Great Plains Rough Fescue Prairie

Prairies de fétuque de Hall des Grandes Plaines

Macrogroup CM332

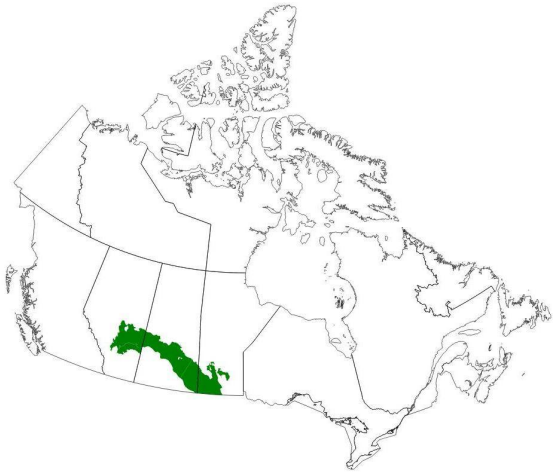
Temperate Grassland & Shrubland

D023 Central North American Grassland & Shrubland

CM051 Great Plains Mixedgrass Prairie

M054 Central Lowlands Tallgrass Prairie

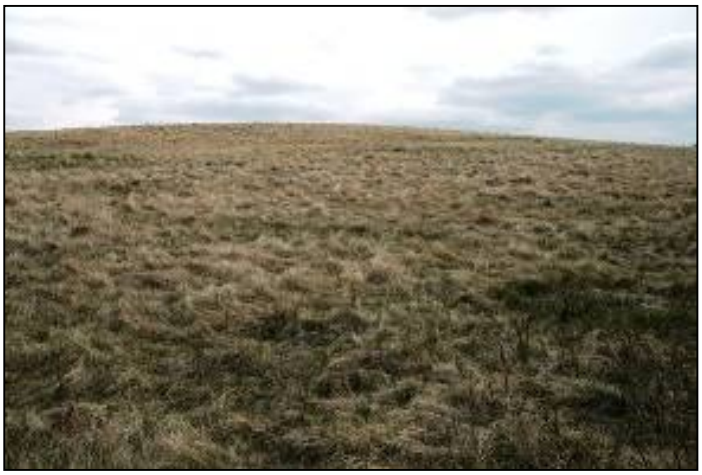
CM332 Great Plains Rough Fescue Prairie



Concept

CM332 describes prairie grasslands at the northern edge of the North American Great Plains that, in later seral stages, are dominated by a single species, plains rough fescue (*Festuca hallii*). Rough fescue prairie is primarily found in Alberta and Saskatchewan, less commonly in Manitoba, with a few occurrences in North Dakota and Montana. CM332 occurs as extensive grasslands south of the limit of tree domination in the west-central prairies and also forms the grassland patches that occur between forest/woodland groves in most of the *Great Plains Parkland* vegetation zone. Natural stands are dense, mid-height (approximately 20-40 cm) and strongly dominated by plains rough fescue. Other common graminoids include northern porcupine grass (*Hesperostipa curtiseta*), needle-and-thread grass (*H. comata*), plains porcupine grass (*H. spartea*), thick-spike wildrye (*Elymus lanceolatus*), slender wildrye (*E. trachycaulus* ssp. *subsecundus*), western wheatgrass (*Pascopyrum smithii*), Hooker's oatgrass (*Avenula hookeri*), prairie junegrass (*Koeleria macrantha*), mat muhly (*Muhlenbergia richardsonis*) and upland sedges such as blunt sedge (*Carex obtusata*), needle-leaved sedge (*C. duriuscula*) and long-stolon sedge (*C. inops* ssp. *heliophila*). A variety of forbs and shrubs occur but may be restricted in abundance by the dense grass. Species composition and abundance shift with disturbances such as livestock grazing, fire or invasion by non-native species.

CM332 occurs in a continental temperate climate with cold winters and warm summers. Mean annual temperatures average approximately 2.5°C, and precipitation varies from approximately 350 to 540 mm. This climate is cooler and moister than that supporting the mixedgrass prairie to the south (CM051 [Great Plains Mixedgrass Prairie]). CM332 usually occurs on level to rolling terrain at elevations <1000 m ASL. Stands are found in a variety of upland or valley settings. Most stands are on Black or Dark Brown Chernozemic soils with loamy to clayey textures but may also develop on sandy sites and on Solonetzic soils with an impervious hardpan layer.



Plains rough fescue (*Festuca hallii*) and northern porcupine grass (*Hesperostipa curtiseta*) stand, showing the bunch grass physiognomy of Great Plains rough fescue prairie. Antelope Hill Provincial Park, Alberta.
Source: L. Allen

Plains rough fescue (*Festuca hallii*) with trembling aspen (*Populus tremuloides*) groves in a parkland landscape, near North Battleford, Saskatchewan.
Source : J. Thorpe

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Macrogroup CM332

Prairies de fétuque de Hall des Grandes Plaines

Vegetation

Physiognomy and Structure

CM332 is characterized by dense stands of vigorous mid-height (approximately 20-40 cm) bunch grasses, predominantly *Festuca hallii*. On well-drained hilltops and south-facing aspects, stands are often co-dominated by *F. hallii* and *Hesperostipa curtiseta* or, in the eastern part of the range, *H. spartea*. Forbs and shrubs may be interspersed within stands, but the *F. hallii* tussocks can be so dense that few other species are present. The persistent, upright leaf litter of *F. hallii* adds to the density of stands. Livestock grazing or fire can result in more open grass stands with a greater proportion of forb cover. In the *Great Plains Parkland* vegetation zone of Alberta, Saskatchewan and western Manitoba, rough fescue prairie typically forms the grassland patches between forest/woodland groves of *Populus tremuloides*.

Floristics

Natural stands of CM332 are dominated by *Festuca hallii*. Other common graminoids include *Hesperostipa curtiseta*, *H. comata*, *H. spartea*, *Elymus lanceolatus*, *E. trachycaulus* [see Comments], *Pascopyrum smithii*, *Koeleria macrantha*, *Avenula hookeri*, *Bouteloua gracilis*, *Muhlenbergia richardsonis* and upland sedges such as *Carex obtusata*, *C. inops* [see Comments], *C. duriuscula* and others. *Sporobolus rigidus* [see Comments] may also be important on sandy soils. In Manitoba, *S. heterolepis* co-occurs with *F. hallii* on moister microsites.

Forbs and dwarf shrubs tend to be somewhat limited in occurrence but may include *Artemisia frigida*, *A. ludoviciana*, *Geum triflorum*, *Pulsatilla nuttalliana*, *Symphyotrichum falcatum*, *Galium boreale*, *Achillea millefolium*, *Cerastium arvense* and *Antennaria* spp. *Symphoricarpos occidentalis* and *Rosa arkansana* are common shrub species but may not be readily visible in the dense grass stands. Other shrubs that may be present include *R. woodsii*, *Elaeagnus commutata* and *Amelanchier alnifolia*. Species abundance can shift dramatically with livestock grazing impacts, changes in fire regime or invasion by non-native species.

Dynamics

Historically, fires occurred frequently in rough fescue prairie but have been greatly reduced with agricultural settlement. Where stands of CM332 occur in the parkland landscape, proportions of forest/woodland and grassland fluctuated over the years in a dynamic balance. Compared to mixedgrass prairie (CM051 [Great Plains Mixedgrass Prairie]), CM332 occurs in a moister climate that is more conducive to woody encroachment and invasion by non-native plant species. In the prolonged absence of fire, shrubs (e.g., *Symphoricarpos occidentalis*) and trees (especially *Populus tremuloides*) tend to encroach into patches of rough fescue prairie from adjacent forest or woodland stands. If this is not checked by fire or land management practices, grassland may be converted to forest or woodland (e.g. M151 [Great Plains Forest & Woodland]).

Stands of CM332 that are exposed to sources of seeds from non-native plants (e.g., vehicles, hayfields, roadsides, coats of animals) are often invaded by species such as *Poa pratensis* and *Bromus inermis*. These species are persistent and aggressive once established, and increases in their abundance can be fostered by disturbance (e.g., overgrazing) or agricultural idling.

Prior to agricultural settlement, intermittent grazing by native herbivores was an important aspect of prairie grassland dynamics. Bison (*Bison bison*), elk (*Cervus canadensis*) and other animals grazed an area and then moved elsewhere. In the process they fertilized stands and dispersed seeds. Currently, stands of CM332 that are ungrazed to lightly grazed by livestock show the high density and dominance of *Festuca hallii* that characterize this Macrogroup. Although tolerant of winter grazing, *F. hallii* is sensitive to livestock grazing during the growing season and decreases in abundance with increased spring and summer grazing pressure. This decrease is accompanied by an increase in *Hesperostipa curtiseta*, *H. comata*, *H. spartea*, *Elymus lanceolatus*, *Pascopyrum smithii*, *Koeleria macrantha*, *Carex* spp. and/or *Artemisia frigida*. As a result, these stands become more similar to the mixedgrass prairie of drier climates to the south. Along with invasion by non-native species, livestock grazing impacts and fire suppression, land conversion to annual crops and hayfields has reduced the extent and range of natural occurrences of CM332.

Great Plains Rough Fescue Prairie

Macrogroup CM332

Prairies de fétuque de Hall des Grandes Plaines

Environment

Climate

The primary range of CM332 occurs in the continental temperate climate of central Alberta and Saskatchewan. Winters are cold and summers are warm; mean annual temperatures average approximately 2.5˚C, with extreme minimum temperatures below -40˚C. Growing degree days above 5˚C (GDD) vary between about 1300 and 1600. Mean annual precipitation is between 350 and 500 mm in the primary range. In Manitoba, where rough fescue prairie occurs less frequently and tallgrass prairie elements become apparent, the climate is somewhat wetter (mean annual precipitation 475-540 mm) and warmer (1550-1840 GDD).

Physiography, Geology, Topography and Soils

CM332 occupies portions of the Alberta and Saskatchewan Plains, subdivisions of the Interior Plains physiographic region. This area is underlain by level Mesozoic and Tertiary sedimentary rocks. Elevations are generally <1000 mASL. The entire range of CM332 was affected by late Pleistocene glaciation and although topography is mostly an undulating plain, local relief is provided by postglacial valley complexes, hummocky moraines and sand dunes. Stands of rough fescue prairie may occur in a variety of upland or valley settings but are increasingly restricted to warmer south-facing aspects at the northern edge of the range and moister north-facing aspects at the southern edge. Most stands are on well-drained Black or Dark Brown Chernozemic soils with loamy to clayey textures but they may also occur on Solonetzic soils with an impervious hardpan layer caused by excess sodium (Na+). Stands also occur on sandy soils, but these sites usually have lower prominence of *Festuca hallii*, with higher proportional abundance of *Hesperostipa* spp. and *Sporobolus rigidus*.

Great Plains Rough Fescue Prairie

Macrogroup CM332

Prairies de fétuque de Hall des Grandes Plaines

Distribution and Geographic Range

CM332 is found in the northern Great Plains of Canada, including Alberta, Saskatchewan and Manitoba. Scattered outliers of rough fescue prairie occur in Montana and North Dakota.

Related Concepts

CM332 includes shrub and herbaceous plant communities that have been described in provincial publications for the Northern Fescue and Central Parkland natural subregions in Alberta, the Moist Mixed Grassland and Aspen Parkland ecoregions in Saskatchewan, and the Aspen Parkland and Assiniboine Delta rangeland ecoregions in Manitoba.

USNVC M051 [Great Plains Mixedgrass & Fescue Prairie] includes both the Canadian portion of mixedgrass prairie (described by CM051 [Great Plains Mixedgrass Prairie]) and Great Plains Rough Fescue Prairie (described here), which it treats as USNVC Group G332 [Northern Great Plains Rough Fescue Prairie].

Comments

CM332 is most common in east-central Alberta and west-central Saskatchewan. In southeastern Saskatchewan and southern Manitoba, rough fescue prairie becomes less common because of a longer history of land conversion, invasion by non-native grasses and livestock grazing that have eliminated *Festuca hallii*, and because of the natural transition to tallgrass prairie (M054 [Great Plains Tallgrass Prairie]).

Elymus trachycaulus here refers to subspecies *subsecundus* (one-sided wildrye, élyme aristé).
Sporobolus rigidus here refers to variety *rigidus* (prairie sandreed, calamovilfa à feuilles longues)
Carex inops here refers to subspecies *heliophila* (sun sedge, carex héliophile).

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Prairies de fétuque de Hall des Grandes Plaines

Source Information

Number of Source Plots for CM332:
Information Sources (data):
Concept Authors: Ken Baldwin, Lorna Allen, Jeff Thorpe
Description Authors: Jeff Thorpe, Ken Baldwin, Lorna Allen
Date of Concept: February, 2015
Date of Description: December, 2015; revised July, 2019

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Great Plains Rough Fescue Prairie

Macrogroup CM332

Prairies de fétuque de Hall des Grandes Plaines

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The information contained in this factsheet is based on data and expert knowledge that is current to the date of description. As new information becomes available, the factsheet will be updated.

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