

10610

Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
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None	None	None	None
None	None	None	None

Vegetation Type

Forest and Woodland

Map Zone

13

Geographic Range

Although this BpS is widespread in the west, it occurs infrequently on cool upper montane chutes and slopes of map zone (MZ) 13.

Biophysical Site Description

Elevations range from 2,100-3,000m (~5,900-9,850ft). Occurrences of this system are found on cooler sites, which include avalanche chutes, cooler northerly slopes, and drainages. Soils are derived from alluvium, colluvium, and residuum from a variety of parent materials, but most typically occur on sedimentary rocks.

Vegetation Description

The tree canopy is dominated by *Populus tremuloides*. With time and lack of fire or stand-replacing disturbances, *Populus tremuloides* is slowly reduced until the conifer species become dominant. Conifers include mostly *Abies concolor* and minor occurrences of *Pinus flexilis* and *Pinus ponderosa* (Nachlinger and Reese 1996). A number of cold-deciduous shrub species can occur, including *Acer glabrum*, *Ribes cereum*, *Juniper communis*, *Holodiscus* spp., and *Symphoricarpos oreophilus*. Herbaceous species include *Carex rossii*, *Bromus ciliatus*, *Elymus elymoides*, *Erigeron* spp., *Astragalus* spp., *Luzula parviflora*, and *Thalictrum fendleri*.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
POTR5	<i>Populus tremuloides</i>	Quaking Aspen
ABCO	<i>Abies concolor</i>	White fir
AMAL2	<i>Amelanchier alnifolia</i>	Saskatoon serviceberry
PRVI	<i>Prunus virginiana</i>	Chokecherry
SYOR2	<i>Symphoricarpos oreophilus</i>	Mountain snowberry
ROWO	<i>Rosa woodsii</i>	Woods' rose
CARO5	<i>Carex rossii</i>	Ross' sedge
BRCI2	<i>Bromus ciliatus</i>	Fringed brome

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

Disturbance Description

This is a strongly fire-adapted community with fire return intervals (FRIs) varying for mixed-severity fire with the encroachment of conifers. It is important to understand that aspen is considered a fire-proof vegetation type that does not burn during the normal lightning season, yet evidence of fire scars and historical studies show that native burning was the only source of fire that occurred predominantly during the spring and fall. As this type has a fairly short FRI compared to other aspen types, it should be noted that aspen can act as a tall shrub. Bradley et al. (1992) state that Loope and Gruell estimated a fire frequency of 25-100yrs for a Douglas-fir forest with seral aspen in Grand Teton National Park (p39). They later state that fire frequencies of 100-300yrs appear to be appropriate for maintaining most seral aspen stands. In the Fontenelle Creek, Wyoming drainage, the mean fire-free interval was estimated to be 40yrs. Fires in this area burned in a mosaic pattern of severities, from stand-replacement to low fires that scarred but did not kill the relatively thin-barked lodgepole pine on the site (p46).

BpS 131061 has elements of Fire Regime Groups II (chosen), III, and IV. Mean FRI for replacement fire is every 60yrs and 120yrs on average, respectively, before and after severe conifer encroachment, except during early development where no fire is present. The FRI of mixed-severity fire increases from 40yrs in stands <80yrs to 50yrs in stands >80yrs with conifer encroachment.

Under pre-settlement conditions, disease and insect mortality did not appear to have major impacts. However, older aspen stands would be susceptible to outbreaks every 200yrs on average. We assumed that 20% of outbreaks resulted in heavy insect/disease stand-replacing events (average return interval of 1,000yrs), whereas 80% of outbreaks would thin older trees >40yrs (average return interval 250yrs). Older conifers (>100yrs) would experience insect/diseases damage about every 50yrs, causing 60% of times stand thinning and 40% of times total mortality of conifers. Occasional weather-related stress every 200yrs will thin the older conifers.

Sites in MZ13 are prone to snowslides, mudslides, and rotational slumping. Flooding may also operate in these systems. Uncertainty exists about the return interval of avalanches. We assumed that avalanches/flood events caused stand replacement every 50yrs on average. Sufficient snow accumulates about every 10yrs in the Mojave Desert, and the chance that an avalanche returns to the same coulee was assumed be 1 out of 5 snow years. For the youngest vegetation class, only very powerful avalanches about every 100yrs would cause stand-replacing events.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	79	41	50	300
Moderate (Mixed)	55	59		
Low (Surface)				
All Fires	32	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

This type occurs as small linear drainage corridors and avalanche chutes from 1-10ac.

This BpS is adjacent to BpS 131054, Southern Rocky Mountain Ponderosa Pine Woodlands, and BpS 1052, Rocky Mountains Mesic Montane Mixed Conifer Forest and Woodlands, which may contain isolated stems and small patches of aspen. This type is highly threatened by conifer replacement.

Issues or Problems

East of the Great Basin, Baker (1925) studied closely the pre-settlement period for aspen and noted fire scars on older trees. Bartos and Campbell (1998) support these findings. Results from Baker (1925) and Bartos and Campbell (1998) would apply to eastern Nevada and BpS 1061. We interpreted ground fires that scarred trees, probably started by Native Americans, as mixed-severity fire that also promoted abundant suckering. In the presence of conifer fuel, these would be killed and aspen suckering promoted.

In previous models from the Rapid Assessment (e.g., R2ASMCIw), experts and modelers expressed different views about the frequency of all fires, citing FRIs longer than those noted by Baker (1925). The FRIs used here were a compromise between longer FRIs proposed by reviewers and the maximum FRI of Baker (1925).

Less than 30% aspen cover in classes B, C, and D is uncharacteristic and likely due to excessive native or livestock herbivory.

Succession Classes

[illegible]

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	D	D	D	D	B	B	B	B	B	B
Tree	10-25	D	D	D	D	C	C	C	C	C	C
Tree	25-50	D	D	D	E	E	E	E	E	E	E
Tree	>50	D	D	D	E	E	E	E	E	E	E

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 27 Early Development 1 - All Structures
Upper Layer Lifeform: Tree

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
POTR5	<i>Populus tremuloides</i>	Quaking aspen	Upper
SYOR2	<i>Symphoricarpos oreophilus</i>	Mountain snowberry	Middle
RIBES	<i>Ribes</i>	Currant	Middle
HOLOD	<i>Holodiscus</i>	Oceanspray	Middle

Description

Tree seedling-shrub-grass-forb. Moderate to high herbaceous cover. Shrubs and trees species that resprout are *Populus tremuloides*, *Symphoricarpos oreophilus*, *Ribes*, and *Holodiscus*. Generally, this is expected to occur 1-3yrs post-disturbance.

Class B 51 Mid Development 1 - Closed
Upper Layer Lifeform: Tree

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
POTR5	<i>Populus tremuloides</i>	Quaking aspen	Upper
SYOR2	<i>Symphoricarpos oreophilus</i>	Mountain snowberry	Low-Mid
RIBES	<i>Ribes</i>	Currant	Low-Mid

Description

Aspen saplings >6ft tall dominate. Canopy cover is highly variable. Replacement fire occurs. Mixed-severity fire does not change the successional age of these stands, although this fire consumes litter and woody debris and may stimulate suckering.

Class C 13 Mid Development 2 - Closed

Upper Layer Lifeform: Tree

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
POTR5	Populus tremuloides	Quaking aspen	Upper
SYOR2	Symphoricarpos oreophilus	Mountain snowberry	Middle
RIBES	Ribes	Currant	Middle

Description

Canopy cover is highly variable. Conifer seedlings and saplings may be present.

Class D	8	Late Development 2 - Closed
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Upper Layer Lifeform: Tree

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
POTR5	<i>Populus tremuloides</i>	Quaking aspen	Upper
ABCO	<i>Abies concolor</i>	White fir	Mid-Upper
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine	Mid-Upper
PIFL2	<i>Pinus flexilis</i>	Limber pine	Middle

Description

This class includes closed trees, sapling, large poles, grass, and scattered shrubs. Aspen is dominant but being encroached by conifers. Composition of conifers consists of similar amounts of white fir, ponderosa pine, and limber pine.

Class E	1	Late Development 1 - Closed
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Upper Layer Lifeform: Tree

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ABCO	Abies concolor	White fir	Upper
PIFL2	Pinus flexilis	Limber pine	Upper
PIPO	Pinus ponderosa	Ponderosa pine	Upper
POTR5	Populus tremuloides	Quaking aspen	Mid-Upper

Description

Closed medium to large trees, scattered shrubs, 60-100% white fir.

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:CLS	9
Mid1:CLS	10	Mid2:CLS	39
Mid2:CLS	40	Mid2:CLS	79
Late2:CLS	80	Late1:CLS	109
Late1:CLS	110	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
Optional 1	Early1:ALL	Early1:ALL	0.01	100	Yes	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.017	59	Yes	0
Optional 1	Mid1:CLS	Early1:ALL	0.02	50	Yes	0
Mixed Fire	Mid1:CLS	Mid1:CLS	0.025	40	No	0
Alternative Succession	Mid2:CLS	Late2:CLS	1	1	Yes	38
Insects or Disease	Mid2:CLS	Early1:ALL	0.001	1000	Yes	0
Insects or Disease	Mid2:CLS	Mid1:CLS	0.004	250	Yes	0
Replacement Fire	Mid2:CLS	Early1:ALL	0.017	59	Yes	0
Optional 1	Mid2:CLS	Early1:ALL	0.02	50	Yes	0
Mixed Fire	Mid2:CLS	Mid2:CLS	0.025	40	No	0
Wind or Weather or Stress	Late1:CLS	Mid2:CLS	0.005	200	Yes	0
Insects or Disease	Late1:CLS	Mid2:CLS	0.008	125	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.0083	120	Yes	0
Insects or Disease	Late1:CLS	Late2:CLS	0.012	83	Yes	0
Mixed Fire	Late1:CLS	Mid2:CLS	0.02	50	Yes	0
Optional 1	Late1:CLS	Early1:ALL	0.02	50	Yes	0
Replacement Fire	Late2:CLS	Early1:ALL	0.017	59	Yes	0
Mixed Fire	Late2:CLS	Mid2:CLS	0.02	50	Yes	0
Insects or Disease	Late2:CLS	Late2:CLS	0.02	50	No	0
Optional 1	Late2:CLS	Early1:ALL	0.02	50	Yes	0

Optional Disturbances

Optional 1: avalanche/flood

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