10860
Rocky Mountain Lower Montane-Foothill Shrubland

BpS Model/Description Version: Aug. 2020

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Vegetation Type
Shrubland

Map Zone
29

Geographic Range
This occurs in the Laramie Peak Range area of map zone (MZ) 29 (Chumley et al. 1998). Foothills, canyon slopes, and lower mountains of the Rocky Mountains. The description here focuses on true mountain-mahogany. Information in the Fire Effects Information System online database indicates that the central distribution of true mountain-mahogany is located on the west side of the Rocky Mountains, in the foothills and mountains of Utah, Colorado, and Wyoming. The range of true mountain-mahogany also extends northward into Montana, eastward into South Dakota and Nebraska, southward from Oklahoma into Mexico, and westward into Arizona and Nevada.

It occurs in every section of MZ22. It is questionable as to whether true mountain-mahogany exists in the Bighorn Basin.

Biophysical Site Description
This biophysical setting (BpS) ranges from roughly 4,400-8,500ft. This BpS occurs on relatively xeric sites with thinly to moderately well-developed soils on moderately steep to steep southerly aspects.

Vegetation Description
Species dominance varies depending on site conditions and geographic location. Shrubs include *Cercocarpus montanus*, *Amelanchier utahensis*, *Purshia tridentata*, *Rhus trilobata*, *Ribes cereum*, *Symphoriocarpus oreophilus*, *Yucca glauca*, sagebrush, bitterbrush, serviceberry, and rabbitbrush. Grasses may include species of *Hesperostipa*, *Pseudoroegneria spicata*, Indian ricegrass, and western wheatgrass.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
CEMO2	*Cercocarpus montanus*	Alderleaf mountain-mahogany
ARTRV	*Artemisia tridentata ssp. vaseyana*	Mountain big sagebrush
PSSP6	*Pseudoroegneria spicata*	Bluebunch wheatgrass
ACHY	*Achnatherum hymenoides*	Indian ricegrass

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

Disturbance Description
Historically, this type may have been in Fire Regime Condition Class 4 -- primarily long-interval stand-replacement fires. Nearly all the dominant species other than sagebrush in this BpS have the capability to resprout after disturbance.

Drought and grazing by native ungulates also occur in this system.

Cercocarpus montanus is a vigorous sprouter after fire.

Fire size is mostly tens to hundreds of acres and is influenced by adjacent grass and mountain shrub types.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	105	100		
Moderate (Mixed)				
Low (Surface)				
All Fires	105	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
Erhard's observations suggest that the scale of the most common disturbance extent is relatively small. Patch size of the system is in the hundreds of acres.

Fire size is mostly tens to hundreds of acres and is influenced by adjacent grass and mountain shrub types.

Adjacency or Identification Concerns
Cheatgrass is present in this system today.

There is occasionally Rocky Mountain juniper and limber pine encroachment into this system.

Issues or Problems

Native Uncharacteristic Conditions
Juniper invasion is uncharacteristic.

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	UN	UN	UN	UN	UN	UN	UN

Herb	0.5-1.0	A	A	A	UN	UN	UN	UN	UN	UN	UN
Herb	>1.0	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Shrub	0-0.5	B	B	C	C	C	UN	UN	UN	UN	UN
Shrub	0.5-1.0	B	B	C	C	C	UN	UN	UN	UN	UN
Shrub	1.0-3.0	B	B	C	C	C	UN	UN	UN	UN	UN
Shrub	>3.0	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	0-5	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	5-10	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	10-25	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	25-50	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	>50	UN	UN	UN	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 **5** **Early Development 1 - Open**

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
CEMO2	Cercocarpus montanus	Alderleaf mountain-mahogany	Upper
PSSP6	Pseudoroegneria spicata	Bluebunch wheatgrass	Upper

Description

Early-seral community. Grasses and sprouting shrubs. Resprouts well after fire.

Herbaceous cover might be approximately 15%. Grasses and shrubs are probably the same height in this class. Shrub cover might be 0-5%. (The canopy cover of true mountain-mahogany resprouts was <3%, per plot data 18mo after a prescribed fire.)

Some grasses that might be present are needle-and-thread, bluebunch wheatgrass, Sandberg bluegrass, blue grama, and western wheatgrass. Hairy golden aster was the most dominant in a wide variety of forbs.

Maximum Tree Size Class

None

Class B **9** **Mid Development 1 - Open**

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
CEMO2	Cercocarpus montanus	Alderleaf mountain-mahogany	Upper
PSSP6	Pseudoroegneria spicata	Bluebunch wheatgrass	Upper

Description
Greater shrub cover. Grasses/forbs dominant in scattered openings.

Maximum Tree Size Class
None

Class C 86 Late Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
CEMO2	Cercocarpus montanus	Alderleaf mountain-mahogany	Upper
PSSP6	Pseudoroegneria spicata	Bluebunch wheatgrass	Upper

Description
Late-development stage with greater shrub cover. There are more dead and decadent shrubs. Herbaceous cover stays the same as in earlier classes. (In current conditions, tree encroachment might be occurring in this stage due to lack of fire.)

Maximum Tree Size Class
None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:OPN	0	Mid1:OPN	5
Mid1:OPN	6	Late1:OPN	15
Late1:OPN	16	Late1:OPN	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:OPN	Early1:OPN	0.005	200	No	0
Replacement Fire	Early1:OPN	Early1:OPN	0.005	200	Yes	0
Native Grazing	Early1:OPN	Early1:OPN	0.005	200	No	0
Wind or Weather or Stress	Mid1:OPN	Mid1:OPN	0.005	200	No	0
Replacement Fire	Mid1:OPN	Early1:OPN	0.0067	149	Yes	0

Wind or Weather or Stress	Late1:OPN	Late1:OPN	0.003	333	No	0
Replacement Fire	Late1:OPN	Early1:OPN	0.01	100	Yes	0

References

Arno, S.F. and G.E. Gruell. 1983. Fire history at the forest-grassland ecotone in southwestern Montana. Journal of Range Management 36: 332-336.

Arno, S.F. and G.E. Gruell. 1986. Douglas-fir encroachment into mountain grasslands in southwestern Montana. Journal of Range Management 39: 272-275.

Arno, S.F. and A.E. Wilson. 1986. Dating past fires in curlleaf mountain-mahogany communities. Journal of Range Management 39(3): 241-243.

Bunting, S.C., L.F. Neuenschwander and G.E. Gruell. 1985. Fire ecology of antelope bitterbrush in the Northern Rocky Mountains. Pages 48-57 in: J.E. Lotan and J.K. Brown, compilers. Fire's Effects on Wildlife Habitat— Symposium Proceedings. March 21, 1984, Missoula, Montana. Gen. Tech. Rep. INT-186. Ogden, UT: USDA Forest Service, Intermountain Research Station.

Chumley, T.W., B.E. Nelson and R.L. Hartman. 1998. Atlas of the Vascular Plants of Wyoming. University of Wyoming, Laramie, WY. Available at: http://www.sbs.utexas.edu/tchumley/wyomap/ROS/cermonmo.pdf

Erdman, J.A. 1970. Pinon-juniper succession after natural fires on residual soils of Mesa Verde, Colorado. Brigham Young University Biological Series Vol. XI (2). 58 pp.

Floyd, M.L, W.H. Romme and D.D. Hanna. 2000. Fire History and vegetation pattern in Mesa Verde National Park, Colorado, USA. Ecological Applications 10: 1666-1680.

Gruell, G.E., S.C. Bunting and L.F. Neuenschwander. 1985. Influence of fire on curlleaf mountain-mahogany in the Intermountain West. Pages 58-71 in: J.E. Lotan and J.K. Brown, compilers. Fire's Effects on Wildlife Habitat— Symposium Proceedings. March 21, 1984, Missoula, Montana. Gen. Tech. Rep. INT-186. Ogden, UT: USDA Forest Service, Intermountain Research Station.

Johnston, B.C., L. Huckaby, T.J. Hughes and J. Pecor. 2001. Ecological types of the Upper Gunnison Basin: Vegetation-Soil-Landform-Geology-Climate-Water land classes for natural resource management. Technical Report R2-RR-2001-01. Lakewood, CO: USDA Forest Service, Rocky Mountain Region. 858 pp.

Keeley, J.E. and S.C. Keely. 1988. Chapter 6: Chaparral. Pages 165-207 in: M.G. Barbour and W.D. Billings (editors). North American terrestrial vegetation. Cambridge Univ. Press, Cambridge, England.

Jones, G. and S. Ogle. 2000. Characterization abstracts for vegetation types on the Bighorn, Medicine Bow, and Shoshone National Forests. Prepared for USDA Forest Service, Region 2 by the Wyoming Natural Diversity Database, University of Wyoming. Available at: http://uwadmnweb.uwyo.edu/WYNDD/

Martin, R.E. and C.H. Driver 1983. Factors affecting antelope bitterbrush reestablishment following fire. Pages 266-279 in: A.R. Tiedemann and K.L. Johnson, compilers. Research and management of bitterbrush and cliffrose in western North America. Gen. Tech. Rep. INT-152. Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station.

Mueggler, W.F. and W.L. Stewart. 1980. Grassland and shrubland habitat types of western Montana. Gen. Tech. Rep. INT-66. Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station, 154 pp.

NatureServe. 2005. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.4. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: May 3, 2005).

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

Omi, P. and L. Emrisk. 1980. Fire and resource management in Mesa Verde National Park. Contract CS-1200-9-B015. Unfinished report, on file at Mesa Verde National Park.

Paysen, T.E., J.R. Ansley, J.K. Brown, G.J. Gottfried, S.M. Haase, M.J. Harrington, M.G. Narog, S.S. Sackett and R.C. Wilson. Chapter 6: Fire in western shrubland, woodland, and grassland ecosystems. Pages 121-160 in: J.K. Brown and J. Kapler-Smith, eds. 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.

Rice, C.L. 1983. A literature review of the fire relationships of antelope bitterbrush. Pages 256-265 in: A.R. Tiedemann and K.L. Johnson, compilers. Research and management of bitterbrush and cliffrose in western North America. Gen. Tech. Rep. INT-152. Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station.

Romme, W.H., P. Barry, D. Hanna and S. White. A wildlife hazard map for La Plata County, Colorado. Final report to the San Juan National Forest, Durango, CO.

Schmidt, K.M., J.P. Menakis, C.C. Hardy, W.J. Hann and D.L. Bunnell. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. Gen. Tech. Rep. RMRS-GTR-87. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. 41 pp. + CD.

Shiflet, T.N., ed. 1994. Rangeland cover types of the United States. Denver, CO: Society for Range Management. 152 pp.

Spencer, J.R., W.H. Romme, L. Floyd-Hanna and P.G. Rowlands. 1995. A preliminary vegetation classification for the Colorado Plateau. Pages 193-213 in: C. van Riper III (editor), Proceedings for the second biennial conference on research in Colorado Plateau national parks. National Park Service Transactions and Proceedings Series NPS/NRNAU/NRTP-95/11.

Spencer, A.W. and W.H. Romme. 1996. Ecological patterns, Pages 129-142 in: R. Blair, managing editor. The western San Juan Mountains: their geology, ecology, and human history. University Press of Colorado, Niwot, CO.

USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, December). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/ [Accessed 6/25/03].

Wright, H.A. 1971. Shrub response to fire. Pages 204-217 in: Wildland shrubs—their biology and utilization. Gen. Tech. Rep. INT-1. Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station.