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)

R0PICO **Persistent Lodgepole Pine**

General Information

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

Modelers

Don G. Despain don_despain@usgs.gov

Reviewers

Steve Barrett sbarrett@mtdig.net

Cathy Stewart cstewart@fs.fed.us

Vegetation Type

Forested

Dominant Species*

PICO
CAGE
VASC
CARO

General Model Sources

- ☐ Literature
- ☐ Local Data
- ☐ Expert Estimate

LANDFIRE Mapping Zones

10 21
19 22
20 29

Rapid AssessmentModel Zones

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

Geographic Range

Northern Rockies, especially on the Yellowstone Plateau.

Biophysical Site Description

This type occurs on coarse, sterile soils derived largely from silicic rocks, (rhyolite, granite, and some sterile sandstone). Annual precipitation averages 25-35 in. with fairly even distribution across the months with slightly more in the spring and less during the summer.

Vegetation Description

Mature to overmature stands are dominated by slow growing lodgepole pine (Pinus contorta Dougl.). Lodgepole pine occurs in nearly pure stands throughout all successional stages (i.e., lodgepole pine plays early-seral and quasi-climax roles in this system). With a sparse lodgepole pine understory and forest floor of scattered clumps of Geyer's sedge, Ross' sedge and some grouse whortleberry patches; early succession stands can be dense lodgepole pine seedlings to saplings that thin over time to widely spaced trees with a multi-aged. It is often associated with Purshia tridentata.

Disturbance Description

Fire is infrequent and often quite patchy due to lack of surface fuels. High winds are needed to carry crown fire which transitions to the crowns above patches of lodgepole reproduction. Pine beetles kill the larger trees leaving the younger trees and patches of establishment sites for new trees. This can produce conditions more conducive to larger crown fires.

Mistletoe may cause mortality in older trees and the profusion of induced branches and partial crown mortality, which may predispose them to intense torching that may lead to crown fire.

Adjacency or Identification Concerns

Mid-seral stages may be confused with dense stands of lodgepole dominated seral stages of more moist

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

PNVGs. They can be distinguished by a more continuous cover of herbaceous growth and the occasional presence of spruce or fir seedlings.

This type corresponds to cool habitat types dominated by lodgepole pine (Pfister et al. 1977).

Scale Description

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

Patch size ranges from a few tens of acres to a few hundred on sandstone outcrops to areas of thousands to tens of thousand on rhyolite and granite.

Issues/Problems

Model Evolution and Comments

Workshop code was PICO1.

Peer-review was incorporated on 4/6/2005 and resulted in adding blowdown disturbances (1 in 1000 years) to classes B and D; adding competition/maintenance to class B (i.e., doghair conditions resulting in delayed succession); and changing the frequency of fire in class A to match the frequency in other classes (400 year frequency); and adding mixed severity fire to class C at a low frequency.

*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

Sparse to dense lodgepole pine seedlings to young pole-sized trees. Sparse herbaceous ground cover mostly of Carex geyeri and C. rossii. Lodgepole are slow growing, and succession to class B occurs after 60 years.

Dominant Species* and Canopy Position

PICO
CAGE2
CARO5

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 25 %

Mid1 Closed

Description

Sparse to dense pole sized lodgepole pine and a sparse herbaceous layer dominated by Carex geyeri. Insects may open up the canopy, causing a transition to class C. Competition in the doghair condition may delay succession, otherwise the class succeeds to class D after200 years.

Dominant Species* and Canopy Position

PICO
CAGE2
CARO5

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	30 %	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:

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

Class C 15 %

Mid1 Open

Description

Scattered pole sized lodgepole pine in a Carex matrix similar to a bunch grass grassland with variousother herbaceous species. Approximately 33% of fires in this class will be mixed severity, maintaining the open condition; the rest of fires will be replacement severity, causing a transition to class A. At 200 years, this class succeeds to class D.

Dominant Species* and Canopy Position

PICO
CAGE2
CARO5

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	30 %
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 45 %

Late1 Closed

Description

Multi-aged sparse to dense lodgepole pine with a sparse herbaceous layer dominated by Carex geyeri. Insects and blowdown may open the canopy, causing a transition to class C.

Dominant Species* and Canopy Position

PICO
CAGE2
CARO5

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	30 %	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 0 %

Late1 Closed

Description

Dominant Species* and Canopy Position

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
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

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

Disturbances Modeled

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

Historical Fire Size (acres)

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

Sources of Fire Regime Data

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

Fire Regime Group: **5**

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	450	300	600	0.00222	88
Mixed	3500			0.00029	11
Surface					
All Fires	399			0.00252	

References

Barrett, S. W. 2004. Altered fire intervals and fire cycles in the Northern Rockies. Fire Management Today 64(3): 25-29.

Barrett, S. W. 2004. Fire Regimes in the Northern Rockies. Fire Management Today 64(2): 32-38.

Bradley, Anne F. 1992. Fire ecology of the forest habitat types of eastern Idaho and western Wyoming. GTR INT-290. Ogden, UT: USDA Forest Service. 92 p.

Despain, Don G. 1990. Vegetation of Yellowstone National Park: Consequences of history and environment. Boulder, CO: Roberts Reinhart Publishers. 239 p.

Pfister, R. D., B. L. Kovalchik, S. F. Arno, and R. C. Presby. 1977. Forest habitat types of Montana. USDA Forest Service, Intermountain Forest and Range Experiment Station, General Technical Report, INT-34.

Romme, WH 1982. Fire and landscape diversity in subalpine forests of Yellowstoe national Park. Ecological Monographs: 52(2):199-221

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