

Rapid Assessment Reference Condition Model

The Rapid Assessment is a component of the LANDFIRE project. Reference condition models for the Rapid Assessment were created through a series of expert workshops and a peer-review process in 2004-2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG):

R#MCONsw

Mixed Conifer - Southwest Oregon

General Information

Contributors (additional contributors may be listed under "Model Evolution and Comments")

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Vegetation Type

Forested

Dominant Species*

ABCO
PSME
PIPO
PILA

General Model Sources

- Literature
 Local Data
 Expert Estimate

LANDFIRE Mapping Zones

1	8
2	9
7	

Rapid Assessment Model Zones

- | | |
|--|---|
| <input type="checkbox"/> California | <input checked="" 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 type="checkbox"/> Southwest |
| <input type="checkbox"/> N-Cent.Rockies | |

Geographic Range

Klamath-Siskiyou region straddling the California-Oregon border and the southern Cascades in the Rogue, Umpqua and southern Willamette river valleys. This type is an extension of the Mediterranean mixed conifer systems centered in northern California that range south over the western slope of the Sierra Nevada to the San Bernardino mountain range.

Biophysical Site Description

Low and mid-montane forests occurring from 1000 feet to 3000 feet in the Willamette Valley, and higher southward, initiating from 1000 to 4000 feet depending on aspect. The upper extent to 6000 feet also varies with aspect. Geologic substrate and soils vary widely but excludes ultramafics. The systems occupy all topographic positions.

Vegetation Description

Mixed conifer forests are typically composed of 3 or more species, predominantly Douglas-fir, with white fir, ponderosa pine, sugar pine, and incense cedar. California black oak, madrone, and chinquapin are also common components.

Disturbance Description

Surface and mixed severity fires occur with a median fire return interval of 10-15 years with a wide range of variability (Fire Regime Group I or III). Mixed severity fire occurs after longer intervals usually exceeding 35 year. Insect/pathogen drought-related mortality occurs at a low background frequency. Snow pack and snow breakage is more important at elevation.

Adjacency or Identification Concerns

Extends between low elevation hardwood forests and mixed evergreen systems to the red fir forests of the

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

upper elevations in the Klamath Mountains and southern Cascades. The mixed conifer group occurs adjacent to Tanoak types on the inland side of the coastal range. To the north, mixed conifer occurs between Douglas-fir western hemlock groups and oak-Douglas-fir northward in the Willamette and Umpqua Valleys.

This PNVG may be similar to the PNVGs R1MCONns and R1MCONss from the California model zone with some differences in species composition.

Scale Description

Sources of Scale Data Literature Local Data Expert Estimate

Small to medium patch size mosaic typically in the range of hundreds of acres limited by earlier fire patches, variations of fire intensity and spread rates due to topographic position and weather, and spread extent mediated by topographic divides and riparian areas. More rare occurrences in the thousands of acres resulted from severe weather. Leiberg (1900) points to some larger scale disturbance of 10,000's acres scale at higher elevations,

Issues/Problems

One reviewer suggested to combine these SW OR types on moisture gradients. For example combine this MCONsw with other dry types (including some of the tanoak series), and combine the coastal wet tanoak with western hemlock series.

Model Evolution and Comments

This version of mixed conifer reflects the literature (Turner and Skinner 2003, Turner and Skinner 1998, Beaty and Teylor 2001, Bekker and Taylor 2001) for the northern Klamath Matins and southern Cascades in California, and Sensenig on the north side of the border: shorter median fire return intervals (MFRI) on south and west aspects than on northerly and easterly aspects, with past fire severity (inferred from age classes) greater on upper slopes, ridge tops, and south and west aspect slopes. Sensenig points to similar return intervals across the range for nearby related groups. Topographic complexity in the Klamath Mountains may contribute to limits on fire spread and the creation of distinct firesheds. Past fire severity has been inferred from punctuated tree recruitment events, however recent interpretation suggest that a component of these may have been due to favorable climatic conditions (Skinner personal communication 2004).

One reviewer suggested different combinations of plant series for PNVGs. For example, combine tanoak with western hemlock series, and red fir with white fir.

Succession Classes
Succession classes are the equivalent of "Vegetation Fuel Classes" as defined in the Interagency FRCC Guidebook (www.frcc.gov).

Class A 15%

Early1 PostRep

Description

Early successional states less than 35 years post severe disturbance, either localized high mortality in a mixed severity fire, or rare larger severe fire events. State initially comprised of grass and forb species, shrub resprouts or seedlings. Later stages within this class include high cover of trees of

Indicator Species* and Canopy Position

PIPO
PSME
ABCO
PILA

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	80 %
Height	no data	no data
Tree Size Class	no data	

Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

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sapling and pole size (<9" dbh).
Shrubs can be dominant to co-dominant with the tree species.

Class B 5%

Mid1 Closed

Description

These stands, between 40 and 170 years in age, are a rare development resulting from an alternate successional pathway in settings and climatic periods that support longer intervals between mixed severity fires. Crowded stands of pole to medium sized conifers (<24" DBH) with canopy cover greater than 40% along with hardwood trees in younger stages. Douglas-fir and or white fir continue to recruit below ponderosa pine or Douglas fir to fill in initial gaps in the canopy. Ladder fuels and subcanopy lower overall average crown base height and increase crown bulk density. Hardwoods are shaded out at later stages, and insect/pathogen disturbance increases with age and relative density. Depauperate understory. Surface fuel moderate and complex.

Indicator Species* and Canopy Position

PSME
ABCO
PILA
PIPO

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	<i>Min</i>	<i>Max</i>
<i>Cover</i>	40 %	90 %
<i>Height</i>	no data	no data
<i>Tree Size Class</i>	no data	

- Upper layer lifeform differs from dominant lifeform.
Height and cover of dominant lifeform are:

Class C 10%

Mid1 Open

Description

Stands between 40 to 170 years with pole to medium large conifers (<32" DBH) with canopy cover less than 40%. Pine species and Douglas-fir dominate, with hardwoods (madrone, black oak, chinquapin) a highly variable component. High crown base height, relatively low crown bulk density and infrequent ladder fuels. Understory composition

Indicator Species* and Canopy Position

PIPO
PILA
PSME
ABC

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	<i>Min</i>	<i>Max</i>
<i>Cover</i>	20 %	40 %
<i>Height</i>	no data	no data
<i>Tree Size Class</i>	no data	

- Upper layer lifeform differs from dominant lifeform.
Height and cover of dominant lifeform are:

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variable. Surface fuels light

Class D 50%

Late1 Open

Description

Predominate state across the HRV landscape. Stands over 170 year old with well developed overstory of large and very large trees with canopy cover less than 40%. Stands occur in small to moderately-sized patches on all aspects and topographic positions with significantly fewer on north aspects and in protected basins and draws. Pine species and Douglas-fir dominate with associated hardwoods a minor component. Shrub layer reduced and herbaceous layer increased from younger stand. Variable height to crown base, crown bulk density, and ladder fuels and surface fuels contribute to variable fire intensity and mixed severity fire.

Indicator Species* and Canopy Position

PIPO
PSME
PILA
ABCO

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	20 %	40 %
Height	no data	no data
Tree Size Class	no data	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class E 20%

Late1 Closed

Description

Overstory of large and very large trees with canopy cover greater than 40%. Occurring with significantly higher probability on north aspects and protected lower slope positions. Understory characterized by medium and smaller-sized shade-tolerant conifers (Douglas fir in lower potential sites, and white fir in higher potential sites) or pine. Understory shrub and herbaceous layer cover reduced. Extensive live fuels in the surface layer, ladder fuels, low mean crown base height and relatively high crown bulk density contribute to increased

Indicator Species* and Canopy Position

ABCO
PIPO
PILA
PSME

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	40 %	75 %
Height	no data	no data
Tree Size Class	no data	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

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probability of mixed severity fire with increased proportion of lethal effects.

Disturbances

Non-Fire Disturbances Modeled

- Insects/Disease
- Wind/Weather/Stress
- Native Grazing
- Competition
- Other:
- Other:

Fire Regime Group: 1

- I: 0-35 year frequency, low and mixed severity
- II: 0-35 year frequency, replacement severity
- III: 35-200 year frequency, low and mixed severity
- IV: 35-200 year frequency, replacement severity
- V: 200+ year frequency, replacement severity

Historical Fire Size (acres)

Avg:
Min:
Max:

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 the 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. All values are estimates and not precise.

Sources of Fire Regime Data

- Literature
- Local Data
- Expert Estimate

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	400			0.0025	4
Mixed	50			0.02	29
Surface	22			0.04545	67
All Fires	15			0.06795	

References

- Beatty, Matthew and Alan H. Taylor 2001. Spatial and temporal variation of fire regimes in a mixed conifer forest landscape, Southern Cascades, California, USA. *Journal of Biogeography*, 28, 955-966.
- Bekker, Matthew F., and Alan H. Taylor 2001. Gradient Analysis of Fire Regimes in Montane Forests of the Southern Cascade Range, Thousand Lakes Wilderness, California, USA. *Plant Ecology* 155: 15–28, 2001.
- Brown, James K.; Smith, Jane Kapler, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 257 p.
- Caprio, Anthony, Swetnam, Thomas W. 1995. Historic fire regimes along an elevational gradient on the west slope of the Sierra Nevada, California. In: Brown, James K.; Mutch, Robert W.; Spoon, Charles W.; Wakimoto, Ronald H., tech. Coord. Proceedings: Symposium on Fire in Wilderness and Park Management: Past Lessons and Future Opportunities, March 30-April 1, 1993. Missoula, MT. Gen. Tech. Rep. INT-GTR-320. Ogden, UT; U.S. Department of Agriculture, Forest Service, Intermountain Research Station.
- Frost, Evan J. and Rob Sweeney 2000. Fire Regimes, Fire History and Forest Conditions in the Klamath-Siskiyou Region: An Overview and Synthesis of Knowledge. Unpublished compilation prepared World Wildlife Fund, Klamath-Siskiyou Ecoregion Program, Ashland, OR
- Kilgore, Bruce M., and Dan Taylor. 1979. Fire History of a Sequoia-Mixed conifer forest. *Ecology* 60(1), 1979, pp. 129 – 142.

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

McKelvey, Kevin, Skinner, Carl, Chang, Chi-ru, Etman, Don, Husari, Susan, Parsons, David, van Wagtendonk, Jan W., Weatherspoon, C. Phillip. 1996. An Overview of Fire in the Sierra Nevada. Sierra Nevada Ecosystem Project: Final report to Congress, vol. II, Assessments and scientific basis for management options: Davis: University of California, Centers for Water and Wildland Resources, 1996.

Sensenig, Thomas Personal communication, 2004.

Skinner, Carl, 2004: presentation at the Mixed Severity Fire Regime: ecology and management conference, Spokane, WA November 2004.

Skinner, Carl, Chang, Chi-ru. 1996. Fire Regimes: Past and Present. Sierra Nevada Ecosystem Project: Final report to Congress, vol. II, Assessments and scientific basis for management options: Davis: University of California, Centers for Water and Wildland Resources, 1996.

Taylor, Alan H. 2001. Fire regimes and forest changes in mid and upper montane forests of the southern Cascades, Lassen Volcanic National Park, California, U.S.A. *Journal of Biogeography*, 27, 87–104.

Taylor, Alan H. and Carl N. Skinner 1998. Fire history and landscape dynamics in a late-successional reserve, Klamath Mountains, California, USA. *Forest Ecology and Management* 111 285-301

Taylor, Alan H. and Carl N. Skinner 200?. Unpublished manuscript: Spatial and temporal patterns of historic fire regimes and forest structure as a reference for restoration of fire in the Klamath Mountains.