10110

Rocky Mountain Aspen Forest and Woodland

BpS Model/Description Version: Aug. 2020

|  |  |  |  |
| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| Mike Manthei | mmanthei@fs.fed.us | Rory Steinke | rsteinke@fs.fed.us |
| Linda Wadleigh | lwadleigh@fs.fed.us | None | None |
| Rory Steinke | rsteinke@fs.fed.us | None | None |

Vegetation Type

Forest and Woodland

Map Zones

15

Geographic Range

Western CO, UT, northern NM, northern AZ, central NV.

Biophysical Site Description

This type occurs on flat to moderately steep terrain (<50%) on all aspects. Elevation typically ranges from 2,275-2,700m. Annual precipitation is 56-68cm. Stable aspen typically occurs above grass, sagebrush, or PJ. Soils are generally deep, mollic, cool and moist. As a species, aspen is adapted to a much broader range of environments than most plants found associated with it.

Vegetation Description

Aspen exists in single-storied or more commonly multi-storied stands. Conifers are not generally present in this type.

Understory consists of an abundant herbaceous component, perhaps with snowberry (*Symphoricarpos* spp.), meadow rue (*Thalictrum fendleri*) and/or yarrow (*Achillea millefolium*) present.

Aspen suckers 5-15ft tall will be present in all classes at least 500 stems/acre. Lack of suckers is representative of an uncharacteristic class. Another uncharacteristic class is indicated if sagebrush cover is over 10% (in UT).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| POTR5 | *Populus tremuloides* | Quaking aspen |
| SYOR2 | *Symphoricarpos oreophilus* | Mountain snowberry |
| ARUV | *Arctostaphylos uva-ursi* | Kinnikinnick |

Species names are from the NRCS PLANTS database. Check species codes at http://plants.usda.gov.

Disturbance Description

Fire, insects, disease. In absence of disturbance, may stay aspen (contrary to NatureServe description). Fire will generally come from adjacent systems. Surface fire would generally come on the margins of stands as a result of fire on adjacent vegetation types. Mixed fire may occur, but is undocumented.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 145 | 79 | 50 | 300 |
| Moderate (Mixed) | 1758 | 7 |  |  |
| Low (Surface) | 836 | 14 |  |  |
| All Fires | 116 | 100 |  |  |

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. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

Patch sizes range in the 10s to 100s of acres. Fires may have been as large as thousands of acres, but patches of this system would have typically been smaller than thousands of acres.

Adjacency or Identification Concerns

If conifers are present, please review an aspen mixed conifer BpS instead. Stable stands appear to occur more often at lower elevations compared to seral stands. Adjacent 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. Adjacent systems include sagebrush/grass (lower elevation) and mixed conifers (higher elevation).

Issues or Problems

Aspen decline does not appear to be the same across the region. Decline is thought to be critical in UT, AZ, NM, but not in CO (especially SW CO).

Aspen stands tend to remain dense through most of the lifespan, hence the open stand descriptions were not used. These are typically self-perpetuating stands, they may not need regular disturbance to regenerate. As aspen is such a wide-ranging species, there are not dominant understory species which assist in identification of this type.

Native Uncharacteristic Conditions

Lack of aspen suckers is representative of an uncharacteristic class. Another uncharacteristic class is indicated if sagebrush cover is over 10% (in UT). Less than 30% cover of aspen in the mid- and late-development conditions can be considered uncharacteristic (typically due to grazing).

Comments

Additional modelers: Jack Triepke, jtriepke@fs.fed.us; Ed Smith, esmith@tnc.org; Deb Bumpus, bdumpus@fs.fed.us. One reviewer suggests removing mixed severity fire, and set surface fire rotation at 2,000yrs.

Succession Classes

**Mapping Rules**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Upper Layer Lifeform** | **Height (m)** | **Canopy Cover (%)** | | | | | | | | | |
| **0-10** | **11-20** | **21-30** | **31-40** | **41 - 50** | **51-60** | **61-70** | **71-80** | **81-90** | **91-100** |
| Herb | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Herb | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Herb | >1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 1.0-3.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | >3.0 | A | A | A | A | A | A | A | A | A | A |
| Tree | 0-5 | A | A | A | A | A | A | A | A | A | A |
| Tree | 5-10 | B | B | B | B | B | B | B | B | B | B |
| Tree | 10-25 | C | C | C | C | C | C | C | C | C | C |
| Tree | 25-50 | C | C | C | C | C | C | C | C | C | C |
| Tree | >50 | C | C | C | C | C | C | C | C | C | C |

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

**Description**

Class A 6 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| POTR5 | Populus tremuloides | Quaking aspen | All |

Description

Aspen suckers less than six feet tall and abundant. Aspen will not necessarily be tree form; will often be <1in DBH. Grass and forbs resprout vigorously with high cover. Often densely vegetated.

*Maximum Tree Size Class*  
Seedling <4.5ft

Class B 35 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| POTR5 | Populus tremuloides | Quaking aspen | All |

Description

Aspen over six feet tall dominate. Canopy cover highly variable, but usually dense. Understory also usually dense.

*Maximum Tree Size Class*  
Pole 5-9" DBH

Class C 59 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| POTR5 | Populus tremuloides | Quaking aspen | All |

Description

Aspen trees 9in+ DBH. Canopy cover is highly variable, but usually dense. Understory dense. Lots of dead and downed material.

*Maximum Tree Size Class*  
Large 21-33"DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:CLS | 9 |
| Mid1:CLS | 10 | Late1:CLS | 69 |
| Late1:CLS | 70 | Late1:CLS | 999 |

Probabilistic Transitions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disturbance Type** | **Disturbance occurs In** | **Moves vegetation to** | **Disturbance Probability** | **Return Interval (yrs)** | **Reset Age to New Class Start Age After Disturbance?** | **Years Since Last Disturbance** |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Native Grazing | Early1:ALL | Early1:ALL | 0.2 | 5 | No | 0 |
| Insects or Disease | Mid1:CLS | Mid1:CLS | 0.002 | 500 | No | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.007 | 143 | Yes | 0 |
| Mixed Fire | Late1:CLS | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Surface Fire | Late1:CLS | Late1:CLS | 0.002 | 500 | No | 0 |
| Insects or Disease | Late1:CLS | Late1:CLS | 0.002 | 500 | No | 0 |
| Wind or Weather or Stress | Late1:CLS | Late1:CLS | 0.005 | 200 | No | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.007 | 143 | Yes | 0 |

References

Baker, F.S. 1925. Aspen in the Central Rocky Mountain Region. USDA Department Bulletin 1291: 1-47.

Bartos, D.L. and R.B. Campbell, Jr. 1998. Decline of Quaking Aspen in the Interior West – Examples from Utah. Rangelands. 20(1): 17-24.

Bradley, A.E., N.V. Noste and W.C. Fischer. 1992. Fire Ecology of Forests and Woodlands in Utah. GTR-INT-287. Ogden, UT. USDA Forest Service, Intermountain Research Station. 128 pp.

Campbell, R.B. and D.L. Bartos. 2001. Objectives for Sustaining Biodiversity. In: W.D. Shepperd, D. Binkley, D.L. Bartos, T.J. Stohlgren and L.G. Eskew, compilers. Sustaining aspen in western landscapes: symposium proceedings; 13-15 June 2000. Grand Junction, CO. RMRS-P-18. Fort Collins, CO. USDA Forest Service, Rocky Mountain Research Station. 460 pp.

Mueggler, W.F. 1989. Age Distribution and Reproduction of Intermountain Aspen Stands. Western Journal of Applied Forestry. 4(2): 41-45.

Mueggler, W.F. 1988. Aspen Community Types of the Intermountain Region. GTR-INT-250. USDA Forest Service, Intermountain Research Station. 135 pp.

NatureServe. 2004. International Ecological Classification Standard: Terrestrial Ecological Classifications, NatureServe Central Databases. Arlington, VA. Data current as of 4 November 2004.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

Romme, W.H., M.L. Floyd, D. Hanna and J.S. Redders. 1999. Landscape condition analysis

for the South Central Highlands Section, southwestern Colorado & northwestern New

Mexico. Draft report to San Juan National Forest, Durango, Colorado.

Romme, W.H., L. Floyd-Hanna, DD. Hanna and E. Bartlett. 2001. Aspen's ecological role in the West. Pages 243-259 in: W.D. Shepperd, D. Binkley, D.L. Bartos, T.J. Stohlgren and L.G. Eskew, compilers. Sustaining aspen in western landscapes: symposium proceedings; 13-15 June 2000. Grand Junction, CO. RMRS-P-18. Fort Collins, CO. USDA Forest Service, Rocky Mountain Research Station. 460 pp.

Shepperd, W.D. 2001. Manipulations to Regenerate Aspen Ecosystems. Pages 355-365 in: W.D Shepperd, D. Binkley, D.L. Bartos, T.J. Stohlgren and L.G. Eskew, compilers. Sustaining aspen in western landscapes: symposium proceedings; 13-15 June 2000. Grand Junction, CO. RMRS-P-18. Fort Collins, CO. USDA Forest Service, Rocky Mountain Research Station. 460 pp.

Shepperd, W.D., D.L. Bartos and S.A. Mata. 2001. Above- and below-ground effects of aspen clonal regeneration and succession to conifers. Canadian Journal of Forest Resources; 31: 739-745.

USDA Forest Service. 2000. Properly Functioning Condition: Rapid Assessment Process (7 January 2000 version). Intermountain Region, Ogden, UT. Unnumbered.

Welsh, S.L., N.D. Atwood, S. Goodrich and L.C. Higgins. 2003. A Utah Flora, Third edition, revised. Print Services, Brigham Young University, Provo, UT. 912 pp.