

## ALPINE VASCULAR FLORA OF BUFFALO PEAKS, MOSQUITO RANGE, COLORADO, USA

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### ABSTRACT

The alpine flora of the Buffalo Peaks, twin volcanic mountains in the Mosquito Range of central Colorado, was surveyed during the summers of 1994 and 1995. A total of 173 species from 32 families and 99 genera were collected, including two species endemic to Colorado and one not native to North America.

Vascular plant diversity surveys are an important prelude to many types of ecological and systematic research, including basic natural history knowledge (Kass 1988), flora preparation (Stuessy 1990), monographic revision (Stuessy 1990), and phytogeographic analysis (Weber 1965; Raven and Axelrod 1974; Taylor 1977; Billings 1978; Harper et al. 1978; Hadley 1987). Floristic surveys are also vital for the location of rare species (O’Kane 1988) and serve as baseline data for monitoring the disappearance of native plants and the encroachment of exotics (Snow 1995).

This research surveyed the alpine vascular flora of the Buffalo Peaks, twin mountains within central Colorado’s Mosquito Range. Although nearby areas such as the Sawatch Range (Hartman and Rottman 1988) and the Mt. Bross massif (Hartman and Rottman 1985) have been previously studied, the Buffalo Peaks themselves have never been systematically surveyed (Weber 1990). The Mosquito Range is known for its high alpine plant diversity (Weber 1990), yet the Buffalo Peaks are volcanic in origin in a range otherwise consisting of sedimentary and intrusive igneous rocks (Chronic and Chronic 1972). Consequently, this area may contain a unique flora of high floristic significance.

*Study area.* The Buffalo Peaks are high, rounded summits located east of the Continental Divide within the Mosquito Range of central Colorado. Lying within the Buffalo Peaks Wilderness Area (San Isabel and Pike National Forests), the twin peaks are located 16.1 km north and 1.6 km east of Buena Vista (Chaffee County), at a latitude of 38 degrees 59 minutes 0 seconds North and a longitude of 106 degrees 7 minutes 25 seconds West (Sections 21 and 22, Township 12 South, Range 78 West). The twin peaks are rounded in profile, have relatively high elevations (West Buffalo Peak is 4066 m, East Buffalo Peak is 4055 m), and consequently have extensive areas of alpine tundra. Lying to the east of the Sawatch Range (the highest range in the Central Rocky Mountains) and hence in its rain shadow, the Buffalo Peaks are probably dryer than would be expected given their fairly lofty elevations.

Topographically, the Buffalo Peaks region consists of a broad rounded ridge with two major and three minor summits. From west to east these summits are “Mt. Columbine” (an unnamed 3699 m peak on the U.S.G.S. topographic maps), “Mt. Bluebird” (unnamed 3694 m peak), “Pika Peak” (unnamed 3938 m summit), West Buffalo Peak (4066 m), and East Buffalo Peak (4055 m). Extending to the northeast from East Buffalo Peak is the “Great Plateau”, an unnamed plateau largely above treeline whose summits range from 3846 m to 3855 m.

The south- and west-facing slopes lose their winter snow relatively early (late June in 1995) and have a fairly gentle topography. Conversely, the north- and east-facing slopes retain snow much longer (into late July in 1995) and have been glacially eroded into much steeper topography.

Structurally, the Mosquito Range is a highly asymmetrical anticline, sloping gently on the east and sharply on the west (Chronic and Chronic 1972). The range crest, which includes four 4,268 m peaks, is primarily capped with fossiliferous Paleozoic sedimentary rocks. However, a few of the higher peaks consist of quite different rock types, including Mt. Bross and Mt. Lincoln (Lincoln Porphyry, a Tertiary intrusive) and Quandary Peak (Precambrian granite) (Chronic and Chronic 1972).

The Buffalo Peaks themselves are two highly eroded volcanoes (Chronic and Chronic 1972) primarily composed of Tertiary andesitic lava and ash flows (Chronic 1980). The upper portions of both West and East Buffalo Peaks consist of the Buffalo Peak Andesite, an Oligocene brownish-gray augite-hornblende andesite (Scott 1975). The lower portions are mainly composed of a white, pinkish-gray, gray, or reddish-brown nonwelded to densely welded pumiceous ash-flow, air-fall, or water-laid tuff (Scott 1975). This formation is covered in many places, however, by thick talus consisting primarily of large angular blocks of Buffalo Peak Andesite (Scott 1975). In addition, the north-facing col between the West and East Peak is covered by a rock glacier dating from the Pinedale Glaciation which may contain an icy center (Scott 1975).



No weather data exist for the Buffalo Peaks region itself. However, there are weather stations at Buena Vista (2418 m), located 17.7 km south of West Buffalo Peak, and at Climax (3454 m), located 41.9 km north and 6.4 km west of West Buffalo. The latter station lies in the northern Mosquito Range and is probably closer in climate to the study site.

The most concentrated collecting activity at Buffalo Peaks was during the period of June, July, August, and September in 1995. Data from Climax indicate that the mean temperatures during these months were 41.1°, 48.3°, 52.5°, and 42.6°F, respectively (NOAA 1995). Temperatures fell below freezing 27 days in June, 16 days in July, zero days in August, and 23 days in September. Total precipitation during this four month period was 5.22 inches, 1.52 below normal. This was partially compensated by heavy winter snowfall which lingered late into June (Seagrist and Taylor personal observation).

At Buena Vista, closer geographically but at a much lower elevation, no data existed for June 1995. However, mean temperatures for July, August, and September were 61.1°, 64.2°, and 53.8°F (NOAA 1995). There were zero days below freezing in July and August and only 8 in September. Total precipitation during the three-month period was 4.22 inches, 0.67 inches below normal.

#### METHODS

Collections of vascular plants were made during June, July, and August in 1994 and during June, July, August, and September in 1995. Collections were made within the alpine zone only, defined here as including the krummholz and all habitats located at higher elevations. Specimens were collected, placed inside plastic bags to prevent drying, and transported back to the Rocky Mountain Biological Laboratory in Gothic, CO. They were then identified, pressed, dried, and mounted using accepted herbarium techniques (Liesner n.d.). Identifications were done by the authors using Harrington (1954), Weber (1990), Weber and Wittman (1996), and Welsh et al. (1993). Nomenclature follows Weber and Wittman (1996). Specimens were deposited at RMBL.

#### PLANT COMMUNITIES

**Krummholz.** Krummholz is located at elevations ranging from 3,537 m to 3,720 m on all slopes of the Buffalo Peaks region. This habitat is defined by the presence of wind- and cold-stunted *Picea engelmannii* Parry ex Engelmann and *Abies bifolia* A. Murray. At Buffalo Peaks, dwarfed *Populus tremuloides* Michaux are also present in large numbers, as are *Pinus aristata* Engelmann, *Pinus flexilis* James, and *Pinus contorta* Douglas. The major groves of *Pinus aristata* are located on the east-facing slopes of the Great Plateau at elevations of

about 3700 m and on the southeast-facing slopes of East Buffalo Peak at about 3600 m. Characteristic plant species include *Pseudocymopterus montanus* (A. Gray) Coulter & Rose, *Mertensia ciliata* (James ex Torrey) G. Don, *Erysimum capitatum* (Douglas) Greene, *Noccaea montana* (L.) F.K. Meyer, *Juniperus communis* L., *Frasera speciosa* Douglas ex Grisebach, *Ribes montigenum* McClatchie, *Delphinium barbeyi* (Huth) Huth, *Polemonium pulcherrimum* Hooker ssp. *delicatum* (Rydberg) Brand, *Ranunculus inamoenus* Greene, *Salix glauca* L., *Salix geyeriana* Andersson, *Salix planifolia* Pursh, *Micranthes rhomboidea* (Greene) Small, *Castilleja occidentalis* Torrey, and *Penstemon whippleanus* A. Gray.

**Shrub tundra.** Shrub tundra is defined by the presence of various *Salix* species, including *Salix geyeriana*, *S. glauca*, and *S. planifolia*. At Buffalo Peaks, this habitat is primarily located in the col between Mt. Bluebird and Pika Peak at an elevation of approximately 3,689 m. Other common plant species include *Pseudocymopterus montanus*, *Mertensia ciliata*, *Erysimum capitatum*, *Noccaea montana*, *Ribes montigenum*, *Psychrophila leptosepala* (De Candolle) W. A. Weber, *Lloydia serotina* (L.) Salisbury ex Reichenbach, *Bistorta bistortoides* (Pursh) Small, *Pulsatilla patens* (L.) P. Miller, *Ranunculus eschscholtzii* Schlechtendal, and *Micranthes rhomboidea* (Greene) Small.

**Fellfield.** Fellfield is a habitat consisting of large, fairly solid rock fragments interspersed with dry tundra vegetation. It is located on the summits of Mt. Columbine (3699 m), Mt. Bluebird (3694 m), Pika Peak (3938 m), West Buffalo Peak (4066 m), East Buffalo Peak (4055 m), and the Great Plateau (3846 m to 3855 m). Characteristic plant species include *Oreoxis alpina* (A. Gray) Coulter & Rose, *Artemisia scopulorum* A. Gray, *Erigeron compositus* Pursh, *Rydbergia grandiflora* (Torrey & Gray) Greene, *Taraxacum ovinum* Greene, *Cystopteris fragilis* (L.) Bernhardt, *Eritrichum aretoides* (Chamisso), *Erysimum capitatum*, *Noccaea montana*, *Sambucus microbotrys* Rydberg, *Ribes montigenum*, *Phlox condensata* (A. Gray) E. Nelson, *Polemonium confertum* A. Gray, *Claytonia megarhiza* (Parry ex A. Gray), *Androsace septentrionalis* L., *Primula angustifolia* Torrey, *Ranunculus macauleyi*, *Acomastylis rossii* (R. Brown) Greene, and *Pentstemon floribunda* (Pursh) Löve.

**Wet meadows.** Wet meadows, defined by the presence of standing water or boggy soil during most of the growing season, are rare at Buffalo Peaks. They are located at only a few scattered locations, usually on north- and east-facing slopes near patches of melting or recently melted snow fields. Characteristic species include *Clementsia rhodantha* (A. Gray) Rose, *Rhodiola integrifolia* Rafinesque, *Gentianella acuta* (Michaux) Hiitonen, *Psychrophila leptosepala*, *Trollius albiflorus* (A. Gray) Rydberg, *Polemonium confertum*, *Potentilla*



*rubricaulis* Lehmann, *Heuchera parvifolia* Nuttall ex Torrey & Gray var. *nivalis* (Rosendahl) Löve et al., *Castilleja occidentalis*, and *Pedicularis groenlandica* Retzius.

**Dry meadows.** Dry meadows are ubiquitous at the Buffalo Peaks, being found on most areas above treeline at elevations ranging from 3,659 m to 4,066 m. Common plants species found in this habitat include *Cerastium beeringianum* Chamisso & Schlechtendol, *Cerastium strictum* L. emend Haenke, *Oreoxis alpina*, *Pseudocymopterus montanus*, *Cirsium scopulorum* (Greene) Cockerell, *Rydbergia grandiflora*, *Eritrichum aretoides*, *Boechera drummondii* (A. Gray) Löve & Löve, *Erysimum capitatum*, *Nocca montana* *Astragalus alpinus* L., *Ribes montigenum*, *Aquilegia coerulea* James ex Torrey, *Aquilegia saximontana* Rydberg ex B. L. Robinson in A. Gray, *Phlox condensata* (A. Gray) E. Nelson, *Polemonium viscosum* Nuttall, *Oreobroma pygmaea* (A. Gray) T. J. Howell, *Androsace septentrionalis* L., *Primula angustifolia*, *Pulsatilla patens*, *Acomastylis rossii*, *Dryas octopetala* L. ssp. *hookeriana* (Jozepczuk) Hultén, *Ivesia gordonii* (Hooker) Torrey & Gray, *Ciliaria austromontana* (Wiegand) W. A. Weber, *Heuchera parvifolia* var. *nivalis*, *Micranthes rhomboidea*, *Besseyia alpina* (A. Gray) Rydberg, *Castilleja occidentalis*, *Pedicularis parryi* A. Gray, *Penstemon hallii* A. Gray, *Penstemon harbourii* A. Gray, *Penstemon whippleanus*, and *Valeriana capitata* Pallas ex Link ssp. *acutiloba* (Rydberg) F. G. Meyer.

## RESULTS

The alpine flora of the Buffalo Peaks consists of 173 species distributed across 32 families, including 1 family, 1 genus, and 1 species of pteridophytes, 2 families, 4 genera, and 6 species of gymnosperms, and 29 families, 94 genera, and 166 species of angiosperms. The largest families include the Asteraceae with 39 species, the Poaceae (21 species), the Rosaceae (12 species), and the Brassicaceae (10 species).

Two species endemic to Colorado were found at Buffalo Peaks, *Ligularia amplexans* (A. Gray) W. A. Weber (Asteraceae) and *Polemonium confertum* (Scrophulariaceae) (Weber and Wittmann 1992, 1996). One exotic species, *Artemisia biennis* Willdenow (Asteraceae), was also collected (Weber and Wittmann 1996).

*Polemonium confertum* is a species endemic to Colorado that had been located at only a few scattered locations prior to our study (Grant 1989). The authors' work has extended the range of this species to include North Italian Mountain, West Hasley Ridge, Frigid Air Pass, Maroon Peak, and Pyramid Peak in the Elk Range and East Buffalo Peak and the Great Plateau in the Buffalo Peaks region of the Mosquito Range (Seagrist and Taylor 1996, Taylor personal observation).

Bristlecone pines (*Pinus aristata*) were common

at scattered locations within the Buffalo Peaks, with the heaviest concentrations lying on the southern slopes of East Buffalo Peak and on the northeast slopes of the Great Plateau. Brunstein (1993) reports that 14 individual bristlecone pines have been located on National Forest land near South Park (just east of Buffalo Peaks) that have been dated to greater than 1600 years of age; the oldest is at least 2436 years old. The Buffalo Peaks' bristlecones may or may not be this ancient, but these groves are nonetheless worthy of high conservation priority and protection.

## DISCUSSION

The total of 173 species collected at Buffalo Peaks compares well with studies from comparable alpine sites in Colorado. A total of 289 species have been reported from sixteen sites in the Sawatch Range (Hartman and Rottman 1988), 220 species from eight basins in the Ruby Range (Hartman and Rottman 1987), 197 species from three basins in the San Juan Mountains (Hartman and Rottman 1985b), and 167 species from the Mt. Bross massif in the northern Mosquito Range (Hartman and Rottman 1985a). It is noteworthy that our total of 173 species compares best with the 167 species collected from Mt. Bross. Not only are both Mt. Bross and the Buffalo Peaks located in the Mosquito Range, but both studies collected at only one site; the other cited studies collected from multiple sites within a single range.

It must be noted that the two years of our study were exceptional in terms of weather. The summer of 1994 was quite dry, due both to low snowfall the previous winter and to low rainfall in June and July. The flowering season in 1995 began late due to a very heavy snowfall the previous winter. Much of the alpine zone at Buffalo Peaks was under heavy snow as late as July 1 and most areas didn't become snow-free until a few weeks later (Seagrist and Taylor personal observation). The stresses related to these shortened growing seasons may have negatively impacted the flowering of certain species and consequently we may have undercollected certain plant groups.

## ANNOTATED CATALOG OF VASCULAR TAXA

Nomenclature follows Weber and Wittmann (1996).

### Alsiniaceae

*Cerastium beeringianum* Chamisso & Schlechtendal ssp. *earlei* (Rydberg) Hultén; dry meadow, krummholz.

*Cerastium strictum* L. emend. Haenke; krummholz, dry meadow.

*Eremogone fendleri* (A. Gray) Ikonnikov; krummholz, dry meadow, shrub tundra.

*Lidia obtusiloba* (Rydberg) Löve & Löve; dry meadow.



*Paronychia pulvinata* A. Gray; dry meadow.

#### Apiaceae

*Angelica grayi* (Coulter & Rose) Coulter & Rose; dry meadow, krummholz.

*Oreoxis alpina* (A. Gray) Coulter & Rose; fellfield, dry meadow.

*Pseudocymopterus montanus* (A. Gray) Coulter & Rose; krummholz, shrub tundra, dry meadow.

#### Asteraceae

*Achillea lanulosa* Nuttall var. *alpicola* Rydberg; krummholz, dry meadow.

*Agoseris glauca* (Pursh) Rafinesque; krummholz.

*Antennaria media* Greene; krummholz.

*Antennaria pulcherrima* (Hooker) Greene ssp. *anaphaloides* (Rydberg) W. A. Weber; krummholz.

*Antennaria rosea* Greene; krummholz, dry meadow.

*Antennaria umbrinella* Rydberg; dry meadow.

*Arnica cordifolia* Hooker; krummholz.

*Arnica mollis* Hooker; shrub tundra.

*Artemisia biennis* Willdenow; krummholz; (non-native).

*Artemisia frigida* Willdenow; dry meadow.

*Artemisia scopulorum* A. Gray; fellfield, krummholz.

*Chrysothamnus parryi* (A. Gray) Greene ssp. *parryi*; krummholz.

*Cirsium hesperium* (Eastwood) Petrak; krummholz.

*Cirsium scopulorum* (Greene) Cockerell; dry meadow, fellfield.

*Erigeron compositus* Pursh; fellfield, dry meadow, krummholz.

*Erigeron elatior* (A. Gray) Greene; krummholz.

*Erigeron leiomerus* A. Gray; dry meadow.

*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronquist; shrub tundra.

*Erigeron pinnatisectus* (A. Gray) A. Nelson; dry meadow.

*Erigeron simplex* Greene; krummholz, dry meadow.

*Erigeron speciosus* (Lindley) De Candolle; krummholz.

*Erigeron ursinus* D. C. Eaton; krummholz.

*Heterotheca villosa* (Pursh) Shinnars; krummholz.

*Ligularia amplexans* (A. Gray) W.A. Weber; krummholz, dry tundra; endemic in Colorado.

*Ligularia pudica* (Greene) W.A. Weber; wet tundra.

*Oreochrysum parryi* (A. Gray) Rydberg; krummholz, dry tundra.

*Packera cana* (Hooker) Weber & Löve; krummholz, dry meadow.

*Packera werneriiifolia* (A. Gray) Weber & Löve; dry meadow.

*Pyrrocoma clementis* Rydberg; dry tundra.

*Rydbergia grandiflora* (Torrey & Gray) Greene; fellfield, dry meadow.

*Senecio atratus* Greene; krummholz, wet tundra.

*Senecio crassulus* A. Gray; krummholz.

*Senecio fremontii* Torrey & A. Gray ssp. *blitoides* (Greene) W.A. Weber; dry meadow.

*Senecio integerrimus* Nuttall; dry meadow, krummholz, wet tundra.

*Solidago simplex* Humboldt, Bonpland, & Kunth var. *nana* (A. Gray) Ringins; dry tundra.

*Taraxacum officinale* G.H. Weber ex Wiggers; dry meadow.

*Taraxacum ovinum* Greene; fellfield.

*Tetraneuris brevifolia* Greene; dry meadow.

*Tonestus pygmaeus* (Torrey & Gray) A. Nelson; krummholz, dry meadow.

#### Athyriaceae

*Cystopteris fragilis* (L.) Bernhardt; fellfield, dry meadow.

#### Boraginaceae

*Eritrichum aretioides* (Chamisso) De Candolle; dry meadow, fellfield.

*Mertensia ciliata* (James ex Torrey) G. Don; krummholz, shrub tundra, dry meadow.

*Mertensia lanceolata* (Pursh) A. De Candolle; fellfield, krummholz, dry meadow.

#### Brassicaceae

*Boechera divaricarpa* (A. Nelson) Löve & Löve; krummholz.

*Boechera drummondii* (A. Gray) Löve & Löve; dry meadow, krummholz, shrub tundra.

*Cardamine cordifolia* A. Gray; krummholz.

*Descurainia incana* (Bernhardtii) Dorn; krummholz.

*Draba albertina* Greene; fellfield.

*Draba aurea* M. Vahl ex Hornemann; dry meadow, fellfield.

*Draba crassifolia* R. Graham; krummholz, shrub tundra.

*Draba spectabilis* Greene; fellfield, dry meadow, krummholz.

*Erysimum capitatum* (Douglas) Greene; dry meadow, fellfield, krummholz, shrub tundra.

*Noccaea montana* (L.) F.K. Meyer; krummholz, wet meadow, shrub tundra, fellfield, dry meadow.

#### Campanulaceae

*Campanula parryi* A. Gray; krummholz.

*Campanula rotundifolia* L.; wet meadow, krummholz.

*Campanula uniflora* L.; dry meadow.

#### Caprifoliaceae

*Sambucus microbotrys* Rydberg; fellfield.

#### Caryophyllaceae

*Gastrollychnis drummondii* (Hooker) Löve & Löve; krummholz.



## Crassulaceae

- Amerosedum lanceolatum* (Torrey) Löve & Löve; dry meadow, krummholz.  
*Clementsia rhodantha* (A. Gray) Rose; wet meadow.  
*Rhodiola integrifolia* Rafinesque; dry meadow, wet meadow, krummholz.

## Cupressaceae

- Juniper communis* L. ssp. *alpina* (J.E. Smith) Cevalakovsky; krummholz.

## Cyperaceae

- Carex albo-nigra* Mackenzie in Rydberg, dry meadow.  
*Carex aquatilis* Wahlenberg; ponds.  
*Carex arapahoensis* Clokey; krummholz.  
*Carex chalciolepis* Holm; shrub tundra, fellfield, krummholz.  
*Carex egglestonii* Mackenzie; shrub tundra, krummholz.  
*Carex elynoides* Holm; dry meadow, krummholz, fellfield.  
*Carex foenea* Willdenow; dry meadow, krummholz.  
*Carex stenophylla* Wahlenberg ssp. *eleocharis* (L.H. Bailey) Hultén; dry meadow.

## Fabaceae

- Astragalus alpinus* L.; dry meadow, krummholz.  
*Oxytropis splendens* Douglas ex Hooker; dry tundra.  
*Trifolium dasyphyllum* Torrey & Gray; krummholz, dry meadow, wet meadow, fellfield.  
*Trifolium nanum* Torrey; dry meadow, fellfield.  
*Trifolium parryi* A. Gray; dry meadow.  
*Trifolium salictorum* Greene ex Rydberg; krummholz, dry meadow.

## Gentianaceae

- Frasera speciosa* Douglas ex Giseback, krummholz, dry meadow.  
*Gentianella acuta* (Michaux) Hiitonen; wet meadow.  
*Gentianodes algida* (Pallas) Löve & Löve; shrub tundra, wet tundra.  
*Pneumonanthe parryi* (Engelmann) Greene; shrub tundra.

## Grossulariaceae

- Ribes montigenum* McClatchie; dry meadow, fellfield, krummholz, shrub tundra.

## Helleboraceae

- Aconitum columbianum* Nuttall ex Torrey & Gray; shrub tundra.  
*Aquilegia coerulae* James ex Torrey; dry meadow, krummholz.

- Aquilegia saximontana* Rydberg ex B. L. Robinson in A. Gray; dry meadow.  
*Delphinium barbeyi* (Huth) Huth; krummholz.  
*Delphinium ramosum* Rydberg; dry meadow.  
*Psychrophila leptosepala* (De Candolle) W. A. Weber; shrub tundra, wet meadow.  
*Trollius albiflorus* (A. Gray) Rydberg; shrub tundra, wet meadow.

## Hydrophyllaceae

- Phacelia sericea* (R. Graham) A. Gray; dry meadow.

## Liliaceae

- Lloydia serotina* (L.) Salisbury ex Reichenbach; dry meadow, krummholz, shrub tundra.

## Melanthiaceae

- Anticlea elegans* (Pursh) Rydberg; krummholz.

## Onagraceae

- Chamerion danielsii* D. Löve; dry meadow.  
*Chamerion subdentatum* (Rydberg) Löve & Löve; krummholz, dry meadow.

## Pinaceae

- Abies bifolia* A. Murray; krummholz.  
*Picea engelmannii* Parry ex Engelmann; krummholz.  
*Pinus aristata* Engelmann; krummholz.  
*Pinus contorta* Douglas Var. *latifolia* Engelmann; krummholz.  
*Pinus flexilis* James ex London; krummholz.

## Poaceae

- Calamagrostis canadensis* (Michaux) P. Beauvois; dry meadow.  
*Calamagrostis purpurascens* R. Brown in Richardson; krummholz.  
*Deschampsia cespitosa* (L.) P. Beauvois; shrub tundra, krummholz, dry meadow.  
*Elymus scribneri* (Vasey) Jones; dry meadow.  
*Elymus trachycaulus* (Link) Gould ex Shinnars ssp. *andinus* (Scribner & Smith) Löve & Löve; dry meadow, krummholz, wet meadow.  
*Festuca arundinacea* Schreber; krummholz.  
*Festuca brachyphylla* Schultes spp. *coloradensis* Frederiksen; dry meadow.  
*Festuca idahoensis* Elmer; krummholz, shrub tundra, dry meadow.  
*Helictotrichon mortonianum* (Scribner) Henrard; dry meadow.  
*Hierochloë hirta* (Schrank) Borbas ssp. *arctica* (J. Presl in K. Aesl) G. Weimarck; krummholz, shrub tundra.  
*Poa abbreviata* R. Brown ssp. *pattersonii* (Vasey) Löve et al; krummholz, shrub tundra.  
*Poa alpina* L.; krummholz.



*Poa arctica* R. Brown; dry meadow.  
*Poa cusickii* Vasey ssp. *epilis* (Scribner) W.A. Weber; dry meadow, krummholz.  
*Poa fendleriana* (Steudel) Vasey; krummholz.  
*Poa glauca* M. Vahl ssp. *rupicola* (Nash) W.A. Weber; dry meadow, shrub tundra, krummholz.  
*Poa leptocoma* Trinius; krummholz.  
*Poa nemoralis* L. ssp. *interior* (Rydberg) W.A. Weber; krummholz, dry meadow.  
*Poa palustris* L.; dry meadow.  
*Poa reflexa* Vasey & Scribner; dry meadow.  
*Trisetum spicatum* (L.) Richter ssp. *congdonii* (Scribner & Merrill) Hultén; krummholz, dry meadow.

#### Polemoniaceae

*Phlox condensata* (A. Gray) E. Nelson; dry meadow, fellfield.  
*Polemonium confertum* A. Gray; wet meadow, fellfield, dry meadow, endemic.  
*Polemonium pulcherrimum* Hooker ssp. *delicatum* (Rydberg) Brand; krummholz.  
*Polemonium viscosum* Nuttall; dry meadow, krummholz.

#### Polygonaceae

*Bistorta bistortoides* (Pursh) Small; krummholz, shrub tundra, fellfield.  
*Eriogonum jamesii* Benth in A. De Candolle; dry meadow.

#### Portulacaceae

*Claytonia megarhiza* (Parry ex A. Gray); fellfield.  
*Oreobroma pygmaea* (A. Gray) T.J. Howell; dry meadow.

#### Primulaceae

*Androsace septentrionalis* L.; dry meadow, fellfield.  
*Primula angustifolia* Torrey; dry meadow, fellfield.  
*Primula parryi* A. Gray; krummholz.

#### Ranunculaceae

*Anemonastrum narcissiflorum* (L.) Holub ssp. *zephyrum* (A. Nelson) W.A. Weber; fellfield, krummholz.  
*Pulsatilla patens* (L.) P. Miller ssp. *multifida* (Pritzel) Zamels; krummholz, dry meadow, shrub tundra.  
*Ranunculus eschscholtzii* Schlechtendal; shrub tundra, dry meadow.  
*Ranunculus inamoenus* Greene; krummholz.  
*Ranunculus macauleyi* A. Gray; dry meadow, fellfield.

#### Rosaceae

*Acomastylis rossii* (R. Brown) Greene ssp. *turbinata* (Rydberg) W.A. Weber; dry meadow, fellfield.

*Dryas octopetala* L. ssp. *hookeriana* (Juzepczuk) Hultén; dry meadow.  
*Fragaria vesca* L. ssp. *bracteata* (Heller) Staudt; fellfield, dry meadow, krummholz.  
*Ivesia gordonii* (Hooker) Torrey & Gray; dry meadow.  
*Pentaphylloides floribunda* (Pursh) Löve; fellfield, dry meadow, wet meadow.  
*Potentilla concinna* Richardson; krummholz, dry meadow, fellfield.  
*Potentilla diversifolia* Lehmann; fellfield, dry meadow, krummholz, shrub tundra.  
*Potentilla nivea* L.; dry meadow.  
*Potentilla pensylvanica* L. var. *paucijuga* (Rydberg) Welsh & Johnston; dry meadow.  
*Potentilla pulcherrima* Lehmann; fellfield, krummholz.  
*Potentilla rubricaulis* Lehmann; krummholz, shrub tundra, wet meadow, dry meadow.  
*Potentilla subjuga* Rydberg; fellfield, dry meadow, krummholz.

#### Salicaceae

*Populus tremuloides* Michaux; krummholz.  
*Salix brachycarpa* Nuttall; dry meadow.  
*Salix drummondiana* Barratt; shrub tundra.  
*Salix geyeriana* Andersson; krummholz, shrub tundra.  
*Salix glauca* L.; krummholz, shrub tundra.  
*Salix planifolia* Pursh; krummholz, shrub tundra.

#### Saxifragaceae

*Ciliaria austromontana* (Wiegand) W.A. Weber; dry meadow.  
*Heuchera parvifolia* Nuttall ex Torrey & Gray var. *nivalis* (Rosendahl) Löve et al.; wet meadow, dry meadow, krummholz.  
*Micranthes rhomboidea* (Greene) Small; shrub tundra, dry meadow, fellfield, krummholz.

#### Scrophulariaceae

*Besseyia alpina* (A. Gray) Rydberg; dry meadow.  
*Castilleja occidentalis* Torrey; wet meadow, dry meadow, krummholz.  
*Pedicularis groenlandica* Retzius; krummholz, wet meadow.  
*Pedicularis parryi* A. Gray; dry meadow.  
*Penstemon hallii* A. Gray; krummholz, dry meadow.  
*Penstemon harbourii* A. Gray; dry meadow.  
*Penstemon whippleanus* A. Gray; dry meadow, krummholz.  
*Veronica nutans* Bongard; krummholz.

#### Valerianaceae

*Valeriana capitata* Pallas ex Link ssp. *acutiloba* (Rydberg) F. G. Meyer; dry meadow.



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