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)

R0PIPObh　　　　**Ponderosa Pine-Black Hills-High Elevation**

General Information

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

Modelers		**Reviewers**	
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Vegetation Type

Forested

Dominant Species*

PIPO
PIGL

General Model Sources

☑ Literature
☐ Local Data
☑ Expert Estimate

LANDFIRE Mapping Zones

10	21
19	22
20	29

Rapid Assessment Model Zones

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

Geographic Range

Black Hills of South Dakota and Wyoming.

Biophysical Site Description

This group is most common at the higher elevations in the Central Granitic Core and Upper Limestone Plateau of the Black Hills. It occurs on gentle to steep slopes. Several mountain grasslands (many that are not associated with water) are intermingled throughout this area and influence burn patterns.

Vegetation Description

Ponderosa pine, white spruce, paper birch and aspen are dominant overstory species. Other woody species found in various areas of this type includes various woody species such as bearberry, hazelnut, ninebark, grouseberry, snowberry, rose, and ironwood. Spruce and paper birch generally occur on northern aspects and higher elevations of this area. Numerous forb species dominate the herbaceous layer and include species such as twinflower, violets, and orchids.

Disturbance Description

Fire Regime Group III or I. Stand replacing disturbances are primarily associated with climatic fluctuations and include fire and insect (in late-development classes only, mountain pine beetle creates larger patch sizes; Ips beetles creates smaller patches). Snowbreak and windthrow events may occur, but are not modeled here.

Surface and stand replacing fire events occurred in this PNVG. Stand replacing fires were likely most common in higher elevation and northern slopes that were primarily dominated by spruce, with surface fires and occurring most often in the moist ponderosa pine. There is some debate about whether mixed severity fire would have occurred in this type based on tree-ring and historical evidence. It is included in this model at a 200-year return interval, but see peer-review feedback under "Comments".

Adjacency or Identification Concerns

This type occurs at elevations above Ponderosa Pine Black Hills Low Elevation. This type differs from Ponderosa Pine Black Hills Low Elevation because it has less frequent surface fires, more frequent replacement fires, and less closed canopy forest.

Scale Description

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

Scale varies widely. Includes gap phase dynamics (single to few tree mortality events) to watershed scale events (mixed severity fire or insect events in ponderosa pine to stand replacing fire in spruce).

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 PPIN9.

Additional authors and in-workshop review from: Cody Wienk, Carolyn Sieg, Peter Brown, Blaine Cook, Breck Hudson.

Peer review was incorporated on 4/18/2005. The peer review process raised questions about the role of mixed severity fire versus surface fire in this PNVG and the overall fire frequency. The PNVG was originally modeled with a 25 year MFI; 62% of fires were surface (45 year MFI), 25% were mixed (100 year MFI), and 12% (200 year MFI) were replacement severity. Based on peer review, the overall fire frequency was reduced to 35 years, the amount of mixed severity fire was cut in half to a 200 year return interval (although some comments indicated eliminating mixed severity fire completely), the amount of replacement fire was reduced to a 300 year return interval, and the amount of surface fire was decreased slightly to a 50 year return interval. The resulting relative proportion of replacement, mixed, and surface fire is a compromise among review comments, and changed the Fire Regime Group from I to III. These changes resulted in only slight adjustments to the amount of the landscape in the vegetation classes: mid-development 1open (class C) was reduced by 5% (from 25% to 20%); mid-development 2 open was reduced by 5% (from 30% to 25%), and the amount of late-development closed was increased by 10% (from 25% to 35%).

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 PostRep

Description

Aspen and birch shrublands with dense herbaceous cover of a variety of forbs.

Dominant Species* and Canopy Position

POTR5
BEPA
ARUV
AMAL

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:

Class B   10 %

Early2 Closed

Description

Closed-canopy deciduous forest dominated by quaking aspen and paper birch. Birch tends to dominate on north aspects and moist slopes, while aspen will dominate on the remaining sites.

Dominant Species* and Canopy Position

POTR5

BEPA

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model   no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	50 %	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:

Class C   20 %

Mid1 Open

Description

Conifers begin invading and constitute about 20% of the overstory.

Dominant Species* and Canopy Position

POTR5

BEPA

PIPO

PIGL

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model   no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	50 %	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:

Class D   25 %

Mid2 Open

Description

Conifers continue to expand, and constitute about 50% of the overstory.

Dominant Species* and Canopy Position

PIPO

PIGL

POTR5

BEPA

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model   no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	50 %	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:

Class E   35 %

Late1 Closed

Description

Dominated by dense stands of white spruce on north-facing slopes at higher elevations, and pine-dominated stands on lower elevation level areas and south-facing slopes at higher elevations. Pockets of deciduous trees and shrubs occur throughout.

Dominant Species* and Canopy Position

PIPO

PIGL

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model   no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	50 %	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:

Disturbances

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: 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	300			0.00333	12
Mixed	200			0.005	18
Surface	50			0.02	71
All Fires	35			0.02833	

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