

Patch Grazing and Sustainable Rangeland Production

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Grazing distribution is a major concern to livestock producers because uneven grazing reduces grazeable acres and carrying capacity. Patch grazing is the close and repeated grazing of small patches and/or individual plants, while adjacent patches or individual plants (often the same species) are left ungrazed or lightly grazed.

Patch grazing causes tall perennial grasses to be replaced by shorter perennial grasses, then with annual grasses until bare ground is finally exposed. More productive species are progressively replaced by less productive and less palatable species, causing a decrease in water infiltration and an increase in runoff and erosion.

Livestock do not graze randomly. Site preference or grazing distribution is influenced by living and non-living factors. Living factors include plant types (grasses, forbs, cacti and woody plants), species and maturity; forage quantity, quality and palatability; animal behavior; and insect pests, predators and human activity. Non-living factors include weather, soil/topography, shade and shelter, water, salt and fencing. The greater the variation among landscape areas (vegetation, topography, etc.), the more likely animals are to graze some areas and avoid others.

Grazing Behavior

Grazing consists of searching for, selecting, grasping and taking the selected forage into the mouth. Grazing animals prefer new green leaves. When new green leaves are not present, they will eat older green leaves, followed by green stems, then dry leaves and, finally, dry stems.

The preference for green plant material remains until almost no green is left. This "chasing green material" explains why cattle often lose body condition during spring green-up. Their preference for new growth overrides their desire to eat quickly until full. Grazing animals also search for plants they consider palatable, and they can be very selective in the species of plants they eat. They are more likely to graze preferred forages, to take more bites from those plants each visit, and to graze those plants again before eating other forages.

If green material is present, but only in small quantities, then forage intake is low. Although available forage may be plentiful, intake may be low because livestock prefers the higher quality green material.

Studies of cattle suggest that livestock quickly explore new pastures and develop map-like representations of the different areas within a pasture. This information is stored in their long-term memories. An animal's expectations of an area based on long-term memory changes at a slower rate than changes in forage quality and quantity. Therefore, they typically return to areas previously grazed. Grazing animals appear to use short-term memory to remember which areas they have recently visited and selectively avoid or return to those areas again. Memories of where they have recently foraged may last up to 8 hours.

Day-to-day cattle movement is not by chance. Cattle rarely stay in the same location for more than two consecutive days. In pastures where forage quantity and quality vary, cattle may not return to sites with low quality forage for as long as 21 consecutive days.

Development of Patch Grazing

Patch grazing is prevalent on sites with high plant density and productivity and where species with contrasting palatabilities are present. Sites that are ungrazed one year also tend to be ungrazed the next year. Ungrazed patches in summer develop on the patches that are not grazed at the beginning of the season. Wolf (large ungrazed) plants tend to develop if grazing in the spring is delayed too long.

Cattle generally avoid forage contaminated with their own feces or forage growing near fecal pats. Forage areas that are avoided can be several times as large as the actual contaminated area. With continuous grazing, rejected areas can cover significant portions of a pasture from two to several months. In contrast, sheep are not as sensitive to their own droppings or to the droppings of other species.

As a result, patch grazing develops in a pasture following a sequence. Livestock entering a new pasture establish an initial pattern of use that is reinforced as the season progresses. Animals are then attracted to previously grazed areas, thereby enlarging those and creating adjacent new ones. Patches that were previously heavily grazed are more likely to be heavily used in subsequent years, and areas previously neglected by livestock will likely receive little subsequent use. These patterns are more pronounced under lighter grazing pressures and longer grazing periods.

Overuse causes soil loss, more bare ground, replacement of normally dominant perennial grasses, lower soil water content and depressed forage production. In spite of this deterioration, heavily grazed patches may continue to be more heavily grazed than adjacent patches in better condition because the regrowth is less mature and more nutritious. Grazed patches will also have higher annual variability in plant production than less-degraded sites, with almost no forage being produced in drought years. Resting such areas during a drought or even during median rainfall years may not assist recovery if a patch has significantly deteriorated. The patch size may expand even without further grazing because of continued soil erosion.

Overcoming Patch Grazing

Uneven grazing and the development of relatively stable, degraded patches can be serious problems associated with continuous grazing, especially in large pastures. Livestock grazing a large pasture tend to repeatedly neglect or lightly use some areas of the pasture while overusing other areas. The larger the pasture and the lower the stocking density, the greater the proportion of pasture neglected. Heavily grazed patches often occur within preferred plant communities or species, close to water sources and within preferred sites.

Managers must minimize the effects of patch grazing and improve the use of undergrazed areas. Forage should be moderately defoliated when a pasture is grazed. Producers can provide water facilities so that all grazing is within one mile and, preferably, one-half mile of water. They can separate preferred from less-preferred landscape areas or plant communities with fences, spread grazing pressure over the pasture with supplemental minerals or feed, and use multiple species of grazing animals. They can increase opportunities for grass to regrow by decreasing pasture size, increasing stock density and rotating livestock from pasture to pasture.

However, while such measures may alleviate problems caused by patch overgrazing, they do not correct the root of the problem. Under continuous grazing, selected patches may remain more heavily grazed and not get adequate rest between defoliations. By providing periodic rests from defoliation, rotational grazing may minimize the effects of patch overgrazing and allow recovery from damage. Consequently, planned rotational grazing is a key tool for using and restoring rangeland.

Several approaches have been suggested to reduce patch grazing. One method is to graze pastures using high stock densities at the beginning of the growing season. This produces more even grazing, which reduces patch formation.

Mowing or shredding and burning have also been used to remove old growth. This reduces or eliminates old patches and improves access to new growth on previously unused areas of the pasture, which can reduce patch formation.

Another way to improve grazing distribution and use is by "management intensive grazing." This requires numerous pastures and one herd of livestock. It is critical that forage use be conservative to moderate (35-45 percent) during each grazing event, even though animal density and grazing pressure is high. Move animals from pasture to pasture relatively quickly with short grazing periods. Use numerous, small pastures to achieve high stock density, with relatively short grazing periods to prevent heavy use. Smaller pastures increase the opportunity to improve forage use, although uneven grazing distribution may never be eliminated. Once animals have moved through the entire sequence of pastures, they are more likely to explore and graze all the landscape.

Conservative to moderate grazing during short periods, even of palatable plant species, preserves the vigor of desirable plants. Long rest periods encourage the growth of plants that are particularly sensitive to grazing, thereby maintaining or increasing species diversity.

Although the appropriate number of pastures and the length of the grazing and rest periods must be determined for each individual situation, high stock densities to achieve controlled, selective grazing should be emphasized. High stock densities, avoiding heavy use at the same time, require short grazing periods in numerous pastures. If conservative to moderate stocking rates are used, this approach can benefit most ranches.



Figure 1. Patch grazing develops on grasslands with species of contrasting palatabilities.

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