10090

Northwestern Great Plains Aspen Forest and Parkland

BpS Model/Description Version: Aug. 2020

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

Vegetation Type

Mixed Upland and Wetland

Map Zones

19

Geographic Range

This system ranges from the North Dakota/Manitoba border west to central Alberta and is considered part of the boreal-mixed grass prairie grassland transition region.

Biophysical Site Description

The climate in this region is mostly sub-humid low boreal with short, warm summers and cold, long winters. Much of this region is covered with undulating to kettled glacial till.

Vegetation Description

*Populus tremuloides* dominates this system. Common associates are *Betula papyrifera* and *Populus balsamifera* with an understory of mixed grass species and tall shrubs. More poorly drained sites may contain willow (*Salix* spp.) and sedges (*Carex* spp.).

After long fire-free intervals, conifers may begin to dominate, including *Picea glauca*, *Picea engelmannii*, *Abies lasiocarpa*, *Pinus contorta*, *Pinus ponderosa*, and *Pseudotsuga menziesii*. Overall cover of conifers will be <30%.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| POTR5 | *Populus tremuloides* | Quaking aspen |
| BEPA | *Betula papyrifera* | Paper birch |
| POBA2 | *Populus balsamifera* | Balsam poplar |
| PIGL | *Picea glauca* | White spruce |
| ABBA | *Abies balsamea* | Balsam fir |

Species names are from the NRCS PLANTS database. Check species codes at http://plants.usda.gov.

Disturbance Description

Fire constitutes the most important dynamic in this system and prevents boreal conifer species such as *Picea glauca* and *Abies balsamea* from becoming too established in this system. Mean fire return intervals may range from 50-100yrs (Barrett 1993, 1996, 1997). Historical ignition sources included lightning and American Indians, who likely set both intentional and accidental fires.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 84 | 83 | 50 | 150 |
| Moderate (Mixed) | 397 | 17 |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 69 | 100 |  |  |

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

Many of these communities will be relative islands of woody vegetation within a matrix of grasslands. Patch sizes may range from tens to hundreds of hectares.

Adjacency or Identification Concerns

This BpS will intermix with shortgrass and mixed-grass prairie.

Fire frequencies have readily decreased with fire suppression activity, elimination of American Indian ignitions, changes in populations of native and non-native grazers (Sieg 1998) and climate change (Henderson et al. 2003), contributing to an overall reduction in acreage of this BpS in the Great Plains (Haugen et al. 1999).

Issues or Problems

Fire history for this BpS is generally estimated from adjacent vegetation communities, such as coniferous BpSs that record fire scars.

Native Uncharacteristic Conditions

Relative canopy cover of conifers >30% can be considered uncharacteristic.

Comments

None

Succession Classes

**Mapping Rules**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Upper Layer Lifeform** | **Height (m)** | **Canopy Cover (%)** | | | | | | | | | |
| **0-10** | **11-20** | **21-30** | **31-40** | **41 - 50** | **51-60** | **61-70** | **71-80** | **81-90** | **91-100** |
| Herb | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Herb | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Herb | >1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 1.0-3.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | >3.0 | A | A | A | A | A | A | A | A | A | A |
| Tree | 0-5 | A | A | A | A | A | A | A | A | A | A |
| Tree | 5-10 | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix |
| Tree | 5-10 | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf |
| Tree | 5-10 | C con | C con | C con | C con | C con | C con | C con | C con | C con | C con |
| Tree | 10-25 | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf |
| Tree | 10-25 | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix |
| Tree | 10-25 | C con | C con | C con | C con | C con | C con | C con | C con | C con | C con |
| Tree | 25-50 | C con | C con | C con | C con | C con | C con | C con | C con | C con | C con |
| Tree | 25-50 | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf |
| Tree | 25-50 | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix |
| Tree | >50 | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf |
| Tree | >50 | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix |
| Tree | >50 | C con | C con | C con | C con | C con | C con | C con | C con | C con | C con |

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

**Description**

Class A 21 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| POTR | Poa tracyi | Tracy's bluegrass | Upper |
| BEPA | Betula papyrifera | Paper birch | Upper |
| POBA2 | Populus balsamifera | Balsam poplar | Upper |

Description

Aspen, birch and poplar resprouting vigorously following fire. Conditions will become closed canopy quickly.

*Maximum Tree Size Class*  
Sapling >4.5ft; <5"DBH

Class B 68 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| POTR | Poa tracyi | Tracy's bluegrass | Upper |
| BEPA | Betula papyrifera | Paper birch | Upper |
| POBA2 | Populus balsamifera | Balsam poplar | None |

Description

Stands of pole to large sized aspen, birch, and balsam poplar.

*Maximum Tree Size Class*  
Large 21-33"DBH

Class C 11 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIGL | Picea glauca | White spruce | Middle |
| PIEN | Picea engelmannii | Engelmann spruce | Middle |
| ABLA | Abies lasiocarpa | Subalpine fir | Middle |
| PICO | Pinus contorta | Lodgepole pine | Middle |

Description

Stands with coniferous species, resulting from long fire-free intervals. Conifers may include *Picea glauca*, *Picea engelmannii*, *Abies lasiocarpa*, *Pinus contorta*, *Pinus ponderosa*, and *Pseudotsuga menziesii*. Cover of coniferous species will typically be <30%, but overall tree cover may reach 100%.

*Maximum Tree Size Class*  
Large 21-33"DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:OPN | 20 |
| Mid1:OPN | 20 | Mid1:OPN | 999 |
| Late1:CLS | 120 | Late1:CLS | 999 |

Probabilistic Transitions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disturbance Type** | **Disturbance occurs In** | **Moves vegetation to** | **Disturbance Probability** | **Return Interval (yrs)** | **Reset Age to New Class Start Age After Disturbance?** | **Years Since Last Disturbance** |
| Mixed Fire | Early1:ALL | Early1:ALL | 0.0025 | 400 | No | 0 |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.012 | 83 | Yes | 0 |
| Alternative Succession | Mid1:OPN | Late1:CLS | 1 | 1 | Yes | 150 |
| Mixed Fire | Mid1:OPN | Mid1:OPN | 0.0025 | 400 | No | 0 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.012 | 83 | Yes | 0 |
| Mixed Fire | Late1:CLS | Mid1:OPN | 0.0025 | 400 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.012 | 83 | Yes | 0 |

References

Barrett S.W. 1993. Fire history of southeastern Glacier National Park. Office report on file, Resources Management Division, USDI National Park Service Glacier National Park, West Glacier, MT. 21 pp.

Barrett S.W. 1996. The historical role of fire in Waterton Lakes National Park, Alberta. Office report on file, Fire Management Division, Environment Canada, Canadian Parks Service Waterton Lakes National Park, Waterton Townsite, ALTA. 32 pp.

Barrett S.W. 1997. Fire history of Glacier National Park: Hudson Bay drainage. Office report on file, Resources Management Division, USDI National Park Service Glacier National Park, West Glacier MT. 46 pp.

Haugen, D.E., R.J. Piva, N.P. Kingsley and R.A. Harsel. 1999. North Dakota's Forest Resources, 1994. Research Paper NC 336. St. Paul, MN: USDA Forest Service, North Central Forest Experiment Station. 101 pp.

Henderson, N., E. Hogg, E. Barrow and B. Dolter. 2003. Climate change impacts on island forests of the Great Plains, the implications for nature conservation policy. Proceedings of the Fifth International Science and Management of Protected Areas Association Conference. University of Victoria, British Columbia, Canada. 11-16 May 2003.

Howard, J.L. 1996. Populus tremuloides. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2005, November 26].

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

Sieg, C.H. 1998. The role of fire in managing for biological diversity on native rangelands of the Northern Great Plains. Pages 31-38 in: D.W. Uresk, G. Schenbeck and J.T. O'Rourke, tech coords. 1996. Conserving biodiversity on native rangelands: symposium proceedings; August 17, 1995; Fort Robinson State Park, Nebraska. General Technical Report RM-GTR-298. Fort Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station.