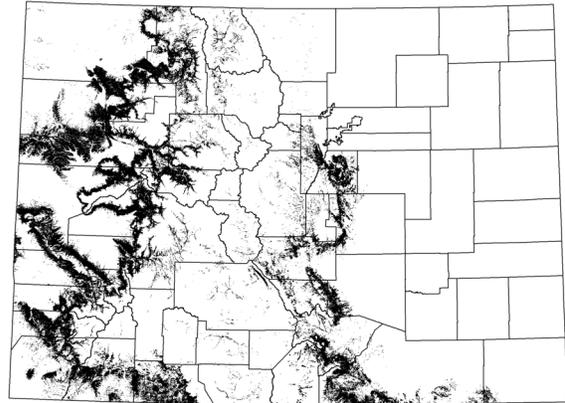


ROCKY MOUNTAIN GAMBEL OAK - MIXED MONTANE SHRUBLAND



S. Kettler



extent exaggerated for display

- AMELANCHIER ALNIFOLIA SHRUBLAND ALLIANCE
 - Amelanchier alnifolia* / *Artemisia tridentata* / *Festuca idahoensis* Shrubland
 - Amelanchier alnifolia* / *Pseudoroegneria spicata* Shrubland
- AMELANCHIER UTAHENSIS SHRUBLAND ALLIANCE
 - Amelanchier utahensis* - *Cercocarpus montanus* Shrubland
 - Amelanchier utahensis* / *Carex geyeri* Shrubland
 - Amelanchier utahensis* / *Pseudoroegneria spicata* Shrubland
 - Amelanchier utahensis* Shrubland
- ARCTOSTAPHYLOS PATULA SHRUBLAND ALLIANCE
 - Arctostaphylos patula* - *Quercus gambelii* - (*Amelanchier utahensis*) Shrubland
- JUNIPERUS SCOPULORUM WOODLAND ALLIANCE
 - Juniperus scopulorum* - *Quercus gambelii* Woodland [Provisional]
- QUERCUS GAMBELII SHRUBLAND ALLIANCE
 - Quercus gambelii* - *Cercocarpus montanus* / (*Carex geyeri*) Shrubland
 - Quercus gambelii* / *Amelanchier alnifolia* Shrubland
 - Quercus gambelii* / *Amelanchier utahensis* Shrubland
 - Quercus gambelii* / *Artemisia tridentata* Shrubland
 - Quercus gambelii* / *Carex inops* Shrubland
 - Quercus gambelii* / *Hesperostipa comata* Shrubland [Provisional]
 - Quercus gambelii* / *Paxistima myrsinites* Shrubland
 - Quercus gambelii* / *Symphoricarpos oreophilus* Shrubland

Overview: This large patch ecological system occurs in the mountains, plateaus, and foothills in the southern Rocky Mountains and Colorado Plateau ecoregions. These shrublands are most commonly found along dry foothills, lower mountain slopes, and at the edge of the western Great Plains from approximately 6,500 to 9,500 ft (2,000-2,900 m) in elevation, and are often situated above pinyon-juniper woodlands. There may be inclusions of other mesic montane shrublands with *Quercus gambelii* absent or as a relatively minor component. This ecological system intergrades with the lower montane-foothills shrubland system and shares many of the same site characteristics.

Characteristic species: The vegetation is typically dominated by *Quercus gambelii* alone or codominant with *Amelanchier alnifolia*, *Amelanchier utahensis*, *Artemisia tridentata*, *Cercocarpus montanus*, *Prunus virginiana*, *Purshia stansburiana*, *Purshia tridentata*, *Robinia neomexicana*, *Symphoricarpos oreophilus*, or *Symphoricarpos rotundifolius*. Vegetation types in this system may occur as sparse to dense shrublands composed of moderate to tall shrubs. Occurrences may be multi-layered, with some short shrubby species occurring in the understory of the dominant overstory species. In many occurrences of this system, the canopy is dominated by the broad-leaved deciduous shrub *Quercus gambelii*, which occasionally reaches small tree size. Occurrences can range from dense thickets with little understory to relatively mesic mixed-shrublands with a rich understory of shrubs, grasses and forbs. These shrubs often have a patchy distribution with grass growing in between.

Scattered trees are occasionally present in stands and typically include species of *Pinus* or *Juniperus*. Characteristic shrubs that may co-occur, or be dominant in place of oak, include

Amelanchier alnifolia, *Amelanchier utahensis*, *Arctostaphylos patula*, *Artemisia tridentata*, *Cercocarpus montanus*, *Ptelea trifoliata*, *Prunus virginiana*, *Purshia stansburiana*, *Robinia neomexicana*, *Rosa* spp., *Symphoricarpos oreophilus*, and *Symphoricarpos rotundifolius*. The herbaceous layer is sparse to moderately dense, ranging from 1-40% cover. Perennial graminoids are the most abundant species, particularly *Bouteloua curtipendula*, *Bouteloua eriopoda*, *Bouteloua gracilis*, *Aristida* spp., *Carex inops*, *Carex geyeri*, *Elymus arizonicus*, *Eragrostis* spp., *Festuca* spp., *Koeleria macrantha*, *Muhlenbergia* spp., and *Stipa* spp. Many forb and fern species can occur, but none have much cover. Commonly present forbs include *Achillea millefolium*, *Artemisia* spp., *Geranium* spp., *Maianthemum stellatum*, *Thalictrum fendleri*, and *Vicia americana*. Ferns include species of *Cheilanthes* and *Woodsia*. Annual grasses and forbs are seasonally present, and weedy annuals are often present, at least seasonally.

Environment: This ecological system typically occupies the lower slope positions of the foothill and lower montane zones where it may occur on level to steep slopes, cliffs, escarpments, rimrock slopes, rocky outcrops, and scree slopes. Climate is semi-arid and characterized by mostly hot-dry summers with mild to cold winters and annual precipitation of 10-27 in (25-70 cm). Precipitation mostly occurs as winter snows but may also consist of some late summer rains. Substrates are variable and include soil types ranging from calcareous, heavy, fine-grained loams to sandy loams, gravelly loams, clay loams, deep alluvial sand, or coarse gravel. Soils are typically poorly developed, rocky to very rocky, and well-drained. Parent materials include alluvium, colluvium, and residuum derived from igneous, metamorphic, or sedimentary rocks such as granite, gneiss, limestone, quartz, monzonite, rhyolite, sandstone, schist, and shale.



S. Spackman

Dynamics: Fire typically plays an important role in this system, causing die-back of the dominant shrub species in some areas, promoting stump sprouting of the dominant shrubs in other areas, and controlling the invasion of trees into the shrubland system. Density and cover of *Quercus gambelii* and *Amelanchier* spp. often increase after fire. Natural fires typically result in a system with a mosaic of dense shrub clusters and openings dominated by herbaceous species. In some instances these associations may be seral to the adjacent *Pinus ponderosa*, *Abies concolor*, and *Pseudotsuga menziesii* woodlands and forests.

Variation: Although this is a shrub-dominated system, some trees may be present. In older occurrences, or occurrences on mesic sites, some of the shrubs may acquire tree-like sizes. Adjacent communities often include woodlands or forests of *Abies concolor*, *Pinus ponderosa*, *Pseudotsuga menziesii*, or *Populus tremuloides* at higher elevations, and *Pinus edulis* and *Juniperus osteosperma* on the lower and adjacent elevations. Shrublands of *Artemisia tridentata* or grasslands of *Festuca*, *Stipa*, or *Pseudoroegneria* may also be present at the lower elevations.

Rank:	A	B	C	D
① CONDITION				
Community structure	Native species dominant Species richness is often high, and native bunch grasses or sedges (non-increasers) are dominant. If trees are present, these are widely scattered and mature.	If trees are present, these are widely scattered and mature. Species richness is often high, and native grasses (non-increasers) are dominant	Herbaceous cover is codominated by native and non-native species. Alteration of vegetation is extensive but potentially restorable over several decades.	Non-native species are dominant. Alteration of vegetation is extensive and restoration potential is low.
Invasive exotics with major potential to alter structure and composition (e.g., leafy spurge, knapweed, non-native thistle, <i>Bromus inermis</i> , <i>Poa pratensis</i> , <i>Bromus tectorum</i>)	Absent or < 1% cover.	May be present, but <3% cover.		
Other non-native spp.	<1% total cover.	<3% total cover.	Co-dominant with native species.	Dominant.
Disturbance	Fragmentation is limited to less than 1% of the occurrence and the fire and grazing regimes are largely intact.	Fragmentation is limited to less than 5% of the occurrence and the fire and grazing regimes are relatively intact.	Vehicle use or livestock grazing disturbance, if present, is extensive and significant enough to have notable impact on species composition and soil compaction. Fragmentation is limited to less than 15% of the occurrence; invasive woody species are present but still controllable. The fire and grazing regimes may need immediate management in order for the occurrence to not deteriorate.	Vehicle use or livestock grazing disturbance, if present, is extensive and significant enough to have notable impact on species composition and soil compaction. System remains fundamentally compromised despite restoration of some processes. Soil compaction and continued disturbance is extensive throughout the occurrence.
② SIZE				
Acres	>5,000	2,000-5,000	1,000-2,000	< 1,000
③ LANDSCAPE CONTEXT				
Connectivity	Connectivity of adjacent systems allows natural ecological processes (e.g., fire), and species migrations to occur. No unnatural barriers present.	Adjacent systems surrounding occurrence retain much connectivity. Few non-natural barriers present.	Adjacent systems surrounding occurrence are fragmented by alteration with limited connectivity.	Connectivity is severely hampered.
Surrounding land	At least 90% native and unaltered landscape with very little to no urban development or agriculture, and little to no industrial forestry.	Surrounding landscape composed of at least 75% natural or semi-natural vegetation, with little urban development within or adjacent to the occurrence.	Surrounding landscape is a mosaic of agricultural or semi-developed areas with >50% natural or semi-natural vegetation. Some non-natural barriers are present. Significant disturbance, but easily restorable.	Major human-caused alteration of surrounding landscape. Adjacent systems surrounding occurrence are mostly converted to agricultural or urban uses.