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)

R2PSMEdy Great Basin Douglas-Fir - Dry

General Information

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

Modelers		Reviewers	
Lynn Bennett	lmbennett@fs.fed.us	Hugh Safford	hughsafford@fs.fed.us
Louis Provencher (ed.)	lprovencher@tnc.org	Steve Barrett	sbarrett@mtdig.net

Vegetation Type

Forested

Dominant Species*

PSME
PICO
POTR5

General Model Sources

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

LANDFIRE Mapping Zones

12 17
13 18
16

Rapid AssessmentModel Zones

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

Geographic Range

PNVG found primarily in Idaho, northern Nevada, and Utah.

Biophysical Site Description

This type is generally located just above sagebrush ecosystems and adjacent to ponderosa pine woodlands. Elevation ranges from 4,000 to 8,700 feet. The xeric Douglas fir type is most strongly expressed on low- to mid-elevation southerly aspects and represents the transition between grasslands and continuous Douglas fir forest.

Vegetation Description

This PNVG was dominated by mostly mid- and late-open forest structure of Douglas-fir; however, some mid- and late-closed forest structure also occurred. Minor amounts of lodgepole pine may have been present in the mid- and late-closed forest structure. Closed forest structure was most likely to occur in areas where site features modified fire behavior to allow for increased tree stocking. Aspen may have been present in smaller patch sizes in mesic sites or riparian areas, mostly in the closed forest structure conditions.

Undergrowth was mostly fire-resistant grasses and forbs that resprouted after fires. This PNVG's fire regime allowed an open overstory of mature Douglas-fir to survive many fires. Small trees and associated less fire-resistant species were heavily thinned by moderate- intensity burning. Additionally, some nonlethal underburns occurred in lodgepole pine stands having light fuels. Occasional stand-replacing fires were also part of the mixture making up this fire regime.

Disturbance Description

This PNVG is in a Fire Regime Group I. Some portions of these sites are transition zones to Fire Regime Groups II and III. Frequent surface and mixed severity fires were the common fire regime characteristics.

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

Surface fires intervals ranged from 10 to 50 years, and replacement severity occurred at intervals of 150 to 400+ years (Crane 1986; Barrett 1988; Bradley et al. 1992a, 1992b; Brown et al. 1994; Morgan et al. 1996). Mixed severity fires were assumed to have an intermediate FRI of 45 to 75 years on average. Stand replacement fires were generally restricted to the closed canopy forest and the stand initiation conditions.

The Fire Regime Group I characteristics were facilitated by understory vegetation dominated by fine fuels (grasses, sedges, forbs), landscape position, and adjacency to other frequent fire PNVG's. Much of the forest structure was open canopy overstory that resulted in an understory dominated by healthy and vigorous plants (grasses, sedges, and forbs) and generally continuous fine fuels layer. These fine fuels facilitated fire spread and thinning of the conifer or aspen seedlings (thus promoting aspen suckering).

In this PNVG, aspen patches occurred at smaller scale than the Douglas fir forest. The aspen tended to be located in the more mesic sites. These more mesic sites would have had grass understories that did not cure as early in the year as surrounding areas, especially under a closed forest canopy, and these mesic areas often experience quicker humidity recovery in the evenings. These circumstances tended to lessen the fire severity in the aspen stands which acted as fire-safe sites compared to the surrounding landscape. This was important because aspen is much less resistant to fire than Douglas fir. Greater suckering would occur at the edges of aspen patches.

Other disturbances included insect (return interval of 100 yrs), disease, drought, and wind and ice damage (every 1,000 yrs in closed stands; every 250 yrs in open stands). Competition among trees was also a factor that increasingly slowed successional dynamics in more closed stands. Fire was by far the dominant disturbance agent.

Adjacency or Identification Concerns

PNVG is often transitional between non-forested areas or between Pinus ponderosa (at lower elevations) and Abies spp. At higher elevations. Sites are dry montane with a variety of slopes, aspects, and soil conditions.

In the Idaho portion of the Great Basin the major habitat types include: PSME/SPBE-SPBE, PSME/CAGE-SYOR, PSME/CAGE-CAGE, PSME/CARU-CARU, PSME/CARU-FEID, PSME, PSME/ACGL-SYOR, PSME/PHMA-PSME, PSME/SPBE-CARU, PSME/SYAL-SYAL, PSME/BERE-SYOR, PSME/ARCO-ARCO, PSME/JUCO, PSME/VACA-CARU, PSME/VAGL, PSME/CARU-CARU (Steele et al. 1981).

This PNVG includes small areas of ABLA habitat types that are transitional between FRG I, III, and IV. This is especially true for the ABLA sites with HRV fine fuel understory vegetation conditions such as pine grass or elk sedge.

This PNVG may be similar to the PNVG R0PSMEdy from the Northern and Central Rockies model zone.

Scale Description

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

This PNVG occurs in patches ranging from 1000's to 10'000's of acres.

Issues/Problems

1) Competition/maintenance among trees was used as a disturbance in all classes but A. This disturbance, however, is only theoretical because the ecological setback was zero in all classes. In fact, the disturbance is non-existent in the model, which does not seem appropriate. 2) Stand replacement is used in class A with a FRI of surface fire. Although this appears ecologically correct, it greatly lowers the MFI for stand replacement, which is much longer in other classes. One expert suggested that the total fire probability in class A was 0.05/year with 80%/20%, respectively, for stand replacement and mixed severity fires. Those values were used. 3) The model is most sensitive to the FRI of stand replacement in class A and D, and the return interval of wind/weather/stress in class D (stand replacing event). These transitions are responsible for the large percentage of class A in this xeric PNVG.

Model Evolution and Comments

This PNVG includes much of the dry Douglas-fire ecosystems. This model was based on the original FRCC model DFIR!. For the Rapid Assessment, this model was originally coded as R2PSMEpw and was changed to R2PSMEdy on 12/13/2004.

Both expert suggested a need to distinguish this PNVG from the mesic Douglas fir (R2PSMEms) one. The shorter FRIs, especially in class A, were added to this PNVG to reflect that need.

*Succession Classes***

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

Class A 20 %

Early1 PostRep

Description

Grass/forb/shrub/tree seedlings. Replacement fire is frequent (FRI of 25 yrs) and causes an ecological setback of 35 yrs. Mixed severity fire (FRI of 100 yrs) does not cause an ecological setback. Vegetation will succeed to the mid-development closed (class B) condition in 35 yrs.

Dominant Species* and Canopy Position

CARU
CAGA3
PSEUD

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	1 %	15 %
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 5 %

Mid1 Closed

Description

Forest canopy closure is >35%. Closed stand with trees, poles, saplings, grass, and scattered shrub, 75 to 100% Douglas fir. In the absence of fire, vegetation will succeed to E (closed, late-development) after 70 years. Replacement fire (average FRI of 150 yrs) and infrequent weather-related stress (return interval of 250 yrs) returns vegetation to class A. Mixed severity fire (FRI of 45 yrs) and insect/diseases every 100 yrs on average will cause a transition to an open mid-development forest (class C). Competition (probability/year = 0.01) maintains the stand in its closed condition.

Dominant Species* and Canopy Position

PSEUD
PICO

POTR5

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	35 %	99 %
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 10 %

Mid1 Open

Description

Forest canopy closure is 16% to 35%. Open trees, poles, saplings, and grass scattered shrubs, 100% Douglas fir. With surface fire (FRI of 10 yrs), mixed severity fire (FRI of 75 yrs), weak adult tree competition, and insect/diseases (every 100 years), primary succession is to D, the open late-development condition. Infrequent stand-replacing fire (FRI of 400 yrs) and infrequent weather-related stress (return interval of 1,000 yrs) will cause transitions to A. The stand will succeed on an alternative path to a closed late-development condition after 70 yrs without fire.

Dominant Species* and Canopy Position

PSEUD

Structure Data (for upper layer lifeform)

	Min	Max
Cover	10 %	35 %
Height	no data	no data
Tree Size Class	no data	

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☐ Tree

Fuel Model no data

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

Class D 60 %

Late1 Open

Description

Forest canopy closure is 16% to 35%. Open large tree/ grass and scattered shrubs; 100% Douglas fir. Surface fire (FRI of 10 yrs) and mixed severity fire (FRI of 75 yrs) maintain the stand in the open condition (i.e., succession from D to D). This open condition, however, will close after 70 years without fire (alternative path to E). Adult tree competition (probability/yr of 0.001) and insect/diseases (100 yrs return interval) also disturb this class, but do not affect the successional age. Replacement fire every 500 yrs on average and weather-related stress (1,000 yrs return interval) will cause a transition to A.

Dominant Species* and Canopy Position

PSEUD

Structure Data (for upper layer lifeform)

	Min	Max
Cover	10 %	35 %
Height	no data	no data
Tree Size Class	no data	

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☐ Tree

Fuel Model 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 E 5 %

Late1 Closed

Description

Forest canopy closure is >35%. Closed large trees, pole-sapling trees, scattered shrubs, 80 to 100% Douglas fir. Replacement fire (FRI of 150 yrs) and infrequent weather/wind-related stress (return interval of 250 yrs) cause a transition to class A. Mixed severity fire (FRI of 45 yrs) and insect/diseases (return interval of 100 yrs) open the structure of the stand (transition to D), whereas surface fire (FRI of 50 yrs) and competition, although present, do not cause transitions to other classes. Succession is from E to E in the closed condition.

Dominant Species* and Canopy Position

PSEUD
PICO
POTR5

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	36 %	99 %
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: 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.

	Avg FI	*Min FI*	*Max FI*	*Probability*	*Percent of All Fires*
Replacement	90	150	600	0.01111	12
Mixed	76	45	75	0.01316	14
Surface	14	10	50	0.07143	75
All Fires	10			0.0957	

References

Barrett, S. W., 1988. Fire Suppression effects on Forest Succession within a Central Idaho Wilderness. Western J. of Applied Forestry. 3(3):76-80. July 1988.

Barrett, S. W., 1994. Fire Regimes on the Caribou National Forest, Southern Idaho. Final Report – Contract No. 53-02S2-3-05071. September 1994.

Barrett, S. W. 2004. Altered fire intervals and fire cycles in the northern Rockies. Fire Management Today 64(2):25-29.

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

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

Bradley, A. F., W. C. Fische and, N. V. Noste. 1992. Fire Ecology of the Forest Habitat Types of Eastern Idaho and Western Wyoming. Intermountain Research Station, Ogden UT 84401. GTR-INT-290, 1992.

Bradley, A. F., N. V. Noste, and W. C. Fischer. 1992. Fire Ecology of the Forests and Woodland in Utah. Intermountain Research Station, Ogden UT 84401. GTR-INT-287, 1992.

Brown, J. K., S. F. Arno, S. W. Barrett, and J. P. Menakis. 1994. Comparing the Prescribed Natural Fire Program with Presettlement Fires in the Selway-Bitterroot Wilderness. Int. J. Wildland Fire 4(3): 157-168, 1994 @ IAWF.

Crane, M.F., 1986. Fire Ecology of the Forest Habitat Types of Central Idaho. Intermountain Research Station, Ogden UT 84401. GTR-INT-218, 1986.

Morgan, P., S. C. Bunting, A. E. Black, T. Merrill, and S. Barrett. 1996. Fire Regimes in the Interior Columbia River Basin: Past and Present. Final Report For RJVA-INT-94913: Course-scale classification and mapping of disturbance regimes in the Columbia River Basin. Submitted to: Intermountain Fire Science Lab., Intermountain Research Station, Missoula, Montana, USDA Forest Service.

Steele, R., R. D. Pfister, R. A. Ryker,and J. A. Kittams. 1981. Forest Habitat Types of Central Idaho. USDA For. Serv. Tech. Rep. INT-114, 138 p. Intermt. For. and Range Exp. Stn., Ogden, Utah 84401

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