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):

R0PIPOnp **Ponderosa Pine-Northern Great Plains**

General Information

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

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Vegetation Type

Forested

Dominant Species*

PIPO

General Model Sources

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

LANDFIRE Mapping Zones

10 21
19 22
20 29

Rapid Assessment Model Zones

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

Geographic Range

This PNVG is located in the lower elevations of the Black Hills, western North and South Dakota, southeastern Montana, the Missouri River Breaks of northern Montana, and from the High Plains of eastern Wyoming eastward to central Nebraska.

Biophysical Site Description

The geology is typically sedimentary in origin. Often found on buttes, hogbacks, rocky outcrops, and steep, rocky slopes. Elevations range from 3200 to 4400 feet, but in the southern Black Hills may be found up to 5700 feet on southern aspects.

Vegetation Description

This type is dominated by ponderosa pine and is often the only tree present. Understory composition varies but Rocky Mountain Juniper, skunkbush sumac, mountain mahogany, snowberry, and yucca are common woody species. Currant and chokecherry are found in the Montana portion of the PNVG's range. Herbaceous species include needlegrasses, gramma grasses, little bluestem, and western wheatgrass.

Disturbance Description

Generally frequent fires of low severity (Fire Regime Group I or III). Mixed severity fire occurs in the closed canopy conditions, and stand replacement fire is very infrequent (300+ years). Surface fires are frequent and range from <10 years to more than 20 (Brown and Sieg 1999, Fisher et al. 1987).

Variation in precipitation and temperature interacting with fire and ungulate grazing affects pine regeneration. Windthrow, storm damage, and mountain pine beetles were minor disturbances in this type unless stands reach high densities. The interactions among drought, insects, and disease are not well understood.

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

Adjacency or Identification Concerns

This type is either surrounded by Northern Plains Prairie or is a transition between Northern Plains Prairie and mid-elevational Black Hills ponderosa pine. Ponderosa pine in this PNVG has encroached into the Northern Plains Prairie type in many areas due to fire suppression and grazing.

Scale Description

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

Patch size probably ranged from 10's to 1000's of acres.

Issues/Problems

There is considerable debate over the role of mixed severity and surface fires in the historical range of variability in this and other ponderosa pine forests in the northern and central Rockies (Baker and Ehle 2001, 2003; Barrett 2004; Veblen et al. 2000).

Model Evolution and Comments

Workshop code was PPIN11.

Additional authors include Deanna Reyher, Carolyn Sieg, Breck Hudson, Cody Wienk, Peter Brown, Blaine Cook. This type was modeled based on earlier work done by an expert panel (Morgan and Parsons 2001). Collapsing of stages were necessary to fit the 5-box model used for this process.

Workshop review indicated more mixed fire should occur in the early stage and surface fire should be modeled in all structural stages. This was examined and included as appropriate.

Peer review incorporated on 4/18/05. Peer review comments disagreed on the role of mixed and surface fire in this type. The majority of review agreed with the original model's parameters for mixed fire, but thought surface fire could be slightly less frequent. One review contended that there is no evidence of mixed severity fire in this type at all, and that the overall MFI should be around 25 years. As a compromise, surface fires were reduced in frequency from a 10 year MFI to 20 year MFI for this model. Mixed severity fire was left in the model based on in-workshop and post-workshop review. These changes resulted in a higher MFI (from 10 years to 15 years) and an increase in the amount of the landscape in the mid- and late-development open classes (class C went from 15% to 20%; class D went from 75% to 70%).

Succession Classes

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

Class A 6 %

Early1 PostRep

Description

This community is dominated by herbaceous and woody species, including the graminoids needlegrasses, western wheatgrass, and little bluestem in moister areas, and various shrubs including skunkbush and snowberry. Ponderosa pine seedlings are scattered and found in small clumps. Number of years in this class is variable depending on climatic patterns and fire

Indicator Species* and Canopy Position

NAVI
PASM

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	100 %
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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disturbances.

Class B **2%**

Mid1 Closed

Description

Multi-story stand of small and medium trees with saplings and seedlings coming in as clumps. Understory is sparse.

Indicator Species* and Canopy Position

PIPO

Structure Data (for upper layer lifeform)

	Min	Max
Cover	50 %	100 %
Height	no data	no data
Tree Size Class	no data	

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

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

Fuel Model no data

Class C **20%**

Mid1 Open

Description

Generally single story stands with a few pockets of regeneration. Low shrubs such as snowberry and skunkbush are present as well as grass and forbs. Rocky Mountain juniper present in patches.

Indicator Species* and Canopy Position

PIPO

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	50 %
Height	no data	no data
Tree Size Class	no data	

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

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

Fuel Model no data

Class D **70%**

Late1 Open

Description

Generally single story stands of large ponderosa pine with pockets of smaller size classes (replacement). Snowberry, skunkbush, patches of Rocky Mountain juniper, and grasses are still present.

Indicator Species* and Canopy Position

PIPO

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	50 %
Height	no data	no data
Tree Size Class	no data	

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

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

Fuel Model no data

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Class E **2 %**

Late1 Closed

Description

Multi-story stands of large, medium, small, and seedling ponderosa pine. Shrubs and grasses are sparse. This type generally exceeds 70% canopy cover.

Indicator Species* and Canopy Position

PIPO

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	50 %	100 %
Height	no data	no data
Tree Size Class	no data	

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☐ Tree

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

Fuel Model no data

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	300			0.00333	5
Mixed	75	0		0.01333	20
Surface	20	10	40	0.05	75
All Fires	15			0.06667	

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