Preliminary Classification of Plains Rough Fescue (*Festuca hallii*) Community Types within the Central Parkland Subregion of Alberta

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INTRODUCTION

The preliminary classification of plains rough fescue (*Festuca hallii*) community types for the Central Parkland Subregion of Alberta is the first phase of a project initiated by the Alberta Natural Heritage Information Centre (ANHIC) to document remnant fescue grasslands within this subregion. The purpose of Phase I is:

- to develop a classification according to the system adopted by The Nature Conservancy,
- to base the classification upon the existing literature and data, such as those stored in the Ecological Site Inventory System (ESIS) and,
- to then compare the preliminary classification to other similar community types identified elsewhere.

This preliminary classification will focus on native grassland community types containing plains rough fescue and less than 25% shrub cover. Disturbances such as over-grazing, mowing, breaking of the soil, etc. can alter the species composition of grasslands, introducing a variety of non-native grasses and forbs and shifting the dominance of native species. Due to the wide array of community types that could result, such disturbed (modified) grasslands have not been included in this classification. Following phase III, which includes the field verification of remnant plains rough fescue grasslands, such modified fescue associations may be described.

The Nature Conservancy has developed a standardised hierarchical system to facilitate the identification and classification of vegetated terrestrial communities (Schneider *et al*. 1997). The upper hierarchical levels (class and subclass) are based on vegetation structure, height and leaf form; the middle levels (group and formation) are based on climate, hydrology and leaf form; the lowest levels (alliance and association) are based on floristic composition of the uppermost strata (alliance) and total floristic composition (association). An important aspect to the classification is that the community elements are related to a set of environmental factors rather than to a particular site, allowing the classification to have ecological meaning over a broad geographical range. The lowest level of the hierarchy (the plant association) has a definite floristic composition and uniform physiography, and represents uniform habitat conditions. Habitat refers to the combination of environmental conditions and ecological processes influencing the community. The classification which is applicable to this project is taken from "The Status of Biodiversity in the Great Plains: Great Plains Vegetation Classification" (Schneider *et al*. 1997) and is presented below:

V HERBACEOUS. Herbs (graminoids, forbs and ferns) dominate (generally forming at least 25% cover)

V Trees, shrubs and dwarf shrubs generally with less than 25% cover

V.A.5.d Medium-tall bunch temperate or subpolar grassland

V.A.5.d *FESTUCA SCABRELLA* HERBACEOUS ALLIANCE
Festuca scabrella Herbaceous Vegetation
Rough fescue Mixedgrass Prairie
Festuca scabrella-Danthonia intermedia Herbaceous Vegetation
Rough fescue-Timber Oatgrass Mixedgrass Prairie
Festuca scabrella-Elymus lanceolatus Herbaceous Vegetation
Rough fescue-Northern Wheatgrass Mixedgrass Prairie
Festuca scabrella-(*Stipa* spp.) Herbaceous Vegetation
Rough fescue-Needlegrass Mixedgrass Prairie

METHODS

A literature review of publications on fescue grasslands was conducted. This included publications from the library of Lorna Allen of ANHIC, those in our own library and those provided by experts in the field whom we contacted. A list of experts contacted is presented in Appendix I. Some were able to provide comments or refer us to publications on fescue grassland classification, while others referred us to other individuals or indicated that they were unable to provide any information on the subject.

EXISTING CLASSIFICATIONS

The following is a summary of the community types applicable to the plains rough fescue community types of the Central Parkland Subregion of Alberta. The species composition and/or canopy cover for each of the community types described is presented in Appendix II. Scientific nomenclature of the plant species is presented as it was in the original citations. Notable changes are *Festuca scabrella*, now known as *Festuca hallii* (Pavlick and Looman 1983), and *Stipa spartea* var. *curtiseta,* now known as *Stipa curtiseta* (Moss 1983).

The Central Parkland Subregion of Alberta forms a broad transition between grasslands to the south and forests to the north. Within the grasslands of this subregion, plant species are essentially the same as those found in the Northern Fescue Subregion to the south. Coupland (1950) and Coupland and Brayshaw (1953) describe the *Festuca* community as preclimax to the *Populus* community to the north and post-climax to the *Stipa-Agropyron* faciation of the mixed

prairie to the south. Generally progressing from north to south or from moist to dry soil moisture regimes on slopes, *Festuca scabrella* cover declines and *Stipa spartea* var. *curtiseta* increases in dominance within the community type.

Numerous publications have described the floristic distribution and/or composition of the landscape (Moss 1932; Clarke *et al.* 1942; Moss 1944; Moss and Campbell 1947; Coupland 1950; Ayyad and Dix 1964; Blood 1966; Carbyn 1971; Bradley and Bradley 1977; Looman 1980; Wallis and Wershler 1985; Pylpec 1986; Trottier 1986; Wallis 1990; Wershler and Wallis 1990; Belcher 1996), but few actually classify or describe discrete community types (Bird 1930; Coupland and Brayshaw 1953; Bird 1961; Looman 1963; Looman 1969; Wroe 1971; Anderson 1972; Coupland 1973; Wheeler 1976; Fehr 1982; Looman 1982; Legris and Cornish 1997).

Although Bird (1930) described biotic communities of the Aspen Parkland of central Canada, he failed to recognise the rough fescue (*Festuca scabrella*) prairie. In a later document (Bird 1961), he rectified this by referring to the work of Coupland and Brayshaw (1953), which considers *Festuca* as the main constituent of the grassland in the Aspen Parkland of Alberta. As previously mentioned, Coupland and Brayshaw (1953) indicated that *Festuca scabrella* ranges from complete dominance in the northern fringe to a position of co-dominance with *Stipa spartea* var. *curtiseta* in the southern part. In a later publication referring to the Fescue Prairie, Coupland (1973) states that "since this community is characterised by one dominant species, no subdivision seems necessary". Moss and Campbell (1947) stated that *Festuca* and *Stipa* communities intermixed. In one of the early quantitative classifications of Canadian prairie grasslands, Looman (1963) described the percentages of grassland species in a vegetational continuum, based on a moisture gradient. Although both *Festuca scabrella* and *Stipa spartea* var. *curtiseta* are associated with dry-mesic (moist) soil moisture regimes, they replace each other as dominants in a distributional continuum. Under drier conditions *Stipa* dominates, with *Festuca* increasing in abundance and cover as soil moisture improves. The dominance can also be dependent upon the successional direction towards climax or disclimax as influenced by climatic fluctuations and grazing pressures.

In a study of the synecology of a *Festuca scabrella* grassland in south central Alberta, Wroe (1971) described eight plant communities, two of which contained rough fescue as a main component. These included the *Festuca scabrella* community and the *Stipa spartea* var. *curtiseta-Festuca scabrella* community. These communities were related to moisture regimes as influenced by topography (slope position and aspect). The *Festuca scabrella* community occurred on level to gentle slopes, while the *Stipa spartea* var. *curtiseta-Festuca scabrella* community was located on south-facing slopes.

In a study on the effect of fire on grasslands in the Alberta Aspen Parkland, Anderson (1972) described only two grassland communities and one shrubland community. These were the *Festuca scabrella* and *Stipa spartea* var. *curtiseta* community types and the *Symphoricarpos occidentalis* community type, respectively. The latter was previously described by Moss and Campbell (1947) and Wroe (1971). It occurs in localised depression areas within the fescue grassland, and in transition zones between forest and grassland. According to Pelton (1953), *Symphoricarpos occidentalis* is one of the few shrubs to invade grasslands creating shaded conditions promoting tree establishment.

Wheeler (1976), described five plant communities in the parklands of central Alberta. These included *Symphoricarpos*, *Symphoricarpos/Festuca*, *Festuca-Stipa*, *Stipa-Festuca* and *Stipa-Agropyron* community types. These community types ranged in order of soil temperature and soil moisture, from cool moist to warm dry, respectively. The *Stipa-Festuca* community type was the major grassland community and was subsequently subdivided into a grassland and shrub phase based on the presence and cover of *Elaeagnus commutata.* Wheeler (1976) suggested that the *Stipa-Festuca* community may be a regressive development resulting from changes brought about by settlers. The *Stipa-Agropyron* community was unusual because of the lack of *Festuca scabrella* on a site where it was expected to be a dominant grass. Wheeler (1976) suggested that this community developed as a result of the heavy grazing that occurred on these sites in the past followed by mowing, in conjunction with edaphic or microclimatic factors. Since the *Stipa-Agropyron* community type is a modified native grassland that does not include rough fescue, it will be disregarded in our preliminary classification. Similarly, the *Symphoricarpos, Symphoricarpos/Festuca* and the shrub phase of the *Festuca-Stipa* community types are shrub dominated types (>25% shrub cover) and will not be considered in our classification.

In an inventory of the proposed Rumsey Ecological Reserve located within the Aspen Parkland of Alberta, Fehr (1982) described twelve plant communities. Seven of these had previously been described by Wroe (1971), of which four had rough fescue as a component within the community. These included *Symphoricarpos occidentalis*, *Festuca scabrella*, *Stipa spartea* var. *curtiseta-Festuca scabrella* and *Stipa spartea* var. *curtiseta-Artemesia frigida* community types. These occurred in an ecological continuum from a mesic to sub-xeric moisture regime. Slope position (e.g., upper slope, lower slope) and aspect were often related to the occurrence of these community types. North-facing slopes and lower south-facing slopes are generally moister with higher shrub cover compared to the upper south-facing slopes which tend to be dry due to rapid drainage and exposure from solar radiation.

Looman (1969, 1980, 1981, 1982) has classified the fescue grasslands of the Canadian prairie provinces according to the Zurich-Montpellier system. In this system, vegetation having similar floristics is tabulated, and common groups (kengroups) are identified and used to delineate

specific vegetation units. The units are interconnected and the result is a hierarchical classification in which each level is identified by a kengroup. The class is the highest unit and the association is the basic unit. To differentiate between associations, the kengroup of species (the kensorts) are evaluated to determine abundance of species in each association.

Based on Looman's classification, the fescue grasslands are placed in the class Stipo-Festucetea, which includes the mesic grasslands (Looman 1980, 1982). This class is divided into two orders, Stipetalia curtisetae, the dry-mesic grasslands where needle grass predominates, and the Danthonio-Festucetalia, the mesic grasslands where fescues dominate under natural conditions. The Danthonio-Festucetalia order is further subdivided into three alliances (Looman 1982): Agropyron spicatae (located in southern Alberta, adjacent British Columbia and northern United States), Festucion hallii (in the plains), and Festucion altaicae (in the sub-boreal zone of Alberta, British Columbia and Alaska). Within each alliance, one of three species of *Festuca* occur based on ecological (climatic and edaphic) and phenological differences (*F. campestris*, *F. hallii* and *F. altaica*, respectively) (Pavlick and Looman 1983).

Since these species generally form a bunchgrass growth type, with apical meristematic tissue, removal of newly formed foliage is detrimental to the plants vigour and vitality. Early grazing on these species is especially damaging, potentially resulting in reduced cover and abundance of rough fescue and an increase in associated species such as *Danthonia intermedia*, *Stipa spartea* var. *curtiseta,* and *Agropyron* spp. in mesic areas, and *Poa pratensis* or *Carex* spp. in wet-mesic habitats (Moss and Campbell 1947; Looman 1984). Coupland (1973) suggested that in the Fescue Prairie, the appearance of Mixed Prairie species is favoured by increased grazing use and there is a tendency for *Danthonia* spp. to increase relative to rough fescue. This results in a retrogressive shift in the floristic composition and potentially the community type. In addition, grazing can reduce soil surface litter accumulation, resulting in changes to edaphic characteristics (Dormaar *et al.* 1989) (i.e., reduced soil moisture, higher bulk density with decreased hydrologic conductivity, and decreased fungal biomass, as measured by Chitin-N) which in turn can influence the floristc composition.

In recent biophysical and vegetation inventory/monitoring studies and reclamation guides (Willoughby 1992; Loonen 1995; Gerling *et al.* 1996; Legris and Cornish 1997; Willoughby *et al.* 1997; Vujnovic 1998; Willoughby 1998), researchers have been describing community types where rough fescue is dominant or has a reduced presence resulting from either progressive or regressive successional trends. Some of these studies were conducted in the Northern Fescue Subregion, Foothills Fescue Subregion and Montane Subregion. Due to localised topographic relief and climatic regimes, there may be similarities in the fescue grasslands between these regions and the Central Parkland Subregion. However, some are modified native grassland community types, which may not be applicable for our classification.

Loonen (1995) has compiled preliminary range type descriptions for eight benchmark sites in east central Alberta. Although he has not classified these sites into distinct community types, he has listed the dominant plant species at each site. These include *Festuca hallii* at sites 2, 6 and 7 in 1989, *Festuca hallii-Carex* spp.*-Juniperus horizontalis* at site 2 in 1994, *Festuca hallii-Rosa arkansana* at site 3 in 1989, and *Festuca hallii-Carex* spp. at sites 3, 6 and 7 in 1994. At sites 2 and 3, the dominant species has changed between observations. All sites were subject to grazing pressure in the past, but have since been protected. Therefore, these communities are not virgin prairie but rather form modified fescue associations (Moss and Campbell 1947). Given enough time, they may progress to form a stable community equilibrium under prevailing climatic regimes.

In the "Guide to Using Native Plants on Disturbed Land" Gerling *et al.* (1996) have described community types for the subregions of Alberta. Some of these occur in more than one subregion due to localised ecological similarities. For both the Northern Fescue and Central Parkland Subregions, they include the *Festuca hallii-Calamovilfa longifolia* community type on sandy upland sites, and *the Festuca hallii-Stipa curtiseta* community type on mesic Chernozemic and Solonetzic soils.

In the Hand Hills Ecological Reserve, located in the Northern Fescue Grassland, Legris and Cornish (1997) described 22 vegetation types. Of these, five grassland types had rough fescue as a dominant or co-dominant. The grassland types included the *Festuca hallii* community type, the *Festuca hallii-Stipa curtiseta* community type, the *Festuca hallii-Stipa viridula* community type, the *Festuca hallii-Koeleria macrantha-Juniperus horizontalis*-forb community type, and the *Stipa curtiseta-Festuca hallii*-forb community type. They also described five shrubland types that had rough fescue as a co-dominant. These included: the *Symphoricarpos occidentalis*/*Festuca hallii* community type, the *Rosa woodsii-Festuca hallii* community type, the *Elaeagnus commutata*/*Festuca hallii-Helictotrichon hookeri* community type, the *Salix bebbiana - Amelanchier alnifolia*/*Festuca hallii-Poa canbyi* community type. These may be pre-climax successional seral stages progressing from grassland toward forest (Coupland 1950; Coupland and Brayshaw 1953; Pelton 1953).

Willoughby (1992, 1998) and Willoughby *et al.* (1997), have described plant community types of the Montane Ecoregion of southwestern Alberta. Willoughby (1998) described the grasslands of the Ya Ha Tinda area (administered by Parks Canada for wintering their horses) along the headwaters of the Red Deer River in west central Alberta. Two of the community types were dominated by rough fescue: the *Festuca scabrella-Bromus ciliatus-Carex* spp. community type, and the *Festuca scabrella-Carex filifolia-Koeleria macrantha* community type. He suggests that since this area is used extensively by elk and horses, grazing pressures may influence the abundance of rough fescue in these community types. However, in a discussion of rough fescue

grasslands within Canadian national parks, Trottier (1986) suggests that although the Ya Ha Tinda is subjected to heavy winter grazing by elk and domestic horses, "the rough fescue community has been maintained in good condition with no loss of native grasses or invasion of undesirable species". He recognises that rough fescue and some of its associated grass species are vulnerable to summer grazing and, once eliminated by overgrazing, do not reestablish. In other Montane Ecoregion areas, Willoughby (1992) and Willoughby *et al.* (1997) described numerous community types, some of which could occur in the aspen parkland. A grassland community type which could be found in the Central Parkland Subregion is the *Festuca scabrella-Carex obtusata*/*Arctostaphylos uva-ursi* community type.

Vujnovic (1998) studied 11 grassland remnants that had never been cultivated or modified by over-grazing or soil removal on a large scale. Quadrats were placed within each remnant to represent areas that had experienced different levels of disturbance (e.g., ungrazed to heavily grazed, heavily trampled cow path, pipeline disturbance). A clustering method was employed that grouped the quadrats into 19 groups. These varied in species dominance and composition along a continuum more or less according to the level of disturbance. Ungrazed to lightly grazed areas (Group A) were dominated by plains rough fescue. Western porcupine grass (*Stipa curtiseta*) occurred in about half of the quadrats at a much lower cover. Moderately grazed areas (Group B) were dominated by both plains rough fescue and western porcupine grass. Intermediate oat grass (*Danthonia intermedia*) had the highest grass cover in Group C, which included moderately to heavily grazed areas. Plains rough fescue and western porcupine grass followed, along with a high cover of everlasting (*Antennaria* spp.) and a high frequency but low cover of other forbs. Further groupings (Groups D to S) included areas of greater disturbance or shrub dominance, and generally much lower cover or absence of plains rough fescue.

Current grassland classification work primarily in the Grassland Natural Region (but including some sites in the aspen parkland and montane regions) has begun by linking range site types with soil types (McNeil and Sawyer 1998). The next step will be to correlate vegetation communities with these types (B. Adams pers. comm.). Taking the soil description into consideration when classifying vegetation communities can be extremely valuable in distinguishing between communities that have developed based on the soils versus disturbances such as grazing.

There was only one record of rough fescue in the ESIS database for the Central Parkland Subregion. The site was dominated by northern bedstraw (*Galium boreale*) and shrubby cinquefoil (*Potentilla fruticosa*), with only 1% cover of rough fescue, 3% cover of needle-and-thread (*Stipa comata*) and 2% cover of both June grass (*Koeleria macrantha*) and Hooker's oat grass (*Helictotrichon hookeri*). Due to the high forb and shrub cover and low grass cover, this site does not appear to match any of the existing fescue grassland classifications. As a point of interest, Coupland and Brayshaw (1953) indicate that the outstanding difference between the fescue grassland of the aspen parkland and the Cypress hills is the absence of shrubby cinquefoil

in the former.
The Saskatchewan Wetland Conservation Corporation has conducted an inventory of remnant prairie in Saskatchewan. Their data was unavailable at the time of writing. However, they did not classify fescue grasslands beyond identifying them as plains rough fescue-dominated. In conducting their inventory, plant species were subjectively grouped into dominant species (>15% cover) and secondary species (5-15% cover). Species of less than 5% cover were recorded only if they fell into exotic, woody or rare categories. Therefore, it would be difficult to determine whether a site would be classified as a grassland versus a shrubland if there is the suggestion that shrub species could collectively cover greater than 15%, as well as to match sites to existing classifications.

PROPOSED PRELIMINARY CLASSIFICATION

The proposed classification of the plains rough fescue community types for the Central Parkland Subregion of Alberta has been developed from the plant communities described above and follows the format of Schneider *et al*. (1997). The community type is composed of "herbs" (graminoids, forbs and ferns) which dominate the site generally forming at least 25% ground cover. Trees, shrubs and dwarf shrubs can occur, but generally are at less than 25% cover. The dominant graminoid species are medium-tall bunch grasses within a temperate or subpolar grassland complex.

PLAINS ROUGH FESCUE (*Festuca hallii)* HERBACEOUS ALLIANCE
Plains Rough Fescue
Plains Rough Fescue-Western Porcupine Grass
Plains Rough Fescue-Western Porcupine Grass-Sedge
Plains Rough Fescue-Green Needle Grass/Forbs
Plains Rough Fescue-Sand Grass
Plains Rough Fescue-Sedge/Bearberry
Plains Rough Fescue-June Grass/Juniper/Forbs
Western Porcupine Grass-Plains Rough Fescue (Western Porcupine Grass-Plains Rough Fescue-Forbs)

A description of these community types is summarised below:

Plains Rough Fescue Community Type
The plains rough fescue community type represents a stable climax fescue association and was described in five of the documents consulted (Blood 1966; Wroe 1971; Fehr 1982; Legris and Cornish 1997; Vujnovic 1998). It occurs on level terrain and lower slopes of undulating topography, inclined uplands and hummocky terrain in association with Black or Dark Brown Chernozemic soils exhibiting a mesic ecological moisture regime. Generally, grazing influences

are non-existent. The dominant species, plains rough fescue (*Festuca hallii*), grows to the exclusion of most other species resulting in a community type that is species poor. A deep accumulation of litter and a thick LFH layer at the soil surface are characteristic due to the resistance of plains rough fescue to decomposition (Dormaar 1975).

Plains Rough Fescue-Western Porcupine Grass Community Type

The plains rough fescue-western porcupine grass (*Festuca hallii-Stipa curtiseta*) community type was described by four authors (Wheeler 1976; Gerling *et al.* 1996; Legris and Cornish 1997; Vujnovic 1998). In this community type, plains rough fescue and western porcupine grass are co-dominant, although plains rough fescue has higher cover. This type represents a climax community on slightly drier sites (mesic to submesic) compared to the pure plains rough fescue type. On slopes, it is positioned above the plains rough fescue type. Coupland and Brayshaw (1953) consider it to be a transitional type to Mixed Prairie. It can occur on hill crests or south- to west-facing slopes of level to undulating topography and hummocky terrain. Generally, the associated soils are Black and Dark Brown Chernozems, although Gerling *et al.* (1996) indicates it can be associated with Solonetzic soils. Light grazing may sometimes contribute to the development of this community type. This type may be similar to the *Festuca scabrella*-(*Stipa* spp.) Herbaceous Vegetation (Rough fescue-Needlegrass Mixedgrass Prairie) association of Schneider *et al*. (1997).

Plains Rough Fescue-Western Porcupine Grass-Sedge Community Type

The plains rough fescue-western porcupine grass-sedge (*Festuca hallii-Stipa curtiseta-Carex obtusata*/*pensylvanica*/*stenophylla*) community type was described by Gerling *et al.* (1996), Coupland and Brayshaw (1953) and Carbyn (1971). It represents a climax community on level to undulating topography and hummocky terrain. It develops on Solonetzic soils or Dark Brown Chernozems and is characterised by the co-dominance of plains rough fescue, western porcupine grass and sedge, and the presence of June grass (*Koeleria macrantha*) and wheat grass(es) (*Agropyron* spp.). In low areas, there is a tendency for water to pond on Solonetzic sites. This type may also be similar to the *Festuca scabrella*-(*Stipa* spp.) Herbaceous Vegetation (Rough fescue-Needlegrass Mixedgrass Prairie) association of Schneider *et al*. (1997).

Plains Rough Fescue-Green Needle Grass/Forbs Community Type

The plains rough fescue-green needle grass/forbs (*Festuca hallii-Stipa viridula*/forbs) community type was described in only one reference (Legris and Cornish 1997) in the Northern Fescue Subregion. It occurred on steep south- and west-facing slopes in association with submesic to subxeric soil moisture regimes and was characterised by drought tolerant species. This community type is apparently present in the Central Parkland Subregion on hilly land, where it occupies the south aspects and the Plains Rough Fescue Herbaceous Vegetation Type occupies the north aspects (H. Loonen pers. comm.).

Plains Rough Fescue-Sand Grass Community Type

The plains rough fescue-sand grass (*Festuca hallii-Calamovilfa longifolia*) community type was described in one reference (Gerling *et al.*1996). It occurs predominantly on sandy Dark Brown Chernozemic and Regosolic soils on undulating glaciolacustrine and glaciofluvial deposits which are frequently modified by eolian action. As a result of the internal drainage of these sandy soils, the sites are generally more drought-prone compared to adjacent areas of heavier textured soils.

Plains Rough Fescue-Sedge/Bearberry Community Type

The plains rough fescue-sedge/bearberry (*Festuca hallii-Carex* spp./*Arctostaphylos uva-ursi*) community type has been described in the Montane Subregion (Willoughby et al. 1997) and is apparently present in the Northern Fescue Subregion (B. Adams pers. comm.), and Central Parkland Subregion on dry, frequently sandy areas (H. Loonen pers. comm.). The montane community contains species that do exist throughout the parkland, but may describe a similar community with mountain rough fescue (*F. campestris*) rather than plains rough fescue as the dominant species. It occurs on shallow, poorly developed soils on hill tops and steep slopes of undulating terrain. It requires xeric to mesic, rapidly to well drained soils, and tends to occur on south- to west-facing slopes (Willoughby et al. 1997).

Plains Rough Fescue-June Grass/Juniper/Forbs Community Type

The plains rough fescue-June grass/juniper/forbs (*Festuca hallii-Koeleria macrantha*/*Juniperus horizontalis*/forbs) community type was described in only one publication (Legris and Cornish 1997). It occurred on subxeric, steep, south- and southwest-facing coulee slopes within the Northern Fescue Subregion and is apparently present in the Central Parkland Subregion on dry, frequently sandy areas (H. Loonen pers. comm.). Soils are Orthic Regosols. Associated species are drought tolerant (Legris and Cornish 1997).

Western Porcupine Grass-Plains Rough Fescue (Western Porcupine Grass-Plains Rough Fescue/Forbs) Community Type

The western porcupine grass-plains rough fescue (*Stipa curtiseta-Festuca hallii*) community type, sometimes referred to as the western porcupine grass-plains rough fescue/forbs community type, was described in four references (Wroe 1971; Wheeler 1976; Fehr 1982; Legris and Cornish 1997). This is a transitional community type best described as a combination of species from the Mixedgrass and Northern Fescue Subregions. Generally, it is located on southwesterly, southerly and southeasterly slopes and knolls. The soils are rapidly to moderately well drained Dark Brown Chernozems. In the parkland, this community type is often a modified rough fescue grassland that may result from grazing pressure, and occurs on a variety of sites. This type may be similar to the *Festuca scabrella* Herbaceous Vegetation (Rough fescue Mixedgrass Prairie) association of Schneider *et al*. (1997).

Other Potential Community Types

Of the four community types listed in Schneider *et al*. (1997), *Festuca scabrella* Herbaceous Vegetation (Rough fescue Mixedgrass Prairie) and *Festuca scabrella*-(*Stipa* spp.) Herbaceous Vegetation (Rough fescue-Needlegrass Mixedgrass Prairie) may be similar to some of the types discussed above. However, based on the literature review, the other two have not previously been described in detail. These include *Festuca scabrella-Danthonia intermedia* Herbaceous Vegetation (Rough fescue-Timber Oatgrass Mixedgrass Prairie) and *Festuca scabrella-Elymus lanceolatus* (= *Agropyron dasystachyum*) Herbaceous Vegetation (Rough fescue-Northern Wheatgrass Mixedgrass Prairie). Moss and Campbell (1947) and Looman (1984) suggest that early grazing can reduce cover and abundance of rough fescue and increase associated species such as *Danthonia intermedia* and *Agropyron* spp. in mesic areas, and *Poa pratensis* or *Carex* spp. in wet-mesic habitats. Similarly, Vujnovic (1998) essentially described an intermediate oat grass-plains rough fescue-forbs type under moderate to heavy grazing regimes. Barry Adams (pers. comm.) identified a western porcupine grass-sedge-western wheat grass-rough fescue community south of Hanna on a lightly grazed Dark Brown-Solodized Solonetz site. Therefore, such rough fescue-oat grass or -wheat grass communities could be considered as potential types in a classification depending on the cover of plains rough fescue and whether modified fescue associations are included.

Community types similar to the *Festuca scabrella-Bromus ciliatus-Carex* spp. community type and the *Festuca scabrella-Carex filifolia-Koeleria macrantha* community type described by Willoughby (1998) have not been reported in the Central Parkland Subregion. Many of the species that comprise these communities do occur within the Central Parkland Subregion, therefore these community types could potentially occur.

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APPENDIX I
EXPERTS CONTACTED REGARDING FESCUE GRASSLAND CLASSIFICATION

Adams, Barry	Public Lands, Alberta Agriculture, Food and Rural Development, Lethbridge
Bjorge, Ron	Fish and Wildlife Services, Alberta Environmental Protection, Red Deer
Cairns, Bruce	Public Lands, Alberta Agriculture, Food and Rural Development, Medicine Hat
Ehlert, Gerry	Public Lands, Alberta Agriculture, Food and Rural Development, Lethbridge
Gerling, Heather	Public Lands, Alberta Agriculture, Food and Rural Development, Edmonton
Gerry, Ann	Saskatchewan Conservation Data Centre, Regina
Hall, Leslie	Saskatchewan Wetland Conservation Corporation, Regina
Harrison, Tom	Saskatchewan Wetland Conservation Corporation, Regina
Irving, Barry	University of Alberta Ranch, Kinsella
Jorgensen, Todd	Saskatchewan Department of Agriculture, Lloydminster
Loonen, Harry	Public Lands, Alberta Agriculture, Food and Rural Development, Wainwright
Millar, Bryan	Alberta Conservation Association, Lethbridge
Milner, Dennis	Public Lands, Alberta Agriculture, Food and Rural Development, Medicine Hat
Trottier, Garry	Canadian Wildlife Service, Edmonton
Vujnovic, Ksenija	Geowest Environmental Consultants Ltd., Edmonton
Willoughby, Mike	Forest Management Division, Alberta Environmental Protection, Edmonton
Willms, Walter	Canada Agriculture, Lethbridge

APPENDIX II

PLAINS ROUGH FESCUE (*Festuca hallii*) FLORISTIC COMMUNITY TYPES

Note: Descriptions are given from those publications where percent cover or composition was given for the plant species. The figures presented for each plant species vary with each publication from which the information was taken (see end of table).
When only the genus was provided (e.g., *Carex* spp.), the figure is listed in the table for the group of species of that genus.

PLANT SPECIES	COMMUNITY TYPES*																
	Rough fescue [6]	Rough fescue [1]	Rough fescue [8]	Rough fescue (association) [5]	Rough fescue-western porcupine grass [7]	Rough fescue-western porcupine grass [2]	Rough fescue-western porcupine grass [1]	Rough fescue-western porcupine grass-sedge [2]	Rough fescue-western Porcupine grass [4]	Rough fescue-grass needle grass/forbs [1]	Rough fescue-sedge/bearberry [3]	Rough fescue-Junegrass/juniper/forbs [1]	Western porcupine grass-rough fescue/forbs [1]	Western porcupine grass-rough fescue [6]	Western porcupine grass-rough fescue [7]	Western porcupine grass-rough fescue [8]	
GRAMINOIDS																	
Festuca scabrella	84	79	79	72	94	60	45	20	32	35	15	24	20	11	18	32	29
Stipa curtiseta	20	2	2	14	74	20	15	10	12	5	5	-	5	17	53	98	29
Helictotrichon hoodii	10	4	-	-	-	2	5	-	3	-	T	-	-	1	-		-
Stipa viridula	-	-	-	-	-	10	-	-	-	20	10	-	5	-	-	-	-
Koeleria macrantha	T	-	T	4	T	2	1	2	9	5	3	3	10	5	3	6	3
Agropyron dasystachyum	-	1	T	4	-	2	-	2	3	2	1	-	5	-	-	-	-
Agropyron trachycaulum	1	-	4	-	-	2	-	2	-	-	2	-	-	-	-	-	T
Calamovilfa longifolia	-	-	-	-	-	-	-	-	-	5	10	-	-	-	-	-	-
Bouteloua gracilis	-	-	-	-	-	T	-	-	3	1	-	-	-	-	7	15	1
Carex obtusata		-	-		-	10	-			-		4	-	1		-	-
Carex stenophylla		-	-	3	-		-	10	25	-	5	-	-	1		-	-
Carex filifolia	49	-	3	-	-	-	-	-	-	-	-	-	-	-	37		-
Poa arida		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Poa interior		T	2	-	-	-	T	-	-	-	-	-	-	-	-	-	-
Poa cusickii		-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-
Poa sandbergii		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	3
Poa juncifolia	T	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-
Distichlis stricta	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-
Puccinellia nuttalliana	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-
Hierochloe odorata	-	-	-	-	-	5	-	-	-	-	T	-	-	-	-	-	-
Agropyron smithii	-	-	-	-	-	1	-	T	-	-	T	-	-	-	-	-	-

PLANT SPECIES	COMMUNITY TYPES*																
	Rough fescue[6]	Rough fescue[1]	Rough fescue[8]	Rough fescue (association)[5]	Rough fescue - western porcupine grass[7]	Rough fescue - western porcupine grass[2]	Rough fescue - western porcupine grass[1]	Rough fescue - western porcupine grass - sedge[2]	Rough fescue - sedge - western Porcupine grass[4]	Rough fescue - green needle grass/forbs[1]	Rough fescue - sedge/ sand grass[2]	Rough fescue - sedge/ bear berry[3]	Rough fescue - Juniper/ forbs[1]	Western porcupine grass - rough fescue /forbs[1]	Western porcupine grass - rough fescue[6]	Western porcupine grass - rough fescue[7]	Western porcupine grass - rough fescue[8]
Stipa comata	-	-	-	-	-	3	-	-	-	-	T	-	-	-	-	-	-
Oryzopsis hymenoides	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	-
Sporobolus cryptandrus	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	-
Festuca ovina	-	-	-	-	-	3	-	-	-	-	T	-	-	-	-	-	-
Agrostis scabra	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyperus schweinitzii	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	-
Danthonia sp.	-	-	2	-	-	-	-	T	-	-	-	4	-	-	-	-	2
FORBS																	
Selaginella densa	-	-	-	-	-	3	5	3	3	-	-	-	-	17	2	-	-
Artemesia frigida	1	-	5	-	1	1	-	2	1	-	5	1	-	5	4	3	15
Artemesia ludoviciana	3	-	4	-	-	3	-	2	-	8	-	-	-	-	3	-	T
Artemesia campestris	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
Galium boreale	2	1	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geum triflorum	T	-	2	1	-	-	-	-	-	2	-	-	-	-	-	-	1
Heterotheca villosa	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
Thermopsis rhombifolia	-	1	T	-	-	1	1	2	-	1	1	-	5	2	T	-	3
Eriogonum flavum	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-
Erigeron caespitosus	-	-	1	10	-	-	-	-	-	-	-	-	5	-	3	-	3
Hedysarum alpinum/boreale	-	-	T	-	-	T	-	-	-	-	-	-	5	-	-	-	-
Anemone patens	T	-	5	-	-	2	1	2	1	-	-	3	-	4	2	1	5
Antennaria aprica	T	-	-	-	-	2	-	2	1	-	-	-	-	4	-	-	T
Arnica fulgens	-	T	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-

PLANT SPECIES	COMMUNITY TYPES*																
	Rough fescue[6]	Rough fescue[1]	Rough fescue[8]	Rough fescue (association)[5]	Rough fescue - western porcupine grass[7]	Rough fescue - western porcupine grass[2]	Rough fescue - western porcupine grass[1]	Rough fescue - western porcupine grass - sedge[2]	Rough fescue - western Porcupine grass[4]	Rough fescue - greenneedle grass/forbs[1]	Rough fescue - sandgrass[2]	Rough fescue - sedge/bearberry[3]	Rough fescue - Junegrass/juniper/forbs[1]	Western porcupine grass - rough fescue/forbs[1]	Western porcupine grass - rough fescue[6]	Western porcupine grass - rough fescue[7]	Western porcupine grass - rough fescue[8]
Oxytropis sericea/campestris	-	T	-	-	-	T	T	-	-	-	T	-	-	-	-	-	-
Cerastiun arvense	1	T	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-
Comandra umbellata	-	-	-	-	-	1	-	-	-	1	-	-	1	-	-	-	-
Senecio canus	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Opuntia polyacantha	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Lithospermum incisum	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Astragalus crassicarpus	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Astragalus tenellus	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Campanula rotundifolia	-	T	2	-	-	2	-	-	-		-	-	-		-	-	T
Linum lewisii	-	-	-	-	-	T	-	-	-	-	-	-	1	-	-	-	-
Allium textile	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Gaillardia aristata	-	-	-	-	-	T	-	-	-	-	-	-	1	-	-	-	-
Gaura coccinea	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Lomatium macrocarpum	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Solidago missouriensis	T	-	-	-	-	2	-	T	-	-	2	-	1	-	-	-	-
Taraxacum officinale	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Vicia americana	1	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-
Potentilla hippiana	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
Potentilla pensylvanica	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
Potentilla arguta	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potentilla gracilis	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aster falcatus/ericoides	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Primula incana	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-

PLANT SPECIES	COMMUNITY TYPES*																
	Rough fescue[6]	Rough fescue[1]	Rough fescue[8]	Rough fescue (association)[5]	Rough fescue-western porcupine grass[7]	Rough fescue-western porcupine grass[2]	Rough fescue-western porcupine grass[1]	Rough fescue-western porcupine grass-sedge[2]	Rough fescue-western Porcupine grass[4]	Rough fescue-green needle grass/forbs[1]	Rough fescue-sedge-bearberry[2]	Rough fescue-sedge/bearberry[3]	Rough fescue-June grass/juniper/forbs[1]	Western porcupine grass-rough fescue/forbs[1]	Western porcupine grass-rough fescue[6]	Western porcupine grass-rough fescue[7]	Western porcupine grass-rough fescue[8]
Grindelia squarrosa	-	-	-	-	-	-	-	T	-	-	-	-	-	-	-	-	-
Dodecatheon pulchellum	-	-	-	-	-	-	-	T	-	-	-	-	-	-	-	-	-
Sphaeralcea coccinea	-	-	-	-	-	-	-	T	-	-	-	-	-	-	-	-	-
Acrtostaphylos uva-ursi	-	-	-	-	-	-	-	-	-	-	-	34	-	-	-	-	-
SHRUBS																	
Juniperus horizontalis	-	-	-	-	-	-	-	-	-	-	10	3	15	-	-	-	-
Juniperus communis	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	
Shepherdia canadensis	-	-	-	-	-		-	-	-	-	-	-	2	-	-	-	-
Rosa arkansana/woodsii	4	-	2	-	5	6	-	6	-	-	5	1	2	-	-	2	1
Symphoricarpos occidentalis	-	-	5	-	T	7	-	7	-	-	5	1	-	-	-	-	-
Prunus virginiana	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-
Elaeagnus commutata	-	-	-	-	T	-	-	-	-	-	4	-	-	-	-	T	-
Amelanchier alnifolia	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	

Plant community type names described by:

1 Legris and Cornish (1997)
2 Gerling *et al.* (1996)
3 Willoughby *et al.* (1997)
4 Coupland and Brayshaw (1953)
5 Blood (1966)
6 Wroe (1971)
7 Wheeler (1976)

* Figures presented above:

canopy cover (%)
canopy cover (%)
canopy cover (%)
percent species composition
percent of each forage class (graminoids and forbs)
canopy cover (%)
canopy cover (%)

8	Fehr (1982)	canopy cover (%)

TERRESTRIAL COMMUNITY CLASSIFICATION ABSTRACT SUB-NATIONAL
***Festuca hallii* Herbaceous Vegetation**

1. IDENTIFIERS

SEL.SUMMARY
The Plains Rough Fescue (*Festuca hallii*) Herbaceous Vegetation Type represents a stable climax fescue association and has been described by Blood (1966), Wroe (1971), Fehr (1982), Legris and Cornish (1997) and Vujnovic (1998). It occurs on level terrain and lower slopes of undulating topography, inclined uplands and hummocky terrain in association with Black or Dark Brown Chernozemic soils exhibiting a mesic ecological moisture regime. Generally, grazing influences are non-existent. The dominant species, plains rough fescue (*Festuca hallii*), grows to the exclusion of most other species resulting in a community that is plant species poor. Western porcupine grass (Stipa curtiseta) is also present but at much lower cover. A deep accumulation of litter and a thick LFH layer at the soil surface are characteristic due to the resistance of plains rough fescue to decomposition (Dormaar 1975).

ET	SNAME	*Festuca hallii* Herbaceous Vegetation
ET	SCOMNAME	Plains Rough Fescue Herbaceous Vegetation

2. CLASSIFICATION

ET	SYSTEM	Terrestrial
ET	CLASS	Herbaceous
ET	SUBCLASS	Perennial graminoid
ET	GROUP	Temperate or subpolar grassland
ET	FORMATION	Medium-tall bunch temperate or subpolar grassland
ET	ALLIANCE	*Festuca hallii* herbaceous alliance

SIMILAR COMMUNITIES
Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type, described by Wheeler (1976), Gerling *et al.* (1996), Legris and Cornish (1997) and Vujnovic (1998), also contains plains rough fescue and western porcupine grass as constant species. However, the two species are co-dominant, although plains rough fescue cover tends to be highest. Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation, described by Gerling *et al.* (1996), Coupland and Brayshaw (1953) and Carbyn (1971), differs by having sedge as a third

co-dominant along with plains rough fescue and western porcupine grass, although plains rough fescue has the highest cover. Other similar communities are dominated by other species of rough fescue (*Festuca campestris* or *Festuca altaica*) rather than *Festuca hallii*.

3. RELATED NOMENCLATURE

SOTHER.NAMES
Rough Fescue (*Festuca scabrella*) Community Type | rough fescue grassland | rough fescue prairie

SOTHER.NAMES.RELATION
+ | + | +

SOTHER.NAMES.RELATION.NOTE
A Rough Fescue (*Festuca scabrella*) community type, rough fescue grassland or rough fescue prairie could refer to a plains rough fescue-dominated community if it is documented within the range of *F. hallii*. It could refer to a similar community dominated by a different species of rough fescue if it is not.

SNAMES.COM
Rough Fescue (*Festuca scabrella*) Community Type, rough fescue grassland, and rough fescue prairie refer to the same community type when they occur within the range of *F. hallii*. Otherwise they refer to a similar community dominated by a different species of rough fescue. This has arisen due to the taxonomic split of the rough fescue (*Festuca scabrella*) complex into plains rough fescue (*F. hallii*), mountain rough fescue (*F. campestris*) and northern rough fescue (*F. altaica*).

4. DISTRIBUTION

ESR SRANGE
The exact range of the Plains Rough Fescue Herbaceous Vegetation Type is unknown. Most range descriptions are for the rough fescue grassland as a whole, which includes different community types contained within the rough fescue complex. Plains rough fescue occurs primarily in western Canada from the northern foothills of Alberta, east through central Alberta, then descending southeastward in a band through Saskatchewan and into southwest Manitoba, with outliers in the Peace River Parkland Subregion, Sweetgrass Hills/Milk River Ridge, Cypress Hills and remnant prairie of northwestern Ontario (Aitken *et al*.1998). The former extent of the fescue prairie in the eastern part of its range is not completely known since much of the suitable habitat was converted to agriculture before vegetation surveys were conducted (Rowe and Coupland 1984).

ESR SRANGECOM
Historically, the Plains Rough Fescue Herbaceous Vegetation occurred throughout the Northern

Fescue Prairie and Aspen Parkland of Alberta, Saskatchewan and Manitoba, and in isolated pockets along the ecotone between the Mixed Prairie to the south and the Boreal Forest transition zone to the north.

Since this community type is associated with deep, nutrient rich, organic soils on gentle slopes to level terrain, much of the original grassland has been cultivated and converted to cropland. At present, in Manitoba the fescue grassland communities are considered to be very rare and are ranked S1 by the Manitoba Conservation Data Centre. There are less than 20 occurrences with an estimated total area of less than 1000 ha. This includes all community types containing rough fescue. The Saskatchewan Conservation Data Centre has assigned a rank of S2 or very rare, to the plains rough fescue alliance (includes one or more plant communities). An inventory of occurrences of fescue grassland revealed approximately 354 ha, mostly in protected areas such as provincial and national parks. In Alberta, a complete inventory has not been completed. However, it is estimated that less than 20,000 ha of plains rough fescue grassland in excellent condition exist (National Fescue Grassland Inventory 1997).

SDISTRIBUTION.COM
The element occurs in the Northern Fescue Subregion and Central Parkland Subregion, and possibly in the Foothills Fescue Subregion and Foothills Parkland Subregion of Alberta.

5. ENVIRONMENTAL FACTORS

SMINELEV	861 m
SMAXELEV	877 m

SLANDFORM
Level to undulating topography, inclined uplands, hummocky terrain.

STOPO.POSITION	Lower slope to level terrain.
SSLOPE	0° to 25°

SASPECT
Variable; north-facing in southern part of range, south-facing in northern part of range.

SGEOLOGY.COM
Lacustrine, morainal or alluvial parent materials (Belcher 1996) over bedrock of sandstone, coal, shale, siltstone and bentonite originating from the Upper Cretaceous Period (Wroe 1971; Fehr 1982).

SSOIL.TYPE
Under modal conditions - Black Soil Zone; also Dark Brown Soil Zone (Chernozems);

occasionally Gleyed Eluviated Black Chernozems and Dark Brown Solods (Legris and Cornish 1997).

SSOIL.MOISTURE Mesic

SSOIL.COM
Under modal conditions - loam or clay loam texture (Belcher 1996). Wroe (1971) described the soils in an ecotone area between the Central Parkland Subregion and Northern Fescue Subregion as Orthic Black to Orthic Dark Brown Chernozems varying in depth from 23 to 50 cm, with a loamy to silty loam textured Ah horizon over clay loam textured Bm horizon. Legris and Cornish (1997) described the soils of the rough fescue community in the Hand Hills (Northern Fescue Subregion) as silty clay loam and loam over sand to clay with a pH of 6.0 to 7.0 (B horizon).

SHYDRO.INFLUENCE Moderately well drained

SSEASONAL.VAR None known

SKEY.ENVIRO.FACTORS
Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The Plains Rough Fescue Herbaceous Vegetation Type has been described from the Northern Fescue and Central Parkland Subregions. The following climate information was taken from Strong and Leggat (1992) for the Aspen Parkland Ecoregion, which includes the Central and Foothills Parkland Subregions, and the northern half of the Northern Fescue Subregion.

The regional climate influencing this element is a result of the interaction of components of the boreal and mixed grassland climates. In addition, the mid-Alberta storm track has a significant influence on the climate. The major difference in climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June.

Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures.

Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate. The climate of this element favours a successional trend toward forests.

Plains Rough Fescue Herbaceous Vegetation Type occurs on level plains, undulating topography, inclined uplands and hummocky terrain (Belcher 1996; Legris and Cornish 1997). It occurs on the slopes of hummocks or knolls (Belcher 1996) and has been found to occupy level and lower slope positions in some areas (Wroe 1971; Ayyad and Dix 1974; Fehr 1982). It varied in elevation from 861 to 877 m in the Rumsey Ecological Reserve (Fehr 1982). It requires mesic, moderately well-drained soils, hence it tends to occupy north-facing slopes in the southern part of its range and south-facing slopes in the northern part of its range (Belcher 1996). It has been found on slopes up to 25° (Fehr 1982). Soils are generally derived from lacustrine, morainal or alluvial parent materials (Belcher 1996). Under modal (average) conditions, the soils are Black Chernozems with a loam or clay loam texture. Wroe (1971) described the soils in an ecotone area between the Central Parkland Subregion and Northern Fescue Subregion as Orthic Black to Orthic Dark-brown Chernozems varying in depth from 23 to 50 cm, with a loamy to silty loam textured Ah horizon over clay loam textured Bm horizon. Legris and Cornish (1997) described the soils of the rough fescue community in the Hand Hills (Northern Fescue Subregion) as Orthic Black and Orthic Dark Brown Chernozems, and occasionally Gleyed Eluviated Black Chernozems and Dark Brown Solods, with a silty clay loam and loam texture over sand to clay and a pH of 6.0 to 7.0 (B horizon).

Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The following climate information was taken from Strong and Leggat (1992). The major difference in the climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June. Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures. Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate. The climate of this element favours a successional trend toward forests.

6. BIOLOGICAL AND STRUCTURAL DESCRIPTION

6a. VEGETATION

SSTRATA.LIFEFORM Shrub, herb

SPCT.COVER
Shrub: <25%
Herb: 75% or greater

SHEIGHT
Foliage of plains rough fescue reaches a height of 18 to 20 cm in exposed areas and 36 to 38 cm in sheltered places, such as near groves. Culm height reaches 3.6 dm to 9.1 dm in different parts of the community (Coupland and Brayshaw 1953).

SMOST.ABUND.SPP
Shrub layer: *Rosa arkansana*/*woodsii*
Herb layer: *Festuca hallii*, *Stipa curtiseta*

SSUNVEGETATED.SURFACE
No unvegetated surface due to the high litter accumulation.

SSUNVEGETATED.SURFACE.COVER 0%

SCONSTANT.SPP *Festuca hallii*, *Stipa curtiseta*

SCHARACTERISTIC.SPP None known of at this time.

SVEGETATION.COM
The Plains Rough Fescue Herbaceous Vegetation Type consists of no more than two vegetation strata: the herb and shrub layers. The shrub layer covers less than 25% and the herb layer covers the remainder. Plains rough fescue is by far the most abundant species, followed by western porcupine grass at distinctly lower cover. These are the only two species that are found consistently within this community type. Both occur in other community types as well. Shrub cover is low or absent and may include common wild rose and/or prairie rose. The characteristic deep accumulation of litter due to the resistance of plains rough fescue to decomposition (Dormaar 1975) results in no or very little bare ground.

6b. OTHER SPECIES

SHIGH.RANK.SPP
Sprague's pipit (blue list, S4B), Baird's sparrow (yellow A list, S3B), upland sandpiper (yellow A list, S3B), turkey vulture (yellow B list, S2B).

Crowfoot violet (*Viola pedatifida*) (S1S2).

SFAUNA.COM
Coyote, red fox, whitetail deer, mule deer, whitetail jackrabbit, Richardson's ground squirrel, thirteen-lined ground squirrel, northern pocket gopher, deer mouse, sharp-tailed grouse, western meadowlark, savannah sparrow, tree swallow, Brewer's blackbird, northern harrier, merlin.

SOTHER.SPP.COM
The preferred nesting habitat of Baird's sparrow, a potentially threatened species in Alberta, is tall fescue grassland with a great tangle of grass at ground level (Semenchuk 1992). Other potentially threatened wildlife species that may occur within the Plains Rough Fescue Herbaceous Vegetation Type include Sprague's pipit, upland sandpiper and turkey vulture**.** Crowfoot violet (*Viola pedatifida*) is considered rare in Alberta (S1S2) and is a species of ungrazed fescue grasslands (Wallis and Wershler 1985).

6c. VARIABILITY

SSPP.COMP.VAR
While *Festuca hallii* and *Stipa curtiseta* are always present, other graminoid species may or may not be present, including *Helictotrichon hookeri*, *Koeleria macrantha*, *Agropyron* spp., *Carex* spp. and *Poa* spp. Forb species can also vary, with *Galium boreale* and *Geum triflorum* most commonly occurring. Some other potential forb species include *Artemisia frigida*, *A. ludoviciana*, *Thermopsis rhombifolia*, *Erigeron caespitosus*, *Anemone patens*, *Cerastium arvense* and *Campanula rotundifolia*. Shrub species may or may not be present, and often include *Rosa arkansana* and *R. woodsii*.

SPHYSIOG.VAR
There may or may not be a shrub layer along with the herb layer.

SSUBTYPES None

SVARIABILITY.COM
While *Festuca hallii* and *Stipa curtiseta* are always present, other graminoid species may or may not be present. Forb species can also vary. Shrub species may or may not be present.

7. DYNAMIC PROCESSES

SNAT.DISTURBANCE
Fire can be a large or small scale natural disturbance, although it was more common in the past. Fire was essential for maintaining the grassland openings in the parklands of the Northern Great Plains before settlement by the Europeans in the late 1800s (Nelson and England 1971). With fire suppression, succession towards shrublands and forest is occurring (Moss and Campbell 1947; Bird 1961; Nelson and England 1971; Bailey and Wroe 1974; Bailey and Anderson 1978; Anderson and Bailey 1980; Gerling *et al*. 1995). Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

SSUCCESS.STATUS Climatic climax

SSUCCESS.DYNAM.COM
Fire can be a large or small scale natural disturbance, although it was more common in the past. Without occasional fire, this community can be invaded by shrubs and aspen, increasing the moisture regime and favouring the establishment of forest cover. Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

8. SPATIAL RELATIONS

SSIZE
Depending on the position on the landscape and historical land use, this community can be relatively small in area or cover large tracts of land.

SSPATIAL DISTRIBUTION
Patchy, e.g., on knob and kettle topography, or continuous on undulating terrain.

SADJACENT.COMMUNITIES
The primary community types adjacent to the Plains Rough Fescue Herbaceous Vegetation Type include the shrub-dominated community of buckbrush (*Symphoricarpos occidentalis*), the forest community of aspen (*Populus tremuloides*), and the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type. The former two tend to grow in depressions and on north- and east-facing slopes. These sites have high edaphic moisture regimes capable of supporting shrubs and/or trees. The Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type usually occurs on slightly drier sites such as up-slope from the Plains Rough Fescue Herbaceous Vegetation Type or on exposed knolls in gently rolling terrain.

Other shrub communities that could occur adjacent to the Plains Rough Fescue Herbaceous Vegetation Type are dominated by *Rosa* spp., *Elaeagnus commutata*, *Amelanchier alnifolia* and/or *Prunus virginiana*. These usually are associated with sheltered areas, low slope positions

or drainages, where there are higher moisture regimes resulting from snow accumulation, run-off or shade.

SINCLUSION.COMMUNITIES
The dominant inclusions within the community include patches of buckbrush shrublands and aspen groves, which tend to grow in depressions and on north- and east-facing slopes. The other common inclusion is the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type which usually occurs on slightly drier sites such as on exposed knolls in gently rolling terrain.

Other shrub communities that could occur as inclusions within the Plains Rough Fescue Herbaceous Vegetation Type are dominated by *Rosa* spp., *Elaeagnus commutata*, *Amelanchier alnifolia* and/or *Prunus virginiana*. These usually are associated with sheltered areas, low slope positions or drainages, where there are higher moisture regimes resulting from snow accumulation, run-off or cooler relative temperatures (e.g., north-facing slopes).

Other herbaceous inclusions include: the *Festuca hallii-Stipa curtiseta-Carex* spp. community (on exposed hilltops), the *Festuca hallii-Stipa viridula*/forb community type (in snow bed or seepage sites), the *Festuca hallii-Calamovilfa longifolia* community type (on aeolian deposits) and the *Festuca hallii-Koeleria macrantha/Juniperus horizontalis*/forb complex (on exposed sites associated with shallow soils or exposed bedrock).

SMOSAIC.COM
The element itself does not represent a mosaic of sub-associations.

SSPATIAL.COM
Depending on the position on the landscape and historical land use, the Plains Rough Fescue Herbaceous Vegetation Type can be relatively small in area or cover large tracts of land. It can be patchy, e.g., on knob and kettle topography, or continuous on undulating terrain.

Adjacent communities and inclusions consist of essentially the same vegetation community types. The dominant types include patches of buckbrush shrublands and aspen groves, which tend to grow in depressions and on north- and east-facing slopes. These sites have high edaphic moisture regimes capable of supporting shrubs and/or trees. The other common type is the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type which usually occurs on slightly drier sites such as on exposed knolls in gently rolling terrain.

9. STATUS

ESR SRANK

ESR SREASONS

SEXEMPLARY.EO Not yet available.

SEXEMP.EO.SITENAME Not yet available.

SSTATCOM
Due to the high agricultural activity in the Central Parkland Subregion, it is assumed that there are few remaining acres. The pressure to graze or cultivate more land causes the remaining acres to be very vulnerable to extirpation. According to Wallis (1990), it is estimated that 90-95% of the original native vegetation of the Central Parkland Subregion has been totally destroyed by clearing or cultivation. Very little native grassland exists and no sizeable areas remain ungrazed. Field work planned for 1999 should confirm whether the above assumptions are correct.

10. MANAGEMENT

SECONCOM
Livestock grazing; fall mowing for hay; recreation (e.g., photography, bird-watching); maintenance of soil and groundwater level.

SMANAGE.COM
Plains rough fescue prairie is a valuable range resource, however grazing intensities beyond light grazing result in a shift towards other community types.

Prescribed burns, if planned correctly, can be used to prevent tree and shrub encroachment into fescue grasslands as well as excessive thatch build-up. Antos *et al*. (1983) suggest that fire frequencies in the range of 5 to 10 years may be most beneficial to the maintenance of rough fescue. Plains rough fescue is generally more resistant to severe damage from fire than mountain rough fescue because of its rhizomatous nature. Plants are generally most tolerant of dormant season burning (Bailey and Anderson 1978). According to Bailey and Anderson (1978), fall is the best time to burn plains rough fescue. There is apparently no affect on floral initiation or subsequent seed development. However, Gerling *et al*. (1995) found that it tolerates single burns at any time of the year, but early spring fires have the greatest benefits by increasing tillering, inflorescence density and standing crop. Spring burns should be conducted as soon after snowmelt as possible to minimize fire damage (Bailey and Anderson 1978).

"Conservation burning" is another management approach (Romo 1997), where the goal is to replicate historical disturbances which were quite variable. Peak fire seasons in the plains rough fescue grasslands were from March to May, after snowmelt, and July to November. Fires were least likely over winter. However, they could occur at any time of year, and varied in type, frequency, intensity and area. By varying burns with respect to these factors, the natural variability of the grasslands would be achieved and maintained. Small fires with a variable burn interval are recommended (Romo 1997) since frequent, large scale burns may cause a shift towards species of the mixed praire association (Anderson and Bailey 1980). It should be noted that conservation burning would not necessarily maintain a single community type.

Mowing is another management tool. Gerling *et al*. (1995) found that the effects of burning and mowing on herbage yield and morphology of plains rough fescue were similar.

11. INVENTORY AND SAMPLING PROCEDURES

SIMAGERY.COM

The element can easily be distinguished from forested community types on air photos and Landsat imagery. It can be distinguished from shrub community types on large scale air photos (1:30,000 or larger), as well as cultivated land and improved pastures. It cannot be distinguished from similar native grassland communities. The preferred scale of aerial photography is 1:20,000 or larger, either colour or black and white infrared.

SSAMPLE.STRATEGY

This community should be sampled using two different techniques as described by Robertson and Adams (1990). The first method uses a quadrat frame or frames (i.e., 0.1 m^2 microplot) placed either randomly or systematically at several locations (i.e., 15 sites) to determine the cover of each individual plant species. Data are recorded on the MF5 inventory form. Within each of the same frames at each location, the percent weight by volume of each plant species is estimated. The data are recorded on the LC55 form. Using this information for the range site type and appropriate precipitation zone, range condition ratings are calculated as outlined in the Guide to Range Condition and Stocking Rates for Alberta (Wroe *et al.* 1988). These methods have been standardised by Alberta Agriculture, Food and Rural Development (Public Lands Division) and Alberta Environmental Protection (Forest Service).

SINVENTORY.COM

Using either air photos or Landsat imagery, grassland can easily be distinguished from forested community types. Grassland can further be distinguished from shrub as well as cultivated land and improved pastures community types on large scale air photos (1:30,000 or larger). However, ground truthing is required to distinguish it from similar native grassland communities.

Locations should be documented using G.P.S.. If the community is to be sampled, two different techniques as described by Robertson and Adams (1990) should be used. Using these methods, comparison can be made among sites since they have been standardised by Alberta Agriculture, Food and Rural Development (Public lands Division) and Alberta Environmental Protection (Forest Service).

12. ANALYSIS PROCEDURES AND DATA MANAGEMENT

SANALYSIS.COM
The type of data and the analysis varied among those who have described this element.

Vujnovic (1998) recorded the percent cover of each plant species to the nearest 1% within 1 m^2 quadrats placed in grassland remnants. An agglomerative clustering method, the Unweighted Arithmetical Average Clustering (UPGMA), and canonical correspondence analysis (CANOCO 3.1) (ter Braak 1988, 1990) were employed to evaluate similarities among quadrats with respect to plant species composition and environmental variables. The resultant 19 groups of quadrats varied in species dominance and composition. Although Vujnovic (1998) did not give community names to her groupings, Group A appears to match the Plains Rough Fescue Herbaceous Vegetation Type based on the dominant species.

Legris and Cornish (1997) gathered vegetation data according to the procedures outlined in the Ecological Land Survey Site Description Manual (Alberta Environmental Protection 1994). At each site, all plant species were recorded along a 10 m transect and percent canopy cover was estimated. Microplot data were averaged for each transect. Vegetation data were analysed using a two-way indicator species analysis (TWINSPAN) (Hill 1979), which ranked the survey sites based on their similarity to each other in terms of species composition and cover values. The resultant groupings of sites were then reassessed and adjusted to more closely reflect the vegetation associations as they were found in the field. Species composition of each community type was then based on an average of the species cover values of the grouped sites (Legris and Cornish 1997).

Fehr (1982) collected percent canopy cover data for each plant species within each stand. The plant communities were described on the basis of their dominant species.

Wroe (1971) recorded the percent canopy cover class (Daubenmire 1959) of each species within stands least affected by grazing disturbance. Plant communities were defined based on species dominance and composition.

Blood (1966) collected clipping data from examples of "typical" fescue prairie and described the *Festuca scabrella* association based on the pounds per acre of dry matter and frequency of occurrence of each plant species.

SANALYSIS.DATA.MANAGE.COM
The type of data and the analysis varied among those who have described this element.

Vujnovic (1998) recorded percent cover of each plant species and employed an agglomerative clustering method and canonical correspondence analysis to evaluate similarities among quadrats. Vujnovic's (1998) data are in the possession of Ksenija Vujnovic, currently with Geowest Environmental Consultants Ltd., Edmonton.

Legris and Cornish (1997) analysed their vegetation data, consisting of percent cover values for each species at each site, using the computer program TWINSPAN (Hill 1979), which ranked the survey sites based on their similarity to each other in terms of species composition and cover values. The data are housed with the Resource Data Division of Alberta Environmental Protection, Edmonton.

Fehr (1982) described plant communities on the basis of their dominant species, using percent canopy cover data. The data are housed with the Natural Areas Program, Alberta Environmental Protection, Edmonton.

Wroe (1971) subjectively defined plant communities based on species dominance and composition using canopy cover class data.

Blood (1966) used clipping data to describe the *Festuca scabrella* association based on the pounds per acre of dry matter and frequency of occurrence of each plant species.

13. GENERAL COMMENTS

SCOMMUNITY.COM No further comments.

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TERRESTRIAL COMMUNITY CLASSIFICATION ABSTRACT SUB-NATIONAL
***Festuca hallii-Calamovilfa longifolia* Herbaceous Vegetation**

1. IDENTIFIERS

SEL.SUMMARY
The Plains Rough Fescue-Sand Grass (*Festuca hallii-Calamovilfa longifolia*) Herbaceous Vegetation Type has been described by Gerling *et al.* (1996). It occurs predominantly on sandy Dark Brown Chernozemic and Regosolic soils on undulating glaciolacustrine and glaciofluvial deposits, which are frequently modified by aeolian action. As a result of the internal drainage of these sandy soils, the sites are generally more drought-prone compared to adjacent areas of heavier textured soils.

ET SNAME
Festuca hallii-Calamovilfa longifolia Herbaceous Vegetation

ET SCOMNAME
Plains Rough Fescue-Sand Grass Herbaceous Vegetation

2. CLASSIFICATION

ET	SYSTEM	Terrestrial
ET	CLASS	Herbaceous
ET	SUBCLASS	Perennial graminoid
ET	GROUP	Temperate or subpolar grassland
ET	FORMATION	Medium-tall bunch temperate or subpolar grassland
ET	ALLIANCE	*Festuca hallii* herbaceous alliance

SIMILAR COMMUNITIES
The Plains Rough Fescue-Green Needle Grass/Forbs Herbaceous Vegetation Type, described by Legris and Cornish (1997), differs in having plains rough fescue and green needle grass as dominants, although sand grass is also common. It occurs on steep escarpment slopes as opposed to sandy upland sites. Creeping juniper cover is moderate in both Plains Rough Fescue-Sand Grass and Plains Rough Fescue-June Grass/Juniper/Forbs (described by Legris and Cornish 1997) Herbaceous Vegetation Types, but the latter contains no sand grass, and is dominated by plains rough fescue, June grass and creeping juniper.

3. RELATED NOMENCLATURE

SOTHER.NAMES
Rough Fescue-Sand Grass (*Festuca scabrella-Calamovilfa longifolia*) Community Type

SOTHER.NAMES.RELATION
+

SOTHER.NAMES.RELATION.NOTE
A Rough Fescue-Sand Grass (*Festuca scabrella-Calamovilfa longifolia*) community type could refer to a plains rough fescue-dominated community if it is documented within the range of *F. hallii*. It could refer to a similar community dominated by a different species of rough fescue if it is not.

SNAMES.COM
Rough Fescue-Sand Grass (*Festuca scabrella-Calamovilfa longifolia*) could refer to the same community type when it occurs within the range of *F. hallii*. If it is found outside the usual range of *F. hallii*, it could either be an outlier of the *F. hallii-C. longifolia* type, or it could be a similar community dominated by a different species of rough fescue. This has arisen due to the taxonomic split of the rough fescue (*Festuca scabrella*) complex into plains rough fescue (*F. hallii*), mountain rough fescue (*F. campestris*) and northern rough fescue (*F. altaica*).

4. DISTRIBUTION

ESR SRANGE
The exact range of the Plains Rough Fescue-Sand Grass Herbaceous Vegetation Type is unknown. Most range descriptions are for the rough fescue grassland as a whole, which includes different community types contained within the rough fescue complex. Plains rough fescue occurs primarily in western Canada from the northern foothills of Alberta, east through central Alberta, then descending southeastward in a band through Saskatchewan and into southwest Manitoba, with outliers in the Peace River Parkland Subregion, Sweetgrass Hills/Milk River Ridge, Cypress Hills and remnant prairie of northwestern Ontario (Aitken *et al*.1998). The former extent of the fescue prairie in the eastern part of its range is not completely known since much of the suitable habitat was converted to agriculture before vegetation surveys were conducted (Rowe and Coupland 1984).

ESR SRANGECOM
Historically, the Plains Rough Fescue-Sand Grass Herbaceous Vegetation Type probably occurred throughout the Northern Fescue Prairie and Aspen Parkland of Alberta, Saskatchewan and Manitoba.

At present, in Manitoba the fescue grassland communities are considered to be very rare and are ranked S1 by the Manitoba Conservation Data Centre. There are less than 20 occurrences with an

estimated total area of less than 1000 ha. This includes all community types containing rough fescue. The Saskatchewan Conservation Data Centre has assigned a rank of S2 or very rare, to the plains rough fescue alliance (includes one or more plant communities). An inventory of occurrences of fescue grassland revealed approximately 354 ha, mostly in protected areas such as provincial and national parks. In Alberta, a complete inventory has not been completed. However, it is estimated that less than 20,000 ha of plains rough fescue grassland in excellent condition exist (National Fescue Grassland Inventory 1997).

SDISTRIBUTION.COM
The element is expected to occur in the Northern Fescue Subregion and Central Parkland Subregion, and possibly in the Foothills Fescue Subregion and Foothills Parkland Subregion of Alberta.

5. ENVIRONMENTAL FACTORS

SMINELEV	No information
SMAXELEV	No information
SLANDFORM	Undulating topography
STOPO.POSITION	No information
SSLOPE	No information
SASPECT	No information

SGEOLOGY.COM
Undulating glaciolacustrine and glaciofluvial deposits frequently modified by aeolian action.

SSOIL.TYPE
Predominantly sandy Chernozems with some Regosols (Dark Brown Chernozems).

SSOIL.MOISTURE	Subxeric
SSOIL.COM	Sandy soils
SHYDRO.INFLUENCE	Rapidly to well drained
SSEASONAL.VAR	None known

SKEY.ENVIRO.FACTORS
Climate is a key environmental determinant of the biological composition and structure of

grassland communities such as this element. The Plains Rough Fescue-Sand Grass Herbaceous Vegetation Type has been described from the Northern Fescue and Central Parkland Subregions. The following climate information was taken from Strong and Leggat (1992) for the Aspen Parkland Ecoregion, which includes the Central and Foothills Parkland Subregions, and the northern half of the Northern Fescue Subregion.

The regional climate influencing this element is a result of the interaction of components of the boreal and mixed grassland climates. In addition, the mid-Alberta storm track has a significant influence on the climate. The major difference in climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June.

Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures.

Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate.

SENVIRO.COM
The Plains Rough Fescue-Sand Grass Herbaceous Vegetation Type occurs on undulating topography. Soils are generally derived from glaciolacustrine and glaciofluvial deposits frequently modified by aeolian action. They are predominantly sandy Chernozems with some Regosols (Dark Brown Chernozems) (Gerling *et al.* 1996).

Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The following climate information was taken from Strong and Leggat (1992). The major difference in the climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June. Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures. Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate.

6. BIOLOGICAL AND STRUCTURAL DESCRIPTION

6a. VEGETATION

SSTRATA.LIFEFORM	Shrub, herb
SPCT.COVER	Shrub: <25% Herb: 75% or greater
SHEIGHT	No information

SMOST.ABUND.SPP
Shrub layer: *Juniperus horizontalis, Rosa acicularis*/*arkansana*
Herb layer: *Festuca hallii*, *Calamovilfa longifolia*, *Stipa viridula*, *Poa cusickii*

SSUNVEGETATED.SURFACE	No information
SSUNVEGETATED.SURFACE.COVER	No information

SCONSTANT.SPP
Festuca hallii, *Calamovilfa longifolia*, *Stipa viridula*, *Poa cusickii*, *Artemisia frigida*, *Juniperus horizontalis*

SCHARACTERISTIC.SPP	None

SVEGETATION.COM
The Plains Rough Fescue-Sand Grass Herbaceous Vegetation Type consists of only two vegetation strata: the herb and shrub layers. The shrub layer covers less than 25% and the herb layer covers the remainder. Plains rough fescue is the most abundant species, followed by sand grass, green needle grass, early bluegrass and creeping juniper. These, along with pasture sagewort, are found consistently within this community type. All occur in other community types as well. Shrub cover is moderate and may include prickly rose and prairie rose in addition to creeping juniper.

6b. OTHER SPECIES

SHIGH.RANK.SPP
Sprague's pipit (blue list, S4B), ferruginous hawk (blue list, S4B), long-billed curlew (blue list, S3B), upland sandpiper (yellow A list, S3B), turkey vulture (yellow B list, S2B).

SFAUNA.COM
Coyote, red fox, whitetail deer, mule deer, whitetail jackrabbit, badger, least weasel, long-tailed weasel, Richardson's ground squirrel, thirteen-lined ground squirrel, northern pocket gopher, deer mouse, meadow vole, prairie vole, sharp-tail grouse, western meadowlark, savannah sparrow, vesper sparrow, horned lark, tree swallow, Brewer's blackbird, brown-headed cowbird, red-tailed hawk, Swainson's hawk, sharp-shinned hawk, northern harrier, merlin, marbled godwit, willet.

SOTHER.SPP.COM

6c. VARIABILITY

SSPP.COMP.VAR
While *Festuca hallii*, *Calamovilfa longifolia*, *Stipa viridula*, *Poa cusickii*, *Artemisia frigida* and *Juniperus horizontalis* are always present, other graminoid species may include *Stipa curtiseta*, *Carex* spp., *Koeleria macrantha* and *Agropyron trachycaulum* var. *unilaterale*. Other forb species often include *Artemisia campestris*, *Solidago missouriensis*, *Potentilla* spp. and *Heuchera richardsonii*. Other shrub species often include *Rosa acicularis* and *R. arkansana*.

SPHYSIOG.VAR
There is always a shrub layer along with the herb layer.

SSUBTYPES None

SVARIABILITY.COM
While *Festuca hallii*, *Calamovilfa longifolia*, *Stipa viridula*, *Poa cusickii*, *Artemisia frigida* and *Juniperus horizontalis* are always present, other graminoid, forb and shrub species may be present.

7. DYNAMIC PROCESSES

SNAT.DISTURBANCE
Fire can be a large or small scale natural disturbance, although it was more common in the past. Fire was essential for maintaining the grassland openings in the parklands of the Northern Great Plains before settlement by the Europeans in the late 1800s (Nelson and England 1971). With fire suppression, succession towards shrublands and forest is occurring (Moss and Campbell 1947; Bird 1961; Nelson and England 1971; Bailey and Wroe 1974; Bailey and Anderson 1978;

Anderson and Bailey 1980; Gerling *et al*. 1995). Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

SSUCCESS.STATUS Edaphic climax

SSUCCESS.DYNAM.COM
Fire can be a large or small scale natural disturbance, although it was more common in the past. Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

8. SPATIAL RELATIONS

SSIZE
Plains Rough Fescue-Sand Grass Herbaceous Vegetation Type is not very common (Harry Loonen, pers. comm.).

SSPATIAL DISTRIBUTION Patchy

SADJACENT.COMMUNITIES
The primary community types adjacent to the Plains Rough Fescue-Sand Grass Herbaceous Vegetation Type include the shrub-dominated communities of buckbrush (*Symphoricarpos occidentalis*), wolf willow (*Elaeagnus commutata*) and rose (*Rosa* spp.), and possibly the Plains Rough Fescue-Western Porcupine Grass, Plains Rough Fescue-Western Porcupine Grass-Upland Sedge and Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Types.

SINCLUSION.COMMUNITIES
The dominant inclusions within the community include patches of buckbrush, wolf willow and/or rose shrublands, which tend to grow in depressions and on north- and east-facing slopes. These sites have high edaphic moisture regimes capable of supporting shrubs. Other possible inclusions are the Plains Rough Fescue-Western Porcupine Grass, Plains Rough Fescue-Western Porcupine Grass-Upland Sedge and Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Types.

SMOSAIC.COM
The element itself does not represent a mosaic of sub-associations.

SSPATIAL.COM
The Plains Rough Fescue-Sand Grass Herbaceous Vegetation Type tends to be uncommon, ~~and~~ small in area and patchy in distribution.

Adjacent communities and inclusions consist of essentially the same vegetation community types. The dominant types include patches of buckbrush, wolf willow and/or rose shrublands, which tend to grow in depressions and on north- and east-facing slopes. Other possible types are the Plains Rough Fescue-Western Porcupine Grass, Plains Rough Fescue-Western Porcupine Grass-Upland Sedge and Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Types.

9. STATUS

ESR SRANK

ESR SREASONS

SEXEMPLARY.EO Not yet available.

SEXEMP.EO.SITENAME Not yet available.

SSTATCOM
Due to the high agricultural activity in the Central Parkland Subregion, it is assumed that there are few remaining acres. The pressure to graze or cultivate more land causes the remaining acres to be very vulnerable to extirpation. According to Wallis (1990), it is estimated that 90-95% of the original native vegetation of the Central Parkland Subregion has been totally destroyed by clearing or cultivation. Very little native grassland exists and no sizeable areas remain ungrazed. Field work planned for 1999 should confirm whether the above assumptions are correct.

10. MANAGEMENT

SECONCOM
Livestock grazing; recreation (e.g., photography, bird-watching); maintenance of soil and groundwater level.

SMANAGE.COM
Plains rough fescue-sand grass prairie is a range resource, however grazing intensities beyond light grazing result in a shift towards other community types.

Prescribed burns, if planned correctly, can be used to maintain this element. Antos *et al*. (1983) suggest that fire frequencies in the range of 5 to 10 years may be most beneficial to the maintenance of rough fescue. Plains rough fescue is generally more resistant to severe damage from fire than mountain rough fescue because of its rhizomatous nature. Plants are generally

most tolerant of dormant season burning (Bailey and Anderson 1978). According to Bailey and Anderson (1978), fall is the best time to burn plains rough fescue. There is apparently no affect on floral initiation or subsequent seed development of plains rough fescue. However, Gerling *et al*. (1995) found that it tolerates single burns at any time of the year, but early spring fires have the greatest benefits by increasing tillering, inflorescence density and standing crop. Annual early spring burning favoured sand grass, which increased greatly in frequency and canopy cover (Anderson and Bailey 1980). Spring burns should be conducted as soon after snowmelt as possible to minimize fire damage (Bailey and Anderson 1978).

"Conservation burning" is another management approach (Romo 1997), where the goal is to replicate historical disturbances which were quite variable. Peak fire seasons in the plains rough fescue grasslands were from March to May, after snowmelt, and July to November. Fires were least likely over winter. However, they could occur at any time of year, and varied in type, frequency, intensity and area. By varying burns with respect to these factors, the natural variability of the grasslands would be achieved and maintained. Small fires with a variable burn interval are recommended (Romo 1997) since frequent, large scale burns may cause a shift towards species of the mixed praire association (Anderson and Bailey 1980). It should be noted that conservation burning would not necessarily maintain a single community type.

11. INVENTORY AND SAMPLING PROCEDURES

SIMAGERY.COM

The element can easily be distinguished from forested community types on air photos and Landsat imagery. As a rule, it can be distinguished from shrub community types on large scale air photos (1:30,000 or larger), as well as cultivated land and improved pastures. It cannot be distinguished from similar native grassland communities. The preferred scale of aerial photography is 1:20,000 or larger, either colour or black and white infrared.

SSAMPLE.STRATEGY

This community should be sampled using two different techniques as described by Robertson and Adams (1990). The first method uses a quadrat frame or frames (i.e., 0.1 m^2 microplot) placed either randomly or systematically at several locations (i.e., 15 sites) to determine the cover of each individual plant species. Data are recorded on the MF5 inventory form. Within each of the same frames at each location, the percent weight by volume of each plant species is estimated. The data are recorded on the LC55 form. Using this information for the range site type and appropriate precipitation zone, range condition ratings are calculated as outlined in the Guide to Range Condition and Stocking Rates for Alberta (Wroe *et al.* 1988). These methods have been standardised by Alberta Agriculture, Food and Rural Development (Public Lands Division) and Alberta Environmental Protection (Forest Service).

SINVENTORY.COM
Using either air photos or Landsat imagery, grassland can easily be distinguished from forested community types. Grassland can further be distinguished from shrub as well as cultivated land and improved pastures community types on large scale air photos (1:30,000 or larger). However, ground truthing is required to distinguish it from similar native grassland communities.

Locations should be documented using G.P.S.. If the community is to be sampled, two different techniques as described by Robertson and Adams (1990) should be used. Using these methods, comparison can be made among sites since they have been standardised by Alberta Agriculture, Food and Rural Development (Public lands Division) and Alberta Environmental Protection (Forest Service).

12. ANALYSIS PROCEDURES AND DATA MANAGEMENT

SANALYSIS.COM
Vegetation data of Gerling *et al*. (1996) consisted of canopy cover estimates of each species. These data were subjectively analysed to derive community types based on dominant species.

SANALYSIS.DATA.MANAGE.COM
Community types described by Gerling *et al*. (1996) were derived subjectively based on dominant species. The data are housed with Public Lands regional offices, Alberta Agriculture, Food and Rural Development.

13. GENERAL COMMENTS

SCOMMUNITY.COM	No further comments.

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TERRESTRIAL COMMUNITY CLASSIFICATION ABSTRACT SUB-NATIONAL
***Festuca hallii-Carex* spp./*Arctostaphylos uva-ursi* Herbaceous Vegetation**

1. IDENTIFIERS

SEL.SUMMARY
The Plains Rough Fescue-Upland Sedge/Bearberry (*Festuca hallii-Carex* spp./*Arctostaphylos uva-ursi*) Herbaceous Vegetation Type has been described in the Montane Ecoregion (Willoughby *et al.* 1997) and is apparently present in the Northern Fescue Subregion (B. Adams pers. comm.), and Central Parkland Subregion on dry, frequently sandy areas (H. Loonen pers. comm.). The montane community contains species that do exist throughout the parkland.

ET SNAME
Festuca hallii-Carex spp./*Arctostaphylos uva-ursi* Herbaceous Vegetation

ET SCOMNAME
Plains Rough Fescue-Upland Sedge/Bearberry Herbaceous Vegetation

2. CLASSIFICATION

ET	SYSTEM	Terrestrial
ET	CLASS	Herbaceous
ET	SUBCLASS	Perennial graminoid
ET	GROUP	Temperate or subpolar grassland
ET	FORMATION	Medium-tall bunch temperate or subpolar grassland
ET	ALLIANCE	*Festuca hallii* herbaceous alliance

SIMILAR COMMUNITIES

3. RELATED NOMENCLATURE

SOTHER.NAMES
Rough Fescue-Sedge/Bearberry (*Festuca scabrella-Carex* spp./*Arctostaphylos uva-ursi*) Community Type

SOTHER.NAMES.RELATION

+

SOTHER.NAMES.RELATION.NOTE
A Rough Fescue-Sedge/Bearberry (*Festuca scabrella-Carex* spp./*Arctostaphylos uva-ursi*) community type could refer to a plains rough fescue-dominated community if it is documented within the range of *F. hallii*. It could refer to a similar community dominated by a different species of rough fescue if it is not.

SNAMES.COM
Rough Fescue-Sedge/Bearberry (*Festuca scabrella-Carex* spp./*Arctostaphylos uva-ursi*) Community Type could refer to the same community type when it occurs within the range of *F. hallii*. Otherwise it could either be an outlier of the *F. hallii-Carex* spp./*Arctostaphylos uva-ursi* type, or it could refer to a similar community dominated by a different species of rough fescue. This has arisen due to the taxonomic split of the rough fescue (*Festuca scabrella*) complex into plains rough fescue (*F. hallii*), mountain rough fescue (*F. campestris*) and northern rough fescue (*F. altaica*).

4. DISTRIBUTION

ESR SRANGE
The exact range of the Plains Rough Fescue-Upland Sedge/Bearberry Herbaceous Vegetation Type is unknown. Most range descriptions are for the rough fescue grassland as a whole, which includes different community types contained within the rough fescue complex. Plains rough fescue occurs primarily in western Canada from the northern foothills of Alberta, east through central Alberta, then descending southeastward in a band through Saskatchewan and into southwest Manitoba, with outliers in the Peace River Parkland Subregion, Sweetgrass Hills/Milk River Ridge, Cypress Hills and remnant prairie of northwestern Ontario (Aitken *et al*.1998). The former extent of the fescue prairie in the eastern part of its range is not completely known since much of the suitable habitat was converted to agriculture before vegetation surveys were conducted (Rowe and Coupland 1984).

ESR SRANGECOM
The Plains Rough Fescue-Upland Sedge/Bearberry (*Festuca hallii-Carex* spp./*Arctostaphylos uva-ursi*) Herbaceous Vegetation Type (Willoughby *et al.* 1997) has been described in the Montane Ecoregion and is apparently present in the Northern Fescue Subregion (B. Adams, pers. comm.), and Central Parkland Subregion (H. Loonen, pers. comm.). Historically, the Plains Rough Fescue-Upland Sedge/Bearberry Herbaceous Vegetation Type probably occurred within the Northern Fescue Prairie and Aspen Parkland of Alberta, Saskatchewan and Manitoba.

At present, in Manitoba the fescue grassland communities are considered to be very rare and are ranked S1 by the Manitoba Conservation Data Centre. There are less than 20 occurrences with an estimated total area of less than 1000 ha. This includes all community types containing rough fescue. The Saskatchewan Conservation Data Centre has assigned a rank of S2 or very rare, to the plains rough fescue alliance (includes one or more plant communities). An inventory of occurrences of fescue grassland revealed approximately 354 ha, mostly in protected areas such as provincial and national parks. In Alberta, a complete inventory has not been completed. However, it is estimated that less than 20,000 ha of plains rough fescue grassland in excellent condition exist (National Fescue Grassland Inventory 1997).

SDISTRIBUTION.COM
The element is expected to occur in the Northern Fescue Subregion and Central Parkland Subregion, and possibly in the Foothills Fescue Subregion and Foothills Parkland Subregion of Alberta.

5. ENVIRONMENTAL FACTORS

SMINELEV	1341 m
SMAXELEV	2134 m
SLANDFORM	Undulating topography
STOPO.POSITION	Hill tops, upper slopes
SSLOPE	Level to 30° (average 15°)
SASPECT	South to west
SGEOLOGY.COM	No information
SSOIL.TYPE	No information
SSOIL.MOISTURE	Xeric to mesic
SSOIL.COM	Shallow, poorly developed soils; sandy soils
SHYDRO.INFLUENCE	Rapidly to well drained
SSEASONAL.VAR	None known
SKEY.ENVIRO.FACTORS	

Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The Plains Rough Fescue-Sedge/Bearberry Herbaceous Vegetation Type occurs in the Northern Fescue and Central Parkland Subregions. The following climate information was taken from Strong and Leggat (1992) for the Aspen Parkland Ecoregion, which includes the Central and Foothills Parkland Subregions, and the northern half of the Northern Fescue Subregion.

The regional climate influencing this element is a result of the interaction of components of the boreal and mixed grassland climates. In addition, the mid-Alberta storm track has a significant influence on the climate. The major difference in climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June.

Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures.

Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate. The climate of this element favours a successional trend toward forests.

SENVIRO.COM
In the Montane Natural Region, the Plains Rough Fescue-Upland Sedge/Bearberry Herbaceous Vegetation Type occurs on shallow, poorly developed soils on hill tops and steep slopes of undulating terrain. It requires xeric to mesic, rapidly to well drained soils, and tends to occur on south- to west-facing slopes (Willoughby *et al.* 1997). In the Central Parkland Subregion, it occurs in dry, frequently sandy areas (H. Loonen pers. comm.).

Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The following climate information was taken from Strong and Leggat (1992). The major difference in the climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June. Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures. Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually.

The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate. The climate of this element favours a successional trend toward forests.

6. BIOLOGICAL AND STRUCTURAL DESCRIPTION

6a. VEGETATION

SSTRATA.LIFEFORM	Shrub, dwarf shrub, herb

SPCT.COVER
Shrub and dwarf shrub: <25%
Herb: 75% or more

SHEIGHT	No information

SMOST.ABUND.SPP
Shrub layer: *Juniperus horizontalis*, *Amelanchier alnifolia*
Dwarf shrub layer: *Arctostaphylos uva-ursi*
Herb layer: *Festuca hallii*

SSUNVEGETATED.SURFACE	Little unvegetated surface
SSUNVEGETATED.SURFACE.COVER	No information
SCONSTANT.SPP	*Festuca hallii*, *Arctostaphylos uva-ursi*
SCHARACTERISTIC.SPP	None

SVEGETATION.COM
The Plains Rough Fescue-Upland Sedge/Bearberry Herbaceous Vegetation Type consists of only three vegetation strata: the herb, dwarf shrub and shrub layers. The example from the Montane Subregion had 34% cover of bearberry. This would be considered a dwarf shrubland. In order for the type to be part of the *Festuca hallii* herbaceous alliance, the shrub and dwarf shrub layers would cover less than 25% and the herb layer would cover 75% or more. Plains rough fescue and bearberry are the most abundant species. These are the only two species that are found consistently within this community type. Both occur in other community types as well. Shrub cover is low and tends to include creeping juniper and saskatoon.

6b. OTHER SPECIES

SHIGH.RANK.SPP	None known

SFAUNA.COM
Coyote, red fox, whitetail deer, mule deer, whitetail jackrabbit, badger, least weasel, long-tailed weasel, Richardson's ground squirrel, northern pocket gopher, deer mouse, meadow vole, prairie vole, sharp-tail grouse, western meadowlark, savannah sparrow, vesper sparrow, horned lark, tree swallow, Brewer's blackbird, brown-headed cowbird, red-tailed hawk, Swainson's hawk, sharp-shinned hawk, northern harrier, merlin.

SOTHER.SPP.COM

6c. VARIABILITY

SSPP.COMP.VAR
While *Festuca hallii* and *Arctostaphylos uva-ursi* are always present, other graminoid species often include *Carex obtusata*, *Koeleria macrantha* and *Agropyron trachycaulum*. Other forb species often include *Anemone multifida*, *Fragaria virginiana*, *Artemisia frigida* and *Phlox hoodii*. Shrub species often include *Juniperus horizontalis*, *Amelanchier alnifolia* and *Rosa acicularis*.

Stipa curtiseta occurs in all of the other plains rough fescue grassland communities of the Central Parkland, therefore it is very likely that it is at least occasionally present within Plains Rough Fescue-Upland Sedge/Bearberry communities of the Northern Fescue and Central Parkland Subregions.

SPHYSIOG.VAR
There is generally a shrub layer along with the herb layer.

SSUBTYPES None

SVARIABILITY.COM
While *Festuca hallii* and *Arctostaphylos uva-ursi* are always present, other graminoid, forb and shrub species may be present, including *Stipa curtiseta*.

7. DYNAMIC PROCESSES

SNAT.DISTURBANCE
Fire can be a large or small scale natural disturbance, although it was more common in the past. Fire was essential for maintaining the grassland openings in the parklands of the Northern Great Plains before settlement by the Europeans in the late 1800s (Nelson and England 1971). With fire suppression, succession towards shrublands and forest is occurring (Moss and Campbell 1947; Bird 1961; Nelson and England 1971; Bailey and Wroe 1974; Bailey and Anderson 1978; Anderson and Bailey 1980; Gerling *et al*. 1995). Small scale disturbances include soil

disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

SSUCCESS.STATUS Edaphic climax

SSUCCESS.DYNAM.COM
Fire can be a large or small scale natural disturbance, although it was more common in the past. Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

8. SPATIAL RELATIONS

SSIZE Relatively small in area.

SSPATIAL DISTRIBUTION Patchy

SADJACENT.COMMUNITIES
The primary community types adjacent to the Plains Rough Fescue-Upland Sedge/Bearberry Herbaceous Vegetation Type include the shrub-dominated communities of buckbrush (*Symphoricarpos occidentalis*), saskatoon (*Amelanchier alnifolia*) and prickly rose (*Rosa acicularis*), and possibly the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge and Plains Rough Fescue-June Grass/Juniper/Forbs Herbaceous Vegetation Types. The shrub communities grow in depressions, coulees and on north- or east-facing slopes. These sites have high edaphic moisture regimes capable of supporting shrubs.

SINCLUSION.COMMUNITIES
The dominant inclusions within the community include patches of buckbrush, saskatoon and prickly rose shrublands, which tend to grow in depressions and on north- and east-facing slopes. These sites have high edaphic moisture regimes capable of supporting shrubs. Other possible inclusions are the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge and Plains Rough Fescue-June Grass/Juniper/Forbs Herbaceous Vegetation Types.

SMOSAIC.COM
The element itself does not represent a mosaic of sub-associations.

SSPATIAL.COM
The Plains Rough Fescue-Upland Sedge/Bearberry Herbaceous Vegetation Type is relatively small in area and patchy in distribution.

Adjacent communities and inclusions consist of essentially the same vegetation community types. The dominant types include patches of buckbrush, saskatoon and prickly rose shrublands, which tend to grow in depressions and on north- and east-facing slopes. These sites have high edaphic moisture regimes capable of supporting shrubs. Other possible types are the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge and Plains Rough Fescue-June Grass/Juniper/Forbs Herbaceous Vegetation Types.

9. STATUS

ESR SRANK

ESR SREASONS

SEXEMPLARY.EO Not yet available.

SEXEMP.EO.SITENAME Not yet available.

SSTATCOM
Due to the high agricultural activity in the Central Parkland Subregion, it is assumed that there are few remaining acres. The pressure to graze or cultivate more land causes the remaining acres to be very vulnerable to extirpation. According to Wallis (1990), it is estimated that 90-95% of the original native vegetation of the Central Parkland Subregion has been totally destroyed by clearing or cultivation. Very little native grassland exists and no sizeable areas remain ungrazed. Field work planned for 1999 should confirm whether the above assumptions are correct.

10. MANAGEMENT

SECONCOM
Livestock grazing; recreation (e.g., photography, bird-watching); maintenance of soil and groundwater level.

SMANAGE.COM
Plains rough fescue-sedge/bearberry prairie is a range resource, however grazing intensities beyond light grazing result in a shift towards other community types.

11. INVENTORY AND SAMPLING PROCEDURES

SIMAGERY.COM
The element can easily be distinguished from forested community types on air photos and Landsat imagery. As a rule, it can be distinguished from shrub community types on large scale air photos (1:30,000 or larger), as well as cultivated land and improved pastures. It cannot be distinguished from similar native grassland communities. The preferred scale of aerial photography is 1:20,000 or larger, either colour or black and white infrared.

SSAMPLE.STRATEGY
This community should be sampled using two different techniques as described by Robertson and Adams (1990). The first method uses a quadrat frame or frames (i.e., 0.1 m^2 microplot) placed either randomly or systematically at several locations (i.e., 15 sites) to determine the cover of each individual plant species. Data are recorded on the MF5 inventory form. Within each of the same frames at each location, the percent weight by volume of each plant species is estimated. The data are recorded on the LC55 form. Using this information for the range site type and appropriate precipitation zone, range condition ratings are calculated as outlined in the Guide to Range Condition and Stocking Rates for Alberta (Wroe *et al.* 1988). These methods have been standardised by Alberta Agriculture, Food and Rural Development (Public Lands Division) and Alberta Environmental Protection (Forest Service).

SINVENTORY.COM
Using either air photos or Landsat imagery, grassland can easily be distinguished from forested community types. Grassland can further be distinguished from shrub as well as cultivated land and improved pastures community types on large scale air photos (1:30,000 or larger). However, ground truthing is required to distinguish it from similar native grassland communities.

Locations should be documented using G.P.S.. If the community is to be sampled, two different techniques as described by Robertson and Adams (1990) should be used. Using these methods, comparison can be made among sites since they have been standardised by Alberta Agriculture, Food and Rural Development (Public lands Division) and Alberta Environmental Protection (Forest Service).

12. ANALYSIS PROCEDURES AND DATA MANAGEMENT

SANALYSIS.COM
In the Montane Subregion, percent canopy cover of each plant species was estimated within microplots (Willoughby *et al*. 1997). Vegetation data were analysed using the cluster analysis of SAS and the ordination program, DECORANA (Gauch 1982), a detrended correspondence analysis. The resultant groupings of sites were then reassessed and adjusted to more closely reflect the vegetation associations as they were found in the field.

SANALYSIS.DATA.MANAGE.COM
In the Montane Subregion, vegetation data (percent canopy cover) were analysed using a cluster analysis and ordination program (Willoughby *et al*. 1997), followed by a subjective reassessment to create the final groupings. The data are housed with Mike Willoughby of the Forest Management Division, Alberta Environmental Protection, Edmonton.

13. GENERAL COMMENTS

SCOMMUNITY.COM No further comments.

15. REFERENCES

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TERRESTRIAL COMMUNITY CLASSIFICATION ABSTRACT SUB-NATIONAL
***Festuca hallii-Koeleria macrantha*/*Juniperus horizontalis*/Forbs Herbaceous Vegetation**

1. IDENTIFIERS

SEL.SUMMARY
The Plains Rough Fescue-June Grass/Juniper/Forbs (*Festuca hallii-Koeleria macrantha*/*Juniperus horizontalis*/Forbs) Herbaceous Vegetation Type was described by Legris and Cornish (1997). It occurred on subxeric, steep south- and south-west-facing coulee slopes within the Northern Fescue Subregion and is apparently present in the Central Parkland Subregion on dry, frequently sandy areas (H. Loonen, pers. comm.). Soils are Orthic Regosols. Associated species are drought tolerant (Legris and Cornish 1997).

ET SNAME
Festuca hallii-Koeleria macrantha/*Juniperus horizontalis*/Forbs Herbaceous Vegetation

ET SCOMNAME
Plains Rough Fescue-June Grass/Juniper/Forbs Herbaceous Vegetation

2. CLASSIFICATION

ET	SYSTEM	Terrestrial
ET	CLASS	Herbaceous
ET	SUBCLASS	Perennial graminoid
ET	GROUP	Temperate or subpolar grassland
ET	FORMATION	Medium-tall bunch temperate or subpolar grassland
ET	ALLIANCE	*Festuca hallii* herbaceous alliance

SIMILAR COMMUNITIES
Plains Rough Fescue-Green Needle Grass/Forbs Herbaceous Vegetation Type, described by Legris and Cornish (1997), contains plains rough fescue and June grass, but the green needle grass is co-dominant with the fescue, and juniper is not present. Creeping juniper is a prominent shrub in Plains Rough Fescue-Sand Grass Herbaceous Vegetation Type, described by Gerling *et al.*(1996). However dominant grasses include plains rough fescue and sand grass, along with green needle grass and early bluegrass.

3. RELATED NOMENCLATURE

SOTHER.NAMES
Rough Fescue-June Grass/Juniper/Forbs (*Festuca scabrella-Koeleria macrantha*/*Juniperus horizontalis*/Forbs) Community Type

SOTHER.NAMES.RELATION
+

SOTHER.NAMES.RELATION.NOTE
A Rough Fescue-June Grass/Juniper/Forbs (*Festuca scabrella-Koeleria macrantha*/*Juniperus horizontalis*/Forbs) community type could refer to a plains rough fescue-dominated community if it is documented within the range of *F. hallii*. It could refer to a similar community dominated by a different species of rough fescue if it is not.

SNAMES.COM
Rough Fescue-June Grass/Juniper/Forbs (*Festuca scabrella-Koeleria macrantha*/*Juniperus horizontalis*/Forbs) could refer to the same community type when it occurs within the range of *F. hallii*. Otherwise it could either be an outlier of the *F. hallii-Koeleria macrantha*/*Juniperus horizontalis*/Forbs type, or it could refer to a similar community dominated by a different species of rough fescue. This has arisen due to the taxonomic split of the rough fescue (*Festuca scabrella*) complex into plains rough fescue (*F. hallii*), mountain rough fescue (*F. campestris*) and northern rough fescue (*F. altaica*).

4. DISTRIBUTION

ESR SRANGE
The exact range of the Plains Rough Fescue-June Grass/Juniper/Forbs Herbaceous Vegetation Type is unknown. Most range descriptions are for the rough fescue grassland as a whole, which includes different community types contained within the rough fescue complex. Plains rough fescue occurs primarily in western Canada from the northern foothills of Alberta, east through central Alberta, then descending southeastward in a band through Saskatchewan and into southwest Manitoba, with outliers in the Peace River Parkland Subregion, Sweetgrass Hills/Milk River Ridge, Cypress Hills and remnant prairie of northwestern Ontario (Aitken *et al*.1998). The former extent of the fescue prairie in the eastern part of its range is not completely known since much of the suitable habitat was converted to agriculture before vegetation surveys were conducted (Rowe and Coupland 1984).

ESR SRANGECOM
Historically, the Plains Rough Fescue-June Grass/Juniper/Forbs Herbaceous Vegetation Type probably occurred throughout the Northern Fescue Prairie and Aspen Parkland of Alberta, Saskatchewan and Manitoba.

At present, in Manitoba the fescue grassland communities are considered to be very rare and are ranked S1 by the Manitoba Conservation Data Centre. There are less than 20 occurrences with an estimated total area of less than 1000 ha. This includes all community types containing rough fescue. The Saskatchewan Conservation Data Centre has assigned a rank of S2 or very rare, to the plains rough fescue alliance (includes one or more plant communities). An inventory of occurrences of fescue grassland revealed approximately 354 ha, mostly in protected areas such as provincial and national parks. In Alberta, a complete inventory has not been completed. However, it is estimated that less than 20,000 ha of plains rough fescue grassland in excellent condition exist (National Fescue Grassland Inventory 1997).

SDISTRIBUTION.COM
The element is expected to occur in the Northern Fescue Subregion and Central Parkland Subregion, and possibly in the Foothills Fescue Subregion and Foothills Parkland Subregion of Alberta.

5. ENVIRONMENTAL FACTORS

SMINELEV	No information
SMAXELEV	No information
SLANDFORM	Undulating topography
STOPO.POSITION	Upper to lower coulee slopes
SSLOPE	19 to 26.5°

SASPECT
South, east and west; occasionally north aspects on lower angled slopes (Legris and Cornish 1997).

SGEOLOGY.COM	Glaciofluvial parent material
SSOIL.TYPE	Orthic Regosol
SSOIL.MOISTURE	Subxeric

SSOIL.COM
Soil texture tends to be clay over silty clay loam to clay. Soil pH is 8.0 (B horizon) and depth to carbonates is 5 to 10 cm (Legris and Cornish 1997).

SHYDRO.INFLUENCE	Moderately well drained
SSEASONAL.VAR	None known

SKEY.ENVIRO.FACTORS
Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The Plains Rough Fescue-June Grass/Juniper/Forbs Herbaceous Vegetation Type occurs in the Northern Fescue and Central Parkland Subregions. The following climate information was taken from Strong and Leggat (1992) for the Aspen Parkland Ecoregion, which includes the Central and Foothills Parkland Subregions, and the northern half of the Northern Fescue Subregion.

The regional climate influencing this element is a result of the interaction of components of the boreal and mixed grassland climates. In addition, the mid-Alberta storm track has a significant influence on the climate. The major difference in climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June.

Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures.

Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate.

SENVIRO.COM
The Plains Rough Fescue-June Grass/Juniper/Forbs Herbaceous Vegetation Type occurs on lower to upper coulee slopes. It requires subxeric, moderately well drained soils, and tends to occur on south- and southwest-facing slopes. The Orthic Regosolic soils are generally derived from glaciolacustrine parent materials. Soil texture tends to be clay over silty clay loam to clay. Soil pH is 8.0 (B horizon) and depth to carbonates is 5 to 10 cm (Legris and Cornish 1997).

Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The following climate information was taken from Strong and Leggat (1992). The major difference in the climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June. Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures. Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate.

6. BIOLOGICAL AND STRUCTURAL DESCRIPTION

6a. VEGETATION

SSTRATA.LIFEFORM	Shrub, herb
SPCT.COVER	Shrub: <25% Herb: 75% or greater
SHEIGHT	No information

SMOST.ABUND.SPP
Shrub layer: *Juniperus horizontalis*
Herb layer: *Festuca hallii*, *Koeleria macrantha*, *Thermopsis rhombifolia*, *Eriogonum flavum*, *Erigeron caespitosus*, *Hedysarum alpinum*

SSUNVEGETATED.SURFACE	Mineral soil
SSUNVEGETATED.SURFACE.COVER	30-35%

SCONSTANT.SPP
Festuca hallii, *Koeleria macrantha*, *Juniperus horizontalis*

SCHARACTERISTIC.SPP	None

SVEGETATION.COM
The Plains Rough Fescue-June Grass/Juniper/Forbs Herbaceous Vegetation Type consists of only two vegetation strata: the herb and shrub layers. The shrub layer covers less than 25% and the herb layer covers the remainder. Plains rough fescue, June grass and creeping juniper are the most abundant species, followed by golden bean, yellow umbrella-plant, tufted fleabane and alpine hedysarum. The former three are found consistently within this community type. All occur in other community types as well.

6b. OTHER SPECIES

SHIGH.RANK.SPP
Sprague's pipit (blue list, S4B), ferruginous hawk (blue list, S4B), long-billed curlew (blue list, S3B), upland sandpiper (yellow A list, S3B), turkey vulture (yellow B list, S2B).

SFAUNA.COM
Coyote, red fox, whitetail deer, mule deer, whitetail jackrabbit, badger, least weasel, long-tailed weasel, Richardson's ground squirrel, thirteen-lined ground squirrel, northern pocket gopher, deer mouse, meadow vole, prairie vole, sharp-tail grouse, western meadowlark, savannah sparrow, vesper sparrow, horned lark, tree swallow, Brewer's blackbird, brown-headed cowbird, red-tailed hawk, Swainson's hawk, sharp-shinned hawk, northern harrier, merlin, marbled godwit, willet.

SOTHER.SPP.COM

6c. VARIABILITY

SSPP.COMP.VAR
While *Festuca hallii*, *Koeleria macrantha* and *Juniperus horizontalis* are always present, other graminoid species often include *Stipa curtiseta*, *Stipa viridula* and *Agropyron dasystachyum*. Common forb species include *Thermopsis rhombifolia*, *Eriogonum flavum*, *Erigeron caespitosus* and *Hedysarum alpinum*. Some other potential forb species include *Comandra umbellata*, *Linum lewisii*, *Allium textile*, *Gaillardia aristata*, *Gaura coccinea*, *Lomatium macrocarpum* and *Solidago missouriensis*. Other shrub species may include *Rosa arkansana* and *Shepherdia canadensis*.

SPHYSIOG.VAR
There is a shrub layer along with the herb layer.

SSUBTYPES
Plains rough fescue-upland sedge/juniper/forbs community type is a variant of the Plains Rough Fescue-June Grass/Juniper/Forbs Herbaceous Vegetation Type (Harry Loonen, pers. comm.).

SVARIABILITY.COM
While *Festuca hallii*, *Koeleria macrantha* and *Juniperus horizontalis* are always present, other graminoid, forb and shrub species may be present.

7. DYNAMIC PROCESSES

SNAT.DISTURBANCE
Fire can be a large or small scale natural disturbance, although it was more common in the past. Fire was essential for maintaining the grassland openings in the parklands of the Northern Great Plains before settlement by the Europeans in the late 1800s (Nelson and England 1971). With fire suppression, succession towards shrublands and forest is occurring (Moss and Campbell 1947; Bird 1961; Nelson and England 1971; Bailey and Wroe 1974; Bailey and Anderson 1978; Anderson and Bailey 1980; Gerling *et al*. 1995). Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

SSUCCESS.STATUS Edaphic climax

SSUCCESS.DYNAM.COM
Fire can be a large or small scale natural disturbance, although it was more common in the past. Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

8. SPATIAL RELATIONS

SSIZE
Depending on the position on the landscape and historical land use, this community can be relatively small in area or cover larger tracts of land.

SSPATIAL DISTRIBUTION Generally patchy

SADJACENT.COMMUNITIES
The primary community types adjacent to the Plains Rough Fescue-June Grass/Juniper/Forbs Herbaceous Vegetation Type, include rose thickets, and possibly the Plains Rough Fescue-Western Porcupine Grass and Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Types.

SINCLUSION.COMMUNITIES
The dominant inclusions within the community include patches of rose shrublands, which tend to grow in depressions and on north- and east-facing slopes, and possibly the Plains Rough Fescue-Western Porcupine Grass and Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Types.

SMOSAIC.COM
The element itself does not represent a mosaic of sub-associations.

SSPATIAL.COM
Depending on the position on the landscape and historical land use, the Plains Rough Fescue-June Grass/Juniper/Forbs Herbaceous Vegetation Type can be relatively small in area or cover large tracts of land. It can be patchy in distribution or continuous on undulating terrain.

Adjacent communities and inclusions consist of essentially the same vegetation community types. They potentially include rose thickets, which tend to grow in depressions and on north- and east-facing slopes, and the Plains Rough Fescue-Western Porcupine Grass and Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Types.

9. STATUS

ESR SRANK

ESR SREASONS

SEXEMPLARY.EO Not yet available.

SEXEMP.EO.SITENAME Not yet available.

SSTATCOM
Due to the high agricultural activity in the Central Parkland Subregion, it is assumed that there are few remaining acres. The pressure to graze or cultivate more land causes the remaining acres to be very vulnerable to extirpation. According to Wallis (1990), it is estimated that 90-95% of the original native vegetation of the Central Parkland Subregion has been totally destroyed by clearing or cultivation. Very little native grassland exists and no sizeable areas remain ungrazed. Field work planned for 1999 should confirm whether the above assumptions are correct.

10. MANAGEMENT

SECONCOM
Livestock grazing; recreation (e.g., photography, bird-watching); maintenance of soil and groundwater level.

SMANAGE.COM
Plains rough fescue-June grass/juniper/forbs prairie is a range resource, however grazing intensities beyond moderate grazing result in a shift towards other community types.

11. INVENTORY AND SAMPLING PROCEDURES

SIMAGERY.COM
The element can easily be distinguished from forested community types on air photos and Landsat imagery. As a rule, it can be distinguished from shrub community types on large scale air photos (1:30,000 or larger), as well as cultivated land and improved pastures. It cannot be distinguished from similar native grassland communities. The preferred scale of aerial photography is 1:20,000 or larger, either colour or black and white infrared.

SSAMPLE.STRATEGY
This community should be sampled using two different techniques as described by Robertson and Adams (1990). The first method uses a quadrat frame or frames (i.e., 0.1 m^2 microplot) placed either randomly or systematically at several locations (i.e., 15 sites) to determine the cover of each individual plant species. Data are recorded on the MF5 inventory form. Within each of the same frames at each location, the percent weight by volume of each plant species is estimated. The data are recorded on the LC55 form. Using this information for the range site type and appropriate precipitation zone, range condition ratings are calculated as outlined in the Guide to Range Condition and Stocking Rates for Alberta (Wroe *et al.* 1988). These methods have been standardised by Alberta Agriculture, Food and Rural Development (Public Lands Division) and Alberta Environmental Protection (Forest Service).

SINVENTORY.COM
Using either air photos or Landsat imagery, grassland can easily be distinguished from forested community types. Grassland can further be distinguished from shrub as well as cultivated land and improved pastures community types on large scale air photos (1:30,000 or larger). However, ground truthing is required to distinguish it from similar native grassland communities.

Locations should be documented using G.P.S.. If the community is to be sampled, two different techniques as described by Robertson and Adams (1990) should be used. Using these methods, comparison can be made among sites since they have been standardised by Alberta Agriculture, Food and Rural Development (Public lands Division) and Alberta Environmental Protection (Forest Service).

12. ANALYSIS PROCEDURES AND DATA MANAGEMENT

SANALYSIS.COM
Vegetation data were gathered according to the procedures outlined in the Ecological Land Survey Site Description Manual (Alberta Environmental Protection 1994). At each site, all plant species were recorded along a 10 m transect and percent canopy cover was estimated. Microplot data were averaged for each transect (Legris and Cornish 1997).

Vegetation data were analysed using a two-way indicator species analysis (TWINSPAN) (Hill 1979), which ranked the survey sites based on their similarity to each other in terms of species composition and cover values. The resultant groupings of sites were then reassessed and adjusted to more closely reflect the vegetation associations as they were found in the field. Species composition of each community type was then based on an average of the species cover values of the grouped sites (Legris and Cornish 1997).

SANALYSIS.DATA.MANAGE.COM
Vegetation data, consisting of percent cover values for each species at each site, were analysed the computer program TWINSPAN (Hill 1979), which ranked the survey sites based on their similarity to each other in terms of species composition and cover values. The data are with the Resource Data Division of Alberta Environmental Protection, Edmonton.

13. GENERAL COMMENTS

SCOMMUNITY.COM No further comments.

15. REFERENCES

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TERRESTRIAL COMMUNITY CLASSIFICATION ABSTRACT SUB-NATIONAL
***Festuca hallii-Stipa curtiseta* Herbaceous Vegetation**

1. IDENTIFIERS

SEL.SUMMARY
The Plains Rough Fescue-Western Porcupine Grass (*Festuca hallii-Stipa curtiseta*) Herbaceous Vegetation Type was described by Wheeler (1976), Gerling *et al.* (1996), Legris and Cornish (1997) and Vujnovic (1998). In this community type, plains rough fescue and western porcupine grass are co-dominant, although plains rough fescue has higher cover. This type represents a climax community on slightly drier sites (mesic to submesic) compared to the pure plains rough fescue type. On slopes, it is positioned above the plains rough fescue type. Coupland and Brayshaw (1953) consider it to be a transitional type to Mixed Prairie. It can occur on hill crests or south- to west-facing slopes of level to undulating topography and hummocky terrain. Generally, the associated soils are Black and Dark Brown Chernozems, although Gerling *et al.* (1996) indicates it can be associated with Solonetzic soils. Light grazing may sometimes contribute to the development of this community type.

ET SNAME
Festuca hallii-Stipa curtiseta Herbaceous Vegetation

ET SCOMNAME
Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation

2. CLASSIFICATION

ET	SYSTEM	Terrestrial
ET	CLASS	Herbaceous
ET	SUBCLASS	Perennial graminoid
ET	GROUP	Temperate or subpolar grassland
ET	FORMATION	Medium-tall bunch temperate or subpolar grassland
ET	ALLIANCE	*Festuca hallii* herbaceous alliance

SIMILAR COMMUNITIES
Plains Rough Fescue Herbaceous Vegetation Type, described by Blood (1966), Wroe (1971), Fehr (1982), Legris and Cornish (1997) and Vujnovic (1998), also contains plains rough fescue and western porcupine grass as constant species. However, the plains rough fescue cover is much higher than western porcupine grass. On slopes, this type is positioned below the plains rough

fescue-Western porcupine grass type. Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type, described by Gerling *et al.* (1996) and Coupland and Brayshaw (1953), differs by having sedge as a third co-dominant. Plains Rough Fescue-Green Needle Grass/Forbs Herbaceous Vegetation Type, described by Legris and Cornish (1997), differs by having plains rough fescue and green needle grass as the two co-dominants, although western porcupine grass is also present. Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Type, described by Wroe (1971), Wheeler (1976), Fehr (1982) and Legris and Cornish (1997), differs in having higher or equal cover of western porcupine grass relative to plains rough fescue. It occurs on drier sites (xeric to submesic).

3. RELATED NOMENCLATURE

SOTHER.NAMES
Rough Fescue-Western Porcupine Grass (*Festuca scabrella-Stipa curtiseta*) Community Type

SOTHER.NAMES.RELATION
+

SOTHER.NAMES.RELATION.NOTE
A Rough Fescue-Western Porcupine Grass (*Festuca scabrella-Stipa curtiseta*) community type could refer to a plains rough fescue-dominated community if it is documented within the range of *F. hallii*. It could refer to a similar community dominated by a different species of rough fescue if it is not.

SNAMES.COM
Rough Fescue-Western Porcupine Grass (*Festuca scabrella-Stipa curtiseta*) Community Type could refer to the same community type when it occurs within the range of *F. hallii*. If it is found outside the usual range of *F. hallii*, it could either be an outlier of the *Festuca hallii-Stipa curtiseta* type, or it could be a similar community dominated by a different species of rough fescue. This has arisen due to the taxonomic split of the rough fescue (*Festuca scabrella*) complex into plains rough fescue (*F. hallii*), mountain rough fescue (*F. campestris*) and northern rough fescue (*F. altaica*).

4. DISTRIBUTION

ESR SRANGE
The exact range of the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type is unknown. Most range descriptions are for the rough fescue grassland as a whole, which includes different community types contained within the rough fescue complex. Plains rough fescue occurs primarily in western Canada from the northern foothills of Alberta, east through central Alberta, then descending southeastward in a band through Saskatchewan and into southwest Manitoba, with outliers in the Peace River Parkland Subregion, Sweetgrass Hills/Milk River Ridge, Cypress Hills and remnant prairie of northwestern Ontario (Aitken *et al*.1998). The former extent of the fescue prairie in the eastern part of its range is not completely known since

much of the suitable habitat was converted to agriculture before vegetation surveys were conducted (Rowe and Coupland 1984).

ESR SRANGECOM
Historically, the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type occurred throughout the Northern Fescue Prairie and Aspen Parkland of Alberta, Saskatchewan and Manitoba.

Since this community type is associated with deep, nutrient rich, organic soils on gentle slopes to level terrain, much of the original grassland has been cultivated and converted to cropland. At present, in Manitoba the fescue grassland communities are considered to be very rare and are ranked S1 by the Manitoba Conservation Data Centre. There are less than 20 occurrences with an estimated total area of less than 1000 ha. This includes all community types containing rough fescue. The Saskatchewan Conservation Data Centre has assigned a rank of S2 or very rare, to the plains rough fescue alliance (includes one or more plant communities). An inventory of occurrences of fescue grassland revealed approximately 354 ha, mostly in protected areas such as provincial and national parks. In Alberta, a complete inventory has not been completed. However, it is estimated that less than 20,000 ha of plains rough fescue grassland in excellent condition exist (National Fescue Grassland Inventory 1997).

SDISTRIBUTION.COM
The element occurs in the Northern Fescue Subregion and Central Parkland Subregion, and possibly in the Foothills Fescue Subregion and Foothills Parkland Subregion of Alberta.

5. ENVIRONMENTAL FACTORS

SMINELEV	No information
SMAXELEV	No information
SLANDFORM	Level to undulating topography, hummocky terrain.

STOPO.POSITION
Crests of knolls, upper slopes (Wheeler 1976), mid-slopes (Bradley and Bradley 1977), lower slopes (Wroe 1971; Bradley and Bradley 1977), depending on moisture level.

SSLOPE	Level or slopes averaging 6E.
SASPECT	South- and west-facing.

SGEOLOGY.COM
Lacustrine, morainal or alluvial parent materials (Belcher 1996) over bedrock of sandstone, coal, shale and bentonite originating from the Upper Cretaceous Period (Bradley and Bradley 1977).

SSOIL.TYPE
Generally, the associated soils are Black and Dark Brown Chernozems, although Gerling *et al.* (1996) indicates it can be associated with Solonetzic soils.

SSOIL.MOISTURE Mesic to submesic

SSOIL.COM
The Chernozemic soils have between 15 and 30 cm of a black coloured A horizon that is developed to 65 cm. The Solonetzic soils are shallower and have less top soil (Gerling *et al.* 1996). The texture is generally a sandy loam (Belcher 1996), clay loam to silty clay loam and soil pH (B horizon) is from 6.5 to 7.0 (Legris and Cornish 1997).

SHYDRO.INFLUENCE Moderately well drained

SSEASONAL.VAR None known

SKEY.ENVIRO.FACTORS
Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type has been described from the Northern Fescue and Central Parkland Subregions. The following climate information was taken from Strong and Leggat (1992) for the Aspen Parkland Ecoregion, which includes the Central and Foothills Parkland Subregions, and the northern half of the Northern Fescue Subregion.

The regional climate influencing this element is a result of the interaction of components of the boreal and mixed grassland climates. In addition, the mid-Alberta storm track has a significant influence on the climate. The major difference in climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June.

Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures.

Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate. The climate of this element favours a successional trend toward forests.

SENVIRO.COM
The Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type occurs on level

to undulating topography and hummocky terrain (Belcher 1996; Gerling *et al.* 1996). It occurs on the crests of knolls, upper slopes, mid-slopes or lower slopes (Wroe 1971; Wheeler 1976; Bradley and Bradley 1977), depending on the moisture level. It requires mesic to submesic, moderately well-drained soils, and tends to occur on south- and west-facing slopes (Wheeler 1976; Bradley and Bradley 1977). Soils are generally derived from lacustrine, morainal or alluvial parent materials (Belcher 1996). Generally, the associated soils are Black and Dark Brown Chernozems, although Gerling *et al.* (1996) indicates it can be associated with Solonetzic soils. The Chernozemic soils have between 15 and 30 cm of a black coloured A horizon that is developed to 65 cm. The Solonetzic soils are shallower and have less top soil (Gerling *et al.* 1996). The texture is generally a sandy loam (Belcher 1996), clay loam to silty clay loam and soil pH (B horizon) is from 6.5 to 7.0 (Legris and Cornish 1997).

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6. BIOLOGICAL AND STRUCTURAL DESCRIPTION

6a. VEGETATION

SSTRATA.LIFEFORM Shrub, herb

SPCT.COVER
Shrub: <25%
Herb: 75% or greater

SHEIGHT
Foliage of plains rough fescue reaches a height of 18 to 20 cm in exposed areas and 36 to 38 cm in sheltered places, such as near groves. Culm height reaches 3.6 dm to 9.1 dm in different parts of the community (Coupland and Brayshaw 1953).

SMOST.ABUND.SPP
Shrub layer: *Rosa arkansana*

Herb layer: *Festuca hallii*, *Stipa curtiseta*

SSUNVEGETATED.SURFACE
Little to no unvegetated surface due to the litter accumulation; occasional surface stones.

SSUNVEGETATED.SURFACE.COVER 0-1%

SCONSTANT.SPP
Festuca hallii, *Stipa curtiseta*, *Koeleria macrantha*

SCHARACTERISTIC.SPP None

SVEGETATION.COM
The Plains Rough Fescue Herbaceous Vegetation Type consists of no more than two vegetation strata: the herb and shrub layers. The shrub layer covers less than 25% and the herb layer covers the remainder. Plains rough fescue is generally the most abundant species, followed by western porcupine grass. These two species and June grass are found consistently within this community type. All three occur in other community types as well. Shrub cover is low or absent and may include prairie rose. The accumulation of litter due to the resistance of plains rough fescue to decomposition (Dormaar 1975) results in little bare ground.

6b. OTHER SPECIES

SHIGH.RANK.SPP
Sprague's pipit (blue list, S4B), ferruginous hawk (blue list, S4B), long-billed curlew (blue list, S3B), upland sandpiper (yellow A list, S3B), Baird's sparrow (yellow A list, S3B), turkey vulture (yellow B list, S2B).

Crowfoot violet (*Viola pedatifida*) (S1S2), few-flowered rush (*Juncus confusus*) (S2) (Cottonwood Consultants 1986).

SFAUNA.COM
Coyote, red fox, whitetail deer, mule deer, whitetail jackrabbit, badger, least weasel, long-tailed weasel, Richardson's ground squirrel, thirteen-lined ground squirrel, northern pocket gopher, deer mouse, meadow vole, prairie vole, sharp-tail grouse, western meadowlark, savannah sparrow, vesper sparrow, horned lark, tree swallow, Brewer's blackbird, brown-headed cowbird, red-tailed hawk, Swainson's hawk, sharp-shinned hawk, northern harrier, merlin, marbled godwit, willet.

SOTHER.SPP.COM
The preferred nesting habitat of Baird's sparrow, a potentially threatened species in Alberta, is tall fescue grassland with a great tangle of grass at ground level (Semenchuk 1992). Crowfoot violet (*Viola pedatifida*) is considered rare in Alberta (S1S2) and is a species of ungrazed fescue grasslands (Wallis and Wershler 1985). Few-flowered rush (*Juncus confusus*) is a rare species

characteristic of fescue grassland habitat (Wershler and Wallis 1990).

6c. VARIABILITY

SSPP.COMP.VAR
While *Festuca hallii*, *Stipa curtiseta* and *Koeleria macrantha* are always present; other graminoid species may or may not be present, including *Helictotrichon hookeri*, *Carex* spp., *Agropyron* spp., *Stipa viridula*, and *Hierochloe odorata*. Forb species can also vary, including such potential forb species as *Selaginella densa, Anemone patens*, *Artemisia frigida*, *A. ludoviciana*, *Thermopsis rhombifolia*, *Oxytropis* spp*., Antennaria parvifolia* (syn. *aprica*)*, Solidago missouriensis* and *Campanula rotundifolia*. Shrub species may or may not be present, and often include *Rosa arkansana*.

SPHYSIOG.VAR
There may or may not be a shrub layer along with the herb layer.

SSUBTYPES
The Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type is sometimes considered to be a subtype of the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type (Harry Loonen, pers. comm.).

SVARIABILITY.COM
While *Festuca hallii*, *Stipa curtiseta* and *Koeleria macrantha* are always present, other graminoid species may or may not be present. Forb species can also vary. Shrub species may or may not be present.

7. DYNAMIC PROCESSES

SNAT.DISTURBANCE
Fire can be a large or small scale natural disturbance, although it was more common in the past. Fire was essential for maintaining the grassland openings in the parklands of the Northern Great Plains before settlement by the Europeans in the late 1800s (Nelson and England 1971). With fire suppression, succession towards shrublands and forest is occurring (Moss and Campbell 1947; Bird 1961; Nelson and England 1971; Bailey and Wroe 1974; Bailey and Anderson 1978; Anderson and Bailey 1980; Gerling *et al*. 1995). Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

SSUCCESS.STATUS Climatic climax

SSUCCESS.DYNAM.COM
Fire can be a large or small scale natural disturbance, although it was more common in the past. Without occasional fire, this community can be invaded by shrubs and aspen, increasing the moisture regime and favouring the establishment of forest cover. Small scale disturbances

include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

8. SPATIAL RELATIONS

SSIZE
Depending on the position on the landscape and historical land use, this community can be relatively small in area or cover large tracts of land.

SSPATIAL DISTRIBUTION
Patchy, e.g., on knob and kettle topography, or continuous on undulating terrain.

SADJACENT.COMMUNITIES
The primary community types adjacent to the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type include shrub-dominated, wooded and graminoid-dominated communities. The shrub communities are usually composed of buckbrush (*Symphoricarpos occidentalis*) and the wooded community of aspen (*Populus tremuloides*). These communities grow in depressions, coulees and on north- or east-facing slopes. These sites have high edaphic moisture regimes capable of supporting shrubs and/or trees.

The main graminoid communities found adjacent to the element are the Plains Rough Fescue Herbaceous Vegetation Type and Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type. The Plains Rough Fescue Herbaceous Vegetation Type usually occurs on slightly moister sites such as down-slope from the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type or adjacent to aspen groves. The Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type occupies slightly drier sites such as on the crests of knolls above the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type.

Other shrub communities that could occur adjacent to the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type are dominated by *Rosa* spp., *Elaeagnus commutata*, *Amelanchier alnifolia* and/or *Prunus virginiana*. These usually are associated with sheltered areas, low slope positions or drainages, where there are higher moisture regimes resulting from snow accumulation, run-off or shade.

SINCLUSION.COMMUNITIES
The dominant inclusions within the community include patches of buckbrush shrublands and aspen groves, which tend to grow in depressions and on north- and east-facing slopes. These sites have high edaphic moisture regimes capable of supporting shrubs and/or trees. The other common inclusions are the Plains Rough Fescue Herbaceous Vegetation Type, which usually occurs on slightly moister sites such as down-slope from the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type or adjacent to aspen groves, and the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type, which occupies slightly drier sites such as on the crests of knolls.

Other shrub communities that could occur as inclusions within the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type are dominated by *Rosa* spp., *Elaeagnus commutata*, *Amelanchier alnifolia* and/or *Prunus virginiana*. These usually are associated with sheltered areas, low slope positions or drainages, where there are higher moisture regimes resulting from snow accumulation, run-off or cooler relative temperatures (e.g., north-facing slopes).

Other herbaceous inclusions include: the *Festuca hallii-Calamovilfa longifolia* community type (on aeolian deposits) and the *Festuca hallii-Koeleria macrantha/Juniperus horizontalis*/forb complex (on exposed sites associated with shallow soils or exposed bedrock). A wheat grass (*Agropyron* spp.)-dominated inclusion on lower relief micro-sites of solodized solonetzic soils has been described within *Stipa curtiseta-Festuca hallii* grasslands (B. Adams, pers. comm.).

SMOSAIC.COM
The element itself does not represent a mosaic of sub-associations.

SSPATIAL.COM
Depending on the position on the landscape and historical land use, the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type can be relatively small in area or cover large tracts of land. It can be patchy, e.g., on knob and kettle topography, or continuous on undulating terrain.

Adjacent communities and inclusions consist of essentially the same vegetation community types. The dominant types include patches of buckbrush shrublands and aspen groves, which tend to grow in depressions and on north- and east-facing slopes. These sites have high edaphic moisture regimes capable of supporting shrubs and/or trees. The other common types are the Plains Rough Fescue Herbaceous Vegetation Type, which usually occurs on slightly moister sites such as down-slope from the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type or adjacent to aspen groves, and the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type, which occupies slightly drier sites such as on the crests of knolls.

9. STATUS

ESR SRANK

ESR SREASONS

SEXEMPLARY.EO Not yet available.

SEXEMP.EO.SITENAME Not yet available.

SSTATCOM

Due to the high agricultural activity in the Central Parkland Subregion, it is assumed that there are few remaining acres. The pressure to graze or cultivate more land causes the remaining acres to be very vulnerable to extirpation. According to Wallis (1990), it is estimated that 90-95% of the original native vegetation of the Central Parkland Subregion has been totally destroyed by clearing or cultivation. Very little native grassland exists and no sizeable areas remain ungrazed. Field work planned for 1999 should confirm whether the above assumptions are correct.

10. MANAGEMENT

SECONCOM
Livestock grazing; fall mowing for hay; recreation (e.g., photography, bird-watching); maintenance of soil and groundwater level.

SMANAGE.COM
Plains rough fescue-western porcupine grass prairie is a valuable range resource, however grazing intensities beyond light to moderate grazing result in a shift towards other community types (Vujnovic 1998).

Prescribed burns, if planned correctly, can be used to prevent tree and shrub encroachment into fescue grasslands as well as excessive thatch build-up. Plains rough fescue-western porcupine grass prairie is tolerant to fire and can be maintained by them (Gerling *et al*. 1995). Antos *et al*. (1983) suggest that fire frequencies in the range of 5 to 10 years may be most beneficial to the maintenance of rough fescue. Plains rough fescue is generally more resistant to severe damage from fire than mountain rough fescue because of its rhizomatous nature. Plants are generally most tolerant of dormant season burning (Bailey and Anderson 1978). According to Bailey and Anderson (1978), fall is the best time to burn plains rough fescue but is not a good time to burn western porcupine grass. There is apparently no affect on floral initiation or subsequent seed development of plains rough fescue. However, Gerling *et al*. (1995) found that it tolerates single burns at any time of the year, but early spring fires have the greatest benefits by increasing tillering, inflorescence density and standing crop. The canopy coverage of western porcupine grass was not affected by spring burning (Bailey and Anderson 1978). Spring burns should be conducted as soon after snowmelt as possible to minimize fire damage (Bailey and Anderson 1978).

"Conservation burning" is another management approach (Romo 1997), where the goal is to replicate historical disturbances which were quite variable. Peak fire seasons in the plains rough fescue grasslands were from March to May, after snowmelt, and July to November. Fires were least likely over winter. However, they could occur at any time of year, and varied in type, frequency, intensity and area. By varying burns with respect to these factors, the natural variability of the grasslands would be achieved and maintained. Small fires with a variable burn interval are recommended (Romo 1997) since frequent, large scale burns may cause a shift towards species of the mixed praire association (Anderson and Bailey 1980). It should be noted that conservation burning would not necessarily maintain a single community type.

Mowing is another management tool. Gerling *et al*. (1995) found that the effects of burning and mowing on herbage yield and morphology of plains rough fescue were similar.

11. INVENTORY AND SAMPLING PROCEDURES

SIMAGERY.COM

The element can easily be distinguished from forested community types on air photos and Landsat imagery. It can be distinguished from shrub community types on large scale air photos (1:30,000 or larger), as well as cultivated land and improved pastures. It cannot be distinguished from similar native grassland communities. The preferred scale of aerial photography is 1:20,000 or larger, either colour or black and white infrared.

SSAMPLE.STRATEGY

This community should be sampled using two different techniques as described by Robertson and Adams (1990). The first method uses a quadrat frame or frames (i.e., 0.1 m^2 microplot) placed either randomly or systematically at several locations (i.e., 15 sites) to determine the cover of each individual plant species. Data are recorded on the MF5 inventory form. Within each of the same frames at each location, the percent weight by volume of each plant species is estimated. The data are recorded on the LC55 form. Using this information for the range site type and appropriate precipitation zone, range condition ratings are calculated as outlined in the Guide to Range Condition and Stocking Rates for Alberta (Wroe *et al.* 1988). These methods have been standardised by Alberta Agriculture, Food and Rural Development (Public Lands Division) and Alberta Environmental Protection (Forest Service).

SINVENTORY.COM

Using either air photos or Landsat imagery, grassland can easily be distinguished from forested community types. Grassland can further be distinguished from shrub as well as cultivated land and improved pastures community types on large scale air photos (1:30,000 or larger). However, ground truthing is required to distinguish it from similar native grassland communities.

Locations should be documented using G.P.S.. If the community is to be sampled, two different techniques as described by Robertson and Adams (1990) should be used. Using these methods, comparison can be made among sites since they have been standardised by Alberta Agriculture, Food and Rural Development (Public lands Division) and Alberta Environmental Protection (Forest Service).

12. ANALYSIS PROCEDURES AND DATA MANAGEMENT

SANALYSIS.COM

The type of data and the analysis varied among those who have described this element.

Vujnovic (1998) recorded the percent cover of each plant species to the nearest 1% within 1 m^2 quadrats placed in grassland remnants. An agglomerative clustering method, the Unweighted Arithmetical Average Clustering (UPGMA), and canonical correspondence analysis (CANOCO

3.1) (ter Braak 1988, 1990) were employed to evaluate similarities among quadrats with respect to plant species composition and environmental variables. The resultant 19 groups of quadrats varied in species dominance and composition. Although Vujnovic (1998) did not give community names to her groupings, Group B appears to match the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type based on the dominant species.

Legris and Cornish (1997) gathered vegetation data according to the procedures outlined in the Ecological Land Survey Site Description Manual (Alberta Environmental Protection 1994). At each site, all plant species were recorded along a 10 m transect and percent canopy cover was estimated. Microplot data were averaged for each transect. Vegetation data were analysed using a two-way indicator species analysis (TWINSPAN) (Hill 1979), which ranked the survey sites based on their similarity to each other in terms of species composition and cover values. The resultant groupings of sites were then reassessed and adjusted to more closely reflect the vegetation associations as they were found in the field. Species composition of each community type was then based on an average of the species cover values of the grouped sites (Legris and Cornish 1997).

Vegetation data of Gerling *et al*. (1996) consisted of canopy cover estimates of each species. These data were subjectively analysed to derive community types based on dominant species.

Wheeler (1976) collected canopy cover data for each plant species and calculated percent frequency. Similar sites were grouped based on species composition and dominance.

SANALYSIS.DATA.MANAGE.COM
The type of data and the analysis varied among those who have described this element.

Vujnovic (1998) recorded percent cover of each plant species and employed an agglomerative clustering method and canonical correspondence analysis to evaluate similarities among quadrats. Vujnovic's (1998) data are in the possession of Ksenija Vujnovic, currently with Geowest Environmental Consultants Ltd., Edmonton.

Legris and Cornish (1997) analysed their vegetation data, consisting of percent cover values for each species at each site, using the computer program TWINSPAN (Hill 1979), which ranked the survey sites based on their similarity to each other in terms of species composition and cover values. The data are with the Resource Data Division of Alberta Environmental Protection, Edmonton.

Community types described by Gerling *et al*. (1996) were derived subjectively based on dominant species. The data are housed with Public Lands regional offices, Alberta Agriculture, Food and Rural Development.

Wheeler (1976) differentiated community types based on species composition and dominance using canopy cover data.

13. GENERAL COMMENTS

SCOMMUNITY.COM No further comments.

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TERRESTRIAL COMMUNITY CLASSIFICATION ABSTRACT SUB-NATIONAL
***Festuca hallii-Stipa curtiseta-Carex* spp. Herbaceous Vegetation**

1. IDENTIFIERS

SEL.SUMMARY
The Plains Rough Fescue-Western Porcupine Grass-Upland Sedge (*Festuca hallii-Stipa curtiseta-Carex obtusata*/*pensylvanica*/*stenophylla*) Herbaceous Vegetation Type was described by Gerling *et al.* (1996), Coupland and Brayshaw (1953) and Carbyn (1971). It represents a climax community on level to undulating topography and hummocky terrain. It develops on Solonetzic soils or Dark Brown Chernozems and is characterised by the co-dominance of plains rough fescue, western porcupine grass and upland sedges, and the presence of June grass (*Koeleria macrantha*) and wheat grass(es) (*Agropyron* spp.). In low areas, there is a tendency for water to pond on Solonetzic sites.

ET SNAME
Festuca hallii-Stipa curtiseta-Carex spp. Herbaceous Vegetation

ET SCOMNAME
Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation

2. CLASSIFICATION

ET	SYSTEM	Terrestrial
ET	CLASS	Herbaceous
ET	SUBCLASS	Perennial graminoid
ET	GROUP	Temperate or subpolar grassland
ET	FORMATION	Medium-tall bunch temperate or subpolar grassland
ET	ALLIANCE	*Festuca hallii* herbaceous alliance

SIMILAR COMMUNITIES
Plains Rough Fescue Herbaceous Vegetation Type, described by Blood (1966), Wroe (1971), Fehr (1982), Legris and Cornish (1997) and Vujnovic (1998), also contains plains rough fescue and western porcupine grass as constant species. However, the plains rough fescue cover is much higher than western porcupine grass, and sedge may or may not be present and/or common. On slopes, this type is positioned below the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge type.

Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type, described by Wheeler (1976), Gerling *et al.* (1996), Legris and Cornish (1997) and Vujnovic (1998), differs by having only plains rough fescue and western porcupine grass as co-dominants, and may or may not contain sedge species. This type is intermediate between Plains Rough Fescue Herbaceous Vegetation Type and Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type in terms of moisture and drainage. The Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Type, described by Wroe (1971), Wheeler (1976), Fehr (1982) and Legris and Cornish (1997), also contains plains rough fescue, western porcupine grass and June grass as constant species. However, the western porcupine grass cover is higher or equal to plains rough fescue, and sedge may or may not be present and/or common.

The Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type is sometimes considered to be a subtype of the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type (Harry Loonen, pers. comm.).

3. RELATED NOMENCLATURE

SOTHER.NAMES
Rough Fescue-Western Porcupine Grass-Upland Sedge (*Festuca scabrella-Stipa curtiseta-Carex* spp.) Community Type

SOTHER.NAMES.RELATION
+

SOTHER.NAMES.RELATION.NOTE
A Rough Fescue-Western Porcupine Grass-Upland Sedge (*Festuca scabrella-Stipa curtiseta-Carex* spp.) community type could refer to a plains rough fescue-dominated community if it is documented within the range of *F. hallii*. It could refer to a similar community dominated by a different species of rough fescue if it is not.

SNAMES.COM
Rough Fescue-Western Porcupine Grass-Upland Sedge (*Festuca scabrella-Stipa curtiseta-Carex* spp.) could refer to the same community type when it occurs within the range of *F. hallii*. If it is found outside the usual range of *F. hallii*, it could either be an outlier of the *F. hallii-Stipa curtiseta-Carex* spp. type, or it could be a similar community dominated by a different species of rough fescue. This has arisen due to the taxonomic split of the rough fescue (*Festuca scabrella*) complex into plains rough fescue (*F. hallii*), mountain rough fescue (*F. campestris*) and northern rough fescue (*F. altaica*).

4. DISTRIBUTION

ESR SRANGE
The exact range of the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type is unknown. Most range descriptions are for the rough fescue grassland as a whole, which includes different community types contained within the rough fescue complex. Plains rough fescue occurs primarily in western Canada from the northern foothills of Alberta, east through central Alberta, then descending southeastward in a band through Saskatchewan and into southwest Manitoba, with outliers in the Peace River Parkland Subregion, Sweetgrass Hills/Milk River Ridge, Cypress Hills and remnant prairie of northwestern Ontario (Aitken *et al*.1998). The former extent of the fescue prairie in the eastern part of its range is not completely known since much of the suitable habitat was converted to agriculture before vegetation surveys were conducted (Rowe and Coupland 1984).

ESR SRANGECOM
Historically, the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type probably occurred throughout the Northern Fescue Prairie and Aspen Parkland of Alberta, Saskatchewan and Manitoba.

Since this community type is associated with deep, nutrient rich, organic soils on gentle slopes to level terrain, much of the original grassland has been cultivated and converted to cropland. At present, in Manitoba the fescue grassland communities are considered to be very rare and are ranked S1 by the Manitoba Conservation Data Centre. There are less than 20 occurrences with an estimated total area of less than 1000 ha. This includes all community types containing rough fescue. The Saskatchewan Conservation Data Centre has assigned a rank of S2 or very rare, to the plains rough fescue alliance (includes one or more plant communities). An inventory of occurrences of fescue grassland revealed approximately 354 ha, mostly in protected areas such as provincial and national parks. In Alberta, a complete inventory has not been completed. However, it is estimated that less than 20,000 ha of plains rough fescue grassland in excellent condition exist (National Fescue Grassland Inventory 1997).

SDISTRIBUTION.COM
The element occurs in the Northern Fescue Subregion and Central Parkland Subregion, and possibly in the Foothills Fescue Subregion and Foothills Parkland Subregion of Alberta.

5. ENVIRONMENTAL FACTORS

SMINELEV	No information
SMAXELEV	No information
SLANDFORM	Level to undulating topography, hummocky terrain.
STOPO.POSITION	No information
SSLOPE	No information
SASPECT	No information

SGEOLOGY.COM
Lacustrine, morainal or alluvial parent materials (Belcher 1996) over bedrock of sandstone, coal, shale and bentonite originating from the Upper Cretaceous Period (Bradley and Bradley 1977).

SSOIL.TYPE	Dark Brown Chernozems and Solonetzic soils.
SSOIL.MOISTURE	No information
SSOIL.COM	No information

SHYDRO.INFLUENCE
In low areas, there is a tendency for water to pond on Solonetzic sites (Gerling *et al.* 1996).

SSEASONAL.VAR	None known

SKEY.ENVIRO.FACTORS
Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The Plains Rough Fescue-Western Porcupine Grass-Sedge Herbaceous Vegetation Type has been described from the Northern Fescue and Central Parkland Subregions. The following climate information was taken from Strong and Leggat (1992) for the Aspen Parkland Ecoregion, which includes the Central and Foothills Parkland Subregions, and the northern half of the Northern Fescue Subregion.

The regional climate influencing this element is a result of the interaction of components of the boreal and mixed grassland climates. In addition, the mid-Alberta storm track has a significant influence on the climate. The major difference in climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June.

Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures.

Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate. The climate of this element favours a successional trend toward forests.

SENVIRO.COM
There is very little documented regarding environmental conditions associated with the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type. It occurs on level to undulating topography and hummocky terrain (Belcher 1996; Gerling *et al.* 1996). Soils are generally derived from lacustrine, morainal or alluvial parent materials (Belcher 1996) and are Dark Brown Chernozems, although Gerling *et al.* (1996) indicates that Solonetzic soils can be present.

Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The following climate information was taken from Strong and Leggat (1992). The major difference in the climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June. Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures. Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate. The climate of this element favours a successional trend toward forests.

6. BIOLOGICAL AND STRUCTURAL DESCRIPTION

6a. VEGETATION

SSTRATA.LIFEFORM Shrub, herb

SPCT.COVER
Shrub: <25%
Herb: 75% or greater

SHEIGHT No information

SMOST.ABUND.SPP
Shrub layer: *Rosa acicularis*/*arkansana and Amelanchier alnifolia*
Herb layer: *Festuca hallii*, *Stipa curtiseta*, *Carex obtusata, Carex stenophylla and Carex pensylvanica*

SSUNVEGETATED.SURFACE
Little unvegetated surface due to the high litter accumulation.

SSUNVEGETATED.SURFACE.COVER No information

SCONSTANT.SPP
Festuca hallii, *Stipa curtiseta*, *Carex* spp., *Koeleria macrantha*, *Agropyron* spp., *Artemisia frigida*, *Anemone* spp., *Antennaria* spp.

SCHARACTERISTIC.SPP None

SVEGETATION.COM
The Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type consists of no more than two vegetation strata: the herb and shrub layers. The shrub layer covers less than 25% and the herb layer covers the remainder. Plains rough fescue has the highest cover, followed closely by western porcupine grass and sedge species. These, along with June grass, wheat grasses, pasture sage, anemone and everlasting are found consistently within this community type. All occur in other community types as well. Shrub cover is low or absent and may include prickly rose, prairie rose and/or saskatoon. The characteristic deep accumulation of litter due to the resistance of plains rough fescue to decomposition (Dormaar 1975) results in little bare ground.

6b. OTHER SPECIES

SHIGH.RANK.SPP
Sprague's pipit (blue list, S4B), ferruginous hawk (blue list, S4B), long-billed curlew (blue list, S3B), upland sandpiper (yellow A list, S3B), Baird's sparrow (yellow A list, S3B), turkey vulture (yellow B list, S2B).

SFAUNA.COM
Coyote, red fox, whitetail deer, mule deer, whitetail jackrabbit, badger, least weasel, long-tailed weasel, Richardson's ground squirrel, thirteen-lined ground squirrel, northern pocket gopher, deer mouse, meadow vole, prairie vole, sharp-tail grouse, western meadowlark, savannah sparrow, vesper sparrow, horned lark, tree swallow, Brewer's blackbird, brown-headed cowbird, red-tailed hawk, Swainson's hawk, sharp-shinned hawk, northern harrier, merlin, marbled godwit, willet.

SOTHER.SPP.COM
The preferred nesting habitat of Baird's sparrow, a potentially threatened species in Alberta, is tall fescue grassland with a great tangle of grass at ground level (Semenchuk 1992).

6c. VARIABILITY

SSPP.COMP.VAR
While *Festuca hallii*, *Stipa curtiseta*, *Carex* spp., *Koeleria macrantha* and *Agropyron* spp. are always present, other graminoid species may or may not be present, including *Helictotrichon hookeri*, *Poa* spp., *Distichlis stricta*, *Puccinellia nuttalliana*, *Agrostis scabra* and *Bouteloua gracilis*. Forb species can also vary, with *Selaginella densa*, *Galium boreale*, *Artemisia frigida*, *Anemone* spp. and *Antennaria* spp. most commonly occurring. Some other potential forb species include *Artemisia ludoviciana*, *Solidago missouriensis*, *Thermopsis rhombifolia*, *Vicia americana*, *Comandra umbellata*, *Potentilla* spp. and *Aster* spp. Shrub species may or may not be present, and often include *Rosa arkansana*, *Rosa acicularis* and *Amelanchier alnifolia*.

SPHYSIOG.VAR
There may or may not be a shrub layer along with the herb layer.

SSUBTYPES None

SVARIABILITY.COM
While *Festuca hallii*, *Stipa curtiseta*, *Carex* spp., *Koeleria macrantha* and *Agropyron* spp. are always present, other graminoid species may or may not be present. Forb species can also vary. Shrub species may or may not be present.

7. DYNAMIC PROCESSES

SNAT.DISTURBANCE
Fire can be a large or small scale natural disturbance, although it was more common in the past. Fire was essential for maintaining the grassland openings in the parklands of the Northern Great Plains before settlement by the Europeans in the late 1800s (Nelson and England 1971). With fire suppression, succession towards shrublands and forest is occurring (Moss and Campbell 1947; Bird 1961; Nelson and England 1971; Bailey and Wroe 1974; Bailey and Anderson 1978; Anderson and Bailey 1980; Gerling *et al*. 1995). Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

SSUCCESS.STATUS Edaphic climax

SSUCCESS.DYNAM.COM
Fire can be a large or small scale natural disturbance, although it was more common in the past. Without occasional fire, this community can be invaded by shrubs and aspen, increasing the moisture regime and favouring the establishment of forest cover. Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

8. SPATIAL RELATIONS

SSIZE
Depending on the position on the landscape and historical land use, this community can be relatively small in area or cover large tracts of land.

SSPATIAL DISTRIBUTION
Patchy, e.g., on knob and kettle topography, or continuous on undulating terrain.

SADJACENT.COMMUNITIES
The primary community types adjacent to the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type include shrub-dominated, wooded and graminoid-dominated communities. The shrub communities are usually composed of rose (*Rosa* spp.), buckbrush (*Symphoricarpos occidentalis*) and saskatoon (*Amelanchier alnifolia*), and the wooded community of aspen (*Populus tremuloides*). These communities grow in depressions, coulees and on north- or east-facing slopes. These sites have high edaphic moisture regimes capable of supporting shrubs and/or trees.

The main graminoid communites found adjacent to the element are the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type and Plains Rough Fescue Herbaceous Vegetation Type. The Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type occupies slightly moister sites such as below the Plains Rough Fescue-Western Porcupine

Grass-Upland Sedge Herbaceous Vegetation Type. The Plains Rough Fescue Herbaceous Vegetation Type usually occurs on still moister sites such as down-slope from the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type or adjacent to aspen groves.

SINCLUSION.COMMUNITIES
The dominant inclusions within the community include patches of rose, buckbrush and/or saskatoon shrublands and aspen groves, which tend to grow in depressions and on north- and east-facing slopes. There are two other common inclusions. The Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type occupies slightly moister sites such as below the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type. The Plains Rough Fescue Herbaceous Vegetation Type usually occurs on still moister sites such as down-slope from the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type or adjacent to aspen groves.

Other herbaceous inclusions include: the *Festuca hallii-Calamovilfa longifolia* community type (on aeolian deposits) and the *Festuca hallii-Koeleria macrantha/Juniperus horizontalis*/forb complex (on exposed sites associated with shallow soils or exposed bedrock).

SMOSAIC.COM
The element itself does not represent a mosaic of sub-associations.

SSPATIAL.COM
Depending on the position on the landscape and historical land use, the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type can be relatively small in area or cover large tracts of land. It can be patchy, e.g., on knob and kettle topography, or continuous on undulating terrain.

Adjacent communities and inclusions consist of essentially the same vegetation community types. The dominant types include patches of rose, buckbrush and/or saskatoon shrublands and aspen groves. The other common types are the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type and the Plains Rough Fescue Herbaceous Vegetation Type.

9. STATUS
ESR SRANK

ESR SREASONS

SEXEMPLARY.EO Not yet available.

SEXEMP.EO.SITENAME Not yet available.

SSTATCOM

Due to the high agricultural activity in the Central Parkland Subregion, it is assumed that there are few remaining acres. The pressure to graze or cultivate more land causes the remaining acres to be very vulnerable to extirpation. According to Wallis (1990), it is estimated that 90-95% of the original native vegetation of the Central Parkland Subregion has been totally destroyed by clearing or cultivation. Very little native grassland exists and no sizeable areas remain ungrazed. Field work planned for 1999 should confirm whether the above assumptions are correct.

10. MANAGEMENT

SECONCOM
Livestock grazing; recreation (e.g., photography, bird-watching); maintenance of soil and groundwater level.

SMANAGE.COM
Plains rough fescue-western porcupine grass-sedge prairie is a valuable range resource, however grazing intensities beyond light to moderate grazing result in a shift towards other community types.

Prescribed burns, if planned correctly, can be used to prevent tree and shrub encroachment into fescue grasslands as well as excessive thatch build-up. Antos *et al*. (1983) suggest that fire frequencies in the range of 5 to 10 years may be most beneficial to the maintenance of rough fescue. Plains rough fescue is generally more resistant to severe damage from fire than mountain rough fescue because of its rhizomatous nature. Plants are generally most tolerant of dormant season burning (Bailey and Anderson 1978). According to Bailey and Anderson (1978), fall is the best time to burn plains rough fescue and sedge but is not a good time to burn western porcupine grass. There is apparently no affect on floral initiation or subsequent seed development of plains rough fescue. However, Gerling *et al*. (1995) found that it tolerates single burns at any time of the year, but early spring fires have the greatest benefits by increasing tillering, inflorescence density and standing crop. The canopy coverage of western porcupine grass was not affected by spring burning (Bailey and Anderson 1978). Annual early spring burning favoured blunt sedge (*Carex obtusata*), which increased in frequency and canopy cover (Anderson and Bailey 1980). Spring burns should be conducted as soon after snowmelt as possible to minimize fire damage (Bailey and Anderson 1978).

"Conservation burning" is another management approach (Romo 1997), where the goal is to replicate historical disturbances which were quite variable. Peak fire seasons in the plains rough fescue grasslands were from March to May, after snowmelt, and July to November. Fires were least likely over winter. However, they could occur at any time of year, and varied in type, frequency, intensity and area. By varying burns with respect to these factors, the natural variability of the grasslands would be achieved and maintained. Small fires with a variable burn interval are recommended (Romo 1997) since frequent, large scale burns may cause a shift towards species of the mixed praire association (Anderson and Bailey 1980). It should be noted that conservation burning would not necessarily maintain a single community type.

11. INVENTORY AND SAMPLING PROCEDURES

SIMAGERY.COM
The element can easily be distinguished from forested community types on air photos and Landsat imagery. It can be distinguished from shrub community types on large scale air photos (1:30,000 or larger), as well as cultivated land and improved pastures. It cannot be distinguished from similar native grassland communities. The preferred scale of aerial photography is 1:20,000 or larger, either colour or black and white infrared.

SSAMPLE.STRATEGY
This community should be sampled using two different techniques as described by Robertson and Adams (1990). The first method uses a quadrat frame or frames (i.e., 0.1 m^2 microplot) placed either randomly or systematically at several locations (i.e., 15 sites) to determine the cover of each individual plant species. Data are recorded on the MF5 inventory form. Within each of the same frames at each location, the percent weight by volume of each plant species is estimated. The data are recorded on the LC55 form. Using this information for the range site type and appropriate precipitation zone, range condition ratings are calculated as outlined in the Guide to Range Condition and Stocking Rates for Alberta (Wroe *et al.* 1988). These methods have been standardised by Alberta Agriculture, Food and Rural Development (Public Lands Division) and Alberta Environmental Protection (Forest Service).

SINVENTORY.COM
Using either air photos or Landsat imagery, grassland can easily be distinguished from forested community types. Grassland can further be distinguished from shrub as well as cultivated land and improved pastures community types on large scale air photos (1:30,000 or larger). However, ground truthing is required to distinguish it from similar native grassland communities.

Locations should be documented using G.P.S.. If the community is to be sampled, two different techniques as described by Robertson and Adams (1990) should be used. Using these methods, comparison can be made among sites since they have been standardised by Alberta Agriculture, Food and Rural Development (Public lands Division) and Alberta Environmental Protection (Forest Service).

12. ANALYSIS PROCEDURES AND DATA MANAGEMENT

SANALYSIS.COM
Vegetation data of Gerling *et al*. (1996) consisted of canopy cover estimates of each species. These data were subjectively analysed to derive community types based on dominant species.

Carbyn (1971) recorded the cover class of each plant species, along with the frequency of occurrence within quadrats of 3 square feet. These two values were used to calculate “importance values”. Although Carbyn (1971) did not classify the vegetation description, it appears to match

the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type based on the importance values.

Coupland and Brayshaw (1953) recorded the percent basal cover of each plant species using the point-transect method, and calculated the percentage composition. Although Coupland and Brayshaw (1953) did not classify the vegetation description, it appears to match the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type based on the dominant species.

SANALYSIS.DATA.MANAGE.COM
Community types described by Gerling *et al*. (1996) were derived subjectively based on dominant species. The data are housed with Public Lands regional offices, Alberta Agriculture, Food and Rural Development. Benchmark sites that have vegetation communities similar to the element include sites Kg, Vy and Ml, at SE 29-40-4 W4M, SE 14-36-2 W4M and NE 21-39-7 W4M, respectively, which are dominated by plains rough fescue and sedge species. The Benchmark site at SW 22-40-9 W4M is dominated by plains rough fescue, sedge species, western porcupine grass and western wheat grass. The Benchmark site at NE 34-40-5 W4M is dominated by plains rough fescue, sedge species and western porcupine grass. More detailed location descriptions are available from the Public Lands office in Wainwright.

Carbyn (1971) described a community resembling the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type based on plant species cover class and frequency of occurrence. The data of Carbyn (1971) are likely housed with the Canadian Wildlife Service, Environment Canada, Edmonton.

Coupland and Brayshaw (1953) described a community resembling the Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Type based on the percent basal cover of each plant species.

13. GENERAL COMMENTS

SCOMMUNITY.COM No further comments.

15. REFERENCES

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TERRESTRIAL COMMUNITY CLASSIFICATION ABSTRACT SUB-NATIONAL
***Festuca hallii-Stipa viridula*/Forbs Herbaceous Vegetation**

1. IDENTIFIERS

SEL.SUMMARY
The Plains Rough Fescue-Green Needle Grass/Forbs (*Festuca hallii-Stipa viridula*/Forbs) Herbaceous Vegetation Type has been described in the Hand Hills Ecological Reserve of the Northern Fescue Subregion (Legris and Cornish 1997). It occurred on steep south- and southwest-facing escarpment slopes in association with submesic to subxeric soil moisture regimes and was characterised by drought tolerant species. This community type is apparently present in the Central Parkland Subregion on hilly land where it occupies the south aspects, and the Plains Rough Fescue Herbaceous Vegetation Type occupies the north aspects (H. Loonen, pers. comm.).

ET SNAME
Festuca hallii-Stipa viridula/Forbs Herbaceous Vegetation

ET SCOMNAME
Plains Rough Fescue-Green Needle Grass/Forbs Herbaceous Vegetation

2. CLASSIFICATION

ET	SYSTEM	Terrestrial
ET	CLASS	Herbaceous
ET	SUBCLASS	Perennial graminoid
ET	GROUP	Temperate or subpolar grassland
ET	FORMATION	Medium-tall bunch temperate or subpolar grassland
ET	ALLIANCE	*Festuca hallii* herbaceous alliance

SIMILAR COMMUNITIES
Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type, described by Wheeler (1976), Gerling *et al.* (1996), Legris and Cornish (1997) and Vujnovic (1998), differs by having plains rough fescue and western porcupine grass as co-dominants, and may or may not contain green needle grass. Plains Rough Fescue-Sand Grass Herbaceous Vegetation Type, described by Gerling *et al.* (1996), differs in having plains rough fescue and sand grass as dominants, although green needle grass is also abundant. It occurs on sandy upland sites, frequently modified by aeolian action, rather than steep escarpment slopes. The Plains Rough Fescue-June Grass/Juniper/Forbs Herbaceous Vegetation Type, described by Legris and Cornish (1997), contains green needle grass and western porcupine grass, but it is the plains rough fescue and June grass that are co-dominants, along with creeping juniper.

3. RELATED NOMENCLATURE

SOTHER.NAMES
Rough Fescue-Green Needle Grass/Forbs (*Festuca scabrella-Stipa viridula*/Forbs) Community Type

SOTHER.NAMES.RELATION
+

SOTHER.NAMES.RELATION.NOTE
A Rough Fescue-Green Needle Grass/Forbs (*Festuca scabrella-Stipa viridula*/Forbs) community type could refer to a plains rough fescue-dominated community if it is documented within the range of *F. hallii*. It could refer to a similar community dominated by a different species of rough fescue if it is not.

SNAMES.COM
Rough Fescue-Green Needle Grass/Forbs (*Festuca scabrella-Stipa viridula*/Forbs) Community Type could refer to the same community type when it occurs within the range of *F. hallii*. If it is found outside the usual range of *F. hallii*, it could either be an outlier of the *F. hallii-Stipa viridula*/Forbs type, or it could be a similar community dominated by a different species of rough fescue. This has arisen due to the taxonomic split of the rough fescue (*Festuca scabrella*) complex into plains rough fescue (*F. hallii*), mountain rough fescue (*F. campestris*) and northern rough fescue (*F. altaica*).

4. DISTRIBUTION

ESR SRANGE
The exact range of the Plains Rough Fescue - Green Needle Grass/Forbs Herbaceous Vegetation Type is unknown. Most range descriptions are for the rough fescue grassland as a whole, which includes different community types contained within the rough fescue complex. Plains rough

fescue occurs primarily in western Canada from the northern foothills of Alberta, east through central Alberta, then descending southeastward in a band through Saskatchewan and into southwest Manitoba, with outliers in the Peace River Parkland Subregion, Sweetgrass Hills/Milk River Ridge, Cypress Hills and remnant prairie of northwestern Ontario (Aitken *et al*.1998). The former extent of the fescue prairie in the eastern part of its range is not completely known since much of the suitable habitat was converted to agriculture before vegetation surveys were conducted (Rowe and Coupland 1984).

ESR SRANGECOM
Historically, the Plains Rough Fescue-Green Needle Grass/Forbs Herbaceous Vegetation Type probably occurred throughout the Northern Fescue Prairie and Aspen Parkland of Alberta, Saskatchewan and Manitoba.

At present, in Manitoba the fescue grassland communities are considered to be very rare and are ranked S1 by the Manitoba Conservation Data Centre. There are less than 20 occurrences with an estimated total area of less than 1000 ha. This includes all community types containing rough fescue. The Saskatchewan Conservation Data Centre has assigned a rank of S2 or very rare, to the plains rough fescue alliance (includes one or more plant communities). An inventory of occurrences of fescue grassland revealed approximately 354 ha, mostly in protected areas such as provincial and national parks. In Alberta, a complete inventory has not been completed. However, it is estimated that less than 20,000 ha of plains rough fescue grassland in excellent condition exist (National Fescue Grassland Inventory 1997).

SDISTRIBUTION.COM
The element is expected to occur in the Northern Fescue Subregion and Central Parkland Subregion, and possibly in the Foothills Fescue Subregion and Foothills Parkland Subregion of Alberta.

5. ENVIRONMENTAL FACTORS

SMINELEV	No information
SMAXELEV	No information
SLANDFORM	Escarpment slopes
STOPO.POSITION	Upper to lower slopes of the escarpment.
SSLOPE	14.5°
SASPECT	South and southwest

SGEOLOGY.COM	Morainal veneer over bedrock.
SSOIL.TYPE	Gleyed Dark Brown Chernozem
SSOIL.MOISTURE	Submesic to subxeric

SSOIL.COM
Soils can be described as silty loams over clay with a pH of 6.5 (B horizon) and depth of 30 cm to carbonates (Legris and Cornish 1997).

SHYDRO.INFLUENCE	Moderately well drained
SSEASONAL.VAR	None known

SKEY.ENVIRO.FACTORS
Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The Plains Rough Fescue-Green Needle Grass/Forbs Herbaceous Vegetation Type occurs in the Northern Fescue and Central Parkland Subregions. The following climate information was taken from Strong and Leggat (1992) for the Aspen Parkland Ecoregion, which includes the Central and Foothills Parkland Subregions, and the northern half of the Northern Fescue Subregion.

The regional climate influencing this element is a result of the interaction of components of the boreal and mixed grassland climates. In addition, the mid-Alberta storm track has a significant influence on the climate. The major difference in climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June.

Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures.

Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate.

SENVIRO.COM
The Plains Rough Fescue-Green Needle Grass/Forbs Herbaceous Vegetation Type has been found on upper to lower slopes of escarpments of the Hand Hills Ecological Reserve (Legris and Cornish 1997). It requires submesic to subxeric, moderately well-drained soils, and tends to occur on south- and southwest-facing slopes. Soils are derived from morainal veneer over bedrock, and consist of Gleyed Dark Brown Chernozems (Legris and Cornish 1997).

Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The following climate information was taken from Strong and Leggat (1992). The major difference in the climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June. Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures. Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate.

6. BIOLOGICAL AND STRUCTURAL DESCRIPTION

6a. VEGETATION

SSTRATA.LIFEFORM	Herb
SPCT.COVER	Herb: 100%
SHEIGHT	No information

SMOST.ABUND.SPP
Herb layer: *Festuca hallii*, *Stipa viridula, Artemisia ludoviciana*

SSUNVEGETATED.SURFACE	Mineral soil
SSUNVEGETATED.SURFACE.COVER	5%

SCONSTANT.SPP
Festuca hallii, *Stipa viridula, Stipa curtiseta*, *Koeleria macrantha*, *Calamovilfa longifolia*, *Artemisia ludoviciana*

SCHARACTERISTIC.SPP None

SVEGETATION.COM
The Plains Rough Fescue-Green Needle Grass/Forbs Herbaceous Vegetation Type consists of only one vegetation stratum: the herb layer. Plains rough fescue is the most abundant species, followed by green needle grass. These, along with western porcupine grass, June grass, sand grass and prairie sagewort are found consistently within this community type. All occur in other community types as well. Mineral soil cover is low at 5%.

6b. OTHER SPECIES

SHIGH.RANK.SPP
Sprague's pipit (blue list, S4B), ferruginous hawk (blue list, S4B), long-billed curlew (blue list, S3B), upland sandpiper (yellow A list, S3B), turkey vulture (yellow B list, S2B).
SFAUNA.COM
Coyote, red fox, whitetail deer, mule deer, whitetail jackrabbit, badger, least weasel, long-tailed weasel, Richardson's ground squirrel, thirteen-lined ground squirrel, northern pocket gopher, deer mouse, meadow vole, prairie vole, sharp-tail grouse, western meadowlark, savannah sparrow, vesper sparrow, horned lark, tree swallow, Brewer's blackbird, brown-headed cowbird, red-tailed hawk, Swainson's hawk, sharp-shinned hawk, northern harrier, merlin.

SOTHER.SPP.COM

6c. VARIABILITY

SSPP.COMP.VAR
While *Festuca hallii*, *Stipa viridula, Stipa curtiseta*, *Koeleria macrantha*, *Calamovilfa longifolia* and *Artemisia ludoviciana* are always present, other graminoid species may be present, including *Agropyron dasystachyum* and *Bouteloua gracilis*. Other forb species may include *Geum triflorum*, *Heterotheca villosa*, *Thermopsis rhombifolia*, *Comandra umbellata*, *Senecio canus*, *Opuntia polyacantha*, *Lithospermum incisum*, *Astragalus crassicarpus* and *A. tenellus*.

SPHYSIOG.VAR There is only a herb layer.

SSUBTYPES None

SVARIABILITY.COM
While *Festuca hallii*, *Stipa viridula, Stipa curtiseta*, *Koeleria macrantha*, *Calamovilfa longifolia* and *Artemisia ludoviciana* are always present, other graminoid and forb species may be present.

7. DYNAMIC PROCESSES

SNAT.DISTURBANCE
Fire can be a large or small scale natural disturbance, although it was more common in the past. Fire was essential for maintaining the grassland openings in the parklands of the Northern Great Plains before settlement by the Europeans in the late 1800s (Nelson and England 1971). With fire suppression, succession towards shrublands and forest is occurring (Moss and Campbell 1947; Bird 1961; Nelson and England 1971; Bailey and Wroe 1974; Bailey and Anderson 1978; Anderson and Bailey 1980; Gerling *et al*. 1995). Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

SSUCCESS.STATUS Edaphic climax

SSUCCESS.DYNAM.COM
Fire can be a large or small scale natural disturbance, although it was more common in the past. Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

8. SPATIAL RELATIONS

SSIZE
The Plains Rough Fescue-Green Needle Grass/Forbs Herbaceous Vegetation Type is not very common (H. Loonen, pers. comm.).

SSPATIAL DISTRIBUTION Patchy

SADJACENT.COMMUNITIES
The Plains Rough Fescue Herbaceous Vegetation Type occupies the north aspects of hills bearing the Plains Rough Fescue-Green Needle Grass/Forbs Herbaceous Vegetation Type (H. Loonen, pers. comm.). Other potential community types adjacent to the Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type include the shrub-dominated community of buckbrush (*Symphoricarpos occidentalis*) and the wooded community of aspen (*Populus tremuloides*), and the Plains Rough Fescue-Western Porcupine Grass and Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Types. The former two grow in depressions, coulees and on north- or east-facing slopes. These sites have high edaphic moisture regimes capable of supporting shrubs and/or trees.

SINCLUSION.COMMUNITIES
The dominant inclusions within the community include patches of buckbrush shrublands and aspen groves, which tend to grow in depressions and on north- and east-facing slopes. These sites have high edaphic moisture regimes capable of supporting shrubs and/or trees. Other potential

inclusions are the Plains Rough Fescue Herbaceous Vegetation Type, which usually occurs on north aspects or adjacent to aspen groves, and the Plains Rough Fescue-Western Porcupine Grass and Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Types.

SMOSAIC.COM
The element itself does not represent a mosaic of sub-associations.

SSPATIAL.COM
The Plains Rough Fescue-Green Needle Grass/Forbs Herbaceous Vegetation Type tends to be uncommon and small in area and patchy in distribution.

Adjacent communities and inclusions consist of essentially the same vegetation community types. The dominant types include patches of buckbrush shrublands and aspen groves, which tend to grow in depressions and on north- and east-facing slopes. These sites have high edaphic moisture regimes capable of supporting shrubs and/or trees. Other potential types are the Plains Rough Fescue Herbaceous Vegetation Type, which usually occurs on north aspects or adjacent to aspen groves, and the Plains Rough Fescue-Western Porcupine Grass and Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Types.

9. STATUS

ESR SRANK

ESR SREASONS

SEXEMPLARY.EO Not yet available.

SEXEMP.EO.SITENAME Not yet available.

SSTATCOM
Due to the high agricultural activity in the Central Parkland Subregion, it is assumed that there are few remaining acres. The pressure to graze or cultivate more land causes the remaining acres to be very vulnerable to extirpation. According to Wallis (1990), it is estimated that 90-95% of the original native vegetation of the Central Parkland Subregion has been totally destroyed by clearing or cultivation. Very little native grassland exists and no sizeable areas remain ungrazed. Field work planned for 1999 should confirm whether the above assumptions are correct.

10. MANAGEMENT

SECONCOM
Livestock grazing; recreation (e.g., photography, bird-watching); maintenance of soil and groundwater level.

SMANAGE.COM
Plains rough fescue-green needle grass/forb prairie is a range resource, however grazing intensities beyond light grazing result in a shift towards other community types.

11. INVENTORY AND SAMPLING PROCEDURES

SIMAGERY.COM
The element can easily be distinguished from forested community types on air photos and Landsat imagery. As a rule, it can be distinguished from shrub community types on large scale air photos (1:30,000 or larger), as well as cultivated land and improved pastures. It cannot be distinguished from similar native grassland communities. The preferred scale of aerial photography is 1:20,000 or larger, either colour or black and white infrared.

SSAMPLE.STRATEGY
This community should be sampled using two different techniques as described by Robertson and Adams (1990). The first method uses a quadrat frame or frames (i.e., 0.1 m^2 microplot) placed either randomly or systematically at several locations (i.e., 15 sites) to determine the cover of each individual plant species. Data are recorded on the MF5 inventory form. Within each of the same frames at each location, the percent weight by volume of each plant species is estimated. The data are recorded on the LC55 form. Using this information for the range site type and appropriate precipitation zone, range condition ratings are calculated as outlined in the Guide to Range Condition and Stocking Rates for Alberta (Wroe *et al.* 1988). These methods have been standardised by Alberta Agriculture, Food and Rural Development (Public Lands Division) and Alberta Environmental Protection (Forest Service).

SINVENTORY.COM
Using either air photos or Landsat imagery, grassland can easily be distinguished from forested community types. Grassland can further be distinguished from shrub as well as cultivated land and improved pastures community types on large scale air photos (1:30,000 or larger). However, ground truthing is required to distinguish it from similar native grassland communities.

Locations should be documented using G.P.S.. If the community is to be sampled, two different techniques as described by Robertson and Adams (1990) should be used. Using these methods, comparison can be made among sites since they have been standardised by Alberta Agriculture, Food and Rural Development (Public lands Division) and Alberta Environmental Protection (Forest Service).

12. ANALYSIS PROCEDURES AND DATA MANAGEMENT

SANALYSIS.COM
Vegetation data were gathered according to the procedures outlined in the Ecological Land Survey Site Description Manual (Alberta Environmental Protection 1994). At each site, all plant species were recorded along a 10 m transect and percent canopy cover was estimated. Microplot data were averaged for each transect (Legris and Cornish 1997).

Vegetation data were analysed using a two-way indicator species analysis (TWINSPAN) (Hill 1979), which ranked the survey sites based on their similarity to each other in terms of species composition and cover values. The resultant groupings of sites were then reassessed and adjusted to more closely reflect the vegetation associations as they were found in the field. Species composition of each community type was then based on an average of the species cover values of the grouped sites (Legris and Cornish 1997).

SANALYSIS.DATA.MANAGE.COM
Vegetation data, consisting of percent cover values for each species at each site, were analysed the computer program TWINSPAN (Hill 1979), which ranked the survey sites based on their similarity to each other in terms of species composition and cover values. The data are housed with the Resource Data Division of Alberta Environmental Protection, Edmonton.

13. GENERAL COMMENTS

SCOMMUNITY.COM No further comments.

15. REFERENCES

SA CITATION

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Rowe, J.S. and R.T. Coupland. 1984. Vegetation of the Canadian Prairies. Prairie Forum 9:231-248.

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TERRESTRIAL COMMUNITY CLASSIFICATION ABSTRACT SUB-NATIONAL
***Stipa curtiseta-Festuca hallii* Herbaceous Vegetation**

1. IDENTIFIERS

SEL.SUMMARY
The Western Porcupine Grass-Plains Rough Fescue (*Stipa curtiseta-Festuca hallii*) Herbaceous Vegetation Type was described by Wroe (1971), Wheeler (1976), Fehr (1982) and Legris and Cornish (1997). This is a transitional community type best described as a combination of species from the Mixedgrass and Northern Fescue Subregions. Generally, it is located on plains and southwesterly, southerly and southeasterly slopes and knolls. The soils are rapidly to moderately well drained Dark Brown Chernozems. In the parkland, this community type is a modified rough fescue grassland that may result from grazing pressure, and occurs on a variety of sites.

ET SNAME
Stipa curtiseta-Festuca hallii Herbaceous Vegetation

ET SCOMNAME
Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation

2. CLASSIFICATION

ET	SYSTEM	Terrestrial
ET	CLASS	Herbaceous
ET	SUBCLASS	Perennial graminoid
ET	GROUP	Temperate or subpolar grassland
ET	FORMATION	Medium-tall bunch temperate or subpolar grassland
ET	ALLIANCE	*Festuca hallii* herbaceous alliance

SIMILAR COMMUNITIES
Plains Rough Fescue-Western Porcupine Grass Herbaceous Vegetation Type, described by Wheeler (1976), Gerling *et al.* (1996), Legris and Cornish (1997) and Vujnovic (1998), also contains plains rough fescue and western porcupine grass as co-dominants. However, the plains rough fescue always has higher cover than the western porcupine grass, and the type occurs on moister (mesic to submesic) sites. Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation, described by Gerling *et al.* (1996), Coupland and Brayshaw (1953) and Carbyn (1971), differs by having sedge as a third co-dominant along with plains rough fescue and

western porcupine grass, although plains rough fescue has the highest cover.

3. RELATED NOMENCLATURE

SOTHER.NAMES
Western Porcupine Grass-Rough Fescue (*Stipa curtiseta-Festuca scabrella*) Community Type

SOTHER.NAMES.RELATION
+

SOTHER.NAMES.RELATION.NOTE
A Western Porcupine Grass-Rough Fescue (*Stipa curtiseta-Festuca scabrella*) community type could refer to a community with plains rough fescue as a co-dominant if it is documented within the range of *F. hallii*. It could refer to a similar community with a different species of rough fescue as a co-dominant if it is not.

SNAMES.COM
Western Porcupine Grass-Rough Fescue (*Stipa curtiseta-Festuca scabrella*) refers to the same community type when it occurs within the range of *F. hallii*. If it is found outside the usual range of *F. hallii*, it could either be an outlier of the *Stipa curtiseta-Festuca scabrella* type, or it could be a similar community dominated by a different species of rough fescue. This has arisen due to the taxonomic split of the rough fescue (*Festuca scabrella*) complex into plains rough fescue (*F. hallii*), mountain rough fescue (*F. campestris*) and northern rough fescue (*F. altaica*).

4. DISTRIBUTION

ESR SRANGE
The exact range of the Western Porcupine Grass - Plains Rough Fescue Herbaceous Vegetation Type is unknown. Most range descriptions are for the rough fescue grassland as a whole, which includes different community types contained within the rough fescue complex. Plains rough fescue occurs primarily in western Canada from the northern foothills of Alberta, east through central Alberta, then descending southeastward in a band through Saskatchewan and into southwest Manitoba, with outliers in the Peace River Parkland Subregion, Sweetgrass Hills/Milk River Ridge, Cypress Hills and remnant prairie of northwestern Ontario (Aitken *et al*.1998). The former extent of the fescue prairie in the eastern part of its range is not completely known since much of the suitable habitat was converted to agriculture before vegetation surveys were conducted (Rowe and Coupland 1984).

ESR SRANGECOM
Historically, the Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Type occurred throughout the Northern Fescue Prairie and Aspen Parkland of Alberta, Saskatchewan and Manitoba.

Since this community type is associated with deep, nutrient-rich, organic soils on gentle slopes to level terrain, much of the original grassland has been cultivated and converted to cropland. At present, in Manitoba the fescue grassland communities are considered to be very rare and are ranked S1 by the Manitoba Conservation Data Centre. There are less than 20 occurrences with an estimated total area of less than 1000 ha. This includes all community types containing rough fescue. The Saskatchewan Conservation Data Centre has assigned a rank of S2 or very rare, to the plains rough fescue alliance (includes one or more plant communities). An inventory of occurrences of fescue grassland revealed approximately 354 ha, mostly in protected areas such as provincial and national parks. In Alberta, a complete inventory has not been completed. However, it is estimated that less than 20,000 ha of plains rough fescue grassland in excellent condition exist (National Fescue Grassland Inventory 1997).

SDISTRIBUTION.COM
The element occurs in the Northern Fescue Subregion and Central Parkland Subregion, and possibly in the Foothills Fescue Subregion and Foothills Parkland Subregion of Alberta.

5. ENVIRONMENTAL FACTORS

SMINELEV	861 m
SMAXELEV	884 m

SLANDFORM
Level to slightly rolling plains and undulating topography.

STOPO.POSITION	Lower to upper slopes, plains.
SSLOPE	Level, 3-11E
SASPECT	South, southeast and west.

SGEOLOGY.COM
Morainal veneers and blankets (Legris and Cornish 1997); lacustrine, morainal or alluvial parent materials (Belcher 1996) over bedrock of sandstone, coal, shale and bentonite originating from the Upper Cretaceous Period (Bradley and Bradley 1977).

SSOIL.TYPE	Orthic and Eluviated Dark Brown Chernozems.

SSOIL.MOISTURE Xeric to submesic

SSOIL.COM
Loam, clay loam to silty loam; pH of 7.0 to 8.0 (B horizon) (Legris and Cornish 1997).

SHYDRO.INFLUENCE Rapidly to moderately well drained.

SSEASONAL.VAR None known

SKEY.ENVIRO.FACTORS
Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Type has been described from the Northern Fescue and Central Parkland Subregions. The following climate information was taken from Strong and Leggat (1992) for the Aspen Parkland Ecoregion, which includes the Central and Foothills Parkland Subregions, and the northern half of the Northern Fescue Subregion.

The regional climate influencing this element is a result of the interaction of components of the boreal and mixed grassland climates. In addition, the mid-Alberta storm track has a significant influence on the climate. The major difference in climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June.

Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures.

Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate. The climate of this element favours a successional trend toward forests.

SENVIRO.COM
The Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Type occurs on level to slightly rolling plains and undulating topography (Fehr 1982; Legris and Cornish 1997). It occurs on lower to upper slopes and plains (Wroe 1971; Wheeler 1976; Fehr 1982; Legris and Cornish 1997), depending on the moisture level. It requires xeric to submesic, rapidly to moderately well drained soils, and tends to occur on south-, southeast- and west-facing slopes (Wroe 1971; Wheeler 1976; Fehr 1982). Soils are generally derived from morainal parent materials (Legris and Cornish 1997). Generally, the associated soils are Orthic or Eluviated Dark Brown Chernozems (Wroe 1971; Legris and Cornish 1997). Soil texture can be loam, clay loam

to silty loam and pH is 7.0 to 8.0 (B horizon) (Legris and Cornish 1997).

Climate is a key environmental determinant of the biological composition and structure of grassland communities such as this element. The following climate information was taken from Strong and Leggat (1992). The major difference in the climate of the Central Parkland and Northern Fescue Subregions relative to other fescue-dominated grassland subregions is that precipitation is most abundant in July rather than in June. Total annual precipitation is normally 412 mm with total summer precipitation averaging 259 mm (ranging from 234 to 323 mm). The regions are also distinct in that they have a greater number of days with measurable precipitation than other grassland subregions. Another characteristic is that snow cover remains longer than other grassland subregions due to fewer chinooks, less ablation by wind and colder temperatures. Mean summer temperatures are approximately 14.4°C, with 1,257 growing degree days annually. The average potential evaporation values during the summer are about -50 mm. Mean annual temperature is 3.3°C, which is 1.5°C to 2.0°C lower than other grassland-dominated ecoregions. This reflects the influence of the northern boreal climate. The climate of this element favours a successional trend toward forests.

6. BIOLOGICAL AND STRUCTURAL DESCRIPTION

6a. VEGETATION

SSTRATA.LIFEFORM — Shrub, herb

SPCT.COVER
Shrub: <25%
Herb: 75% or greater

SHEIGHT — No information

SMOST.ABUND.SPP
Shrub layer: *Rosa arkansana*/*woodsii*
Herb layer: *Stipa curtiseta*, *Festuca hallii*

SSUNVEGETATED.SURFACE
Little unvegetated surface due to the high litter accumulation.

SSUNVEGETATED.SURFACE.COVER
0-1%

SCONSTANT.SPP
Stipa curtiseta, *Festuca hallii*, *Koeleria macrantha*, *Artemisia frigida*, *Anemone patens*

SCHARACTERISTIC.SPP None

SVEGETATION.COM
The Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Type consists of no more than two vegetation strata: the herb and shrub layers. The shrub layer covers less than 25% and the herb layer covers the remainder. Western porcupine grass is the most abundant species, followed by plains rough fescue. These, along with June grass, pasture sagewort and prairie crocus, are found consistently within this community type. All occur in other community types as well. Shrub cover is low or absent and may include prairie rose or common wild rose.

6b. OTHER SPECIES

SHIGH.RANK.SPP
Sprague's pipit (blue list, S4B), ferruginous hawk (blue list, S4B), long-billed curlew (blue list, S3B), upland sandpiper (yellow A list, S3B), turkey vulture (yellow B list, S2B), northern grasshopper mouse (yellow B list, S2S3).

SFAUNA.COM
Coyote, red fox, whitetail deer, mule deer, whitetail jackrabbit, badger, least weasel, long-tailed weasel, Richardson's ground squirrel, thirteen-lined ground squirrel, northern pocket gopher, deer mouse, meadow vole, prairie vole, sharp-tail grouse, western meadowlark, savannah sparrow, vesper sparrow, horned lark, chestnut-collared longspur, tree swallow, Brewer's blackbird, brown-headed cowbird, red-tailed hawk, Swainson's hawk, sharp-shinned hawk, northern harrier, merlin, marbled godwit, willet.

SOTHER.SPP.COM

6c. VARIABILITY

SSPP.COMP.VAR
While *Stipa curtiseta*, *Festuca hallii*, *Koeleria macrantha*, *Artemisia frigida* and *Anemone patens* are always present, other graminoid species may be present, including *Bouteloua gracilis*, *Carex* spp., *Poa sandbergii* and *Danthonia intermedia*. Other forb species can also vary, and may include *Selaginella densa*, *Thermopsis rhombifolia*, *Erigeron caespitosus*, *Antennaria parvifolia* (syn. *A. aprica*) and *Artemisia ludoviciana*. Shrub species may or may not be present, and often include *Rosa arkansana* and *R. woodsii*.

SPHYSIOG.VAR
There may or may not be a shrub layer along with the herb layer.

SSUBTYPES None

SVARIABILITY.COM
While *Stipa curtiseta*, *Festuca hallii Koeleria macrantha*, *Artemisia frigida* and *Anemone patens* are always present; other graminoid species may be present. Other forb species can also vary. Shrub species may or may not be present.

7. DYNAMIC PROCESSES

SNAT.DISTURBANCE
Fire can be a large or small scale natural disturbance, although it was more common in the past. Fire was essential for maintaining the grassland openings in the parklands of the Northern Great Plains before settlement by the Europeans in the late 1800s (Nelson and England 1971). With fire suppression, succession towards shrublands and forest is occurring (Moss and Campbell 1947; Bird 1961; Nelson and England 1971; Bailey and Wroe 1974; Bailey and Anderson 1978; Anderson and Bailey 1980; Gerling *et al*. 1995). Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

SSUCCESS.STATUS Seral

SSUCCESS.DYNAM.COM
Fire can be a large or small scale natural disturbance, although it was more common in the past. Without occasional fire, this community can be invaded by shrubs and aspen, increasing the moisture regime and favouring the establishment of forest cover. Small scale disturbances include soil disturbance by burrowing animals, grazing by ungulates and rodents, and soil compaction along game trails.

8. SPATIAL RELATIONS

SSIZE
Depending on the position on the landscape and historical land use, this community can be relatively small in area or cover large tracts of land.

SSPATIAL DISTRIBUTION
Patchy or continuous on plains and undulating terrain.

SADJACENT.COMMUNITIES
The primary community types adjacent to the Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Type include rose thickets and the Plains Rough Fescue-Western Porcupine Grass and Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Types. These types usually occur on slightly moister sites such as down-slope from the Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Type or closer to

aspen groves.

SINCLUSION.COMMUNITIES
The dominant inclusions within the community include patches of rose shrublands, which tend to grow in depressions and on north- and east-facing slopes, as well as the Plains Rough Fescue-Western Porcupine Grass and Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Types. These types usually occur on slightly moister sites such as down-slope from the Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Type or closer to aspen groves.

Other potential herbaceous inclusions include the *Festuca hallii-Calamovilfa longifolia* community type (on aeolian deposits) and the *Festuca hallii-Koeleria macrantha*/*Juniperus horizontalis/ Arctostaphylos uva-ursi*/forb complex (on exposed sites associated with shallow soils or exposed bedrock).

SMOSAIC.COM
The element itself does not represent a mosaic of sub-associations.

SSPATIAL.COM
Depending on the position on the landscape and historical land use, the Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Type can be relatively small in area or cover large tracts of land. It can be patchy in distribution or continuous on undulating terrain.

Adjacent communities and inclusions consist of essentially the same vegetation community types. The dominant types include patches of rose shrublands, which tend to grow in depressions and on north- and east-facing slopes, as well as the Plains Rough Fescue-Western Porcupine Grass and Plains Rough Fescue-Western Porcupine Grass-Upland Sedge Herbaceous Vegetation Types. These types usually occur on slightly moister sites such as down-slope from the Western Porcupine Grass-Plains Rough Fescue Herbaceous Vegetation Type or closer to aspen groves.

9. STATUS

ESR SRANK

ESR SREASONS

SEXEMPLARY.EO Not yet available.

SEXEMP.EO.SITENAME Not yet available.

SSTATCOM
Due to the high agricultural activity in the Central Parkland Subregion, it is assumed that there are few remaining acres. The pressure to graze or cultivate more land causes the remaining acres

to be very vulnerable to extirpation. According to Wallis (1990), it is estimated that 90-95% of the original native vegetation of the Central Parkland Subregion has been totally destroyed by clearing or cultivation. Very little native grassland exists and no sizeable areas remain ungrazed. Field work planned for 1999 should confirm whether the above assumptions are correct.

10. MANAGEMENT

SECONCOM
Livestock grazing; recreation (e.g., photography, bird watching); maintenance of soil and groundwater level.

SMANAGE.COM
Western porcupine grass-plains rough fescue prairie is a valuable range resource, however grazing intensities beyond light grazing result in a shift towards other community types.

Prescribed burns, if planned correctly, can be used to prevent tree and shrub encroachment into fescue grasslands as well as excessive thatch build-up. Antos *et al*. (1983) suggest that fire frequencies in the range of 5 to 10 years may be most beneficial to the maintenance of rough fescue. Plains rough fescue is generally more resistant to severe damage from fire than mountain rough fescue because of its rhizomatous nature. Plants are generally most tolerant of dormant season burning (Bailey and Anderson 1978). According to Bailey and Anderson (1978), fall is the best time to burn plains rough fescue but is not a good time to burn western porcupine grass. There is apparently no affect on floral initiation or subsequent seed development of plains rough fescue. However, Gerling *et al*. (1995) found that it tolerates single burns at any time of the year, but early spring fires have the greatest benefits by increasing tillering, inflorescence density and standing crop. The canopy coverage of western porcupine grass was not affected by spring burning (Bailey and Anderson 1978). Spring burns should be conducted as soon after snowmelt as possible to minimize fire damage (Bailey and Anderson 1978).

"Conservation burning" is another management approach (Romo 1997), where the goal is to replicate historical disturbances which were quite variable. Peak fire seasons in the plains rough fescue grasslands were from March to May, after snowmelt, and July to November. Fires were least likely over winter. However, they could occur at any time of year, and varied in type, frequency, intensity and area. By varying burns with respect to these factors, the natural variability of the grasslands would be achieved and maintained. Small fires with a variable burn interval are recommended (Romo 1997) since frequent, large scale burns may cause a shift towards species of the mixed praire association (Anderson and Bailey 1980). It should be noted that conservation burning would not necessarily maintain a single community type.

11. INVENTORY AND SAMPLING PROCEDURES

SIMAGERY.COM
The element can easily be distinguished from forested community types on air photos and

Landsat imagery. As a rule, it can be distinguished from shrub community types on large scale air photos (1:30,000 or larger), as well as cultivated land and improved pastures. It cannot be distinguished from similar native grassland communities. The preferred scale of aerial photography is 1:20,000 or larger, either colour or black and white infrared.

SSAMPLE.STRATEGY
This community should be sampled using two different techniques as described by Robertson and Adams (1990). The first method uses a quadrat frame or frames (i.e., 0.1 m^2 microplot) placed either randomly or systematically at several locations (i.e., 15 sites) to determine the cover of each individual plant species. Data are recorded on the MF5 inventory form. Within each of the same frames at each location, the percent weight by volume of each plant species is estimated. The data are recorded on the LC55 form. Using this information for the range site type and appropriate precipitation zone, range condition ratings are calculated as outlined in the Guide to Range Condition and Stocking Rates for Alberta (Wroe *et al.* 1988). These methods have been standardised by Alberta Agriculture, Food and Rural Development (Public Lands Division) and Alberta Environmental Protection (Forest Service).

SINVENTORY.COM
Using either air photos or Landsat imagery, grassland can easily be distinguished from forested community types. Grassland can further be distinguished from shrub as well as cultivated land and improved pastures community types on large scale air photos (1:30,000 or larger). However, ground truthing is required to distinguish it from similar native grassland communities.

Locations should be documented using a G.P.S.. If the community is to be sampled, two different techniques as described by Robertson and Adams (1990) should be used. Using these methods, comparison can be made among sites since they have been standardised by Alberta Agriculture, Food and Rural Development (Public lands Division) and Alberta Environmental Protection (Forest Service).

12. ANALYSIS PROCEDURES AND DATA MANAGEMENT

SANALYSIS.COM
The type of data and the analysis varied among those who have described this element.

Legris and Cornish (1997) gathered vegetation data according to the procedures outlined in the Ecological Land Survey Site Description Manual (Alberta Environmental Protection 1994). At each site, all plant species were recorded along a 10 m transect and percent canopy cover was estimated. Microplot data were averaged for each transect. Vegetation data were analysed using a two-way indicator species analysis (TWINSPAN) (Hill 1979), which ranked the survey sites based on their similarity to each other in terms of species composition and cover values. The resultant groupings of sites were then reassessed and adjusted to more closely reflect the vegetation associations as they were found in the field. Species composition of each community type was then based on an average of the species cover values of the grouped sites (Legris and

Cornish 1997).

Fehr (1982) collected percent canopy cover data for each plant species within each stand. The plant communities were described on the basis of their dominant species.

Wheeler (1976) collected canopy cover data for each plant species and calculated percent frequency. Similar sites were grouped based on species composition and dominance.

Wroe (1971) recorded the percent canopy cover class (Daubenmire 1959) of each species within stands least affected by grazing disturbance. Plant communities were defined based on species dominance and composition.

SANALYSIS.DATA.MANAGE.COM
The type of data and the analysis varied among those who have described this element.

Legris and Cornish (1997) analysed their vegetation data, consisting of percent cover values for each species at each site, using the computer program TWINSPAN (Hill 1979), which ranked the survey sites based on their similarity to each other in terms of species composition and cover values. The data are with the Resource Data Division of Alberta Environmental Protection, Edmonton.

Fehr (1982) described plant communities on the basis of their dominant species, using percent canopy cover data. The data are with the Natural Areas Program, Alberta Environmental Protection, Edmonton.

Wheeler (1976) differentiated community types based on species composition and dominance using canopy cover data.

Wroe (1971) subjectively defined plant communities based on species dominance and composition using canopy cover class data.

13. GENERAL COMMENTS

SCOMMUNITY.COM No further comments.

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