



# MONARCH JOINT VENTURE

Partnering across the U.S. to conserve the monarch migration

www.monarchjointventure.org

The Monarch Joint Venture is a partnership of federal and state agencies, non-governmental organizations, and academic programs that are working together to protect the monarch migration across the lower 48 United States.

## PARTNERS

U.S. Forest Service  
 U.S. Fish and Wildlife Service  
 U.S. Geological Survey  
 Bureau of Land Management  
 Natural Resources Conservation Service  
 Iowa Department of Natural Resources  
 Cibola Nature Center  
 Cincinnati Nature Center  
 Green Schools Alliance  
 Journey North  
 Lady Bird Johnson Wildflower Center  
 Loudoun Wildlife Conservancy  
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 Monarch Health  
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 Pheasants Forever and Quail Forever  
 Pollinator Partnership  
 Southwest Monarch Study  
 Tallgrass Prairie Center  
 Wild Ones: Native Plants, Natural Landscapes  
 The Xerces Society for Invertebrate Conservation

University of Minnesota  
 Monarch Joint Venture  
 2003 Upper Buford Circle  
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## Plant Milkweed for Monarchs

Monarchs cannot survive without milkweed. Monarch caterpillars need milkweed plants (*Asclepias* spp.) to grow and develop, and female monarch butterflies only lay their eggs on milkweed. With shifting land management practices, we have lost much milkweed from the landscape. Please plant milkweed to support monarch populations, and their incredible migration! Planting milkweed is a great way to help other pollinators too, as milkweed provides nectar resources to a diverse suite of bees and butterflies.



Dave Wendtken

### Northeast Region Milkweed Species



**Common Milkweed**  
*Asclepias syriaca*  
 Well drained soils.  
 Photo by Louis-M. Landry



**Swamp Milkweed**  
*Asclepias incarnata*  
 Damp, marshy areas.  
 Photo by Janet Allen



**Butterfly Weed**  
*Asclepias tuberosa*  
 Well drained soils.  
 Photo by Thomas Muller, Lady Bird Johnson Wildflower Center



**Whorled Milkweed**  
*Asclepias verticillata*  
 Prairies and open areas.  
 Photo © Kim Davis & Mike Stangeland



**Poke Milkweed**  
*Asclepias exaltata*  
 Woodland areas (except in NE, KS, MO, ND & SD).  
 Photo by David Smith

### Milkweed Regions

There are many native milkweed species in each of the six "Milkweed Regions" shown on this map. The species highlighted are known to be used by monarchs, and are easy to establish. Please try to find plants grown as close as possible to where you'll be planting them, and from the closest possible seed source.



### South Central Region Milkweed Species



**Green Antelopehorn Milkweed**  
*Asclepias viridis*  
 Dry areas and prairies. Also known as green milkweed.  
 Photo by Harlen Aschen



**Antelopehorns Milkweed**  
*Asclepias asperula*  
 Desert and sandy areas.  
 Photo by Kip Kiphart



**Zizotes Milkweed**  
*Asclepias oenotheroides*  
 Sandy/rocky prairies and fields.  
 Photo by Jennifer Kleinrichert



## Southeast Region Milkweed Species



**Butterfly Weed**

*Asclepias tuberosa*

Well drained soils.

Photo by Thomas Muller, Lady Bird Johnson Wildflower Center



**Whorled Milkweed**

*Asclepias verticillata*

Prairies and open areas.

Photo © Kim Davis & Mike Stangeland



**White Milkweed**

*Asclepias variegata*

Thickets and Woodlands.

Photo by Melton Wiggins



**Aquatic Milkweed**

*Asclepias perennis*

Hydrated soils.

Photo © Kim Davis & Mike Stangeland



**Sandhill/Pinewoods Milkweed**

*Asclepias humistrata*

For use in some regions of FL.

Dry sandy areas and soils.

Photo © Kim Davis and Mike Stangeland

Note: *Asclepias syriaca* and *Asclepias incarnata* are native to parts of this region and may also be suitable species to plant. More details on the native range of each species can be found at: <http://bonap.net/NAPA/TaxonMaps/Genus/County/Asclepias>

## Western Region Milkweed Species

NOTE: Excludes California and Arizona; see below for those regions.



**Mexican Whorled Milkweed**

*Asclepias fascicularis*

Dry climates and plains, except in CO, UT, NM & AZ.

Photo by Christopher Christie



**Showy Milkweed**

*Asclepias speciosa*

Savannahs and prairies.

Photo by Robert Potts © California Academy of Sciences

### Selecting and Finding Milkweed Plants

While any of the species listed here can be grown in garden settings, please use species that are native to your county for larger restoration projects. You can find more information about milkweed, together with a directory of native plant vendors that sell milkweed plants and seeds, on our website:

[www.plantmilkweed.org](http://www.plantmilkweed.org)

## Arizona Milkweed Species



**Butterfly Weed**

*Asclepias tuberosa*

Well drained soils.

Photo by Gail Morris



**Antelopehorns Milkweed**

*Asclepias asperula*

Desert and sandy areas.

Photo by Kip Kiphart



**Rush Milkweed**

*Asclepias subulata*

Desert areas.

Photo by Gail Morris



**Arizona Milkweed**

*Asclepias angustifolia*

Riparian areas and canyons.

Photo by Morris Family

## California Milkweed Species



**Mexican Whorled Milkweed**

*Asclepias fascicularis*

Dry climates and plains.

Photo by Christopher Christie



**Showy Milkweed**

*Asclepias speciosa*

Savannahs and prairies.

Photo by Robert Potts © California Academy of Sciences



**Desert Milkweed**

*Asclepias erosa*

Desert regions.

Photo by Christopher Christie

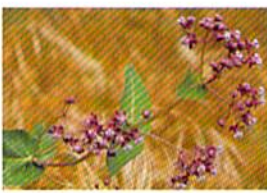


**California Milkweed**

*Asclepias californica*

Grassy areas.

Photo by Christopher Christie



**Heartleaf Milkweed**

*Asclepias cordifolia*

Rocky slopes.

Photo by Dee E. Warena



**Woolly Milkweed**

*Asclepias vestita*

Dry deserts and plains.

Photo © 2010 Neal Kramer



**Woolly Pod Milkweed**

*Asclepias eriocarpa*

Clay soils and dry areas.

Photo by Br. Alfred Brousseau, St. Mary's College



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INTERNATIONAL PROGRAMS  
US Forest Service, Department of Agriculture

\*Common names vary from place to place, so we have used the USDA names for consistency.





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## Gardening for Monarchs:

Creating habitat for monarch butterflies and other pollinators

### Habitat needs

Good monarch habitat must meet the needs of all four monarch life stages, and ideally, multiple parts of the monarch migratory cycle. Female monarchs lay eggs on milkweed host plants because their caterpillars only eat milkweed leaves. Once the caterpillar is fully developed, it often leaves the host plant to find a safe place to pupate, or form its chrysalis. After the adult butterfly emerges, it uses its long straw-like mouth, or proboscis, to consume nectar from a variety of different flowering plants. Thus, monarchs need both milkweed and nectar plants during the breeding part of their annual migratory cycle. As they migrate, they need nectar plants to fuel their long flight.

Because monarch-friendly gardens are usually focused on breeding and migrating, the information here targets milkweed and nectar plants. More information on overwintering habitat requirements for monarchs in the western U.S. can be found on our website.



Increasing use of herbicides, habitat loss due to real estate and agricultural development, and climate change are all factors in a declining monarch population. However, conservation efforts can start in your backyard. Plant a butterfly garden, and provide a safe haven for monarch eggs and caterpillars, and help fuel adults during their migration!

### First steps

Start by replacing a patch of lawn or bare ground, or simply add native plants to an existing garden. Planning and creating a butterfly garden is a great way to increase the amount of time you spend outdoors and connect with nature.

1. Choose a sunny site for your garden. Butterflies need the sun's energy to warm up and most nectar and milkweed plants grow best in sunny spots. Adding flat rocks can help create basking zones for butterflies to regulate their temperature.
2. Include windbreaks. Butterflies prefer to feed in areas sheltered from wind. A fence, shrub, or a wall can serve as a windbreak, and can also be a good place for pupation. If your site does not have a wind break, consider planting a shrub.
3. Testing garden soil can determine whether the area is suitable for growing plants, or if it needs amendments. Sand, clay or wet soils may be difficult to plant in, and may require specialized techniques.
4. Prepare the soil by removing lawn or other plant cover, and raking the soil. Additional soil can be brought in as needed.
5. In difficult areas, or if space is limited, consider planting in containers.

## The Importance of Monarch Conservation

The monarch butterfly is a flagship species for conservation. As a national partnership organization, the Monarch Joint Venture utilizes the social and cultural presence of monarchs to promote conservation for more than just monarchs.

With a tremendous geographic range and amazing migration, monarchs draw attention from all over North America. Many other pollinators benefit from monarch conservation efforts, as people throughout the entire breeding, migration, and overwintering range work to preserve and create habitat. Adding native milkweed to an area provides food for monarch caterpillars, and nectar for a diversity of other pollinators.



## Planting the habitat

1. Whenever possible, use native plants for your garden. Plants that are native to your area are hardy, suited to live in the region, and usually require less maintenance. The Pollinator Partnership's Eco-regional Planting Guides<sup>1</sup> can help you find a list of plants that are suitable to your area, and determine the time of year that they flower.
2. Find a nursery that sells native plants. You may find a native plant nursery in your area at the Plant Native website<sup>2</sup> or by contacting your local Wild Ones chapter. Most nurseries provide a list of native plants that they have in stock. Choose plants that have not been treated with systemic pesticides, meant to deter insects, as these can affect pollinators, including monarchs, and their caterpillars.
3. Using potted plants or plant plugs (plants that have germinated and are ready for planting) may be the easiest choice for small garden areas. Seed mixes may also be used, and may be more cost-effective in larger areas.
4. Planting perennial plants will ensure that your garden comes up year after year. You can supplement these with annuals if needed, to add color once perennials are done blooming.
5. Choose a diverse array of plants that flower at different times to attract butterflies throughout the growing season. Plants that bloom early are critical for monarchs during the spring migration. Late blooming plants, such as goldenrod, many asters, and blazing stars, are critical during the monarch's long migration each fall.
6. If using potted plants, plan your garden and prepare the bed before purchasing plants. Group plants by color and type. Butterflies are attracted to large splashes of color in the landscape, especially red, orange, yellow and purple. Place short plants in front of tall ones.
7. Whenever possible, avoid hybrids and cultivars that are bred for their size, as they usually have less nectar in their flowers.
8. Include larval host plants. Monarchs need milkweed, so include species of milkweed native to your area. For a list of native milkweed, see the Monarch Joint Venture Milkweed Information Sheet<sup>3</sup>. Milkweeds are also a good source of nectar for butterflies and other pollinators.
9. Keep plants well-watered after purchase but prior to planting.
10. When you are ready to plant, dig a hole just large enough for the plug's roots. Use soil to cover the roots so that only the leaves and stem of the plant are above ground. Add straw or grass mulch around the plants to retain water in the soil and prevent weed growth. Water newly planted plugs.
11. If seed is used, prepare the area by removing lawn and invasive plants. Seed can be spread manually, or for

larger areas, use a broadcaster to get an even spread. Frost seeding, or the application of seed in the late winter, when snow is starting to melt, may also help the seed settle into the soil. Add mulch to conserve moisture.



## Maintenance

1. Water plants until they are well established. Follow the vendor's directions on watering, and keep in mind that additional water may be needed during warm dry spells or if the plants appear to be drooping. Once established, native plants typically do not need additional water.
2. Butterfly requirements vary from site to site. Don't be surprised if a plant that is touted as being a butterfly magnet does not attract any butterflies to your garden. Watch your habitat over time and determine which flowering plants are most popular to butterflies in your area.
3. Weed by hand as needed. Avoid using herbicides and insecticides to rid your garden of unwanted plants and insects, as they may also be harmful to beneficial organisms.
4. Remember that host plants are meant to serve as food for caterpillars, so chewed leaves are a sign that they are doing their job!

## Additional features of a good butterfly habitat

1. Keep dead trees and wood piles to serve as winter shelters. While monarchs migrate in the fall, many other butterflies and pollinators may overwinter in the area and use these features as shelter.
2. Consider other wildlife friendly practices. Bird feeders and a heated bird bath can help resident birds in the winter months. Bee nesting boxes can help native bees overwinter. Having bare ground can help ground nesting pollinators find a spot for the winter.
3. Register your monarch habitat online with the Monarch Joint Venture as a "Success Story" to share with others!

### Resources:

1. **Pollinator Partnership Eco-Regional Planting Guides** - <http://www.pollinator.org/guides.htm>
2. **Plant Native Website** - <http://www.plantnative.org/>
3. **MJV Milkweed Information Sheet** - <http://monarchjointventure.org/images/uploads/documents/MilkweedFactSheetFINAL.pdf>

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Photo credits: Janet Allen, Candy Sarikonda, Teal Johannsen





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In the face of declines in monarch numbers and habitat, researchers and conservationists are pooling their efforts under the Monarch Joint Venture to protect monarchs and pollinator habitat.

## Monarch Migration

The monarch migration is one of nature's most spectacular events. Much as birds migrate to take advantage of resources available across a large landscape, North American monarchs travel up to an astonishing 3,000 miles in an annual migration from their summer breeding habitat to overwintering grounds.

During the summer breeding season, eastern monarchs spread across the eastern U.S. and into southern Canada, laying eggs on milkweed plants. Western monarchs make use of milkweeds across the western states, primarily west and south of the Rockies, and into southwestern Canada.

In the fall, monarchs feast on late-blooming nectar plants along the way to their wintering sites. The eastern monarch population winters in oyamel fir forests in the mountains of central Mexico. While the spring migration northward is completed over the course of two or more generations, the final generation of the year flies the entire way back to these forests, new to them, but visited by



their ancestors a few generations ago. In the same way, monarchs from across the western U.S. return to eucalyptus, Monterey cypress, Monterey pine, and other trees in groves along the Pacific coastline, from Mendocino County south to Baja, Mexico. Climatic conditions at these sites allow monarchs to survive the winter before beginning the return trek to their summer breeding grounds.

## Monarchs and Milkweed

Monarch caterpillars require milkweed to grow and develop into butterflies, and they feed on many of the over 100 species of milkweed native

to North America. These plants, key to monarch survival, are found along roads and highways; in yards, parks, and gardens; in old fields; and in pristine native prairies and other natural habitats.

In addition to the important role that milkweeds play in the lives of

monarchs, they are valuable nectar resources for a diverse suite of bees and butterflies. Enhancing monarch habitat will thus benefit many important pollinators.

## The Monarch Joint Venture Mission and Vision

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.

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



## Monarchs at Risk?

The monarch migration was listed by the International Union for Conservation of Nature as an endangered phenomenon in 1983. In 2010, the World Wildlife Fund included monarchs on its list of the “Top 10 to Watch in 2010”: species that are thought to be in need of close monitoring and protection.

The conservation status of monarch overwintering sites in Mexico receives much attention. However, monarchs face challenges in the U.S. as well. A decline in the number of western monarchs, most of which spend their entire life cycle in the U.S., has been well documented over the past decade. Both eastern and western monarchs are dependent on habitat quality throughout the U.S., which is being threatened by:

- Habitat conversion and changes in land management practices that are reducing the availability of milkweed;
- Possible changes in milkweed availability, quality, and distributions due to effects of climate change;
- Pesticide use to control other insects, with unintended harmful consequences for monarchs;
- Habitat conversion in California, resulting in reduced availability and quality of overwintering sites; and
- Shifting overwintering habitat quality, as the trees in California’s monarch groves age and deteriorate.



## Monarch Joint Venture Projects

Ensuring the availability of quality habitat is critical for the conservation of any species. The availability and quality of monarch breeding habitat has diminished in recent years, with a reduced abundance of milkweed in the landscape in the eastern and western U.S. Overwintering habitat for the western monarch population is threatened by habitat destruction and degradation due to development. MJV partners are engaged in work to improve habitat availability and quality for both eastern and western monarch populations. We are implementing a variety of science-based habitat conservation and public engagement projects to better protect monarchs while inspiring America’s youth and adults to observe and study nature.



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INTERNATIONAL PROGRAMS  
US Forest Service, Department of Agriculture

Photo credits: Chip Taylor, Wendy Caldwell, Steven Munafò, Jim Ellis

## **A few of our current projects include:**

- Increasing the availability of native milkweed seeds and plants for habitat enhancement projects;
- Adding milkweed and nectar plant seeds in key monarch breeding areas annually;
- Expanding butterfly gardening programs (e.g. Monarch Waystations) to increase monarch habitat and citizen engagement in monarch conservation;
- Inventorying, assessing, and creating land management plans for monarch overwintering sites along coastal California;
- Creating wildlife corridors by expanding monarch habitat in corporate landscapes, utility right-of-ways, residential landscapes, and neighborhood common areas;
- Conducting teacher-training workshops to increase student knowledge of monarch biology across the migration flyway;
- Increasing citizen-science monarch and other butterfly monitoring efforts, especially in important areas where little or no data exists; and
- Expanding the online availability of monarch and milkweed educational resources.



## What is a Conservation Joint Venture?

In 1986, the largest cooperative effort ever initiated to protect wetlands, waterfowl, and other wildlife was initiated with the North American Waterfowl Management Plan. In a new approach to conservation, regional partnerships of agencies, non-profit organizations, corporations, tribes, and individuals—called Joint Ventures—were created to implement conservation plans within specific geographical areas.

Joint Ventures increase the efficiency and effectiveness of conservation by bringing together the science, the people, and the resources needed to develop and implement conservation strategies. Due to their remarkable success, Joint Ventures have been generally accepted as the model for moving bird conservation forward in the 21st century.

The similar migratory nature of birds and monarchs, and their use of multiple habitats across a large landscape, make the Joint Venture model ideal for building monarch conservation efforts.

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