

LANDFIRE Biophysical Setting Model

Biophysical Setting 7716550

Alaskan Pacific Maritime Floodplain Forest and Shrubland

☐ This BPS is lumped with:

☐ This BPS is split into multiple models:

General Information

Contributors (also see the Comments field) **Date** 7/30/2008

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Modeler 3 **Reviewer**

Vegetation Type

Forest and Woodland

Map Zone

77

Model Zone

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

Dominant Species*

PISI ALVIS
TSHE SALIX
POBA2 OPHO
ALRU2 RUSP

General Model Sources

- ☒ Literature
☐ Local Data
☒ Expert Estimate

Geographic Range

This BpS is found from Prince William Sound through southeast AK.

Biophysical Site Description

This system includes the active and inactive portions of the floodplain of glacially and non-glacially-fed rivers and streams. This system includes large and small channels as well as proximal outwash, but not abandoned floodplains. Glacially-fed rivers occur primarily on the mainland, while non-glacially fed rivers occur on both the mainland and large islands in the Gulf of Alaska.

Glacial outwash occurs near the terminus of the glacier. This is active proximal outwash with high flood frequency and high sediment input. Channels are scoured and braided, and the substrate is well-drained to excessively well-drained gravel or cobble.

Vegetation Description

Vegetation dominance on the floodplain depends on seral stage and frequency of flooding. Low benches are dominated by shrub, seedling, and herbaceous species such as *Alnus viridis* ssp. *sinuata*, *Salix alaxensis*, other *Salix* spp., *Ribes bracteosum* and *Sambucus racemosa*. Mid bench vegetation features shrub types and early seral forests (*Picea sitchensis*, *Alnus rubra*, *Populus balsamifera*). High bench types include mature forests with a more diverse shrub understory (*Picea sitchensis*, *Tsuga heterophylla*, *Oplopanax horridus*, *Rubus spectabilis*, *Vaccinium ovalifolium*, *Menziesia ferruginea*, and *Lysichiton americanus* (in poorly drained inclusions). Herbaceous species may include *Tiarella trifoliata*, *Viola glabrescens*, *Prenanthes alata*, *Osmorhiza purpurea*, *Circaea alpina* and *Heracleum lanatum* (Schoen and Dovichin 2007). Extensive wetlands (modeled separately) may develop on the low angle glacially-fed

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floodplains.

On non-glacially fed streams *Populus balsamifera* is not common (as it is on the glacially fed systems). *Alnus rubra* or *Alnus viridis* ssp. *sinuata* may be common in early seral stands of non-glacially fed streams. Salmonberry (*Rubus spectabilis*) is characteristic, and often forms a mosaic with *Vaccinium* spp., with the latter on older, inactive alluvial deposits. *Oplopanax horridus* is also common. Floodplain wetlands (modeled separately) on non-glacially fed streams are common, but small patch compared to those on large, distal outwash plains.

Disturbance Description

Frequent flooding, shifting channels, and sediment deposition characterize the system. Flooding can be caused by snowmelt, precipitation, ice jams and glacial runoff. Different rivers or portions of rivers may be more prone to certain types of flooding. Frequent flooding and channel migration create a pattern of gravel bars and early successional stages across the valley bottom. Sediment deposition raises the surface of the floodplain over time. As the terrace becomes farther removed from the channel, flooding becomes less frequent and spruce forest can establish. Water availability on terraces plays a major role in community structure and composition. On very active floodplains (e.g. Taku River), conifers have difficulty establishing and the hardwood community tends to dominate (Schoen and Dovichin 2007). Water inputs are from overbank flow (flooding), ground water, and precipitation. Deposits with high permeability become progressively drier as they are vertically and horizontally removed from the active channels.

Windthrow can affect the conifer and hardwood/conifer stages of this model (classes C, B and D) but it is not included in the VDDT model. It is unlikely that this BpS could carry a fire.

Adjacency or Identification Concerns

Floodplain wetlands are modeled separately from the floodplains.

Native Uncharacteristic Conditions

Riparian spruce forests have been heavily logged.

Scale Description

Linear

Issues/Problems

Since glacial and non-glacial floodplain types can not be mapped confidently as separate systems, they are considered one ecological system. However, vegetation composition and disturbance cycle vary depending on type of input (glacial vs. non-glacial) and proximity to the glacier. Close to the glacier terminus, glacially fed streams likely have a higher frequency of flooding and therefore a greater percentage of the landscape in early seral stages than distal locations or non-glacially fed streams.

Comments

This model was based on input from the experts who attended the LANDFIRE Juneau modeling meeting (Feb. 08), the hypothesized outwash plain and flood plain successional sequences from Boggs 2000, p. 51 and input from Tom DeMeo. Review resulted in minor changes to the model description and the addition of an alternate succession pathway in class D in the VDDT model. The quantitative change to the model did not change the model results.

Vegetation Classes

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Class A 5%

Early Development 1 All Structures

Upper Layer Lifeform

- ☒ Herbaceous
☐ Shrub
☐ Tree

Indicator Species* and**Canopy Position**

TITR Upper
 PRAL Upper
 OSPU Upper
 CIAL Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	Herbaceous	Herbaceous
Height	Herbaceous	Herbaceous
Tree Size Class	Seedling/Sapling <5"	

☐ Upper layer lifeform differs from dominant lifeform.

Description

0-5yrs

Floodplain, herbaceous wetlands. These early seral communities colonize new alluvial deposits following flood events. Herbaceous species may include *Tiarella trifoliata*, *Viola glabrescens*, *Prenanthes alata*, *Osmorhiza purpurea*, *Circaea alpina* and *Heracleum lanatum* (Schoen and Dovichin 2007).

Succession to class B. Flooding (probability = 0.05; represented as Option 1 in the model) resets the age of this class. Flooding could be more frequent, especially on glacial streams.

Class B 15%

Early Development 2 All Structures

Upper Layer Lifeform

- ☐ Herbaceous
☒ Shrub
☐ Tree

Indicator Species* and**Canopy Position**

ALVIS Upper
 SAAL Upper
 RIBR Upper
 SARA2 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	Seedling/Sapling <5"	

☐ Upper layer lifeform differs from dominant lifeform.

Description

6-30yrs

Floodplain, early-seral shrub/sapling. Red alder or cottonwood typically dominate and can sometimes persist for 75-110yrs. Life expectancy of alder depends on if it gets overtopped by spruce because spruce shades out the alder. Other common species may include *Ribes bracteosum* and *Sambucus racemosa*.

Succession to class D. The alternate succession pathway to C (probability = 0.01) represents lack of hardwood seed source or the possibility that spruce will germinate in large numbers on mineral soil after flooding, resulting in a dense, even-aged stand. Flooding (probability = 0.033; represented as Option 1 in the model) causes a transition to class A. Flooding could be more frequent, especially on glacial streams.

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Class C 10 %

Mid Development 1 All Structures

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☒ Tree

Indicator Species* and**Canopy Position**

PISI Upper
 ALVIS Middle
 SAAL Middle
 RUSP Lower

Structure Data (for upper layer lifeform)

	Min	Max
Cover	Open (25-59% tree cover)	Open (25-59% tree cover)
Height	Tree (> 3 m)	Tree (> 3 m)
Tree Size Class	Med. 9–20" (swd)/11–20" (hwd)	

☐ Upper layer lifeform differs from dominant lifeform.

Class C is distinguished from D based on the absence of hardwood species.

Description

31-110yrs

Floodplain, mid-seral spruce. Spruce gains canopy dominance over shrubs but overstory remains open.

Succession to class E. Flooding (probability = 0.01; represented as Option 1 in the model) causes a transition to class A.

Class D 20 %

Late Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☒ Tree

Indicator Species* and**Canopy Position**

PISI Upper
 POBA2 Upper
 ALRU2 Upper
 ALVIS Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	Open (25-59% tree cover)	Open (25-59% tree cover)
Height	Tree (> 3 m)	Tree (> 3 m)
Tree Size Class	Med. 9–20" (swd)/11–20" (hwd)	

☐ Upper layer lifeform differs from dominant lifeform.

Class D is distinguished from C based on the presence of hardwood species.

Description

31-110yrs

Floodplain, mid-seral spruce-hardwood. Mixed spruce/cottonwood stands are common on glacial streams whereas spruce/alder tends to be more prevalent on non-glacially fed streams. A reviewer noted that in many of the floodplain spruce forests in the central and northern part of southeast AK this class may persist for well over 200yrs (see the alternate succession pathway below).

The main successional pathway goes to class E, however, there is an alternate succession pathway (probability = 0.01) that maintains this class representing frequently flooded areas where spruce have difficulty establishing. Flooding (probability = 0.01; represented as Option 1 in the model) causes a transition to class A.

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Class E 50 %**Structure Data (for upper layer lifeform)**

Late Development 1 Closed

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☒ Tree

Indicator Species* and**Canopy Position**

PISI Upper
 TSHE Upper
 OPHO Lower
 RUSP Lower

	Min	Max
Cover	Closed (60-100% tree cover)	Closed (60-100% tree cover)
Height	Tree (> 3 m)	Tree (> 3 m)
Tree Size Class	Large 20" – 40"	

- ☐ Upper layer lifeform differs from dominant lifeform.

Description

111yrs+

Floodplain terraces, mature spruce forest. Mature spruce forest develops. Western hemlock eventually codominates with spruce (Boggs 2000). These forests tend to be more open than non-riparian forests and therefore support an abundant understory community.

This class persists in the absence of disturbance. Flooding (probability = 0.005; represented as Option 1 in the model) causes a transition to class A.

Disturbances**Fire Regime Group**:** NA**Fire Intervals**

Avg FI Min FI Max FI Probability Percent of All Fires

Historical Fire Size (acres)

Avg 0

Min 0

Max 0

Replacement

Mixed

Surface

All Fires

Sources of Fire Regime Data

- ☐ Literature
☐ Local Data
☒ Expert Estimate

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 ☐ Native Grazing ☒ Other (optional 1) Flooding
☐ Wind/Weather/Stress ☐ Competition ☐ Other (optional 2)

References

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