K-STATE Research and Extension
Department of Agronomy MF3073 Prescribed Burning

Patch Burn Grazing

Patch burn grazing is a method of range management in which only a portion of a pasture or management unit is burned and then grazed, either by domestic livestock or native wildlife. The management unit can vary in size from just a few to several thousand acres. A single unit may have two or more patches, depending on management goals and pasture configuration. Patches that are burned are distributed spatially across the landscape and also may be distributed over time if burned at different times during the year.

Patch burn grazing is often used as part of a strategy to enhance habitat for specific wildlife species by increasing variability of the vegetative structure, which is referred to as heterogeneity. Patches will display a gradient of use as animals preferentially graze the most recently burned areas and avoid grazing on the areas not recently burned. Patch burning with grazing provides a wider range of grassland vegetation structure and composition than other burning and grazing regimes, which is important for certain wildlife species.

A patch burn grazing system is created by dividing a management unit into smaller units, generally not fewer than three units. Each subunit or patch should be relatively equal in size and forage production. The size and distribution of patches can vary widely. As an example, a 900-acre unit could be divided into three patches of 300 acres each, one of which is burned each year. Conversely, the same pasture might be divided into nine patches of 100 acres each, with three patches burned each year. The distribution of patches across the landscape would be vastly different in these two examples.

Natural firebreaks, such as streams and roads, often influence the location and distribution of patches. Each patch is burned in some system of rotation. Adjacent patches are not burned the same year when fire occurs only during one season (generally spring). A common fire return interval in eastern Kansas would be to burn each patch once every 3 years. Longer return intervals may be used in western Kansas where conditions are dryer and tree and brush invasion is slower.

Grazing distribution over the course of the multiple-year-burn rotation tends to be uniform, even in large pastures, reducing the need for cross fences. Existing cross fences can often be removed without sacrificing the overall grazing distribution. Fence removal results in less maintenance time and, for wildlife, fewer impediments to travel and decreased mortalities from collisions with fences. Removing cross fences also can result in revegetation of eroding trails along fence lines that no longer serve as livestock travel lanes. Fewer water developments may also be needed with patch burn grazing because the lure of high-quality forage will induce livestock to move longer distances from water sources. Since livestock congregate on the most recently burned patches, it is also easier to check the herd in large pastures.

Because fences do not separate patches, livestock and wildlife have access to the entire management unit during the grazing period. The reduced grazing pressure during the years when a patch is not burned allows desirable plants (decreasers) to regain vigor. Riparian and other sensitive areas also can benefit from a period free from heavy livestock use. Because the most recently burned patch will be grazed the most intensively, each year a patch needs to be burned to allow the vegetation in areas grazed heavily in the prior year to recover. In eastern Kansas, the recovery period generally takes 2 to 3 years.

In times of forage scarcity, the less recently burned patches can provide emergency forage. As forage is exhausted in the recently burned patches during a drought, or if growth is late to begin due to cold temperatures, livestock and wildlife can use the abundant but less nutritious forage in the unburned patches.

Patch burn grazing concentrates fuel (residual grass) in the lightly grazed areas. When burned, these patches will have hotter, more intense fires due to the increased fuel load. This may be useful in controlling undesirable plant species that are damaged by higher temperatures. Patch burn grazing may be less effective in pastures with a severe woody vegetation problem, where high burn frequency is necessary, but it could be used after woody vegetation is under control. Compared with annual burning of the entire unit, smoke production may be reduced if fewer acres are burned each year, but the reduction in acres may be offset to some extent by the higher fuel loads in the patches that are burned.

Although fewer acres are burned within a unit each year with patch burning, preparation and planning needs may increase. Additional firebreaks may be needed if natural fire barriers such as streams and roads cannot be used where patch boundaries occur. Constructed firebreaks may be more complex than when burning an entire unit and will likely exceed the length of firebreaks needed to burn the entire unit. Crew needs also may be greater than when burning the entire management unit. In general, more management, both in time and expertise, is required for patch burning. Costs for patch burning will likely exceed those for burning the entire management unit in a single burn.

Because patch burn grazing is a rotational burning regimen, it is important to burn the designated patches as scheduled to maintain the planned rotation. Weather and other factors may make it impossible to burn the patches as planned. Failure to burn designated patches during a given year will disrupt the burn rotation schedule.

While not applicable for all situations, patch burn grazing can be effective in achieving wildlife and grazing management goals. Patch burn grazing also may result in reduced costs, as fewer water developments and cross fences may be needed to achieve good forage use. The cost of implementing partial pasture prescribed burns may offset these savings, however. Ecological parameters, such as improved stream water quality, decreased erosion, and improved plant composition, also may be enhanced with patch burn grazing. Despite greater management requirements, patch burn grazing is a range practice worth considering when wildlife and habitat management is the primary goal. Patch burn grazing can provide a shifting mosaic of differently aged burns, resulting in greater heterogeneity important for meeting the varying habitat needs of many wildlife species.

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