# Monitoring Grazing Lands
## Grazing Management Guide

**The Grazing Management Guide incorporates monitoring elements from several factsheets; topics in the factsheets are outlined below.**

### Topics include:

**In this factsheet (Factsheet 11: Monitoring Grazing Lands):**

1. Rationale for monitoring
2. Photo point monitoring
3. Record Keeping

**Factsheet 12: Monitoring Strategies for Management Intensive Grazing will review:**

1. Grazing Response Index (GRI)
2. Overview of a Pasture Walk

**Other monitoring methods are available including:**

1. Grassland Conservation Council - Grasslands Monitoring Manual for British Columbia: A Tool for Ranchers
2. *Factsheet 12 – Monitoring Strategies for Management Intensive Grazing*
3. The Beef Cattle Research Council (BCRC) also has a more detailed version of the GRI that can be found here

**Disclaimer:** *The monitoring protocols were adapted from several sources including the Targeted Grazing for Wildfire Risk Reduction – Rancher's Monitoring Manual and summaries from other Grazing Management Guide Factsheets.*

*Some concepts were retained and updated from the Monitoring Grazing Lands Factsheet (2005) from the original Grazing Management Guide.*

## What is monitoring?

Monitoring is the planned, regular collection, analysis, and interpretation of data to determine whether grazing management goals are being met. It must be repeated over time and include multiple observations to confirm progress toward objectives. Maintaining consistent methods over time is important otherwise you are not making similar comparisons, and it may be difficult to track changes. In this context, monitoring is more like checking in on how your management practices are working. When starting a Grazing Management Plan, you should complete a full assessment of tame or native pasture as outlined in *Factsheet 1* and *Factsheet* 2.

## Why monitor?

Monitoring is an important component of any grazing management plan. It provides measurables that allow you to determine whether the objectives of these plans are being met.

Without it, you are unable to determine what effect your grazing has had on the health of your pastures. It also helps identify trends or changes in the condition of your grazing areas over time.

## Types of monitoring

In addition to assessing pasture and range health, you may want to include other monitoring methods in your program. It is recommended to add both short-term and long-term components to strengthen your system. The monitoring approach described below can be used on private land holdings. Keep in mind that the Range Health Assessment may not apply to all grazing areas. The Range Health Assessments were designed for monitoring health of native plant communities not always on tame pastures.

If monitoring is being done on native range lands under a range agreement, there are several resources listed on the on the Rangelands Ecology page which can guide monitoring in conjunction with discussion with the Ministry of Forests Range Agrologists.

## Where do I monitor?

There are two ways that annual monitoring can be conducted, and which often work complementary to one another

1. A pasture-wide survey encompassing all vegetation types in the pasture.
2. Detailed plot monitoring focuses on a predetermined area—such as a 50-meter diameter plot as identified in the Targeted Grazing for Wildfire Risk Reduction – Rancher's Monitoring manual - representing a specific vegetation type or landscape feature, such as a riparian area.

## When do I monitor?

All monitoring programs should ideally take place at the same time each year or when there is a management practice change and should be repeated at regular time intervals. Ideal monitoring times in British Columbia generally range from May to September, depending on location. Ideally, monitoring should be done before and after grazing, with follow-up checks conducted under similar conditions. Long-term monitoring generally takes place every one to five years whereas short-term monitoring may be repeated at any time interval. Overall, any monitoring program should be systematic and rigorous.

## Initial set-up

Mapping the pasture is essential for determining where and how grazing will occur (see *Factsheet 4: Designing a Grazing Management Plan).* The map created during the design phase can also help identify suitable locations for monitoring plots.

Ideally, monitoring should occur in areas that grazing animals actually use. A pasture-wide survey covers all vegetation types and is not based on plots. When selecting plots, choose locations that represent the different vegetation types and landscape features within the pasture.

Criteria considerations for plot selection:

1. Common vegetation utilized by animals
2. Average conditions of the pasture including, slope, accessibility
3. Not within 50 m of a road
4. Not within 100 m of a stock waterer
5. Not within 50 m of a fence
6. Not within 50 m of cattle trails

7. If there are sensitive areas, such as riparian zones, they may require their own monitoring plot. The factors you monitor in these areas could differ from standard grazing utilization measures.

Targeted grazing monitoring typically uses a 50-meter diameter plot. For smaller acreages, a 1-meter square plot (or several of them) may be more appropriate. On large tracts of land, multiple monitoring plots may be necessary.

Once the plot is selected, mark the site clearly so it can be easily found in the future. Record the geographic coordinates.

## Materials (photos from the Original GMG Factsheet)

- 1 meter square (3 $ft^2$) frame
- Four large nails, bridge spikes, or rebar stakes
- Compass (if possible) or GPS device
- Camera or phone to take photos with GPS built-in if possible
- Photo point (ID) board (chalk or whiteboard) or photo point (ID) card on a clipboard to identify the monitoring site
- Marking Pen


**Figure 1.** Example of a photo-point ID board

## Methods

### Option 1

- If using a square to mark photo points, drop the square in the plot.
- Mark the sign (see example) to indicate the location and place it next to the square so it is visible in the photo.
- Take the photo so your shadow is not in the photo
- Repeat throughout the field at several different representative locations

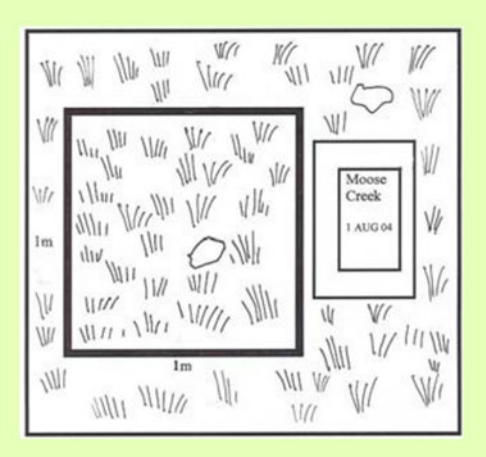


**Figure 2.** Example of an overhead photo.

**Figure 3.** Taking additional photos.

### Option 2

- If you are using a larger plot for monitoring, create a sign to mark the location. Use this sign in each photo as you move between areas to clearly indicate the site.
- Step back about five paces from the plot and take an oblique photo that includes the plot and the skyline, preferably with a recognizable feature, in the background. The skyline should make up approximately 30% of this photo and any additional photos. Indicate the direction the camera is pointing e.g. facing south
- If you are using a 50-meter plot as outlined in the Targeted Grazing guidelines, take photos from the center along the measured transect in both directions. Then, take a photo straight down from the center, similar to the approach used with the smaller square plot.

Get as many photos as needed by repeating the process above for any additional locations.

After taking the required photos, record the GPS location for at least one of the photo points. Again, this will aid in plot relocation. Also, record the bearing and distance from the photo plot (for example, one of the corner markers) to a witness marker such as a rock, fence post, or marked tree. If there is no obvious location marker place a marker and sign at the location.

After removing the plot frame (if used), you may want to spray the corner pins to make them easier to find later.

Photos can be saved or added to your Grazing Management Plan to record changes over time.

## What do I look for when monitoring?

When doing a visual survey, record the following:

- Presence and distribution of invasive plants
- Density of the stand
- Height of grasses and other desirable vegetation
- Evidence of browsing on woody or shrubby species
- Any visible bare soil


**Figure 4.** Measuring the height of the stand.

The leaf lengths or stubble heights cited in the table below are intended to help with determining if too much defoliation is occurring, or if there has been sufficient rest periods. It is important to remember that the table is not to substitute for the applications of FIO (Frequency, Intensity, and Opportunity) principles. More details on this chart and implementation can be found in *Factsheet 8 - Grazing Frequency and Utilization.*

| 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.

If this assessment is being done on BC Range or native species on Crown Land, please refer to:

- The "Range Readiness Guidelines" found here
- The "Stubble Height Criteria" found here

Browse utilization of woody or shrubby species can be categorized by overall use and can be categorized as hedging. Over-utilization of woody plants can result in a reduction of vigour or the reduction of desirable species. More information can be found in *Factsheet 8 (Grazing Frequency and Utilization).*

The Riparian Hedging or browse trends are based on the distinctive growth lines on shrubs and trees which can be examined to determine the amount of hedging. The categorization below can be used in the monitoring sheet below. When determining the rating, it is important to analyze based on the most common condition. Information below is compiled from ISDO Bureau of Land and Management and the original GMG Monitoring Factsheet.

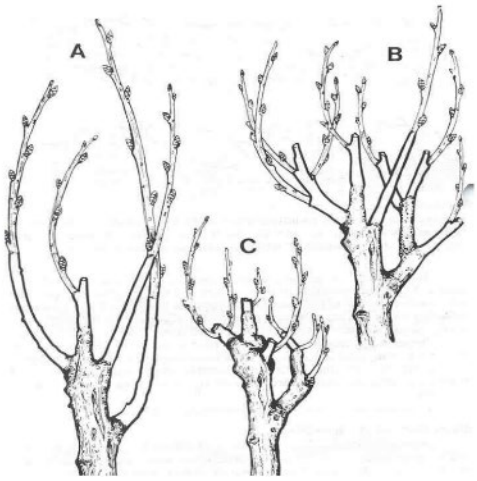


**Figure 5.** *Image Reference: ISDO Bureau of Land and Management TR 4400-3. The above notes the amount of hedging based on the appearance and length of two-year old wood.*

1. Not evident (Little to no hedging) – the two-year old wood is mostly unaltered and long. There is little indication of any hedging and little to no reduction of lower growth. The lower branches and twigs look similar to those above what animals can reach.

2. Moderate (Moderately hedged) – the length of the two-year old wood is fairly long, but it has been altered from the normal growth habit. The twigs from the most recent years have been browsed which will show branching and re-branching from lateral buds. The growth will be more compact. There can be a visible difference between the growth that is accessible and not accessible to livestock, which can also cause less productivity in the lower branches and twigs.
3. Severe (Severely hedged) – strongly altered or shortened two-year old wood, short twigs, stubby branches, smaller leaves, dead branches, and lower production differing from the normal growth pattern. In larger taller plants there can be an obvious browse line, with little to no production that is within reach of the animals.

In terms of browsing and utilization of woody species and to evaluate sensitive areas such as riparian areas and the occurrence of woody species, the riparian management guides outline a detailed protocol.

For more details on specific items to monitor, refer to the *Assessment Factsheets (2 and 3), Monitoring Strategies for Management Intensive Grazing (Factsheet 12), and Grazing Frequency and Utilization (Factsheet 8)*.

While the monitoring protocol is more formalized, it can be complemented with pasture walks to help assess the overall health and condition of the pasture. For handouts for monitoring the *Tame and Native Pastures see Factsheet 12 – Monitoring Strategies for Management Intensive Grazing*. Factsheet 12 also outlines what to evaluate in terms of soil health, forage stand, and browsing.

## How to develop a Grazing Monitoring Program

The following considerations will assist you in developing and implementing a monitoring program to coincide with your grazing management plan.

- Define monitoring objectives.
- Assemble background information (maps, photos).
- Select key areas you would like to monitor.
- Describe each monitoring site's management and current conditions (Fill out form on last page).

- Select monitoring strategies and indicators (riparian assessment, photo points, herbaceous and browse utilization, stubble height, etc.).
- Establish permanent transects and begin monitoring.

At the end of this factsheet, you'll find worksheets to help record your findings and include them in your Grazing Management Plan.

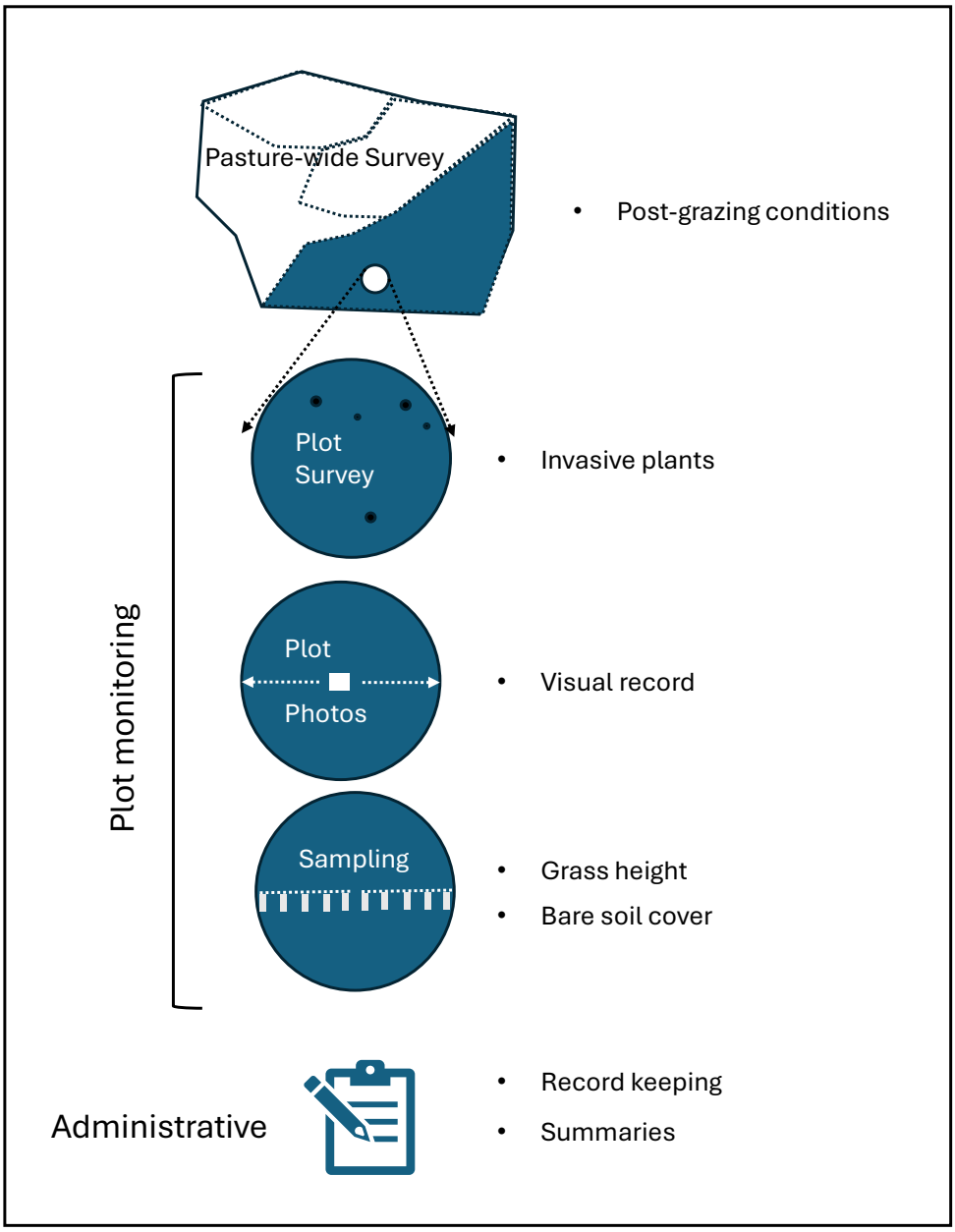


**Figure 6.** Components of the monitoring process. Source: Targeted Grazing for Wildfire Reduction: Rancher's Monitoring Manual

**Handouts Below– To Print and Take into the Field (fill in an example to put in the factsheet)**

1. Pasture Walk and Monitoring Record Keeping Table
2. Pasture Walk Considerations
3. Grazing Response Index (GRI) Worksheet

## Pasture Walk and Monitoring Record Keeping Table

*(Will need one per monitoring location)*

| **Pasture:** | | | | **Monitoring Location (description and coordinates):** | | | |
|---|---|---|---|---|---|---|---|
| **Precipitation:** | | | | **Size of Monitoring Site:** | | | |
| **Date** | **GRI Number** | **Stubble Height Before Grazing or leaf stage** | **Stubble Height After Grazing** | **Browse Evaluation (Not Evident, Moderate, Severe)** | **Photo?** | **Location Marked on Grazing Management Plan Map?** | **Other Notes** |
| | | | | | | | |
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## Pasture walk considerations (before and after grazing)

| **Indicator** | **Before Grazing**<br>**(N/A if not applicable)**<br><br>**Date:** | **After Grazing**<br>**(N/A if not applicable)**<br><br>**Date:** |
|---|---|---|
| Where are livestock grazing? | | |
| Are there areas of heavy or light use? | | |
| Is livestock condition and performance good and meeting objectives? | | |
| Do desirable plant species comprise the majority or the stand? | | |
| Are undesirable plant species expanding or declining? | | |
| Are silvopasture and/or cutblock species growing as expected? Make a note of the species e.g. tree and shrub species in addition to forage stands. | | |
| Are the pasture stands producing the volume of forage expected and/or needed throughout the year? | | |
| Is soil moisture adequate for the time of year, is rain in the forecast? | | |
| Is soil aggregation evident? | | |
| Is there a need to make adjustments to the rotation, livestock numbers, or timing of grazing to promote stand vigour/health or livestock performance? | | |
| What is the browse utilization of preferred woody species? Desirable Species? Non-Preferred Species? (See Riparian Management Guides) | | |

## Grazing response index (GRI) Worksheet

**Frequency –** How many times can a plant be defoliated?

Length in days of grazing period _____ ÷ 7 = Number of Defoliations _____

| Grazing duration (days) | Number of defoliations | Value | Site Value |
|---|---|---|---|
| ≤ 7 | 1 | +1 | |
| 8 to 14 | 2 | 0 | |
| >14 | 3 or more | -1 | |

**Intensity –** How much photosynthetic material (leaf area) is left after the grazing period ends?

| Percent leaf material remaining | Value | Site Value |
|---|---|---|
| ≥ 65 | +1 | |
| 50 to 64 | 0 | |
| < 50 | -1 | |

**Opportunity –** How much time have plants had to either grow before grazing or to regrow and recover after grazing?

| Opportunity to grow or regrow | Value | Site Value |
|---|---|---|
| Full Season | +2 | |
| Most of Season | +1 | |
| Some Chance | 0 | |
| Little Chance | -1 | |
| No chance | -2 | |

**Adding it Up –** Add the scores to get the overall GRI Rating

| Factor | Site Values |
|---|---|
| Frequency | |
| Intensity | |
| Opportunity | |

**GRI Site Score (total):**

## Find more information:

**Riparian Management Guide:**

https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/agricultural-land-and-environment/water/riparian-areas/management

SCAN ME

**Range Readiness Guidelines:**

Range Readiness Criteria

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**Stubble Height Criteria:**

Apply best stubble heights on rangelands

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**Contact AgriServiceBC:**

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