

LANDFIRE Biophysical Setting Model

Biophysical Setting: 0210280

**Mediterranean California Mesic Mixed
Conifer Forest and Woodland**

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

General Information

Contributors (also see the Comments field) **Date** 10/26/2005

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Modeler 3 **Reviewer**

<u>Vegetation Type</u>	<u>Dominant Species</u>	<u>Map Zone</u>	<u>Model Zone</u>	
Forest and Woodland	PSME ABCO	2	<input type="checkbox"/> Alaska	<input type="checkbox"/> Northern Plains
General Model Sources	CADE27		<input type="checkbox"/> California	<input type="checkbox"/> N-Cent.Rockies
<input checked="" type="checkbox"/> Literature	PIPO		<input type="checkbox"/> Great Basin	<input checked="" type="checkbox"/> Pacific Northwest
<input type="checkbox"/> Local Data	PILA		<input type="checkbox"/> Great Lakes	<input type="checkbox"/> South Central
<input checked="" type="checkbox"/> Expert Estimate			<input type="checkbox"/> Hawaii	<input type="checkbox"/> Southeast
			<input type="checkbox"/> Northeast	<input type="checkbox"/> S. Appalachians
				<input type="checkbox"/> Southwest

Geographic Range

This type occurs all over California, from the San Bernardino mountain range thru the western slope of the Sierra Nevada mountain range, to the Klamath-Siskiyou region, and it may include interior coast ranges. Type intergrades with mixed conifer in southern Oregon, and may be extremely similar to it. Type very similar to that found in SW Oregon with range of mixed conifer found commonly up to the North Umpqua river, ending within the Steamboat 5th field drainage.

Biophysical Site Description

Favorable slopes, primarily north and east aspects throughout the geographic range. Generally above 5000ft elevation at the southern extent to above 1000ft in the north. In SW Oregon, generally found above 1000ft and up to about 3500ft. In Oregon, it is found on E-NW aspects.

Vegetation Description

Mixed conifer forests are typically composed of three or more species, with white fir, Douglas-fir, ponderosa pine, sugar pine, and incense cedar. Tanoak and bigleaf maple are occasional associates. Giant sequoia forests are included within this BPS in CA. Douglas-fir drops out south of Yosemite National Park. Incense cedar may compose a larger proportion of BPS in the south.

In Oregon, sequoia forests are not applicable. Incense cedar is a main conifer associate throughout the range with madrone, live oak, big-leaf maple and chinquapin common hardwood species. Ceanothus sp. Along with Holodiscus, Arctostaphylos and Gautheria are common shrub associates.

Disturbance Description

Surface fire occurs at an average generally between 10-20yrs (Taylor and Skinner 2003, Taylor and Skinner 1998). Kilgore and Taylor (1979) reported a FRI of 19-39yrs (N/NE aspects), which may favor mixed and

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replacement fires of longer return intervals. Most medium and high severity fires may actually occur on mid and upper slope positions (Taylor and Skinner 1998, Taylor 2002, Beaty and Taylor 2001).

Insect/drought-related mortality affects this BpS, especially in synch with periodic drought, causing individual and small patch effects. Insect activity increases in amount and frequency in the north part of the range of this BpS, particularly in the mid-open and mid-closed stands following surface and mixed severity fires. The frequency would be in the order of 30yrs.

Adjacency or Identification Concerns

Extends between the low elevation hardwood forests to the red fir forests of the upper elevations.

In CA, upper elevations defined by ecotone with red fir, and lodgepole. Lower elevations defined by ecotone with drier mixed conifer types. Upper elevations defined by ecotone with both red fir as in CA. but also with silver fir. Lower elevations defined by cedar-hemlock-Douglas-fir or the RA mixed evergreen north BpS groups.

CALVEG types that are included in this model are DF, DW, DP, MB, MF (depending on RF content), MK, WF (depending on site productivity), and BT.

Native Uncharacteristic Conditions

Extent of high density forest is higher today, primarily due to effective fire suppression. Species composition has shifted to higher levels of shade tolerant conifer in the absence of frequent surface fire.

Scale Description

Literature suggest an historical average fire size of 50-200ha (Agee 1993, Taylor, various). Small to medium patch size mosaic, driven by variations of surface fire intensity and insect/pathogen-related mortality. Also includes coarser texture, at the 100s to 1000s of acres scale, that are less frequent.

Issues/Problems

It is unknown if there is a need for a northern (latitude) versus a southern MCON PNVG. This version is intended to respond to literature inferences that "north" slopes, perhaps especially in the northern Sierra Nevada through the Klamath region, have a longer fire regime and larger patch size than estimated by work in the southern and central Sierra Nevada. Likewise, the Klamath region literature also indicates that the topographic complexity also contributes to disparity between the two types. Even though a FRI difference may exist between N and S aspects, Skinner and Taylor (1998) found that the numbers were not statistically significant in their study. Difference in severity between aspects may be more important.

In Oregon, aspects play a more significant role in determining differences in fuel loading and fire severity, particularly in the southern portions to be replaced by elevation in the most northern extent of this type.

Due to the vegetative effects of the mixed severity fire regime, mapping is difficult.

BpS 1098 can be regarded as a successional stage (class A) within this BpS.

Comments

Created from R1MCONns. For that Rapid Assessment model, Shlisky adjusted ratio of replacement to mixed fire from 0.8 to 1.25 from previous version based on reviewer feedback. Shlisky also added insect/pathogen and snow breakage (wind/weather/stress) probabilities included in description but not in

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previous model version. Very little data on reference % of PNVG by state. Current pathways show late-seral open succeeding to late-seral closed - need to consider if late-seral open can succeed to itself; then succeeding to late-seral closed in the absence of fire. In Oregon, the mesic mixed-conifer can sustain succession to itself for periods of time to include hundreds of years due to the mixed severity effects of most fires.

This model works well for MZ07, but certain changes were needed, such as species composition and duration. Alan Baumann would add a snow disturbance every 20yrs in the mid-closed stands to open up the canopy to class C.

Vegetation Classes

Class A 5 %

Early Development 1 All Structure

Upper Layer Lifeform

Herbaceous

Shrub

Tree

Fuel Model

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Indicator Species and Canopy Position

PSME Upper

PIPO Upper

PILA Upper

ABCO Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	100 %
Height	Tree 0m	Tree 10m
Tree Size Class	Sapling >4.5ft; <5"DBH	

Upper layer lifeform differs from dominant lifeform.

Shrubs may be the dominant lifeform with canopy cover 0-100% and heights up to 3m.

Description

Early succession conditions after stand replacement disturbance.

In some cases, tree seedlings may develop a nearly continuous canopy and succeed relatively quickly to Mid-development conditions. In other cases, chaparral conditions may dominate class A and persist for long periods of time. Shrub species may include: *Arctostaphylos patula*; *Quercus vaccinifolia*; *Ceanothus* spp.; *Holodiscus discolor*; Hardwood resprouting can be significant with madrone, chinquapin, tanoak, live oak and big-leaf maple. In the north portion of the range, Douglas-fir is the predominant upper canopy conifer with white fir establishing in the mid-upper canopy.

Class B 5 %

Mid Development 1 Closed

Upper Layer Lifeform

Herbaceous

Shrub

Tree

Fuel Model

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Indicator Species and Canopy Position

PSME Upper

PIPO Upper

ABCO Upper

PILA Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	51 %	100 %
Height	Tree 10.1m	Tree 25m
Tree Size Class	Medium 9-21"DBH	

Upper layer lifeform differs from dominant lifeform.

Description

Pole to medium sized conifers with canopy cover greater than 50%. Many of the fuels in this class are in the crown versus on the ground due to dead limbs calving off to create most of the fuel loading. Shrub and forage species are on the decline. Insect and disease is prevalent in Oregon in these stands.

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Class C 15 %

Mid Development 1 Open

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model

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Indicator Species and Canopy Position

PSME
 Upper
 ABCO
 Mid-Upper
 PILA
 Upper
 PIPO
 Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	50 %
Height	Tree 10.1m	Tree 25m
Tree Size Class	Medium 9-21"DBH	

Upper layer lifeform differs from dominant lifeform.

Description

Pole to medium sized conifers with canopy cover less than 50%. Frequent surface fires maintain the distribution of this class in Oregon. With less disturbance, white fir begins to dominate the stand. Pine crown health is maintained by more open conditions found in more frequently disturbed areas. Recruitment of more understory (usually white fir) is possible in patches with stand replacement and in areas of heavier thinning by fire. Hardwoods are generally healthy in this class, also due to the more open stand conditions.

Class D 50 %

Late Development 1 Open

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model

10

Indicator Species and Canopy Position

PSME
 Upper
 PIPO
 Mid-Upper
 PILA
 Upper
 ABCO
 Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	50 %
Height	Tree 25.1m	Tree >50.1m
Tree Size Class	Very Large >33"DBH	

Upper layer lifeform differs from dominant lifeform.

Description

Overstory of large and very large trees with canopy cover less than 50%. Occurring in small to moderately-sized patches on southerly aspects and ridgetops. In Oregon, the open late seral stands can be maintained for long periods of time (hundreds of years), alternating between about 30-55% crown closure. These stands occur as a matrix (not a patch) across many of the mid-slope areas and on E-NW aspects.

Class E 25 %

Late Development 1 Closed

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model

10

Indicator Species and Canopy Position

PSME
 Mid-Upper
 ABCO
 Mid-Upper
 PILA
 Upper
 PIPO
 Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	51 %	100 %
Height	Tree 25.1m	Tree >50.1m
Tree Size Class	Very Large >33"DBH	

Upper layer lifeform differs from dominant lifeform.

Description

Overstory of large and very large trees with canopy cover greater than 50%. Occurring in small to moderately-sized patches on north aspects and lower slope positions. Understory characterized by medium and smaller-sized shade-tolerant conifers, primarily ABCO. In Oregon, these stands are located in refugia areas of the

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landscape occurring in small-moderate-sized patches on mid-slope E-NW aspects.

Disturbances

Fire Regime Group**:	Fire Intervals					
	Avg FI	Min FI	Max FI	Probability	Percent of All Fires	
I	Replacement	225			0.00444	6
	Mixed	250			0.004	5
	Surface	14	10	40	0.07143	89
	All Fires	13			0.07987	

Historical Fire Size (acres)

Avg 70000
Min 1000
Max 200000

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 (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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