

Best Management Practices

Monarch Habitat (Grazing)

Initiative supported by:



The Missourians for Monarchs Habitat Initiative is a partnership between producers, federal, state and local conservation organizations to sustain habitat for monarch butterflies and pollinators through voluntary citizen involvement. The collaborative agrees to create at least an additional 19,000 acres of pollinator habitat annually for the next 20 years.

Learn how you can benefit monarch butterflies & pollinators not only on agricultural land, but also at home, school & other sites: moformonarchs.org

Photo courtesy of: Jim Hudgins/USFWS



• **Animal Unit Equivalentents**

- Stocking recommendations should be based on Animal Unit Equivalentents (AUE), and not on the number of animals being grazed. Most (but not all),AUE definitions are based on the concept that a 1,000-pound cow, with or without an unweaned calf, equals one animal unit. Such a cow is assumed to consume approximately 26 pounds of forage dry matter per day. The following Animal Unit Equivalentents (AUE) should be used to determine stocking rate.

Animal Type	AUE
Horse	1.25
Cattle	-
Bull	1.25
1,000 lb. cow	1.0
500 lb. calf	0.5
300 lb. calf	0.3
Sheep	0.2
Goat	0.17

- **Use cattle as a management tool!** Graze mixed cool season and warm season grass early to set back cool season and release warm season grass and forbs. Cattle can also be used to intensively graze an area to prepare it for fall herbicide applications.
- If invasive plants or woody encroachment is an issue, then consider spot spraying during the growing season or basal bark treatment during the dormant season to avoid collateral damage to native forbs. Herbicides used to control tree sprouts or exotic species on native prairie will also kill most forbs, so individual plant treatment is preferred over broadcast spraying.

10. **Limit Dewormers and Medications -**

Parasiticides should be limited to those that pose the lowest risk to native insect species. Dewormers with active ingredient Moxidectin (trade name Cydectin), have shown to be the least harmful to native dung beetles in all life stages and are preferred at this time. The Minnesota DNR document, http://files.dnr.state.mn.us/natural_resources/npc/bmp_dewormer.pdf contains a table that compares the relative impact of multiple dewormers on dung beetles.



Photo courtesy of: Megan Rudroff

Following these BMP’s can help improve your property for monarchs, pollinators and other grassland dependent wildlife like quail and grassland songbirds while improving water quality and holding soil in place. If you would like to discuss your plans with a resource professional, please contact your local Private Lands Services biologist with the **Missouri Department of Conservation:** <https://mdc.mo.gov/regional-contacts?county=103&=Go>

Your local county **Natural Resources Conservation Service Field Office:** <https://www.nrcs.usda.gov/wps/portal/nrcs/site/mo/home/>

Your local **U.S. Fish and Wildlife Service Missouri Private Lands Office:** <https://www.fws.gov/midwest/partners/index.html>;

Your local **Soil and Water Conservation District Office:** <https://mosoilandwater.land/> for assistance from a resource professional.



Photo courtesy of: MDC

7. Do not spray pesticides in or surrounding pollinator habitat if possible, but if you must use pesticides, limit their use to controlling invasive or noxious weeds.

- Follow label on pesticides
- If using with a triazole fungicide use only with approved tank-mixes.
- Utilize Drift reduction nozzles to reduce herbicide drift into unwanted areas including pollinator plots.
- Limit overspray- Allow wildflowers to grow beside your crop fields.
- Lower booms and pressure rates during pesticide applications to reduce drift. Droplegs are a good option as well...
https://beecare.bayer.com/bilder/upload/dynamicContentFull/BEENOW/BEENOW_GB_dropleg_higher-protectioniwrsi02d.pdf
- Check the wind speed is less than 5 mph, that nozzles are as close to the crop as possible, and appropriate nozzles are being used and properly cleaned. This is particularly important with older equipment.
- Avoid spraying when bees are actively foraging. Spray in the evening or in the early morning when fewer bees and other important pollinators forage. Bees usually do not forage in significant numbers at temperatures below 50°.

8. Use long rest intervals for pastures when possible-

- Ensure part of the farm remains ungrazed while other patches are grazed short, and still others are recovering from past grazing. The larger the rest interval, then better.
 - These recovering areas host an array of annual, biennial, and perennial plants that provide wildlife food in the form of seeds, nectar, pollen, and insects.
 - Well-managed grazing can help create new usable space in the form of patchy, diverse grasslands and help meet the needs of quail and other grassland wildlife, including pollinators, throughout the year.
 - Good quality cover and pollinator habitat often results during the recovery period after grazing. It is important not to mow or spray these areas to provide optimal pollinator habitat. Maintaining about 1/3 of the total grassland acres in brood habitat from June through the end of September will be of great value to pollinators.
9. **Be Flexible**-The key to proper grazing is to be flexible with grazing dates and stocking density and frequently (at least weekly), monitor the condition of the vegetation and animals.
- **Consider** Stocking 1 animal unit (1000 lbs) per 4 acres and 1 animal unit per 6 acres to benefit pollinators. Adjust over time to site specific conditions.

93% of Missouri is held in private ownership and most of those acres are owned and operated by farmers and ranchers that depend on the land they own to make a living. Landowners inherently want to leave their farms in better shape than they found them and are willing to help promote multiple land uses when they are sustainable and do not cause economic losses that would endanger their operation. The Missourians for Monarchs Collaborative understands this important issue and the following is a list of Best Management Practices (BMP's) that can help integrate pollinator habitat into a successful farming operation. Missourians for Monarchs also realizes that not all these BMP's will work for every operation, but it is our intent to offer multiple practices to help farmers and ranchers reach their management objectives for pollinators with minimal effect on farm profitability.



Photo courtesy of: MDC

Grazing Operations

I. Consider excluding cattle from sensitive areas and unproductive sites such as hedgerows, woodlots, ponds or streams.

- Consider installing pollinator plots in odd areas of the operation and leave vegetation for wildlife and pollinators. Examples include establishing a pollinator plot around ponds that are protected from grazing or odd areas of the farm that are hard to reach or unproductive.

- Pollinator plots should be at least a minimum of 10 ft x 10 ft, with plants that bloom during spring, summer and fall and should consist of at least 12 species at least one of which should be a type of milkweed: You can find preferred Midwest species at the following Natural Resource Conservation Service (NRCS) link.
https://efotg.sc.egov.usda.gov/references/public/MO/Monarch_Habitat_Information_Sheet_10_30_17.pdf

- Consider establishing traditional quail escape cover in ungrazed areas adjacent to pastures, leave clumps of non-aggressive, low-growing native shrubs whenever possible. Good choices may include deciduous holly, false indigo, blackberry and wild plum. These species are also great for pollinators.
- Exclude livestock from riparian areas with permanent or temporary fencing. Planting these riparian areas to wildflowers, trees and shrubs will improve water quality and create improved habitat for pollinators.
- Developing an alternative watering source will be needed if the creek was your only source of water.
https://prod.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1144213.pdf

2. Diversify pastures and avoid Monocultures - Pollinators will get the most from diversified habitat types.
- Interseed legumes into pastures to add diversity and increase livestock gains.

- Diversify pastures with improved varieties of red clover, ladino clover, lespedeza.
https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_011376.pdf
- native forbs such as Illinois bundleflower, lead plant (*Amorpha canescens*), Maximilian sunflower (*Helianthus maximiliani*), ashly sunflower (*Helianthus mollis*), alfalfa (*Medicago sativa*), annual lespedezas will also benefit pollinators if not overgrazed.
https://prod.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_010792.pdf
- Many broadleaf plants that are considered weedy can provide beneficial forage. The following chart describes nutritional characteristics of some common pasture plants.

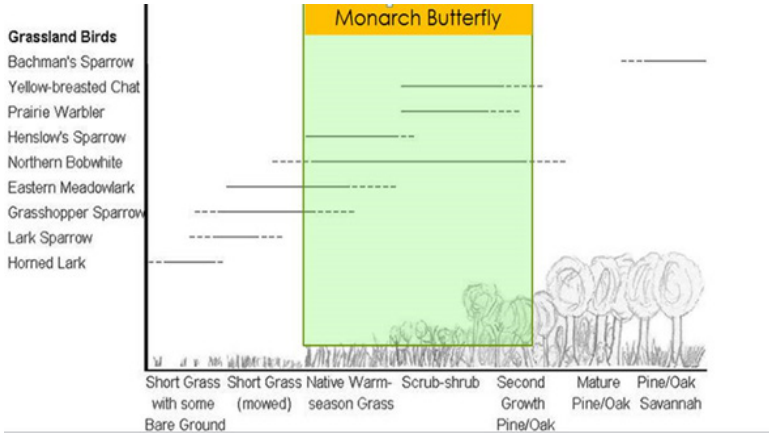
	Harvest date in July	Growth Stage	Crude protein (CP)	Invitro digestible dry matter (IVDDM)	Neutral detergent fiber (NDF)	Acid detergent fiber (ADF)
-----	-----	-----	%			
Common lambsquarters	2	Bud	22	73	22	17
Common lambsquarters	7	Flower	18	67	27	19
Shepherds purse	2	Green seed	19	55	37	29
Shepherds purse	7	Seed	16	53	41	34
Pennsylvania smartweed	2	Flower	18	47	24	19
Pennsylvania smartweed	7	Late flower	15	44	32	19
Redroot pigweed	2	Flower	18	74	22	16
Redroot pigweed	7	Early seed	15	73	27	20
Yellow foxtail	2	Early seed	17	63	52	27
Yellow foxtail	7	Seed	14	60	54	30
Common ragweed	2	Vegetative	26	77	21	17
Common ragweed	7	Vegetative	21	70	26	21
Alfalfa	7	Early bloom	20	70	28	23

Adapted from Temme, D. G., R. G. Harvey, R. S. Fawcett, and A. W. Young. 1979. Effects of annual weed control on alfalfa forage quality. *Agronomy Journal* 71:51-54.



Photo courtesy of: MDC

3. Clump-forming cool season grasses (CSG), such as timothy, redtop and orchard grass provide open areas for wildflowers and introduced legumes to have a place in the pasture. A diverse forage base allows for better pasture nutrition, but also increased pollinator habitat in the form of nectaring plants that benefit butterflies, bees and all pollinators.
- Utilize native warm season grasses (NWSG) on a portion of your grazed paddocks as they provide excellent nesting and escape cover for pollinators.
 - Mixed stand of NWSGs that includes native perennial forbs, legumes and annual weeds is a preferred mix compared to any monoculture of hay or pasture.
 - Most pollinators dependent upon nectar would prefer medium, tall and shrubby cover. Remember many shrub species provide excellent nectar sources and escape cover for insects. See chart below.



- Good brood rearing habitat for small game such as quail also makes good pollinator habitat! A diverse plant community is needed to support an equally diverse abundance of insects, the staple food for fast-growing chicks.
- Encouraging a diversified forage base will help meet seasonal forage needs, reduce the need to harvest hay and increase usable space for pollinators and other grassland wildlife.
- Diversifying a farm's forage base requires planning to establish and maintain different forage types that peak in quality and availability in different seasons. Diversification helps provide wildlife cover because grazing and rest cycles follow seasonal changes in forage quality.

- Diversifying NWSG and CSG pastures with native or introduced legumes is a good starting point for most producers. Over time, more complex diversified management plans might include work to create a forage base where total grazed acres are comprised of:
 - 25-35% Native grassland
 - 40-60% CSG, including some tall fescue for winter stockpiling.
- Consider splitting native pastures into at least two paddocks. A portion should be grazed beginning in early May through mid-June. At that time, rotate grazing to the idle portion. This approach allows livestock to graze peak-quality forage during the early portion of the season and provides undisturbed nesting/pollinator habitat through the summer. Regrowth on the portion grazed early in the season will provide good habitat for broods/pollinators produced in the ungrazed portion and will likely be attractive and beneficial to late-season nesters as well.
- 4. Reduce or eliminate haying where feasible from your operation. Hay feeding focuses intense disturbance and concentrates nutrients in high amounts.
- Hay is expensive and eliminates pollinator habitat. If you must hay, then consider the following....
 - Hay feeding sites should be on well-drained upland areas and moved frequently.
 - Hay should not be fed on diverse native pastures unless it is free of unwanted plant seed. Consider feeding hay only on introduced CSG pasture.
 - Cool-season grass hay should be cut as early as possible (preferably before May 10th), to avoid destruction of established nests.
 - Delay haying a portion of acres until at least after June 15. Early pollinators can benefit from delaying mowing until June.
 - Leave an unharvested buffer at least 50' wide along some field edges, rotate those cover strips among years to prevent woody encroachment.
 - Prairie and NWSG hay should not be cut more than once per year; taking a second cutting weakens plants and is likely to significantly reduce yields the next year. If possible, set cutting height to at least 4".

- Adopt a cutting pattern that cuts hay from the inside of a field, out to avoid trapping and killing wildlife.
- Use a flushing bar ahead of the mower to reduce the likelihood of killing insects. See picture below for flush bar example.



Photo courtesy of: www.flushingbarproject.net

5. Integrating cover crops into a grazing system can provide beneficial brooding cover and nectar producing plants.
https://efotg.sc.egov.usda.gov/references/public/MO/2_APPENDIX1_CoverCrop340_Jan2016.xlsm
- 15-25% devoted to both cool and warm season annual cover crops.
6. Put the mower away! Although sometimes necessary to gain initial control of woody encroachment, rotary mowing is not a wildlife-friendly practice. Most mowing is implemented to create a uniform, pleasing appearance; this mindset is at odds with wildlife needs in most circumstances.
- Define a clear management-driven reason before mowing. Mowing can set back succession, buy time for controlling cedar encroachment or maintain savanna habitat. In most cases targeted herbicide application is more effective than mowing.
<https://monarchjointventure.org/images/uploads/documents/MowingForMonarchs.pdf>
 - When mowing, avoid cutting the milkweed colonies and plants if possible, so learn to identify milkweed species in your area.
<https://monarchjointventure.org/images/uploads/documents/MilkweedFactSheetFINAL.pdf>