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)

R3PIJUff Pinyon Juniper - Mixed Fire Regime

General Information

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

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Vegetation Type

Woodland

Dominant Species*

jumo
juos
pied
pipo

General Model Sources

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

LANDFIRE Mapping Zones

14 24 28
15 25
23 27

Rapid AssessmentModel Zones

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

Geographic Range

Found throughout the region, but more common on the west side of the Colorado Plateau. This type is usually the lowest elevation tree-dominated type in the area, and is found on lower mountain slopes, mesas, and on adjacent plains.

Biophysical Site Description

This type is found on many sites, ranging from deep, well drained soils on nearly flat slopes, to shallow, steep and rocky sites.

Vegetation Description

This type is dominated by JUOS (west of the continental divide) and JUMO (east), with lesser amounts of PIED, PIPO, and JUSC2. The most common shrub associates are ARTRV, QUGA, CEMO2, opuntia spp., and ephedra. It has a sparse to absent understory of grasses, subshrubs, and forbs.

Disturbance Description

Fire regimes for pinyon-juniper woodlands are difficult to reconstruct owing to scant fire scar evidence (Baker and Shinneman 2004). Fire regimes in pinyon-juniper were dominated by very infrequent replacement fire (see also R3PIJUrf), but in some cases may have had somewhat frequent mixed severity fire (top-kill of 25-75% of overstory vegetation) (Rondeau 2001). There can be frequent fire importation from adjacent types. Mixed severity fire was modeled here at ~200 year MFI. However, there is much controversy and uncertainty surrounding fire frequencies in pinyon-juniper systems, and the contrasting pinyon-juniper model (R3PIJUrf) with no mixed severity fire should be also be examined.

Adjacency or Identification Concerns

At upper elevations this type grades into pinyon-juniper with rare replacement fire (R3PIJUrf), ponderosa pine, and/or Gambel oak/Cercocarpus shrubland. It abuts sagebrush and desert scrub on the lower end.

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

Some areas have extensive mortality since 2002 due to the drought-induced IPS beetle outbreak.

This PNVG may be similar to the PNVG R2PIJU from the Great Basin model zone.

Scale Description

Sources of Scale Data ☐ Literature ☑ Local Data ☑ Expert Estimate

The most common disturbance in this type is very small-scale - either single-tree, or small groups. If the conditions are just right, then it will have replacement fires that burn stands up to 1000's of acres. This type may also have mixed-severity fires of 10-100's of acres.

Issues/Problems

Model Evolution and Comments

This model was developed base on two previous models: the original FRCC JUPI1 PNVG and a model developed by an interagency team working on a fire management plan for the Greater Sand Dunes area in southern Colorado (called Pjsangre). Although references were not provided for the Pjsangre model, we adopted the 170-year MFI for mixed severity fire used in it because of the collaborative expertise that went into that model. This type is a combination of the following Ecological Systems: CES304.767 Colorado Plateau Pinon-Juniper Woodland and CES306.835 Southern Rocky Mountain. Pinyon-Juniper Woodland.

Peer review of this type was mixed. One reviewer strongly recommended dropping this type entirely and using only the pinyon-juniper rare fire model (R3PIJUrf), based on studies showing no evidence of mixed severity fire in pinyon juniper. Because of the time frame of the Rapid Assessment and the relative uncertainty surrounding pinyon-juniper fire history, the issue was unresolved and both models were unchanged.

*Succession Classes***

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

Class A 10 %

Early1 All Struct

Description

Grass/forb/shrub/seedling - usually post-fire.

Dominant Species* and Canopy Position

grass
forb
shrub
seedling

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	0 %	25 %
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 B 20 %

Mid1 Closed

Description

Mid-development, dense (>40% cover) pinyon-juniper woodland; understory being lost

Dominant Species* and Canopy Position

pied
jumo
jusc2
juos

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	40 %	70 %
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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Class C 25 %

Mid1 Open

Description

Mid-development, open (<40% cover) pinyon-juniper stand with mixed shrub/herbaceous community in understory

Dominant Species* and Canopy Position

pied
jumo
juos
jusc2

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	10 %	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 D 35 %

Late1 Open

Description

Late-development, open juniper-pinyon stand
with "savannah-like" appearance; mixed
grass/shrub/herbaceous community.

Dominant Species* and Canopy Position

pied
jumo
juos
jusc2

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	10 %	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 10 %

Late1 Closed

Description

Dense, old-growth stands with multiple layers. Late-development, closed pinyon-juniper forest. May have all-aged, multi-storied structure. Moderate mortality within stand.
Occasional shrubs with few grasses and
forbs and often much rock.

Dominant Species* and Canopy Position

pied
jumo
juos
jusc2

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	40 %	70 %
Height	no data	no data
Tree Size Class	no data	

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

Disturbances

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Disturbances Modeled

- [x] Fire
- [x] Insects/Disease
- [x] 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
- [x] Local Data
- [x] Expert Estimate

Fire Regime Group: **3**

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.

	Avg FI	*Min FI*	*Max FI*	*Probability*	*Percent of All Fires*
Replacement	430			0.00233	29
Mixed	192			0.00521	65
Surface	2000			0.0005	6
All Fires	124			0.00803	

References

Baker, W.L. and D.J. Shinneman. 2004. Fire and restoration of piñon-juniper woodlands in the western United States: a review. Forest Ecology and Management 189: 1-21.

Despain, D.W., Mosely, J.C., 1990. Fire history and stand structure of a pinyon-juniper woodland at Walnut Canyon National Monument, Arizona. USDI National Park Service Technical Report No. 34. Cooperative National Park Resources Studies Unit, University of Arizona, Tucson AZ. 27p

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Gruell, George E., Eddleman, Lee E., and Jaindl, Ray. 1994. Fire History of the Pinyon-Juniper Woodlands of Great Basin National Park. Technical Report NPS/PNROSU/NRTR-94/01. U.S. Department of Interior, National Park Service, Pacific Northwest Region. 27 p.

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Rondeau, Renee, 2001. Ecological System Viability Specifications for Southern Rocky Mountain Ecoregion. Colorado Natural Heritage Program. 181p.

Unpublished report for the Fire-Learning Network: Robbie and McCarthy on Jemez Mtns.

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