16371

Western North American Boreal Wet Meadow and Marsh -- Boreal

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

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| Tina Boucher | antvb@uaa.alaska.edu | None | None |
| Kori Blankenship | kblankenship@tnc.org | None | None |
| None | None | None | None |

Reviewer: Robin Innes

Vegetation Type

Upland Shrubland

Map Zones

68, 69, 70, 71, 73, 74, 75, 76

Model Splits or Lumps

This BpS is split into multiple models:

This BpS was split into Boreal and Aleutian variants to represent regional differences.

Geographic Range

The BpS is found in alpine and subalpine areas in the boreal and boreal transition regions of AK.

Biophysical Site Description

This system includes active and inactive alpine and subalpine floodplains of glacially and non-glacially fed streams (NatureServe 2008). Soils develop on alluvium and are typically shallow and well-drained (NatureServe 2008). Alpine Floodplains extend from the subalpine zone within the tall shrub zone to above the elevational limit of tall shrubs. Wetlands develop on poorly drained deposits, oxbows, and abandoned channels and are often mosaiced with well-drained floodplain vegetation.

Vegetation Description

This system includes a range of floodplain vegetation including shrub (dwarf, low, and tall), mesic herbaceous meadow, early seral forbs, and barren gravel. Common species include Salix alaxensis, other Salix spp., Alnus viridis ssp. Sinuata, Betula nana, Chamerion latifolium, Lupinus spp. (L. nootkatnesis and L. arcticus), Mertensia paniculata, Crepis spp (C. nana and C. elegans) Achillea millefolium spp. Borealis, Erigeron acris and a variety of grasses (NatureServe 2008).

Aquatic bed, marsh, and fen communities are common within floodplain boundaries. The earliest seral stages (aquatic bed) have aquatic vegetation such as Nuphar polysepala. Aquatic vegetation generally succeeds to marsh and fen communities with species such as Menyanthes trifoliata, Carex aquatilis, and Equisetum fluviatile. Later seral stages of floodplain wetland development may include Sedge-Dwarf-Shrub Bogs and Low Shrub Peatland. Common species may include Sphagnum spp., Eriophorum angustifolium, Oxycoccus microcarpus, Andromeda polifolia, Myrica gale and Betula nana.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| SAAL | Salix alaxensis | Feltleaf willow |
| SALIX | Salix | Willow |
| ALVIS | Alnus viridis ssp. sinuata | Sitka alder |
| BENA | Betula nana | Dwarf birch |
| CHLA13 | Chamerion latifolium | Dwarf fireweed |
| METR3 | Menyanthes trifoliata | Buckbean |
| CAAQ | Carex aquatilis | Water sedge |

Disturbance Description

Frequent river channel migration and associated flooding and fluvial processes constitute the major disturbances in this type (NatureServe 2008). The probability of flooding is assumed to be higher in alpine floodplains compared with lower elevation floodplains because the alpine floodplains tend to have higher gradients and the landscape absorbs less runoff due to steep slopes and typically coarse substrates. The overall return interval for flooding in the alpine floodplain is estimated at about 20yrs, compared with 70-75yrs in the floodplain forest and shrub systems.

In 2015 an extensive search was done by Fire Effects Information System staff to locate information for a synthesis on Fire regimes of Alaskan alder and willow shrublands (Innes 2015). At that time, the scientific literature about fire regimes in Alaskan alder and willow shrublands was scarce. Descriptions of fire ignition, season, pattern, and size specific to alder and willow shrublands were not found in the literature. Information about alder and willow communities acting as firebreaks is available in the Fire Regime Synthesis on alder and willow shrublands.

Fire Frequency

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

Scale Description

Linear

Non-Fire Disturbances

Other 1: Flooding

Adjacency or Identification Concerns

Floodplain systems may occur in the active and inactive part of the riparian zone, but abandoned floodplains are considered part of the adjacent upland. Adjacent systems may include mesic shrublands and meadows.

Issues or Problems

The probability of flooding in the model is a best guess, not based on literature.

Native Uncharacteristic Conditions

Comments

Review needed:

-Does the revised state-and-transition model represent the new Ecological System concept for the Boreal region? See below for more details on Ecological System and BpS changes.

-Does the flooding frequency represent the average frequency of floods throughout the BpS?

-Do the class proportions seem appropriate?

In 2021 changes to the Ecological Systems classification resulted in the Boreal and Aleutian floodplain and wetland systems merging into one system called Western North American Boreal Wet Meadow and Marsh. Kori Blankenship merged the descriptions for Western North American Boreal Shrub and Herbaceous Floodplain Wetland (BpS 16170), Western North American Boreal Alpine Floodplain - Lower Elevations (BpS 16371), and Western North American Boreal Alpine Floodplain - Higher Elevations (16372) into one BpS called Western North American Boreal Wet Meadow and Marsh – Boreal. A separate description and model were developed for the Aleutians. Blankenship used the 16372 model as a starting point to represent this BpS but changed the overall modeled flooding frequency to about 50 years; a compromise between the estimates for lower and upper elevation floodplains (as described in the Disturbance Description section). Blankenship also adjusted the alternative succession probability to reduce the proportion of the dwarf shrub class because this model now represents all elevations.

During LANDFIRE National the Ecological System Western North American Boreal Alpine Floodplain was split into a Lower Elevations and an Upper Elevations BpS model. The lower elevation model applied in the subalpine zone within the tall shrub zone, and the upper elevations model applied above the elevational limit of tall shrubs. These models were developed based on input from the experts who attended the LANDFIRE Anchorage (Dec. 07) modeling meeting and refined by Tina Boucher and Kori Blankenship for the boreal region of AK (it did not receive review for other parts of the state).

During LANDFIRE National the model and description for the Western North American Boreal Shrub and Herbaceous Floodplain Wetland was based on input from the experts who attended the LANDFIRE Fairbanks modeling meeting (Nov. 07) and refined by Tina Boucher, Kori Blankenship, and Colleen Ryan. Michelle Schuman reviewed the BpS.

Succession Classes

Class A 35 Early Development 1 - All Structures

Structural Information

Tree Size Class: None

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CHLA13 | Chamerion latifolium | Dwarf fireweed | Upper |
| LUPIN | Lupinus | Lupine | Upper |
| MEPA | Mertensia paniculata | Tall bluebells | Upper |
| CREL | Crepis elegans | Elegant hawksbeard | Upper |

Description

Although it is not modeled, because LANDFIRE does not map sparsely vegetated areas, this class should be preceded by a sparse/gravel bar phase. This herbaceous class represents early seral vegetation that would come in on gravel bars or other sparsely vegetated areas in the floodplain. Common species include Chamerion latifolium, Lupinus spp. (L. nootkatnesis and L. arcticus), Mertensia paniculata, Crepis spp (C. nana and C. elegans) Achillea millefolium spp. borealis, Erigeron acris and a variety of grasses. Vegetation cover is generally open (10-50%) with large areas of exposed alluvium.

The alternate succession pathway represents sites that would not support low or tall shrubs.

Class B 20 Late Development 1 - All Structures

Structural Information

Tree Size Class: None

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SAAL | Salix alaxensis | Feltleaf willow | Upper |
| SALIX | Salix | Willow | Upper |
| ALVIS | Alnus viridis ssp. sinuata | Sitka alder | Upper |
| BENA | Betula nana | Dwarf birch | Upper |

Description

Willow and alder low and tall shrubs. Common shrub species may include Salix alaxensis and other Salix spp., Alnus viridis ssp. Sinuata and Betula nana.

This class may persist on some sites or may eventually transition to dwarf shrub.

Class C 45 Late Development 2 - All Structures

Structural Information

Tree Size Class: None

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SALIX | Salix | Willow | Upper |
| SARE2 | Salix reticulata | Netleaf willow | Upper |
| DRYAS | Dryas | Mountain-avens | Upper |
| EMNI | Empetrum nigrum | Black crowberry | Upper |

Description

On higher elevation alpine flood plains, dwarf shrubs may replace the early seral herbaceous stage. Dominant shrubs may include one or more of the following: Salix spp., Salix reticulata, Dryas spp., or Empetrum nigrum. Low willows can still be present, but cover is less than 25%.

References

Innes, Robin J. 2015. Fire regimes of Alaskan alder and willow shrublands. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Missoula Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/fire\_regimes/AK\_alder\_shrub/all.html [ 2016, August 3].

NatureServe. 2008. International Ecological Classification Standard: Terrestrial Ecological Classifications. Draft Ecological Systems Description for Alaska Boreal and Sub-boreal Regions.

Racine, C.H., and J.C. Walters. 1994. Groundwater-discharge fens in the Tanana Lowlands, Interior Alaska, USA. Arctic and Alpine Research 26: (4) 418-426.