USDA United States Department of Agriculture

Best Practices for the Monarch Butterfly

Achieving best results for the monarch in the Midwest

USDA's Natural Resources Conservation Service (NRCS) is working with partners and landowners to increase eastern monarch butterfly habitat on private lands. NRCS is targeting the monarch's core migration route and primary breeding range within the Midwest and Southern Great Plains states to restore and enhance monarch habitat wherever possible. This "*All-Hands on Deck*" strategy can be applied to great effect on small plots of non-production land.

NRCS requests the voluntary assistance of landowners and agricultural producers to incorporate monarch habitat on their land. By implementing and managing a monarch conservation plan, conditioned with the conservation measures prescribed in the Monarch Butterfly Conference Report (herein referred to as best practices), eligible landowners and agricultural producers may reverse the decline of the eastern monarch butterfly population. What's more, by adhering to these best practices, participants will receive the peace of mind that comes from ESA predictability.

Incorporate these best practices into your monarch butterfly conservation plan:

Use Approved Decision Support Tools

Use the monarch Wildlife Habitat Evaluation Guide (WHEG) as a decision-support tool to inform the planning process, and to implement a plan to restore degraded habitat. Furthermore, use the WHEG to inform future management actions to maintain or enhance the habitat rating (i.e., *fair* to *good*, *good* to *excellent*). Apply all applicable best practices prescribed in this document, unless the habitat rating for the AA is *poor* or *fair*.

Why? The WHEG is the decision-support tool NRCS planners and their Clients use to identify resource concerns and to develop a plan to restore or improve habitat. Applying additional best practices to activities in habitat with a rating of *poor* or *fair* places undue burdens on actions that result in long-term conservation benefits, whereas, avoidable adverse effects may result from actions in *good* to *excellent* habitat if not conditioned with additional best practices.

Use Time-of-Year Restrictions

Implementing and managing the plan consistent with an applicable time-of-year restriction ensures best outcomes (use NRCS Monarch Management Zones Map, and Journey North animation map if necessary). If activities must occur during this period in habitat with a WHEG rating of *good* or *excellent*, it is highly recommended to do so within the preferred dates and employ all applicable best practices. Importantly, because of the immediate need for quality habitat, strict adherence to time-of-year restrictions should not preclude activities to implement or manage habitat rated as *poor* or *fair*.

Why? Curbing activities during peak breeding and migration periods is paramount to achieving best outcomes. Adhering to all applicable best practices in *good* or *excellent* habitat during a time-of-year restriction period helps avoid and minimize larval and adult mortality; however, some research suggests that management actives during a discrete window within the time-of-year restriction period is beneficial. Activities related to plan implementation or management in habitat with a

WHEG rating of *poor* or *fair*, should have more long-term beneficial effects—despite occupancy—and should be undertaken whenever possible (i.e., without restrictions).

Look Before Acting

To the greatest extent practicable, monitor the habitat for the presence of eggs and larvae before undertaking management activities. Use the WHEG to document the need for management in addition to an approved egg and larva survey protocol (e.g., Integrated Monarch Monitoring Program). It is especially important to conduct monitoring before undertaking activities within the time-of-year restriction period.

Why? Non-specialists can be trained to perform a rapid assessment to detect the presence of monarch eggs and larvae. Foregoing activities (plan implementation or management) until eggs and larvae are absent or in low abundance can greatly minimize mortality and thereby balance short-term adverse with long-term beneficial effects. Monitoring is an option under NPS 645, Upland Wildlife Habitat Management, which the planner and client may select and receive financial assistance to offset costs.

Coordinate Activities with Neighbors

To the greatest extent practicable, use an adaptive, landscape approach by coordinating plan implementation and management activities with neighbors.

Why? Coordinating activities with neighbors may result in better outcomes and reduce the frustration and limitations inherent with well-intended best practices.

Burning

1. Implement prescribed fire to no more than 1/3 of the habitat, unless suitable monarch habitat exists nearby, or the WHEG rating is *poor* or *fair*.
   Why? Prescribed fire is a common management technique used to set back ecological succession. Restricting burning to a fraction of the habitat retains suitable habitat, promotes ecological heterogeneity, and promotes abundant breeding and nectaring resources.

2. Allow at least 3 years to elapse without fire (i.e., minimum 4-year rotation) before re-burning any area. Successive burns are allowable to establish or re-establish habitat (typically 2-3 years in a row).
   Why? Prescribed fire is a common management technique used to set back ecological succession but may also be used to prepare a site for planting monarch habitat (plan implementation). Burning a limited portion of the site retains suitable habitat, promotes ecological heterogeneity, and promotes abundant breeding and nectaring resources.

3. Allow fires to burn in a patchy, finger-like pattern within units. Do not burn every square inch, rather, allow “skips” of unburned habitat.
   Why? Prescribed fire is a common management technique used to set back ecological succession. Encouraging landscape matrix with practices with patches of suitable habitat promotes ecological heterogeneity and long-term benefits important to the monarch’s life cycle.

Grazing

Ensure forage harvested by grazing animals does not exceed ½ of the current available forage. Limit to once per growing season, if possible.

Why? Grazing livestock is a common management option used to disturb herbaceous systems. Through a prescribed grazing plan, higher quality habitat may be achieved by controlling overutilization, thereby promoting ecological heterogeneity, and the retention of abundant breeding and nectaring resources.

Herbicide Applications

1. Plan implementation: Broadcast apply herbicides consistent with the time-of-year restrictions, unless the WHEG rating is *poor* or *fair*.
   Why? Broadcast application of herbicides is often the most cost-effective and efficient way to prepare existing stands to high quality, species-rich monarch habitat. Depending on the existing cover, aggressive treatment may be necessary.
2. Plan management: Spot apply selective herbicides without time-of-year restrictions during the establishment period, or to maintain, restore or enhance the WHEG rating (i.e., *fair-to-good*, *good-to-excellent*).
   Why? Undesirable plant species (e.g., invasive species) may reduce outcomes for the monarch. Selective herbicides are not expected to harm any of the monarch life stages if applied to spots of infestation, and according to the label. However, if applied without caution, herbicides can reduce milkweed and nectar sources and compromise outcomes.

Mowing and Haying

1. Mow or hay no more than 1/2 of the habitat per year and leave patches of untreated habitat for the entire year.
   Why? Mowing and haying are common management techniques used to set back ecological succession. Limiting this activity to a portion of the site retains suitable habitat, promotes ecological heterogeneity, and promotes abundant breeding and nectaring resources.

2. Mow at the highest cutting height possible, ideally 12-16 inches (30 - 40 cm), but no less than 8 inches (20 cm). Limit to once per growing season or defer after fall migration.
   Why? Much like burning, mowing benefits monarch habitat because it replicates disturbance and stimulates new plant growth. Increasing mowing height retains more standing biomass reduces temporal loss of milkweed and nectar resources.

Tillage

Shallow-till no more than 1/2 of the habitat per year, if possible. Leave patches of untilled habitat for the entire year.
Why? Use of a tillage tool such as a disk to break the sod and stir the soil surface to a shallow depth is a common management technique used to set back ecological succession. Tilling a limited portion of the site retains some suitable habitat, promotes ecological heterogeneity, and promotes abundant breeding and nectaring resources. Mowing, burning, grazing or haying may be needed prior to tillage if equipment is not heavy enough to penetrate existing sod.

Useful Resources:

NRCS Storyboard: "Working Lands for Monarch Butterfly"
"*Good for Butterflies, Good for Your Bottom Line*"
NRCS Monarch Management Zone Map

- Based on Monarch Joint Venture's "Mowing: Best practices for Monarch"

Journey North Interactive Maps

- Real-time peak migration tracking.

Integrated Monarch Monitoring Program

- Monitoring protocol, online-training and datasheets