

Planning for Bison Grazing on Native Rangeland

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Bison have been an important part of Native American and early settler culture for centuries. Uses included food and clothing, among others. Once vast-spreading herds became nearly extinct due to great slaughter. By 1894 there was only approximately 500 – 1500 bison remaining in North America. But, some of the early settlers in the Western United States saw the advantages of raising bison. These early private and public herds were valuable in the recovery of the species. Now, estimates by the National Bison Association that there are between 250,000 and 300,000 in the United States.

Bison production has become increasingly more popular through the United States and Canada. Even though the bison industry is quickly becoming a major livestock industry, it is still considered to be a novelty or alternative livestock. However, there continues to be debate amongst bison producers about whether or not bison should be designated as livestock or as wildlife. With the increasing number of producers, there has been increasing demand and need for technical assistance on rangeland and pasture management.

General Bison Information

Bison are herd animals and form family or social groups based on age, season, sex, forage conditions and availability, and habitat. Bison are an extremely mobile and a highly social animal. Bison also have strong herding instincts and the structure of the herd is very important to the group. Activities of the herd such as establishing a “pecking order,” protection of the herd, challenges, and other non-grazing activities can be observed regularly.

Social groups of the bison may change during different periods of the life cycle of the bison. During the rut, the groups are usually larger, and during the winter groups usually tend to be fairly small. The lead animal, usually an older cow, in these social groups is very important. The herd will follow the lead animal, which will lead them to different grazing areas and away from danger. Within the group of bulls, there is usually one dominant bull.

Bison Breeding and Calving

Bison production is similar to cattle in many ways, but also very different in others. This makes understanding bison very important when planning a grazing system which utilizes bison as the primary grazing animal.

The life span of an individual bison is over 20 years and the cows may calve well into her 20s. Breeding occurs during the rut period. This phenomenon generally

occurs between late July and August, however it will vary geographically and may be later in the north and sooner in the south. During this time, the cows come into estrus and the bulls join the cow groups.

The female's estrus cycle will usually last from 3 - 4 weeks. Females will usually not breed until they are two years of age, and fertility will tend to decline once she reaches 14 to 15 years of age. Few males under the age of four reproduce in a natural setting, however, they can breed at age two with a lower cow ratio (1:5 vs. 1:10). The ratio is decisively lower than that used for cattle. This is mainly due to the short breeding season of bison.

The gestation of a bison cow is between 270 and 293 days, but usually lasts approximately 275-280 days. The gestation period of cattle is 285 days. The length of gestation in bison is dependent on the nutrition availability, cow body condition, and the geographic location. Typically, bison are very fertile with 85-95% of the cows weaning a calf annually.

Bison have a low rate of dystocia (difficult birth). Bison calves are much smaller than cattle when they are born. The average weight for a bison calf is between 40 and 50 pounds. Bull calves weigh far more than heifer calves and are much harder on the cow to raise. The mother of a bull calf will be less likely to reproduce the following year if she has been nutritionally stressed.

Foraging Ecology of Bison

Rangeland across the Great Plains developed under grazing pressure, primarily by bison. Grasses and sedges were the dominant species, accounting for about 90 to 98 percent of the forage available. Bison were migratory and would search out areas of desirable grazing forage.

Bison and cattle consume similar forages, but bison will travel greater distances while grazing. Proportions of forages consumed differ; therefore the quality of the diet differs. Forbs were never less than 5% of cattle diets and were never of any importance to bison diets (VanVuren, 1981, and Plumb and Dodd, 1994). Although the use of forbs and browse is limited, bison will consume certain forbs during certain times and bulls tend to utilize browse more than cows. Bison tend to balance nutrient demands by consuming a diet dominant of grasses (Plumb and Dodd, 1994). Bison tend to use higher elevations and steeper slopes than cattle.

Bison are more efficient forage users than cattle. This accounts, in part for the less time they spend grazing than cattle. By being able to consume and digest forages more efficiently than cattle, they can consume a less amount of feed (of the same quality) and be able to meet their nutritional needs.

Bison spend less time grazing, per day grazing than cattle. During the non-rut period, bison graze an average of 4% less time than cattle. This reduction increased to 12% less time grazing during the rut. During the rut, bison spend a large amount of time in social activities. Bison require less water than do cattle or horses and tend to spend a very short time at the watering locations.

Factors Affecting Nutrient Requirements of Bison

Many in the bison industry have theorized that three bison can be grazed for every two cattle on the same acreage as before, or an increase in stocking rates of 150% the cattle stocking rates (Peden, et.al. 1973). There are no studies on intake that show a significant reduction in intake rates of bison compared to similar sized cattle (Norland, 2000). See Table 1 for intake rates of bison compared to cattle. Feedlot studies have shown little to no intake difference between cattle and bison either.

Table 1. Intake rates (as a percent of body weight) of bison vs. cattle during the different seasons.

Animal	Summer	Winter
Bison	2.1 to 2.8%	1.4 to 1.8%
Cattle	2.3 to 2.5%	1.9 to 2.1%

Because there are no significant differences in intake rates between cattle and bison, the standard for a grazing animal unit (AU) should be used to determine stocking rates of bison. An AU is defined as a 1,000-pound mature cow, with a calf less than three months old, or its equivalent. Therefore, one tenth of an animal unit is equal to 100 pounds live weight.

Most mature bison cows weigh about 900 pounds, so a bison is equivalent to 0.9 AU. A bull will vary widely in weight, ranging from 900 to 2000+ pounds. Being able to accurately estimate the weight of the bison is important when determining the amount of forage the animal will consume. Through correct stocking rates and forage use levels, both bison and forage production can be optimized.

Both bison cows and bulls will start a cycle of winter weight loss followed by spring and summer weigh gain at about 18 months old. It is not uncommon for bison to lose 10 to 15% of their pre-winter body weight (Sask. Ag and Food). A loss much higher than 15% of body weight may put the bison at risk. This winter weight loss is a result of reduced metabolic rate and is difficult to change. This makes planning for fall weight gains very important. See Table 2 (from Sask. Ag and Food).

	Short Daylight Hours	Long Daylight Hours
Metabolism	Slow	Fast
Dry Matter Intake	Low (1.4-1.8% body wt.)	High (2.2-3.0% body wt.)
Body Weight Status	Maintain or Lose Weight	Maintain or Gain Weight

Planning a Grazing System with Bison

Many people who raise bison or work within the industry question how well a rotational grazing system with bison works. It has been said that bison will naturally rotate and will do a better job of distribution than what man can force them to do. It is true that bison are very good at moving and distributing use in very large areas. They will also use rough terrain and travel greater distances to water than will cattle. However, this is usually better accomplished on an extremely large scale. Most pastures in Nebraska are not large enough for even distribution and adequate rest periods between grazing events to occur.

Therefore, some type of grazing system is necessary for proper grazing management when utilizing bison. Many considerations must be taken into account when designing the system or systems to be used. Items to consider before planning a grazing system with bison include time of rut, time of calving, social groups of the animals involved, areas of the pastures preferred during different times of the year, and other herd behaviors.

Because these factors have a strong influence on how easily the herd will move, along with the disruptions that may cause breeding to stop or abortions of fetus, it may be difficult to plan a rotational system in the same manner that one is planned for cattle. Assistance from the producer in identifying these times and developing solutions to best avoid stress to the animal is important. As with any grazing system, the plan chosen should be dependent on the goals of the producer.

In designing a grazing system, attention should also be given to the type of fencing, location of watering facilities, and the amount of water storage available. Many times, bison have a high respect for any type of fencing. If bison are in adjoining pastures, one herd may try to join with the other herd. Once the animals make up their mind that they want in with the other herd, practically no fence will keep them apart. Interior (or cross) fences should be designed to allow for the herd dynamics to be interrupted the least. Optimum size of pastures will vary depending on the size of the herd, but generally the larger the pasture can be and still be able to meet the goals of the grazing program the less stressful it will be to the animal.

Because of the impact of the lead animal in the herd, not only is water storage important when determining locations and sizes of tanks, but so is the amount of drinking area. It is important to have a tank large enough for as many bison as possible to drink from at one time. It is also important to have it low enough to the ground for the calves. Surface drinking area is critical for the watering location because once the lead cow leaves the area, all other bison will follow even if the others did not get to drink.

Summary

Additional challenges occur with bison than with cattle. It is important for the planner to have a good understanding of the herd dynamics, timing of various life cycles, and the resources that the bison will be grazing. The planner must work closely with the bison producer to achieve the goals of the producer, good grazing management while working within the herd structures of bison.

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