

Appendix 3: The Grassland Working Group Best Management Practices

The Grassland Working Group has created a list of Best Management Practices for the conservation and restoration of monarch and native pollinator required habitat on Kansas grasslands.

One of the primary needs for restoring and managing Kansas rangelands for native pollinators and other wildlife is the integration of ecologically appropriate fire cycles in grazing management systems. The grasslands of the Great Plains, and the wildlife within those grasslands, evolved with fire as one of the primary drivers of ecosystem processes, patterns, and services (Symstad & Jonas 2011). Large scale fire suppression by humans has negatively impacted those processes, patterns, and services to the detriment of grassland obligate species, such as the monarch (Sankaran et al. 2004). Promotion of the safe, planned use of fire (at historically/ecologically appropriate intervals) as a management tool can be used to restore prairie communities, control a number of invasive herbaceous and woody species, and improve palatability and nutritional content of native vegetation for grazing animals (Anderson 2006).

Grazing is also an important dynamic process within the prairie ecosystem, and livestock grazing within Kansas grasslands is important financially and culturally. The Kansas Monarch Task Force believes that the coupling of well-planned fire and grazing systems may be the most efficient and economically feasible approach for broad scale restoration and enhancement of native prairies in Kansas. As such, there should be a continued emphasis on improving grassland manager knowledge and use of prescribed grazing plans for all grazing systems. We encourage landowners, grassland managers, and technical service providers to produce and use adaptive grazing plans which account for local, site specific characteristics (geography, forage availability, type of grazing operation, season(s) of use, etc.) and climatic variability when calculating stocking and forage utilization rates as well as rest-return intervals.

Fire

Fire is necessary for the long-term maintenance of pollinator habitat and livestock production in all native rangeland ecosystems (Knapp et al. 1993; Fuhlendorf & Engle 2004). Fire can be safely returned to prairie ecosystems using well-planned prescribed fire applications.

Common Prescribed Fire Systems in Kansas

1. Irregular, Whole Field Prescribed Fire – This practice is generally employed to meet a specific objective (CRP stand regeneration as part of Mid-Contract Management, pasture burning to reduce invasive species, reduce standing dead litter prior to inter-seeding, etc.) and is employed on a whole field basis only as required. Other prescribed fire systems described below often employ a more regular, or cyclical, fire return interval.
2. Annual Spring Burning – This is a beef production-oriented practice most commonly applied in the Flint Hills ecoregion of Kansas. The practice burns every portion of a grazed area just before cattle are returned to the land each spring. This is often coupled with doubling traditional stocking rates of yearling cattle based on research showing increased weight gain efficiency for cattle on short grazing seasons following fire. While this practice is effective from a livestock production and brush management perspective, it may also produce a more homogenous landscape which can have adverse impacts on native flora and fauna as well as creating a growing societal concern in relation to potential air quality impacts attributed to the burning of many acres during the same time period.
3. Patch-Burn Grazing – Seeks to replicate the grazing and brush management benefits shown to occur with annual burning, but also promotes habitat heterogeneity and plant species diversity

that pollinators and grazers evolved with across the Great Plains. The basic principal is that portions of grazing units are burned each year (*e.g.* a different third of a grazing unit burned each year) on a rotation that provides differing age classes and vegetation characteristics in each portion of the grazing unit. Grazing animals spend a disproportionate amount of time in the most recently burned area which keeps their gain efficiencies high and provides an additional (beneficial) disturbance to the vegetative community, while providing different vegetation community structure for wildlife in the unburned portions of the unit each year. Since livestock largely do not impact the unburned areas, it also provides ample rest periods during the growing season to improve the overall vigor of the entire vegetative community. It is thought that this approach reproduces, on a smaller scale, the fire/grazing interactions seen at the landscape scale prior to settlement of Great Plains by European-American immigrants.

Suggestions for Prescribed Fire Use in Kansas

1. Burn based on historical fire cycles and seasons; acknowledging higher fire frequencies may be required to restore prairie to ecological site description parameters.
2. Consider splitting a property into multiple burn units that are burned at different times within and/or between years. This promotes early, mid and late season plant species beneficial to pollinators and livestock. Only conducting burns during the spring increases selection pressure on spring flowering plants and can reduce their presence in the community over time while concentrating air quality impacts during that same season.
3. Burning can have short-term negative or positive impacts on plants and animals. Some native prairie plants and animals thrive in areas that have been recently burned and grazed while others thrive in areas that have not been burned or grazed for multiple years. Overall, fire is a necessary process to maintain native grasslands and provides a net conservation benefit in the long-term.
4. Burning woodlands can promote pollinator habitat, particularly in oak-savannah sites.
5. Growing season burns promote the re-expression of some milkweed species, improving the resources for late-season breeding events and the fall migration. Also, growing season burns can extend crude protein and palatability of grazing lands for livestock.
6. Burn sericea lespedeza (*Lespedeza cuneata*) while it is in bloom, but before it goes to seed. This practice can help control the spread of this non-native, invasive species. In Kansas, the blooming (*i.e.*, flowering) period for sericea lespedeza can be anywhere from early August-early September. Watching plant progression is important to burning at the right time.
7. When annually burning, do not go back and burn off patches that do not burn. These unburned areas provide important refugia and cover for monarchs and other wildlife and do not limit cattle gains.
8. Burning when non-native cool season grasses are in bud (but before they flower) can help control or reduce their spread. This is typically when new growth of native warm-season grasses is one to two inches.
9. Promote Prescribed Burning Associations (PBAs) across the state. Fire is needed to control woody plant expansion, invasive and noxious weeds, and stands of rank grass that are detrimental to the plants and habitat that monarchs need for breeding and migration. PBAs are landowner-led coalitions to support the safe, effective deployment of prescribed fire in an area. This “landowner-helping-landowner” framework ensures that knowledge of fire behavior can be spread through a community to advance the safe use of fire while also pooling necessary labor and equipment to conduct prescribed burns according to prepared specifications.

10. Fire is essential to maintaining native hay meadows. Fire should be used every 2-5 years depending on grassland type and climatic conditions. Consider using a rest and haying rotation within a hay meadow every year such as: rest 1/3 from haying every year and annually rotate the 1/3 that isn't hayed; the year that the meadow is burned, the burned area can be hayed.

Suggestions for Grazing Management in Kansas

1. Promote and support statewide and regional grazing organizations with a collective mission to regenerate Kansas grazing land resources.
2. Using various grazing practices, a land manager can manage for monarch habitat for the breeding and migration seasons. Patch-Burn grazing, described above, is a beneficial technique, others include:
 - a. Two Pasture Switch Back
 - b. Modified Two Pasture Patch-burn Grazing
 - c. High Intensity-Low Frequency Grazing, Season-Long
 - d. High Intensity-Low Frequency Grazing, Late Summer-Early Winter
 - e. Grazing Without Feeding Hay
 - i. If hay is used, restrict feeding to one geographic area that is already degraded and ensure hay does not contain noxious or invasive species. Monitor hay feeding sites for noxious or invasive species.
3. Base stocking rates upon annual forage availability and grazeable acres. Calculate based upon 25-35% grazed, 25-35% trampled or otherwise not available to grazing, and no less than 50% residual growth.
4. Maintain a diverse forb community for cattle production and pollinators. When available, forbs compose a significant portion of cattle diet at certain times and can have higher crude protein and digestibility compared to perennial grass (Holechek 1984).
5. Develop a drought contingency plan to adjust stocking rates based upon annual precipitation and forage production. Maintaining a diverse plant community can mitigate soil moisture deficits and maintain higher stocking rates relative to lower diversity prairie.
National Drought Mitigation Center planning page:
<https://drought.unl.edu/droughtplanning/PlanningHome.aspx>
6. Consider water developments, such as solar water wells, away from limited riparian or wetland areas.
7. Light to moderate grazing (stocking rate) is better than no Grazing or heavy grazing
 - a. When grasslands are repeatedly overgrazed, or not grazed at all, habitat for many species is negatively impacted. Light to moderate grazing will also result in more drought resiliency in the vegetative community and provide the most consistent average daily gain for livestock (Knapp et al. 1998).

Other Grassland Management Practices

Brush Management – Invasive trees can alter native plant community diversity. Depending on the ecological site and species of invasive trees present on the site a mechanical and/or chemical application can be used to control invasive trees. Recover low density infested areas first to prevent long-term alteration of ecological processes and plant communities. Allowing 30% invasive tree infestation before acting is synonymous to losing 30% of native prairie resources for pollinators. Landowners should contact a natural

resource technical assistance provider to explore the many financial and technical assistance opportunities available to control invasive trees.

Invasive Species Management – Identify and remove invasive species, including grasses, vines, shrubs, trees and forbs identified by natural resource professionals as nonnative invasive species or native invasive species.

http://www.kansasnativeplantsociety.org/invasive_plants.php

Clean all equipment being brought into the area from outside sources. Control invasive trees and shrubs as guided by natural resource professionals.

Application of Pesticides – When considering the use of pesticides to control invertebrates perceived as a threat, landowners should consult with a County Extension Agent or the Natural Resource Conservation Service to identify the resource concern and beneficial practices to address it if needed. If pesticide use must be implemented, use best management practices to avoid migration timing, breeding periods, locations, drift etc.

<http://www.epa.gov/pesticides/factsheets/ipm>.

Application of Herbicides- A healthy prairie with a diverse wildlife community is invaluable to pollinators and provides nectar resources needed by monarch butterfly adults. Control of invasive plant species is imperative to maintain this healthy prairie wildflower community. In the United States, invasive plants are linked to the decline of 33 butterfly species (New et al. 1995, Wilcove et al. 1998), and 15 of 18 recovery plans for threatened or endangered butterflies recommend invasive plant control (Schultz et al. 2008). While herbicides can be an important management tool, broadcast applications of herbicides can reduce important floral resources. To avoid herbicide damage to nontarget plants and associate pollinators, avoid broadcast spraying or pellet dispersal, which may kill large number of larval hostplant or adult forage plants. Instead, spot treatment of targeted invasive plant species is a preferred method, allowing for selective control. For floral invasive species, to minimize negative impacts to monarch and other pollinators, treatment prior to blooming is recommended. If treatment must occur during the blooming period, it is recommended to spray early or late in the day or on cloudy, cool days when butterflies and other pollinators are least active.

Mowing and Haying – Avoid mowing and or shredding or pastures before and during spring and fall migration. Consider other techniques to achieve land management goals.

Consider harvesting hay during non-blooming periods for beneficial nectar plants. Leave unharvested strips or areas as allowable or alternate timing of harvest. Avoid broadcast herbicide application, except to control noxious weeds.

Inter-seeding Forbs – Inter-seeding diverse forb mixes into pasture/CRP stands lacking a diverse forb community beneficial to pollinators. Follow guidelines for local CRP CP-42 plantings or consult a natural resource professional to develop a locally adapted seed mix beneficial to the monarch butterfly. Use native local seed sources ecologically suitable for your site.

<https://websoilsurvey.nrcs.usda.gov/app/> When planting use minimum till drills.

Wetland Management – Management of water resources along riparian areas and other wetland types can also provide habitat for Monarchs. Migrating monarchs will stopover at water resources. Often, these wetland areas are rapidly invaded by nonnative and introduced species, making them unavailable to monarchs. Manage upland portions of the watershed to maintain, enhance or restore hydrologic function, water-holding capacity and healthy wetland plant communities. Develop grazing regimes that benefit the plant community, habitat structure and function. Include these areas in prescribed burn units.

Landowners can consult with natural resource professionals to identify resource concerns, monitor forage/habitat condition, and acquire technical guidance concerning monarch and pollinator conservation. Opportunities exist to continue rangeland management education by joining regional grazing groups through conservation organizations such as, Kansas Grazing Lands Coalition and attending educational events (i.e. Kansas Grazers, Range Schools, Comanche Pool Coffee Shops, K-State Extension, Prescribed Burn Workshops) to advance application of new resource management information and innovation.

NRCS's Field Office Technical Guide

<https://efotg.sc.egov.usda.gov/#/>

KDWPT's Habitat First Program – Practice Descriptions and Specifications

<https://ksoutdoors.com/Services/Private-Landowner-Assistance/Wildlife-Biologists/Habitat-First-Program/Payment-Rates-Practice-Descriptions/Practice-Descriptions-Specifications>