11070

Rocky Mountain Gambel Oak-Mixed Montane Shrubland

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Shrubland

Map Zones

23, 24

Geographic Range

Gambel oak occurs primarily in CO, NM, UT, AZ and southeastern WY. In the southern extent of its distribution, Gambel oak occupies a minor role as an associate with ponderosa pine and mixed conifer habitats. Moving north, long-lived Gambel oak clones form dominant to mono-typic overstories (Simonin 2000).

Biophysical Site Description

In CO, Gambel oak occurs between 6000-9000ft on all aspects. At higher elevations it is more predominant on southern exposures. Gambel oak is typically a riparian species in northern NM, occurring from 6580-8080ft within the Black and Sacramento Mountain ranges. In southern NM, Gambel oak is found on south-facing montane aspects. AZ Gambel oak occurs as a shrub thicket or as a tree throughout the ponderosa pine habitat at elevations ranging from 8000-8600ft. In UT, Gambel oak is a dominant species in the central UT mountain brush zone at 6500-7800ft on southern exposures. On northern exposures Gambel oak shares dominance with bigtooth maple or is completely replaced by bigtooth maple. (Simonin 2000).

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 |
| STLE4 |  |  |

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

Disturbance Description

Fire regime group IV or III. The primary disturbance mechanism is replacement fire, resulting in >75% top-kill. Gambel oak responds 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 | 52 | 74 |  |  |
| Moderate (Mixed) | 153 | 26 |  |  |
| 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 10 to 1000s of acres

Adjacency or Identification Concerns

This BpS is characterized by >80% Gambel oak. This type merges with the mountain shrub communities at lower elevations and intermingles with deciduous woodland BpS 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 | B | B | B | B | B | D | D | D |
| Shrub | >3.0 | A | A | B | B | B | 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 8 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CAGE2 | Carex geyeri | Geyer's sedge | Lower |
| STLE4 | Stipa lettermanii Vasey | Letterman's needlegrass | Lower |
| QUGA | Quercus gambelii | Gambel oak | Upper |
| SYOR2 | Symphoricarpos oreophilus | Mountain snowberry | Upper |

Description

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

Upper Layer Lifeform is not the dominant lifeform. Grasses may dominate for the early part of this class. Sprouting shrubs will recover relatively quickly.

*Maximum Tree Size Class*  
None

Class B 46 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUGA | Quercus gambelii | Gambel oak | Upper |
| CAGE2 | Carex geyeri | Geyer's sedge | Lower |
| STLE4 | Stipa lettermanii Vasey | Letterman's needlegrass | Lower |

Description

Oak 3-6ft tall to 3in dbh. There will be some stem mortality due to competition and self-thinning, with slight decrease in understory species due to shading. Grass and forbs declining.

*Maximum Tree Size Class*  
None

Class C 13 Late Development 2 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUGA | Quercus gambelii | Gambel oak | Upper |
| ARTRV | Artemisia tridentata ssp. vaseyana | Mountain big sagebrush | Middle |
| CAGE2 | Carex geyeri | Geyer's sedge | Lower |

Description

Greater than six feet tall and less than three inches DBH. Small stands <30m across usually scattered throughout a grassland or shrub type (Brown 1958).

*Maximum Tree Size Class*  
None

Class D 33 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUGA | Quercus gambelii | Gambel oak | Upper |
| CAGE2 | Carex geyeri | Geyer's sedge | Lower |
| STLE4 | Stipa lettermanii Vasey | Letterman's needlegrass | Lower |
| ACAG | Achillea ageratifolia | Yarrow | Lower |

Description

Greater than six feet tall and three inches DBH. Nearly continuous stand two or more hectares in size with only occasional openings (Brown 1958).

*Maximum Tree Size Class*  
None

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 |
| Late2:OPN | 45 | Late1:CLS | 69 |
| Late1:CLS | 46 | 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:CLS | Early1:ALL | 0.013 | 77 | Yes | 0 |
| Mixed Fire | Late1:CLS | Late2:OPN | 0.02 | 50 | Yes | 0 |
| Replacement Fire | Late2:OPN | Early1:ALL | 0.017 | 59 | 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].