

Compliance With Range Use Plan Stubble Heights

Report on 2004 Monitoring Activities

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Environmental Stewardship Division

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Introduction

In 2004, the Ministry of Water, Land and Air Protection (WLAP)¹ Thompson, Okanagan and Kootenay Regions Ecosystems Sections monitored compliance of range use practices with legislated requirements in Range Use Plans (RUP). This document reports the findings for compliance with stubble height requirements identified in the applicable Range Use Plans approved under the Forest Practices Code.

Relevant legislation

The *Forest Practices Code of British Columbia Act* (FPC), the Operational Planning Regulation (OPR) and the Range Practices Regulation are three pieces of legislation that address rangeland management. The RUP, a requirement under the FPC, is the main administrative mechanism directing operational management of grazing activities on Crown land. The required content of the RUP for grazing is contained in the OPR. The 1995 Range Management Guidebook and selected species from the 2003 Rangeland Health Brochure # 6 provides the best management practices (BMPs) for stubble heights by species that District Managers should have considered in adjudicating Range Use Plan submissions.

The OPR specifies that the Ministry of Forests (MOF) district manager (DM) must give the following information to a person preparing a RUP for grazing:

- (c) location of key areas, and for those areas
- (i) average stubble height for plant species specified by the district manager

The person preparing the plan must ensure the plan contains measures that implement the strategies provided by the DM.

Project Scope

The 2004 Range Compliance project entailed compliance monitoring of the regulatory requirements for stubble height identified in key areas in a Range Use Plan under the *Forest Practices Code Act* and Regulations. Stubble height was selected for its relevance as an indicator of environmental conditions and for ease of measurement. Stubble height has been widely used to gauge the impacts of grazing use in both riparian and upland areas (Hall and Bryant 1995; Turner and Clary 2001, USDA and USDI 1999). Maintaining a minimum stubble height helps preserve forage, plant vigour, retain sufficient forage to prevent excessive browsing of shrubs, and indirectly limits stream bank trampling. The maintenance of residual vegetation also benefits wildlife as a food source and as hiding and nesting cover.

¹ WLAP became the Ministry of Environment (MOE) in 2006. This document was prepared prior to that change.

Project Objectives

The objective of this project was to assess compliance with the stubble height requirements in range use plans. Stubble height requirements are set out as part of the legal content/format of range use plans that are specified in the Operational Planning Regulation and within the Range Practices Regulation. To help guide practitioners, the Ministry of Forests has prepared a technical report on safe levels of use for livestock grazing on forage species titled “Applying Best Stubble Heights on Rangeland.”

Methodology

Study Area

Stubble height measurements were collected from one site within the Kamloops Forest District, two sites in the Rocky Mountain Forest District, and five sites in the Okanagan Shuswap Forest District.

Site Selection

The following criteria were used to select sites for sampling:

- Approved Range Use Plans on Crown land;
- Low elevation biogeoclimatic subzone grassland
- Crown land
- Approved RUP with key areas identified
- Grazing had been completed the same growing season prior to sampling
- Key area with a specific high wildlife value:
- Sharp-tailed grouse lek (Kamloops Forest District)
- Important ungulate winter ranges in the Rocky Mountain Forest District
- High biodiversity values due to the presence of rare habitat values in the Okanagan Region as selected from the Okanagan Habitat Atlas.

Stubble height measurements*

Sampling was conducted by establishing one or more transects within the key area and systematically collecting stubble height measurements at intervals along the transects.

Transects were located to reflect representative habitat conditions and grazing use in the key area.

Sampling at each site was systematic. Plot centers were established at 10 meter intervals along the transects. A stake was used to mark the center of each sample plot. A 5m radius was determined using a pre-measured string attached to the stake. Only those key species identified in the range use plan and found within the 5m circle were sampled.* One stubble height of each key species was measured at each plot. Only the height of the individual closest to the stake (plot center) was recorded. Transects consisted of between 25 and 60 plots, depending on the site.

* with the exception of the East Kootenay sample sites where bmp stubble heights were sampled.

Table 1. Summary of findings for the two species measured in the key area.

| Long Lake Range | bluebunch wheatgrass | rough fescue |
|-------------------------|-------------------------|-----------------|
| n | 58 | 21 |
| Mean height (cm) | 42.3 | 13.7 |
| Standard deviation (cm) | 13.2 | 9.4 |
| # non-compliant | 1 | 18 |
| % non-compliant | 2 | 86 |

Stubble heights were measured to the nearest centimeter and recorded on the data form. The average height of the vegetative portion (not seed stalk) of each plant was recorded. To assess relative frequency of a key species, the distance from plot centre to the nearest individual was also recorded.

Only species identified with stubble heights in the RUP key area were measured.* Mean measured stubble heights of these species were evaluated for compliance against the mean with RUP stubble height requirements. A confidence interval of 90% was selected and the standard deviation for each transect was recorded.

Timing of Sampling

Sampling was conducted in the fall of 2004 on rangelands following cessation of grazing by livestock. This provided a measurement of compliance with the stubble height requirements in the range use plan following grazing by livestock and a measurement of end of season residual vegetation remaining. Rangeland health depends on plant biomass left to protect soil, watershed, wildlife habitat and aesthetic values. (Molinar et al. 2001).

Results

Kamloops Forest District

The stubble height requirement in the RUP stated that 50% of the key bunchgrass plants in the key area [in this case bluebunch wheatgrass (*Pseudoroegneria spicata*) and rough fescue (*Festuca campestris*)] must have stubble heights no less than 25cm. Bluebunch wheatgrass was quite common in the key area. From the 60 plots measured, the mean height was determined to be 42.3 cm (Table 1). Fifty-eight of the 60 plots contained bluebunch wheatgrass, with only one non-compliant (2% of sample, Table 1). Rough fescue was less common and only 21 of the 60 plots contained this species. Of these 21 plots, 18 (86% of the sample) were found to be non-compliant. The mean height for rough fescue was 13.7 cm (Table 1).

Okanagan Shuswap Forest District

Measured stubble heights were compared to prescribed stubble heights found in the range use plans. Bluebunch wheatgrass was common on four of the five sampled sites and was absent on the Little Chopaka site. Needle grasses were present and common on all sites, though less common on the Lower Cawston and Observatory sites. Sandberg's bluegrass (*Poa secunda* ssp. *secunda*) was common on three sites and absent on two. Idaho fescue (*Festuca idahoensis* ssp. *idahoensis*) was found on only one site (Observatory) and was uncommon there.

Table 2. Summary of findings for the three species measured in the key area.

| Site 1. Observatory | bluebunch wheatgrass | Columbia needlegrass | Idaho fescue |
|-------------------------|----------------------|----------------------|--------------|
| n | 40 | 33 | 14 |
| Stubble height in RUP | 12 | 9 | 8 |
| Mean Height (cm) | 26.43 | 23.86 | 11.33 |
| Standard Deviation (cm) | 12.58 | 8.84 | 7.24 |
| Compliant Yes/ No | Yes | Yes | Yes |

Table 3. Summary of findings for the three species measured in the key area.

| Site 2. Night Hawk | bluebunch wheatgrass | needle and thread grass |
|-------------------------|----------------------|-------------------------|
| n | 40 | 40 |
| Stubble height in RUP | 12 | 9 |
| Mean Height (cm) | 22.83 | 13.7 |
| Standard Deviation (cm) | 7.55 | 5.04 |
| Compliant Yes/No | Yes | Yes |

The Observatory and Nighthawk sites were in compliance with RUP stubble heights for all species measured. The Little Chopaka site was not in compliance for needle and thread grass. The South Strawberry site was in compliance for the two species measured, bluebunch wheatgrass and Columbia needlegrass (*Achnatherum nelsonii* ssp. *Dorei*). The Lower Cawston site was in compliance for bluebunch wheatgrass and not in compliance for needle and thread grass (*Hesperostipa comata*).

Rocky Mountain Forest District

The two areas selected for sampling are both identified as critical winter range areas for wild ungulates. Each area has significantly different plant communities.

On the Skookumchuck (Pulp Pasture) sites, rough fescue is a key forage species and was sampled in 58 of the 60 established plots. Within these plots, rough fescue did not meet the recommended BMP average stubble height criteria of 17 cm, as indicated in Rangeland Health Brochure #6 (Tables 7 and 8). Other key species on site were spreading needlegrass (*Achnatherum richardsonii*) and Canada bluegrass (*Poa compressa*). Spreading needlegrass was less than the bmp value recommended for this species on both transects. Canada bluegrass met the recommended stubble height bmp value. The only species with provided stubble heights in the Range Use Plan was bluebunch wheatgrass, which was not found in the sampled areas.

On the Bull River (Lower Fontaine pasture) stubble heights were provided in the Range Use Plan for 7 species. Of the 7 species indicated in the RUP, only one species, Canada bluegrass, was observed and sampled on the 2 transects for the area. Canada bluegrass was not in compliance with the RUP stubble height. Spreading needlegrass did not meet the recommended bmp value for this species on both transect 1 and 2. Columbia needlegrass did meet the bmp value on transect 2 but not on transect 1.

Table 4. Summary of findings for one species measured in the key area.

| | |
|-------------------------|-------------------------|
| Site 3. Little Chopaka | needle and thread grass |
| n | 61 |
| Stubble height in RUP | 9 |
| Mean Height (cm) | 7 |
| Standard Deviation (cm) | 2.37 |
| Compliant Yes/No | No |

Table 5. Summary of findings for the two species measured in the key area.

| | | |
|--------------------------|----------------------|-------------------------|
| Site 4. South Strawberry | bluebunch wheatgrass | Columbia needlegrass |
| n | 50 | 40 |
| Stubble height in RUP | 12 | 9 |
| Mean Height (cm) | 20.26 | 12.25 |
| Standard Deviation (cm) | 6.66 | 5.06 |
| Compliant Yes/No | Yes | Yes |

Table 6. Summary of findings for the two species measured in the key area.

| | | |
|-------------------------|----------------------|-------------------------|
| Site 5. Lower Cawston | bluebunch wheatgrass | needle and thread grass |
| n | 61 | 26 |
| Stubble height in RUP | 12 | 9 |
| Mean Height (cm) | 12.79 | 5.69 |
| Standard Deviation (cm) | 5.79 | 2.83 |
| Compliant Yes/No | Yes | No |

Table 7. Summary of findings for the three species measured

| | | | |
|-------------------------|--------------------------|-----------------|---------------------|
| Pulp Pasture Transect 1 | Spreading needlegrass | Rough fescue | Canada bluegrass |
| N | 25 | 24 | 25 |
| Stubble height in RUP | Not provided | Not provided | Not provided |
| Bmp stubble height | 12 | 12-17 | 8 |
| Mean Height (cm) | 10.68 | 8.04 | 8.28 |
| Standard Deviation (cm) | 3.36 | 2.98 | 3.53 |
| Compliant Yes/No | | | |

Table 8. Summary of findings for the three species measured

| | | | |
|-------------------------|--------------------------|-----------------|---------------------|
| Pulp Pasture Transect 2 | Spreading needlegrass | Rough fescue | Canada bluegrass |
| N | 35 | 34 | 35 |
| Stubble height in RUP | Not provided | Not provided | Not provided |
| Bmp stubble height | 12 | 12-17 | 8 |
| Mean Height (cm) | 11.03 | 9.21 | 8 |
| Standard Deviation (cm) | 3.98 | 3.28 | 3.1 |
| Compliant Yes/No | | | |

Table 9. Summary of findings for the four species measured.

| Lower Fontaine #1 | Canada bluegrass | junegrass (<i>Koeleria micrantha</i>) | Spreading needlegrass | Columbia needlegrass |
|-------------------------|---------------------|--|--------------------------|-------------------------|
| N | 30 | 28 | 30 | 29 |
| Stubble height in RUP | 6-8 cm | Not provided | Not provided | Not provided |
| Bmp stubble height | 8 | | 12 | 12 |
| Mean Height (cm) | 4.83 | 4.31 | 5.07 | 7.85 |
| Standard Deviation (cm) | 2.53 | 1.85 | 1.93 | 2.83 |
| Compliant Yes/No | No | | | |

Table 10. Summary of findings for the four species measured

| Lower Fontaine #2 | Canada bluegrass | junegrass | Spreading needlegrass | Columbia needlegrass |
|-------------------------|---------------------|--------------|--------------------------|-------------------------|
| N | 30 | 30 | 30 | 23 |
| Stubble height in RUP | 6-8 | Not provided | Not provided | Not provided |
| Bmp stubble height | 8 | | 12 | 12 |
| Mean Height (cm) | 5.43 | 4.57 | 6.53 | 12 |
| Standard Deviation (cm) | 2.93 | 2.06 | 3.26 | 3.72 |
| Compliant Yes/No | No | | | |

Discussion

In the Thompson Region, the two grass species specified in the RUP had distinctly different levels of compliance. Bluebunch wheatgrass was virtually 100% in compliance with the RUP requirement. Conversely, the measurements of rough fescue were found to be 86 percent non-compliant. The significant difference in the level of use between the two species is likely due to a preference for rough fescue by livestock. The high use of rough fescue may pose a problem in this particular key area as Sharp-tailed grouse (*Tympanuchus phasianellus*) select rough fescue as their preferred nest hiding cover. It is recommended that this key area be assessed for stubble height compliance annually over the next two-three years to determine if this is a trend.

A similar pattern occurred in the Rocky Mountain Forest District. Fescue plants were preferred forage for grazing livestock and wild elk in the Skookumchuck Range Unit. Measured stubble heights for fescue did not meet the BMP recommendations for this species. For this area, there is a need to review the RUP plant community criteria to better reflect stubble height criteria for the appropriate site species. This area is a critical winter area for wild ungulates and livestock and wildlife managers need to work together to ensure that the combined use by both does not exceed the capacity of the forage base. The Bull River area (Lower Fontaine) RUP contained a greater number of species stubble height criteria, but of the species provided only one was encountered on the transects within the key areas. Canada bluegrass was non-compliant with the RUP height.

There is an observed lack of carry-over litter and visual hiding cover for small mammals consistent with the high levels of forage utilization on these two sites.

In the Okanagan Region, only one site had fescue present and this may be reflective of a lower overall fescue abundance in the Okanagan Basin. Idaho fescue was present on the Observatory pasture and this species was in compliance with the RUP stubble height requirement of 8 cm. The average stubble height recommended for Idaho fescue in the 2003 Ministry of Forests Rangeland

Health Brochure, Applying best stubble heights on rangelands, has been revised from 8 cm to 12 cm. The mean stubble height of 11.3 cm for Idaho fescue on the Observatory pasture was close to, but slightly under this new recommended value.

The Little Chopaka site was the only one of five sites where bluebunch wheatgrass was not present. There was no apparent ecological reason why bluebunch wheatgrass should not be present at this site. Bluebunch wheatgrass tends to be a decreaser species and may disappear under prolonged heavy grazing. Additionally the mean stubble height for needle and thread grass was low at this site (Table 4) and did not meet the RUP stubble height requirement for this species. These observations may indicate that the site has been heavily grazed for some time. The South Strawberry site was in compliance with the RUP stubble height requirements and would also meet the new stubble height recommended values in the 2003 brochure. The Lower Cawston site was in compliance for bluebunch wheatgrass but not in compliance for needle and thread grass. The mean stubble height value for bluebunch wheatgrass would not meet the new 2003 recommended stubble height of 15 cm.

Recommendations

The following recommendations are intended to improve stubble height management and compliance:

- On those sites where over-use of important species (e.g., rough fescue) is detected through random monitoring, conduct formal stubble height monitoring over successive years and over a more widespread area to determine the aerial extent of over-use and the potential impacts of over-use on wildlife and other ecological values.
- Focus future stubble height assessments in those key areas with rough fescue stubble heights listed in RUP.
- Where stubble heights are prescribed for a species, ensure the key areas have a high likelihood of containing that species.
- Range Use Plan preparer should provide rationale (in the RUP) for prescribing stubble heights shorter than those in the document “Applying best stubble heights on rangelands, (British Columbia Ministry of Forests 2003).
- Effectiveness monitoring should be conducted to assess the effects of specified range use plan compliance criteria on habitat attributes and quality.
- In areas of the Province such as the East Kootenays, where overwintering wild ungulates are also dependant on the forage resource, livestock and wildlife managers need to work together to ensure that the combined use by both wild ungulates and livestock does not exceed the capacity of the forage base.

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