



Patch Burn Grazing

Conservation Practice Information Sheet (IS-MO528A)

Designing a Patch Burn Grazing System

What is Patch Burn Grazing?

Patch burn grazing is defined as the application of prescribed fire to focus livestock grazing on a portion of a single grazing unit where the objective is to increase the diversity and structure of the vegetation in a way to benefit wildlife and maintain livestock production. Patch burn grazing is a grassland management practice for landowners primarily interested in improving habitat for wildlife while still maintaining cattle production on their land. This management practice creates a mosaic of heavily grazed and lightly grazed areas that provide a diverse vegetative structure and increase plant diversity in the same grazing unit. From a livestock production perspective, reports from research in Kansas and Oklahoma are showing that patch burn grazing is producing weight gains competitive with cattle raised under traditional grazing management in the Flint Hills.

Fire and nomadic herbivores, such as bison and elk, played an important roll in shaping and developing Missouri's prairies. Historically, only a portion of a prairie would burn. Fires were either intentionally set by Native Americans or started by lightning. During the growing season, large herds of bison were attracted to the recently burned areas for the succulent new growth. Bison would continue to graze these sites until the herd depleted the vegetation in the area or moved to another part of the prairie. At the same time, nearby unburned areas remained relatively undisturbed.

The following season, last year's burned-and-grazed sites would produce a patchy stand of grasses and forbs with bareground in between – ideal habitat for grassland wildlife. These areas were also less likely to burn than the undisturbed sites because there was little or no fuel available to carry a fire. However, the undisturbed portion of the prairie would burn, and now these freshly burned areas were what attracted bison and other herbivores. Over time, a patchwork of areas disturbed and undisturbed by fire and grazing were scattered across the prairie. This mosaic of plant structures and diverse species were attractive to all grassland wildlife.



The objective of a patch burn grazing system is to use fires to focus livestock grazing in scattered patches across a single grazing unit. The affect is a range of heavy grazing to virtually no grazing within the same unit, without the use of interior fencing. Grasslands under patch burn grazing have greater plant and animal diversity than grasslands that are just burned or grazed. A patch burn grazing unit may appear to be mismanaged and under-utilized.

However, this untidy appearance is precisely what provides habitat for grassland wildlife. And the system appears to also benefit forage, as livestock gains on patch burning systems are even with those on traditional systems.



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With settlement, fires and large herbivores were eliminated from much of the prairie. At first, early pioneers plowed only parts of the prairie. This not only destroyed the native grassland but also prevented fires from consuming entire landscapes. Without fire, isolated prairies were soon invaded by woody vegetation and choked with litter from dead vegetation. Bison and elk were hunted to near extinction, or driven west in search of new grasslands and replaced with cattle. Eventually cattle were confined to fenced grasslands that were continuously overgrazed each year. This led to further degradation of the remaining native grasslands. In less than a hundred years the complex relationship between fire and nomadic grazing were eliminated from the prairie landscape.

Today, no single management practice can recreate the plant diversity and structure that result when both fire and grazing are used together in a patch burn grazing system. Prescribed burning or traditional grazing systems, especially early intensive grazing systems, will produce a uniform stand of vegetation that is attractive to very few grassland species. Haying and mowing also create a homogeneous stand of vegetation that is similarly unattractive to grassland wildlife. The plant diversity and structure that historically occurred on the prairie landscape for thousands of years with fire and bison can best be reproduced with patch burn grazing.



The goal of a patch burn grazing system is to create a diversity of structure and plants that benefit livestock as well as wildlife.

Why Patch Burn Graze?

Patch burn grazing is an alternative to traditional intensive grazing systems. Instead of depending on interior fencing to focus grazing in a portion of a unit, a manager instead uses post-fire regrowth to attract cattle to selected areas. Meantime, other portions of the unit remain open to grazing but are underutilized, thereby allowing plants to rest while root reserves build up.

Patch burn grazing benefits a wide range of wildlife species, particularly grassland birds, by providing a mosaic of different vegetation types. Burned and grazed patches will support early successional plants like black-eyed susan, croton and ragweed the following year – excellent quail food. Late successional plants like goldenrods and asters are more common in areas that have not been burned or grazed for one or two years. The method provides dense nesting cover, open brooding areas, and escape habitat not only within the same field but in close juxtaposition with one another, improving the ability of grassland wildlife to nest and raise young. The diversity



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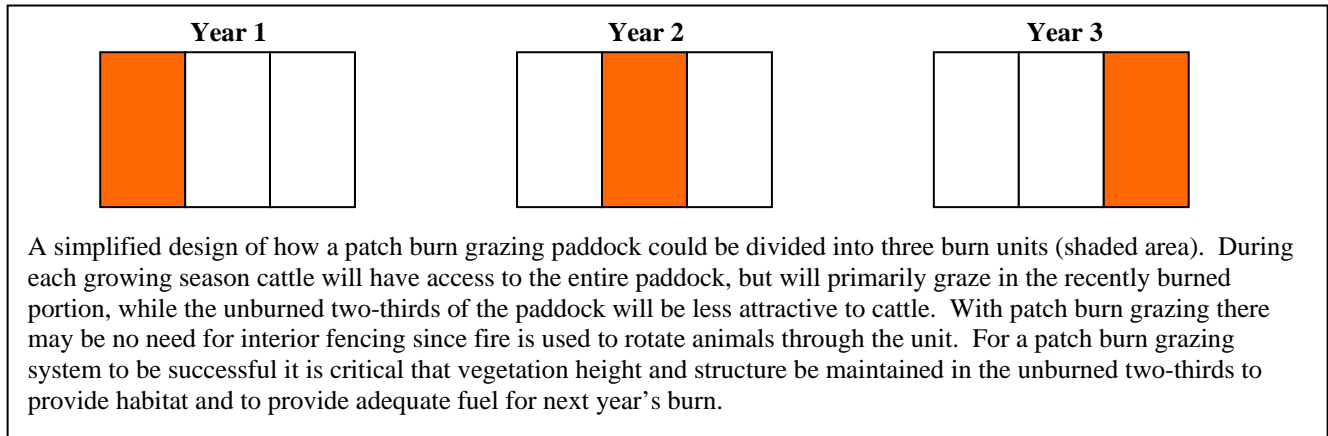
of structure and plants created through the combination of burning and grazing is not re-producible by either of these methods used alone; or by any other management practices with which we are familiar with.

Livestock also benefit from a patch burn grazing system. Research in three on-going trials in Oklahoma have shown that cattle on patch-burn-grazed native grasslands have gains comparable to those cattle in the traditional intensive grazing system. The increased plant diversity may also be a plus for livestock health.

A patch burn grazing system has many advantages for the producer over a traditional grazing system. With patch burn grazing there may be no need for interior fence (once the system is established), only one water source may be necessary for the entire unit, and less time is spent maintaining the grazing unit and rotating animals. This ultimately leads to lower operating cost for the producer.

Where can Patch Burn Grazing Be Applied?

Most research has been completed on native grasslands in Oklahoma and Kansas. Little research has been done on cool-season pastures; however, managers believe similar results can be obtained, with attention to burning dates. Given our current understanding, patch burn grazing might best be applied to native grass pastures and native prairies. This type of system might also be used successively to restore remnant prairies which have been invaded by exotic cool-season grasses. Further research is underway in Missouri to determine how our various situations may be improved with the technique. Grasslands currently enrolled in CRP or other conservation programs could be grazed under a patch burn grazing system.



Who Should Consider Patch Burn Grazing?

Patch burn grazing is not for everyone. The technique is best suited for landowners interested in improving wildlife habitat *and* producing cattle. Patch burn grazing may not be for managers exceeding carrying capacity since proper stocking is essential for the desired response from the forage. It is important to understand that ungrazed forage is not wasted. It is more in a mode of stockpiling; or of restoring carbohydrates to the root reserves. Research has shown that cattle have similar average daily gains on a patch burn grazing system as those on an intensive management system. Due to a lower stocking rate, total gain per acre may be lower. Remember, with a patch burn grazing system cattle will have access to the entire unit but will primarily graze in only one-third of the unit. In intensive rotation systems, the entire unit will be grazed uniformly.



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Patch burn grazing may require managers to reduce the number of animals where over-stocking has been the norm. However, the comparable livestock gains cited on Oklahoma patch burn grazing trials were achieved with stocking rates that were the same as those on the traditional early intensive grazing areas. It is also important to note that the grazing unit should be stocked for the entire acreage... not just the third of the area that is patch burned. During the initial set-up of a system, a portion of the grazing units may need to be temporarily fenced off in July to ensure that there will be adequate regrowth to carry a burn the following spring.

Patch burn grazing will create a mosaic of vegetation heights across the unit. To the uninitiated, patch burn grazing units will appear mismanaged. Although it may be unattractive by traditional standards, this untidy appearance is very attractive to grassland wildlife and critical if the patch burn grazing design is to work.

Developing a Patch Burn Grazing System

It will take three years to complete a patch burn grazing cycle. However, wildlife and cattle will benefit the first year. Before starting the cycle, resting a portion of the unit for part of the growing season may be necessary to build-up adequate fuel loads to be burned the first year. A minimum of 30 contiguous acres might be preferred to provide ample nesting cover for grassland birds. *Before starting a patch burn grazing system managers should evaluate their present goals and current stocking rates to determine if this type of system will work for them.*

Designing a Patch Burn Grazing System:

1. In July, evaluate the current herbaceous fuel load in the grazing unit. At least 3 inches of residual plant material must be present to carry a fire. If fuel is lacking, then temporarily fence off one-third of the unit or move cattle to another paddock to allow litter to build-up. The excluded acreage should not be mowed, hayed or grazed from July until after the prescribed burn.
2. Conduct a prescribed burn on the excluded one-third of the unit. Cool-season grasses should be burned between the dates of September 1st and March 1st and warm-season grasses from March 1st to April 15th. Prescribed burns should be conducted at a time of the year to stimulate grass production. Consider topography, surrounding vegetation, natural and man-made firebreaks and proximity to buildings and other structures when conducting prescribed burns. Avoid placing firebreaks along the edges of woody draws. Instead, construct firebreaks along ridge-tops and burn through woody draws. Doing so will help control woody vegetation encroachment in to the grassland. *Landowners should request an approved prescribed burn plan before conducting a burn.*
3. Stock grazing unit based on the entire paddock acreage, not the portion burned. Cattle should be stocked when there is adequate forage in the burned portion of the unit. Initial stocking heights for grasses do not apply in a patch burn system.

Suggested stocking rates in animal units (AU):

- 1 AU per 5 acres for native warm-season grasses
- 1 AU per 4 acres for cool-season grasses

4. End grazing when forage in the unburned portion of the unit reaches an average height of 6 to 8 inches for cool-season grasses and 10 to 12 inches for native warm-season grasses. *Minimum forage heights*



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do not apply to the burned portion. The unburned portion, approximately two-thirds of the entire unit, should be left for habitat and not heavily grazed, hayed or mowed. Some light grazing may occur in the unburned area, but remove cattle before minimum forage heights are reached in the unburned area to provide wildlife habitat, to protect next year's fuel load for the portion to be burned, and to improve grassland health. Additional grazing paddocks will be necessary to ensure ample vegetation remains in the ungrazed portion of the unit.

5. The second year, conduct a prescribed burn on one-half of the unburned two-thirds from last year. Repeat the process described above. During the second year cattle will graze primarily in the newly burned area, while the previous year's one-third and the remaining one-third are only used occasionally. Continue to maintain minimum heights in the unburned two-thirds of the unit.
6. In the third year, burn the remaining third of the unit and repeat the process.
7. In the fourth year, burn the first area treated and repeat the cycle in future years.

Other Considerations

1. Vary the boundaries of each burn unit and time of year burned to improve plant structure and diversity. Consider burning in summer or early fall to setback warm-season pastures and encourage cool-season plants and forbs.
2. To create an even patchier and diverse grazing paddock, divide each burn unit into several smaller burn units that equal no more than one-third of the total paddock.
3. Control invasive vegetation.
4. Exclude livestock or limit access to sensitive areas such as riparian corridors and woodlands.
5. Have additional pasture ready in case the minimum vegetation heights within the patch burn unit are being jeopardized.



Greater prairie chickens require a range of habitat structure, including short cover or bare ground for booming, tall, dense cover for nesting, and open, diverse areas with a juxtaposition of bare ground and taller plants for brood-rearing. Properly applied patch burn grazing supplies all these needs, as well as those of many other grassland birds, in the same unit.

For additional information on patch-burn grazing, contact your local USDA Service Center or Missouri Department of Conservation office.

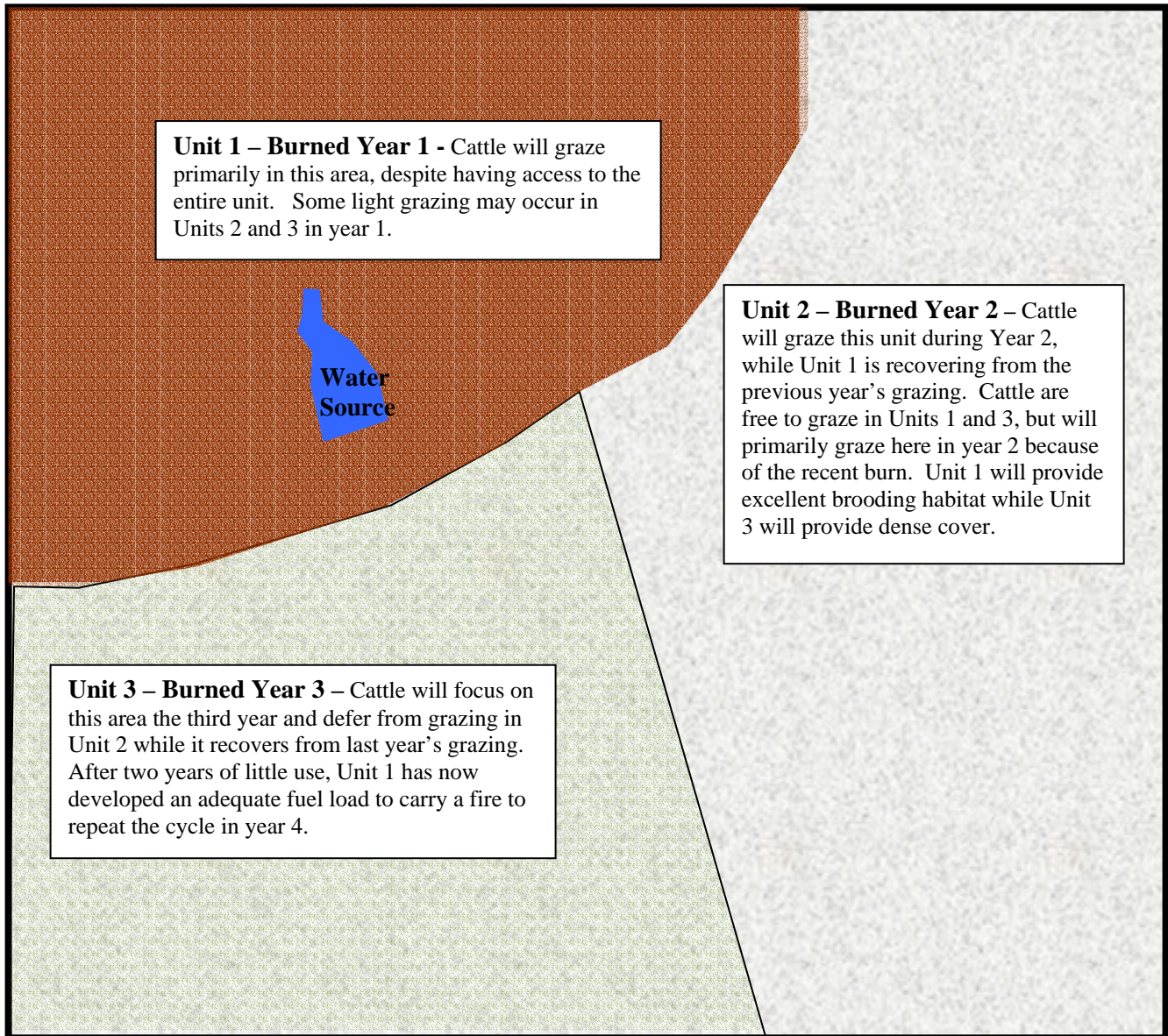


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Patch Burn Grazing Unit Design

Here is an example of how prescribed fire and grazing could be used to develop a patch burn grazing unit over a three year period. Repeat cycle in years 4 through 6.



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