

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 and 2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG)

R1PIJE **Jeffrey Pine**

General Information

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

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Vegetation Type

Forested

General Model Sources

- Literature
- Local Data
- Expert Estimate

Rapid Assessment Model Zones

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

Dominant Species*

PIJE
ABCO
QUVA
ARPA

LANDFIRE Mapping Zones

3 6
4
5

Geographic Range

Central and Northern Sierra Nevada Mountains, higher inner North Coast Ranges (Yolla Bolly Mountains), and higher southern mountains in California; Southern Oregon on the Modoc Plateau and in the Klamath Mountains; Sierra San Pedro de Martyr in northern Baja California.

Biophysical Site Description

This PNVG generally occurs in the montane region on mountain side slopes and toeslope positions. It occurs on the Carson Range in the Lake Tahoe Basin, and north through California. It is within the northern portion of the TNC M261E ecoregion. It is found at elevations between 5500 feet to 7500 (down to 2500 ft in the Klamath Matins). This area is in the rainshadow of the Sierra Nevada, getting overall lower precipitation than the western slope. It is also found in the Klamath Matins. on ultramafic soils. The PNVG is found on sites with limited nutrients, shallow soils, or other environmental gradients that make this area less suitable for the mixed conifer and other more mesic forest types.

Vegetation Description

Jeffery Pine is the dominant tree in the overstory with an open canopy providing between 20 and 50% cover. White fir is a common associate, which can be become codominant in the absence of fire. Incense cedar and lodgepole pine are occasionally present. Sugar pine is an infrequent component, as is red fir and Sierra juniper. West of the Sierra crest, the understory is composed of scattered fire dependent shrubs (greenleaf manzanita, huckleberry oak, mountain whitethorn complex). East of the Sierra crest and into the Modoc Plateau, the less fire tolerant bitterbrush/mountain sagebrush complex is present. In NE California, snowbrush (CEVE) along with huckleberry oak common in understory as well. The shrub complex present is dependent on the fire history of the site and/or the microclimate. There is a low cover of forbs and perennial grasses. PIJE replaces PIPO in Klamath Matins. on ultramafic soils. Here it is associated with CADE. Coffeeberry (Rhamnus sp.) common in understory.

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

Disturbance Description

Where stands are relatively dense and sufficient fuels are available, this PNVG is dependent on relatively frequent low intensity surface fire interval of about 30 years. The mixed intensity fire interval is about 130 years, and the stand replacement fire interval is 250 years. The mean fire interval for all fires is 20 years with a range from 8 to 28 years. Intervals may be longer for relatively open stands with low understory fuels, as over shallow granitic soils in the Kern Plateau or over serpentine substrate in the Klamath Matins. The fire regimes in this type are more variable and somewhat longer than the ponderosa pine PNVG, due to slower fuel accumulation rates.

Adjacency or Identification Concerns

This PNVG often intergrades into the interior white fir PNVG in areas with higher precipitation, and into the red fir PNVG at higher elevations. It transitions to the ponderosa pine PNVG along the east slope of the Sierras, where white fir is much less frequent. It is also associated with the sierra mixed conifer PNVG which is primarily on the western slopes of the Sierra Nevada in a higher precipitation zone. In the Klamath Mountains, PIJE also occurs adjacent to Pinus balfouriana, Cercocarpus ledifolius, and other vegetation alliances. It also commonly interdigitates with riparian vegetation along streams coming out of the east side of the Sierra (e.g., Betula occidentalis, Salix spp., Populus tremuloides, P. balsamifera, alliances)

This PNVG may be similar to the PNVG R#PIJEsp from the Pacific Northwest model zone.

Scale Description

Sources of Scale Data Literature Local Data Expert Estimate

Lightning was historically the main ignition source for fires in this area. Small fires would burn the surface of this forest type, cover 100's to 1,000's of acres. Large fires also occurred possibly up to the 10,000 acre size, but they would be uncommon, and would pass into a different forest community, most likely the white fir dominated mixed conifer type. In some cases in low density stands (e.g., on very rocky soil) fires are spotty, attacking individual trees and extinguishing.

Issues/Problems

Model Evolution and Comments

Shlisky reduced patch size as per reviewer comments. One reviewer suggested that to get at the reality of the density and frequency of the different types of stands of PIJE and PIJE with ABCO currently would be to query the recent vegetation map for Yosemite NP and for Sequoia NP. These should show acreages and crown closure classes for a variety of stands and you could do a more realistic snapshot of current conditions in relatively well managed National Parks for many of the types you are modeling this way. Nate Stephenson, Jon Keeley, and Jan VanWagtenonk may provide access to these maps.

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 All Struct

Description

Fire dependent shrubs such as greenleaf manzanita and mountain whitethorn resprout and germinate from seed vigorously after fire. Scattered Jeffery pine seedlings sprout but may take several years to dominate over the shrub community. Perennial bunch grasses and some forbs cover small portions of the area. An alternative

Dominant Species* and Canopy Position

ARPA6
CECO
PIJE
QUVA

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

| | Min | Max |
|-----------------|---------|---------|
| Cover | 10 % | 85 % |
| Height | no data | no data |
| Tree Size Class | no data | |

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

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

pathway is possible to class B when the shrub layer does not develop and succession goes straight to a closed pole size forest. This "closed" successional pathway is more likely east of the Sierra crest and on the Modoc where Great Basin shrubs such as Artemisia tridentata, Purshia tridentata, Chrysothamnus nauseosus, etc are likely to replace the other shrubs. This pathway is also not likely to happen in areas constrained by poor soil development and much rock outcrop (granitic slabs, etc.)

Class B 5%

Mid1 Closed

Description

This class has developed after escaping significant fire and it is modeled as an alternative pathway when 3 fire cycles have been missed. In the absence of fire, a closed forest with a dense stand of multi-layered pole and medium sized Jeffery Pine and white fir trees (5-16"dbh) develops. This multilayered forest is often dominated by Jeffery pine in the overstory with white fir dominant in the mid and regeneration layers. The understory vegetation is almost absent do to the lack of sunlight and heavy litter and woody debris accumulations. In some cases on the east side of Sierra, both white fir and Jeffrey pine are pretty equally stocked and have a number of older individuals present suggesting that there is not always a low cover of white fir of small size classes in such settings (e.g., Buckeye Creek and other drainages NE of Yosemite NP). The understory vegetation is generally sparse, but not always due to lack of sunlight. Poa wheeleri and Elymus elymoides can be main

Dominant Species* and Canopy Position

PIJE
ABCO

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

| | Min | Max |
|-----------------|---------|---------|
| Cover | 55 % | 85 % |
| 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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understory species

Class C 10%

Mid1 Open

Description

This class has developed with frequent low intensity surface fires. Pole to medium sized (5-21" dbh) Jeffery Pine has become dominant over the shrub layer. Several conifer species could also be present depending on location. Shrubs are prevalent in the understory with scattered forbs and perennial grasses. East of the Sierra crest (e.g., Truckee Basin north of Tahoe), this class can have substantial amounts of white fir, but usually exists where the shrubs are mostly Purshia tridentata and other Great Basin species.

Dominant Species* and Canopy Position

PIJE
ARPA6
ARTR
PUTR

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> | 25 % | 55 % |
| <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 D 65%

Late1 Open

Description

This class is a continuation of class C which has developed with frequent low intensity surface fires. Large to very large (>21" dbh) Jeffery Pine is dominant with an open canopy. Scattered shrubs are found in the canopy openings, with a diversity of forbs such as lupines and woolly mules ears. Perennial grasses are also present.

Dominant Species* and Canopy Position

PIJE
ARPA
ARTR
PUTR

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> | 25 % | 55 % |
| <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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Class E 5%

Late I Closed

Description

This class has developed in time from class B after escaping significant fire. It is modeled as an alternative pathway when 3 fire cycles have been missed. In the absence of fire a closed forest structure continues to develop with a dense stand of multi-layered medium to large sized Jeffery Pines and white fir trees (16"+ dbh). The diameter remains smaller than in the open forest due competition. This overstory canopy is often codominated by Jeffery pine and white fir, with white fir dominating the understory. There is severe competition for sunlight and water. This stress combined with insect and disease infestation create a high level of tree mortality. The understory vegetation is almost absent do to the lack of sunlight and heavy litter and woody debris accumulations. Current conditions where there are large Jeffery pine trees along with multi-ages classes of white fir suggest that historically there were low intensity fires that maintained stands without killing white fir, but more recently white fir has become dominant in the understory.

Dominant Species* and Canopy Position

PIJE
ABCO

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> | 55 % | 85 % |
| <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:

Disturbances

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Disturbances Modeled

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

Historical Fire Size (acres)

Avg: no data
 Min: no data
 Max: no data

Sources of Fire Regime Data

- Literature
- Local Data
- Expert Estimate

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

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. All values are estimates and not precise.

| | <i>Avg FI</i> | <i>Min FI</i> | <i>Max FI</i> | <i>Probability</i> | <i>Percent of All Fires</i> |
|--------------------|---------------|---------------|---------------|--------------------|-----------------------------|
| <i>Replacement</i> | 250 | | | 0.004 | 9 |
| <i>Mixed</i> | 130 | | | 0.00769 | 17 |
| <i>Surface</i> | 30 | | | 0.03333 | 74 |
| <i>All Fires</i> | 22 | | | 0.04503 | |

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USDA FEIS Biscuit Fire Assessment - Terrestrial Resources. [Http://biscuitfire.com/final_terrestrial.htm](http://biscuitfire.com/final_terrestrial.htm)