

LANDFIRE Biophysical Setting Model

Biophysical Setting: 2810540

Southern Rocky Mountain Ponderosa Pine Woodland

- This BPS is lumped with:
 This BPS is split into multiple models:

General Information

Contributors (also see the Comments field) **Date** 10/28/2004

Modeler 1 Merrill Kaufmann	mkaufmann@fs.fed.us	Reviewer Laurie Huckaby	lhuckaby@fs.fed.us
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Vegetation Type

Forest and Woodland

Map Zone

28

Model Zone

- | | |
|--|---|
| <input type="checkbox"/> Alaska | <input type="checkbox"/> N-Cent.Rockies |
| <input type="checkbox"/> California | <input type="checkbox"/> Pacific Northwest |
| <input type="checkbox"/> Great Basin | <input type="checkbox"/> South Central |
| <input type="checkbox"/> Great Lakes | <input type="checkbox"/> Southeast |
| <input type="checkbox"/> Northeast | <input type="checkbox"/> S. Appalachians |
| <input type="checkbox"/> Northern Plains | <input checked="" type="checkbox"/> Southwest |

Dominant Species*

PIPO
PSME

General Model Sources

- Literature
 Local Data
 Expert Estimate

Geographic Range

In MZ28, this is the dominant forest type along the eastern slope of the Continental Divide but is scarce on the western side of the Divide. The montane zone borders the Plains grasslands found to the east. In the foothills of the eastern slope it includes shrublands and meadows.

Biophysical Site Description

The montane zone (1650-2900m) (4900-8700ft). Lower montane below 2120m and upper montane above 2120m. Northern Front Range -Ponderosa pine tends to be associated with xeric, south-facing slopes, and Douglas-fir tends to be associated with mesic, north-facing slopes. South of I-70 the southern Front Range southwards to Pikes Peak, ponderosa pine-Douglas-fir forest exists on all site conditions (ie., aspect) above 1970m (6500 ft) elevation and pure ponderosa pine exists below 1970m (6500 ft). Below 1970m (6500ft) in the southern Front Range it is similar to the lower montane of the northern Front Range. Differences exist in the upper montane stands between the northern and southern Front Range.

Vegetation Description

The lower montane zone is dominated by ponderosa pine (historically <30% canopy cover below 2000m (6600ft)). More dense stands of Douglas-fir occur on north-facing slopes. In the upper montane zone, the ponderosa pine cover type occurs both as relatively pure stands, and with significant components of Douglas-fir. In the northern Front Range, typically striking contrast in stand density and species composition on south as opposed to north-facing slopes. Douglas-fir prominent on north-facing slopes. Structural stages will greatly vary depending on past disturbance history (ie, 50% cover of class B would not be outside of the historical range of variability following widespread high-severity fire which has occurred in the past over the last few hundred years prior to the 20th century). In the southern Front Range,

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**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.

historically most Douglas-fir was confined to north-facing slopes with occasional larger Douglas-fir on other aspects.

Disturbance Description

Mixed-severity fire regime - typically an average fire frequency range from 40-100yrs (5-100ha; Kaufmann et al. 2000, Veblen et al. 2000, Ehle and Baker 2003, Sherriff 2004). These fires range from low severity to high severity fires, and the forest structure was shaped by the pattern of fire at a landscape scale. Drought and other weather events (eg, blowdown); insects such as mountain pine beetle, Douglas-fir beetle and western spruce budworm (Negron 1998, 2004; Swetnam and Lynch 1993); and pathogens such as dwarf mistletoe (Hawksworth) also play important roles in this type.

Replacement fire rotation uncertain, and this affects the amount of forest in each class. Cheesman Lake -fire rotation (all fires 75yrs) and stand-replacement (460yrs) estimation.

Adjacency or Identification Concerns

Native Uncharacteristic Conditions

Scale Description

Northern range -fire history sites range from 1-200ha, average of 100ha areas for fire regime information over tens of thousands of acres. Southern range -- patch sizes from less than one hectare to a landscape scale of 35km² plus.

Issues/Problems

Replacement fire rotation uncertain, and this affects the amount of forest in each class.

Comments

Based on the Rapid Assessment model R3PPDF, by Merrill Kaufmann (mkaufmann@fs.fed.us), Rosemary Sherriff (sherriff@colorado.edu), Bill Baker (bakerwl@wyo.edu), Jose Negron and Brian Kent. Was also reviewed in workshop by Vic Ecklund (vecklund@csu.org) 7/25/2005.

Vegetation Classes

Class A	10 %	<u>Indicator Species* and Canopy Position</u>		<u>Structure Data (for upper layer lifeform)</u>	
				Min	Max
Early Development 1	All Structures	CERCO	Low-Mid	Cover	0 % 100 %
		PIPO	All	Height	Tree 0m Tree 5m
		PSME	All	Tree Size Class Pole 5-9" DBH	
		BOGR	Lower	<input type="checkbox"/> Upper layer lifeform differs from dominant lifeform.	
<u>Upper Layer Lifeform</u>					
		<input type="checkbox"/> Herbaceous			
		<input type="checkbox"/> Shrub			
		<input checked="" type="checkbox"/> Tree			
	<u>Fuel Model</u> 2				

Description

Openings with up to 10% cover by overstory dominated by ponderosa pine and sometimes Douglas-fir. Some openings may persist.

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Class B 10%

Mid Development 1 Closed

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Fuel Model 8**Indicator Species* and Canopy Position**

PIPO Upper
 PSME Upper
 CERCO Low-Mid

Structure Data (for upper layer lifeform)

	Min	Max
Cover	41 %	100 %
Height	Tree 5.1m	Tree 25m
Tree Size Class	Medium 9-21"DBH	

 Upper layer lifeform differs from dominant lifeform.**Description**

Greater than 50% canopy cover in the northern Front Range (above c. 6500ft) and >30% canopy cover in the southern Front Range.

Class C 25%

Mid Development 1 Open

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Fuel Model 8**Indicator Species* and Canopy Position**

PIPO Upper
 PSME Upper
 CERCO Low-Mid

Structure Data (for upper layer lifeform)

	Min	Max
Cover	10 %	40 %
Height	Tree 5.1m	Tree 25m
Tree Size Class	Medium 9-21"DBH	

 Upper layer lifeform differs from dominant lifeform.**Description**

Greater than 50% canopy cover in the northern Front Range (above c. 6500ft) and <30% canopy cover in the southern Front Range.

Class D 40%

Late Development 1 Open

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Fuel Model 8**Indicator Species* and Canopy Position**

PIPO Upper
 PSME Upper
 CERCO Lower

Structure Data (for upper layer lifeform)

	Min	Max
Cover	10 %	40 %
Height	Tree 25.1m	Tree 50m
Tree Size Class	Large 21-33"DBH	

 Upper layer lifeform differs from dominant lifeform.**Description**

Less than 50% canopy cover in the northern Front Range (above c. 6500ft) and <30% canopy cover in the southern Front Range.

Class E 15%

Late Development 1 Closed

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Fuel Model 8**Indicator Species* and Canopy Position**

PIPO Upper
 PSME Upper
 CERCO Lower

Structure Data (for upper layer lifeform)

	Min	Max
Cover	41 %	100 %
Height	Tree 25.1m	Tree 50m
Tree Size Class	Large 21-33"DBH	

 Upper layer lifeform differs from dominant lifeform.**Description**

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 **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.

Greater than 50% canopy cover in the northern Front Range (above c. 6500ft) and >30% canopy cover in the southern Front Range.

Disturbances

Fire Regime Group:** III

Historical Fire Size (acres)

Avg 0

Min 0

Max 0

Sources of Fire Regime Data

- Literature
 Local Data
 Expert Estimate

Additional Disturbances Modeled

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

Fire Intervals	<i>Avg FI</i>	<i>Min FI</i>	<i>Max FI</i>	<i>Probability</i>	<i>Percent of All Fires</i>
<i>Replacement</i>	460			0.00217	15
<i>Mixed</i>	160			0.00625	43
<i>Surface</i>	160			0.00625	43
<i>All Fires</i>	68			0.01467	

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.

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LANDFIRE Biophysical Setting Model

Biophysical Setting: 2811170

**Southern Rocky Mountain Ponderosa Pine
Savanna**

- This BPS is lumped with:
 This BPS is split into multiple models:

General Information

Contributors (also see the Comments field) **Date** 10/27/2004

Modeler 1 Jeff Redders	jredders@fs.fed.us	Reviewer Brenda Wilmore	bwilmore@fs.fed.us
Modeler 2 Patrick Medina	pmedina@fs.fed.us	Reviewer Laurie Huckaby	lhuckaby@fs.fed.us
Modeler 3 anonymous		Reviewer anonymous	

Vegetation Type

Forest and Woodland

Map Zone

28

Model Zone

- | | |
|--|---|
| <input type="checkbox"/> Alaska | <input type="checkbox"/> N-Cent.Rockies |
| <input type="checkbox"/> California | <input type="checkbox"/> Pacific Northwest |
| <input type="checkbox"/> Great Basin | <input type="checkbox"/> South Central |
| <input type="checkbox"/> Great Lakes | <input type="checkbox"/> Southeast |
| <input type="checkbox"/> Northeast | <input type="checkbox"/> S. Appalachians |
| <input type="checkbox"/> Northern Plains | <input checked="" type="checkbox"/> Southwest |

Dominant Species*

PIPO
FEAR2
MUMO

General Model Sources

- Literature
 Local Data
 Expert Estimate

Geographic Range

Central and northern NM and AZ, southern CO and possibly southern UT

Biophysical Site Description

1970-2575m in elevation on a variety of topographic features, including mountains, mesas and canyons. Mean annual precipitation ranges from about 16-25in. BpS is best described as a savanna that has widely spaced (>150yrs old) Pinus ponderosa.

Vegetation Description

Overstory canopy of ponderosa pine with a grassy understory, predominantly the bunchgrasses Arizona fescue and mountain muhly. May include sites with minor cover of Gambel oak (<15% cover).

Disturbance Description

Mean composite surface fire intervals have been found to be 5-15yrs (Swetnam and Baisan 1996). Infrequent stand-replacement fire on the order of a few hundred years possible (300-500yrs?). Drought and other weather events (eg, blowdown), parasites and disease may play a minor role, and have very long rotations. Insects may be a significant, but infrequent occurrence.

Adjacency or Identification Concerns

Native Uncharacteristic Conditions

Scale Description

Landscape scale (thousands to tens of thousands of acres) (Swetnam and Baisan 1996).

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Issues/Problems

Replacement fire rotation uncertain, and this affects the amount of forest in each class.

Comments

Based on the Rapid Assessment model R3PPGRsw by J Redders (jredders@fs.fed.us), W. Baker, (bakerwl@wyo.gov) and P. Medina (pmedina@fs.fed.us). Original model reviewed by Brenda Wilmore, bwilmore@fs.fed.us.

Additional reviewers of this BpS include Paul Langowski, plangowski@fs.fed.us; Dick Edwards, rledwards@fs.fed.us; Vic Ecklund, vecklund,vecklund@csu.org; and Chuck KostECKA. Based on the reviews, there was disagreement on surface fire interval. Majority of reviews supported models mixed fire interval. One reviewer thought the surface fire interval should be 20yrs.

Vegetation Classes

Class A 10%

Early Development 1 All Structures

Indicator Species* and Canopy Position	FEAR2 Lower	Structure Data (for upper layer lifeform)
	MUMO Lower	
	PIPO All	

Upper Layer Lifeform

Herbaceous

Shrub

Tree **Fuel Model 1**

Description

	Min	Max
Cover	0 %	90 %
Height	Tree 0m	Tree 5m
Tree Size Class	Seedling <4.5ft	

Upper layer lifeform differs from dominant lifeform.

Dominant lifeform will be herbaceous, with <90% canopy cover and any height.

Bunchgrass dominated (0-49yrs). Some ponderosa pine individuals also becoming established.

Class B 5%

Mid Development 1 Closed

Indicator Species* and Canopy Position	PIPO Upper	Structure Data (for upper layer lifeform)
	FEAR2 Lower	
	MUMO Lower	

Upper Layer Lifeform

Herbaceous

Shrub

Tree **Fuel Model 8**

Description

	Min	Max
Cover	51 %	100 %
Height	Tree 5.1m	Tree 10m
Tree Size Class	Pole 5-9" DBH	

Upper layer lifeform differs from dominant lifeform.

Small and medium sized ponderosa pine (50-149yrs), still with high bunchgrass cover. Closed canopy defined as >50%.

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Class C 20%

Mid Development 1 Open

Indicator Species* and Canopy Position

PIPO Upper
FEAR2 Lower
MUMO Lower

Structure Data (for upper layer lifeform)

	Min	Max
Cover	10 %	50 %
Height	Tree 5.1m	Tree 10m
Tree Size Class	Pole 5-9" DBH	

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 1

Upper layer lifeform differs from dominant lifeform.

Description

Small and medium sized ponderosa pine (50-149yrs), with moderate bunchgrass cover. Open canopy defined as 10-49%.

Class D 60%

Late Development 1 Open

Indicator Species* and Canopy Position

PIPO Upper
FEAR2 Lower
MUMO Lower

Structure Data (for upper layer lifeform)

	Min	Max
Cover	11 %	50 %
Height	Tree 10.1m	Tree 25m
Tree Size Class	Large 21-33"DBH	

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 8

Upper layer lifeform differs from dominant lifeform.

Description

Large and very large old growth ponderosa pine, with medium to high cover of bunchgrasses. Old growth attributes prominent, including downed wood, snags and diseased trees.

Class E 5%

Late Development 1 Closed

Indicator Species* and Canopy Position

PIPO Upper
FEAR2 Lower
MUMO Lower

Structure Data (for upper layer lifeform)

	Min	Max
Cover	51 %	100 %
Height	Tree 25.1m	Tree 50m
Tree Size Class	Large 21-33"DBH	

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 10

Upper layer lifeform differs from dominant lifeform.

Description

Large and very large old growth ponderosa pine, with medium cover of bunchgrasses. Old growth attributes prominent, including downed wood, snags and diseased trees.

Disturbances

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Fire Regime Group:** I

Historical Fire Size (acres)

Avg 0
Min 0
Max 0

Sources of Fire Regime Data

- Literature
- Local Data
- Expert Estimate

Additional Disturbances Modeled

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

Fire Intervals	<i>Avg FI</i>	<i>Min FI</i>	<i>Max FI</i>	<i>Probability</i>	<i>Percent of All Fires</i>
<i>Replacement</i>	300			0.00333	4
<i>Mixed</i>					
<i>Surface</i>	12			0.08333	96
<i>All Fires</i>	12			0.08668	

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.

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*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.
**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.