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
Animal Unit Equivalents

Stocking recommendations should be based on Animal Unit Equivalents (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 Equivalents (AUE) should be used to determine stocking rate.

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.

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.

<table>
<thead>
<tr>
<th>Animal Type</th>
<th>AUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horse</td>
<td>1.25</td>
</tr>
<tr>
<td>Cattle</td>
<td>1.25</td>
</tr>
<tr>
<td>Bull</td>
<td>1.0</td>
</tr>
<tr>
<td>1,000 lb. cow</td>
<td>1.0</td>
</tr>
<tr>
<td>500 lb. calf</td>
<td>0.5</td>
</tr>
<tr>
<td>300 lb. calf</td>
<td>0.3</td>
</tr>
<tr>
<td>Sheep</td>
<td>0.2</td>
</tr>
<tr>
<td>Goat</td>
<td>0.17</td>
</tr>
</tbody>
</table>

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 Soil and Water Conservation District Office: https://mosoilandwater.land/ for assistance from a resource professional.
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 (BMPs) that can help integrate pollinator habitat into a successful farming operation. Missourians for Monarchs also realizes that not all these BMPs 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.

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-protectionwr02d.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.

Grazing Operations

1. 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/stelppdb1144213.pdf
2. Diversify pastures and avoid Monocultures - Pollinators will get the most from diversified habitat types.
   - Intersode legumes into pastures to add diversity and increase livestock gains.
   - Diversify pastures with improved varities of red clover, ladino clover, and lespedza.

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 (NWSS) on a portion of your grazed paddocks as they provide excellent nesting and escape cover for pollinators.
   - Mixed stand of NWSSG 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.

4. Diversification helps provide wildlife cover because 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.

5. Integrating cover crops into a grazing system can provide beneficial brooding cover and nectar producing plants.
   - 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.


Photo courtesy of MDO