

10861

Rocky Mountain Lower Montane-Foothill Shrubland - No True Mountain-Mahogany

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Shrubland

Map Zone

22

Model Splits or Lumps

This Biophysical Setting (BpS) is split into multiple models: 1086 was split in order to accommodate the mountain mahogany portion of 1086, which does function differently than the rest of the shrub component of 1086. True mountain-mahogany is being split from 1086 due to different fire intervals, range, and effects. It can be distinguished from the rest of 1086 by aspect -- more exposed aspects and shallower, rocky soils for true mountain-mahogany.

Geographic Range

This ecological system is found in the foothills, canyon slopes, and also the lower mountains of the Rocky Mountain system.

For map zone (MZ) 22, it occurs everywhere except not much in 342F1 and 342Fb and none in M331Ba (Cleland et al. 2007).

Biophysical Site Description

In lower elevations, it's found on north and east aspects -- and cooler aspects and mesic sites.

Precipitation from 12-20in. Soils are deep to shallow, well drained and udic. Soil temperatures are cryic (very cold soils of the Rocky Mountain region).

These shrublands occur between 1,500-2,900m elevations and are usually associated with exposed sites.

Vegetation Description

The vegetation is typically dominated by a variety of shrubs including *Amelanchier utahensis*, *Purshia tridentata*, *Ribes cereum*, *Symphoricarpos oreophilus*, *Artemisia tridentata vaseyana*, and *Prunus virginiana*. *Ribes*, *Acer*, mountain ash (*Sorbus scopulina*), *Holodiscus*, and *Chrysothamnus* are less common. *Artemisia tridentata* var. *vaseyana* is a more common shrub on dry sites.

Grasses are represented as species of *Muhlenbergia*, *Bouteloua*, *Hesperostipa*, *Nassella viridula*, *Achnatherum nelsonii*, *kingspike fescue*, *Idaho fescue*, and *Pseudoroegneria spicata*.

Forbs include *Helianthella uniflora*, Longleaf stalwort, lupine, and *Delphinium nuttallianum*.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
AMELA	<i>Amelanchier</i>	Serviceberry
SYMPH	<i>Symphoricarpos</i>	Snowberry
PRVI	<i>Prunus virginiana</i>	Chokecherry
CAGE2	<i>Carex geyeri</i>	Geyer's sedge
LEKI2	<i>Leucopoa kingii</i>	Spike fescue
SYOR2	<i>Symphoricarpos oreophilus</i>	Mountain snowberry
NAVI	<i>Navarretia viscidula</i>	Sticky pincushionplant
LUAR3	<i>Lupinus argenteus</i>	Silvery lupine

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

Disturbance Description

These communities contain several species that resprout following fire. Some mountain shrubs are prolific resprouters such as Utah snowberry, green rabbitbrush, and black chokecherry while others are weak resprouters, including serviceberry, alderleaf mountain-mahogany, and antelope bitterbrush (FEIS).

This is a fire-dependent system, and it is strongly influenced by the fire regime of the surrounding shrublands. Dominant species are resprouters (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. However, this model was created with a somewhat shorter interval in the last stage, as it is thought that there is more fuel for fire. FRIs of 40-140yrs are reported for communities in juxtaposition to Douglas-fir (Zlatnik 1999) while intervals of 40-100yrs and 60-140yrs describe the mountain big sagebrush steppe and persistent aspen forest (FEIS), respectively.

Severe weather events, such as prolonged drought and/or 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.

Insect damage occurs and can severely affect stands, but frequency is thought to be rare. This was not modeled.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	89	100	90	200
Moderate (Mixed)				
Low (Surface)				

All Fires	89	100		
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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 community can occur on a large or small scale, on mesic sites near or within the mountain big sagebrush zone. However, it may occur on mesic sites outside this zone. Patch sizes are very variable in size. It can range from 1/4 acre to 100s of acres.

It is also a transitional (see ID concerns) system.

Adjacency or Identification Concerns

This is a transitional system at higher elevations shifting into deciduous or coniferous forests.

Fire suppression may have allowed an invasion of trees into some of these shrublands in present times, but in many cases sites are too xeric for tree growth. When trees are present, they include juniper and limber pine.

This system is generally drier than Rocky Mountain Gambel Oak-Mixed Montane Shrubland (1107).

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

This type may be difficult to identify today because of the small patch size and because of its transitional nature.

Aspen and willows 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).

Historically, there might have been dense shrub cover with shrub species mentioned in the classes below. However, current conditions might appear to have the same shrub cover, but the species would differ (higher percentage today of mountain sagebrush) and the amount of dead and decadent shrubs would be much greater. Today, we would see a conversion of live fuel to dead fuel under the same canopy cover.

BpS 1106 NRM Lower Montane Deciduous Shrubland could be confused for BpS 10861 RM Lower Montane-Foothill Shrubland -- no true mountain mahogany. There was disagreement among MZ22 modelers as to whether BpS 1106 was truly a different BpS than 10861. However, modelers for 1106 stated that they are different in that the FRI is less and there is more mixed-severity fire due to more mesic conditions in 1106 and different fuel types. Therefore, an individual model for 1106 was retained, although the two will be difficult to distinguish and some modelers for 10861 felt that 1106 and 10861 were indistinguishable for a mapper and functioned similarly.

The 10861 model recommends using a riparian model when the shrub community is in a more mesic site. However, the riparian models for this MZ22 would not be appropriate here. This 1106 model describes a mesic deciduous shrubland occurring from abiotic factors such as precipitation and groundwater gradients and may be associated with riparian areas but is not one itself. This site is modeled differently than a riparian wetland site.

1106 probably occurs in more mesic sites in canyon areas, shaded areas, and where snow accumulates.

There is probably more current Douglas-fir encroachment in 1106 than 10861.

Issues or Problems

Native Uncharacteristic Conditions

Comments

This model for MZ22 was adapted from the model for the same BpS from MZs 23 and 24, created by Beth Corbin and Stanley Kitchen and reviewed by Tim Christiansen. Another modeler for MZ22 was Carl Bezanson. For MZ22, descriptive and quantitative changes were made, as it was thought that in MZ22, it might differ from the other MZs.

The model for S from MZs 23 and 24 is identical to the model for the same BpS in MZ16 (Utah High Plateaus) with minor descriptive changes based on peer review for MZs 23 and 24.

The models for MZ16 were based on Rapid Assessment PNVG R2MSHBwt -- Mountain Shrubland with trees developed by Michele Slaton (mslaton@fs.fed.us), Joanne Baggs (jbaggs@fs.fed.us), and Cheri Howell (chowell@fs.fed.us) for the western and eastern Great Basin. Reviewers of R2MSHBwt were Stanley Kitchen (skitchen@fs.fed.us), Crystal Golden (kolden@unr.edu), and Clinton Williams (cwilliams03@fs.fed.us).

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

Tree	>50	C	C	C	C	C	UN	UN	UN	UN	UN
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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
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Indicator Species

Indicator Species	Symbol	Scientific Name	Common Name	Canopy Position
	NAVI	Navarretia viscidula	Sticky pincushionplant	Upper
	SYOR2	Symphoricarpos oreophilus	Mountain snowberry	Upper
	LUAR3	Lupinus argenteus	Silvery lupine	Upper
	LEKI2	Leucopoa kingii	Spike fescue	Lower

Description

Grasses and forbs are abundant, as are resprouting shrubs (shrub cover up to 30% possible). Grass is dominant.

Maximum Tree Size Class

None

Class B	21	Mid Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
SYMPH	Symphoricarpos	Snowberry	Upper
AMELA	Amelanchier	Serviceberry	Upper
LEKI2	Leucopoa kingii	Spike fescue	Lower
PRVI	Prunus virginiana	Chokecherry	Upper

Description

Shrubs are dominant, and grasses and forbs may be present, especially in gaps between shrubs. Many shrubs are small and immature. Some of the shrubs are large -- chokecherry can get up to 3m.

Maximum Tree Size Class

None

Class C	73	Late Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
SYMPH	Symphoricarpos	Snowberry	Upper
AMELA	Amelanchier	Serviceberry	Upper
PRVI	Prunus virginiana	Chokecherry	Upper
LEKI2	Leucopoa kingii	Spike fescue	Upper

Description

Shrubs are dominant. Grasses and forbs are present. Shrubs are larger, and many are reproducing.

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

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	0.0067	149	Yes	0
Wind or Weather or Stress	Mid1:CLS	Early1:ALL	0.005	200	Yes	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.008	125	Yes	0
Wind or Weather or Stress	Late1:CLS	Early1:ALL	0.005	200	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.0125	80	Yes	0

References

Anderson, M. 2001. Acer glabrum. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis> [2004, November 18].

Brown, J.K. and J. Kapler-Smith, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42. vol 2. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station. 257 pp.

Cleland, D.T.; Freeouf, J.A.; Keys, J.E.; Nowacki, G.J.; Carpenter, C.A.; and McNab, W.H. 2007. Ecological Subregions: Sections and Subsections for the conterminous United States. Gen. Tech. Report WO-76D [Map on CD-ROM] (A.M. Sloan, cartographer). Washington, DC: U.S. Department of Agriculture, Forest Service, presentation scale 1:3,500,000; colored

Esser, L.L. 1995. *Prunus emarginata*. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis> [2004, November 18].

Howard, J.L. 1997. *Amelanchier alnifolia*. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis> [2004, November 18].

Howell, C., R. Hudson, B. Glover and K. Amy. 2004. Resource implementation protocol for rapid assessment matrices. USDA Forest Service, Humboldt-Toiyabe National Forest, Sparks, NV.

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

Uchytel, R.J. 1990. *Acer grandidentatum*. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis> [2004, November 18].

Zlatnik, E. 1999. *Amelanchier utahensis*. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis> [2004, November 18].