10610

Inter-Mountain Basin Aspen-Mixed Conifer Forest and Woodland

BpS Model/Description Version: Aug. 2020

Vegetation Type

Forest and Woodland

Map Zone

6

Geographic Range

Sites that support aspen are common at elevations >5,000ft in the Modoc Plateau, Warner Mountains, and Sierra Nevada. Aspen are found in smaller patches in the Klamath Mountains and are rare in the mountains of southern California.

Biophysical Site Description

At lower elevations throughout its range in California (3,500-6,500ft), the aspen forest type is associated with sites with added moisture (i.e., azonal wet sites). These sites are often close to streams and lakes. Other sites include meadow edges, rock reservoirs, springs, and seeps. Terrain can be simple to complex. At these lower elevations, topographic conditions for this type tend toward positions resulting in relatively colder, wetter conditions within the prevailing climate, such as ravines, north slopes, and wet depressions. At higher elevations (>6,500ft), more diverse combinations are possible because of generally wetter, colder climates. At these higher elevations, aspen forest types can occur in the riparian settings mentioned earlier as well as in slight depressions and on sites subject to snowdrift accumulation. Sites appear to be zonal or close to zonal. Aspen sites fall into two distinct categories at the higher elevations: those riparian-associated sites that are not likely to be succeeded by conifers (“meadow aspen”) and those sites where conifers such as JUOC, ABCO, ABMA, and PICO1 can succeed aspen and eventually dominate in the absence of fire or logging disturbance (“upland aspen”). Soil temperature regimes are usually frigid to cryic, with mesic soil temperature regimes being much less common. The model associated with this description models the “upland” aspen type with conifer succession potential.

Vegetation Description

Stands are dominated by aspen trees in a range of size classes. Tree canopy cover in reference condition stands can easily exceed 85%. Understory graminoid and forb vegetation is rich and diverse in deep soil sites because of high water retention and bountiful soil nutrients. Soils on the deep sites usually have mollic epipedons, high root density, and biologically active litter components. At least 500 aspen suckers 5-15ft tall are present in historical range of variability. Lack of suckers or stems in the 15- to 30-ft-tall class is representative of potentially unsustainable conditions for aspen. Another potentially unsustainable condition occurs if sagebrush cover (various species but usually mountain big sagebrush) or conifer cover (JUOC, PIPO, ABCO, ABMA, and PICO1 are possibilities) exceeds 10%.

BpS Dominant and Indicator Species

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

Disturbance Description

Meadow sites supporting this aspen type are maintained by occasional stand-replacing fire, and reference conditions are severely impaired by improperly timed grazing. Upland sites supporting this aspen type are maintained by disturbances that allow regeneration from belowground suckers, such as stand-replacement fires. Upland aspen clones are impaired or eliminated by conifer ingrowth and overtopping and, to a lesser extent, by disturbances such as ill-timed grazing. If aboveground aspens on upland sites disappear (the site is overtaken by conifers). then the site has probably shifted to a conifer biophysical setting and restoration to an aspen state is not a viable pathway. In a reference condition scenario, a few stands advance toward conifer dominance, but much fewer than in many current scenarios in which fire frequency is reduced from reference conditions.

Fire Frequency

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 tens to hundreds of acres.

Adjacency or Identification Concerns

This model considers sites that support the upland aspen type as opposed to the meadow aspen type. The meadow aspen type PNVG seems to be covered by the R3ASPN model for the rapid assessment (RA).

Issues or Problems

Native Uncharacteristic Conditions

Comments

This model was converted from RA model R1ASPN for LANDFIRE National implementation by Foster to create 031061, then imported directly for the Sierras (061061).

During model review, it was commented that 200yrs (time since fire) before developing the conifer overstory seemed like a long time and that it likely developed more canopy than merely 40% closure. Also, it was observed that this model shows more surface fire than many other aspen models. Nonetheless, the reviewer felt the total amount of fire seemed appropriate.

Succession Classes

**Mapping Rules**

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 13 Early Development 1 - Closed

Upper Layer Lifeform Is Not the Dominant Lifeform

These aspen trees may appear more shrub-like when <6ft tall.

Indicator Species

Description

Aspen suckers are less than 6ft tall. Grass and forbs are present.

Replacement fire resets. Native grazing is relatively heavy.

*Maximum Tree Size Class*  
Sapling >4.5ft; <5" DBH

Class B 59 Mid Development 1 - Closed

Indicator Species

Description

Aspen >6ft tall dominate. Canopy cover can be highly variable.

Replacement fire and insects/disease reset the stand.

*Maximum Tree Size Class*  
None

Class C 26 Late Development 1 - Closed

Indicator Species

Description

These stands are about 70yrs or older and could maintain indefinitely, except that replacement fire, mixed fire, or wind/weather/stress reset the stand. Competition/maintenance and surface fire leave the stand condition unchanged. However, if the stand goes without fire, it eventually converts. Aspen trees are 5-16in DBH. Canopy cover is highly variable. Some understory conifers are present.

*Maximum Tree Size Class*  
Medium 9-21" DBH

Class D 2 Late Development 2 - Closed

Upper Layer Lifeform Is Not the Dominant Lifeform

The conifers are usually less than 40%, but the aspen underneath can be full closure.

Indicator Species

Description

This condition describes stands that have been protected from fire (>270yrs old). Aspen trees are predominantly 16in DBH and greater. Conifers are present and overtop the aspen, but usually <40% closure of conifers. White fir is a typical conifer successional to aspen and is depicted here, but other conifers -- especially lodgepole and red fir -- are also possible. This condition can endure indefinitely except in the event of replacement fire or surface fire.

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

Model Parameters

Deterministic Transitions

Probabilistic Transitions

References

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

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

Bradley, Anne E., Nonan V. Noste and Willam 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, Robert B. and Dale L. Bartos. 2001. Objectives for Sustaining Biodiversity. In: Shepperd, Wayne D., Dan Binkley, Dale L. Bartos, Thomas J. Stohlgren and Lane G. Eskew, compilers. 2001. Proceedings of the symposium: Sustaining aspen in western landscapes. 13-15 June 2000; Grand Junction, CO. Proceedings RMRS-P-18. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. 460 pp.

Griffin, James R. and William B. Critchfield, William B. 1972. The distribution of forest trees in California. Res. Pap. PSW-82. Berkeley, CA: USDA Forest Service, Pacific Southwest Forest and Range Experiment Station. 118 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. General Technical Report INT-250. USDA Forest Service. 135 pp.

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 E.J. Barlett. 1999. Chapter 5: Aspen Forests in Landscape Condition Analysis for the South Central Highlands Section, Southwestern Colorado and Northwestern New Mexico.

Shepperd, Wayne D. 2001. Manipulations to Regenerate Aspen Ecosystems. In: Shepperd, Wayne D, Dan Binkley, Dale L. Bartos, Thomas J. Stohlgren and Lang G. Eskew, compilers. 2001. Proceedings of the symposium--Sustaining aspen in western landscapes. 13-15 June 2000, Grand Junction, CO. Proceedings RMRS-P-18. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. 355-365.

Shepperd, Wayne D., Dale L. Bartos and Stephen 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 (January 7, 2000 version). Odgen, UT: Intermountain Region, Ogden, UT. Unnumbered.