16240

Western North American Boreal Shrub Swamp

BpS Model/Description Version: Nov. 2024

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
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Reviewer: Robin Innes, Blaine Spellman

Vegetation Type

Woody Wetland

Map Zones

68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78

Geographic Range

This Biophysical Setting (BpS) occurs throughout the boreal and sub-boreal regions of AK.

Biophysical Site Description

Shrub swamps occur on poorly drained fine textured soil in lowland areas or depressions that retain standing water throughout all or most of the growing season (NatureServe 2008; Viereck et al. 1992). Soils range from muck to mineral (does not include peatlands; NatureServe 2008). This BpS tends to occur in transition zones between peatlands and forest systems. Specific locations may shift over time.

Vegetation Description

Deciduous shrub swamps are usually dominated by alders, but willows or an alder/willow mix also occur (Viereck et al. 1992). Common species include *Alnus incana* ssp. *tenuifolia, A. viridis* ssp. *sinuata, Salix pulchra, S. richardsonii, Calamagrostis canadensis, Equisetum* spp., *Comarum palustre* (formerly *Potentilla palustris*), and hydrophytic mosses (Viereck et al. 1992).

Though this system is classified as closed by Viereck, et al. (1992), it may also occur in an open form.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| ALINT | *Alnus incana ssp. tenuifolia* | Thinleaf alder |
| ALVIS | *Alnus viridis ssp. sinuata* | Sitka alder |
| SAPU15 | *Salix pulchra* | Tealeaf willow |
| SARI4 | *Salix richardsonii* | Richardson's willow |
| CACA4 | *Calamagrostis canadensis* | Bluejoint |
| EQUIS | *Equisetum spp.* | Horsetail |

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

Disturbance Description

Shrub swamps likely represent a topoedaphic climax community which will persist as long as the hydrologic conditions supporting them are maintained (Viereck et al. 1992). Some sites may move back and forth between this system and peatland, forest, or even open water as hydrology changes, but these transitions are not directional, and are generally outside of the time scale of this model.

This BpS typically acts as a fire break, but it could burn under drought conditions and severe fire behavior. When fire occurs, it is likely to be replacement fire. Alders and willows are generally top-killed by fire but may resprout following fire (Viereck and Schandelmeier 1980), allowing recovery to this system. Alternatively, fire may cause changes in hydrology that could transition the site out of this system, possibly toward an open water condition. Replacement fire that regenerated this system is estimated at a mean fire return interval (MFRI) of 500yrs.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 504 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 504 | 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

Typically small patch, but some large patches occur, especially in the Tanana Flats area.

Adjacency or Identification Concerns

Issues or Problems

Native Uncharacteristic Conditions

Comments

In 2015 an extensive search was done by Fire Effects Information System (FEIS) staff to locate information for a synthesis on fire regimes of Alaskan alder and willow shrublands. 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 fire in Alaskan boreal shrub swamps specifically also was not found. Effects of fire on alders and willows is available in the [Fire Regime Synthesis of Alaskan alder and willow shrublands](https://www.fs.fed.us/database/feis/fire_regimes/AK_alder_shrub/all.html).

Addition of an early herb stage was considered, but it is believed that shrubs typically recover quickly from fire. Flooding was not included as a disturbance because the dominant species are flood-tolerant. Flooding severe or prolonged enough to kill the shrubs is likely to cause a transition out of this system.

Suggested reviewers for this system include: Al Batten, Torre Jorgenson and Katie Ireland.

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 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |

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 100 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ALINT | *Alnus incana* ssp*. tenuifolia* | Thinleaf alder | Upper |
| ALVIS | *Alnus viridis* ssp. *sinuata* | Sitka alder | Upper |
| SAPU15 | *Salix pulchra* | Tealeaf willow | Upper |
| SARI4 | *Salix richardsonii* | Richardson's willow | Upper |

Description

Open to closed tall shrub swamp. The shrub canopy is commonly 3-5 meters tall (Viereck et al. 1992). Overstory is typically dominated by alder, willow or an alder/willow mix. Common overstory species include *Alnus incana* ssp. *tenuifolia, A. viridis* ssp. *sinuata, Salix pulchra*, and *S. lanata*. Understory can include *Calamagrostis canadensis, Equisetum* spp., *Comarum palustre*, and hydrophytic mosses. This class persists indefinitely under appropriate hydrological conditions.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Early1:ALL | 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** |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.002 | 500 | Yes | 0 |

References

Batten, Alan R., S. Murphy and D.F. Murray. 1978. Definition of Alaskan coastal

wetlands by floristic criteria. Corvallis, OR: Corvallis Environmental Research Laboratory; EPA 804965-01. 490 p.

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.

Viereck, L.A., Dyrness, C.T., Batten, A.R., Wenzlick, K.J. 1992. The Alaska vegetation classification. Pacific Northwest Research Station, USDA Forest Service, Portland, OR. Gen. Tech. Rep. PNW-GTR286. 278 p.

Viereck, Leslie A.; Schandelmeier, Linda A. 1980. Effects of fire in Alaska and adjacent Canada: a literature review. BLM-Alaska Tech. Rep. 6, BLM/AK/TR-80/06. Anchorage, AK: U.S. Department of the Interior, Bureau of Land Management, Alaska State Office. 124 p