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Fire Regime Condition Class (FRCC) Interagency Guidebook Reference Conditions

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Potential Natural Vegetation (PNV) Name: Persistent Shrub North

Fire regime group: III – infrequent, mixed severity regime

Geographic Area: Interior, arctic, western, and Alaska Range transition regions of Alaska.

Physical Setting Description:

The Persistent Shrub North PNV encompasses many different plant communities on a variety of sites; the common element is that the shrub communities are persistent over time and do not appear to be a series of another PNV. The Persistent Shrub North PNV occurs on a variety of sites including steep subalpine slopes, avalanche tracks, tundra uplands, alpine treeline transitions, wet creek banks, and moderate, protected slopes beyond latitudinal treeline (Viereck et al 1992). Persistent shrub communities also occur on steep, south facing bluffs along major river systems in interior and southcentral Alaska.

Soils range from well to moderately drained to poorly drained and range in texture from thick loam to thin and stony. Permafrost is absent or 50 cm or more below the surface.

Biophysical Classification:

Persistent Shrub North PNV occurs in the following ecoregions described by Nowacki et al (2001):

- Intermontane Boreal
- Bering Tundra
- Bering Taiga – Nulato Hills (P2)
- Arctic Tundra
- Alaska Range Transition

The following community types described by Viereck et al (1992) are included Persistent Shrub North PNV group:

- IIB1a – Closed Tall Willow Shrub (topoedaphic climax on sheltered upland slopes only)
- IIB1b – Closed Tall Alder Shrub (topoedaphic climax on avalanche tracks, steep alpine slopes and tundra uplands only)
- IIB1c – Closed Tall Shrub Birch Shrub
- IIB1d – Closed Tall Alder-Willow Shrub (topoedaphic climax in tundra areas with thick active layer and adequate drainage only)
- IIB1e – Closed Tall Shrub Birch-Willow Shrub
- IIB1f – Closed Tall Shrub Swamp
- IIB2b – Open Tall Alder Shrub (topoedaphic climax at treeline only)
- IIB2c – Open Tall Shrub Birch Shrub (on treeline sites)
- IIB2d – Open Tall Alder-Willow Shrub (topoedaphic climax at terrace edges and steep slopes only)
- IIB2e – Open Tall Shrub Birch-Willow Shrub
- IIB2f – Open Tall Shrub Swamp
- IIC1a – Closed Low Shrub Birch Shrub (topographic climax on steep slopes and banks only)

IIC1c – Closed Low Shrub Birch-Willow Shrub
 IIC1e – Closed Low Alder-Willow Shrub (topoedaphic climax beyond treeline in n. and w. AK only)
 IIC2c – Open Low Mesic Shrub Birch-Ericaceous Shrub
 IIC2f – Open Low Shrub Birch-Willow Shrub (alpine slope sites only)
 IIC2g – Open Low Willow Shrub
 IIC2k – Open Low Alder-Willow Shrub
 IIC2n – Sagebrush-Grass
 IIIA1a – Elymus (sere in ericaceous shrub sequence in western Alaska)
 IIIA2b – Bluejoint-Herb (sere in wet sedge meadow-bluejoint-herb-scrub sequence on wet sites)
 IIIA2d – Tussock Tundra (may convert to ericaceous shrub-forb-sphagnum community if sphagnum accumulation kills tussocks or if permafrost table rises into organic mat at soil surface).

 IIIB1a – Seral Herbs (sere developing into shrub community on steep, south-facing bluffs in interior Alaska)

Identification of Key Characteristics of the PNV and Confuser PNVs:

The vegetation communities included in this PNV are diverse (see cross-walk to Viereck et al (1992) community types above). These same community types occur on different sites (e.g., on floodplains and on burned areas within a forested area) as part of a successional sequence of a different PNV. Therefore, the key to identifying the Persistent Shrub North PNV is to match the community type with the site where it occurs according to the physical setting description and community type list from Viereck et al (1992) above.

Common species occurring in the Persistent Shrub North PNV include alder (*Alnus* spp), willow (*Salix* spp.), resin birch (*Betula glandulosa*), and dwarf birch (*Betula nana*). Common shrub species on sites dominated by ericads include *Empetrum nigrum*, *Vaccinium uliginosum*, *V. vitis-idaea*, *Ledum decumbens*, *Andromeda polifolia* and *Arctostaphylos* spp.. On steep, south facing river bluffs, sagebrushes (*Artemisia frigida* and *A. alaskana*) are common. In the tall shrub communities, low shrubs may be absent or common. An herb layer may be abundant or sparse. Trees are absent or scarce.

Communities in this PNV may be open (25-75% cover) or closed (>75% cover). In the case of persistent shrub communities occurring on steep, south facing bluffs along major river systems in interior and southcentral Alaska, shrub cover may be discontinuous with bare ground exposed. Shrubs may be tall (>1.5 m) or low (0.2 m to 1.5 m).

The Persistent Shrub North PNV resembles the Persistent Shrub South PNV, which is similarly diverse and defined by the presence of persistent shrubs, but occurs in southeast, coastal southcentral and southwest Alaska. The ericaceous plant communities included in this PNV may also bear resemblance to the Dwarf Shrub Tundra PNV, which occurs throughout Alaska but usually occupies well-drained sites and supports shrubs < 20 cm (vs. poorly drained sites and shrub > 20 cm in the Persistent Shrub North PNV).

Natural Fire Regime Description:

Very little information is available about fire history in persistent shrub communities in Alaska. The dominant PNVs of the region that tend to occur adjacent to the Persistent Shrub North PNV include:

- Upland White Spruce Interior (170 year MFI)
- Black Spruce Interior (80 year MFI)
- Upland Spruce Hardwood Southcentral (200 year MFI)

- ❑ Black Spruce Southcentral (165 year MFI)
- ❑ Riparian Spruce Hardwood (300 year MFI)
- ❑ Tussock Tundra 1 (230 year MFI)
- ❑ Tussock Tundra 2 (560 year MFI)
- ❑ Dwarf Shrub Tundra (625 MFI)

Based on the primarily treeline sites where this PNV occurs, climate and fire histories of adjacent PNVs, mean fire return interval (MFI) for the Persistent Shrub North was estimated at 225 years for this model.

Other Natural Disturbance Description:

Other natural disturbances may include wind, flooding and avalanche, depending on the site.

Natural Landscape Vegetation-Fuel Class Composition:

The natural vegetation structure is a mosaic of the seral stages described in the table below.

Natural Scale of Landscape Vegetation-Fuel Class Composition and Fire Regime:

The Persistent Shrub North PNV exists within a landscape mosaic composed primarily of forested, wetland and tundra PNVs (see above). Most of the other PNVs occurring in the region are characterized by large, primarily replacement fires.

Uncharacteristic Vegetation-Fuel Classes and Disturbance:

Uncharacteristic sites have disproportionate percentages of seral classes on the landscape relative to those listed below.

PNV Model Classes and Descriptions:

Class	Modeled Percent of Landscape	Description
A: Post-disturbance herbaceous 0-5 years	2%	Grasses, sedges and/or forbs dominate the site. Shrubs sprout from rootstock
B: Mature shrub 5-1,000 years	98%	Shrubs overtop herbaceous layer and become dominant. A low shrub and/or herbaceous layer usually persists. Shrub cover is 25-75%.
Total:	100%	

Modeled Fire Frequency and Severity:

	Mean Probability	Mean Fire Frequency (years) (inverse of probability)	Description
Replacement fire	.34	295	Based on literature and expert input
Mosaic fire	.10	1,000	Based on literature and expert input
All Fire	.44	225	Based on literature and expert input
Other disturbances			

Modeled Fire Severity Composition:

	Percent All Fires	Description
Replacement fire	75%	Based on literature and expert input
Non-replacement fire	25%	Based on literature and expert input
All Fire	100%	

Further Analysis:

- The 150 year MFI estimate from experts' workshop seems low relative to adjacent PNVs and sites where this PNV occurs (primarily at treeline). I modeled at 225 years.

References

- Nowacki, G., Spencer, P., Brock, T., Fleming, M., and Jorgenson, R. 2001. Narrative Descriptions for the Ecoregions of Alaska and Neighboring Territories. National Park Service. Place of publication unknown. 17 p.
- Personal communication experts' workshop, March 2-4 2004. Fire Regime Condition Class (FRCC) interagency experts' workshop to develop and review Potential Natural Vegetation (PNV) groups for Alaska. Anchorage, Alaska.
- Viereck, L.A., Dyrness, C.T., Batten, A.R., and Wenzlick, K.J. 1992. The Alaska Vegetation Classification. Gen. Tech. Rep. PNW-GTR-286. Portland, OR. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 278 p.

VDDT successional class box diagram:

