

# 132.1 Great Basin Montane Scrubland

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Great Basin montane scrub is equivalent to "Petran chaparral" (Clements, 1916; Hayward, 1948), "deciduous thicket scrub" (Cooper, 1922), "mountain shrub" (Costello 1954), "Mountain brush" (Vallentine, 1961), "mountain-mahogany-oak scrub" (Küchler, 1964), and "Rocky Mountain bushland" (Shelford, 1963). It is largely a deciduous scrub, although evergreen elements are regularly present and may dominate locally. The physiognomy is that of a thicket of from 1 to 6 m in height which may present a dense homogeneous "chaparral" aspect or be relatively open (Fig. 41).

In the Southwest, Great Basin montane scrub is found in the higher (ca. 2,300-2,400 to over 2,750 m) foothill and mountain regions of Colorado, Utah, Nevada, and in the Sangre de Cristo, Sandia, and Manzano Mountains in New Mexico. It is especially prevalent on mountain slopes around Durango, Colorado, where it is typically positioned on the altitudinal gradient above Great Basin conifer woodland and below subalpine conifer forest. Less commonly (in the Southwest), the lower elevation contact is with sagebrush. The major interaction is with montane conifer forest, whose Ponderosa Pine series it largely replaces on xeric sites.

Considering the high elevations, precipitation is low—mean annual totals range from 380 to 535 mm (Table 8). Moreover, this scanty precipitation is spread throughout the year, with a dry period during the early growing season; the months of May and June are the most moisture deficient. According to Hayward (1948), montane scrub in the Wasatch Mountains is almost bare of snow in winter, indicating that much of the winter precipitation is lost through wind-blow. Low annual precipitation coupled with poor soil development on steep slopes precludes the establishment of montane conifer forest, and it is erroneous to regard this biome as only a "fire climax" community of the montane conifer forest as suggested by Dixon (1935) and others.

Winter temperature minima are commonly below  $-6^{\circ}\text{C}$ , and in some years, the growing season is less than 100 days. These cold temperatures are possibly the reason for the replacement of the less cold tolerant Great Basin conifer woodland by montane scrub at higher elevations here and farther north.

In the Southwest, as throughout much of its range, the dominant species in Great Basin montane scrub is a shrub form of the facultative Gambel Oak (*Quercus gambelii* = *Q. gunnisonii*, *Q. utahensis*, *Q. vreelandii*, *Q. novomexicana*, et al.). Other important species include mountain-mahoganies (*Cercocarpus montanus*, *C. ledifolius*), snowberries (*Symphoricarpos* spp.), serviceberries (*Amelanchier alnifolia*, *A. utahensis*), Chokecherry (*Prunus virginiana* var. *melanocarpa*), Cliffrose (*Cowania mexicana*), Greenleaf Manzanita (*Arctostaphylos patula*), buckbrushes (*Ceanothus fendleri*, *C. velutinus*), and New Mexican Locust (*Robinia neomexicana*), any one of which may be locally prevalent in the composition. Other scrub species as Bigtooth Maple (*Acer grandidentatum*) and Bitterbrush (*Purshia tridentata*), although found in the Southwest, are of more importance further north. Sagebrushes (*Artemisia tridentata*, *A. arbuscula*), and to a lesser extent, rabbitbrushes (*Chrysothamnus viscidiflorus* and others) are almost always well represented. Locally common tree and scrub associates include Aspen (*Populus tremuloides*), hop-trees (*Ptelea* spp.), Hackberry (*Celtis reticulata*), Wildrose (*Rosa woodsii*), Elderberry (*Sambucus cerulea*), currants (*Ribes* spp.), Apache Plume (*Fallugia paradoxa*), barberries (*Berberis* spp.), and Skunkbush Sumac (*Rhus trilobata*). It is not uncommon for individuals of Ponderosa Pines, Douglas-fir or Pinyon to interrupt the brush overstory.

Much of this biotic community has been greatly abused and modified by livestock grazing. As a consequence, grasses are often scarce, and when present, are often the non-native bromes (*Bromus* spp.) and Kentucky Blue-grass (*Poa pratensis*). Native species are those of the Great Basin grassland and montane biomes. Usually the understory and openings are populated by forbs, particularly the less palatable species. Studies in southern Utah by Coles and Pederson (1969) showed the following herbs to be common participants in this biome:

<i>Achillea millefolium</i>	Western Yarrow
<i>Anemone</i> spp.	anemones, windflowers
<i>Antennaria</i> spp.	pussytoes
<i>Aster</i> spp.	asters
<i>Balsamorhiza sagittata</i>	Arrowleaf Balsamroot
<i>Erigeron</i> spp.	fleabanes
<i>Eriogonum</i> spp.	buckwheats
<i>Geranium</i> spp.	geraniums, crane's bills
<i>Lupinus</i> spp.	lupines



**Figure 41.** Great Basin montane scrub at Raton Pass between 2,280-2,440 m elevation, near the Colorado-New Mexico state line. Here, as is often the case in this biotic community, the prevalent scrub cover is the deciduous shrub-form Gambel Oak (*Quercus gambelii*). The scrubland is relatively snow free, the persistent brown leaves of the oak contrasting with the green of the scattered conifers (*Pinus ponderosa*, *P. edulis*, *Abies concolor*). The occasional openings are well clothed with perennial grasses.

<i>Penstemon</i> spp.	penstemons, beardtongues	<i>Pipilo chlorurus</i>	Green-tailed Towhee
<i>Senecio cerra</i>	Butterweed Groundsel	<i>P. erythrophthalmus</i>	Rufous-sided Towhee
<i>Taraxacum officinale</i>	Dandelion	<i>Sceloporus graciosus</i>	Sagebrush Lizard
<i>Thalictrum fendleri</i>	Meadowrue	<i>Spermophilus variegatus</i>	Rock Squirrel
<i>Thermopsis montana</i>	Golden Pea	<i>Spizella passerina</i>	Chipping Sparrow
		<i>Vermivora celata</i>	Orange-crowned Warbler
		<i>Vermivora virginiae</i>	Virginia Warbler
		<i>Vireo gilvus</i>	Warbling Vireo

Great Basin montane scrub is an important vegetation-type for Rocky Mountain Mule Deer (*Odocoileus hemionus hemionus*); the snow-free hillsides provide winter feeding areas for this animal and for numerous birds (Hayward, 1948). Hayward also reported the following vertebrates to be well represented in this biome in the Wasatch Mountains:

<i>Aphelocoma coerulescens</i>	Scrub Jay
<i>Charina bottae</i>	Rubber Boa
<i>Felis rufus</i>	Bobcat
<i>Hypsiglena torquata</i>	Night Snake
<i>Odocoileus hemionus</i>	Mule Deer
<i>Passerina amoena</i>	Lazuli Bunting

Only the Virginia Warbler and Green-tailed Towhee could be considered characteristic species. This lack of species affinity led Hayward (1948) to conclude reluctantly that Great Basin montane scrub was more an "ecotone" than a biotic community. Although many of the representative plants and animals listed above are also found within montane conifer forest or Great Basin desertscrub, few of them are centered there, suggesting instead that this scrubland is a biotic community of relatively recent derivation.

**Table 8.** Precipitation data from three stations in the Southwest in and adjacent to Great Basin Montane Scrub.

Station	Elevation (in m)	Mean monthly precipitation in mm												Total
		J	F	M	A	M	J	J	A	S	O	N	D	
Bryce Canyon N.P., UT 37°39' 112°10'	2,412	33	31	36	30	22	19	33	61	38	38	27	35	403
Mesa Verde N.P., CO 37°12' 108°29'	2,155	44	37	40	35	25	18	45	54	33	46	29	47	453
Durango, CO 37°17' 107°53'	2,012	43	29	37	35	29	22	47	62	40	49	28	51	472