

# Grazing Frequency and Utilization

## Grazing Management Guide

### Introduction

When developing a grazing management plan, it's important to consider both how often livestock graze (*frequency*) and how much forage they consume (*intensity*) in each pasture. This factsheet is designed to help guide you through the key factors to consider when making those decisions to maintain healthy and productive pastures.

There are general guidelines that can be used as a “trigger” for you to consider next steps relating to the need to move livestock to avoid the potential of stressing or weakening your stands. Of course, this type of guidance needs to be put into the context of your environment, plant species, time of year, grazing plan, and goals. In general, the guidelines for grasses and forbs indicate when the plants have enough stored energy and leaf area to start grazing and have enough leaf area remaining to maintain root growth and/or store enough energy to overwinter.

The leaf lengths or stubble heights, provided in the table below, are intended to assist with gauging if too much defoliation is occurring or if the rest period has provided adequate regrowth and/or as a tool that can assist you in determining livestock use and distribution. They are not a substitute for the application of FIO (Frequency, Intensity, Opportunity) Principles, rather leaf lengths serve as a simple visual tool to evaluate whether grazing is occurring too early or too intensively. Leaf lengths provide an indication of whether defoliation (*intensity*) is excessive, or rest periods (*opportunity*) have been sufficient. Not meeting these leaf height guidelines may suggest if changes in stocking level, grazing duration (*frequency* – length of stay in a paddock), size of the paddock or the rest period (*opportunity* – regrowth) need to be adjusted. If leaf lengths are exceeded, it may also signal that there is more forage available to be consumed than originally predicted and the area may be able to support increased livestock numbers or a longer grazing season.

**Note:** the leaf lengths in the table below are not intended to be a substitute for the application of the FIO Principles. They can be used as a simple visual tool to help evaluate whether grazing is too heavy (*intensity*) and if the rest period (*opportunity*) is adequate. They are not intended or designed to stand alone as a measure of pasture vigour/health.

For example, livestock may be scheduled to graze a paddock for three days, but if the “graze no closer than” leaf length is reached earlier than expected, it’s a sign to move them out sooner than planned. If the plan has livestock returning to graze, for example, in 40 days, but the “regrowth” height is not met in the paddock, it suggests not entering that paddock and shifting to another one that does. If this happens during a normal year (not caused by drought), it may be appropriate to adjust the grazing rotation or reduce livestock numbers into the future. In a drought year, changes to the rotation should be made to match the reduced plant growth and thus help maintain pasture health. If the conditions that year – such as rainfall – don’t support adequate regrowth, and leaf lengths are shorter than needed with no alternative paddocks available, then the grazing plan should be adjusted to allow more recovery time in the following year or years. Conversely, if leaf lengths are notably exceeded (longer or higher), it may be a signal that there is more forage available to be consumed than originally predicted and the area may be able to support increased livestock numbers or a longer grazing season.

Forage	Begin grazing at:***	Graze no closer than:	Start grazing regrowth:	Cut for hay (first cut) at: *	Allow regrowth to this height before killing frost:
Kentucky Bluegrass	4 – 6” (10-15 cm)	2” (5 cm)	4 - 5” (10-13cm)	Head	4” (10 cm)
Orchard grass	6 – 8” (15-20 cm)	4” (10 cm)	8” (20 cm)	Boot to early head	6” (15 cm)
Smooth Bromegrass	8 - 10” (20-25 cm)	4” (10 cm)	8 - 10” (20-25 cm)	Med. to full head	6” (15 cm)
Tall Fescue	6 – 10” (15-25 cm)	4” (10 cm)	8” (20 cm)	Boot to early head	6” (15 cm)
Meadow Brome	6 – 8” (15-20 cm)	4” (10 cm)	8” (20 cm)	Boot to early head	6” (15 cm)
Festulolium	8 – 10” (20-25 cm)	3” (7.5 cm)	8” (20 cm)	Boot to early head	4 – 6” (10-15 cm)

Perennial Ryegrass	6 – 8" (15-20 cm)	3" (7.5 cm)	5 – 7" (12.5 – 18 cm)	Boot to early head	3 - 4" (7.5 – 10 cm)
Timothy	6 – 8" (15-20 cm)	3 - 4" (7.5 – 10 cm)	8 - 10" (20-25 cm)	Early head	5 – 6" (12.5-15 cm)
Alfalfa	6 – 12" (15-30 cm)	3" (7.5 cm)	>8" (20 cm)**	Late bud - early bloom	8 – 12" (20-30cm)
Red & Alsike Clover	6 – 12" (15-30 cm)	3 - 4" (7.5 – 10 cm)	8" (20 cm)	Early to ¾ bloom	8" (20 cm)
White Clover	6 – 10" (15-25 cm)	3" (7.5 cm)	8 - 10" (20-25 cm)	Early to mid-bloom	4 – 6" (10-15 cm)
Sainfoin	10 – 12"	6" (15 cm)	10 – 12"	Early to mid-bloom	6 – 10" (15-25 cm)
Birdsfoot Trefoil	6 – 10" (15-25 cm)	3 - 4" (7.5 – 10 cm)	6 – 10" (15-25 cm)	Early to ¾ bloom	6" (15 cm)
Cicer Milkvetch	6 – 8" (15-20 cm)	3 - 4" (7.5 – 10 cm)	6 – 8" (15-20 cm)	Early to mid-bloom	6" (15 cm)

**Table 1.** Leaf lengths to guide grazing

\* The boot stage follows the vegetative phase and precedes seed head emergence (heading). It is called "boot" because the swelling at the top of the stem resembles a foot in a boot.

\*\* Alfalfa, especially in multiple grazing passes, would benefit from being allowed to go to flower and/or having at least 40 days of rest (regrowth) at least once, preferably later in the season.

\*\*\* In the spring for most domestic or tame grass species the "begin grazing at" is typically the 3 to 3.5 leaf stage of growth.

Table Adapted for B.C. from: Pasture and Grazing Management in the Northwest (Shoemaker & Bohle editors); Management Intensive Grazing in Indiana (NRCS & Purdue Extension); Minnesota NRCS Conservation Practice Standard; Grazing Management and Soil Health (USDA & NRCS Iowa); Forage Pocket Guide (Ball, Lacefield & Hoveland).

**Reminder:** Please use these numbers as general guidelines. Your environment, the season, and management can affect outcomes, especially winter survival. If you have an intensive rotational grazing system, you may well be able to turn out earlier if you move quickly and leave adequate leaf area to support quick regrowth.

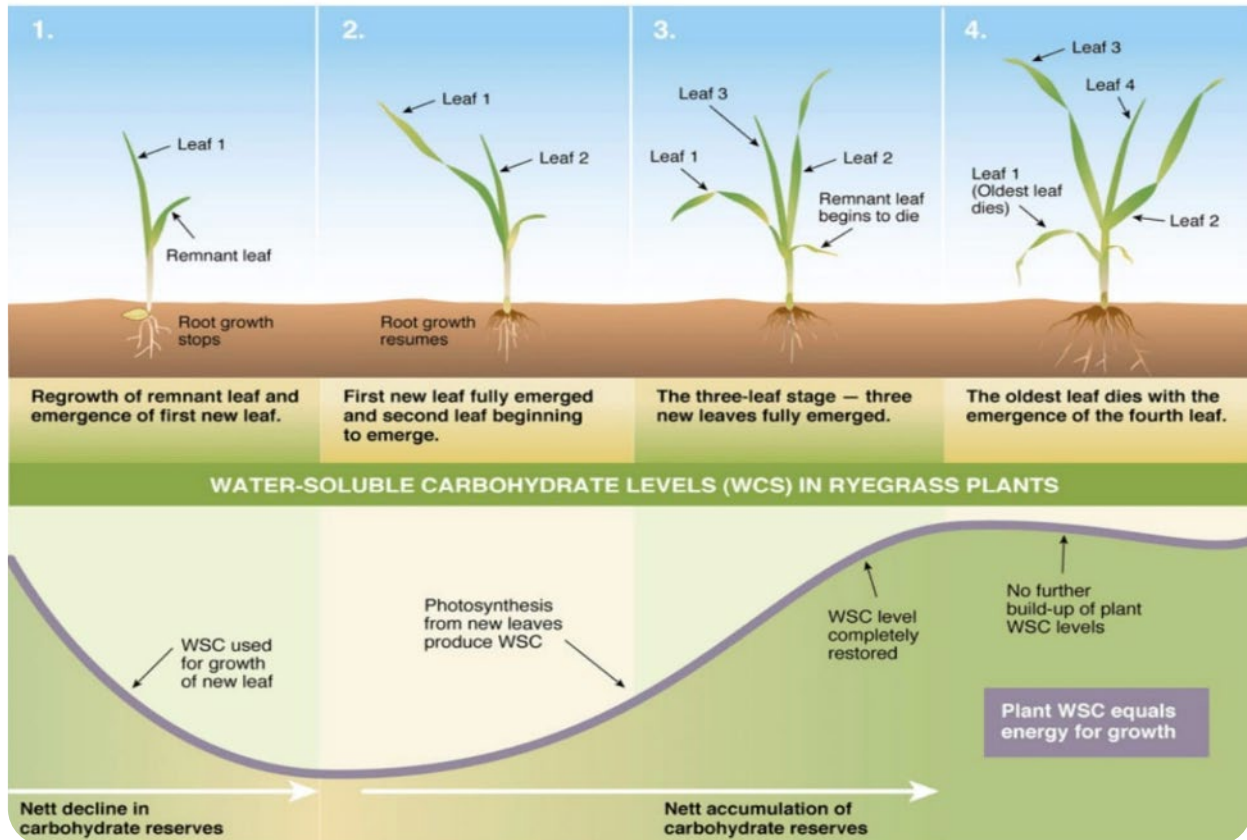
**BC range or native species on Crown land, please refer to:**

- the "[Range Readiness Guidelines](#)"

- the “[Stubble Height Criteria](#)”

### Spring growth diagram:

Regrowth of ryegrass after grazing and the change in WSC levels during regrowth (image source EVERGRAZE)



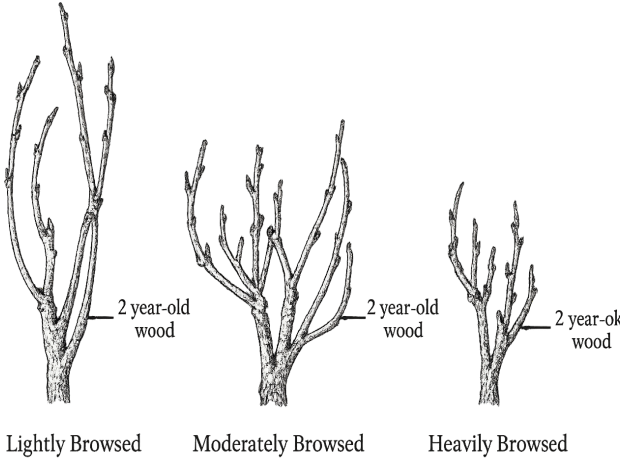
**Figure 1.** Regrowth of ryegrass after grazing and the change in WSC levels during regrowth (Image source: EVERGRAZE).

This diagram shows the drawdown in energy (WSC – Water-Soluble Carbohydrates) to support the initiation of growth in the spring. That drawdown may also occur after close grazing, harvest, or regrowth after drought. Rather than using leaf height, it refers to leaf stage, as does the readiness or turnout criteria for BC rangelands, which better reflects a plant species physiological readiness for grazing – indicating energy reserves sufficient to support both above-and below-ground growth. A grass species may be ready, however remember to consider other key or desired species in the stand or pasture. Before turnout, confirm forage biomass is sufficient to support livestock and that key species (e.g., legumes) have reached a growth stage that can support grazing.

In the spring most tame forage grasses are “ready” to graze at the 3.0 to 3.5 leaf stage or growth

**Browse Utilization**

In addition to grasses and forbs, it is also important to determine whether woody vegetation is being utilized by livestock. Woody plants play an important role in maintaining or restoring the functionality of a riparian area. Over-utilization and heavy use of woody plants can result in a reduction of woody plant vigour, leading to the reduction or elimination of preferred woody plants and an increase of disturbance and/or weedy species. The timing of browse utilization is also a factor to consider. Woody material removal during bud elongation in the spring and early summer is generally more impactful on tree and shrub health than after buds have set for the year. It is also important to note that light to moderate use (diagram below) helps maintain woody plant vigour. (from Riparian Management Field Workbook)



**Figure 2.** Browse utilization examples.

**Pasture health or vigour**

Pasture health or vigour depends on multiple dynamic factors that vary annually and throughout the growing season. To keep perennial pastures healthy and meet livestock goals, it's important to look at grazing frequency and intensity through the lens of how plants respond. In that regard, the FIO Principles can readily be used to help us assess when and how much we graze. Also, the FIO Principle aligns with the *Grazing Response Index* monitoring tool

## **FIO Principles** = Frequency, Intensity, and Opportunity:

- *Frequency* refers to the number of times plants are defoliated during the grazing period and depends on the length of time that plants are exposed to grazing animals. When leaves are removed shortly after having regrown, (often referred to as the “second bite” – a second grazing of a plant, i.e. its regrowth, with the same grazing event), the plants may need to draw further on energy reserves to support leaf growth.

This results in root growth slowing or stopping, further depletion of energy reserves and a reduction in plant vigour and production. Less than a seven-day grazing duration greatly reduces that risk, particularly in range and dryland situations. In high producing sites – irrigation, high precipitation, domestic species, good fertility – leaf regrowth can occur in three to five days and be susceptible to the “second bite” sooner.

- *Intensity* refers to the amount of leaf material remaining after the grazing period. It can be seen as defoliation or utilization or its reverse. However, the emphasis is placed on leaf volume or area remaining to support growth. In general, leaving more than 50% of the leaf material provides enough photosynthetic area to allow the plants to meet their energy needs to sustain root and leaf growth. Leaving less than 50% can result in a lack of photosynthetic capacity which slows or stops root growth for a time, often requiring the plant to draw upon stored energy reserves to support leaf growth.
- *Opportunity* refers to the time plants have to grow before grazing or regrow and recover after grazing. This is critical in maintaining forage productivity and plant health.
  - Plants must have the opportunity to fully store energy at some point during the active growth period; it is dependent on the availability of soil moisture, nutrient availability, temperature, and leaf area.
  - High energy reserves or stored energy is particularly important going into winter or drought periods. If your environment has known drought periods (e.g., late summer) managing for these conditions is advisable. When drought hits unexpectedly, providing opportunity for regrowth will be important to restore plant vigour; if plants are lost, then consider stand rejuvenation to fill their spaces.

Towards the end of the growing season (fall), perennial forages (most cool-season grasses) respond to environmental signals and prepare for winter dormancy. At this time, they develop most of their growing points (apical meristems) on their basal shoots and the first generation of roots occurs. In order for this there must be enough leaf tissue to support their development. Planning your grazing to ensure you have enough leaf area to support those functions as well as support winter survival is important. If livestock need to be present at those times, adjusting next year's rotation to ensure growth (opportunity) will be desirable.

Regenerative Agriculture and other grazing protocols suggest addressing "*Five Grazing Fundamentals*" when designing and implementing your rotational grazing plan. They are:

1. **Timing:** When during the season or year grazing occurs.
2. **Frequency:** How often the plants are grazed.
3. **Intensity:** How heavily the plants are grazed.
4. **Duration:** How long the grazing event lasts.
5. **Rest:** Time during the growing season when the plants can recover from grazing.

A quick look shows that FIO addresses all the above fundamentals but **Timing**. Timing when grazing occurs during the season (plant stage or growth) can be critical, as it affects plant development and recovery capacity. Paying attention to development and recovery can address the needs of specific plant or livestock species. For example, some native species can have a very short growing periods (e.g., 4 to 6 weeks), so repeated grazing at that time of growth could stress or weaken those species. Adjusting away from grazing at that time every year would be a good strategy. The opportunity may exist to target less-desirable species, such as increaser, weedy, or woody species, at times or stages of growth where they are more susceptible to grazing, reducing their vigour and perhaps reducing their presence in the stand. If you have livestock that have high nutrient requirements for growth or performance, you could plan your grazing to target paddocks where stages of growth indicate plant nutrition is high. Conversely, maintenance of livestock with lower nutritional needs could target paddocks with more mature or older growth, hence lower nutrition. (Diagram from earlier factsheet – *Grazing Management Guide* – showing growth pulses).

A slightly different way to look at the pasture health attributes to manage for, is the GRASS Principles outlined in Canadian Forage and Grassland Association's (CFGa) Advanced Grazing Systems program and training.

- **Grazing period** = time animals graze a paddock. Move animals prior to the "second bite" (re-grazing of leaf regrowth within the grazing event). *If not, adjust to enable regrowth and recovery.*
- **Rest (regrowth) period** = time plants need or are given to recover, i.e., grow after defoliation. Varies with season, species, plant vigour, utilization, and growing conditions.
- **Animal impact** = physical effect animals have on the soil. For example, "hoof action" and deposition of nutrients. *Caution is needed as negative impacts can also occur.*
- **Stock density** = number of animals per unit of area. Typically expressed in terms of animal units per acre or hectare. Higher density equates to more plant species being grazed (less selectivity), better distribution of manure, and more uniform physical impacts.
- **Soil armour (litter)** = plant residue covering the soil surface. Provides insulation, which mitigates soil temperatures (summer & winter). Reduces rain impacts, runoff, erosion, evaporation, and supports soil biology and function.

Although this approach describes the key elements a bit differently than the previous two, it still emphasizes managing grazing to support pasture and soil health. All three approaches identify *grazing period* or duration (leaf removal or defoliation), *rest* (growth and regrowth), and *soil armour*, stubble or leaf length remaining after grazing as components for success. GRASS also points to the benefits associated with high livestock densities in terms of *animal impact* (nutrient and seed incorporation) and *stock density* which sees decreased plant species selectivity and improved livestock distribution within the paddocks.

### A note on rest:

When planning your grazing system, it is important to recognize that *rest (opportunity)* refers specifically to periods of active plant growth—not simply times when livestock are absent. Plants require sufficient leaf area, temperature, and moisture to photosynthesize and rebuild energy reserves after defoliation. Resting a pasture during the dormant season—such as during winter months with subzero temperatures—does not provide plants the opportunity to recover, due to no growth or regrowth. True rest must coincide with the growing season, when conditions allow the plant to grow or regrow foliage and restore/build energy reserves. Studies consistently show that pastures given adequate rest during active growth exhibit improved root mass, forage yield, resilience and long-term persistence. In contrast, repeated grazing without proper growth and regrowth opportunities leads to energy depletion, root dieback, and eventual stand decline. The length of rest required depends on the species, level of utilization, and growing conditions, but the key is that rest occurs when the plant can respond and grow.

### Rest period guidance

**Why it matters:** The amount of rest or recovery time pasture plants need can vary a lot depending on rainfall, plant species, season, and soil type. This table provides general guidelines for rest periods based on **annual precipitation**, helping producers match grazing intensity with ecosystem resilience.

Annual Precipitation**	Rest Period During Fast Growth (Spring - vegetative to early transition phases)	Rest Period During Slow Growth (Summer/Fall)	Comments
< 300 mm (12 in)	35–45 days	60–90+ days	Very dry zone. Avoid overgrazing — recovery is slow.
300–450 mm (12–18 in)	30–40 days	45–75 days	Dryland zone. Moderate flexibility, but rest timing is critical.
450–600 mm (18–24 in)	25–35 days	40–60 days	Good balance between productivity and rest.

> 600 mm (24 in)	20–30 days	35–50 days	Irrigated or moist areas. May allow faster rotations but monitor closely for regrowth.
< 300 mm (12 in)	35–45 days	60–90+ days	Very dry zone. Avoid overgrazing — recovery is slow.

**Table 2.** General guidelines for rest periods based on annual precipitation.

\*\* Give consideration to local/micro climatic conditions when applying this guidance. Timing of the precipitation is key for best utilization by the plants.

**Note:** rest periods refer to time *between grazing events on the same paddock*. Always adjust based on plant height, growth stage, and visual indicators of readiness to graze again.

Sources for the above table adapted from:

- Manitoba Agriculture, Forage Rest and Recovery Guidelines (2022);
- Alberta Agriculture and Irrigation, Rotational Grazing Factsheets;
- USDA NRCS Prescribed Grazing Technical Notes (2017);
- BC Forage Council, Grazing School Materials (2019).

This factsheet outlines key concepts, features/attributes, and tools to support grazing strategies that promote healthy pastures and soils.

Core principles include short grazing periods, approximately 50% defoliation or less, substantial/appropriate rest (growth or regrowth) periods and livestock densities that improve distribution and reduce selectivity (plant and spatial). While simplified, this provides a solid foundation.

Based on your operation's capacity and monitoring results, implement a grazing management plan as intensive as feasible, and the approach that resonates with you and/or your client, and the environment. Monitoring and candid observations allow for refinements or adjustments as they are identified and addressed, which will ultimately occur.

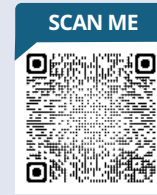
## Find more information:

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Range Readiness Guidelines:



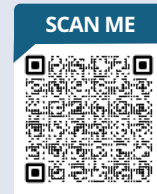
[Range Readiness Guidelines](#)



Stubble Height Criteria (Rangeland Health Brochure):



[Stubble Height Criteria](#)



Contact AgriServiceBC:

**Email:** [AgriServiceBC@gov.bc.ca](mailto:AgriServiceBC@gov.bc.ca)

**Phone:** 1 888 221-7141