# LANDFIRE Biophysical Setting Model

## *Biophysical Setting:* 7116372 Western North American Boreal Alpine Floodplain - Higher Elevations

☐ *This BPS is lumped with:*

☑ *This BPS is split into multiple models: Western North American Boreal Alpine Floodplain was split into a lower elevations and an upper elevations BpS model. The lower elevation model applies in the subalpine zone within the tall shrub zone. The upper elevations model applies above the elevational limit of tall shrubs.*

## *General Information*

**Contributors** (also see the Comments field) **Date** 4/15/2008

| | | |
|---|---|---|
| **Modeler 1** Tina Boucher | antvb@uaa.alaska.edu | **Reviewer** |
| **Modeler 2** Kori Blankenship | kblankenship@tnc.org | **Reviewer** |
| **Modeler 3** | | **Reviewer** |

**Vegetation Type**

Upland Shrubland

**Map Zone**

71

**Model Zone**

☑ Alaska ☐ N-Cent.Rockies
☐ California ☐ Pacific Northwest
☐ Great Basin ☐ South Central
☐ Great Lakes ☐ Southeast
☐ Northeast ☐ S. Appalachians
☐ Northern Plains ☐ Southwest

**Dominant Species***

SAAL
SALIX
ALVIS
CHLA13

**General Model Sources**

☐ Literature
☐ Local Data
☑ Expert Estimate

### 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). This model applies to Alpine Floodplains that occur above the elevational limit of tall shrubs.

### 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).

### 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-

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75yrs in the floodplain forest and shrub systems.

Alpine floodplains and riparian areas generally act as fire breaks.

### 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. This model applies to the variant of this system that occurs above the elevational limit of tall shrubs. Adjacent systems may include Western North American Boreal Alpine Dwarf-Shrubland, Western North American Boreal Alpine Mesic Herbaceous Meadow, Alaska Sub-boreal and Maritime Alpine Mesic Herbaceous Meadow, Maritime High Alpine Herbaceous, Talus and Bedrock.

### Native Uncharacteristic Conditions

### Scale Description

Linear

### Issues/Problems

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

### Comments

This model was developed based on input from the experts who attended the LANDFIRE Anchorage (Dec. 07) modeling meeting and refined by Tina Boucher and Kori Blankenship.

## *Vegetation Classes*

### *Class A* 35%

Early Development 1 All Structures

**Upper Layer Lifeform**

- ☑ Herbaceous
- ☐ Shrub
- ☐ Tree

**Indicator Species* and Canopy Position**

| | |
|---|---|
| CHLA13 | Upper |
| LUPIN | Upper |
| MEPA | Upper |
| CREL | Upper |

**Structure Data (for upper layer lifeform)**

| | *Min* | *Max* |
|---|---|---|
| *Cover* | Herbaceous | Herbaceous |
| *Height* | Herbaceous | Herbaceous |
| *Tree Size Class* | None | |

☐ Upper layer lifeform differs from dominant lifeform.

**Description**

0-14yrs

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.

This class can succeed to a low shrub state (class B) or directly to a dwarf shrub state (class C).

Deterministic succession to class B. The alternate succession pathway to C (probability = 0.03) represents sites that would not support low shrubs. Flooding (probability = 0.08), represented by Option 1 in the model, resets the age of this class.

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### *Class B* 20 %

Late Development 1 All Structures

**Upper Layer Lifeform**

- ☐ Herbaceous
- ☑ Shrub
- ☐ Tree

**Indicator Species* and Canopy Position**

| | |
|---|---|
| SAAL | Upper |
| SALIX | Upper |
| ALVIS | Upper |
| BENA | Upper |

**Structure Data (for upper layer lifeform)**

| | Min | Max |
|---|---|---|
| *Cover* | Open Shrub (25-74% shrub cover) | Closed Shrub (> 75% shrub cover) |
| *Height* | Low Shrub (20 cm to 1.5 m) | Tall Shrub (>1.5 m) |
| *Tree Size Class* | None | |

☐ Upper layer lifeform differs from dominant lifeform.

**Description**

15yrs+

Willow and alder low 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).

Alternate succession to class C occurs with a probability of 0.015. Flooding (probability = 0.03), represented by Option 1 in the model, causes a transition to class A.

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### *Class C* 45 %

Late Development 2 All Structures

**Upper Layer Lifeform**

- ☐ Herbaceous
- ☑ Shrub
- ☐ Tree

**Indicator Species* and Canopy Position**

| | |
|---|---|
| SALIX | Upper |
| SARE2 | Upper |
| DRYAS | Upper |
| EMNI | Upper |

**Structure Data (for upper layer lifeform)**

| | Min | Max |
|---|---|---|
| *Cover* | Open Shrub (25-74% shrub cover) | Closed Shrub (> 75% shrub cover) |
| *Height* | Dwarf Shrub (< 20 cm) | Dwarf Shrub (< 20 cm) |
| *Tree Size Class* | None | |

☐ Upper layer lifeform differs from dominant lifeform.

**Description**

15yrs+

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 <25%.

This class persists in the absence of disturbance. Flooding (probability = 0.03), represented by Option 1 in the model, causes a transition to class A.

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### *Class D* 0 %

[Not Used] [Not Used]

**Upper Layer Lifeform**

- ☐ Herbaceous
- ☐ Shrub
- ☐ Tree

**Indicator Species* and Canopy Position**

**Structure Data (for upper layer lifeform)**

| | Min | Max |
|---|---|---|
| *Cover* | | |
| *Height* | | |
| *Tree Size Class* | | |

☐ Upper layer lifeform differs from dominant lifeform.

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**Description**

***Class E*** **0%**

[Not Used] [Not Used]

**Upper Layer Lifeform**

- ☐ Herbaceous
- ☐ Shrub
- ☐ Tree

**Indicator Species* and Canopy Position**

**Structure Data (for upper layer lifeform)**

| | Min | Max |
|---|---|---|
| *Cover* | | |
| *Height* | | |
| *Tree Size Class* | | |

☐ Upper layer lifeform differs from dominant lifeform.

**Description**

## *Disturbances*

**Fire Regime Group**:** **NA**

**Historical Fire Size (acres)**

Avg 0
Min 0
Max 0

**Sources of Fire Regime Data**

- ☐ Literature
- ☐ Local Data
- ☑ Expert Estimate

**Fire Intervals**

| | *Avg FI* | *Min FI* | *Max FI* | *Probability* | *Percent of All Fires* |
|---|---|---|---|---|---|
| *Replacement* | | | | | |
| *Mixed* | | | | | |
| *Surface* | | | | | |
| *All Fires* | | | | | |

***Fire Intervals (FI):***

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class.

**Additional Disturbances Modeled**

- ☐ Insects/Disease
- ☐ Wind/Weather/Stress
- ☐ Native Grazing
- ☐ Competition
- ☑ Other (optional 1) Flooding
- ☐ Other (optional 2)

## *References*

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

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