

10860

Rocky Mountain Lower Montane-Foothill Shrubland

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
Dean Erhard	derhard@fs.fed.us	Tim Christiansen	tchristiansen@tnc.org
None	None	None	None
None	None	None	None

Vegetation Type

Shrubland

Map Zone

25

Geographic Range

Foothills, canyon slopes, and lower mountains of the Rocky Mountains. The general information provided in this form is based on personal experience in the upper Rio Grande drainage (specifically the Rio Grande NF, Erhard). The description here focuses more on true mountain-mahogany. Information in the FEIS 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 north into Montana, east into South Dakota and Nebraska, south from Oklahoma into Mexico, and west into Arizona and Nevada. True mountain-mahogany occasionally occurs in Idaho and southwestern Oregon.

Biophysical Site Description

This Biophysical Setting (BpS) occurs in the transition zone between the foothill and montane life zones. It ranges from roughly 1,500-2,900m (4,950-9,570ft). This BpS occurs on relatively xeric sites with thinly to moderately well-developed soils on moderately steep to steep southerly aspects. This BpS is not intended to cover communities dominated by ocean-spray (HODU) on extremely rocky sites (where vegetation is clearly subordinate to rock).

Vegetation Description

Species dominance varies depending on site conditions and by geographic location. Shrubs include *Amelanchier utahensis*, *Cercocarpus montanus*, *Purshia tridentata*, *Rhus trilobata*, *Ribes cereum*, *Symphoricarpos oreophilus*, and *Yucca glauca*. Grasses may include species of *Bouteloua*, *Muhlenbergia*, *Hesperostipa*, and *Pseudoroegneria spicata*. Species dominant in the upper Rio Grande drainage are true mountain-mahogany, several species of rabbitbrush, snowberry, and chokecherry. Gambel oak is not included here.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
CEMO2	<i>Cercocarpus montanus</i>	Alderleaf mountain mahogany
CHRY9	<i>Chrysothamnus</i>	Rabbitbrush
SYMPH	<i>Symphoricarpos</i>	Snowberry
PRVI	<i>Prunus virginiana</i>	Chokecherry

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 a Fire Regime Group IV or II -- primarily moderate-interval (e.g., 20-50yr) stand-replacement fires in the shrub-dominated layer. Nearly all the dominant species in this BpS have the capability to resprout after disturbance.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	73	74		
Moderate (Mixed)	206	26		
Low (Surface)				
All Fires	54	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. The disturbance regime is expected to be relatively frequent under historic conditions. Scale estimate is in the 100s of acres realm -- not 1,000s of acres.

Adjacency or Identification Concerns

Shrub species vary by geographic location in this region. Shrub species dominance is tied to a variety of environmental conditions including geology, soils, topographic position, etc., making a description of this generalized type problematic.

Issues or Problems

Minor occurrence in map zone 25.

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	C	C	B	B	B	B	B	B	B	B
Shrub	0.5-1.0	C	C	B	B	B	B	B	B	B	B
Shrub	1.0-3.0	D	D	E	E	E	E	E	E	E	E
Shrub	>3.0	D	D	E	E	E	E	E	E	E	E
Tree	0-5	E	E	E	E	E	UN	UN	UN	UN	UN
Tree	5-10	E	E	E	E	E	UN	UN	UN	UN	UN
Tree	10-25	E	E	E	E	E	UN	UN	UN	UN	UN
Tree	25-50	E	E	E	E	E	UN	UN	UN	UN	UN

Tree	>50	E	E	E	E	E	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 14 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
BOGR2	Bouteloua gracilis	Blue grama	Upper
MUMO	Muhlenbergia montana	Mountain muhly	Upper

Description

Early succession, usually after moderately frequent stand-replacement fires; grasses and forbs dominant.

Maximum Tree Size Class

None

Class B 16 Mid Development 1 - Closed

Upper-layer lifeform is not the dominant lifeform. Herbaceous cover may dominate: BOGR2, up to 0.09m in height, canopy cover 0-20%.

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
CEMO2	Cercocarpus montanus	Alderleaf mountain mahogany	Upper
CHRY9	Chrysothamnus	Rabbitbrush	Upper
BOGR2	Bouteloua gracilis	Blue grama	Lower
MUMO	Muhlenbergia montana	Mountain muhly	Lower

Description

Greater than 20% shrub cover (i.e., line intercept method) by weakly sprouting and seed-producing shrubs; grasses/forbs dominant in scattered openings.

Maximum Tree Size Class

None

Class C 6 Mid Development 1 - Open

Upper-layer lifeform is not the dominant lifeform. Herbaceous cover may dominate: BOGR2, up to 0.09m in height, canopy cover 20-60%

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
BOGR2	Bouteloua gracilis	Blue grama	Lower
MUMO	Muhlenbergia montana	Mountain muhly	Lower
CEMO	Centaurea montana	Perennial cornflower	Upper
CHRY9	Chrysothamnus	Rabbitbrush	Upper

Description

Less than 20% shrub cover, with grasses/forbs dominant in extensive openings.

Maximum Tree Size Class

None

Class D	14	Late Development 1 - Open
----------------	-----------	----------------------------------

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
BOGR2	Bouteloua gracilis	Blue grama	Lower
CEMO	Centaurea montana	Perennial cornflower	Upper
MUMO	Muhlenbergia montana	Mountain muhly	Lower
CHRY9	Chrysothamnus	Rabbitbrush	Upper

Description

Less than 20% shrub cover, with over-mature shrubs as patchy dominant overstory (e.g., in rock outcrops); grasses/forbs dominant in extensive openings.

Maximum Tree Size Class

None

Class E	50	Late Development 1 - Closed
----------------	-----------	------------------------------------

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
CEMO2	Cercocarpus montanus	Alderleaf mountain mahogany	Upper
CHRY9	Chrysothamnus	Rabbitbrush	Upper
SYMPH	Symphoricarpos	Snowberry	Mid-Upper
BOGR2	Bouteloua gracilis	Blue grama	Lower

Description

Greater than 20% shrub cover; all age classes present but dominated by over-mature shrubs (e.g., in rocky draws).

Maximum Tree Size Class

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:CLS	19
Mid1:OPN	20	Mid1:CLS	29
Mid1:CLS	20	Late1:CLS	39
Late1:OPN	30	Late1:CLS	59
Late1:CLS	40	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	No	0
Replacement Fire	Early1:ALL	Early1:ALL	0.015	67	Yes	0
Alternative Succession	Early1:ALL	Mid1:OPN	0.03	33	Yes	0
Wind or Weather or Stress	Mid1:OPN	Mid1:OPN	0.003	333	No	0
Replacement Fire	Mid1:OPN	Mid1:OPN	0.008	125	No	0
Mixed Fire	Mid1:OPN	Mid1:OPN	0.008	125	No	0
Competition or Maintenance	Mid1:OPN	Mid1:OPN	0.01	100	No	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.01	100	Yes	0
Alternative Succession	Mid1:OPN	Late1:OPN	0.015	67	Yes	0
Competition or Maintenance	Mid1:CLS	Mid1:CLS	0.001	1000	No	0
Wind or Weather or Stress	Mid1:CLS	Mid1:OPN	0.005	200	Yes	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.005	200	Yes	0
Alternative Succession	Mid1:CLS	Late1:OPN	0.005	200	Yes	0
Replacement Fire	Mid1:CLS	Mid1:CLS	0.01	100	No	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.01	100	Yes	0
Wind or Weather or Stress	Late1:OPN	Late1:OPN	0.003	333	No	0
Mixed Fire	Late1:OPN	Mid1:OPN	0.004	250	Yes	0
Mixed Fire	Late1:OPN	Late1:OPN	0.004	250	No	0
Replacement Fire	Late1:OPN	Late1:OPN	0.008	125	No	0

Competition or Maintenance	Late1:OPN	Late1:OPN	0.01	100	No	0
Replacement Fire	Late1:OPN	Early1:ALL	0.01	100	Yes	0
Mixed Fire	Late1:CLS	Mid1:OPN	0.002	500	Yes	0
Mixed Fire	Late1:CLS	Late1:OPN	0.003	333	Yes	0
Wind or Weather or Stress	Late1:CLS	Late1:OPN	0.005	200	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	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*. 21 March 1984, Missoula, Montana. Gen. Tech. Rep. INT-186. Ogden, UT: USDA Forest Service, Intermountain Research Station.

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

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. Chaparral. Pages 165-207 in: M.G. Barbour and W.D. Billings, editors. North American terrestrial vegetation. Cambridge Univ. Press, Cambridge, England.

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. 2000. 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, Thomas 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.