

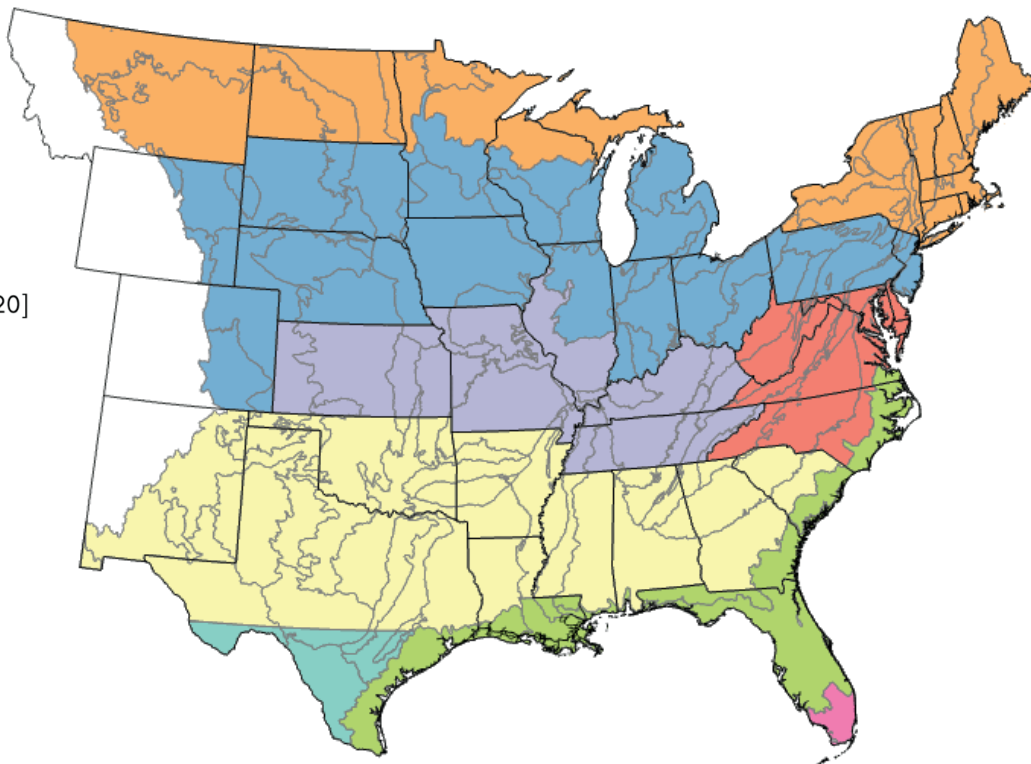
Mowing and Management:

Best Practices for the Eastern Monarch Range



The importance of management: Disturbance is a critical driver of health and biodiversity in grassland ecosystems. Historically, natural events like periodic fires and ongoing grazing by animals like bison, deer, and elk kept woody species and grasses in check, maintaining open and diverse plant communities. In the absence of such natural disturbances, grasslands risk becoming overrun by trees, shrubs, and dominant grasses, reducing habitat quality. Thoughtfully applied, disturbance remains a cornerstone of grassland conservation. Land managers can replicate these natural processes by using tools like controlled burns, mowing, or managed grazing to simulate the effects of fire and herbivory.

Recommended Management Timing



These regional spring, summer, and fall management windows may reduce direct impact on monarchs. Periods indicated by [brackets] reflect windows during the growing season when monarchs may still be present but at reduced density.

Considerations when using recommendations

- Monarch breeding and migrating activity varies from year to year. Verify monarch presence or absence using real-time observations on Journey North (journeynorth.org/monarchs) or iNaturalist (iNaturalist.org) or survey for monarch eggs and larvae. This is especially important near the beginning/end of a management window or in unusual weather years.
- Year-round monarch breeding can occur in areas with mild winter climates, especially on non-native milkweeds. See the Monarch Joint Venture handout "Tropical Milkweed and OE: Potential Risks for Monarchs" to learn more.
- If you must manage while monarchs are present, minimize disturbance to milkweed and blooming flowers. For example, mow only where necessary, avoid milkweed and blooming plants during management, and manage only a portion of an area.

Understanding when monarchs and milkweed are present can help land managers make informed decisions about management timing, balancing necessary disturbance and immediate impacts on wildlife. Properly timed management can reduce harm to monarchs by avoiding peak periods when eggs, caterpillars, or adult monarchs are present. **These recommendations are intended to reduce harm to monarchs based on breeding and migration activity in the eastern U.S.** These recommendations along with conservation objectives specific to your situation can inform your land management activities.



Mowing: Best Practices for Monarchs

Mowing can be an effective management tool to control woody and weedy species and keep undesirable species from setting seed. It may also stimulate the growth of desirable nectar plants. However, mowing too often or during certain times of the year may result in reduced habitat quality and higher mortality for wildlife. Monarch eggs, larvae, pupae, and even adults may be killed directly by the mower, and mowing can remove timely resources for monarchs and other species. To minimize threats to monarchs, follow these BMPs:

- **Avoid mowing the entire habitat.** Leave unmowed areas for wildlife to escape during management and maintain access to resources. Leave areas with good wildlife nesting or overwintering sites (leaf litter, dead stems, other ground cover). Signage may prevent accidental mowing and help communicate why an area is not mowed.
- **Avoid mowing habitat when monarchs are present.** Survey for monarchs before conducting growing-season mowing. Mowing milkweed mid-season in areas where there is a lull in monarch activity, such as the Southern Great Plains, may promote milkweed growth and late summer or early fall breeding.
- **Allow native plants to disperse seed.** Maintaining a native seed bank helps to retain plant diversity. Delay mowing until native plant seeds have dispersed or have been collected.
- **Reduce mowing overall.** Where regular mowing is required, consider reducing to 1-2 mows per year. Utilize integrated vegetation management to target mowing primarily for weed control. During the first year of restoration projects, more frequent mowing may be needed. Once established, mowing too frequently reduces habitat diversity.
- **Use a minimum cutting height of 10-12 inches** (shorter may be needed for early establishment mowing). This effectively removes seed-producing parts of most weedy plants and lessens impacts on wildlife.
- **Use a flushing bar and cut at reduced speeds** to allow wildlife to escape prior to mowing.

For a list of references and additional guidance, visit the MJV website: www.monarchjointventure.org

When are monarchs present in your area?

Throughout most of the eastern US, monarchs are present and reproduce from spring to fall. The timing of this activity depends on your location within their migratory route. They are also present year-round at specific areas of the southern coast. Community science websites such as **iNaturalist** or **Journey North** allow users to see others' monarch observations, offering a real-time picture of monarch activity near you. Additionally, you can look for signs of monarchs on your own land (see figure below).

Search for signs of larval presence on milkweed plants such as small chewed holes from first instar caterpillars and frass from fifth instars.



Management Scenarios

Brush Management/Woody Species Control: Mow any time monarchs and milkweed are likely not present to help control woody encroachment. If mowing must take place during the growing season, do not mow the entire area at once.

Noxious Weed Control: Optimal management timing is specific to each weed species. Mow only the affected areas just before or during flowering to prevent seed production, continuing to mow regrowth. Mowing alone may not be sufficient for complete control of noxious weeds; if appropriate for your situation, you may want to follow-up with spot herbicide treatments or manual removal until the targeted weed population is controlled. Always use herbicide according to the label instructions. Repeat this process as needed until the targeted weed population is controlled.

Mowing for Wildlife Habitat: This method involves mowing different sections of the grassland parcel each year on approximately a two- to five-year rotation. This is effective in maintaining habitats with diverse vegetation of different ages and structures while preventing the growth of trees and shrubs.

How was this map made?

Data used to create management windows during the monarch breeding season for the eastern U.S. were provided by the Monarch Larva Monitoring Project (MLMP) from 1997-2024 (mlmp.org) and Journey North (journeynorth.org). Peak monarch migration estimates from Monarch Watch (monarchwatch.org) were used to generate recommendations for management during fall migration. Expert opinion by field biologists and scientists was also used to inform management windows. Recommended management zones were defined by a combination of latitude, state boundaries, and EPA Level III ecoregion.

Mowing and Management References

Baum, K. A., and E. Mueller. 2015. Grassland and roadside management practices affect milkweed abundance and opportunities for monarch recruitment, pp 197–202. In K. S. Oberhauser, K. R. Nail, and S. M. Altizer, (eds.), *Monarchs in a changing world: Biology and conservation of an iconic butterfly*. Cornell University Press, Ithaca, New York

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Hopwood, J., S. H. Black, E. Lee-Mader, A. Charlap, R. Preston, K. Mozumder, and S. Fleury. 2015. "Literature Review: Pollinator Habitat Enhancement and Best Management Practices in Highway Rights-of-Way." Prepared by The Xerces Society for Invertebrate Conservation in collaboration with ICF International. 68 pp. Washington, D.C.: Federal Highway Administration