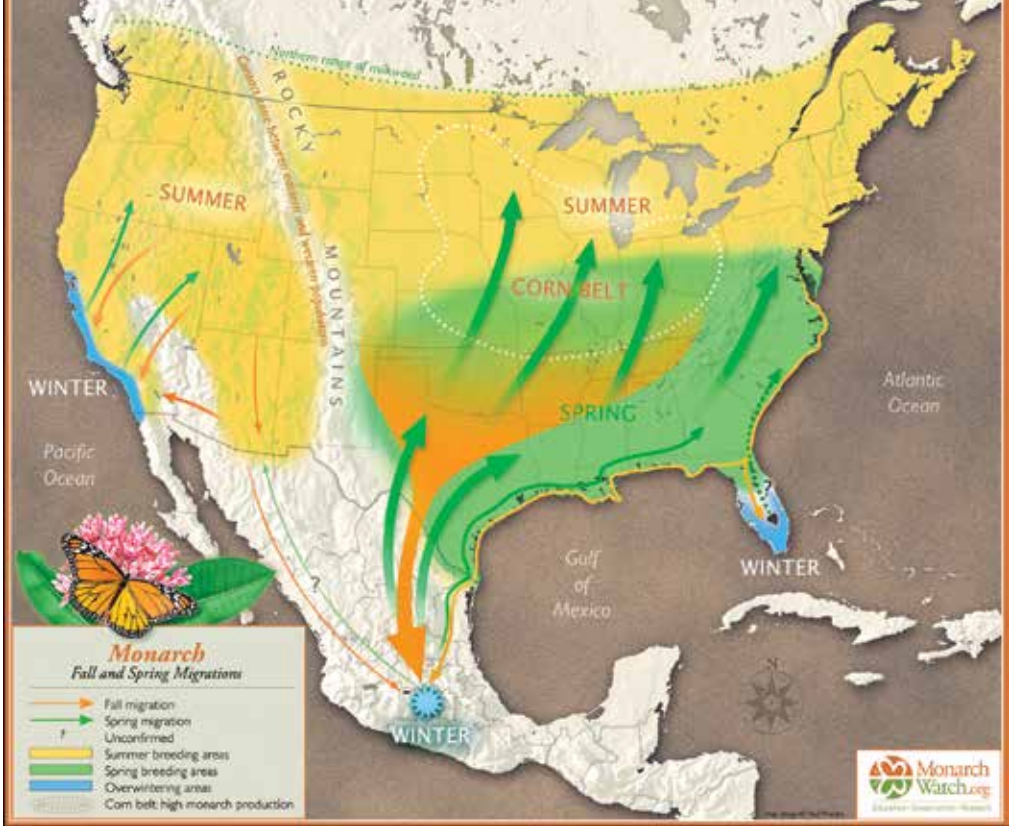
Unlike many of the environmental issues we are faced with on a daily basis, you can have a direct, positive impact on monarchs by creating habitat. You will know you are successful once you start seeing the caterpillars eating the milkweed leaves and the adult butterflies feeding on nectar from the wildflowers.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

Benefits of Managing for Monarchs

Not only can monarch habitat help your long term budget by reducing mowing frequency as well as pesticide and fertilizer applications, it can also help reach sustainability goals. Native plants, including milkweed, native grasses, and nectar sources, have much deeper root systems than most conventional landscaping plants. This means fewer costs in upkeep while also providing environmental services and improving water quality and soil health.

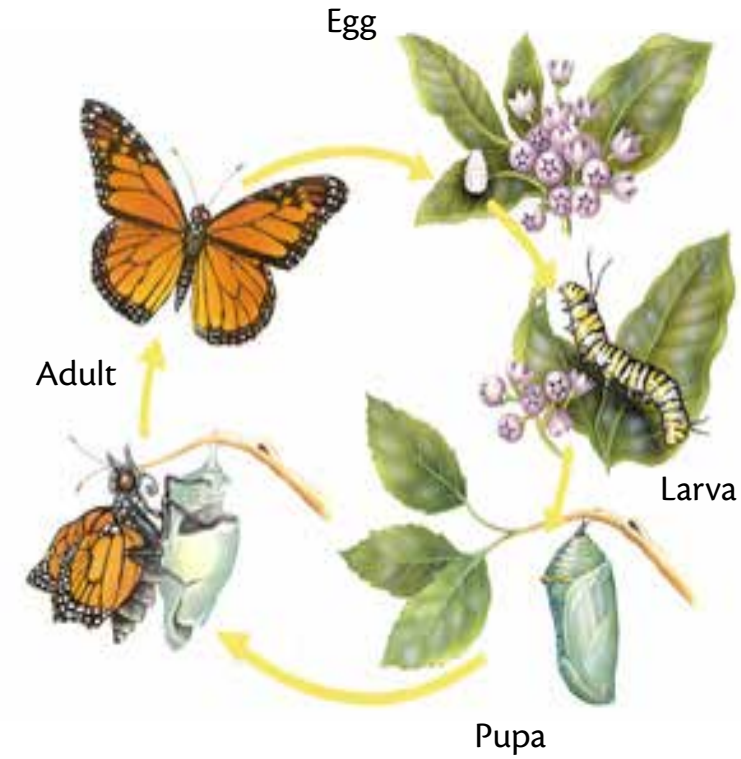
Monarch Habitat

Monarchs have a few basic habitat requirements; milkweed leaves for caterpillars, 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 and 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 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 Corporate Lands

Commercial buildings and lands with green space provide a great opportunity to create monarch habitat and beautify your community by including monarch-friendly plants. Whether you are interested in planting a carefully designed formal garden, restoring a natural meadow, or creating something that falls somewhere in between, this guide will help you select a site and manage your project step by step.

Step 1: Site Selection

Step 2: Building a Team

Step 3: Planning and Budgeting

Step 4: Site Preparation

Step 5: Planting and Seeding

Step 6: Maintenance

Step 7: Education, Outreach, and Certification

1 Step 1: Site Selection

Creating pollinator habitat does not need to take acres of land. In fact, it is recommended that your first project area be less than a quarter of an acre (10,890 sq. ft.). A grassy island in your parking lot or the front of your office building will suit this project perfectly. Consider enlarging the habitat after achieving success with your initial small plot, either by expanding it or by creating new sites. Using the Site Evaluation Rubric on page 17, begin evaluating potential project sites.

The potential for partnerships is also an important factor to consider in site selection. For example, if a parcel of land has an environmentally active neighbor, or is in the jurisdiction of a public land owner, his/her participation will bring greater success to the project. Additionally, sites that may be used for public outreach or that are more accessible to the public enrich your project's impact.

2 Step 2: Building a Team, Gaining Support

To make monarch habitat projects as smooth and as successful as possible, it is often important to gain internal support from within your company and the community. Establish an internal Monarch Habitat Team, and then reach out to the community for additional members as needed. Including community members in your land management planning process increases support and confidence in the forthcoming actions. You may want to invite representatives from the government and non-profit sector as well.

When it is reasonable to do so, begin assigning roles and responsibilities. Roles and responsibilities will grow and change as your actions develop. Delegate tasks to bring diversity and increase commitment to the project.

Name	Title	Contact	Role
Ben Williams	*Sustainability Officer*	BW@company.com	Project Management and Budget
Eve Kramer	*Head of Grounds*	EK@company.com	Site Prep and Maintenance
Amber Barnes	*Biologist, Pollinator Partnership*	AB@pollinator.org	Plant List and Procurement

3 Step 3: Planning and Budgeting

As a team, evaluate the potential sites determined in Step 1. Provide the site rubric results to the entire team to stimulate an objective discussion, and hold a meeting to review the pros and cons of each site based on the site evaluations. Ultimately, select a site with as few obstacles to success as possible.

Budget

Determine the amount of funding your company can spend on this project and seek support from departments other than your own. Approach your team and determine if additional support can be leveraged from the local government, community members, or other companies. Although volunteer hours are not monetary, seek commitments from groups such as Master Gardeners or Naturalists Clubs in your community. Weekly or even monthly commitments to perform specific site maintenance tasks will reduce overall maintenance costs.

ITEM	COST
Mulch	$500
Plants	$2000
Water Truck	$150
Signage	$200

Budget and scale are important factors when determining the correct combination of plants and/or seeds for your project. Plant materials such as plugs are usually more costly than purchasing seeds. Plants are showier and more appealing to community members, but may require advance ordering. If you are short on labor and do not have access to water, planting plugs will be impractical, whereas broadcasting seed will be much less labor intensive. Below is a chart highlighting the pros and cons of seeds and plants that have already been started by a grower.

Plants vs. Seeds

	PLANTS	SEEDS
Labor	Intensive	Less Intensive
Cost	High	Low
Water	Generally needed for establishment	Not required
Development Period	Plants can flower the same season they are planted	Development can take up to 3 years
Availability	Inventories are usually sold off seasonally	Can be purchased year-round

Timeline

Keep in mind that establishing a successful monarch habitat requires time and planning. Consider these timing issues when you develop your timeline:

- Ordering plants: place your plant order with a native plant nursery as soon possible.
- Site preparation and weed removal.
- Time planting and seeding with the seasons: the best time to establish a habitat from transplants is in spring. If you are seeding, the best time to sow is late fall or first frost.

Define the Habitat

As noted in Step 1, creating pollinator habitat does not need to take acres of land. It is highly recommended that your first project area be less than a quarter of an acre (10,890 ft^2). You will need to determine where on the spectrum between natural meadow and formal garden your habitat will fall.

Soil Testing

Do a soil test to determine pH levels and soil composition (sand, clay and/or loam). Milkweeds generally require a pH between 4.8 and 6.8. Inexpensive soil test kits can be purchased online or at a hardware store.

Selecting Plants for Monarchs

Selecting the right mix of plants is the backbone of any habitat enhancement project! See the Planting List on page 16 for Ohio-specific native species that will support monarchs from caterpillar to adult, and will also benefit bees, birds, and many others.

There are several milkweed species to choose from in Ohio, but make sure to also include nectar resources. Remember to select at least 3 species per bloom period (spring, summer, and fall).

Determine the quantity of plants and seed you need. Generally, one plant per one to two feet will be plenty and about 2-3 pounds of pure-live seed (PLS) or 10-15 pounds of bulk seed per acre will yield good results. Reduce quantities if using a combination of seeds and plugs. For the most immediate results, install mature plants or incorporate them into a mix of seeds and plugs. Consider using mature plants when working in a highly visible area.

Step 4: Site Preparation

Before preparing the site for planting, use the Site Evaluation Rubric on page 17 to review key components to habitat development success.

Site Preparation Techniques

Weed removal is one of the most important steps to successful habitat creation. Whether there is heavy weed pressure at your site or simply turf grass, removing this vegetation is key to preparing your site for planting. Choose the method below that best suits your needs:

Solarization

Solarization is a great method for sites one acre in size or smaller. Solarization reduces the beneficial microbes so consider using a mycorrizal inoculant before planting. Begin by mowing and tilling the site. Then wait for a rainfall or irrigate the area so that the moisture makes the dormant weed seeds germinate. Dig a canal around the site, then place a clear, UV-stabilized plastic sheet over the site, and bury it in the canal to ensure the heat is sealed in. The heat generated from the sun becomes trapped under the plastic sheet, and the high temperatures kill the vegetation and dormant weed seeds. This should be done in the spring or early summer and left until the fall, just before seeding or planting. If the soil dries out, moisten it and the steam will help eradicate the unwanted vegetation. Do not till between solarizing and planting as this will bring up remaining weed seeds.

Hand Weeding and Clearing

On small sites, a combination of mowing and hand weeding can be very effective but usually requires more people hours. On such sites, the careful and selective application of herbicide to individual weed plants can also be appropriate, especially if there are shrubby plants, such as the invasive Japanese Knotweed, Autumn-Olive, and Buckthorn. This method is effective for preparing relatively small sites in spring and early summer when transplants (plugs and potted plants) will be used.

Herbicide Application

This is an option for sites too large for solarization and where mechanical removal is not an option. Carefully time and repeat herbicide applications over the summer in preparation for a fall seeding and planting. Begin by mowing the site. Hire a certified pesticide applicator and use a broad-spectrum herbicide to kill turf grass, when possible use targeted herbicide. Targeted herbicides reduce impact to other plants. When killing woody plants, apply herbicide immediately and directly to freshly cut stumps. Avoid herbicides that are toxic to bees, such as Gramoxone/Paraquat. The site will likely need to be sprayed repeatedly as dormant seeds germinate. A fall spray will be necessary if there is an abundance of cool season grasses and many other types of weeds. Wait at least two weeks after the last herbicide treatment before planting or seeding.

Tilling

Tilling the site is a good option when weed pressure is low or multiple tills are possible to eliminate the seedbed. Do a survey of existing plant material before tilling. Often times, a till will work well in the short term but often brings weed seeds to the surface from the soil bed, creating a long-term weed problem. If you want to till, consider combining it with herbicide application. When tilling to exhaust the seedbed, first till, then irrigate to germinate the weed seeds, till to eliminate the plants, and repeat until the seedbed is exhausted.

No matter which method you use, make sure to coordinate the plant delivery so live plants can be planted after the area has been cleared of weeds (wait at least two weeks after herbicide application). If the site goes unplanted for an extended length of time, the invasive species will return to fill the ecological void.

5 Step 5: Planting and Seeding

Schedule planting or seeding at least two weeks after weed removal, especially if herbicides have been used (see page 10). Make sure water will be available on the day of planting and volunteers know when to arrive, and what supplies to bring.

Broadcast Seeding

Broadcast seeding is when seed is scattered either by hand or machine. The soil should be raked just before broadcast seeding. For sites under an acre in size, broadcast seeding by hand is very cost effective. Scatter the seed across the site by walking the length of it, and then scatter the seed again by walking the width of the site.

Drill Seeding

Drill seeding uses mechanical equipment, a drill seeder, to cut into the soil and drop in the seed. This method is great for large meadow restoration sites, but renting specialized equipment and hiring labor can be expensive. The seed should be covered by only 1/8" of soil, any more will reduce germination success.

Plugs and Mature Plants

Planting plugs and mature plants is more costly, but the results are more immediate and the success rate is often higher. Sometimes choosing plants over seeds is a matter of aesthetics as seeds are much slower to produce flowers. This option is ideal if you are planting a more designed garden, as opposed to creating a naturalized meadow. A great resource for milkweed plugs is the Milkweed Market at http://monarchwatch. org/milkweed/market/.

For your plants to survive, they will need to be watered immediately after planting, and once a week for the first 4-6 weeks. Planting early in the morning, late in the afternoon or on an overcast day also helps reduce heat stress on the plants.

Develop a planting strategy and communicate it to your group. Holes for plug plants can be dug with a basic trowel. To save time, have the holes dug in advance. Generally, 1 plug per 1-2 feet gives a 'fuller' look sooner, but plants may need to be transplanted the next year. You can reduce the ratio if the area can look a little sparse in the first year. Reduce this amount if using a combination of seeds and plugs.

It is recommended that you group plants of the same species together to create patches. Milkweeds need to be planted in groups of six or more. This is more visually appealing and it also helps pollinators forage more efficiently. It also helps volunteers identify 'good plants' from weeds in the early growing season before flowers have blossomed.

6 Step 6: Maintenance

Proper care and maintenance is a vital part of any monarch habitat. While native plants require less maintenance over time, especially compared to turf or gardens of annuals, some 'TLC' will help them establish, and monarchs, thrive.

Post-Meadow Seeding

After seeds have germinated in the spring, water once a week for the first 4-6 weeks if possible. It is helpful to keep the soil moist until the seedlings are about 4-6" tall. After that, the seedlings will survive on rain water. Though native prairie plants are adapted to drought, watering during dry periods will increase the attractiveness of the habitat as well as the amount of pollen and nectar available for monarchs and other pollinators.

If weeds and grasses start shooting up in the spring before the seeded mixture has germinated, mow with the blades 6" from the ground to set them back.

Organize a team of employees or community volunteers to hand pull weeds or target spray herbicides once a week or once a month during the first two years. Perfection is not necessary, but prioritizing weeding the most aggressive species is key.

In the fall, after plants have browned from frost, we recommend an annual mowing of the habitat with the blades 6" from the ground. This will distribute the flower seed throughout the site and keep any woody plants from growing up in the planting.

Post-Garden Planting

Water the plants thoroughly the day of planting and as needed during the following days.

Water the plants at least once a week for 4-6 weeks post-planting. If conditions are particularly dry, water more often.

Have a team of staff or volunteers spend time weeding the habitat weekly or monthly.

Leave the old stems in place over the winter. These can be trimmed back in late spring or left in place. The seed heads provide a winter food source for birds while the stems can provide cover for birds and nesting habitat for bees.

Long-Term Habitat Maintenance

Have a maintenance plan in place to monitor for weeds annually, focusing efforts on aggressive and invasive species (targeting them before they go to seed). As the native monarch plants establish, the pressure from the weeds will reduce, but some weeding or targeted herbicide spraying will be required each spring/summer.

Mowing once a year helps stimulate plant growth and keep your meadow thriving. Do not mow during peak monarch migration periods.

Always keep one section un-mowed to serve as a refuge to wildlife; rotate this section from year to year.

Spring and early summer mowing can help keep some weeds down–prior to May 1 for Northern Ohio and prior to April 1 for Southern Ohio

Late fall mowing should be done after October 31 in Ohio to avoid damage to monarchs.

The timing of monarchs' arrival in Ohio and the emergence of their caterpillars a few weeks later changes from year to year depending on the weather. Before mowing, scout for monarch eggs and caterpillars. If they are present, delay mowing.

Seeded habitat can take multiple years to establish and may look different from year to year as the perennial species form a healthy root system and begin to produce flowers. Be patient as your wildflower habitat invests in its below ground growth. Once the roots are well established, flowers will follow.

7 Step 7
Education, Outreach, and Certification

Education

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

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.

Monitoring and Research

P2 has partnered with many corporations to conduct monitoring and research. Contact P2 if you are interested in including your corporate lands in a scientific study that can aid in pollinator conservation and monitor the pollinators you have helped.

Outreach

There are many ways to reach out to the community:

- Install interpretive signage so that visitors to the site learn more about monarchs and your company's commitment to the environment.
- Organize a monarch monitoring or tagging event on your site to engage local citizens and community groups.
- Provide information about your monarch project on your website and social media.
- P2 has a wide variety of outreach materials available at www.pollinator.org. Many of the materials can be customized with your company's logo.

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 r
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
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and lawns to maint
bloom and ensure
of caterpillars and

Adjust mow
utility right
minimize in
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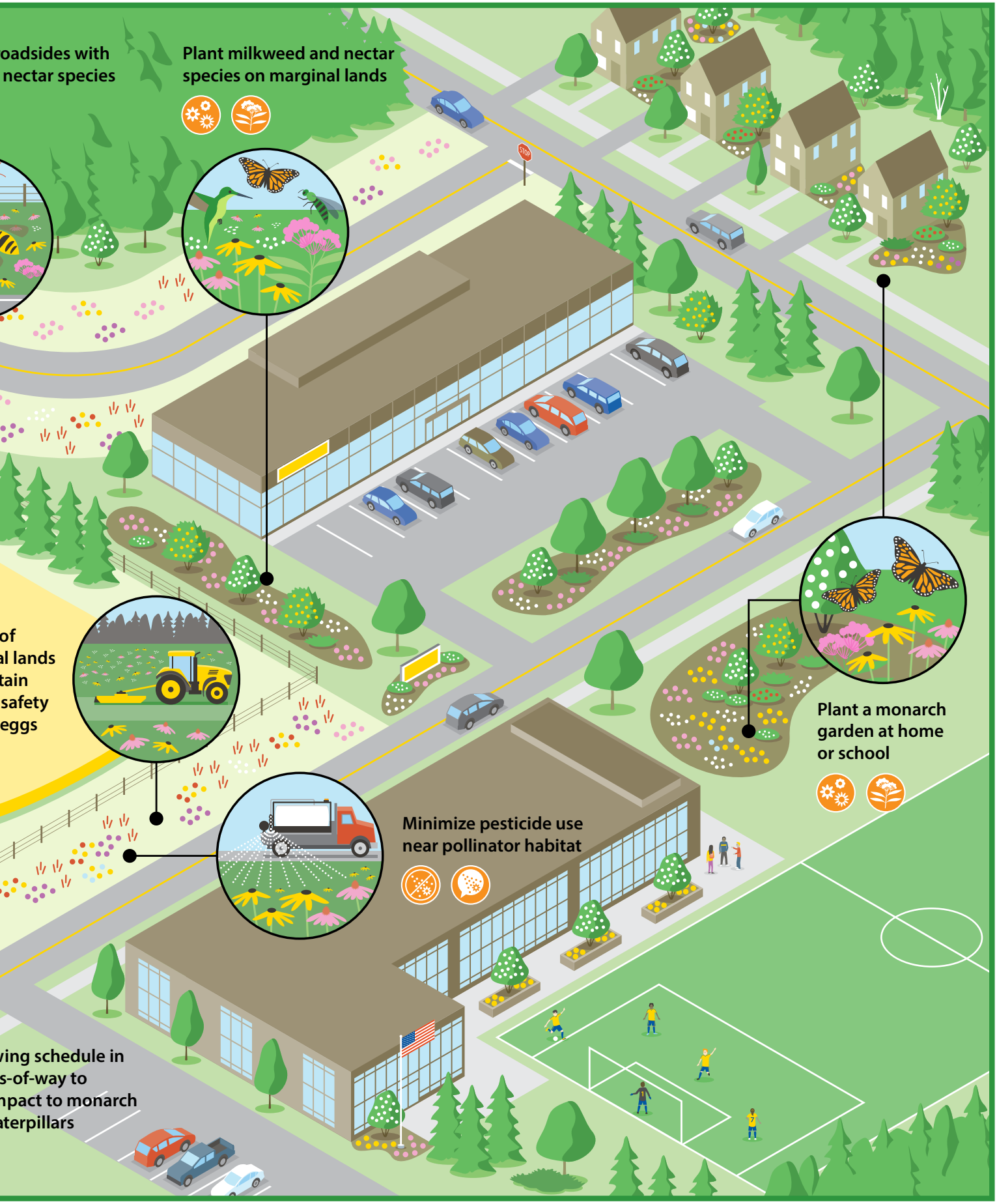
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Minimize pesticide use
near pollinator habitat
Plant a monarch
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Ohio Monarch Habitat Planting List

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						
Asclepias incarnata	Swamp Milkweed	Full Sun	Medium Wet to Medium	4 feet	June-August	Pink/Rose
Eutrochium purpureum	Joe Pye Weed	Partial Shade	Medium Wet to Medium Dry	Up to 7 feet	July-September	Pink
Symphyotrichum novae-angliae	New England Aster	Full Sun	Moist to Medium Dry	5 feet	August-October	Purple
GOOD MONARCH NECTAR PLANTS						
Asclepias tuberosa	Butterfly Weed	Full Sun to Partial Shade	Medium to Medium Dry	2 feet	June-August	Orange
Echinacea purpurea	Purple Coneflower	Full Sun to Partial Shade	Medium	Up to 4 feet	July-September	Pink/Purple
Liatris aspera	Rough Blazing Star	Full Sun	Medium	3 feet	July-October	Pink/Purple
Lythrum alatum	Winged Loosestrife	Full Sun	Moist to Medium Wet	3 feet	June-September	Pink/Purple
Parthenium integrifolium	Wild Quinine	Full Sun	Medium to Medium Dry	4 feet	June-September	White
Pycnanthemum tenuifolium	Narrowleaf Mountain Mint	Full to Partial Sun	Moist to Medium Dry	2 feet	June-September	White
Solidago rigida	Stiff Goldenrod	Full to Partial Sun	Moist to Medium Dry	4 feet	August-October	Yellow
Symphyotrichum laeve	Smooth Aster	Full Sun	Dry to Medium	Up to 4 feet	September-October	Purple
EARLY BLOOMING POLLINATOR FRIENDLY PLANTS						
Penstemon digitalis	Foxglove Beardtounge	Full to Partial Sun	Medium to Medium Dry	5 feet	May-July	White
Tradescantia ohiensis	Ohio Spiderwort	Full to Partial Sun	Medium	3 feet	April-July	Purple
Zizia aurea	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 proved, 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
Asclepias exaltata	Poke Milkweed	Partial Shade, Shade	Medium to Medium Dry	5 feet	June-July	White
Asclepias incarnata	Swamp Milkweed	Full Sun	Medium Wet to Medium	4 feet	June-August	Pink/Rose
Asclepias syriaca	Common Milkweed	Full Sun	Medium to Medium Dry	3 feet	June-August	Pink/Rose
Asclepias tuberosa	Butterfly Weed	Full Sun	Medium to Medium Dry	2 feet	June-August	Orange

Monarch Habitat Site Evaluation Rubric

Use this rubric to evaluate each site being considered for monarch habitat development. Circle the description that best represents the site. Do not proceed with a site that receives a zero in any category. If a site is in between scores use the blank boxes or modify the rubric as you see fit.

Site Name: _____ **Evaluator:** _____

Total Score: _____ **Date:** _____

SCORE	0 (do not proceed with site)	1	2	3	4
VEGETATION					
Existing Vegetation (Undesirable is defined by any species that don't support monarchs or habitat development.)	>75% Undesirable	>50% Undesirable	100% Turf	50% Desirable/50% Undesirable	>50% Desirable
Existing Host Plants (Milkweed Species)	None	None, but would like to plant	1 species	1 species, can add more	2-3+ species
Existing Nectar Plants	None	None, but would like to plant	1-2 species	2-4 species	4+ species
Ability to Procure Additional Plants or Seeds	No ability	Ability to procure seed of a few species, not able to maintain bloom during migration periods.		Ability to procure seeds to maintain continuous bloom, including peak migration periods.	Ability to procure plugs and seeds to maintain a continuous bloom, including peak migration periods.
SITE ATTRIBUTES					
Proposed Project Site Size (Smaller is better for first time habitat project leaders. If you have experience disregard this criteria.)	10+ acres	3+ acres	1.5-3 acres	1.5-1 acres	1-10 acres
Water Availability	Not available for plug planting	Not available for seeding	No water on site, able to bring it on site post-planting	Can water weekly for 6 weeks post-planting	Constant, accessible water source (i.e. spigot with hose)
Sun Exposure	Full Shade	Partial Shade	Partial Sun		Full Sun
Soil pH	<4 OR >7.0	Acidic, 4-5.5	Slightly acidic, 5.5-6.5		Neutral 6.5-7
Soil Texture		Gravel	Compacted	Clay, Sandy	Well Drained Loam
Slope	46-90 degrees (extreme slope)	16-45 degrees (steep slope)		6-15 degrees (moderate slope)	0-5 degrees (gentle slope)
Accessibility (if desired)	Inaccessible		Limited to land manager	Accessible to land manager and some public	Fully accessible to all
MAINTENANCE					
Vegetation Management Regime	Vegetation is mowed, no flexibility for change.	No existing regime.	Vegetation is mowed frequently, but this practice can be changed.	Invasive species are removed a couple times a year.	Frequent invasive species removal (weekly or monthly).
Intended Habitat Duration	<1 year	<3 years	3-5 years	5-10 years	10+ years
Ability to reduce invasive species	No ability	Turf removal only	Biannually	Monthly	Weekly
Ability to add more plant material after initial planting	No ability		As needed, seed only		As needed, seed and plants
Mulch (only applicable to garden settings)	No		After initial planting		Annually applied
TOTAL SCORE					
OUTREACH (if applicable)					
Volunteer Potential		None	One-time commitment(s)		Regularly scheduled group(s)
Interpretive Signage		Interpretive signage cannot be installed			Funding and space allocated
TOTAL SCORE (with Outreach)					
ADDITIONAL COMMENTS:					

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 16.

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.

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

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

Plant Sales

Cleveland Museum of Natural History, Cleveland, Ohio
Holden Arboretum, Kirtland, Ohio
Shaker Lakes, Shaker Heights, Ohio

Migration Information

Journey North

Organizations with Additional Resources

David Suzuki Foundation
Lake Erie Allegheny Partnership (LEAP)
Monarch Joint Venture
Monarch Watch
Pollinator Partnership
Wild Ones
Wildlife Habitat Council
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
The Bee & Butterfly Habitat Fund
S.H.A.R.E.

POLLINATOR PARTNERSHIP
MonarchWings AcrossOhio

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