R-1540

Fact Sheet

Grazing Riparian Ecosystems: Grazing Systems

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Livestock often are attracted to riparian systems for the availability of forage and water, shade and smooth terrain.

Riparian ecosystems are extremely productive, with some providing 81 percent of the summer forage utilized by grazing livestock (Roath and Krueger 1982). Changes in riparian vegetation induced by grazing can result in a decline in soil health, loss of biotic diversity, degradation of wildlife habitat, reduced water quality and alterations in stream hydrology. However, grazing has been found to be important for the proper functioning of many riparian zones. Implementation of proper grazing management practices is essential to prevent degradation by livestock and improve riparian health. Continuous and seasonlong grazing is detrimental to riparian ecosystems as livestock are allowed to congregate in them; however, implementation of a grazing system can enhance the health of riparian ecosystems.

Rotational Grazing

Rotational grazing is a grazing system that consists of multiple pastures that are grazed in sequence, with the starting pasture changing each year, altering the season of use in each pasture, and the length of the grazing period being determined by monitoring the available vegetation (Figure 1). In areas that require dense vegetation to stabilize stream banks, a rotational grazing system consisting of at least four or five pastures may be more beneficial to riparian health than a rest-rotation because it allows for shorter grazing periods and greater flexibility in management (Clary 1995).

High Intensity, Low Frequency

A high-intensity, low-frequency (HILF) grazing system consists of three or more pastures that are grazed at a high grazing intensity for 14 to 20 days and rested for 30 to 90 days before being grazed again (Figure 2, page 2). The HILF grazing system is used to maximize utilization by forcing livestock to consume nonpreferred forage species. HILF grazing results in similar hydrologic properties as moderate intensity seasonlong grazing (Blackburn 1983) because heavy grazing reduces riparian vegetation, altering the riparian ecosystem and stream morphology.

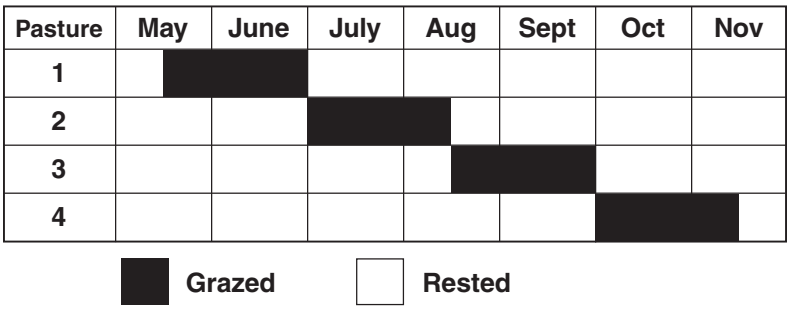

Figure 1. Sample grazing schedule of a rotational grazing system (i.e., once-over deferred rotation) for the northern Plains.

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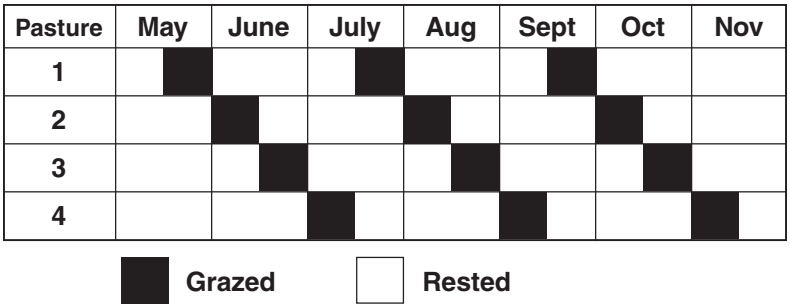

Figure 2. Sample grazing schedule of a high-intensity, low-frequency grazing system for the northern Plains.

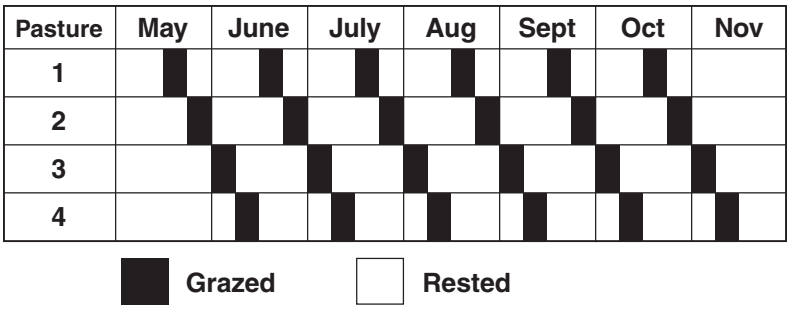

Figure 3. Sample grazing schedule of a short-duration grazing system for the northern Plains.

Short Duration

A short-duration (SD) grazing system is designed to graze one herd at a high grazing intensity on multiple pastures. Five or more pastures or cells are recommended, with grazing periods of 1 to 15 days and rest periods of 20 to 60 days (Figure 3).

Despite the fact that SD grazing systems utilize a high grazing intensity, grazing pressures are reduced by shortening grazing periods. SD grazing negatively impacts the hydrology of the system, having similar hydrologic properties as heavy seasonlong grazing (Blackburn 1983); specifically, increasing sedimentation and bulk density and decreasing infiltration (Magner et al. 2008, McEldowney et al. 2002).

Deferred

A deferred grazing system employs nongrazing during periods that are expected to enhance forage production. Deferment can be applied selectively or in a rotational manner (Figure 1). Deferred-rotation grazing enhances palatable forage species that are targeted by grazing animals, giving them the chance to store carbohydrates and set seed, improving plant vigor. Riparian pastures grazed under a deferred-rotation system have the same hydrologic properties as areas in which grazing is restricted (Blackburn 1983).

The most commonly used deferred-grazing system in the northern Plains is the twice-over rotation deferred-grazing system (Figure 4). This system rotates the livestock faster, resulting in more acceptable forage for livestock throughout the grazing season. During the first grazing cycle, cool-season grasses and sedges are utilized before they become too mature and unpalatable. High-quality vegetative regrowth forage is available during the second grazing cycle. Three to five pastures are commonly used in this system.

Rest Rotation

A rest-rotation grazing system consists of multiple pastures in which one pasture is rested each grazing season on a rotational basis (Figure 5). Rest-rotation grazing of riparian ecosystems positively influences hydrologic properties, including infiltration, sediment production and bulk density, compared with deferred rotation and seasonlong grazing (Bohn and Buckhouse 1985). Stream banks have been reported as being more stable in areas grazed under a rest-rotation grazing system than areas in which grazing livestock are excluded (Hayes 1978).

Rest-rotation grazing is most successful when the pasture is allowed two years of rest following grazing. This system has been reported to reduce utilization

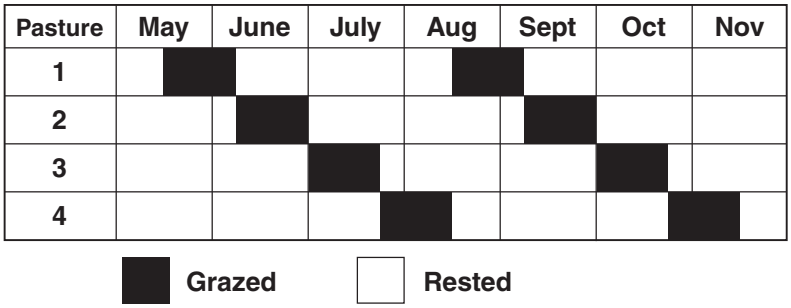

Figure 4. Sample grazing schedule of a twice-over rotation deferred grazing system for the northern Plains.

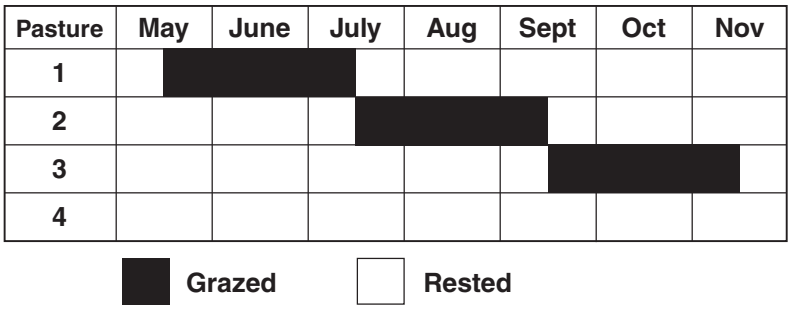

Figure 5. Sample grazing schedule of a rest-rotation grazing system for the northern Plains.

of riparian ecosystems more than deferred and seasonlong grazing (Platts and Nelson 1985). A rest-rotation grazing system has the potential to improve riparian ecosystems at a rate similar to livestock exclusion (Fleming et al. 2001). Rest-rotation grazing not only enhances the health of riparian ecosystems, but also can be beneficial to wildlife populations.

Riparian Pastures

Fencing riparian zones and uplands into separate pastures allows for proper utilization of uplands without overgrazing of riparian zones (Kauffman et al 1983). Separate riparian pastures allow for greater flexibility in the length of the grazing season and placement in the rotation.

Conclusions

Grazing systems that delay grazing on riparian ecosystems are beneficial to vegetation, stream bank stability and livestock. Livestock performance under these systems is equal to or greater than under seasonlong use of riparian ecosystems (Table 1).

Table 1. Impact of grazing treatment on riparian ecosystems in the northern Plains (Holechek et al. 2004).

	Season-long	High Intensity Low Frequency	Short Duration	Deferred	Rest Rotation	Rotational	Riparian Pastures
Hydrology[1]	-	-	-	+	+	+	+
Wildlife	-	-	-	+	+	+	+
Livestock Performance	0	0	0	+	+	+	+

[1] (-) indicates negative, (+) positive and (0) neutral responses by grazing treatment.

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