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7.0 GRAZING MANAGEMENT

Grazing lands are the backbone of the cow/calf industry and are important to wildlife, biodiversity and water quality. Grazing management is the care and use of range and pasture to obtain the highest sustainable yield of animal products without endangering forage plants, soil, water resources and other important land attributes.

A grazing system is a plan for managing when and where livestock graze. It is a strategy for making productive use of pasture resources so that livestock production goals can be met while maintaining and improving the pasture. To build a successful grazing system, assess the operation's grazing resources, develop a strong understanding of the principles behind good grazing management and learn about the tools available.

Good grazing management should:

- Keep pasture covered with desirable and healthy forage plants.
- Support the increase or maintenance of livestock production capacity and wildlife habitat.
- Improve water-holding capacity of the land base and prevent rapid runoff of rainfall.
- Control soil erosion.
- Balance forage supply with livestock production.

Benefits of good grazing:

- Removes older plant material that is less vigorous.
- Increases light available to lower, younger leaves.
- Improves water conservation.
- Recycles nutrients through manure and urine.

7.1 Assessing Grazing Resources

Well-managed and sustainable pasture lands are dependent on a producer knowing and understanding the operation's grazing resources.

Most beef herds will use more than one pasture type throughout the year. The most suitable grazing system depends on the relative amounts of:

- Native range area.
- Improved (tame) perennial pasture area.
- Cultivated lands available for annual pasture.
- Nutrient requirements of the herd.
- Complementary or competing enterprises on the farm.
- Other feeds available.

In any grazing system, pay extra attention to livestock distribution.

Some grazing areas are unsuitable for the production of annual cultivated crops due to topography, climate, soil type and susceptibility to erosion. Many of these areas are also sensitive to damage from improper use; riparian areas are susceptible to erosion through frequent or severe grazing that removes deep-rooted vegetation. Native pastures, such as open grassland, parkland and forest provide excellent summer and fall grazing, but are generally not ready for grazing early in the growing season.

Each pasture type has unique characteristics and limitations that require specific management practices. By developing a unique management plan and being flexible in its application, producers will be better able to deal with changing weather conditions and the unique features of each site.

7.1.1 Tame pastures

Pastures that have been cultivated and seeded with improved species are referred to as tame pastures. They are more responsive to intensive management and, depending on the species seeded, are useful for year-round grazing.

7.1.2 Annual pastures

Annual pastures consist of cultivated areas that are seeded each year with annual crops for grazing purposes. Using annual pastures allows a rest period for native and tame pastures and lengthens the grazing season. Use annual crops to supplement forage production of perennial pastures or use as emergency pasture. Examples of annual crops include oats, barley, fall rye, spring-seeded winter wheat, winter triticale, annual rye grass and forage kale.

7.1.3 Native range

Manage native range to obtain maximum animal production, as well as to support the long-term sustainability of the natural resource.

Goals of native range management:

- To maintain a diversity of native plant species, especially those that are deep-rooted and productive.
- To maintain vigorous, healthy plants with well-developed root systems.
- To maintain adequate vegetative cover to protect soils from erosion and conserve moisture.

Use the following management principles to maintain and foster healthy, productive native rangeland.

- Balance livestock demands with the available forage supply, but take care to leave adequate residue to protect plants and soil.
- Promote even livestock distribution by using tools such as fencing, salt placement and water development to spread the grazing load over the landscape.
- Avoid grazing rangeland during sensitive periods. Grazing too early in the spring can stress range plants because the new growth depletes plant energy reserves.
- During the growing season, provide rest periods after grazing to allow range plants to recover from the stress of grazing.

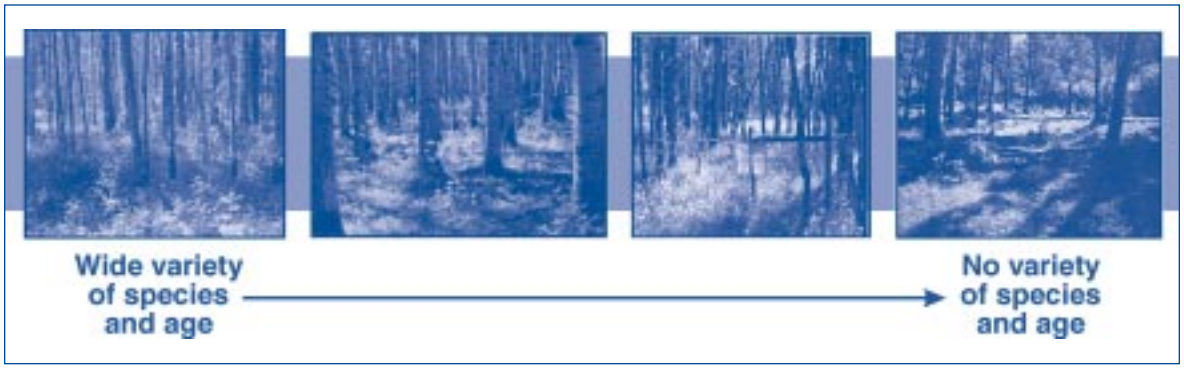
Alberta's native rangelands fall into four major landscape units – Mixed Grass Prairie, Fescue Prairie, Aspen Parkland and Boreal Forest. These landscapes vary with climate, annual precipitation, soil and topography.

7.1.4 Forest pastures

Forest pastures vary in the amount of forage they produce, depending on how they are grazed and how they respond to grazing. In a forest pasture, forage is provided by a variety of plant species, including shrubs, forbs, and grasses. Grassy plants often provide only a small portion of the available forage. The grazing season for forest pastures is relatively short. Plants in forest pastures produce little forage before the middle of May or early June and the nutritional value drops quickly as the plants mature. Native forage plants in forest pastures do not tolerate heavy grazing pressure, and many palatable and productive plants can easily be grazed out.

The grazing schedule during the summer affects the survivability of plants in a forest pasture. Timing determines whether cattle consume more or less shrub material; palatability drops as the summer progresses. Grazing early in the summer reduces shrub growth; grazing late in the summer and into the fall allows the forest undergrowth to develop.

Figure 7.1 **Forested Pastures**



7.1.5 Combined native and tame pastures

To manage a combination of tame pasture and native range, fence the different types into separate fields. Palatability, tolerance of grazing pressure and grazing schedule should be different for native and tame pastures. In many cases, it is more efficient to graze tame pastures early and to delay the use of native pastures until later in the season. The regrowth that occurs on tame pastures while forested pastures are being grazed can be used for late summer or fall grazing.

7.1.6 Riparian pastures

Riparian areas are the lands adjacent to water bodies where the vegetation and soils are strongly influenced by the presence of water.

These wet zones can be some of the most productive ecosystems on the Prairies. Water is collected, filtered, slowed and released in these areas, making them rich in vegetation and soil. Besides being an important part of the water cycle, they also benefit wildlife and agriculture. Although riparian pastures comprise only a small portion of the landscape, they are more important than their size indicates.

The abundant growth of trees, shrubs and grass in these areas provides food and habitat to animals, birds, amphibians and fish.

There is great diversity within riparian areas.

Some common features include:

- An abundance of water on the surface or close to the surface.
- Vegetation that requires abundant water to survive.
- Soils that are often modified by abundant water (as in high water tables), stream processes and lush, diverse vegetation.

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Benefits of these green zones include:
- Water filtration, which controls salinity and siltation.
- Water flow control, allowing for groundwater recharge.
- Flood regulation.
- Excellent source of clean water.
- Reliable source of pasture.
- Reduction and dissipation of steam energy.
- Maintenance of biodiversity.

Riparian resources and functions are different than those of the uplands and require different management techniques. A proper riparian grazing management system must take into account the specific needs of these areas.

When grazing a riparian area:
- Plan to graze when moisture levels are low and sod is firm, typically late summer. Timing is key.
- Add more rest to riparian areas to ensure good vegetative recovery.
- Use an alternative off-site watering system.
- Use a wide riparian area as well as its associated buffer zone for greater benefits.

Riparian health
Healthy riparian areas are beneficial to cattle producers. A healthy riparian area is one where all normal ecological processes are able to proceed. Riparian health assessments look at several key health indicators, including vegetative (plants) and physical (soils and hydrology) features.

These indicators include:
- Significant deep-rooted forage production.
- Vigorous, overhanging tree and shrub growth.
- Good plant cover, no exposed or bare soil.
- A narrow, deep stream channel.
- A variety of wildlife.
- Strong, solid banks.
- Clean water.

Riparian health assessments give a generalized understanding of the health of the area. This information can help resolve problems; it provides an awareness of the importance of riparian areas and it identifies what can be done to maintain healthy green zones and repair damaged ones. Health assessments should be repeated at regular intervals to evaluate the changes caused by human interaction and natural occurrences.

For assistance in evaluating the health of a riparian area, or for more information, contact Cows and Fish at www.cowsandfish.org.

Figure 7.2 Unhealthy Riparian

Figure 7.3 Healthy Riparian

7.2 Understanding Grazing Practices

7.2.1 Pasture growth and grazing

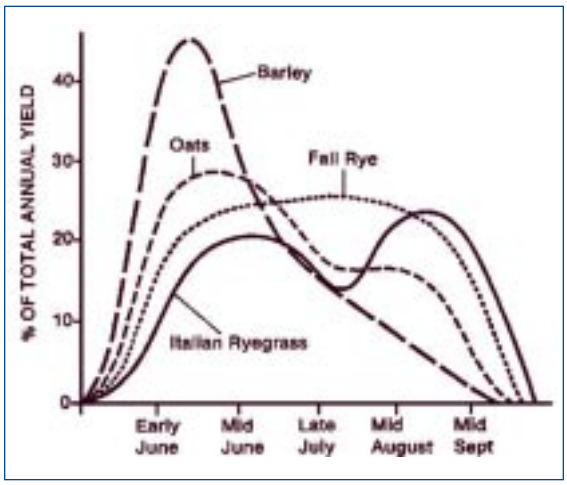
Grazing management is the care and use of range and pasture to obtain the highest sustainable yield of animal products without endangering forage plants, soil, water resources and other important land attributes. Accomplishing these goals requires maintaining an adequate leaf area on desirable plants in order to intercept the sunlight on which photosynthesis depends. Animal grazing must also be controlled so that plant vigour is maintained, and water and nutrient cycles are enhanced. Cows are selective in the type and maturity of the plants they graze. This selectivity may lead to uneven utilization of the pasture. Grazing systems that control where and for how long the cattle graze result in healthier pastures, higher productivity and potentially a longer grazing season.

The growth potential of forage plants on range and pasture is determined by:

- Plant species.
- Previous grazing management.
- Leaf area.
- Day length.
- Temperature.
- Availability of water.
- Availability of soil nutrients.

Leaf area is a characteristic of species; however, plant density and grazing severity also affect leaf area. Day length and temperature mean the majority of pasture growth occurs in the late spring and early summer. Growth slows in the fall as days shorten and temperatures fall.

Figure 7.4 Grazing Calendar



Good grazing management that allows rest during active growth periods produces more forage, fewer weeds and healthier animals.

Water is often the most limiting factor to growth. Available moisture peaks in early spring following snowmelt and generally becomes the limiting factor to growth by mid-June in Prairie regions and by mid-July in Parkland regions. In drier areas, late summer or fall moisture can stimulate new growth. If plants are stressed because of drought, they need a longer rest period to recover from grazing. It is important to remember that during drought, plants may go dormant before the end of the growing season.

Litter is old grass residue left from previous production. It conserves moisture by reducing evaporation. It also shades and cools the soil, traps snow, increases water infiltration and reduces raindrop impact.

Maintain as much carryover or litter as possible to help plants recover from drought more quickly.

Proper soil fertility greatly increases pasture productivity when plant density and vigour are good and moisture is not limited. Grasses respond well to nitrogen and sulphur fertilizers. Legumes respond best to applications of phosphorus, potassium and sulphur. Healthy legumes in a mixed pasture can fix enough nitrogen from the atmosphere to improve grass production.

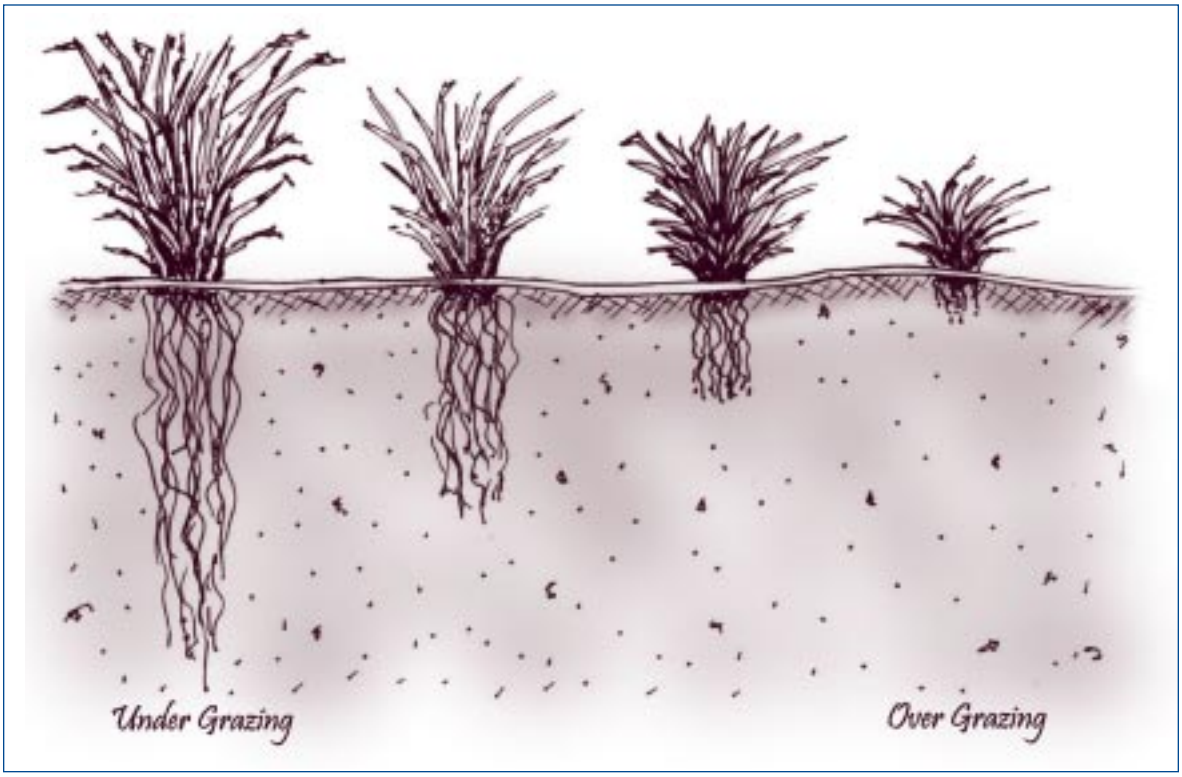
Previous grazing can have a strong impact on the growth potential of forage plants. When plants are stressed, the roots stop growing so there will less forage production. This allows weeds to invade.

Overgrazing results when a plant is grazed before it has fully recovered from a previous grazing or cutting. Undergrazing refers to plants that are not grazed, often because other plants in the pasture are being selectively overgrazed. This is not to be confused with carryover – carryover is planned so that pasture is uniform in quantity and stage of maturity.

Heavy grazing removes a high percentage of the plants' leaves, often to the point where photosynthesis and re-growth are slowed.

Removal and trampling of old and undesirable plant material by severe grazing can improve the pasture, provided that a sufficient rest period is allowed. Severe grazing without the proper rest period is one example of overgrazing, but a light grazing without enough rest is also overgrazing. To maximize productivity and pasture health, the pasture must be stocked with the appropriate number of animals to achieve uniform grazing, provide a recovery period suitable for the climate and severity of the previous grazing, and leave adequate carryover for re-growth and moisture management.

Figure 7.5 **Root Growth versus Grazing Intensity**



7.2.2 Stocking rates

For optimum pasture use, there must be enough animals to use the forage produced; it must achieve the appropriate animal performance and leave the desired amount of carryover or stockpiled material. The stocking rate or carrying capacity is the number of animal units grazed on the pasture for the season.

Carrying capacity is the potential stocking rate of a given parcel of land. If the range is in good to excellent condition, the stocking rate and the carrying capacity may be the same, but if it is a dry year, or if the range is in fair to poor condition, the stocking rate must be reduced to allow for recovery.

Carrying capacity and stocking rate are measured by animal unit month (AUM), which is the amount of pasture needed to support a 1,000 lb. cow (with or without a calf) for one month. Adjustments for different classes and sizes of animals are necessary. To adjust for changes in animal size on an animal equivalent basis, add 0.1 AU above the standard AU for every 100 lb. increase in live weight (i.e. 1,250 lb. cow would constitute 1.25 AU).

Understocking is poor economics. Similarly, overstocking reduces the pasture productivity by reducing the population of palatable plants and increasing weedy and unpalatable species.

Poorly managed pasture land means rainfall and snowmelt will run off because:

- There is not enough vegetative cover to slow water flow.
- There is less organic matter in the soil to absorb water.
- Compaction from trampling further reduces water infiltration.
- The increased runoff can cause soil erosion and reduce moisture needed for re-growth.

Figure 7.6 **Animal Unit Month Equivalents**

Yearlings	0.67 to 075 AU
Mature bulls	1.5 AU
Weaned calves	0.5 AU

7.2.3 Stocking density

Stocking density refers to the number of animal units grazing one acre for one day. It is measured as the combined weight of the grazing herd per unit of grazing area for one day. Low stocking density can result in uneven use of the pasture; high stocking density can cause damage to sensitive grazing areas, but may be used as a tool to improve pasture productivity.

7.2.3 Stockpiled pastures and dormant season grazing

To bank or stockpile pasture for use in the dormant season, plan a recovery period that is appropriate for the pasture type and growing conditions. In moist areas, cutting or grazing in early July followed by a pasture re-growth period for the balance of the growing season may provide the best balance between quality and quantity. In drier areas, an entire season's growth might be appropriate. This usually results in an adequate quantity of high quality pasture for use in the fall or the following spring. Proper stockpiling ensures a long rest period that improves pasture vigour.

The length of the feeding season is determined by how heavily the pastures are stocked relative to their growth, and by the grazing system used. If pastures are stocked below their potential for growth within the growing season, surplus forage is available for use in the dormant season. Extending the grazing season in this way shortens the winter feeding period. It may be necessary to provide supplemental feed when using dormant season pasture.

Dormant pasture may not contain an adequate quantity or balance of nutrients for the animals; adjusting these levels can improve pasture utilization and animal performance. To obtain a high level of utilization while grazing dormant pasture, only restrict access to that portion of the field that is to be grazed immediately. Allowing access to the entire grazing area at once could result in feed losses due to the trampling of the forages or due to the restricted availability of the feed because of snow crusting.

7.2.5 Grazing season

To maintain pasture and range conditions, delay grazing until the grasses have produced green leaves and are manufacturing and storing food, unless there is a surplus stockpile of previous years' growth. Another reason to delay grazing in the spring is that different grass species start growing at different times, and this starting time can vary by as much as six weeks. Also, the longer grazing is delayed in the spring, the greater the forage yield. However, palatability and animal performance may decline as the forage matures.

In some cases, it may be impractical to delay grazing until late spring, especially if no other livestock feed is available. In this case, adopt a grazing system or rotation that allows different fields to be used for spring grazing in consecutive seasons. Other common solutions are to seed fields to early-growing species of perennials or annual cereals before other pastures are ready, or to graze pasture that was stockpiled in the previous year.

7.2.6 Carryover

Carryover is the amount of forage left when grazing ends. It protects the soil surface from the drying effects of direct sunlight and wind, and leaves enough leaf area for plant regrowth.

On native range, recommended carryover is 45 percent of the current growth with 20 percent of the seed stalks remaining. However, a carryover of 45 percent every year is impractical because production varies from year-to-year. This variation may range from 35 to 250 percent of average forage production. Forty-five percent carryover is an average value that the proper stocking rate will yield over a period of years.

The need for a consistent amount of carryover is not as critical on tame pastures as it is with native range but it does affect re-growth and moisture retention. Utilization of 70 to 75 percent is often considered proper. This is usually estimated by assessing average stubble height when the cattle are moved to a new pasture. Although proper pasture use according to height varies with species sown and the length of the rest period, a rule of thumb is to remove the cattle when the average stubble height in the pasture reaches seven to 10 centimetres (three to four inches). Continual severe grazing causes depletion of plant food reserves, which reduces stand vigour.

7.3 Grazing Management Tools

When grazing animals are used to harvest a forage crop, they must be managed to graze as uniformly as possible. If left unmanaged, livestock will continue to graze small areas and keep them closely grazed while leaving other areas untouched. Some of the factors that affect livestock distribution are: distance from water, topography, vegetation type and livestock behaviour.

The benefits of proper stock distribution are:

- Nutrient cycling.
- Balanced use and more even grazing of the land base.
- Improved range health.
- Additional AUMs from ungrazed or lightly grazed areas.
- Improved wildlife habitat.
- Recovery of primary range over time, leading to increased AUMs.

Tools to achieve more uniform grazing include:

- A planned grazing system.
- Fencing.
- Water supply locations.
- Salt and mineral locations.
- Nutrient cycling.
- Cattle oilers or rubbing post locations.
- Shelter locations.
- Herding cattle to unused portions of the range or pasture.

Figure 7.7 **Comparison of Grazing Systems**

Type	Description	Advantages	Disadvantages	Management options
Continuous grazing	One pasture is used throughout the entire season.	• Convenient. • Limits fencing. • Limits labour. • Limits the need to develop water supplies.	• Overgrazing and undergrazing. • Lower forage quality and yields. • Uneven pasture use. • Lower stocking rates. • Weeds. • Can be detrimental to the health of the riparian area.	• Adjust stock numbers to match available forage.
Deferred rotation grazing	Grazing is delayed until a critical growth stage has passed. The deferred period is altered between pastures. More than one field is used.	• Limits damage from early grazing. • Provides an effective rest period for forage. • Reduces selective grazing.	• Requires more fencing. • Requires more development of water supplies.	• Vary the length of the rest period. • Vary the stocking density. • Vary the season that each particular field is used.
Management intensive grazing	Grazing areas are divided into smaller units or paddocks and grazed in sequence.	• Maximizes rest period. • Increases stocking density. • Improves nutrient cycling. • Reduces need to mechanically harvest forages.	• High investment in fencing, water. • Labour intensive.	• Vary stocking density. • Vary severity of grazing. • Vary length of rest period.

7.3.1 Fencing

Fencing can improve grazing distribution by:

- Restricting cattle to the grazing land.
- Forcing livestock into areas not usually frequented.
- Restricting access to rest areas.

Fencing can be permanent, temporary or portable, barbed or electric.

7.3.2 Water source

The objective in developing water supplies is to provide a more even distribution of animals over the range, and thus use areas that would otherwise be wasted because of lack of water. Cattle should not have to travel to water more than three kilometres in flat country and no more than 0.8 kilometres in rough country. Cleaning and preserving springs, seeps and ponds can improve natural water supplies. Development can include drilling wells, constructing reservoirs and installing pipelines. Economics and location usually dictate the type of water development. More information on watering systems can be found in Section 5.3.

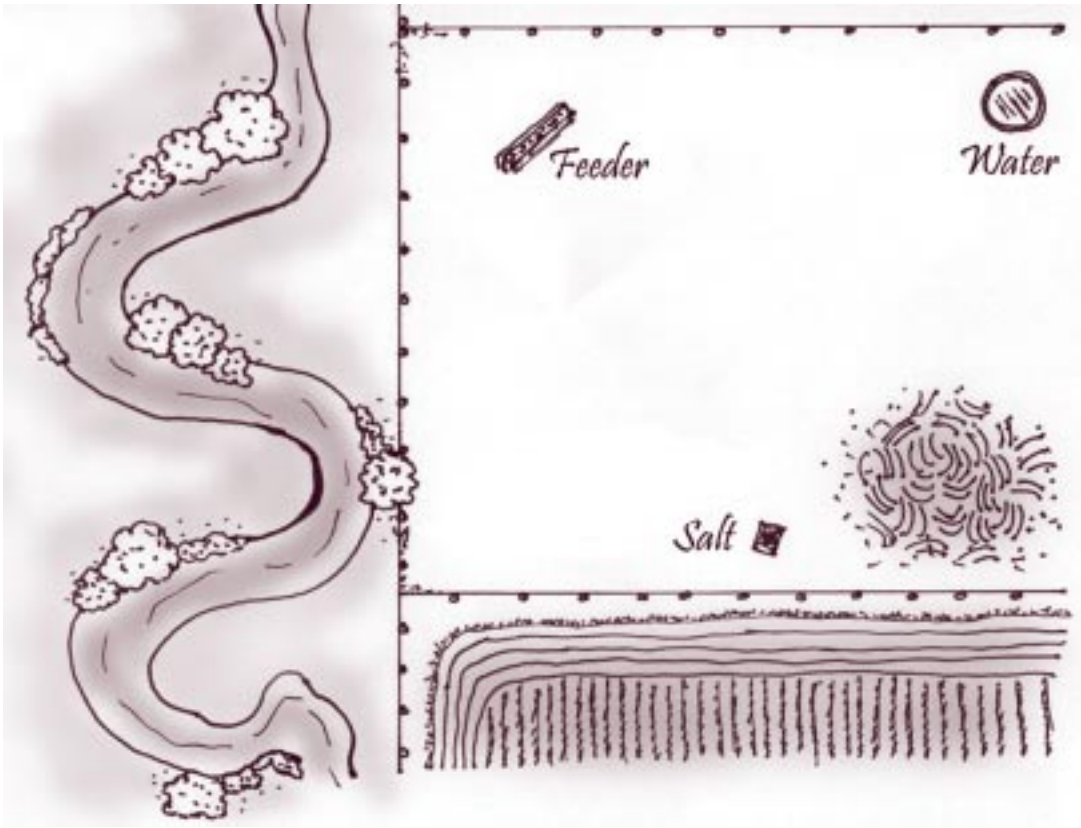
7.3.3 Salt and minerals

Animals usually seek salt. Producers can use this to their advantage to improve grazing by distributing salt throughout the farm.

Options for management of salt and minerals include:

- Periodically move salt minerals and other supplements to new locations.
- Locate salt in underused but accessible areas.
- Avoid feeding in areas prone to erosion.
- Locate salt away from watering sites as this leads to overgrazing and vegetation damage.

Figure 7.8 **Salt and Mineral Locations to Increase Manure Distribution**



7.3.4 Nutrient cycling

Adequate nutrients are required for maximum pasture growth. A soil test of the pasture will indicate the nutrients that may be lacking. When applying commercial chemical fertilizers to pastures, take into account the difference in nutrient requirements between grasses and legumes and the effect that fertilizer could have on species composition of the pasture. For information on manure application, see Section 6.

In all cases, use soil testing as a guide to nutrient management practices. If any one nutrient is lacking, application that includes other nutrients will not provide the needed nutrient response, and could lead to a buildup of excess nutrients in the soil.

Applying fertilizer on native range is not usually recommended because most range areas contain a mixture of grasses, broad-leafed plants and shrubs and the added fertility may favour the growth of undesirable plants. Rangeland research has shown that adequate moisture increases yields but usually not enough to make fertilizer cost-effective.

7.4 For More Information

Contact the following offices for the publications listed or for more information.

Alberta Agriculture, Food and Rural Development (AAFRD)
Agriculture Information Centre 1-866-882-7677
Publications 1-800-292-5697
www.agric.gov.ab.ca

- *Establishing Hay and Pasture Crops* Agdex FS120/22-2.
- *Grazing Tame Pastures Effectively (Revised June 1998)* Agdex 130/53-1.
- *Understanding the Animal Unit Month* Agdex FS420/16-1.
- *Winter Cereals for Pasture* Agdex 133/20-1.
- *Guide to Range Conditions and Stocking Rates for Alberta Grasslands.*
- *Alberta Forage Manual* Agdex 120/20-4.
- *Fencing with Electricity.*

Cows and Fish
(403) 381-5538
www.cowsandfish.org

- *Caring for the Green Zone: Riparian Areas and Grazing Management, 2nd edition.*

Public Lands
www3.gov.ab.ca/srd/land

- *Grazing Systems for Public Grazing Lands.*