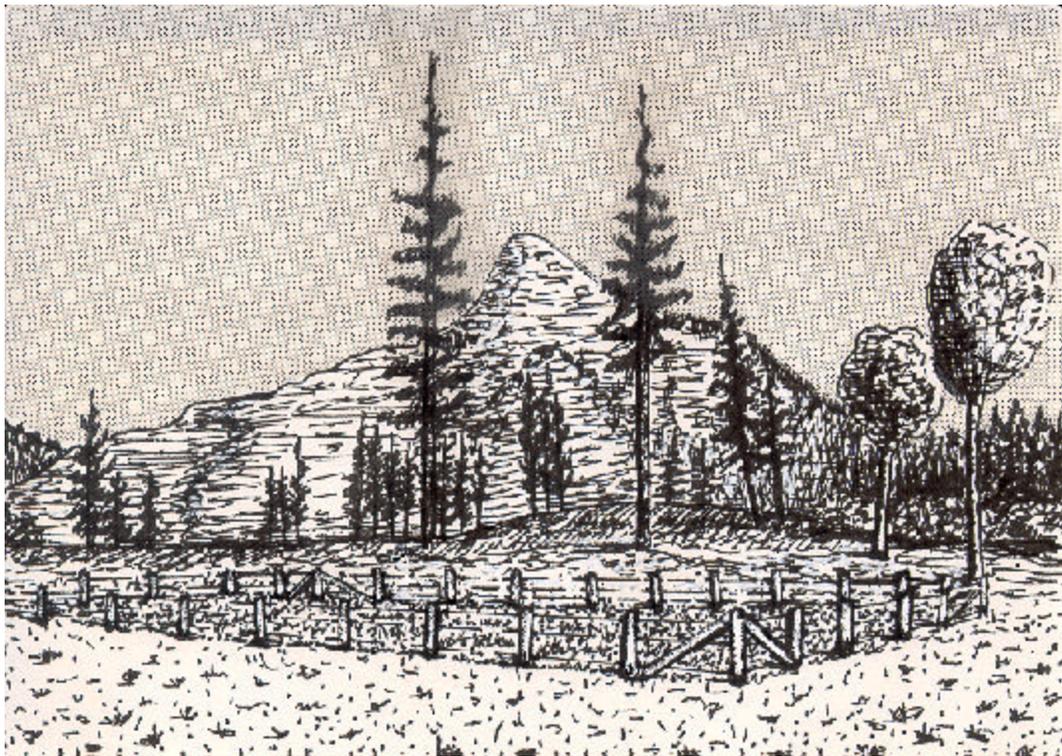


**THE ROUGH FESCUE DOMINATED COMMUNITY  
TYPES IN THE FOOTHILLS OF  
NORTH-CENTRAL  
ALBERTA**



**Alberta**

**ALBERTA SUSTAINABLE RESOURCE  
DEVELOPMENT**

**THE ROUGH FESCUE DOMINATED COMMUNITY TYPES IN  
THE FOOTHILLS OF NORTH-CENTRAL ALBERTA**

**Prepared by**

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## ABSTRACT

The fescue grasslands of Alberta are an important grazing resource for both wildlife and domestic livestock. These grasslands are also found in some of the most ecological diverse areas of the province. Looman (1982) described three zones of rough fescue in Alberta, characterized by a different species. In the Northern rough fescue zone, north of 51° N latitude in the foothills of North-central Alberta three undisturbed rough fescue dominated types have been described. These include the Rough fescue-Hairy wildrye dominated community which is found on dry, well-drained sites. On moister sites with deep snow accumulation bog birch will invade to form the Bog birch/Rough fescue/Bearberry dominated community type. In contrast, on moist, rich sites tufted hairgrass co-dominates with rough fescue to form the Rough fescue-Tufted hairgrass dominated community type. This paper will describe and examine the successional relationships of these community types in the presence and absence of disturbance.

## INTRODUCTION

Looman (1982) and Hill (1995) recognized three zones of rough fescue in Alberta (Figure 1) each characterized by a different species (Pavlick and Looman 1984). The largest zone (I) included the Foothills and Central Parkland (Strong and Thompson 1995) of east-central Alberta and is dominated by Plains Rough fescue (*Festuca hallii*). The second zone (II) is dominated by Foothills Rough fescue (*F. campestris*) and includes the Foothills fescue, Montane and Subalpine subregions of southwestern Alberta and the Cypress Hills. The third zone (III) is dominated by Northern rough fescue (*F. altaica*) and extends north of 50° N latitude along the foothills and mountains of north-central Alberta and includes the Upper Foothills, Subalpine and Montane subregions.

Classification of the Rough fescue dominated communities have been made by Willoughby et al. (2001) for the Foothills rough fescue zone, but only a limited classification is available for the Northern rough fescue<sup>1</sup> zone. Particularly, it is not clear how the rough fescue grasslands are related between the Upper Foothills, Montane and Subalpine subregions.

The rough fescue grasslands of North-Central Alberta are important locally for grazing by livestock and wildlife. Morgantini and Russell (1983) found that rough fescue made up over 69% of the elk winter diet in the Ya Ha Tinda area. These grasslands are also important in maintaining the local biodiversity. Despite the importance of these grasslands there is little understanding of their ecology. Willoughby (2001) and Willoughby (1999) have identified a Rough fescue-Hairy wildrye, Rough fescue-Tufted Hairgrass and Bog birch/Rough fescue/Bearberry dominated communities in the Upper Foothills and Subalpine subregions within this zone, but no attempt has been made at examining the relationship between these community types across the various subregions. In this paper the data from the rough fescue dominated communities north of 51° N latitude located within the Upper Foothills, Subalpine and Montane subregions were combined in order to determine the similarity and successional relationships of these types.

## METHODS

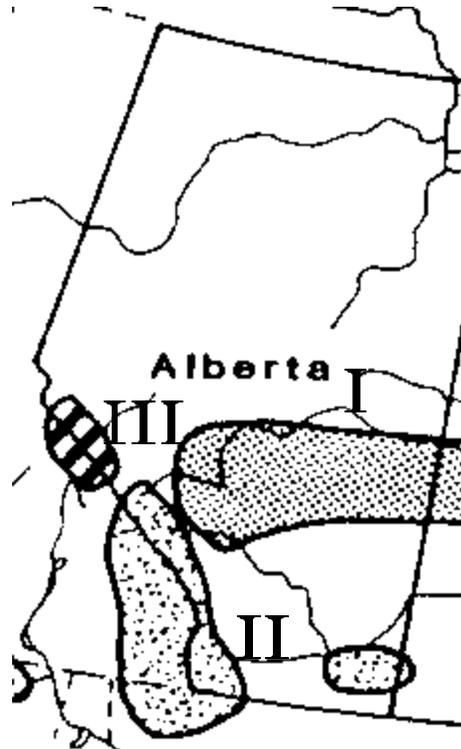
All of the data from the Rough fescue dominated communities identified by Willoughby (2001), Willoughby (1999) and Willoughby et al. (2001) in the Upper Foothills, Subalpine and Montane subregions of Alberta were classified using both cluster analysis (SAS) and ordination (PC-ORD). The data included plots done near the Ya Ha Tinda ranch, Harrison flats, Forty Mile Flats (Upper Clearwater Forest Land Use Zone), Ribbon Flats, Panther Corners and Wilson Creek range

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<sup>1</sup>Looman (1969) and Hill (1995) felt that the third rough fescue zone was dominated by Northern rough fescue, but there appears to be extensive overlap between this species and Foothills rough fescue, particularly in the southern part of the zone west of Rocky Mtn. House and Sundre.

allotment. These data also included rangeland reference area data from, McCue Creek, Yara Creek, Harold Creek, Upper James River, Seven mile burn, Elk Creek and Eagles Nest Cabin (Willmore Wilderness Park) (Weerstra and Willoughby 1998). The reference area data included grazed and ungrazed transects with over 30 years of data from a number of the sites. The initial classification was complicated by the fact that a number of the transects represented grazing and fire disclimax community types. In order to gain a better understanding of the ecology of these sites in the absence of disturbance only the undisturbed transects were reordinated and classified. This left 64 transects which included the inside ungrazed transects from 1981 to 2000 at the Upper James (UJR) and McCue Creek (MC) reference areas, from 1991 to 2000 at the Harold Creek (HC) reference area, from 1998 to 2000 at Eagles Nest cabin (EN) and Wilson Creek allotment (WCT01). The inside and outside transects from 1979 to 1985 at Yara Creek (YC), from 1991 to 2000 at Elk Creek (EC) and the unburned transects at Seven Mile Burn (SMB). Data from Ribbon Creek Flats (RF) prior to brush clearing (MacCallum and Yakimchuk 1992), Panther Corners (PANT)(AGRA 1998) and Forty Mile Flats (FM) were also included in the analysis.

Both the Ya Ha Tinda (YE,YW) and Harrison flats (H) areas of the province have extensive areas of rough fescue grassland that support large herds of elk. In an effort to determine how these disturbed grasslands were ecologically related to the other undisturbed rough fescue dominated community types the Ya Ha Tinda and Harrison transects were reordinated with the summarized species lists of the undisturbed Rough fescue-Hairy wildrye (HWR), Bog birch/Rough fescue/Bearberry (BEGL) and Rough fescue-Tufted hairgrass (TUFT) community types.



**Figure 1.** Rough fescue dominated zones in Alberta. Adapted from Looman (1982)

Ordination (DECORANA)(Gauch 1982) and cluster analysis (SAS) multivariate techniques combine the sites based on the similarity of species composition. The groupings from cluster analysis were overlain on the site ordination. Soil moisture, nutrients, drainage, elevation and slope data were collected in the procedure outlined in the Ecological Land Survey Site Description Manual (1994). These data were correlated with the ordination axes using PC-ORD in an effort to determine which environmental variables accounted for the most variation in the species-stand table. These data were presented in a species-environment biplot.

Rangeland reference area sites were selected from within range allotments on areas that represented primary range. Originally sites thought to be in poor range condition were selected. These sites were usually represented by open grasslands on south-facing slopes, benchlands and terraces. The reference sites were not located near salt or within 100-ft. (30-m) of a fence. The preferred distance from a water source was greater than 1000-ft. (300-m) but less than 1-mi. (1.6-km). Each reference site consisted of a fenced enclosure and a 100-ft (33-m) transect inside and outside the enclosure. The outside transect was situated 25-ft (8-m) or greater from the edge of the enclosure. At 3-in. (7-cm) intervals, the basal frequency of the plant species were recorded using Parker's loop (Parker 1954). In 1981, the canopy cover of the plant species was also recorded (at 6-ft. (1.8-m) intervals) using a 20x50 cm Daubenmire frame. Presently, the transects are being recorded every three

years. All the basal frequency data prior to 1981 was converted to canopy cover using regression analysis.

Transect data from non-rangeland reference area sites were collected in order to develop management plans for the various range allotments. These data were collected using the methodology outlined by Dale et al. (2001).

## **RESULTS**

### **Species composition**

The ordination and cluster analysis of the undisturbed rough fescue dominated communities in zone 3 is outlined in Figures 2 and 3. The first two axes in the ordination accounted for 49% and 16% of the variation in the species stand table, respectively (Figure 2). There is a distinct grouping of the transects done at Yara Creek (YC), McCue Creek (MC), Upper James River (UJR), majority of the Panther Corner transects and Forty Mile flats. These transects are dominated by rough fescue, hairy wildrye and slender wheatgrass and represent the Rough fescue-Hairy wildrye community type. The transects located at Harold Creek (HC), Eagles Nest (EN) and Wilson Creek (WCT) were all dominated by rough fescue and tufted hairgrass and they grouped together to form the the Rough fescue-Tufted hairgrass dominated community type.

The final grouping was all of the transects that were dominated by bog birch, rough fescue and bearberry. These included the Seven Mile Burn, Ribbon Flats, Elk Creek and a number of transects located within Panther Corners. Both the cluster analysis (Figure 3) and ordination (Figure 2) indicated that the Rough fescue-Tufted hairgrass and Rough fescue-Hairy wildrye dominated community types were much more similar than the transects dominated by rough fescue, bearberry and bog birch. Indeed, cluster analysis indicated that the Rough fescue-Tufted hairgrass transects grouped together within the larger Rough fescue/Hairy wildrye dominated group (Figure 3).

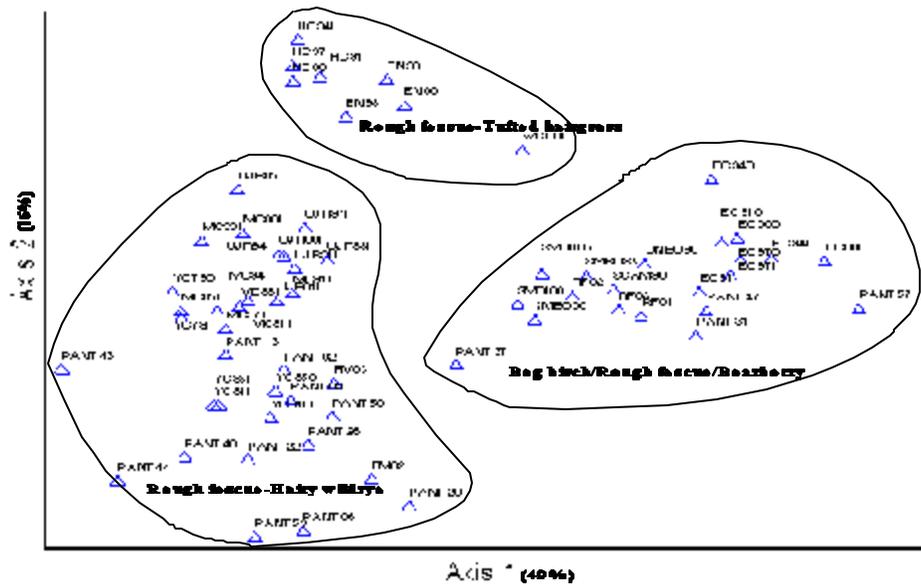


Figure 2. Ordination of undisturbed Rough fescue dominated plots in Zone III.

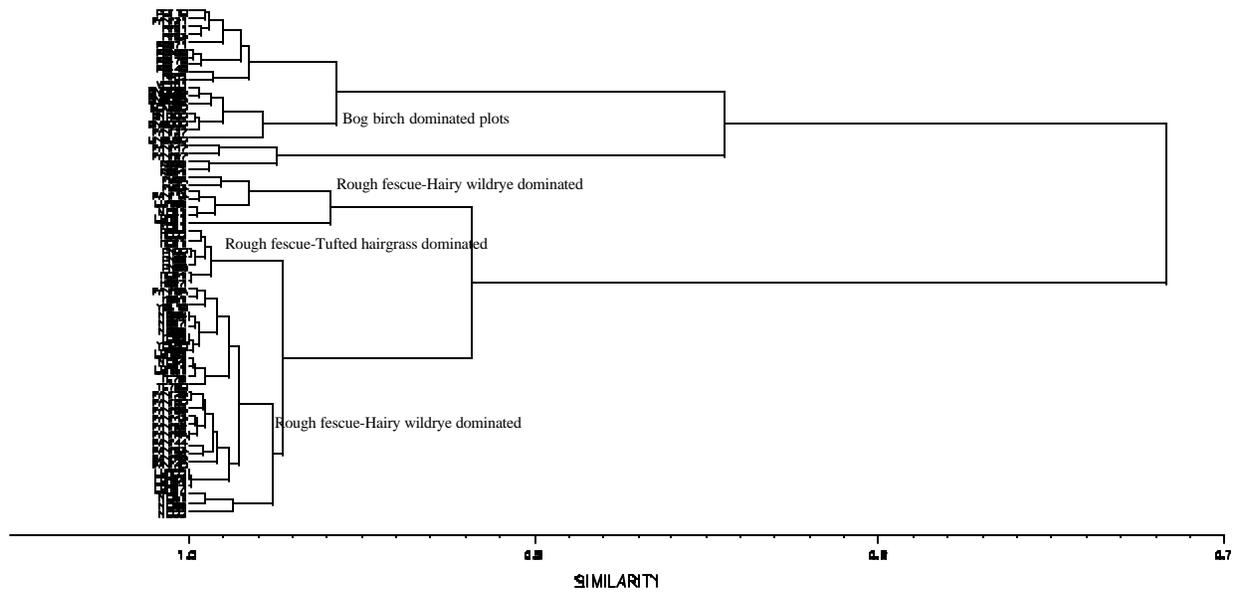
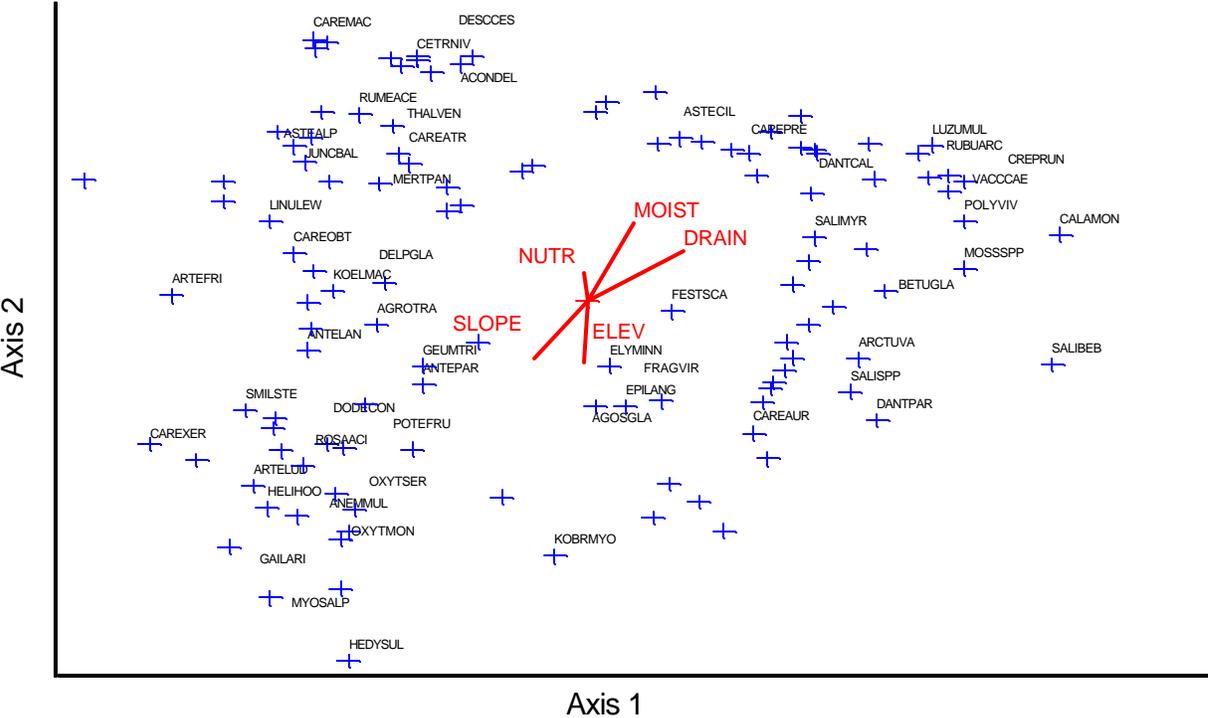


Figure 3. Cluster analysis of undisturbed Rough fescue plots in Zone III.

The species-environment biplot is outlined in Figure 4. Species characteristics of the Bog birch/Rough fescue/Bearberry community, bog birch (*betugla*), bearberry (*arctuva*), oatgrass (*dantcal*, *dantpar*), willow (*salimyr*, *salispp*, *salibeb*), scapose hawk’s beard (*creprun*), blueberry (*vacccae*), alpine bistort (*polyviv*), valeriana (*valesit*), graceful sedge (*carepre*) were found on the right side of axis one and were situated around the ordinates of higher moisture and higher (poorer) drainage.

In contrast species characteristic of the Rough fescue-Hairy wildrye community, shrubby cinquefoil (*potefru*), rose (*rosaaci*), fringed and prairie sage (*artefri*, *artelud*), white scaled sedge (*carexer*), browned eyed susan (*gailari*), locoweed (*oxytmon*, *oxytser*), junegrass (*koelmac*), cut leaved anemone (*anemmul*) and bog sedge (*kobrmyo*) were found on the left side of axis 1 and



**Figure 4.** Biplot ordination of selected plant species and environmental variables for all undisturbed rough fescue dominated transects in zone III.

bottom of axis 2 and tended to have lower moisture, nutrients and were more rapidly drained. Many of these plots were also found at higher elevations and were located on steep south facing slopes. Species characteristic of the Rough fescue-Tufted hairgrass community, tufted hairgrass

(descetes), monkshood (acondel), veiny meadow rue (thalven), thick-spiked and long-bracted sedges (caremac, careatr), tall lungwort (mertpan), dock (rumeace), arctic rush (juncbal) were found at the top of axis 2. These species were correlated with higher moisture and were found on somewhat richer sites. Species that were common to all three types tended to be found in the middle of the ordination rough fescue (festsca), hairy wildrye (elyminn), slender wheatgrass (agrotra), old man's whiskers (geumtri), strawberry (fragvir), mountain dandelion (agosgla), blunt sedge (careobt), flax (linulew), shooting star (dodecon) and fireweed (epilang).

Table 1 outlines the differences in species composition between the various community types. All three community types were dominated by rough fescue which was not significantly different between the types. The Rough fescue-Hairy wildrye community type had a significantly higher cover of shrubby cinquefoil and slender wheatgrass than the Rough fescue-Tufted hairgrass or Rough fescue/Bearberry/Bog birch community types. In contrast, the Rough fescue-Tufted hairgrass had a significantly higher cover of tufted hairgrass than the other community types and the Rough fescue/Bearberry/Bog birch community had the highest cover of bog birch, bearberry and oatgrass species (Parry and California) (Table 1).

Table 2 outlines the physical characteristics of each plant community type. The soils of each community type are very similar ranging from Orthic Eutric and Melanic Brunisols on the Rough fescue-Hairy wildrye and Bog birch/Rough fescue/Bearberry communities to Cumulic and Orthic Regosols on the Rough fescue-Tufted hairgrass community. All of the communities have fluvial and lacustrine parent materials and their textures range from loamy at the surface to Clay loams and Silty Clay Loams at depth. The pH ranges from 5-8 and the depth of the Ah horizon averages from 3-10 cm for all community types. The Rough fescue-Tufted hairgrass or Bog birch/Rough fescue/Bearberry community is slightly moister ranging from mesic to subhygric, than the Rough fescue-Hairy wildrye community type which has a submesic to mesic moisture regime. The Rough fescue-Tufted hairgrass community also has slightly poorer drainage and higher nutrients than the other community types with gleying at depth at one site.

Table 1. Canopy cover of selected species in each of the three rough fescue dominated community types in Zone III.

Species	Rough fescue- Hairy wildrye	Rough fescue Tufted hairgrass	Bearberry/ Bog birch
<b>Shrubs</b>			
SHRUBBY CINQUEFOIL ( <i>Potentilla fruticosa</i> )	4a*	1b	1b
BOG BIRCH ( <i>Betula glandulosa</i> )	0b	Tb	32a
<b>Forbs</b>			
OLD MAN'S WHISKERS ( <i>Geum triflorum</i> )	9a	2c	6b
COMMON YARROW ( <i>Achillea millefolium</i> )	3a	3a	3a
GRACEFUL CINQUEFOIL ( <i>Potentilla gracilis</i> )	4a	2a	Ta
AMERICAN VETCH ( <i>Vicia americana</i> )	3a	Ta	1a
MOUNTAIN DANDELION ( <i>Agoseris glauca</i> )	1a	Ta	1a
VEINY MEADOW RUE ( <i>Thalictrum venulosum</i> )	1b	4a	1b
TALL LARKSPUR ( <i>Delphinium glaucum</i> )	2a	Tb	1b
BEARBERRY ( <i>Arctostaphylos uva-ursi</i> )	1b	Tb	10a
<b>Grasses</b>			
NORTHERN AND FOOTHILLS ROUGH FESCUE ( <i>Festuca altaica</i> , <i>F. campestris</i> )	21a	17a	28a
HAIRY WILDRYE ( <i>Elymus innovatus</i> )	5a	5a	4a
SLENDER WHEATGRASS ( <i>Agropyron trachycaulum</i> )	7a	3b	3b
SEDGE SPECIES ( <i>Carex obtusata</i> , <i>C. siccata</i> <i>C. praegracilis</i> , <i>C. atosquama</i> )	9a	9a	9a
TUFTED HAIRGRASS ( <i>Deschampsia cespitosa</i> )	Tb	12a	Tb
JUNEGRASS ( <i>Koeleria macrantha</i> )	1a	Tb	1b
CALIFORNIA OATGRASS ( <i>Danthonia californica</i> )	Tb	0b	3a
PARRY OATGRASS ( <i>Danthonia parryi</i> )	Tb	0b	2a
BOG SEDGE ( <i>Kobresia myosuroides</i> )	1a	0a	Ta

\*Means with the same letter within a row are not significantly different according to an LSMEANS test at the 0.05 level .

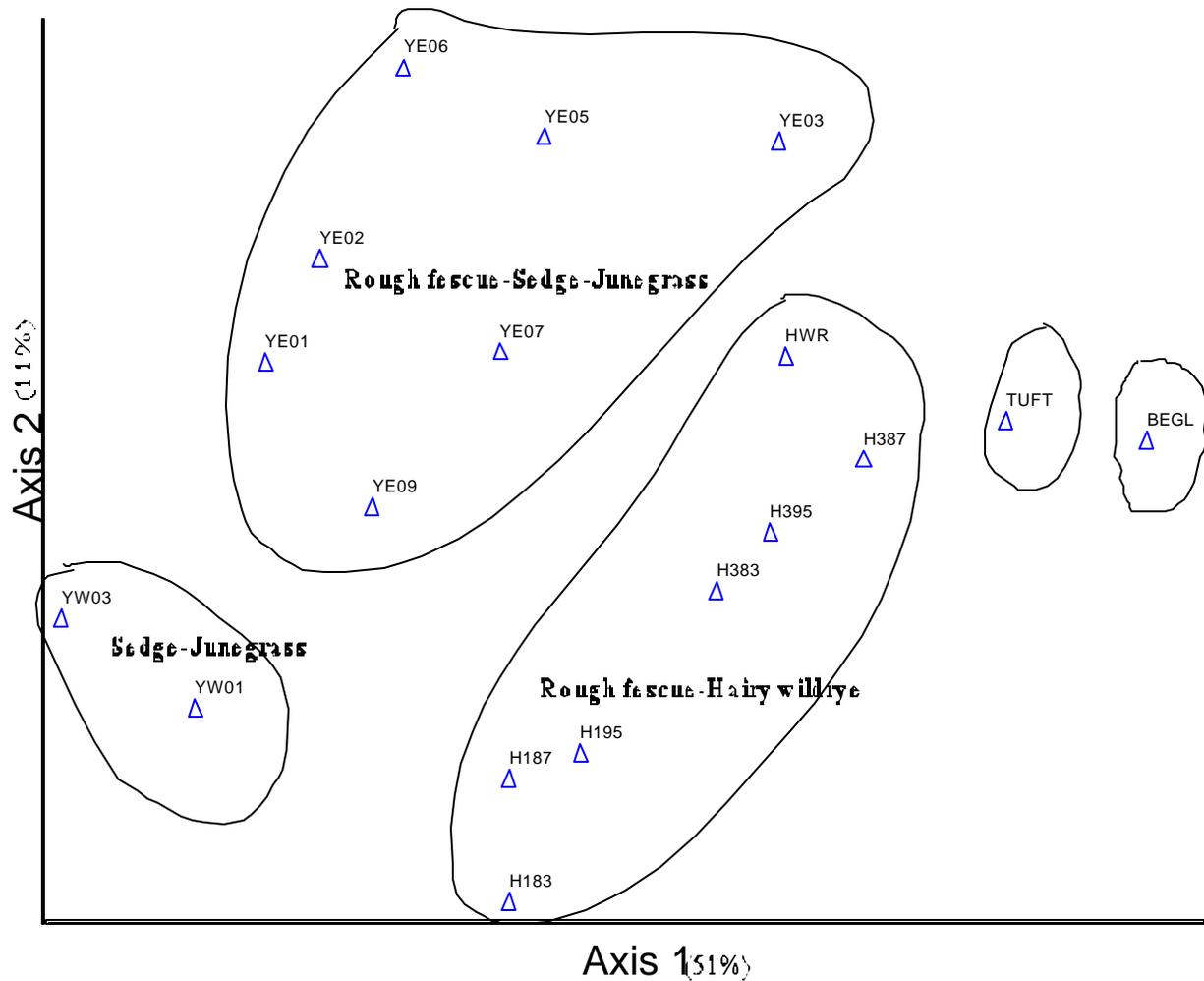
Table 2. Site characteristics of the three undisturbed rough fescue dominated community types in Zone III.

Site characteristics	Rough fescue -Hairy wildrye	Rough fescue -Tufted hairgrass	Rough fescue/ Bearberry/ Bog birch
Soil (subgroup)	O. Melanic Brunisol <sup>1</sup> O.Eutric Brunisol <sup>7</sup> O. Humic Regosol <sup>2</sup>	Cumulic Regosol <sup>5</sup> Orthic Regosol <sup>5</sup>	O.Eutric Brunisol <sup>10</sup>
Parent material	Fluvial, Colluvial apron, Glacial fluvial	Fluvial, Glacial Fluvial	Lacustrine, over glacial till
Surface Texture	L	L	L
Effective texture	CL, SiL, SiCL, SiC	CL, SiCL	CL, SiL, SiC
pH	5-8	5-6.5	5-8
Ah thickness (average)	2-27(10)	2-4(3)	2-5(4)
Humus form	Mor, Mull	Mor	Mull, Mor
Depth to Gleying	None	None, 60cm	None
Moisture	Submesic, Mesic	Mesic, Subhygric	Mesic, Subhygric
Nutrient	Mesotrophic, Permesotrophic	Mesotrophic, Permesotrophic	Mesotrophic
Drainage	Well	Moderately well, Well	Well
Elevation (m)	1470-2150	1370-1737	1300-1981
Aspect	Level, South	North, East, South	Level, South
Slope (%)	0-22(9)	2-3(2)	1-2(1)
Number of Soil Pits	10	2	4

<sup>1</sup> Indicates percentage of soil pits with this soil subgroup (ie 1=10%)

## Ya Ha Tinda, Harrison Flats

The ordination of the Ya Ha Tinda (YE, YW) and Harrison flats (H) transects with the summarized undisturbed rough fescue community types is outlined in Figure 5.



**Figure 5.** Ordination of Ya Ha Tinda and Harrison flats transects with the summarized undisturbed rough fescue dominated community types in Zone III

The first two axes accounted for 51% and 11% of the variation in the species-stand table respectively. The ordination indicates that the Ya Ha Tinda and Harrison flat grasslands have a closer affinity with the Rough fescue-Hairy wildrye (HWR) community than either the Rough fescue-Tufted hairgrass (TUFT)

or Bog birch/Rough fescue/Bearberry (B EGL) dominated community types.

There is a distinct grouping of the Ya Ha Tinda plots into two community types. The first type was described on grasslands east of Scalp Creek (YE). These transects were dominated by shrubby cinquefoil, rough fescue or sedge, junegrass, fringed brome, old man's whiskers and early yellow locoweed and represent the Rough fescue-Sedge-Junegrass community type (Willoughby et al. 2001). This community type was the most extensive grassland community described in the Ya Ha Tinda area. The other community type was described west of Scalp Creek near the Ya Ha Tinda ranch buildings. The transects (YW) in this community were dominated by shrubby cinquefoil, sedge, junegrass, Kentucky bluegrass, showy locoweed and cut leaved anemone. These transects represented a Sedge-Junegrass community type.

In contrast the Harrison flats transects were the most similar to the summarized Rough fescue-Hairy wildrye (HWR) community and were dominated by shrubby cinquefoil, rough fescue, sedge, junegrass, old man's whiskers and early yellow locoweed. The dominant species on the Harrison transects are very similar to the dominant species at the Ya Ha Tinda, but the cover of rough fescue averaged 35% at Harrison flats in comparison to only 10% at the Ya Ha Tinda (Appendix 1).

## **DISCUSSION**

The rough fescue dominated grasslands follow the creeks and river valleys throughout the foothills of the Rocky Mountains north of Calgary to Willmore Wilderness park near Grande Cache. The topography of the area consists of both mountains and foothills. Closed-canopy coniferous forest dominates the area with potential climax species on modal sites being white and black spruce with lodgepole pine as an early successional species (Strong 1992). The valley bottoms have predominant willow and bog birch cover with pockets of open grassland. The south facing slopes are also covered by grassland.

The rough fescue dominated grasslands are generally found on mesic to subhygric, well drained sites within these valley bottoms and on lower slope positions of south facing slopes. On moister and richer sites tufted hairgrass and graceful sedge often replaces rough fescue as the dominate species in the community. On steep dry south facing slopes hairy wildrye, junegrass, sedge species and fringed sage tend to dominate (Willoughby 2001).

Soil moisture and nutrients appear to account for most of the variation within the ordination of the undisturbed rough fescue dominated community types. Moisture is a major limiting factor limiting the distribution of plants (Krebs 1978). In this study it appears there was a definite species response to a moisture and nutrient regime gradient. Species characteristic of moist, medium rich sites included bog birch, willow, graceful sedge, and alpine bistort. These species were indicative of the Bog birch/Rough fescue/Bearberry community type. Species characteristic of moist, rich sites included tufted hairgrass, long-bracted sedge, monkshood, tall lungwort and dock. These species were characteristic of the Rough fescue-Tufted hairgrass community type. In contrast species characteristic of dry, well drained, medium to rich sites included bog sedge, fringed sage, shrubby cinquefoil and locoweeds. These species were characteristic of the Rough fescue-Hairy wildrye community type.

## **Plant community ecology**

### *Bog birch/Rough fescue/Bearberry*

de Groot (1998) found that bog birch tended to prefer moist, acidic, nutrient poor organic soils which were well drained. Anderson (1975) also found that bog birch is very sensitive to extremely cold winter temperatures, but can survive temperatures to as low as  $-27^{\circ}\text{C}$  if sufficient snowfall occurs. The presence of bog birch on these rough fescue dominated grasslands may indicate sites which have deeper snow accumulations, which insulate bog birch from the extreme winter conditions. The deeper snow accumulations would also increase soil moisture in the spring further favouring bog birch growth. The surface of this community is well drained and dries out quickly in the summer favouring the growth of rough fescue, junegrass, bearberry, Parry oatgrass and California oatgrass plant species.

Repeated fire (every few years) reduces bog birch canopy cover and above ground biomass, but has only a minimal effect on bog birch mortality (de Groot 1998, Bork et al. 1996). Bork et al. also found that burning bog birch three times in 9 years controlled shrub growth and increased forage production by over 40% compared to the unburned control. The increase in bog birch cover in the absence of fire is evident from the pictures taken at the Elk Creek rangeland reference area from 1968 to 2000 (Photo 1).

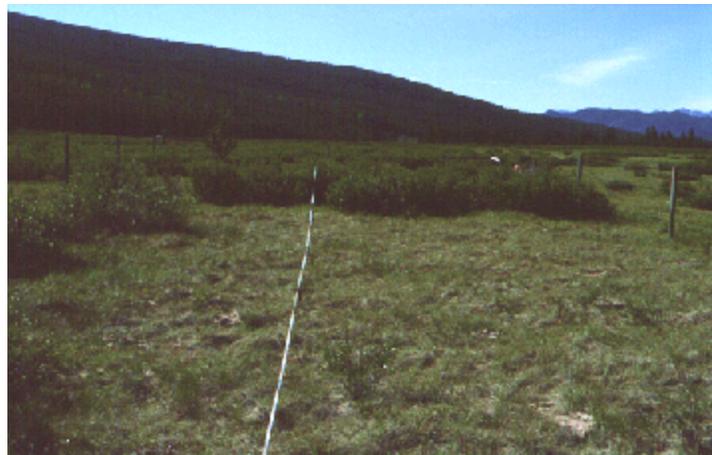
### *Rough fescue-Hairy wildrye*

The Rough fescue-Hairy wildrye dominated community is found on submesic to mesic, well drained sites. This community can also be found on south facing slopes in lower slope positions where some moisture accumulates (Willoughby 2000). In the absence of grazing and fire it appears this community type will eventually succeed to conifer forest (Willoughby 2000), but the time frame for complete tree invasion appears to be greater than 60 years. Willoughby also found that increased grazing pressure by domestic livestock leads to a decline in rough fescue and other native species and allows species like Kentucky bluegrass and dandelion to dominate the site to form a Kentucky bluegrass-Sedge dominated community type.

Initial analysis of the Ya Ha Tinda ranch and Harrison flats rough fescue dominated grasslands indicated that these grasslands were very different from the other undisturbed rough fescue dominated types. Work by Looman (1969), found that these grasslands supported a large elk herd during the winter when they remained snow free. It would appear that this heavy dormant season grazing has altered the community structure so that these grasslands do not resemble the other undisturbed or grazed Rough fescue-Hairy wildrye community types. Bailey et al. (1988) found that heavy dormant season grazing lowered plains rough fescue cover and allowed species like junegrass, sedge, slender wheatgrass, fringed sage and pussytoes to increase in the Aspen parkland. They also found that forage production was significantly lower under



**1968**



**2000**

**Photo 1:** The lack of fire has allowed bog birch cover to increase on both the grazed and ungrazed transects at the Elk Creek rangeland reference area from 1968 to 2000.

heavy dormant season grazing compared to the ungrazed control. They concluded that heavy dormant season grazing was having the same impact on the community as a light June grazing treatment. It would appear that the heavy grazing by wildlife during the winter is having a similar affect on the majority of the Ya Ha Tinda grasslands.

The other Ya Ha Tinda grassland community type (Sedge-Junegrass) that was described by Willoughby et al. (2001) was found in an area where the Ya Ha Tinda ranch feeds hay to horses during the winter. The horses also graze this area early in the spring. This grazing pressure has allowed Kentucky bluegrass to invade onto this community type and it would appear that this community type is succeeding to a community that is similar to a number of the grazed transects of the rangeland reference areas to the east of the ranch in the Red Deer river valley (Willoughby 2000).

It would appear that the grasslands of the Ya Ha Tinda represent grazing disclimax community types. If protected from grazing these grasslands would likely succeed to a community type that is similar to the undisturbed Rough fescue-Hairy wildrye dominated type.

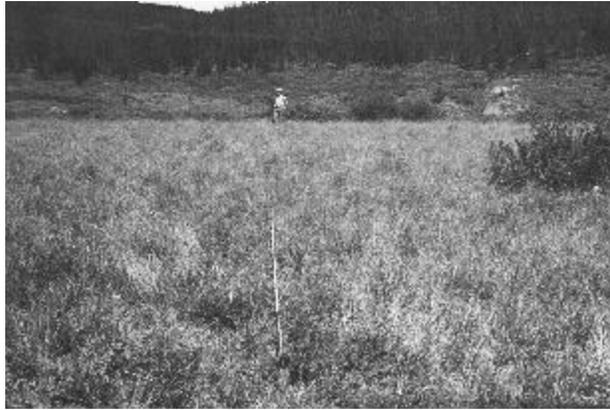
#### *Rough fescue-Tufted hairgrass*

The Rough fescue-Tufted hairgrass community is found on moderately well drained, subhygric, rich sites. This community type appears to represent the transition between the drier Rough fescue-Hairy wildrye community and the moister and richer Tufted hairgrass-Sedge dominated community type (Willoughby 2001). Willoughby (1998) found a 25% increase in shrub cover in only 25 years on the Tufted hairgrass-Sedge community type, but this community type is rarely shrub covered. Photos taken at the Harold Creek rangeland reference area in 1963 and again in 2000 show little shrub expansion in over 30 years of no disturbance (Photo 2). Lane et al. (2001), have found that there has only been an 18% increase in shrub cover on this community type in Willmore Wilderness Park in over 40 years. Presently it is not clear why shrub expansion is slower in this community type.

Continued grazing pressure causes rough fescue to decline and initially tufted hairgrass and sedge increase in cover. However, continued grazing pressure causes a further decline in all native species and the site will become dominated by Kentucky bluegrass, dandelion and clover species (Willoughby 2001). In Willmore where there is little seed source for Kentucky bluegrass and these heavily grazed Rough fescue-Tufted hairgrass types are often dominated by alpine timothy, slender wheatgrass, sedge and tufted hairgrass. Many of the sites have also been invaded by tall buttercup.

## **SUMMARY**

The fescue grasslands of Alberta represent some of the most ecologically diverse areas of the province. Historically, the desired plant community of these grasslands was one that maximized beef production, which has led to a decline in condition of many of these grassland communities. In recent years there has been a movement towards more sustainable use of our natural resources. The scope of sustainability has shifted from being defined by economic assesment to include broader sustainability of ecological functions and patterns (Lee and



1963



1994

**Photo 2:** In over 30 years of protection from grazing and fire there has been little shrub expansion at the Harold Creek rangeland reference area. However, shrub expansion has continued on the moister sites in the background

Hanus 1998). Today society desires the conservation of native plant communities. In North-central Alberta these rough fescue dominated grasslands are important locally for both wildlife and domestic livestock. They also contribute to the local biodiversity of the area. Despite their importance there is only limited understanding of their ecology. This paper describes and presents a classification of the rough fescue dominated community types of the foothills of North-central Alberta. This classification recognizes three rough fescue dominated community types and outlines the successional relationships of each type. Hopefully, this classification can be used to ensure the conservation of these native grasslands.

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