

Forest Grazing

Forested rangelands, partially or completely forested areas grazed by livestock, are widespread in Alberta and Western Canada. When managed properly, forest grazing has the potential to provide multiple benefits to both livestock and the plant community. It is common for landowners to manage this type of rangeland similar to grasslands or tame pastures. However, forests have a range of diversity to functionality and must be managed accordingly.

This AWES Fact Sheet will outline the following:

- Concept of forest grazing
- Benefits of forest grazing
- Common management regimes
- Recommended best management practices for a productive forested pasture, while maintaining forest integrity

Please note that this fact sheet is intended for private landowners and may provide information that may not be permitted for crownland leaseholders.

What is Forest Grazing?

Forest grazing is a common strategy used by livestock producers to increase the quantity of pasture, either temporarily or permanently, and protect livestock against the elements. The primary agents determining the success of this strategy will depend on forest age, composition, and the level of management provided. These agents are important as they alter the forest canopy which intercepts sunlight before it reaches the pasture, thus strongly influencing productivity of the pasture (e.g. white spruce or a young trembling aspen stands have a relatively high rate of amount of light interception compared to older trembling aspen stands).



Figure 1. Forest pasture in Red Deer County, AB
Source: Jeff Renton

Forest grazing results in a number of benefits to livestock, the landowner, and the local environment:

- **Protection from winter winds:** Wind chill can cause livestock a great deal of stress in the winter, which reduces feed efficiency and increases the risk of disease and mortality. Forests provide shelter, which helps lessen stress, and resulting in healthier livestock and reduced feed requirements.
- **Protection from summer heat:** Heat stress can reduce feed intake, weight gain, reproductive efficiency, and milk production, while also increasing the risk of disease and mortality. In the summer, forests provide shade for livestock and still allow wind to circulate in the understory.
- **Resting other pastures:** Grazing forested rangeland allows rest for other pastures, ensuring the long-term productivity of both rangelands.
- **Stable forage production during drought:** During dry seasons treed overstory retains moisture by providing shade and cool temperatures, thus reducing the effects of drought on understory plants.
- **Reduced probability of large wildfires:** Livestock grazing reduces the risk of a large fire event on the rangeland by reducing the fuel load on the forest floor.
- **Wildlife habitat:** Forested rangeland provides habitat for a number of wildlife species, including a diverse range of habitat for birds, small mammals, and ungulates.

There are three categories of integrating livestock and forested rangeland: silvopasture, turning livestock into the woods, and forest grazing.



Figure 2. A designed silvopasture system.
Source: Doug Macaulay

Silvopasture: Under this management scheme, merchantable value is derived from the timber and livestock components, and management will reflect both values. A successful silvopasture system will demand a high capital investment for the development of planting, fencing, and watering systems, as well as time for management. Silvopasture usually requires a high quality and fast growing timber species that also provides a suitable environment for the livestock, and can persist on the landscape. In Alberta, the

species that are suitable for this system are of low economic value, and most often used as

pulp or oriented strand board (OSB). This will not provide the landowner with a proper return on their investment thus making a silvopasture system infeasible.

Turning Livestock into the Woods: This practice is usually based on the need for additional forage or browse to rest other pastures, and sometimes simply to reduce environmental stress on the animals. Turning livestock into the woods has less structured management goals, and covers a wide spectrum. This can entail brief, controlled access to forested or partially forested rangeland when soil conditions are favourable to livestock movement; or long-term uncontrolled access for livestock with no consideration of forage availability, tree health, soil health, or natural regeneration. When the latter is practiced, the risk of environmental degradation is extremely high. If livestock access is uncontrolled,

young growth will be eaten, broken, or tramped out. Over time, older trees will gradually die due to over-browsing without a sufficient amount of natural regeneration coming up in the understory. This transforms the land from dense woods to a wooded pasture with a declining overstory, which has severe ecological implications (i.e. soil degradation, decreased wildlife habitat, etc.).

Forest Grazing: Under this management scheme, the primary objective is providing pasture for livestock, and may reflect the benefits of the forest canopy. In contrast to 'turning livestock into the woods', forest grazing requires additional infrastructure (e.g. fencing and watering systems) and management to ensure the forest pasture is not overgrazed, which would lead to a decline in forage quantity, tree quantity, and tree health (i.e. reduced productivity, mechanical damage to roots and shoots, mechanical damage to bark).

Negative Effects of Forest Grazing

As in all rangelands, livestock grazing can significantly impact forested rangelands. The challenges associated with overgrazing in grasslands and tame pastures are even more prevalent on the forested landscape, resulting from a lower quantity of forage in the forest understory. Desirable forage species are likely to become depleted, and browsing of trees and shrubs is possible.

Common range management concerns (e.g. soil compaction, weed introduction, increased erosion, decreased soil productivity, and stream degradation) also apply to forested pasture. As forest grazing can lead to a decline in tree health, these stands may have increased insect and disease occurrence, in addition to a decline in tree regeneration, reduced tree growth, changes to species composition, and degraded wildlife habitat. However, as described below, a forested rangeland can be managed to emphasize the benefits of forest grazing while minimizing the negative impacts from livestock.



Figure 3. Recently harvested aspen stand degraded from overgrazing in Minnetonas, MB
Source: Jeff Renton

Alberta Forest Types

Forest grazing typically occurs in the parkland and boreal regions, where there is sufficient canopy cover and room to allow livestock movement. Forest types in Alberta are diverse, with a wide array of species, soil types, and nutrient levels. Trembling aspen (referred to hereafter as aspen) communities are most often associated with forested grazing systems—aspen has a higher crown, which better facilitates livestock movement, and has less light interception than most conifer dominated communities. Generally, aspen stands tend to contain up to ten times more forage than conifer stands. Aspen typically reproduces through “suckers,” which are extremely palatable to livestock. Forest grazing should be highly controlled or excluded in aspen stands where regeneration is an objective.

It is important to consider the dominant species of trees, shrubs, forbs, and grasses within forested range. This information will help determine the sustainable stocking rate, and forage value, which will then inform management practices. A few examples:

- **Jack pine/bearberry/lichen:** This plant community would be found on a very dry, nutrient poor ecosite. It is associated with dry, rapidly drained, sandy soil that yields low forage production that is easily depleted. This range would have a very low sustainable stocking rate of 0.01 AUM/acre, meaning you would need 100 acres of this community type to graze one 1,000 lb. cow for one month. Grazing is not recommended on this community type.

- **White Spruce – Aspen/Rose:** This is a mixed-wood plant community that is commonly found in Alberta. This stand type transitions from aspen-dominated tree cover to spruce-dominated tree cover. As the stand becomes more spruce-dominated, the cover of forage plants (i.e. rose and low-bush cranberry) will become reduced. The sustainable stocking rate is 0.1 AUM/acre, meaning you would need 10 acres of this community type to graze one 1,000 lb. cow for one month.

- **Aspen/rose/tall forb:** This is a common plant community in Alberta. The abundance of tall forbs provides a moderate amount of forage for livestock, resulting in a higher sustainable stocking rate of 0.2 AUM/acre. This means you would need five acres of this community type to graze one 1,000 lb. cow for one month.

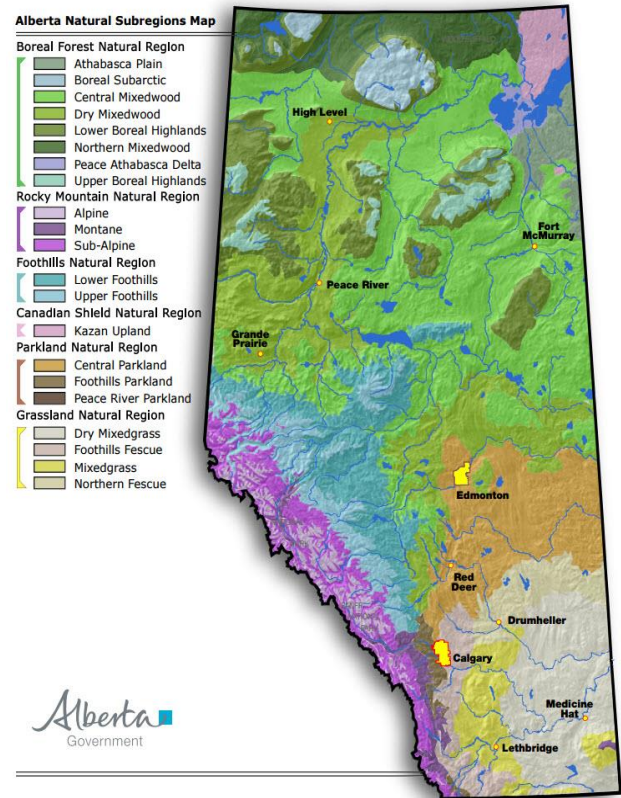


Figure 4. Natural regions of Alberta
Source: Government of Alberta

Management

Effective management of forested or partially forested rangeland involves a combination of strategies. If you are starting a forest grazing regime from scratch, it is important to understand the baseline conditions of the forest. Choose a couple of sites within the range that will be sensitive to livestock distribution and weather, and continually monitor these sites. Using a permanent marking point, take pictures for a visual comparison over time and complete a range health assessment. In order to determine the forage value of your rangeland and its sustainable stocking rate, you must identify the key understory forage species and determine the community type you are working with. There are many guides available to help the landowner understand the sustainable stocking rate for their forested or partially forested rangeland,

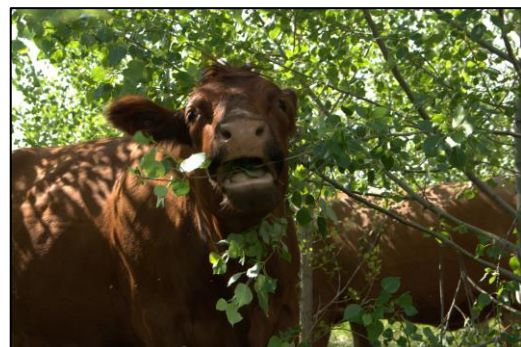


Figure 5. Cattle browsing stems
Source: Jeff Renton

such as the Guide to Common Northern Rangeland Communities and Their Management, available from the Government of Alberta.

Once the sustainable stocking rate has been determined, there are a number of practices that can be applied for successful range management:

- 1) **Proper season of use:** All plants are vulnerable to grazing in the spring, especially plants with growing points located at the tips of branches. If plants are grazed too early, energy reserves will be severely reduced, which affects overall health and ability to produce new growth. In particular, cattle should be deterred from browsing stems as this has a significant impact on tree growth. In order to reduce browsing on trees and shrubs, cattle grazing should be delayed until mid-June when the forage has developed. Grazing should only occur from mid-June until the end of September. OR in order to reduce browsing on trees and shrubs, cattle grazing should only occur from mid-June to the end of September. This will allow the forage to develop by mid-June, providing the cattle a grazing alternative to the trees and shrubs.

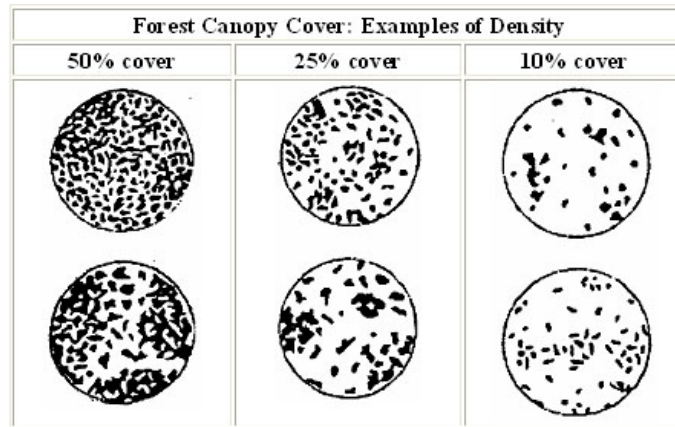


Figure 6. Estimating canopy cover
Source: How, When and Why of Forest Farming

- 2) **Rest periods:** It is recommended that forested rangeland be grazed only once per grazing season. This will help maintain plant health and vigor and allow grazed plants to regrow and replenish energy reserves before winter. A rule of thumb is to graze 25% of the total forage production within the forested rangeland. This will leave enough growing points intact and allow Litter, Fermenting and Humified vegetation (LFH) to build up. This material insulates soil from temperature changes, helps cycle water and nutrients, and prevents erosion.
- 3) **Fencing:** Installing a cross-fence is an effective method for creating multiple areas of primary range. When tame pastures are fenced together with forested rangeland, livestock will spend more time grazing tame pasture (the primary range) and less time in forested rangeland (the secondary range). When a cross-fence is added, both areas become primary range. The range manager will have more control of livestock distribution and the two pastures can be grazed in rotation, ensuring each pasture is grazed during the proper season at proper utilization levels. When one pasture is grazed, the other can be rested.
- 4) **Placement of watering systems and mineral supplementation:** Strategically placing watering systems is another very effective way of controlling livestock movement. Watering systems can be placed such that cattle will spend more time grazing in the forest, which also works to establish two areas of primary range. Placing salt or other mineral supplements in forested areas will also attract cattle and encourage the use of these areas for foraging.

- 5) **Stand thinning:** Generally, a tree canopy cover of 50% or more will shade out most understory plants, causing the site to be unproductive for grazing. Canopy closure is the most influential and manageable variable affecting understory production, therefore management efforts should be focused here. Stand thinning that results in a canopy closure from 20% to 50% will be an effective means of stimulating understory production, thus increasing the forage value of the forest. It is important to ensure that desirable understory plants are being recruited after thinning, therefore monitoring is critical. Biological and chemical brush management can help in maintaining a desirable understory composition, which will provide forage for livestock and allow natural seedling regeneration.

Monitoring

Monitoring the effects of livestock grazing on forest conditions is important for ensuring the long-term sustainability of a management regime. The **key species and key areas** approach is an effective method of monitoring forested range. One to three plants can be used as key species; they should be abundant, productive and palatable. These species are valuable for livestock grazing and will decrease in abundance if the range has been overgrazed, making them a good indicator of grazing pressure. Aspen, ricegrass (*Oryzopsis hymnoides*), cream-colored vetchling (*Lathyrus ochroleucus*), and Saskatoon (*Amelanchier alnifolia*) are common key species.

Key areas are portions of range that act as an indicator of range condition, trend, or degree of use. No range of a moderate size will be used uniformly, so key areas will be located where livestock tend to graze. A key area cannot be near water or salting sites, or other areas where livestock gather for reasons other than grazing. An indicator of grazing sustainability is the abundance of key species in the key areas identified.

This approach should be combined with a strategy that looks at soil health and compaction, such as the **'Poke (Pencil) Test Method'**, which is used to assess LFH thickness and mineral soil compaction. To perform this test, place the eraser end of a sharp pencil on the palm of your hand and press down into the LFH layer with a straight arm. The thickness of the LFH layer can be estimated by measuring the distance the pencil penetrates before it reaches mineral soil. You can also gauge the resistance you feel as the pencil moves through the LFH. Generally, better site management correlates with resistance felt i.e. the better managed the site, the more resistance should be felt.

An excellent resource for performing a rangeland health assessment is the Government of Alberta's **'Range Health Assessment Field Worksheet for Forests'**, found on their 'Range Health' webpage.

You can find more detailed information about forest grazing in:

- Government of Alberta Environment and Sustainable Resource Development: *Grazing & Range Management*
<http://esrd.alberta.ca/lands-forests/grazing-range-management/default.aspx>
- Government of Alberta Environment and Sustainable Resource Development: *Range Health*
<http://esrd.alberta.ca/lands-forests/grazing-range-management/range-health.aspx>
- USDA National Agroforestry Center, Agroforestry Notes: *Forest Grazing, Silvopasture, and Turning Livestock into the Woods*
<http://nac.unl.edu/documents/agroforestrynotes/an46si09.pdf>
- Government of Saskatchewan Ministry of Agriculture: *Grazing Forested Rangeland*
<http://www.agriculture.gov.sk.ca/Default.aspx?DN=4aabe84e-ea79-417a-ace2-e629ffe95cb3>
- Foragebeef.ca: *Forest Grazing*
[http://www1.foragebeef.ca/\\$foragebeef/frgebeef.nsf/all/frg1207](http://www1.foragebeef.ca/$foragebeef/frgebeef.nsf/all/frg1207)

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