LANDFIRE Biophysical Setting Model

Biophysical Setting **0910550** **Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland**

☐ *This BPS is lumped with:*
☐ *This BPS is split into multiple models:*

General Information

Contributors (also see the Comments field) **Date** 10/4/2005

Modeler 1 Dave Powell	dcpowell@fs.fed.us	**Reviewer**	
Modeler 2 Dave Swanson	dswanson@fs.fed.us	**Reviewer**	
Modeler 3		**Reviewer**	

Vegetation Type
Forest and Woodland

General Model Sources
- ☑ Literature
- ☑ Local Data
- ☑ Expert Estimate

Dominant Species
PICO
ABLA
PIEN

Map Zone
9

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

Geographic Range
This BpS occurs in the Blue Mountains of WA and Blue and Ochoco Mountains in OR.

Biophysical Site Description
This forest type occurs at upper elevations (6000-8000ft), on cold sites with short summer and frosty growing seasons.

Vegetation Description
Some sites take a very long time to regenerate following reburn fires. Dense stands of lodgepole can develop and survive for 100yrs+. Old stands of Engelmann spruce and subalpine fir can develop, but are prone to insect and fire replacement.

Disturbance Description
Wildfires are less frequent than at lower elevations. Most fires are mixed severity or stand replacement severity. Spruce beetle can play a significant role at both endemic and epidemic/outbreak levels. Balsam woolly adelgid (an introduced insect) is currently causing high mortality. Mountain pine beetle can cause high mortality of seral lodgepole pine forests. Windthrow is important in this environment.

Adjacency or Identification Concerns
Subalpine woodland occurs above this type, and wet or dry mixed conifer (1045 or 1047) occurs below. Dense, dog-hair lodgepole stands were not modeled in this type, but were left to be defined in the Rocky Mountain lodgepole model (1050).

Native Uncharacteristic Conditions
If tree canopy closure is <10%, the site might be subalpine woodland/parkland (1046). Canopies >25m

**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

might be mesic spruce fir (1056).

Scale Description

Stands often occur as large patches on upper slopes and break into stringers or islands as elevation nears tree line.

Issues/Problems

Comments

This model was made from extensive alteration of the R#SPFI model.

During review, balsam woolly adelgid was removed from class D to reflect presettlement conditions. The model outcome was negligible.

Vegetation Classes

Class A 5 %

Early Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
- ☑ Shrub
- ☐ Tree

Fuel Model

Indicator Species and Canopy Position

VASC Upper
ARCO9 Upper
ACOC3 Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	40 %
Height	Shrub 0m	Shrub 0.5m
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Openings and meadows following stand replacement fire. Poorly stocked with lodgepole pine, subalpine fir and Englemann spruce. Slow tree recruitment. Trees 0-5in DBH. Dominant understory species include grouse huckleberry, heartleaf arnica and western needlegrass. Canopy closure >40% is possible, but unlikely due to site limitations in favor of rock, snow and ice.

Class B 20 %

Mid Development 1 Closed

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model

Indicator Species and Canopy Position

PICO Upper
ABLA Upper
PIEN Upper
PSME Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	31 %	60 %
Height	Tree 5.1m	Tree 10m
Tree Size Class	Medium 9-21"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Mid-sized mixed lodgepole pine, fir and spruce stand. Trees mostly 6-15in DBH. Moderate lodgepole regeneration leads to more closed canopy than class C. Lodgepole pines range in height up to 20m. Some large spruce and fir may persist from old stands that were thinned by insects or wind.

**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

Class C 40 %

Mid Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model

Indicator Species and Canopy Position

PICO
Upper
ABLA
Upper
PIEN
Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	11 %	30 %
Height	Tree 5.1m	Tree 10m
Tree Size Class	Medium 9-21"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Mid-sized mixed lodgepole, fir and spruce stand, closed canopy. Trees mostly 6-15in DBH. Lodgepole pines susceptible to outbreaks of mountain pine beetle. Lodgepole pines range in height up to 20m.

Class D 25 %

Late Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model

Indicator Species and Canopy Position

ABLA
PIEN
PICO
VASC

Structure Data (for upper layer lifeform)

	Min	Max
Cover	11 %	40 %
Height	Tree 10.1m	Tree 25m
Tree Size Class	Large 21-33"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Mixed age stands dominated by Engelmann spruce and subalpine fir, with minor lodgepole pine. Trees mostly 15in+ DBH. Dominant understory species include grouse huckleberry, heartleaf arnica and western needlegrass. Spruce beetle attacks mature spruce and fir, moving the stand back to class C. Mountain pine bark beetles attack mainly the remaining old lodgepole pines and result in maintenance of class D.

Class E 10 %

Late Development 1 Closed

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model

Indicator Species and Canopy Position

ABLA
PIEN
PICO
VASC

Structure Data (for upper layer lifeform)

	Min	Max
Cover	41 %	70 %
Height	Tree 10.1m	Tree 25m
Tree Size Class	Large 21-33"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Mixed age stands dominated by Engelmann spruce and subalpine fir, with minor lodgepole pine. Trees mostly 15in+ DBH. Understory vegetation is sparse.

Disturbances

**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

Fire Regime Group:** III

Historical Fire Size (acres)

Avg
Min
Max

Sources of Fire Regime Data

- [x] Literature
- [ ] Local Data
- [x] Expert Estimate

Fire Intervals

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	250			0.004	50
Mixed	250			0.004	50
Surface					
All Fires	125			0.00801	

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

- [x] Insects/Disease
- [x] Wind/Weather/Stress
- [ ] Native Grazing
- [ ] Competition
- [ ] Other (optional 1)
- [ ] Other (optional 2)

References

Agee, J.K. 1993. Fire ecology of Pacific Northwest forests. Washington, DC: Island Press. 493 pp.

Heyerdahl, E.K. and J.K. Agee. 1996. Historical fire regimes of four sites in the Blue Mountains, Oregon and Washington. Final Report, University of Washington, Seattle. 173 pp.

Johnson, C.G. Jr. 2004. Alpine and subalpine vegetation of the Wallowa, Seven Devils and Blue Mountains. R6-NR-ECOL-TP-03-04. Portland, OR: USDA Forest Service, Pacific Northwest Region. 612 pp.

Johnson, C.G. and R.R. Clausnitzer. 1992. Plant associations of the Blue and Ochoco Mountains. P6-ERW-TP-036-92. Portland, OR: USDA Forest Service, Pacific Northwest Reigion. 164 pp. + appendices.

Johnson, C.G. and S.A. Simon. 1986. Plant associations of the Wallowa-Snake province. R6-ECOL-TP-255b-86. Portland, OR: USDA Forest Service, Pacific Northwest Reigion. 272 pp. + appendices.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.