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)

R2ASPN **Stable Aspen / Cottonwood - No Conifers**

General Information

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

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Vegetation Type

Forested

Dominant Species*

POTR5
SYOR

General Model Sources

- [x] Literature
- [x] Local Data
- [ ] 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

Great Basin and throughout the western USA on drier sites.

Biophysical Site Description

This type occurs on flat to moderately steep terrain (<50% slope) on all aspects. Elevation ranges from 5000' to 11000'. Stable upland aspen typically occurs above pinyon/juniper and adjacent to mountain big sagebrush. At elevations below 6,500 feet this group grades into black and narrowleaf cottonwood types along riparian corridors. Soils are generally deep, mollic, and moist. Bare ground does not exceed 2% of soil surface cover. As a species, aspen is adapted to a much broader range of environments than most plants found associated with it.

Vegetation Description

This PNVG occurs as single-storied or more commonly multi-storied stands. Stands are always closed. Conifers are usually absent in this type. In part of the Utah High Plateau, stable aspen is associated with sites too dry to support conifers and may be surrounded by small acreages of low sagebrush (Artemesia arbuscula). On Great Basin ranges, stable aspen is found both on dry sites and in more mesic areas where fir species are largely absent. Understory consists of abundant herbaceous and shrub components. Common species of tall forbs are Thalictrum fendleri (meadowrue), Osmorhiza spp. (sweet cicely), Geranium spp., Hackelia spp. (stickseed), tall larkspur (Delphinium barbeyi), and Aquileja spp. (columbine). Common grasses include Bromus carinatus (mountain brome), Elymus trachycaulis (slender wheatgrass), and Elymus glaucus (blue wildrye). Common shrub species are Ribes spp. (currant), Symphoricarpos spp. (snowberry), and Amelanchier alnifolia (serviceberry). Aspen suckers 5-15' tall will be present in all classes (min. 500 stems/acre). Lack of suckers is representative of an uncharacteristic class. Another uncharacteristic class is indicated where sagebrush and rabbitbrush cover is over 10% (in Utah and Nevada). Stands that lack a shrub or tall forb component, or stands dominated by Wyethia spp. (mulesears) are uncharacteristic.

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

Disturbance Description

Baker (1925) offers the best description of the pre-settlement condition. Two types of fire affect stable aspen, and both depend heavily on native burning. Replacement fire has a mean annual FRI of 75-100 yrs. Mean annual fire return intervals for surface fire may have been as frequent as 20 years, averaging approximately 40 years (Baker 1925). Under pre-settlement conditions, disease and insect mortality did not appear to have major effects, however older stands would be susceptible to a) heavy insect/disease stand-replacing outbreaks every 200-500 yrs (average 350 yrs) and b) insect/diseases that would thin older trees between 80-110 yrs (average 90 yrs). Periodic fires kept the incidence of disease and insect infestations at levels lower than are observed today. Disturbance effects would also have varied from clone to clone. Many aspen clones situated on steep slopes are prone to disturbance caused by avalanches and mud/rock slides. Riparian aspen is prone to flooding. Drought is currently impacting many stands in the Great Basin.

Adjacency or Identification Concerns

If conifers are present, please review R2ASMClw and R2ASMCup as options. Stable stands appear to occur more often at lower elevations compared to seral stands. On Great Basin mountain ranges that do not support fir trees, stable aspen occurs at all elevations but tend to be more common at higher elevations. Sagebrush groups, especially mountain big sagebrush and high elevation Wyoming big sagebrush, occurred below and in places around this group. Forest types such as ponderosa pine or warm/dry mixed conifer with more frequent fire may influence fire frequency in stable aspen to facilitate regeneration.

This PNVG is similar to the PNVG R3ASPN for the Southwest model zone, but fire severities differ.

Scale Description

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

Patch size for this type ranges from the 10's to 100's of acres.

Issues/Problems

Aspen decline varies across the region. Declines have been documented in UT, NV, AZ, NM, but not in CO (especially SW CO).

Model Evolution and Comments

Aspen stands tend to remain dense throughout most of their life-span, hence the open stand descriptions were not used. These are typically self-perpetuating stands. While not dependent upon disturbance to regenerate, aspen was adapted to a diverse array of disturbances. For example, there are surface fires which burn small areas throughout these stands. These fires do not set succession back. Under current conditions, herbivory can significantly effect stand succession. Kay (1997, 2001a, b, c) found the impacts of burning on aspen stands were overshadowed by the impacts of herbivory. In the reference state the density of ungulates was low due to efficient Native American hunting, so the impacts of ungulates were low. Herbivory was therefore not included in the model. The probabilities for insect/disease outbreaks in the older development state has potentially a large effect on the model, especially the transition from C to B.

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 suckers less than 6' tall. Grass and forbs present. No fire at this stage. Succession to B after 10 yrs.

Dominant Species* and Canopy Position

POTR5

Structure Data (for upper layer lifeform)

	Min	Max
Cover	50 %	99 %
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:

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

Fuel Model no data

Class B **70 %**

Mid1 Closed

Description

Aspen over 6' tall dominate. Canopy cover highly variable. Replacement fire occurs every 75 yrs on average. Surface fire (average FRI of 40 yrs) does not change the successional age of these stands, although this fire consumes litter and woody debris and may stimulate suckering. Succession to C.

Dominant Species* and Canopy Position

POTR5

Structure Data (for upper layer lifeform)

	Min	Max
Cover	40 %	99 %
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 %**

Late1 Closed

Description

Aspen trees 5 - 16in DBH. Canopy cover is highly variable. Replacement fire is less frequent in late development (FRI of 150 yrs) than in mid development. The FRI of surface fire does not change with age (40 yrs). Insect/diseases affecting older trees every 90 yrs will cause a transition to B, whereas insect/disease outbreaks every 350 yrs will cause a transition to A. Succession from C to C.

Dominant Species* and Canopy Position

POTR5

Structure Data (for upper layer lifeform)

	Min	Max
Cover	40 %	99 %
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 **0 %**

Late1 Open

Description

Dominant Species* and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	%
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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*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.

Class E **0 %**

Late1 Closed

Description

Dominant Species* and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	0 %
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

Disturbances Modeled

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

Historical Fire Size (acres)

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

Sources of Fire Regime Data

- [x] Literature
- [x] Local Data
- [x] 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	96	50	300	0.01042	31
Mixed					
Surface	44	20	60	0.02273	69
All Fires	30			0.03315	

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