

10860

Rocky Mountain Lower Montane-Foothill Shrubland

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Shrubland

Map Zones

13, 16, 17, 18, 21, 23

Geographic Range

This ecological system is found in the foothills, canyon slopes, and lower mountains of the Rocky Mountains and on outcrops and canyon slopes in the western Great Plains. It ranges from southern New Mexico extending north into Wyoming and west into the Intermountain region.

Biophysical Site Description

These shrublands occur between 1,500-2,900m elevation and are usually associated with exposed sites, rocky substrates, and dry conditions, which limit tree growth. It is common where *Quercus gambelii* is absent such as the northern Colorado Front Range and in drier foothills and prairie hills.

Vegetation Description

Scattered trees or inclusions of grassland patches or steppe may be present, but the vegetation is typically dominated by a variety of shrubs including *Amelanchier utahensis*, *Cercocarpus montanus*, *Purshia tridentata*, *Rhus trilobata*, *Ribes cereum*, or *Symphoricarpos oreophilus* or *Yucca glauca*. In Utah, true mountain-mahogany (*Cercocarpus montanus*) is a resprouting shrub that sometimes dominates this ecological system, whereas *Ribes*, *Acer*, mountain ash (*Sorbus scopulina*), and *Chrysothamnus* are less common. *Artemisia tridentata* var. *vaseyana* and *Holodiscus* are more common shrubs on dry sites in Utah and the Great Basin. Grasses are represented as species of *Muhlenbergia*, *Bouteloua*, *Hesperostipa*, and *Pseudoroegneria spicata*.

Fire plays an important role in this system as the dominant shrubs usually affected by severe die-back, although some plants will stump sprout. *Cercocarpus montanus* requires a disturbance such as fire to reproduce, either by seed sprout or root crown sprouting. Fire suppression may have allowed an invasion of trees into some of these shrublands, but in many cases sites are too xeric for tree growth. When trees are present, they include pinyon pine, juniper, and limber pine. Douglas-fir, white fir, and lodgepole pine may be found on more mesic sites.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
SYMPH	<i>Symphoricarpos</i>	Snowberry

AMELA	<i>Amelanchier</i>	Serviceberry
PRUNU	<i>Prunus</i>	Plum
HOLOD	<i>Holodiscus</i>	Oceanspray

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

Disturbance Description

This ecological system could be in Fire Regime Group III or IV. This is a fire-dependent system and is strongly influenced by the fire regime of the surrounding shrublands. Dominant species are resprouters (FEIS 2004; Uchytel 1990; Esser 1995; Howard 1997; Zlatnik 1999; Anderson 2001). Average fire return intervals (FRIs) for replacement fire vary between 100-200yrs with longer intervals for older stands. The average mixed-severity FRI varies between 25yrs for younger stands to 100yrs for older stands with greater tree encroachment.

Severe weather events, such as frost, can cause replacement type mortality every 200yrs on average.

Sites on steep slopes experience rockslides and avalanches that favor resprouting shrubs. The effect is assumed to be small in extent and is not included in the model.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	102	21	100	200
Moderate (Mixed)	28	79	25	100
Low (Surface)				
All Fires	22	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

Usually, this community occurs on a small scale, on mesic sites near or within the mountain big sagebrush zone. However, it may occur on mesic sites outside this zone.

Adjacency or Identification Concerns

In the Great Basin (west desert of Utah and Nevada) mountain shrublands, the potential for tree invasion by pinyon, juniper, white fir, limber pine, and, incidentally, lodgepole pine is greater than in the Rocky Mountains (map zone [MZ] 16 and east). This system is generally drier than Rocky Mountain Gambel Oak-Mixed Montane Shrubland (Biophysical Setting [BpS] 1107) in the eastern part of MZ17 but may include mesic montane shrublands where *Quercus gambelii* does not occur.

This type occurs in association or complex with mountain big sagebrush, although mountain shrublands are differentiated here by greater diversity.

This type may be difficult to identify today on more mesic sites where fire suppression has allowed tree invasion.

Dwarf aspen, willows, and alder may be present on moist sites. If those species are dominant, an aspen or riparian model would be more appropriate (e.g., Rocky Mountain Aspen Forest and Woodland 1011; Rocky Mountain Montane Riparian Systems 1159).

Issues or Problems

Native Uncharacteristic Conditions

Comments

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	B	B	B	C	C	C	C	C	C	C
Shrub	1.0-3.0	B	B	B	C	C	C	C	C	C	C
Shrub	>3.0	B	B	B	C	C	C	C	C	C	C
Tree	0-5	D	D	D	UN	UN	UN	UN	UN	UN	UN
Tree	5-10	D	D	D	UN	UN	UN	UN	UN	UN	UN
Tree	10-25	D	D	D	UN	UN	UN	UN	UN	UN	UN
Tree	25-50	D	D	D	UN	UN	UN	UN	UN	UN	UN
Tree	>50	D	D	D	UN	UN	UN	UN	UN	UN	UN

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	7	Early Development 1 - All Structures
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
SYMPH	Symphoricarpos	Snowberry	Upper
AMELA	Amelanchier	Serviceberry	Upper
PRUNU	Prunus	Plum	Upper
HOLOD	Holodiscus	Oceanspray	Upper

Description

Grasses and forbs are abundant, as are resprouting shrubs. Shrub seedlings are also present.

None

Mid Development 1 - Closed

Upper Layer Canopy Height: Shrub 0.6m - Shrub 3.0m

Symbol	Scientific Name	Common Name	Canopy Position
SYMPH	Symphoricarpos	Snowberry	Upper
AMELA	Amelanchier	Serviceberry	Upper
HOLOD	Holodiscus	Oceanspray	Upper
PRUNU	Prunus	Plum	Upper

Shrubs are dominant, and grasses and forbs may be present, especially in gaps between shrubs. Many shrubs are small and immature.

None

Late Development 1 - Closed

Symbol	Scientific Name	Common Name	Canopy Position
SYMPH	Symphoricarpos	Snowberry	Upper
AMELA	Amelanchier	Serviceberry	Upper
PRUNU	Prunus	Plum	Upper
HOLOD	Holodiscus	Oceanspray	Upper

Shrubs are dominant, with little decadence. Grasses and forbs may be present. Small tree seedlings may be present. Shrubs are larger, and many are reproducing.

None

Late Development 1 - Open

Upper-layer lifeform is not the dominant lifeform. Dominant lifeform medium shrubs (*Symphoricarpos*, *Amelanchier*, *Prunus*, *Holodiscus*) but overtopped by trees. Minimum canopy 25%, maximum canopy 50%; minimum height short shrub, maximum height medium shrub.

Symbol	Scientific Name	Common Name	Canopy Position
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JUNIP	Juniperus	Juniper	Upper
PIFL2	Pinus flexilis	Limber pine	Upper
ARTR2	Artemisia tridentata	Big sagebrush	Middle
HOLOD	Holodiscus	Oceanspray	Middle

Description

Shrubs are dominant, with more decadence. Trees are overtopping the shrub canopy. Vegetation is considered open because trees do not form a closed canopy.

Maximum Tree Size Class

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:CLS	4
Mid1:CLS	5	Late1:CLS	19
Late1:CLS	20	Late1:CLS	999
Late1:OPN	80	Late1:OPN	979

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
Wind or Weather or Stress	Early1:ALL	Early1:ALL	0.005	200	Yes	0
Replacement Fire	Early1:ALL	Early1:ALL	0.01	100	Yes	0
Wind or Weather or Stress	Mid1:CLS	Early1:ALL	0.005	200	Yes	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.01	100	Yes	0
Mixed Fire	Mid1:CLS	Mid1:CLS	0.04	25	No	0
Wind or Weather or Stress	Late1:OPN	Late1:OPN	0.005	200	No	0
Replacement Fire	Late1:OPN	Early1:ALL	0.005	200	Yes	0
Mixed Fire	Late1:OPN	Late1:CLS	0.01	100	Yes	0
Alternative Succession	Late1:CLS	Late1:OPN	1	1	Yes	80
Wind or Weather or Stress	Late1:CLS	Early1:ALL	0.005	200	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.01	100	Yes	0
Mixed Fire	Late1:CLS	Late1:CLS	0.04	25	No	0

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