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Grazing Rainwater Basin Wetlands

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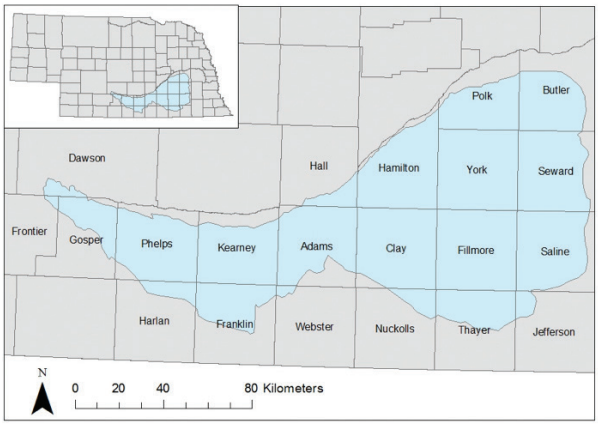

Figure 1. Outline of the Rainwater Basin in south-central Nebraska.

Figure 2. Example of moist-soil vegetation.

Wetlands have a predominance of hydric soils that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support vegetation adapted to saturated soils. Most wetlands support a diverse population of plant and animal life. They often collect and hold floodwaters, which can reduce erosion. They also can filter, clean, and store water as well as recharge groundwater reserves. Wetlands often provide unique habitat that many wildlife depend on for their survival.

The wetlands of the Rainwater Basin (RWB) in south-central Nebraska (*Figure 1*) primarily consist of shallow playa wetlands. Each wetland is at the lowest point of a unique watershed. These closed watersheds funnel runoff from rainfall and snowmelt to the wetland that lies at the lowest point in the watershed. The wetland soils have a high clay content that slows water percolation so water loss occurs primarily from evaporation and plant transpiration during the growing season.

Every spring, nearly 10 million migrating waterfowl use RWB wetlands for resting and feeding. However, only 40,000 acres, or 10 percent, of the historic wetland acres remain. As a result, the migrating waterfowl deplete the food resources within these RWB wetlands.

Effective management and promotion of desired vegetation communities is needed to provide the seeds and plant material migrating waterfowl feed on while in the RWB. Moist-soil plant communities that are dominated by annual plants such as smartweed, ragweed, barnyard grass, and a variety of annual and perennial sedges, are most desired because they produce a large amount of high-quality seeds (*Figure 2*). Bare soil also is considered desirable because it usually transitions to a moist-soil community in subsequent years. Any factor that decreases moist-soil plant growth and seed production reduces food availability for migrating waterfowl. This can lead to increased crowding and disease risk as well as decreased breeding success following spring migrations.

Unfortunately, moist-soil plant communities often are

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Figure 3. Cattails.

Figure 4. River bulrush.

Figure 5. Reed canarygrass.

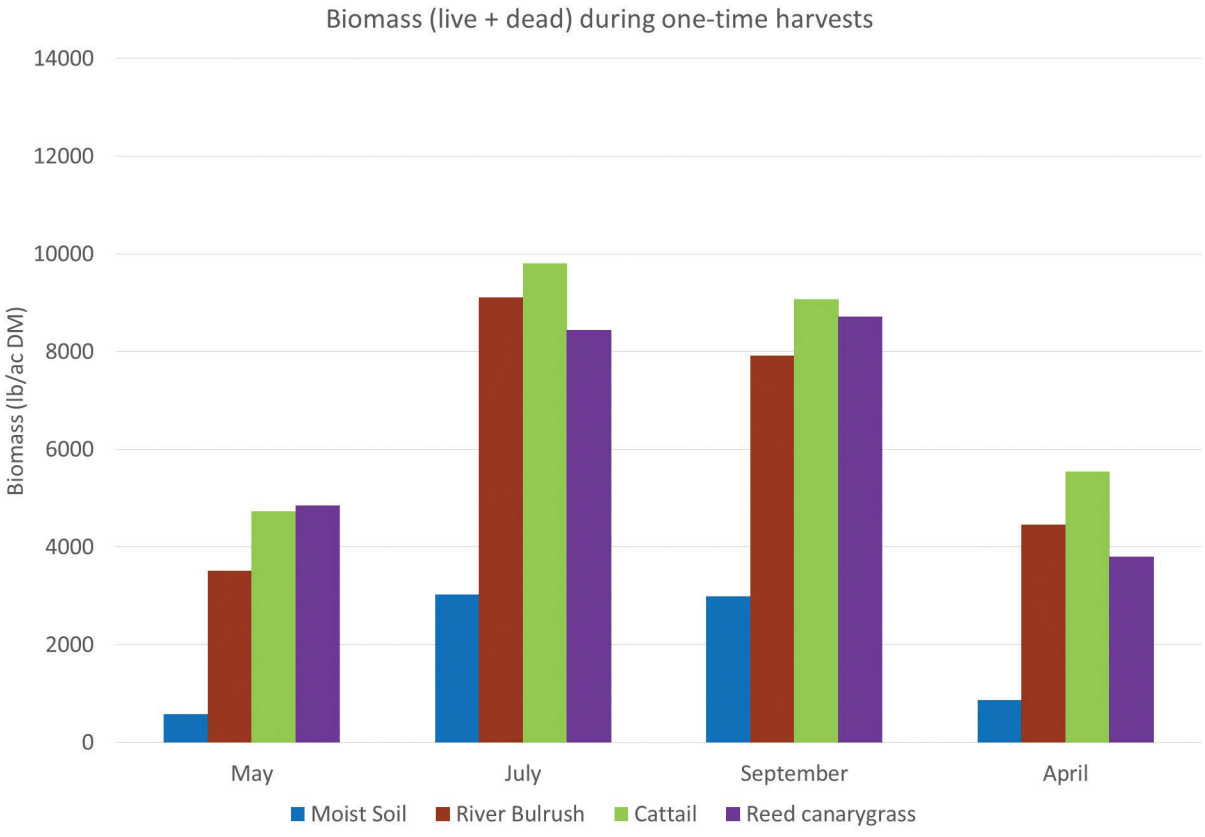

Figure 6. Biomass (live + dead) present during one-time harvests in Rainwater Basin wetlands.

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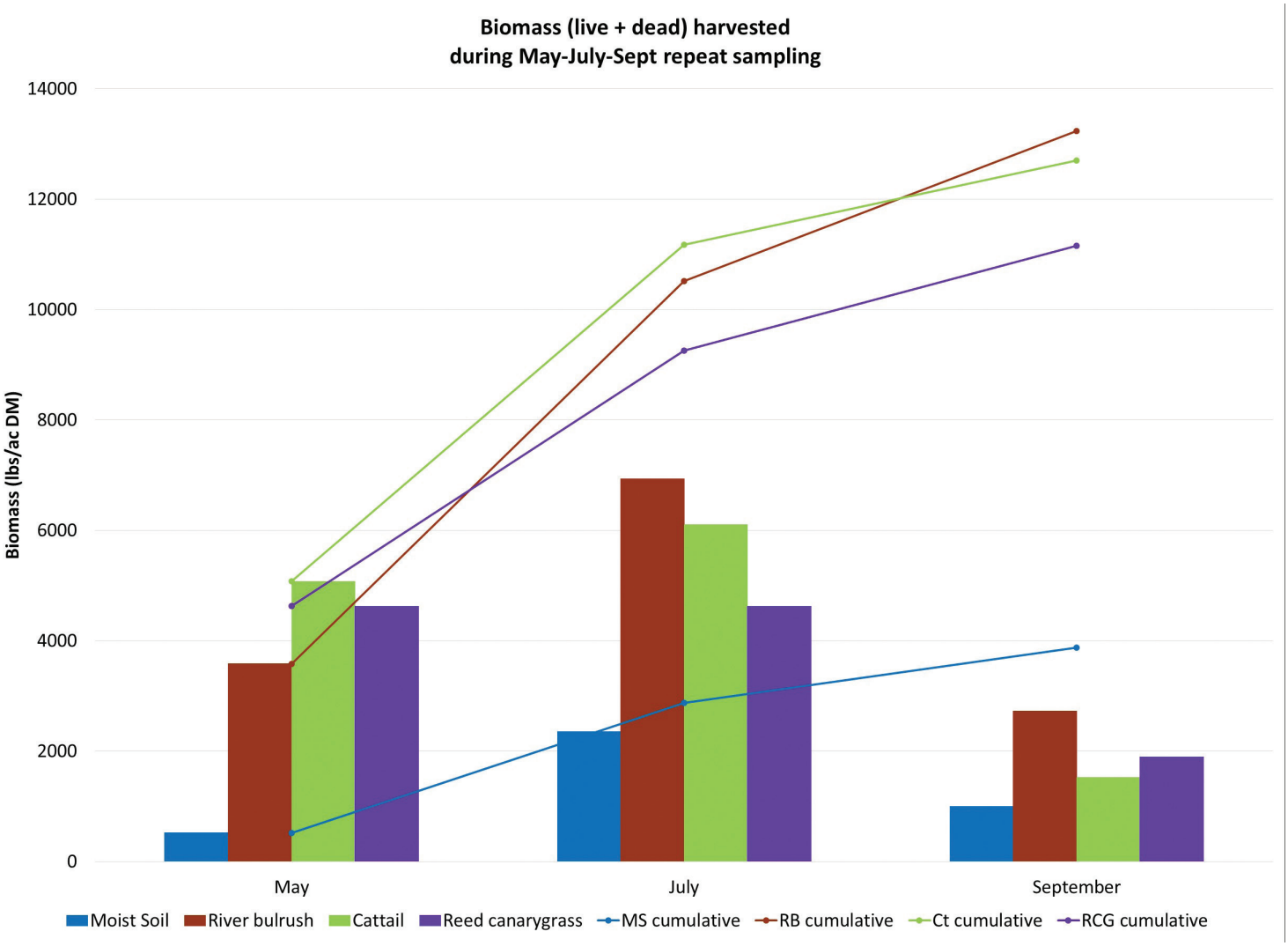

Figure 7. Biomass (live + dead) harvested during repeated May-July-September harvests.

invaded and overtaken by undesired perennial plant communities like cattail (*Figure 3*), river bulrush (*Figure 4*), or reed canarygrass (*Figure 5*). Seed yield and feed quality are substantially lower from these perennial-dominated communities. Reed canarygrass can be especially disruptive as it produces abundant aboveground growth and a thick litter layer that blocks sunlight and reduces seed germination of annual plants. With time, reed canarygrass can also suppress perennial species through shading and crowding.

Although moist-soil communities are desired as wildlife habitat, perennial plant communities can produce high biomass yields in wetlands when compared with moist-soil plant communities. From a single cutting during the year, average peak growing season biomass of cattails, river bulrush, and reed canarygrass was 9100 lb/ac dry matter compared with 3000 lb/ac for moist-soil plants in research conducted over three years from three RWB wetlands (*Figure 6*). Similarly, when harvested three times during the year, total yield averaged 12,350 lb/ac for the perennial plant communities and only 3900 lb/ac for moist-soil plant communities (*Figure 7*).

Management Practices

Disturbances can cause wetland plant communities to shift from perennial-dominated to annual-dominated plant communities. Disturbances like disking, fire, and herbicides can reduce biomass and expose soil, increasing light penetration and improving germination conditions for many annual species.

While high perennial biomass yields present a barrier to establishment and seed production from annual moist-soil plants, it provides an opportunity to use grazing as a disturbance method to shift plant communities. Grazing is effective at reducing stand height while creating structural and species diversity. It also has potential to generate income.

Grazing can have various impacts on wetlands and wetland plant species depending on how the grazing is managed. Outcomes can include the following:

- sustained plant growth
- high plant species diversity

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Figure 8. Grazing in standing water needs careful management to avoid health problems.

- reduced plant species diversity
- more exotic plants
- loss or increase of desirable species
- loss or increase of undesirable species
- reduced ground cover
- increased bare soil
- soil pugging and compaction
- increased soil erosion
- increased woody encroachment

To achieve a desired outcome, appropriate objectives must be described when grazing RWB wetlands. From a wildlife standpoint, the primary focus in the RWB is to improve vegetative conditions for wetland-dependent migratory birds. Moist-soil dominated plant communities and their associated superior seed production provide the most desired habitat. Grazing that promotes this type of vegetation usually will be the primary objective. Bare soil also is desirable because it usually becomes populated quickly with annual plants and other moist-soil vegetation.

Another objective is satisfactory livestock production. While it often will be secondary to grazing management that promotes moist-soil dominated plant communities, livestock production will occasionally be the primary objective.

Grazing management generally takes the following forms:

- Continuous stocking—grazing the same land area during the entire growing season.
- Seasonal stocking—grazing only during a portion of the growing season.
- Rotational stocking—moving livestock among multiple smaller pastures for short time periods.
- Ultra-high density stocking (mob grazing)—grazing a relatively large number of animals on a small land area for a very short time period.

Many management factors can be manipulated to achieve desired objectives, including stocking rate, stock density, timing, duration, and frequency of grazing and degree of utilization. These will be discussed relative to their impact on various grazing objectives.

Planning and Monitoring

Prior to grazing a wetland, the first step is to inventory existing forage and livestock resources and outline objectives as well as create grazing, monitoring, and contingency plans. Graze following the plans. After each grazing season and prior to the following growing season, monitor each site to assess current conditions, determine if objectives are being met, and evaluate if changes in the grazing plan are necessary to meet the objectives. If changes are needed to the grazing plan, consider altering the timing, intensity, and duration of grazing.

Objective: Promote Livestock Production and Maintain Existing Plant Community

Livestock producers who graze cattle on wetlands need adequate nutrition for the animals to perform satisfactorily. They often seek to maintain or even enhance the plant community in ways that will serve their livestock most effectively. Proper grazing management can help achieve these goals. Special care also is needed to avoid health problems, especially with feet and legs as animals may often be grazing in standing water (*Figure 8*).

Reed Canarygrass

Reed canarygrass can be challenging to graze successfully. It naturally contains some unpalatable compounds called alkaloids that discourage animals from eating it. These alkaloids sometimes cause severe diarrhea and can lead to animals losing weight. It also produces a coarse stem that makes it difficult to eat.

Nonetheless, reed canarygrass responds very favorably to well-managed rotational or seasonal stocking. Success primarily depends on proper stocking rate, initiation of grazing at the proper time, and adequate recovery time following grazing.

Prior to grazing, if old growth from previous years is present, a prescribed burn (*Figure 9*) in early spring that

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Figure 9. Spring prescribed burn to remove old growth.

Figure 10. Grazing regrowth.

removes the old growth will improve grazing outcomes. To achieve good animal performance and grass utilization, graze reed canarygrass before it gets more than a foot tall in the spring. If grazed down to no less than 4 inches tall, dietary protein usually will be over 15 percent and total digestible nutrients (TDN) above 60 percent. If grazed down almost to ground level, however, dietary crude protein might be as low as 10 percent with TDN levels in the mid-50s. This may be adequate for dry cows but not high enough for cows nursing young calves. Grazing this severely also will weaken the stand, especially if done repeatedly, and will require a longer time for regrowth before grazing again.

Generally, whenever the reed canarygrass regrows to 1 foot tall, it can be grazed again as long as soil moisture remains to support more regrowth (*Figure 10*). Do not graze regrowth that has not reached about 1 foot in height or stands will begin to decline. During rapid spring growth, it may regrow adequately in just two or three weeks. As summer progresses, four to six weeks may be needed to allow adequate regrowth that maintains plant health.

If reed canarygrass gets tall and stemmy, animals will just nibble at some leaves, trampling the rest. A high density stocking that encourages animals to quickly graze what they want and just as rapidly trample all the less desirable plant parts will encourage plants to regrow and recover most rapidly.

Stocking rates can be estimated based on available biomass and desired degree of utilization. Leafy spring growth as well as later leafy regrowth is grazed readily by cattle, often consuming 50 to 60 percent of the biomass. Many RWB wetlands that are grazed using rotational stocking can support 1 to 1.5 animal units of grazing per acre each month, beginning in early May and continuing through late July when cattle might be removed to allow seed development of annual plant species. If rotational stocking continues through August and September, another 1 to 1.5 AUMs per acre might be harvested. If continuous stocking is used, stocking rates might need to be reduced 40 percent.

Cattails and River Bulrush

Stems and leaves of cattails and river bulrush tend to be even coarser than those of reed canarygrass. If much dead residue from the previous year's growth is present in the spring, a prescribed spring burn can be used to remove this old, unpalatable growth and make new spring growth readily accessible to grazing.

To achieve high utilization rates, high stock densities of five to 10 or more cow-calf pairs per acre for just a few days may be needed as long as plants have not yet developed significant stem production. However, diet protein and energy usually will be low at high utilization rates so animal performance will suffer if cattle are forced to graze this way for very long without supplementation. Furthermore, repeated severe grazing can quickly reduce stands of cattail and river bulrush.

At relatively light stocking densities, such as one cow-calf pair for every 2 or 3 acres, cattle will selectively graze a diet that will provide adequate animal performance. Rotational stocking that allows cattails and river bulrush to regrow for four to six weeks before grazing again can maintain stands for an extended time. Stands may even become denser if grazing periods last no longer than one week, at least 6 inches of stubble remains after grazing, and plants are allowed adequate time to regrow before grazing again.

Moist-Soil Plant Communities

Total forage production of moist-soil plant communities usually is low, often just one-third that of reed canarygrass, cattails, or river bulrush. As a result, grazing these areas exclusively during the grazing season, either continuously or rotationally, often is impractical. Stocking rates of 5 to 10 acres per cow-calf pair might be needed to graze season

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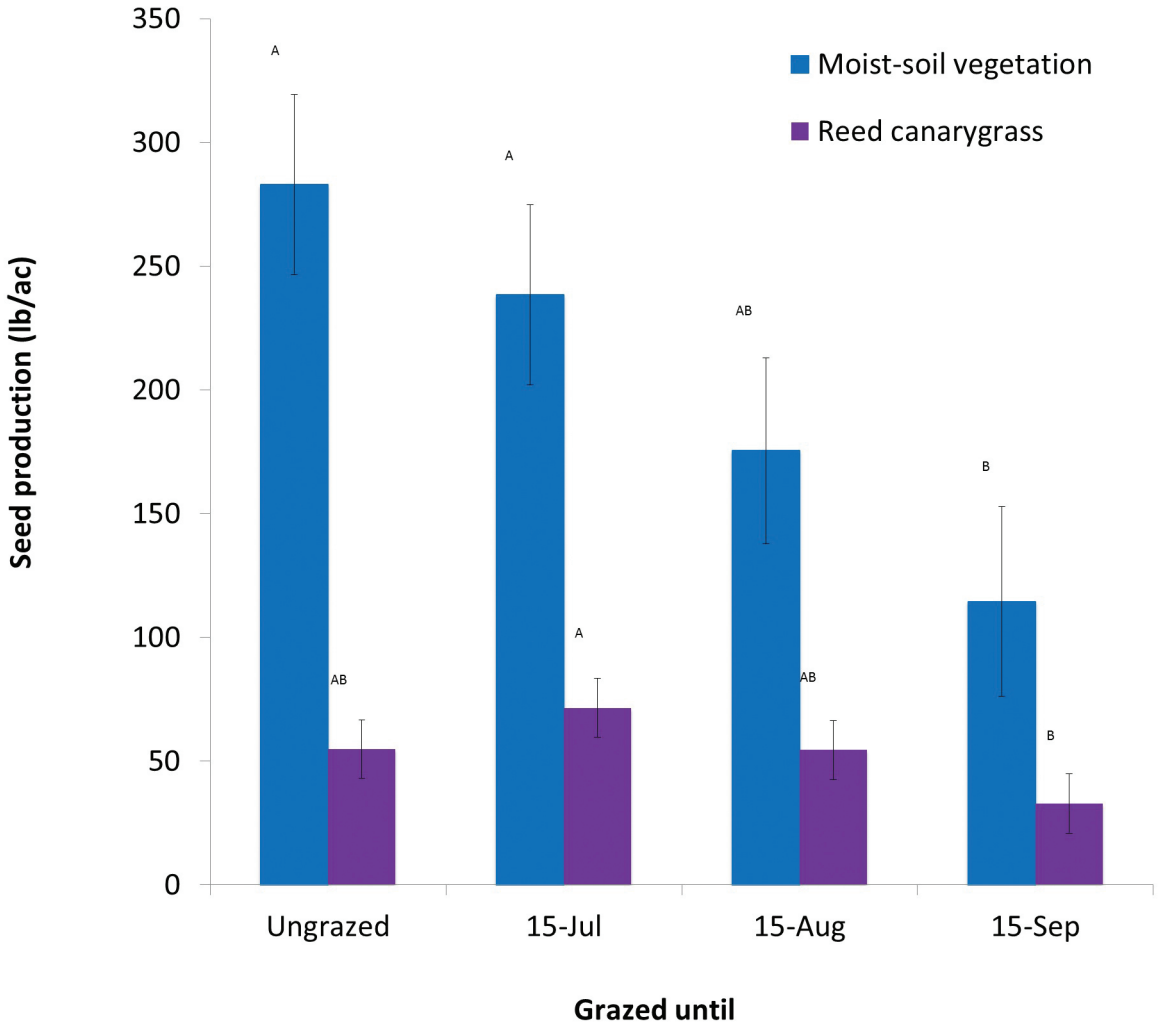

Figure 11. Seed production in Rainwater Basin wetland under four grazing durations.

long and maintain a desirable moist-soil community. Despite their lower forage production, moist-soil communities can still provide important forage. The average crude protein for severely grazed moist-soil communities was 8.4 percent, compared with river bulrush and cattail communities averaging 7.0 percent and reed canarygrass averaging 9.5 percent. Digestibility of severely grazed vegetation was quite low, averaging 42 percent, but if stocked moderately so animals can selectively graze the higher quality plant parts, digestibility of the selected forage would be expected to exceed 55 percent and crude protein to exceed 10 percent.

Often, a more practical way to graze moist-soil plant communities is to combine it in a rotational stocking format with adjacent, more productive upland pastures or with other wetland vegetation community sites. When the moist-soil plant community produces sufficient biomass to justify its use, move animals to graze this area. After animals have grazed this area to the desired utilization level, return them to the upland pastures or other portions of the wetland. By varying the timing, intensity, and duration of grazing, a diverse moist-soil community with a variety of annual and perennial plant species will be promoted.

Objective: Promote Moist-Soil-Dominated Plant Communities and Seed Production

Management strategies depend primarily on the existing plant community. When the plant community already is moist-soil dominant, most grazing strategies will result in a continuation of this community. Moist-soil plant communities shift to reed canarygrass, river bulrush, or cattails less than 15 percent of the time following one year of moderate grazing. Therefore, grazing often should seek to maximize current year seed production.

Research and experience show that seed production is greater when moist-soil plant communities are grazed, with or without prescribed burning or spraying herbicides prior to grazing, than when they are rested the entire year. However,

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Figure 12. Results of severe mob grazing.

seed production declines when grazing is terminated later in the year (*Figure 11*). It becomes especially low if grazing continues beyond mid-July.

If a moist-soil plant community is grazed, conclude grazing as early as possible to maximize the plant recovery time and facilitate seed production. Grazing later into the season usually increases plant diversity if that is desired. At the beginning of the grazing season, most moist-soil sites will require at least 6 to 8 acres per cow-calf pair. If the goal is to acquire a certain number of animal-grazing days during the year, start with a high stock density at the site in order to finish grazing early rather than graze lightly for a longer time. For example, for a specific acreage, grazing 100 animals for 10 days (1000 animal grazing days) is usually better than grazing 25 animals for 40 days. Of course, this assumes enough forage is available to graze the higher number of animals during a short time period.

Shifting a plant community is more difficult than maintaining existing conditions so when moist-soil plant communities and seed production are desired but the existing community is dominated by river bulrush, cattails, or reed canarygrass, management is challenging. However, with the right timing and grazing pressure, these undesirable plants can be severely injured. Severe and frequent defoliation can weaken the plants and cattle hooves can cut and shred the plants' extensive root system (*Figure 12*).

Stands of invasive river bulrush, cattails, or reed canarygrass must be severely stressed and/or damaged to convert them to moist-soil plant communities and seed production. Severe and frequent defoliation that prevents plants from regrowing adequately to recover from grazing is necessary. However, this type of grazing also puts stress on grazing animals as forage supply becomes limited. Thus, grazing strategies are needed that expose animals to as little stress as possible while still stressing plants adequately.

Continuous stocking that maintains plant height below 4 inches is likely to cause severe stand loss. However, the nutritional stress on the grazing animals also will be unacceptably severe for an extended period of time unless they are heavily supplemented to overcome the reduced intake that will occur when forced to graze such short growth.

Animal health and performance will be maintained better if they experience nutritional stress for only short time periods, such as two or three days. Even less is better. To limit animal stress to short time periods while still causing stress to the vegetation, ultra-high density stocking, often referred to as mob grazing, is needed.

Ultra-high density stocking works best when **at least** 20 cows per acre (or equivalent by weight) are stocked on a relatively small area for just a few days. If sufficient livestock are not available, larger areas can be divided into smaller parcels that might be mob grazed in succession. Dry cows are best to minimize the effects of nutritional stress, but cow-calf pairs can be used if this intense stocking lasts only two or three days. The nutritional stress usually occurs only during the latter part of the intense stocking period.

Animals should remain on this small area until all the vegetation is either grazed to no more than 2 to 3 inches of stubble or is trampled. If ultra-high density stocking is applied when vegetation is young, relatively short (15 inches or less), and leafy, nearly all of the vegetation might be consumed, leaving nearly bare soil (*Figure 12*). As vegetation gets older, taller, and contains more stems and stalks, an increasing amount will be trampled rather than consumed.

After plants are allowed to regrow for two to three weeks, repeat this ultra-high density stocking. Do not allow a lengthy regrowth/recovery period. This mob grazing followed by a short regrowth period can be continued throughout the grazing season. Alternatively, if it is observed that the invasive plant stand has thinned considerably or the remaining shoots are not regrowing after two or three of these mob grazing events, removing livestock from further grazing may allow time for annual plants to grow and produce seeds, especially if removal occurs prior to August 1.

Combining any type of grazing with other active management treatments such as prescribed spring burning or a fall glyphosate application can effectively manipulate plant communities. Grazing can be used to encourage plant growth to be at a more sensitive stage when herbicide is applied. Combination treatments are especially successful at both maintaining moist-soil plant communities and increasing seed production compared with no active treatment or just grazing.

A particularly effective technique is to combine grazing with spraying herbicide for two or more years back-to-back when it is desired to convert reed canarygrass to a moist-soil plant community with high seed production. When condi-

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tions permit, adding a disking treatment to the graze and spray combination can also be effective. Disking will result in more bare soil, which usually produces a moist-soil community the next year. River bulrush and cattail are more resistant to conversion using these procedures and may require either more severe grazing treatments, more than two years of herbicide application, or disking to complete the conversion.

Figure Credits

2, 3, 5, 8, 10—Heidi Hillhouse

4—Andy Bishop

9—Doreen Pfost

12—Richard Souerdyke

For More Information

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