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The role of pasture in conservation management

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The role of pasture in conservation management

Abstract

Pasture is a longtime and significant part of Iowa agriculture and is a critical component of the state's agricultural landscape. The main function of pasture is as a primary support system for livestock. It can affect conservation and the environmental planning in several ways, including soil carbon storage, soil quality, and water quality. The effect of livestock on such parameters is highly significant depending on the way livestock and pasture are managed. Therefore, pasture management does play an important role in a farming operation's overall conservation management plan.

Keywords

Agronomy, Agricultural and Biosystems Engineering

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences | Bioresource and Agricultural Engineering
| Natural Resources and Conservation

INTEGRATED CROP MANAGEMENT

A person is visible in the background of the title image, working in a field. The text 'INTEGRATED CROP MANAGEMENT' is overlaid in large, bold, serif font. 'INTEGRATED CROP' is in green and 'MANAGEMENT' is in white.

The role of pasture in conservation management

Soil Management

Pasture is a longtime and significant part of Iowa agriculture and is a critical component of the state's agricultural landscape. The main function of pasture is as a primary support system for livestock. It can affect conservation and the environmental planning in several ways, including soil carbon storage, soil quality, and water quality. The effect of livestock on such parameters is highly significant depending on the way livestock and pasture are managed. Therefore, pasture management does play an important role in a farming operation's overall conservation management plan. The significant benefits and drawbacks of both include the following:

Soil carbon storage

Carbon sequestration is a leading issue in agriculture right now--and pasture is a natural carbon storage facility that can maximize carbon storage due to the stability of the cropping system--mostly grasses. The value of these properties is that they cannot only increase soil organic matter but also will contribute significantly to improving soil quality and water quality.

Pasture practices that encourage carbon storage can actually improve agricultural production, restore environmental quality by reducing atmospheric levels of carbon dioxide, and foster long-term sustainability.

To maximize the benefits of pasture, certain practices need to be implemented. Some actual, on-the-ground practices in pasture include better management of timberland and limiting livestock access to fragile timberland areas including areas undergoing reforestation, especially those located in riparian areas.

Another on-the-ground practice is limiting livestock access to areas where their hooves can expose soil. The action of hooves on soil is worse than tillage--not only do hooves disturb the soil, but they are instruments of tremendous compaction. Cattle are especially hard on soil. Soil aggregates and associated structural units can't withstand the pressure cattle exert for prolonged periods. Heavy hoof traffic in wet areas or in areas where sandy soils are located can result in unvegetated or exposed soils, increasing the potential for soil erosion leading to significant sediment and nutrient losses such as C, P, K, N, as well as loss of organic matter.

Soil quality

Producers need to remember that other soil qualities are as important as soil carbon when

managing pasture and livestock. The role of pasture and grasses in general in improving soil properties such as soil structure, infiltration rate, organic matter, and the soil environment is significant. The sustainability of such properties depends on the management plan for pasture and livestock. The proper nutrient management for pasture and livestock rotation is highly related to the sustainability of high soil quality. Heavy animal traffic and mismanaged grazing exerts constant pressure on soil quality and can negatively impact almost every good soil quality characteristic. A rotational grazing management system allows soil and vegetation time to recover from grazing and rebuilds the characteristics of good soil quality.

There are many characteristics and indicators of soil quality, including the soil's physical properties.

Soil quality can be assessed by observing bulk density, soil pores, water-holding capacity and infiltration rates, overall soil tilth, and levels of organic matter and beneficial soil organisms.

Water quality

The association of livestock with pasture management and the need for access to water sources for drinking by livestock is a management challenge that may be convenient, but it can also contribute to many problems associated with soil stability and water quality. Aside from the issues of livestock health, giving animals access to stream banks and stream channels leads to instability in the stream bank because of the soil-churning action of hooves leading to significant soil erosion and sediment transport to streams and rivers. The deterioration of pasture cover due to intensive grazing can be a very significant source of water pollution from both sediment and animal waste. Also, many acres of land in pasture in Iowa are undesirable for crop production due to its location on steep slopes, that is, slopes greater than 14 percent gradient. In addition, those slopes are extremely vulnerable to water erosion if disturbed by animal hooves, or if the vegetation has been excessively reduced by overgrazing.

To improve water quality, it's recommended that producers with livestock in pasture find ways to keep animals out of streams and find alternative water sources. Rotational grazing is again the answer to managing levels and quality of vegetation in a manner that provides for improved water quality.

Managing pasture effectively

Rotational grazing is highly recommended. However, some producers are skeptical of its benefits, or their ability to manage a rotational grazing plan. Here are the facts.

First, high animal density for short periods of time is a good practice. It increases competition between animals for forages and forces them to spend more time eating and less time wandering, which saves energy. It also means that they will eat plants that they would otherwise ignore.

The additional costs and management issues with rotational grazing are less onerous than they appear. A single strand of high tensile electric fence with a low-impedance fencer provides high output, and cattle learn quickly to avoid it. And while livestock don't move themselves from paddock to paddock, more frequent contact translates into better

management, since there are more opportunities to check animals and make visual assessments.

Conclusion

While livestock and pasture are a longtime and significant part of Iowa's agriculture, every producer using pasture as part of their farming operation needs to consider its impact on soil and water quality.

Planning and consideration for soil carbon storage, soil quality, and water quality in managing pasture are important. Each property contributes an important role in any farming operation's overall conservation management plan.

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