11070

Rocky Mountain Gambel Oak-Mixed Montane Shrubland

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Shrubland

Map Zone

15

Geographic Range

Colorado Plateau and southern Rocky Mountains. Gambel oak occurs primarily in Colorado, New Mexico, Utah, Arizona, and southeastern Wyoming. In the southern extent of its distribution, Gambel oak occupies a minor role as an associate with ponderosa pine and mixed-conifer habitats. Moving northward, long-lived Gambel oak clones form dominant to monotypic overstories (Simonin 2000).

Biophysical Site Description

In Colorado, Gambel oak occurs between 2,000m and 2,900m (6,600-9,570ft) on all aspects in this biophysical setting (BpS). At higher elevations, it is more predominant on southern exposures. Gambel oak is typically a riparian species in New Mexico within the Black and Sacramento mountain ranges.

Vegetation Description

Gambel oak occurs as the dominant species, ranging from dense thickets to clumps associated with serviceberry or sagebrush. Gambel oak generally has a well-developed understory comprised of snowberry, elk sedge, Letterman’s needlegrass, *Poa ampla*, yarrow, lupine, and goldenrod.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| QUGA | *Quercus gambelii* | Gambel oak |
| AMUT | *Amelanchier utahensis* | Utah serviceberry |
| CAGE2 | *Carex geyeri* | Geyer’s sedge |
| ACLE9 | *Achnatherum lettermanii* | Letterman’s needlegrass |
| AMAL2 | *Amelanchier alnifolia* | Saskatoon serviceberry |
| PUTR2 | *Purshia tridentata* | Antelope bitterbrush |
| RONE | *Robinia neomexicana* | New Mexico locust |
| PRVI | *Prunus virginiana* | Chokecherry |

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

Disturbance Description

The primary disturbance mechanism is mixed-severity fire resulting in top-kill and rare mortality. Gambel oak respond to fire with vigorous sprouting from the root crown. Larger forms may survive low-intensity surface fire. Extended drought also contributes to disturbance.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 51 | 78 |  |  |
| Moderate (Mixed) | 175 | 22 |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 39 | 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

Scale ranges from tens to thousands of acres

Adjacency or Identification Concerns

This BpS is characterized by >80% Gambel oak. This type merges with the mountain shrub systems at lower elevations and intermingles with the deciduous woodland systems at higher elevations and/or northern exposures.

Issues or Problems

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 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0.5-1.0 | A | A | B | B | B | B | B | B | B | B |
| Shrub | 1.0-3.0 | A | A | C | C | C | C | C | D | D | D |
| Shrub | >3.0 | A | A | C | C | C | C | C | D | D | D |
| Tree | 0-5 | D | D | D | D | D | UN | UN | UN | UN | UN |
| Tree | 5-10 | D | D | D | D | D | UN | UN | UN | UN | UN |
| Tree | 10-25 | D | D | D | D | D | UN | UN | UN | UN | UN |
| Tree | 25-50 | D | D | D | D | D | UN | UN | UN | UN | UN |
| Tree | >50 | D | D | D | D | D | 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 7 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUGA | Quercus gambelii | Gambel oak | Upper |

Description

Post-replacement sprouts to approximately 2ft high. Dense resprouting with high number of stems per acre. Abundant grass and forb cover.

*Maximum Tree Size Class*  
No Data

Class B 47 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUGA | Quercus gambelii | Gambel oak | Upper |

Description

Three to 6ft tall to 3in DBH. Stem mortality due to competition, with slight decrease in understory species due to shading. Grass and forbs declining.

*Maximum Tree Size Class*  
No data

Class C 17 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUGA | Quercus gambelii | Gambel oak | Upper |
| ARTRV | Artemisia tridentata ssp. vaseyana | Mountain big sagebrush | None |
| CAGE2 | Carex geyeri | Geyer’s sedge | None |

Description

More than 6ft tall and >3in DBH. Small stands cover <30m, with open canopy, and usually scattered throughout a grassland or shrub type (Brown 1958).

*Maximum Tree Size Class*  
No data

Class D 29 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUGA | Quercus gambelii | Gambel oak | Upper |

Description

More than 6ft tall and 3in DBH. Nearly continuous canopy cover (2ha+), with only occasional openings (Brown 1958).

*Maximum Tree Size Class*  
No data

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:CLS | 4 |
| Mid1:CLS | 5 | Late1:CLS | 44 |
| Late1:OPN | 5 | Late1:CLS | 44 |
| Late1:CLS | 45 | 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** |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.02 | 50 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.025 | 40 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.017 | 59 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.013 | 77 | Yes | 0 |
| Mixed Fire | Late1:CLS | Late1:OPN | 0.02 | 50 | Yes | 0 |

References

Brown, H.E. 1958. Gambel oak in West-central Colorado. Ecology 39: 317-327

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

Simonin, K.A. 2000. Quercus gambelli in Fire Effects Information System [Online]. USDA Forest Service, Rocky Mountain Research Station, Forestry Sciences Laboratory (producer). Www.fs.fed.us/database/feis/ [2004, October 28].