Forest Practices Board

# MEASURING AND ALLOCATING FORAGE ON RANGELANDS IN BC

## SPECIAL REPORT

DECEMBER 2023

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# GLOSSARY OF TERMS

**Animal Unit Month** (AUM) refers to the amount of forage required to sustain an average cow with an unweaned calf born in the current calendar year for one month, which the *Range Act* defines as 450 kilograms of forage measured on a dry matter basis.

**Carrying Capacity** is the theoretical maximum population that forests or grasslands can sustain indefinitely, given the food, habitat, water and other necessities available in the environment, without being significantly depleted or degraded. This is an estimate of forage production by plant community or range type at mid-summer peak production.

**Forage** is browse and herbage that provides food for grazing livestock and wildlife.[1]

**Forest encroachment** refers to establishing trees in historically non-forested areas, such as grasslands.[2]

**Forest ingrowth** refers to open forests and treed grasslands having increased densities of young trees.

**Rangeland** refers to land that supports vegetation that can be consumed by livestock and wildlife. Rangelands are natural ecosystems of alpine, subalpine, community pastures, forestlands, grasslands, parklands, shrublands, and riparian areas.[3]

**Range Use Plan** (RUP) refers to a plan authorized under the *Forest and Range Practices Act* (FRPA) for grazing livestock or cutting hay on Crown range. Each RUP must include a map and a grazing schedule for each pasture used for grazing livestock. The plan must also detail specific actions to be carried out to address any issues identified by the ministry. It must conform to prescribed requirements, such as range readiness, and be consistent with objectives set by government.[4]

**Range agreements** (RA) are grazing licences and permits for a specific area of public rangeland that authorizes the holder to graze livestock for a period and specify the number of animal unit months authorized annually. Licences are issued for 15 to 25 years, while permits are shorter terms not exceeding 10 years.

**Vacancy** refers to an area not historically grazed but may have suitable unallocated forage or an expired range agreement area not currently held under licence or permit.

[1] *A Glossary of Terms Used in Range Management.* 1998. The Society for Range Management.
[2] *Forest in-growth and encroachment: a provincial overview from a range management perspective.* 1999. Ministry of Forests. Victoria, BC.
[3] Rangelands Website. www2.gov.bc.ca/gov/content/industry/rangelands
[4] *Forest and Range Practices Act*, sections 32 and 33.

# INTRODUCTION

The Forest Practices Board regularly audits range practices and the appropriateness of government's enforcement of range practices. The Board has occasionally observed damage to riparian areas, soils and native grassland ecosystems resulting from grazing. The Board has also reported on the issue of competition for available forage between wildlife (particularly elk) and livestock in the East Kootenays.[5] Given that there are approximately 1310 grazing licenses and 27 grazing permits covering more than 33 million hectares of public land in BC, the Board was interested in evaluating how government measures and allocates forage and how that process considers values identified under the *Forest and Range Practices Act* (FRPA). We decided to examine the 10 natural resource districts with the highest forage allocations to see if a credible and systematic process exists for measuring and allocating forage on rangelands in BC.

The plants that livestock and wildlife eat are called forage. Knowing where and how much forage is available is vital to maintaining a stable ranching industry and wildlife populations. Responsible forage management is important for restoring or maintaining healthy soils and plant communities. Too many livestock can result in overgrazing, which can adversely impact water, wildlife habitat, and other values. Overgrazing can also increase the risk of invasive species, reducing biodiversity and forage production. Too few livestock can lead to missed economic opportunities for government and ranchers, increased flammable understories[6] or forest ingrowth.

Range managers aim to balance the forage available for livestock and wildlife while maintaining rangeland health. If the right amount of forage isn't available, that can affect a range agreement holder's ability to meet compulsory practices or comply with a range use plan (RUP), such as following schedules for pasture use or livestock distribution.

Most rangeland in BC is forested. It can be shared by multiple range agreement holders while overlapping with different land uses, such as forestry. The legislature has set objectives to promote a competitive ranching industry while maintaining important values like water quality or forage for wildlife. Government has an important job in overseeing how forage is measured and allocated to help meet these diverse objectives over a common area.

Section 135 of FRPA permits the Board to make a special report on matters that the Chair considers to be in the public interest. This is the Board's special report on the measurement and allocation of forage in BC.

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[5] Follow-up Report on Wildlife and Cattle Grazing in the East Kootenay (2015). Special Report 51. Forest Practices Board, Victoria. BC., and; Wildlife Cattle Grazing in the East Kootenay (2008). Complaint Investigation 060724. Victoria, BC.

[6] Siegel, K. J., Macaulay, L., Shapero, M., Becchetti, T., Larson, S., Mashiri, F. E., Waks, L., Larsen, L., & Butsic, V. (2022). Impacts of livestock grazing on the probability of burning in wildfires vary by region and vegetation type in California. Journal of Environmental Management, 322.

## Objectives

The objective of this special report is to determine if government has a credible and systematic[7] approach to measuring and allocating forage on rangelands and how well this process contributes to achieving government's objectives for range.

For context, we have included a brief history of forage management, including the policies that shaped current processes and the recent trends in forage allocations. We will provide a brief background on legislation and government roles and summarize important factors affecting forage availability. Finally, we will report our findings on how government measures forage, allocates forage and how those processes contribute to achieving government's objectives for range.

# BACKGROUND

## History of Forage Measurement & Allocation

Until 1919, grazing was unregulated, and ranchers claimed operating areas on a first-come, first-served basis. This unregulated grazing led to the establishment of the *Grazing Act*, its regulations, and the foundation of administrative control.[8] In 1919, with permits approved for 43 602 head of cattle, the Commissioner of Grazing surveyed grazing districts to determine the number of livestock using Crown ranges, along with "a rough estimate of the carrying capacity, based on the present methods of use." By 1931, the authorized use had increased to 59 182 cattle[9] and the Commissioner of Grazing position was dissolved, with duties transferred to the chief forester.

The *Forest Act* was eventually rewritten in 1978, and it directed the chief forester to develop and maintain an inventory of the lands and forests. This included assessing the land for its potential to produce forage for livestock, which now included nearly 270 000 head of cattle.[10] In the 1980s, range inventories were linked to a provincial inventory that relied on the "forest cover inventory to estimate the available Animal Unit Months."[11] By the mid-1990s, the Resource Inventory Committee (RIC) was developing new inventory procedures to map distinct plant communities in grasslands and wetlands and focus on measurements rather than estimates.

The *Forest Act* was amended in 2002, and the chief forester no longer had a legislated responsibility to inventory forage on a provincial scale. By 2004, the number of cattle in the

[7] Credible refers to *offering reasonable grounds for being believed,* and systematic means *methodical in procedure or plan*. (Merriam-Webster)
[8] Report of The Forest Branch of the Department of Lands. February 13, 1920. Province of British Columbia.
[9] By 1937, the Ministry of Forests had 46,100 sheep grazing on Crown range under permit. Sourced from Mulholland, F.D. 1937. The Forest Resources of British Columbia 1937. Department of Lands, BC Forest Service. Victoria, BC.
[10] Ministry of Agriculture, Annual Report. 1979.
[11] Ministry of Forests, *Forest, Range & Recreation Resource Analysis*. 1994.

province peaked at approximately 950 000 head.[12] The following year, FRPA required individual range agreement holders to have an RUP, including mapping their range use areas and implementing practices that maintain or enhance forage quantities.[13]

In 2020, the *Range Act* permitted and licenced 816 750 animal unit months (AUMs). These are allocated over 33 million hectares of rangeland in BC and, along with private lands, support approximately 600 000 head of cattle.

# Recent Trends in Forage Allocation

The number of authorized AUMs in the province has declined by nearly 24 percent since 2004. AUMs have only seen a 2 percent decline since 2016 in the natural resource districts we reviewed (Figure 1). Most of these declines are from tenures being turned back to the province. Other reasons for the decline include strategic agreements with First Nations, provincial beef herd reductions from drops in market demand, range agreement holders' deaths, aging infrastructure too costly to repair, or predation problems. Environmental factors, including lower forage availability, are also an issue. Where a range agreement's AUMs have been reduced because of forage availability, the Board heard that the reductions are usually with the consent of the range agreement holder.

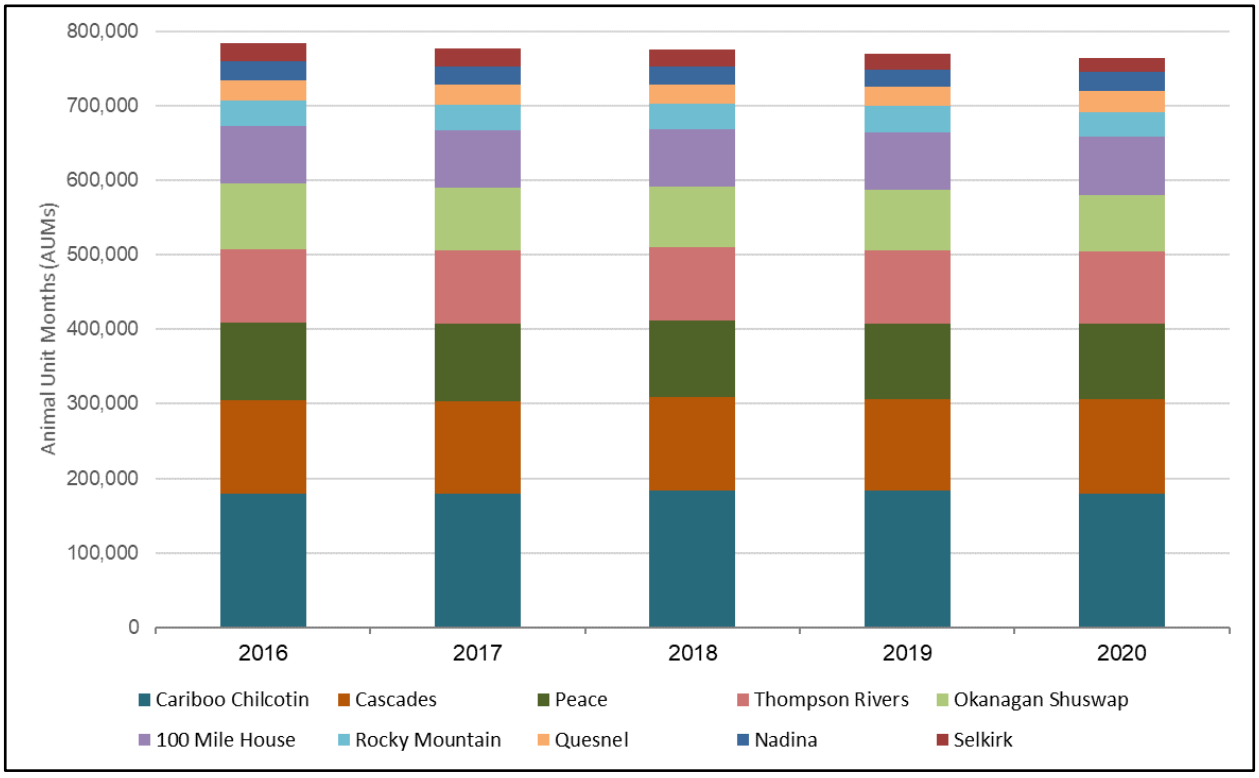


**Figure 1.** Five years of AUMs for districts investigated in this report (Range Branch, Ministry of Forests, 2022)

[12] Statistics Canada measure, total cattle in BC, all cattle operations, measured on July 1.
[13] Section 7(b) of the *Range Planning and Practices Regulation*

# Relevant Legislation

The ***Range Act*** authorizes grazing and hay cutting with licences and permits (termed "agreements"). The act authorizes the allocation of forage and stipulates licences should be renewed with the same forage level previously licenced.[14] The *Range Act* also includes the authority to reduce AUMs, for example, where the area no longer supports the previously issued AUM levels.[15]

The ***Forest and Range Practices Act*** (FRPA) partly governs livestock grazing, other range practices, and range developments on public rangelands. The *Range Planning and Practices Regulation* (RPPR), established under FRPA, contains government's objectives for stewardship and economic benefits from the range resource. FRPA provides a critical link between objectives for range and allocation of forage for grazing made under the *Range Act*. FRPA requires that an RUP and the area subject to the RUP for grazing livestock be consistent with the objectives set by government.[16] Government objectives under the RPPR focus on soils, forage, water, fish, wildlife, and biodiversity. Government can set other legally binding forage objectives under the *Land Act*, such as through land use objectives orders.

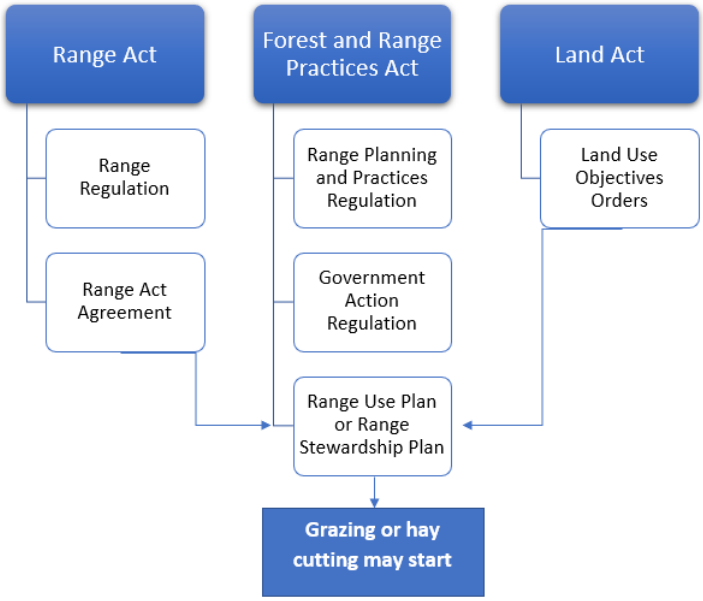


**Figure 2.** Various acts and regulations that relate to range management.

# Roles

**Natural Resource Districts** (districts) within the Ministry of Forests (referred to as the ministry in this report) are responsible for the provincial range program's stewardship, authorization and operations. Districts make all the operational decisions, such as determining forage supply, issuing tenures, approving RUPs and monitoring. Districts can also establish Best Management Practices (BMPs) and District Manager policies.

The Range Branch within the ministry is responsible for training, policies and procedures, technology, revenue, research, inventory, audits and range monitoring. Its role includes supporting the districts to advance a provincially consistent and legally sound range program. The Range Branch offers Geographic Information System (GIS) modelling assistance, field

[14] Section 24(c) of the *Range Act*
[15] Section 36(2) of the *Range Act*
[16] Section 33(1)(e) of FRPA

training, and professional advice. Range Branch has published over 10 rangeland health brochures and numerous guidance documents to support district range staff. One health brochure, *Determining Available Forage*, is specific to forage measurement.[17]

The **Forest and Range Evaluation Program** (FREP) was established to evaluate the effectiveness of FRPA. The program's mission is to promote sustainable management through monitoring and evaluating the condition of the 11 FRPA resource values, including forage and associated plant communities, and to identify opportunities for continued improvement.[18] FREP uses the *Rangeland Health Field Guide*[19] and Invasive Plants checklists for assessing range health.

**Range agreement holders** are licence or permit holders responsible for complying with government legislation and practice requirements outlined in approved range use plans (RUPs), which must be consistent with government objectives while being granted authority to access a defined amount of forage through grazing or hay cutting.

# What Affects the Availability of Forage?

Forage availability is influenced by several factors, including land use, natural disturbance, and the type of ecosystem it is found in, such as grasslands, forests or alpine areas. Cyclical factors like weather and natural disturbances like fire or drought can increase or decrease forage availability seasonally and annually. For example, a low-intensity spring burn may increase summer forage, while a high-intensity summer burn may reduce forage in subsequent years.

Other factors can reduce forage availability, including invasive plants, over-grazing, human settlement, or recreational uses. Forage might be reduced over time from changes in forest cover, such as from aspen-dominated stands to pine stands. Forage may also be reduced by changes in fire regimes; if fire is excluded from a landscape, forests may encroach on grasslands, particularly in dry interior forests. Forage availability can be increased through range improvements like invasive species control, ecologically suitable forage seeding, fertilization, prescribed fire, or controlling the distribution of livestock.

[17] Fraser, D. A. 2004. *Determining available forage*. Forest Practices Branch, BC Ministry of Forests, Victoria, BC. Rangeland Health Brochure 7.
[18] Forest and Range Evaluation Program (FREP).
[19] Fraser, D.A. 2007. *Rangeland Health Field Guide.* Range Branch.

# APPROACH

The Board interviewed and surveyed knowledgeable professionals, including professional agrologists, registered professional foresters and biologists within interest groups, and government staff (including range staff, decision-makers, and policymakers) from each of the 10 districts with the most *Range Act* agreements (see Table 1). The Board also reviewed government policies and procedures.

**Table 1.** Natural Resource Districts Included in this Report

| | |
|---|---|
| • Peace | • 100-Mile House |
| • Rocky Mountain | • Okanagan-Shuswap |
| • Nadina | • Thompson Rivers |
| • Quesnel | • Cascades |
| • Cariboo-Chilcotin | • Selkirk |

# FINDINGS

## How Does BC Measure Forage?

In most districts, measuring forage occurs at various scales. At a strategic scale, the Board heard from government staff that forage supply is estimated on a longer cycle, such as a 10- to 15-year cycle, to provide production estimates over large areas. These production estimates over large areas are sometimes achieved through a forage supply analysis. At an operational level, point-in-time availability of forage is monitored on a subset of range agreement areas, such as areas of high use or when grazing poses a risk to values.

The Board found that the ministry has credible procedures for measuring forage at both a strategic and operational scale; however, they are often difficult to implement when weighed against other priorities. As a result, ministry staff primarily monitor and measure forage at a site level, with variations in how systematic that monitoring is. The Board also found that there is currently no province-wide inventory or policy regarding when analyses are done or how to use the resulting information.

**Range monitoring** is done by district staff and includes assessing rangeland health, such as riparian function, soils, and plant health, as well as current livestock use and distribution. Monitoring helps gauge range readiness, when plant growth can be grazed without permanently damaging vegetation and soils and can assess if RUPs are being followed.

## Ministry procedures are useful at multiple scales

The ministry has well-documented procedures for measuring forage availability. The methods help ensure that estimates for production over large areas or estimates for a point-in-time at a specific site are replicable. The process involves ground sampling, where palatable plants from representative range types are clipped and the dry weight in kilograms per hectare (kg/ha) measured, with each range type sampled to capture variations in production levels and carrying capacities. A "safe use" factor is recommended to estimate the amount of forage that can be consumed without overgrazing while maintaining forage for wildlife and ecosystem health. The total area is then multiplied by the available forage for each range type and divided by an estimate of forage that a cow-calf pair will consume in a month. This provides the number of AUMs the area can support.[20]

### *Procedures are not consistently implemented*

Despite the provincial guidance on measuring forage, the procedures' implementation varies across the province. District staff have limited resources, and measuring forage using a sampling-intensive standard may not be a priority.

Ground sampling using forage clippings was highlighted by one district as being important for strategic forage analyses and calibrating their ocular assessments when monitoring range use. That same district developed reference material for each range type, with forage estimates and photos. This offered a credible and accessible way for staff to replicate forage production estimates at various scales.

However, systematic ground sampling is not commonly practised across the province. Some districts have grazing extending across immense areas, such as the Cariboo-Chilcotin with its 205 tenures over 3.5 million hectares and a staff of five.

[20] Forest Practices Branch, Range Section. *Determining available forage*. 2004.

This ratio of area managed to number of range staff isn't uncommon throughout the province. For example, nearly 1.3 million hectares of range land are under permit for each range staff in the 10 districts we reviewed.

Despite being scientifically rigorous, ministry staff told the Board that forage measurement methods are difficult to implement when balancing operational duties such as tenure administration and monitoring. Rather than measuring forage availability, resources are often used to monitor utilization and distribution in priority areas, focusing on when and how many cows are on which pastures.

Most of the ministry's range monitoring relies on ocular assessments. Ocular assessments are visual approximations of forage use and availability. These field observations of forage availability are typically documented with written notes and photos.[21] Some districts have modified the field sampling protocols for measuring forage availability, reducing sampling intensity from ministry guidelines. However, few districts have written procedures for how their district measures forage.

### *Forage monitoring focuses on the site-level*

The Board was interested in knowing whether measuring forage was done systematically. The Board found that most assessments of forage availability are done by district monitoring programs. The monitoring intensity varied between districts from 5 to 30 percent of tenures annually. Monitoring includes formal rangeland health assessments or tenure inspections to gauge range practices which may assess forage availability. Monitoring typically relies on ocular assessments and is in response to a range of practices needing attention and resolution. Six of the ten districts sampled target their monitoring of range agreements, including the assessment of forage availability, to the period immediately prior to the renewal of the RUP and licence.

The Board observed in the 10 districts sampled that the level of forage monitoring is reflective of the staff and resources available, with 9 out of 10 districts interviewed having high turnovers in range staff. This, along with the complex nature of range management over large areas, has compelled the ministry to develop a risk ranking system to identify high-risk range agreements. The pilot phase of this system was tested in six districts in 2022 and may be implemented province-wide in 2023. The goal is to monitor at least 5 percent of high-risk agreements each year, as this is believed to be a feasible goal with current resources and will help reinforce a systematic approach to monitoring.

Most of these monitoring efforts focus on point-in-time forage availability in specific pastures or measure grazing effects on RPPR objectives. However, the Board was also interested in whether government knows how much forage is available at a range agreement level and whether AUM allocation is based on that number.

To answer that question, the Board assessed whether government develops, maintains, and uses range inventories to support AUM allocation.

[21] Experienced agrologists, from both government and industry, state that ocular estimates of forage can be very accurate, comparable to a clipping, if those visuals are calibrated with clippings from the field.

### *Range inventory methods exist, but there is no province-wide range inventory*

A range agreement comprises one or more pastures, each having different range types producing different amounts and qualities of forage. Knowing how much land is in each range type and how much forage each type can grow requires an inventory. Inventories change over time due to changes in plant communities or their seral stages and fluctuations in vegetation from livestock utilization, climate, land use, and disturbances. For rangelands, these changes in inventory can happen quickly and unpredictably, requiring responsive and continual updates that include ground sampling data to determine productivity trends. This poses challenges to having a range inventory. As discussed below, varying vintages of range inventories exist in some range units, but BC currently has no provincial-scale range inventory.

Since 2002, there has been no legal requirement for government to maintain range inventories. Nonetheless, government developed inventory methods, including the Vegetation Resource Inventory (VRI) standards and a separate range-type classification system.[22] However, these methods have not been consistently used to inform how much forage is available on BC's rangelands and how much can be sustainably consumed for grazing.

To help range managers estimate forage and carrying capacity, the ministry published forage estimates (kg/ha) for 28 range types[23] across the province that are correlated with the Biogeoclimatic Ecosystem Classification system (BEC). These well-documented range-type classifications are derived from field-sampled measurements and include the expected differences in production between young and old sites (seral stages) and estimates for "altered states"[24] (see Figure 3).[25] The range type classifications haven't been developed province-wide, are used primarily at an operational level, and are not commonly used for inventory at a range-use-agreement scale.


**Figure 3.** Example differences in forage availability between "climax" southern interior yellow pine range type at 600 kg/ha (left) and "altered state" southern interior yellow pine range (from forest ingrowth) at ~10 kg/ha. One hectare of *the higher productive site would amount to approximately 0.8 AUM at 50% utilization.*[24] *(Photo: Range Branch)*

[22] The efforts from the Resource Inventory Standards Committee in the 1990s led to VRI standards that included ground sampling procedures for estimating forage production (Ministry of Forests, 2018. Vegetation Resource Inventory- Ground Sampling Procedures. Version 5.5). Non-timber attributes for range, such as herb cover measurements, had been included in VRI but are no longer. Grasses, herbs and shrubs are hard to detect under the canopy of trees as seen from the perspective of air-photo interpreters. The resulting information was deemed unreliable for estimating amounts and qualities of forage.

[23] https://www2.gov.bc.ca/gov/content/industry/rangelands/ecology#Range%20type%20summaries

[24] An altered state occurs when disturbance causes a site to develop a plant community that cannot succeed back to a previous plant community without unnaturally large inputs. This has been described as a site passing through a one-way threshold. BC Range Branch glossary of range.

[25] Province of BC. *Rangeland ecology*. 2022.

## Forage supply analysis procedures exist without a mandate to use them

Forage supply analyses involve estimating the amount of forage produced in each range type and projecting that over a range unit or range agreement area. These analyses rely on forest cover inventory instead of the range-type classification system described above. The forage supply analyses apply safe use and utilization[26] factors to estimate spring or peak summer production. While forage supply can fluctuate significantly year-to-year, a good forage supply analysis can objectively estimate carrying capacity. A forage supply analysis guideline was published by the ministry in 2013[27] and is currently being updated. Forage supply analyses have well-documented procedures that support replicable outcomes.

However, these tools are not consistently used at a Range Use Agreement scale. While some district-wide range inventories have been developed, they have not been consistently developed or maintained across BC. Forage supply analyses are not consistently used in determining the amount of available forage ahead of awarding new tenures. Forage supply analysis was conducted for 7 out of 10 of the districts reviewed, but only 6 of these districts performed the analysis recurrently.

This disparity may result from a lack of policy directives on when to inventory range, when to do forage supply analysis, and how these should inform decisions, including allocation decisions. The inconsistent use of forage supply analyses may be attributable to inconsistent access to Geographic Information Systems (GIS), the absence of protocols for using forage models, and uncertainty by district staff regarding the responsibility for conducting the analyses.

When developing or updating a range inventory for a specific range unit and conducting a forage supply analysis, the results don't always directly affect AUM allocation (see Coutlee plateau text box for further details). As described in the next section, when AUMs for a Range Use Agreement are being allocated or under review, decision-makers are influenced by various factors beyond just the measured availability of forage. These factors include range operations (e.g., the timing and distribution of herds) and other social and economic considerations.

**AN EXAMPLE FORAGE SUPPLY ANALYSIS IN THE COUTLEE PLATEAU**

In 2010, the Range Branch conducted a forage supply analysis for six pastures on the Coutlee plateau, southwest of Merritt. These pastures, shared among six active Range Use Agreements, had tenures that authorized 5050 AUMs. After measuring the forage, Range Branch recommended that the AUMs for these pastures have a long-term reduction (e.g., 50 years) to somewhere between 670-1960 AUMs to allow for either recovery or maintenance of current forage levels. By 2022, the RUAs that cover the area had been reduced to 3653 AUMs, 47% higher than the maximum recommended by the Range Branch.

[26] The proportion of current year's forage production that is consumed or destroyed by grazing animals.
[27] Elliot, N., Tucker, R. 2013. Forage Supply Analysis: the Range Vegetation Inventory. Range Branch, Ministry of Forests, Lands and Natural Resource Operations.

# How Does BC Allocate Forage?

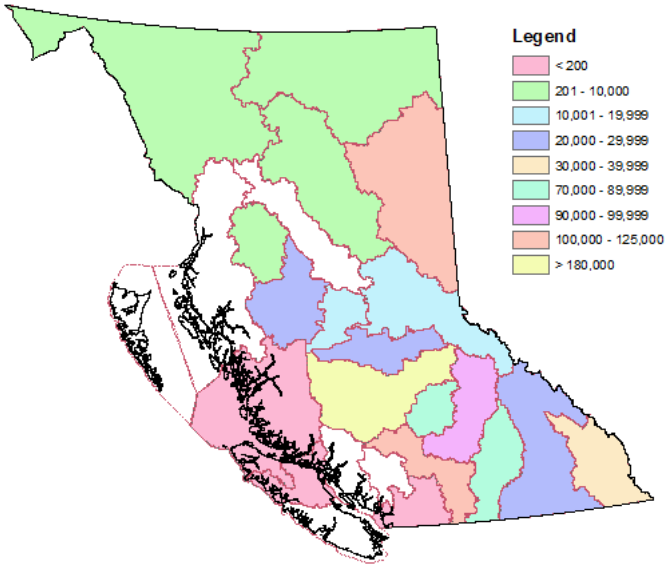


**Figure 4.** AUM distribution within BC, shown as total AUMs per Natural Resource District.

Every grazing licence and permit must specify the area of range land included in the tenure, the term, and the number of AUMs. The size of tenures varies considerably, but on average, there are around 430 AUMs authorized per tenure (see Figure 4).

The Board found that most current AUM allocations are based on historic numbers, that changes in forest practices may reduce AUMs available, and that avoiding reductions is the legal and practical default by decision-makers.

## Current AUMs from past decisions

While government clearly defines a range agreement's term or number of AUMs, it's rarely clear how that number was derived. Forage allocation is primarily based on historical AUMs, and little information is available to demonstrate how government came up with the number. Some ministry staff suggested the historical AUMs did not account for changes in range types, such as forest ingrowth, wildfires or human development. Ministry staff in some districts were concerned that historical allocations are considerably higher than what is sustainable today. Ministry staff in other districts estimated current AUM levels are lower than historical allocations within their district. Although there are examples where range agreements have had AUMs reduced, many continue to use the historical allocations.

## While practices change, AUMs stay the same

The Board heard that historic land use practices helped maintain AUM levels, but in many places, practices have significantly changed while AUMs have stayed the same. District agrologists and range users alike pointed to forestry influencing the fluctuations in forage availability. Several examples were provided by ministry staff and range users, including:

- Aspen stands maintain a steady rate of forage production once they are mature, while stands replanted with conifers decline in forage production as their canopies close with age. There is concern in the Peace Natural Resource District that increased targeting of aspen stands for logging is drawing down long-term forage availability in the area.
- In the Okanagan-Shuswap Natural Resource District, licensees no longer broadcast burn blocks to reduce slash, which increased forage. Seeding wildfire areas for forage production has also not been done in that district since 2003.

- Historically, more mechanical site preparation was needed, such as disc trenching after logging, creating more suitable seedbeds for forage establishment. Likewise, the practice of seeding cutblocks is less prevalent.
- In the Cariboo-Chilcotin, management changes, such as the establishment of Mule Deer Winter Range or Old Growth Management Areas, have led to less area harvested, lowering forage numbers compared to historic levels.

In these examples, land use or forest practice changes can affect forage production. Under FRPA, the legislature made its intent clear: range use plans must be consistent with government objectives to maintain or enhance forage production in BC. However, these legal obligations to maintain forage don't extend to Forest Stewardship Plans prepared by forest tenure holders. This disparity is discussed further in this report's Importance of Integrating Forest and Range Management section.

## Avoiding reductions: a legal and practical default

Government can either increase or reduce AUMs. Section 24(c) of the *Range Act* requires that the specified AUMs for an area remain the same in a replacement licence. District staff told the Board that, once in place, AUMs are rarely reviewed or adjusted until all other potential options are exhausted. Ministry staff indicated they usually do not change the allocation unless they are awarding a vacancy. This is partly because the distribution of livestock is the biggest influence affecting forage availability. Changing patterns of operation, such as when, where, and for how long livestock are on pastures, can be a more pragmatic solution than trying to change AUMs.

As discussed earlier, forage availability can greatly fluctuate seasonally or annually, and as such, government has other practical solutions to manage forage other than changing AUMs. For example, AUMs can be temporarily lost due to natural disasters, such as drought and wildfire. In these cases, there are ways of maintaining or restoring range resources without reducing AUMs. Where wildfires have occurred, range managers may restrict grazing for a short period to allow for plant recovery until the next year. Other options may include temporary partial or full restriction of grazing an area (termed "non-use"), adding area to the tenure, or changing the grazing schedule. The Board saw examples where a district actively promotes activities to increase forage availability through livestock management, forage seeding, temporary non-use, and direct award of alternative pastures/ranges.

Voluntary AUM reductions due to insufficient forage have occurred through collaboration between ranchers and the ministry. Similar to what the Board found in 2009, ministry staff prioritize developing and maintaining long-term working relationships with range agreement holders.[28] Ministry staff indicated that it is almost always easier to work with the tenure holder when seeking a reduction in AUMs rather than relying on the *Range Act*. However, these voluntary reductions represent a small number of the total active range agreements. For example, one district had reductions on 4 of 92 tenures, while the remaining AUM authorizations are based on allocations going back to the 1950s.

[28] Forest Practices Board. 2009. Range Planning under the Forest and Range Practices Act. Special Investigation #26. Victoria, BC.

Licence AUM reductions can be imposed in several different ways under the *Range Act*, including through Orders of the Minister or their delegate, such as a district manager.[29] These Orders should include sufficient documentation and field verification based on accepted procedures. One district was pursuing an AUM reduction, collecting data over several field seasons to verify the number for the reduction. Due to staff turnover, the process was temporarily set aside in 2021. In that case, the range agreement continues to use the original AUMs allocated despite the knowledge that the range is being overused and cannot sustain that level of forage use. Ministry staff acknowledged that, while the AUM levels of most tenures have not been reviewed, forage is conservatively allocated.

# How does the process for measuring and allocating forage contribute to achieving government objectives?

The Board was interested in how well the process of measuring and allocating forage contributes to achieving government's objectives for range. Government objectives related to range come from both FRPA and land use orders established under the *Land Act.* FRPA objectives for range agreement holders are set out in the RPPR and relate to soils, forage, water, fish, wildlife, and biodiversity. Most of these are managed through day-to-day range practices, like grazing schedules or the distribution of livestock. However, if AUMs are set above the carrying capacity of the rangeland, objectives can be compromised, regardless of best grazing practices.

At a range practice level, government has policies and programs that align range use with government objectives. Although these are not in this report's scope, they deserve mention. For example, all districts monitor FRPA values through site inspections guided by the *Range Resource Assessment Procedures.* These provide methods to evaluate the effects of grazing on soils, water, fish, biodiversity, and forage. These site-level assessments are designed to evaluate a particular pasture, riparian, or upland area, with results helping to inform range operations, AUM allocations, and range use plan developments. Within an RUP, the grazing schedule is a critical tool to develop and implement strategies to integrate use and minimize impacts. These schedules can help meet an RPPR objective, for instance, setting timing and duration of use to meet the objective to *"minimize disturbance during critical periods to wildlife or wildlife habitats."* The Board heard from ministry staff that integrating strategies to meet government objectives within the RUP greatly increases the likelihood of achieving those objectives.

[29] AUM reductions are enabled under section 36 of the *Range Act*.

In the process of preparing this report, several within-scope issues became apparent. Some of the issues affecting range objectives are discussed below. They include the difficulty of balancing forage use between livestock and wildlife without measurable targets and the issue of competing government objectives for range and forestry within an overlapping area. The first of these issues relates to government's objective under section 7 of the *RPPR*:

> "The objectives set by government for forage and associated plant communities are as follows:
> (a) maintain or enhance healthy plant communities, including their vigour and cover;
> (b) maintain or enhance forage quality and quantity for livestock and wildlife;
> (c) recruit desirable plants, including through forage seeding;
> (d) maintain a variety of age classes and structural characteristics within plant communities;
> (e) maintain or improve litter;
> (f) enable a range agreement holder to exercise its grazing or hay cutting rights granted by government to be vigorous, efficient and world competitive."

## Forage objectives are hard to meet without targets for wildlife.

Safe use is a widely accepted factor used in range management to estimate the amount of forage per hectare that can be consumed without over-grazing and maintaining forage for wildlife and ecosystem health. When the ministry allocates or reduces AUMs, only a percentage of the available forage is allocated for livestock consumption. The ministry's rule-of-thumb for safe use is a 35-65 percent split, with 35 percent representing forage available for livestock and 65 percent representing the amount to be retained for factors like wildlife, plant recovery and ecosystem health. Safe-use percentages are used when calculating AUMs over a large range unit and at a site level when monitoring pasture health. Most ministry staff recognized that the percentage of safe use needs to account for various factors, including season, ecosystem type, wildlife use and grazing duration.

Four of the ten investigated districts use the ministry guideline of 35 percent. Another three districts base safe use on a professional opinion that considers factors like range type, timing of use, cattle distribution and forage enhancement. Three districts are more conservative, allocating only 17-25 percent to livestock; two apply the 50/50 rule. Although no longer encouraged,[30] the 50/50 rule, where 50 percent of forage is allocated to consumption by livestock and wildlife and 50 percent conserved for ecosystem health, had a long history of use by the ministry, going back as far as 1918.[31]

The Board found that, even when conservative safe use levels are applied, it is rarely done in consultation with habitat biologists and is not linked to species-specific wildlife management strategies or targets.

Both agrologists and ranchers have expressed that the RPPR forage objectives are challenging as governments' wildlife management policies offer no species-specific forage guidelines or targets.

[30] Fraser, D. 2013. Rangeland Health Brochure 13. Four Principles of Range Management. BC Ministry of Forests, Lands and Natural Resource Operations
[31] Annual Report of the Minister of Lands for the Year Ending December 31st, 1918. Province of British Columbia.

The amount of forage for wildlife should vary depending on the local wildlife populations, habitat, and the dietary overlap between wildlife and livestock. For example, some species (such as mule deer) have little dietary overlap with cattle. Other species, such as elk, compete directly with cattle, making it difficult to balance the needs of wildlife and livestock. For example, when elk access pastures before cattle in the spring, ranchers told us there might be no forage left for livestock despite those pastures being factored into the AUM allocations.

## Importance of integrating forest and range management

Another challenge to achieving range objectives arises from the need for further integration between range management and forestry. As discussed earlier, historic AUM allocations may have accounted for land use practices that enhanced forage, such as prescribed burning, site preparation, or grass seeding in cutblocks. However, while these practices may have changed, AUMs remain unchanged by default under the *Range Act*. While the RPPR establishes objectives for range users to maintain or enhance forage quality and quantity, forest licensees are not obligated to adhere to the same objectives. This has led to a long-standing sense of unfairness for range agreement holders. Similar to the Board's findings in 2009,[32] range agreement holders expressed that it's unfair to have the responsibility for meeting government's objectives for range while having little control over other land users that affect their ability to meet those objectives.

Although practices like forage seeding in cutblocks contribute to multiple government objectives, range agreement holders typically have limited influence in the post-harvest management decisions made by forest licensees. For example, one district range agreement holder observed that forage enhancement on transitory range areas like cutblocks might benefit black bears, grizzly bears, deer, and elk by providing high-quality forage during spring. In this area, ministry staff believe that locating forage enhancement away from the valley bottom can be a way to relieve forage supply tensions with livestock. Without integrated planning between ranchers and forest licensees, solutions to help meet government objectives often go overlooked.

One notable example of range managers actively seeking to integrate forage objectives with forest planning and practice is in the Okanagan Shuswap Natural Resource District. There, managers developed a district-wide forage strategy. One of the strategy's many goals is to integrate timber harvesting and stocking with forage enhancement opportunities to address any current or future shortfalls. Both government staff and ranchers expressed that this type of forage strategy is pivotal for collaborative forage management between the ranching and forest sectors.

Another approach to integrating range objectives with forestry is through land use plan objectives and legal orders. Legal orders under the *Land Act* can legally compel forest licensees to have forage-related results and strategies in their forest stewardship plan (FSP). For example, the *Cariboo-Chilcotin Land Use Plan* (CCLUP) has legal objectives to preserve forage levels which applies to both range agreement holders and forest licensees.[33] Licensees must maintain or

[32] Forest Practices Board. 2009. *Range Planning under the Forest and Range Practices Act*. Special Investigation #26. Victoria, BC.
[33] Province of BC. 1995. Cariboo-Chilcotin Land Use Plan, Ninety-day Implementation Process Final Report, and; Province of BC. 1996. Order Declaring the Cariboo-Chilcotin Land-Use Plan to be a Higher-Level Plan Pursuant to section 1(1) of the *Forest Practices Code of British Columbia Act.*

restore Grassland Benchmark areas when forestry overlaps grassland areas. This is achieved by avoiding road building, prohibiting herbicide use, or not reforesting grassland areas. With the loss of so much interior grassland ecosystem elsewhere since the 1990s[34] from forest ingrowth or encroachment, this objective has had a lasting and positive effect on maintaining grassland ecosystems for the Cariboo-Chilcotin. Only three land use plans in BC include forage objectives,[35] and the CCLUP stands out as the only plan with legally enforceable objectives.

AUM allocation is primarily based on historical levels of available forage, and government expects these levels to be maintained or enhanced. However, changes in land use, including forestry practices, can significantly impact forage availability. Government range objectives can take a back seat without integrated planning between range managers and forest managers over the same area. Active integration between range management and forestry is crucial to address this challenge. Examples such as the forage strategy in the Okanagan Shuswap Natural Resource District and the incorporation of forage objectives in land use plans highlight the importance of collaborative efforts to achieve range objectives.

# CONCLUSION

The Board set out to determine if government has a credible and systematic approach to measuring and allocating forage on rangelands and how well these processes contribute to achieving government's objectives for range.

The 10 natural resource districts with the highest forage allocation were surveyed, including interviews with decision makers and range staff at the range branch and district level, ranchers (through the BC Cattlemen's Association), and qualified professionals. Government policies and legal instruments, such as range use plans, were reviewed. The Board's findings are presented in three parts to address the questions of how forage is measured, how forage is allocated, and how those processes contribute to achieving government's objectives for range.

**Regarding forage measurement**, the Board found that the ministry has credible methods for measuring forage availability. Still, applying them is not always practical. Ministry staff are limited and oversee huge areas of range tenures, so they often customize forage assessments but lack written standards, weakening credibility. There is insufficient capacity to monitor all tenures promptly, and forage supply analyses are not consistently conducted across districts, leading to a gap in a systematic approach to measuring forage in BC.

The ministry's method for measuring forage availability for livestock can help estimate production over large areas or estimate point-in-time forage availability at a specific site. However, those well-documented and credible methods are not always operationally practical.

[34] 15 331 ha of grasslands was lost between 1995 to 2014. This loss is attributed to developments, disturbances, and tree encroachment. The Grassland Conservation Council. *Grassland Ecosystem Mapping and Loss Assessment: Final Report.* March 2015.
[35] Other higher-level plans with forage objectives include the *Kootenay Boundary Land Use Plan* and the *Okanagan-Shuswap Land and Resource Management Plan*.

The focus of most districts is monitoring range practices rather than measuring forage. Most districts do not measure forage availability using the ministry guidelines for clipping but instead use ocular assessments or a combination of both. They have informal procedures in place regarding the documentation of field monitoring, but most lack written standards for conducting ocular assessment for forage availability. Replication is therefore not assured, particularly in districts with high staff turnover. Ocular assessments alone lack credibility. When used, they require written procedures, including proof of training and a systematic approach to estimating forage availability over a range use agreement area.

Districts do not have the resources to monitor all tenures in a timely manner. This problem is compounded as 9 of the 10 districts interviewed reported high staff turnover, with 1 having no district range staff at the time of writing. Although the province has initiated a risk-ranking system to prioritize monitoring activities at the district level, full implementation is still pending. While this system may help government's assessment of high-risk tenures, it does not address the inconsistent evaluation of forage availability by districts before replacing licenses.

Sustainability of any resource involves identifying it, knowing where it is, and how much is available for use without negatively affecting other values. The ministry has well-researched forage production estimates by range types. Still, these ecological classifications have not been adopted into a provincial inventory and are inconsistently used in forage supply analyses or rangeland health monitoring across districts. In addition, forage supply analyses are not done in all districts, and there is no obligation to undertake a forage supply analysis or guidance on how the results should inform AUM allocations. This represents a gap in carrying out a methodical or systematic way of measuring forage in BC.

**Regarding forage allocation**, the Board found that AUM allocations in BC are often based on historical allocations and seldom reviewed despite changes in forage availability. Overgrazing is typically considered a livestock-distribution issue rather than an over-allocation issue, with the legal and administrative default to not change the AUMs.

We could find very little information on how historical allocations were derived. Forage availability in forests and grasslands has changed over time, partly due to changes in forestry practices or natural disturbances that can reduce forage availability. Despite that, AUMs are rarely reviewed and generally stay the same. That may not result in an issue for some districts where the AUM allocations are low or below carrying capacities; however, in other districts, staff believe these historic allocations are now too high. Keeping AUM allocations the same despite changes in forage availability can lead to either potential underutilization, where range opportunities are missed, or overutilization, with consequences to ecosystem health.

AUM allocations are part of the long-term renewable range tenures, and by default, the *Range Act* requires previous allocations AUMs to be maintained when licences are renewed. While government has other authorities under the *Range Act* to increase or reduce AUM allocations, proposed changes can require a lot of supporting evidence. Therefore, if over-allocation is suspected, the ministry finds it easier to work with range agreement holders to change patterns of operations or to achieve a voluntary reduction rather than gathering the evidence needed to make a reduction under the *Range Act*.

**Regarding how these processes contribute to meeting government's objectives for range**, the Board found two areas needing improvement. First, while forage allocation directly affects wildlife, range managers lack wildlife guidelines or species-specific forage targets. Secondly, despite having overlapping tenures over the same area, range users are legally obliged to manage forage under FRPA, but forest licensees are not. Differing objectives call for active integration between these two land managers.

Range managers consider the forage needs of livestock and wildlife by applying a safe-use estimate of the amount of forage that can be consumed without over-grazing while maintaining forage for wildlife and ecosystem health. However, managers face challenges in making informed decisions on safe-use levels. They find it difficult to meet government's objectives for maintaining forage for wildlife without wildlife guidelines or species-specific forage targets. Government's *Together for Wildlife Strategy* (2020) includes an action to set objectives that link wildlife populations and habitats. While still under development, these stewardship goals may complement BC's existing objectives.

In 2006, during a complaint investigation, the Board identified a "potential gap in FRPA" regarding integrating range values into forest stewardship plans. Unless range objectives are specified in a relevant land use plan, a *Government Actions Regulation* order, or a *Land Act* land use order, there are no requirements for forest licensees to meet them. Most areas have no such range objectives, and forest licensees do not have to integrate their operations with range agreement holders.[36]

AUM allocation mostly relies on past forage levels, and government has objectives to sustain or improve these levels. However, changes in land use, particularly forestry practices, can significantly impact forage availability. Government objectives for forage may be undermined without integrated planning between range and forest managers within the same area. Addressing this challenge requires active integration between range management and forestry, as demonstrated by initiatives like the forage strategy in the Okanagan Shuswap Natural Resource District and the inclusion of forage objectives in land use plans. These examples underscore the importance of collaborative efforts in successfully attaining range objectives.

[36] Forest Practices Board. Complaint Investigation 050694 Impacts of Harvesting on Cattle Grazing near Quesnel. 2006.

# OPPORTUNITIES FOR IMPROVEMENT

In the Board's view, relative to measuring and allocating forage, good range management includes:

### Having an estimate of what forage is available on public lands

The ministry has a well-founded range-type classification system and some range inventories, but these are not consistently available, even in districts with high AUM allocations. The first opportunity for improvement is, therefore, to:

1. Develop and maintain a strategic scale and province-wide range inventory to inform range management.

### Having methods to efficiently and consistently measure forage that range managers can use

The ministry has good guidelines for measuring forage, but they are resource-intensive and not always practical, especially for monitoring at an operational scale. The second opportunity to improve is to:

2. Ensure district staff have a credible and efficient system to measure forage availability, including how and when to use ocular assessments and what documentation is required.

Effectively monitoring range management, such as forage availability, across huge areas with limited staff and resources necessitates well-informed decisions. The Board is encouraged that government has been developing an approach to help districts prioritize monitoring resources. The third opportunity to improve is, therefore, to:

3. Fully implement a risk ranking system for prioritizing where and when to monitor forage availability and other FRPA objectives.

### Allocating forage based on what the resource can provide while considering other government objectives

Most allocations are based on very old numbers, and many historic allocations do not reflect today's government objectives. Whether enhanced through management or naturally occurring, forage is a product of shared habitat for livestock and wildlife across BC's rangelands. There is, however, a weak link between wildlife management and the allocation of forage. Accordingly, the fourth opportunity to improve is:

4. Develop and maintain regionally appropriate guidelines for range managers to consider how wildlife populations and habitat can be incorporated into range management, aiming to sustain or improve forage quality and quantity for livestock and wildlife.

### Flexibility in range decisions that are responsive to changes in the environment

The *Range Act* and the *Forest and Range Practices Act* currently provide flexibility to help range managers respond to operational challenges, and districts are generally adept at using these tools. The previously mentioned opportunities for improvement will better inform managers of environmental changes.

### Integrating planning and practice between land uses

Range agreement holders and forest tenure holders have different obligations to meet different objectives, often over the same area. Forest practices, including access and silviculture, affect forage availability. As such, the last opportunity to improve is:

5. Prioritize the integrated planning and collaboration between range and forest managers to help achieve government's range objectives.


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