16120

Western North American Boreal Dry Grassland

Model Date: 04/25/08 Report Date: 9/11/15

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
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| None | None | None | None |

Reviewer: Robin Innes

Vegetation Type

Upland Grassland/Herbaceous

Map Zones

69, 70, 73, 74, 75

Geographic Range

Western North American Boreal Dry Grassland occurs across the boreal and sub-boreal regions of AK. Today dry grassland communities in AK are relatively uncommon (Edwards and Armbruster 1989, Lloyd et al. 1994), but during the late Pleistocene these were more common (Edwards and Armbruster 1989).

Biophysical Site Description

Soil conditions in boreal forest regions are frequently conducive to dry grasslands (Redmann and Schwarz 1986). Soils are well drained to excessively drained, and permafrost is absent. This system typically occurs on dry sideslopes or bluffs. Some slopes may have steep, unstable soil (NatureServe 2008).

Vegetation Description

These sites are typically dominated by grasses, though forbs and shrubs may be common, but shrub cover is less than 25%. Common species include Festuca altaica, F. rubra, Calamagrostis purpurescens, Elymus inovatus, Artemisia frigida, Artemisia alaskana, Pseudoroegneria spicata, Bromus pumpellianus, Poa spp. and Achillea spp. (NatureServe 2008). Shrubs cover is less than 25% and may include Vaccinium vitis-idaea, Empetrum nigrum, low willows, and sagebrush species (especially Artemisia frigida; Viereck et al. 1992).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| FEAL | Festuca altaica | Altai fescue |
| FERU2 | Festuca rubra | Red fescue |
| CAPU | Calamagrostis purpurascens | Purple reedgrass |
| PSSP6 | Pseudoroegneria spicata | Bluebunch wheatgrass |
| BRINA | Bromus inermis ssp. pumpellianus var. arcticus | Pumpelly's brome |
| ARFR4 | Artemisia frigida | Prairie sagewort |
| ARAL5 | Artemisia alaskana | Alaska wormwood |

Disturbance Description

Little is known about the successional dynamics of this community, but it is assumed to be relatively stable over time (Viereck et al. 1992).

LANDFIRE National modelers assumed that the fire regime for this system would be similar to that of the adjacent Western North American Boreal Dry Aspen-Steppe Bluff - Higher Elevations. Starfield and Chapin (1996) estimated a 40-year fire return interval for dry grasslands assuming that Alaskan boreal dry grasslands burn more frequently than other ecosystems types in the region.

Because this system is often found on loose, dry mineral soils on unstable slopes, shifting slopes are an ongoing disturbance. Grazing is probably an important factor in shaping this system, as this is important Dall sheep habitat. Grazing and erosion were not included as disturbances in the model because these are long-term, ongoing phenomena.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Min FI** | **Max FI** | **Percent of All Fires** |
| Replacement | 100 |  |  | 100 |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| **All Fires** | **100** |  |  | **100** |

Scale Description

Small to large patch

Non-Fire Disturbances

Adjacency or Identification Concerns

Adjacent systems may include Western North American Boreal Dry Aspen-Steppe Bluff - Higher Elevations or Western North American Boreal Dry Aspen-Steppe Bluff - Lower Elevations. This system does not encompass the coastal Leymus-forb meadows that occur in Aleutians, SW, SC and SE Alaska (NatureServe 2008).

Issues or Problems

Native Uncharacteristic Conditions

Research suggests that dry grasslands are likely to increase as a result of climate change (Rupp et al. 2000a and 2000b).

Comments

More information on this and similar vegetation types can be found in the Fire Effects Information System Synthesis: [Fire regimes of Alaskan dry grassland communities](http://www.fs.fed.us/database/feis/fire_regimes/AK_dry_grassland/all.html). (Innes 2014).

For LANDFIRE National the fire intervals in this model were adapted from the Boreal Subalpine Steppe Bluff model, also by Boucher and Ryan. During the 2021 review Kori Blankenship revised the model to include an early herbaceous state (as originally modeled) and a later state where shrubs may be present. Blankenship also eliminated mixed fire (because the dominant species in this BpS are top killed by fire) and change the replacement fire frequency to 100 years. The more frequent fire interval was based on Starfield and Chapin (1996) but retains the relationship between the adjacent BpS. Lacking data, Blankenship assumed that fire frequency did not vary between states.

Suggested reviewers for this system include Carl Roland and Dalia Vargis-Kretzinger for information on grazing.

Review questions included:

-What is a reasonable estimate of fire frequency for this BpS?

-Does fire frequency vary between states?

-How should herbaceous cover be defined for the Early and Late states?

Succession Classes

Class A 2 Early Development 1 – Open

Structural Information

Herb 0-30% cover

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| FEAL | Festuca altaica | Altai fescue | Upper |
| FERU2 | Festuca rubra | Red fescue | Upper |
| CAPU | Calamagrostis purpurascens | Purple reedgrass | Upper |
| BRINA | Bromus inermis ssp. pumpellianus var. arcticus | Pumpelly's brome | Upper |

Description

This class represents the post-fire grass community. Grasses, sedges and/or forbs dominate the site.

Class B 98 Late Development 1 - All Structures

Structural Information

Herb 30-100% cover

Shrubs 0-100% cover

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| FEAL | Festuca altaica | Altai fescue | Upper |
| CAPU | Calamagrostis purpurascens | Purple reedgrass | Upper |
| VAVI | Vaccinium vitis-idaea | Lingonberry | Upper |
| EMNI | Empetrum nigrum | Black crowberry | Upper |

Description

Grass cover reaches pre-fire levels within two to three years following fire (Tirmenstein, 2000). Shrub cover up to 25% is possible (Viereck et al. 1992).

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