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## ALPINE VASCULAR FLORA OF THE RUBY RANGE, WEST ELK MOUNTAINS, COLORADO

Emily L. Hartman and Mary Lou Rottman<sup>1</sup>

**ABSTRACT.**—The Ruby Range is a northern extension of the West Elk Mountains of west central Colorado. Composed primarily of sedimentary rocks, the range is heavily faulted and intruded by many dikes and sills. Eight study areas, selected as representative of the major topographic features of the range, were analyzed floristically. A vascular flora of 220 species in 111 genera and 35 families is reported. The phytogeographic distribution of the flora is primarily alpine and western North American. The flora of the Ruby Range shows a 74% similarity to the flora of the San Juan Mountains to the southwest.

The Ruby Range, a northern extension of the West Elk Mountains (Prather 1982) of west central Colorado, is west of the Continental Divide between 107 degrees 05 minutes and 107 degrees 07 minutes West longitude and 38 degrees 52 minutes and 39 degrees North latitude. This discrete range extends 15.2 km northward from its southern boundary, 18.5 km northwest of Crested Butte, Gunnison County. In outline the range resembles the letter *h* with the vertical line being formed on the west by a series of 11 mountain peaks ranging in elevation from 3,573 to 3,982 m. The curved part of the letter represents an escarpment and its southeastern terminus ranges from 3,664 to 3,780 m. Glacial effects are evident in the present alpine landscape as cirques, tarns, hanging valleys, basins, rock steps, and broad U-shaped valleys in the lower elevations.

The Ruby Range is composed primarily of sedimentary rocks intruded by many dikes and sills. The sedimentary formations include: Mancos Shale, a silty marine shale interbedded with silty sandstone, sandy limestone, and carbonaceous shale of Upper Cretaceous age in the north; Mesa Verde, interbedded sandstone, shale, coal, and carbonaceous shale of Upper Cretaceous age in the central part; and Wasatch, evenly bedded sandstone, siltstone, and conglomerate of Eocene age in the south. The Mancos Shale is locally metamorphosed to hornfels, whereas the Wasatch is generally metamorphosed to quartzite, argillite, and silty and argillaceous hornfels. A large number of dikes and sills

composed of either quartz monzonite porphyry, granodiorite porphyry, or dacite porphyry are intruded into the sedimentary formations. Stocks of quartz monzonite porphyry form the summits of four of the mountains in the range (Gaskill et al. 1967). There are numerous fault zones and talus deposits in the range. A floristic study of the subalpine and alpine zones in Robinson Basin was made by Bathke (1968).

Collections were made in the Ruby Range during the summers 1980–1985. Nomenclature in the checklist follows Kartesz and Kartesz (1980). Voucher specimens are deposited in CU-Denver. Phytogeographic abbreviations used in the annotated checklist of vascular species are identified in the discussion section.

### STUDY AREAS

Eight study areas representative of the major topographic features and distributed throughout the length of the Ruby Range were selected. Northeast-facing cirque basins of Mount Owen, Purple Peak, and Augusta Mountain are the highest in elevation, ranging from 3,660 to 3,843 m. Baxter, Robinson, and Redwell basins are drainage basins of the Slate River, a tributary of the Gunnison River. The elevational range of the upper parts of these basins is 3,556 to 3,599 m. Scarp Ridge, a northwest-southeast-trending escarpment ranges in elevation from 3,664 to 3,725 m. The south- and southwest-facing convex slopes of Mount Emmons, which forms the southeast

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terminus of Scarp Ridge, range in elevation from 3,698 to 3,780 m.

Climatic data are lacking from the study area. The nearest U.S. Weather Bureau station is Crested Butte at 2,701 m elevation to the east. Only generalized climatic information for the Ruby Range can be extrapolated from this station. Two precipitation maxima occur: July to September, and January (Langenheim 1962). Heavy snowfall in the winter renders the area inaccessible from November through June. Permanent snowbanks are common on northeast-facing exposures in the higher elevations. The prevailing winds are from the west and southwest. Wind velocities approaching 92 kph are not uncommon in the alpine throughout the summer (Bathke 1968).

## PLANT COMMUNITIES

### Meadow Communities

The moist meadow community type is most representative of the tundra in the Ruby Range. This contrasts with the predominant dry meadows of the Front Range and correlates with the San Juan Mountains which, like the Ruby Range, experience a higher moisture regime (Hartman and Rottman 1985). In many places the uniformity of the turf meadow is interrupted by talus deposits and tailings associated with old mining activity. Moist meadow communities on slopes are dominated by *Deschampsia caespitosa* and *Geum rossii* var. *turbinatum*; whereas *Carex nigricans* and *Juncus drummondii* dominate the community type in flat areas.

Dry meadow communities occur on steep, rocky, convex slopes which experience early snowmelt or adjacent to bedrock outcrops. The most frequent dominants include *Agropyron trachycaulum* var. *latiglume*, *Danthonia intermedia*, *Geum rossii* var. *turbinatum*, and *Ivesia gordonii*. *Kobresia myosuroides*, the overwhelming dominant of dry meadows and climatic climax species of the Front Range (Marr 1961, Eddleman and Ward 1984), is highly restricted in occurrence in the Ruby Range. Langenheim (1962) found the same to be true in the adjacent Elk Mountains near Crested Butte. *Carex chlynoides*, a dry meadow dominant and substitute for *Kobresia* in the San Juan Mountains (Hartman and Rottman 1985), is restricted in occurrence to fellfields in the Ruby Range.

The dominants found in wet meadows adjacent to ponds are *Caltha leptosepala*, *Carex illota*, and *Carex praeceptorum*. On slopes and in association with rivulets the wet meadow dominants are *Caltha leptosepala* and *Corydalis caseana* ssp. *brandegii*.

### Fellfield Community

Fellfields are restricted to ridgetops and the top surface of bedrock outcrops. This community type may show a lack of dominants or may have *Ivesia gordonii* as the dominant species. The typical fellfield cushion plant community, dominated by *Paronychia pulvinata* and *Phlox caespitosa* ssp. *condensata*, on windswept sites of the Front Range (Cox 1933, Eddleman and Ward 1984) and Sangre de Cristo Range (Soil Conservation Service 1979) is absent in the Ruby Range.

### Talus Community

Talus communities in the Ruby Range, like those of the Mosquito Range (Hartman and Rottman 1985), are characterized by a lack of dominants and a high diversity of total species present, reflecting the opportunistic nature of many tundra species (Schaack 1983). Any number of 83 species may be found in various talus communities.

### Krummholz Community

Timberline, in the form of krummholz, is variable ranging from 3,538 to 3,729 m with the lower elevations found on easterly exposures and the higher on southerly exposures. This ecotonal community has representative species from both the alpine and subalpine zones. Krummholz conifers, *Abies lasiocarpa* and *Picea engelmannii*, are equally co-dominant.

### Shrub Tundra Community

The shrub tundra community is very patchy and restricted to moist depressions and drainage areas. This community is dominated by thickets of *Salix brachycarpa* and *Salix glauca* var. *villosa* which exert a primary influence on the surrounding environment and associated species.

## DISCUSSION

The alpine flora of the Ruby Range consists of 220 vascular plants: 213 species represent-

ing 104 genera of angiosperms, 3 genera and 3 species of gymnosperms, and 4 genera and 4 species of pteridophytes. The family with the greatest number of species is Asteraceae with 34 species. Other families with a large representation are Cyperaceae, Poaceae, Brassicaceae, Caryophyllaceae, Saxifragaceae, and Rosaceae with 23, 19, 17, 15, 12, and 11 taxa, respectively.

In comparing the seven leading families found in the Ruby Range to those found in the San Juan Mountains, southwestern Colorado (Hartman and Rottman 1985); Mosquito Range, north central Colorado (Hartman and Rottman 1985); and Indian Peaks area of the Front Range, northern Colorado (Komarkova 1976), only the exclusion of the Scrophulariaceae and inclusion of the Rosaceae are noted; however, the rank order varies somewhat with each range. Although there is a tendency to emphasize differences in community structure and dominants in this study and other studies in Colorado, much similarity is seen in the floristic inventories from the various areas. The greatest similarity, 74%, occurs between the Ruby Range and the San Juan Mountains and a slightly lower 70% with the Indian Peaks area of the Front Range. The lowest similarity in vascular plant inventories, 66%, occurs between this study and the Mosquito Range.

#### Phytogeography

Table 1 shows the phytogeographic distribution of the flora. Four elements are recognized, each of which may be combined with more specific geographic subelements (Komarkova 1976). Several of these subelements should be defined. The Rocky Mountains subelement includes the Northern Rocky Mountain province south to the Laramie Basin in Wyoming. The Southern Rocky Mountains subelement includes southern Wyoming, Colorado, New Mexico, and Arizona. The Colorado subelement represents species which are endemic to Colorado. Phytogeographic determinations for taxa are taken from Porsild (1957), Weber (1965), Munz and Keck (1970), Komarkova (1976), Cronquist et al. (1977), Porsild and Cody (1980), and Moss (1983).

As may be seen from the percentages given, the largest part of the vascular flora is made up of alpine species (35.5%) and western North

TABLE 1. Affinities of the flora elements in the Ruby Range, Colorado. Abbreviations following each unit are cited in the annotated checklist.

Element	Abbreviation	Percent of taxa
<b>ELEMENT</b>		
Boreal montane	BM	24.1
Montane	M	16.8
Arctic alpine	AA	23.6
Alpine	A	35.5
<b>GEOGRAPHIC SUBELEMENT</b>		
Circumpolar	C	17.7
North American	NA	12.3
Western North American	WNA	32.3
Rocky Mountains	RM	14.5
Southern Rocky Mountains	SRM	11.8
Colorado	CO	1.4
North American-Asiatic	NAA	8.6
North American-European	NAE	1.4

American species (32.3%). The circumpolar subelement (17.7%), which is closely identified with the arctic-alpine element, is a second important component of the flora. With the exception of seven species, the North American-Asiatic subelement is linked also with the arctic-alpine element. In the montane element the Rocky Mountain species are nearly double the Southern Rocky Mountain species, whereas the latter two are nearly equal in the alpine element. A stronger affinity between the Ruby Range alpine flora and the Asiatic alpine flora than to the European alpine flora is indicated by the higher percentage of North American-Asiatic species (8.6%) in relation to North American-European species (1.4%). This appears to be the case in all ranges of Colorado studied floristically.

A comparison of phytogeographic analyses of the Ruby Range shows a higher boreal-montane and montane representation and a concomitantly lower arctic-alpine representation in this study than in the San Juan Mountains (Hartman and Rottman 1985). This same trend is seen in the Mosquito Range comparison (Hartman and Rottman 1985). The western North American subelement is higher, however, in the Ruby Range than in either the San Juan Mountains or Mosquito Range. There is less than 0.2% difference in the Southern Rocky Mountain species between all three mountain ranges.

A comparison of the phytogeographic analyses of this study with the Indian Peaks area of the Front Range, northern Colorado

(Komarkova 1976), indicates a decrease in the number of arctic-alpine (5.4%) and alpine (5.0%) species. Among the subelements there is a decrease in circumpolar (8.1%) and North American-Asiatic (2.1%) species and a small increase (3.7%) in western North American species.

### Colorado Endemics

There are only three endemic species, Colorado subelement, found in the Ruby Range: *Draba spectabilis* var. *oxyloba*, *Potentilla subjuga* var. *subjuga*, and *Senecio soldanella*. This number is lower than in the more northerly Mosquito Range and Indian Peaks area of the Front Range and fails to support the statement of Major and Bamberg (1967) that endemism increases in a southerly direction.

### ANNOTATED CHECKLIST OF VASCULAR PLANT SPECIES

#### PTEROPHYTA

##### Selaginellaceae

*Selaginella densa* Rydb. Common; dry and moist meadows, fellfield, dry and moist ledges, krummholz, talus, and patterned ground. A/WNA.

##### Adiantaceae

*Cryptogramma crispa* (L.) Br. ex Hook. ssp. *acrostichoides* (R. Br.) Hulten. Infrequent; dry and moist meadows, dry ledge, and talus. BM/NAA.

##### Aspleniaceae

*Athyrium destentifolium* Tausch ex Opiz var. *americanum* (Butters) Boivin. Rare; talus and disturbed area. BM/NAA.

*Cystopteris fragilis* (L.) Bernh. Infrequent; moist and wet meadows, and moist ledges. AA/C.

#### CONIFEROPHYTA

##### Pinaceae

*Abies lasiocarpa* (Hook.) Nutt. Rare; krummholz. BM/WNA.

*Juniperus communis* L. Rare; krummholz. BM/C.

*Picea engelmannii* Parry ex Engelm. Rare; krummholz. BM/WNA.

#### ANTHOPHYTA-DICOTYLEDONEAE

##### Apiaceae

*Angelica grayi* Coult. & Rose. Infrequent; moist and wet meadows, shrub tundra, talus, and disturbed area. A/SRM.

*Ligusticum porteri* Coult. & Rose. Rare; moist meadow and talus. M/RM.

*Oreoxis alpina* (Gray) Coult. & Rose. Rare; dry meadow. A/SRM.

*Oreoxis bakeri* Coult. & Rose. Infrequent; dry and moist meadows, dry and moist ledges, and rivulet. A/SRM.

*Oxypolis fendleri* (Gray) Heller. Rare; moist ledge and rivulet. M/SRM.

*Pseudocymopterus montanus* (Gray) Coult. & Rose. Infrequent; dry and moist meadows, fellfield, shrub tundra, krummholz, and disturbed area. M/SRM.

#### Asteraceae

*Achillea millefolium* L. var. *lanulosa* (Nutt.) Piper. Infrequent; dry and moist meadows, shrub tundra, krummholz, and talus. A/WNA.

*Agoseris aurantiaca* (Hook.) Greene. Infrequent; moist meadow, fellfield, and krummholz. BM/WNA.

*Agoseris glauca* (Pursh) Raf. Infrequent; dry and moist meadows, dry ledge, shrub tundra, talus, and disturbed area. BM/NA.

*Antennaria alpina* (L.) Gaertn. Common; dry and moist meadows, fellfield, dry and moist ledges, krummholz, and talus. AA/NAE.

*Antennaria microphylla* Rydb. Rare; talus and disturbed area. BM/NA.

*Arnica mollis* Hook. Common; dry, moist and wet meadows, dry and moist ledges, shrub tundra, krummholz, and disturbed area. BM/NA.

*Arnica rydbergii* Greene. Very rare; dry meadow. BM/WNA.

*Artemisia ludoviciana* Nutt. ssp. *incompta* (Nutt.) Keck. Very rare; dry meadow. M/WNA.

*Artemisia scopulorum* Gray. Ubiquitous; dry and moist meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, talus, rivulet, and disturbed area. A/RM.

*Aster foliaceus* Lindl. var. *apricus* Gray. Infrequent; moist and wet meadows, fellfield, moist ledge, shrub tundra, and disturbed area. A/WNA.

*Chaenactis alpina* (Gray) H. E. Jones. Infrequent; dry meadow, fellfield, and talus. M/WNA.

*Erigeron coulteri* Porter. Rare; moist meadow and shrub tundra. BM/WNA.

*Erigeron elatior* (Gray) Gray. Rare; dry meadow and talus. M/SRM.

*Erigeron melanocephalus* A. Nels. Infrequent; moist and wet meadows, fellfield, moist ledge, and talus. A/SRM.

*Erigeron pinnatisectus* (Gray) A. Nels. Common; dry and moist meadows, fellfield, dry and moist ledges, krummholz, and talus. A/SRM.

*Erigeron peregrinus* (Pursh) Greene. Common; dry, moist and wet meadows, dry ledge, shrub tundra, krummholz, and rivulet. BM/WNA.

*Erigeron simplex* Greene. Common; dry and moist meadows, fellfield, dry and moist ledges, krummholz, and talus. A/WNA.

*Haplopappus parryi* Gray. Very rare; shrub tundra. M/SRM.

*Haplopappus pygmaeus* (Torr. & Gray) Gray. Very rare; fellfield. A/RM.

*Heterotheca fulerata* (Greene) Shinnars. Infrequent; dry meadow, dry ledge, and talus. M/RM.

*Hieracium gracile* Hook. Infrequent; dry and moist meadows, fellfield, dry and moist ledges, and krummholz. A/WNA.

*Hymenoxys grandiflora* (Torr. & Gray ex Gray) Parker. Common; dry and moist meadows, fellfield, dry and moist ledges, krummholz and disturbed area. A/RM.

*Senecio amplexens* Gray var. *amplexens*. Infrequent; wet meadow, moist ledge, talus, rock debris habitats, snowbank, and disturbed area. M/RM.

*Senecio amplexens* Gray var. *holmii* (Greene) Harrington. Infrequent; dry meadow, fellfield, dry ledge, talus, and disturbed area. M/RM.

*Senecio atratus* Greene. Infrequent; dry and wet meadows and krummholz. A/SRM.

*Senecio crassulus* Gray. Ubiquitous; dry, moist and wet meadows, moist ledge, shrub tundra, krummholz, talus, rivulet, snowbank, and disturbed area. BM/WNA.

*Senecio dimorphophyllus* Greene. Infrequent; moist and wet meadows, dry and moist ledges, and shrub tundra. M/RM.

*Senecio soldanella* Gray. Rare; fellfield. A/CO.

*Senecio taraxacoides* (Gray) Greene. Very rare; talus. A/SRM.

*Senecio triangularis* Hook. Rare; moist meadow and moist ledge. BM/WNA.

*Senecio werneriiifolius* (Gray) Gray. Common; dry and moist meadows, fellfield, dry ledge, talus, rivulet, and disturbed area. M/RM.

*Solidago spathulata* DC. var. *nana* (Gray) Cronq. Common; dry and moist meadows, fellfield, dry ledge, shrub tundra, krummholz, and talus. A/WNA.

*Taraxacum ceratophorum* (Ledeb.) DC. Infrequent; dry meadow, talus, and disturbed area. AA/C.

*Taraxacum lyratum* (Ledeb.) DC. Very rare; dry ledge. AA/NAA.

#### Boraginaceae

*Mertensia bakeri* Greene. Infrequent; dry meadow, fellfield, dry ledge, and disturbed area. A/SRM.

*Mertensia ciliata* (James ex Torr.) G. Don. Infrequent; moist and wet meadows, shrub tundra, krummholz, and rock debris habitats. BM/WNA.

#### Brassicaceae

*Arabis drummondii* Gray. Common; dry and moist meadows, fellfield, dry ledge, krummholz, talus, and disturbed area. BM/NA.

*Arabis lemmonii* S. Wats. Very rare; talus. A/WNA.

*Cardamine cordifolia* Gray. Infrequent; wet meadow, shrub tundra, and rivulet. BM/WNA.

*Draba aurea* Vahl. Infrequent; fellfield, talus, and disturbed area. AA/C.

*Draba crassa* Rydb. Rare; dry ledge. A/RM.

*Draba crassifolia* Graham. Infrequent; moist meadow, fellfield, moist ledge, talus, and disturbed area. AA/NAE.

*Draba fladnizensis* Wulfen. Rare; fellfield and talus. AA/C.

*Draba incerta* Payson. Rare; patterned ground and disturbed area. AA/WNA.

*Draba nivalis* Lilj. Very rare; dry ledge. AA/C.

*Draba oligosperma* Hook. Very rare; fellfield. AA/WNA.

*Draba spectabilis* Greene var. *oxyloba* (Greene) Gilg. ex O. E. Schulz. Infrequent; dry and moist meadows and fellfield. A/CO.

*Draba spectabilis* Greene var. *spectabilis*. Rare; moist meadow and talus. M/RM.

*Draba streptocarpa* Gray var. *streptocarpa*. Rare; dry ledge. A/SRM.

*Erysimum nivale* (Greene) Rydb. Infrequent; dry meadow, fellfield, dry ledge, and disturbed area. A/SRM.

*Rorippa curvipes* Greene. Infrequent; moist and wet meadows and disturbed area. A/RM.

*Smelowskia calycina* (Steph.) C. A. Mey. ex Ledeb. Infrequent; dry and moist meadows, fellfield, dry ledge, krummholz, and patterned ground. AA/NAA.

*Thlaspi montanum* L. Ubiquitous; dry, moist and wet meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, talus, snowbank, and disturbed area. A/C.

#### Campanulaceae

*Campanula rotundifolia* L. Infrequent; dry and moist meadows, fellfield, dry ledge, and krummholz. BM/C.

*Campanula uniflora* L. Rare; dry meadow and dry ledge. AA/C.

#### Caryophyllaceae

*Arenaria congesta* Nutt. ex Torr. & Gray. Infrequent; dry and moist meadows, fellfield, dry ledge, and krummholz. M/WNA.

*Cerastium earlei* Rydb. Common; dry and moist meadows, fellfield, dry ledge, shrub tundra, talus, patterned ground, and disturbed area. A/RM.

*Minuartia biflora* (L.) Schinz & Thellung. Rare; fellfield and dry ledge. AA/C.

*Minuartia obtusiloba* (Rydb.) House. Infrequent; dry and moist meadows, fellfield, and dry and moist ledges. AA/NAA.

*Minuartia rubella* (Wallenb.) Hiern. Infrequent; dry and moist meadows, fellfield, dry ledge, krummholz, and patterned ground. AA/C.

*Minuartia stricta* (Sw.) Hiern. Very rare; moist ledge. AA/C.

*Moehringia lateriflora* (L.) Fenzl. Rare; shrub tundra and krummholz. AA/C.

*Moehringia macrophylla* (Hook.) Fenzl. Very rare; shrub tundra. BM/NA.

*Sagina saginoides* (L.) Karst. Infrequent; moist meadow, fellfield, moist ledge, and disturbed area. AA/C.

*Silene acaulis* (L.) Jacq. var. *subacaulis* (F. N. Williams) C. L. Hitchc. & Maguire. Common; dry and moist meadows, fellfield, dry and moist ledges, krummholz, talus, patterned ground, and disturbed area. AA/NAA.

*Silene drummondii* Hook. Rare; dry meadow and krummholz. BM/NA.

*Silene kingii* (S. Wats.) Bocquet. Rare; moist meadow and fellfield. A/SRM.

*Silene uralensis* (Rupr.) Bocquet. Very rare; fellfield. AA/C.

*Stellaria longipes* Goldie. Rare; krummholz and talus. BM/NA.

*Stellaria umbellata* Turcz. ex Kar. & Kir. Infrequent; moist and wet meadows, shrub tundra, talus, and disturbed area. A/NAA.

#### Celastraceae

*Pachistima myrsinites* (Pursh) Raf. Very rare; talus. M/WNA.

## Crassulaceae

*Sedum integrifolium* (Raf.) A. Nels. ex Coult. & A. Nels. Ubiquitous; dry, moist, and wet meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, talus, rock debris habitats, rivulet, and disturbed area. AA/NAA.

*Sedum lanceolatum* Torr. Common; dry and moist meadows, fellfield, dry ledge, krummholz, talus, and patterned ground. A/WNA.

*Sedum rhodanthum* Gray. Infrequent; moist and wet meadows, moist ledge, and shrub tundra. A/RM.

## Ericaceae

*Arctostaphylos uva-ursi* (L.) Spreng. Very rare; moist ledge. BM/NA.

*Gaultheria humifusa* (Graham) Rydb. Very rare; moist ledge. BM/WNA.

*Vaccinium caespitosum* Michx. Common; dry and moist meadows, fellfield, dry and moist ledges, shrub tundra, and krummholz. BM/NA.

*Vaccinium myrtillus* L. ssp. *oreophilum* (Rydb.) Love, Love & Kapoor. Very rare; shrub tundra. BM/C.

## Fabaceae

*Lupinus argenteus* Pursh. Infrequent; dry meadow, dry ledge, shrub tundra, and talus. M/WNA.

*Trifolium dasyphyllum* Torr. & Gray. Infrequent; dry meadow, fellfield, dry ledge, krummholz, and talus. A/RM.

*Trifolium nanum* Torr. Infrequent; dry meadow, fellfield, dry ledge, and patterned ground. A/RM.

*Trifolium parryi* Gray. Ubiquitous; dry, moist, and wet meadows, dry and moist ledges, shrub tundra, krummholz, talus, snowbank, and disturbed area. A/RM.

## Gentianaceae

*Gentiana algida* Pallas. Infrequent; dry and moist meadows, fellfield, and shrub tundra. AA/NAA.

*Gentiana calycosa* Griseb. Rare; moist meadow and krummholz. A/WNA.

*Gentiana prostrata* Haenke ex Jacq. Very rare; moist ledge. AA/NAA.

*Gentianella amarella* (L.) Borner. Infrequent; dry and moist meadows, fellfield, dry ledge, and shrub tundra. BM/C.

*Gentianella tenella* (Rottb.) Borner. Infrequent; dry and moist meadows, and moist ledge. AA/C.

*Gentianopsis barbellata* (Engelm.) Iltis. Very rare; krummholz. A/SRM.

*Gentianopsis thermalis* (Kuntze) Iltis. Infrequent; dry, moist, and wet meadows, and moist ledge. A/RM.

*Swertia perennis* L. Rare; moist meadow and shrub tundra. A/C.

## Geraniaceae

*Geranium richardsonii* Fisch. & Trautv. Rare; dry ledge and krummholz. M/WNA.

## Hydrophyllaceae

*Phacelia heterophylla* Pursh. Rare; fellfield and talus. M/WNA.

*Phacelia sericea* (Graham) Gray. Infrequent; dry meadow, krummholz, talus, and disturbed area. A/WNA.

## Onagraceae

*Epilobium anagallidifolium* Lam. Infrequent; moist and wet meadows, talus, rivulet, and disturbed area. AA/C.

## Orobanchaceae

*Orobanche uniflora* L. Very rare; moist meadow. BM/NA.

## Papaveraceae

*Corydalis cascana* Gray ssp. *brandegii* (S. Wats.) G. B. Ownbey. Common; moist and wet meadows, moist ledge, shrub tundra, krummholz, talus, rivulet, snowbank, and disturbed area. M/SRM.

## Polemoniaceae

*Polemonium delicatum* Rydb. Very rare; krummholz. M/SRM.

*Polemonium viscosum* Nutt. Infrequent; dry and moist meadows, talus, and disturbed area. A/WNA.

## Polygonaceae

*Eriogonum jamesii* Benth. var. *xanthum* (Small) Reveal. Very rare; talus. A/WNA.

*Eriogonum umbellatum* Torr. Infrequent; dry meadow, fellfield, dry ledge, and talus. M/WNA.

*Oxyria digyna* Hill. Common; moist meadow, fellfield, dry ledge, talus, rock debris habitats, rivulet, and disturbed area. AA/C.

*Polygonum bistortoides* Pursh. Ubiquitous; dry, moist, and wet meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, talus, patterned ground, rivulet, and disturbed area. A/WNA.

*Polygonum douglasii* Greene. Very rare; dry meadow. BM/NA.

*Polygonum viviparum* L. Infrequent; dry and moist meadows, dry and moist ledges, shrub tundra, and rock crevice. AA/C.

## Portulacaceae

*Claytonia lanceolata* Pursh. Very rare; talus. M/WNA.

*Claytonia megarhiza* (Gray) Parry ex S. Wats. Infrequent; fellfield, dry ledge, talus, patterned ground, and rock debris habitats. A/RM.

*Lewisia pygmaea* (Gray) B. L. Robins. Common; dry, moist, and wet meadows, fellfield, moist ledge, shrub tundra, talus, and rivulet. A/WNA.

## Primulaceae

*Androsace septentrionalis* L. Infrequent; dry and moist meadows, fellfield, talus, and patterned ground. AA/C.

*Primula parryi* Gray. Infrequent; moist and wet meadows, moist ledge, talus, and rivulet. A/RM.

## Ranunculaceae

*Anemone narcissiflora* L. ssp. *zephyra* (A. Nels.) Love, Love & Kapoor. Common; dry, moist, and wet meadows, fellfield, moist ledge, krummholz, and shrub tundra. A/SRM.

*Aquilegia coerulea* James. Infrequent; dry meadow, fellfield, dry ledge, shrub tundra, krummholz, and talus. M/RM.

*Caltha leptosepala* DC. Infrequent; moist and wet meadows, moist ledge, shrub tundra, and rivulet. A/WNA.

*Delphinium barbeyi* (Huth) Huth. Very rare; talus. M/SRM.

*Ranunculus alisamifolius* Geyer ex Benth. var. *montanus* S. Wats. Infrequent; moist and wet meadows, moist ledge, shrub tundra, and rivulet. BM/WNA.

*Ranunculus eschscholtzii* Schlecht. Infrequent; moist and wet meadows and moist ledge. AA/NA.

*Ranunculus macauleyi* Gray. Common; moist and wet meadows, moist ledge, talus, rivulet, snowbank, and disturbed area. A/SRM.

*Trollius laxus* Salisb. ssp. *albiflorus* (Gray) Love, Love & Kapoor. Infrequent; moist and wet meadows, and shrub tundra. BM/WNA.

## Rosaceae

*Fragaria vesca* L. ssp. *americana* (Porter) Staudt. Rare; moist meadow and krummholz. BM/NA.

*Geum rossii* (R. Br.) Ser. var. *turbinatum* (Rydb.) C. L. Hitchc. Ubiquitous; dry, moist, and wet meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, talus, patterned ground, rivulet, snowbank, and disturbed area. AA/NA.

*Ivesia gordonii* (Hook.) Torr. & Gray. Common; dry and moist meadows, fellfield, dry and moist ledges, krummholz, talus, and disturbed area. M/WNA.

*Potentilla diversifolia* Lehm. Ubiquitous; dry, moist, and wet meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, talus, patterned ground, rivulet, snowbank, and disturbed area. A/WNA.

*Potentilla fruticosa* L. ssp. *floribunda* (Pursh) Elington. Infrequent; dry and moist meadows, fellfield, dry ledge, and talus. BM/C.

*Potentilla nivea* L. Infrequent; dry meadow, fellfield, dry ledge, and patterned ground. AA/C.

*Potentilla ovina* Macoun. Infrequent; fellfield, dry and moist ledges. M/WNA.

*Potentilla rubricaulis* Lehm. Rare; dry meadow and fellfield. AA/NA.

*Potentilla subjuga* Rydb. var. *subjuga*. Rare; dry meadow and dry ledge. A/CO.

*Rubus idaeus* L. ssp. *sachalinensis* (Levi.) Focke. Very rare; talus. BM/NA.

*Sibbaldia procumbens* L. Ubiquitous; dry, moist, and wet meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, talus, rivulet, and disturbed area. AA/C.

## Salicaceae

*Salix arctica* Pallas. Infrequent; dry and moist meadows and patterned ground. A/WNA.

*Salix brachycarpa* Nutt. Infrequent; moist ledge, shrub tundra, and krummholz. BM/NA.

*Salix glauca* L. var. *villosa* (Hook.) Anderss. Rare; shrub tundra and krummholz. BM/WNA.

*Salix planifolia* Pursh. Rare; moist ledge and shrub tundra. BM/NA.

*Salix reticulata* L. ssp. *nivalis* (Hook.) Love, Love & Kapoor. Infrequent; dry and moist meadows, fellfield, dry ledge, and shrub tundra. A/WNA.

## Saxifragaceae

*Heuchera parvifolia* Nutt. ex Torr. & Gray. Rare; moist meadow and dry ledge. M/RM.

*Ribes coloradense* Coville. Very rare; dry ledge. M/SRM.

*Ribes montigenum* McClatchie. Very rare; krummholz. BM/WNA.

*Saxifraga adscendens* L. ssp. *oregonensis* (Raf.) Bacig. Very rare; moist meadow. AA/NAE.

*Saxifraga bronchialis* L. ssp. *austromontana* (Wieg.) Piper. Infrequent; fellfield, dry ledge, krummholz, talus, and patterned ground. A/WNA.

*Saxifraga caespitosa* L. ssp. *delicatula* (Small) Porsild. Very rare; patterned ground. AA/C.

*Saxifraga chrysantha* Gray. Very rare; patterned ground. AA/NA.

*Saxifraga debilis* Engelm. ex Gray. Infrequent; moist meadow, fellfield, dry and moist ledges, and talus. A/RM.

*Saxifraga flagellaris* Sternb. & Willd. ssp. *platysepala* (Trautv.) Porsild. Rare; fellfield and patterned ground. A/SRM.

*Saxifraga odontoloma* Piper. Rare; wet meadow and moist ledge. BM/WNA.

*Saxifraga oregana* T. J. Howell ssp. *montanensis* (Small) C. L. Hitchc. Infrequent; moist and wet meadows and shrub tundra. M/WNA.

*Saxifraga rhomboidea* Greene. Common; dry and moist meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, talus, and rivulet. A/WNA.

## Scrophulariaceae

*Besseyia alpina* (Gray) Rydb. Infrequent; dry and moist meadows, fellfield, dry ledge, talus, and patterned ground. A/SRM.

*Castilleja occidentalis* Torr. Ubiquitous; dry, moist, and wet meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, talus, and disturbed area. A/RM.

*Castilleja rhexifolia* Rydb. Infrequent; moist meadow, shrub tundra, and rivulet. BM/WNA.

*Mimulus guttatus* DC. Rare; moist ledge and disturbed area. BM/NA.

*Pedicularis bracteosa* Benth. var. *paysoniana* (Pennell) Cronq. Rare; moist meadow and shrub tundra. M/RM.

*Pedicularis groenlandica* Retz. Infrequent; moist and wet meadows, moist ledge, shrub tundra, and rivulet. AA/NA.

*Pedicularis parryi* Gray. Infrequent; dry and moist meadows, fellfield, dry and moist ledges, and shrub tundra. A/RM.

*Penstemon whippleanus* Gray. Common; dry and moist meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, and talus. M/RM.

*Veronica wormskjoldii* Roemer & Shultes. Common; dry, moist, and wet meadows, dry and moist ledges, shrub tundra, krummholz, rivulet, and disturbed area. AA/NA.

## Valerianaceae

*Valeriana capitata* Pallas ex Link. Very rare; fellfield. AA/NA.

*Valeriana edulis* Nutt. ex Torr. & Gray. Rare; moist meadow and dry ledge. BM/WNA.

## Violaceae

*Viola adunca* Sm. ssp. *bellidifolia* (Greene) Harrington. Infrequent; moist meadow, fellfield, and moist ledge. BM/NA.

*Viola nuttallii* Pursh. Rare; dry meadow and dry ledge. M/WNA.

## ANTHOPHYTA - MONOCOTYLEDONEAE

## Cyperaceae

*Carex albionigra* Mackenzie. Infrequent; moist meadow, moist ledge, shrub tundra, and talus. AA/WNA.

*Carex aquatilis* Wahlenb. Rare; wet meadow. AA/C.

*Carex arapahoensis* Clokey. Rare; dry meadow and rock debris habitats. A/SRM.

*Carex brevipes* W. Boott. Very rare; moist meadow. BM/NA.

*Carex brunnescens* (Pers.) Poir. Very rare; wet meadow. BM/C.

*Carex ebenea* Rydb. Common; dry, moist, and wet meadows, fellfield, moist ledge, shrub tundra, talus, and disturbed area. A/RM.

*Carex elynoides* Holm. Rare; fellfield. A/WNA.

*Carex foenea* Willd. Infrequent; dry ledge, krummholz, and talus. BM/NA.

*Carex geyeri* Boott. Very rare; krummholz. M/WNA.

*Carex haydeniana* Olney. Infrequent; dry and moist meadows, dry ledge, talus, and disturbed area. A/WNA.

*Carex heteroneura* W. Boott var. *chalciolepis* (Holm) F. J. Herm. Common; dry, moist, and wet meadows, fellfield, dry and moist ledges, shrub tundra, talus, and disturbed area. A/WNA.

*Carex heteroneura* W. Boott var. *epapillosa* (Mackenzie) F. J. Herm. Very rare; dry meadow. M/WNA.

*Carex illota* Bailey. Rare; moist and wet meadows. A/WNA.

*Carex nelsonii* Mackenzie. Rare; fellfield and dry ledge. A/SRM.

*Carex nigricans* C. A. Mey. Infrequent; moist and wet meadows, moist ledge, shrub tundra, and rivulet. A/NAA.

*Carex nova* Bailey. Infrequent; moist meadow, moist ledge, shrub tundra, and rivulet. BM/WNA.

*Carex phaeocephala* Piper. Common; dry and moist meadows, fellfield, dry and moist ledges, krummholz, talus, rock debris habitats, and disturbed area. A/WNA.

*Carex praeceptorum* Mackenzie. Very rare; wet meadow. A/WNA.

*Carex pseudoscirpoidea* Rydb. Very rare; shrub tundra. A/WNA.

*Carex pyrenaica* Wallenb. Infrequent; moist meadow, fellfield, and talus. A/C.

*Carex scopulorum* Holm. Very rare; moist meadow. A/WNA.

*Eleocharis acicularis* (L.) Roemer & Schultes. Very rare; wet meadow. AA/C.

*Kobresia myosuroides* (Vill.) Fiori & Paol. Rare; dry meadow and dry ledge. AA/C.

## Juncaceae

*Juncus drummondii* E. Mey. Ubiquitous; dry, moist, and wet meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, talus, rivulet, and disturbed area. A/WNA.

*Juncus mertensianus* Bong. Infrequent; moist and wet meadows, moist ledge, shrub tundra, rivulet, and disturbed area. A/NAA.

*Juncus tracyi* Rydb. Very rare; disturbed area. M/WNA.

*Luzula spicata* (L.) DC. Ubiquitous; dry and moist meadows, fellfield, dry and moist ledges, shrub tundra, talus, patterned ground, and disturbed area. A/RM.

## Liliaceae

*Erythronium grandiflorum* Pursh var. *chrysandrum* (Applegate) Scroggan. Common; dry, moist, and wet meadows, fellfield, dry and moist ledges, shrub tundra, talus, and rivulet. M/RM.

*Lloydia serotina* (L.) Salisb. ex Reichenb. Rare; dry meadow and dry ledge. AA/C.

*Zigadenus elegans* Pursh. Infrequent; dry and moist meadows, dry and moist ledges, shrub tundra, and rivulet. AA/NA.

## Poaceae

*Agropyron scribneri* Vasey. Infrequent; dry meadow, fellfield, dry ledge, krummholz, talus, and disturbed area. A/WNA.

*Agropyron trachycaulum* (Link) Malte ex H. F. Lewis var. *latiglume* (Scribn. & Smith) Beetle. Common; dry and moist meadows, fellfield, shrub tundra, talus, rock debris habitats, and disturbed area. AA/NA.

*Agrostis scabra* Willd. Very rare; dry meadow. BM/NA.

*Calamagrostis purpurascens* R. Br. Infrequent; dry and moist meadows, fellfield, dry ledge, and krummholz. AA/NAA.

*Danthonia intermedia* Vasey. Infrequent; dry meadow, fellfield, and dry ledge. BM/NAA.

*Deschampsia caespitosa* (L.) Beauv. Ubiquitous; dry, moist, and wet meadows, fellfield, dry and moist ledges, shrub tundra, talus, rock debris habitats, rivulet, and disturbed area. BM/C.

*Elymus glaucus* Buckl. Very rare; krummholz. BM/NA.

*Festuca brachyphylla* Schultes. Ubiquitous; dry and moist meadows, fellfield, dry and moist ledges, krummholz, talus, patterned ground, rock debris habitats, and disturbed area. AA/C.

*Festuca ovina* L. Very rare; moist meadow. AA/C.

*Phleum alpinum* L. Common; dry, moist, and wet meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, and disturbed area. AA/C.

*Poa alpina* L. Ubiquitous; dry, moist, and wet meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, talus, rock debris habitats, snowbank, and disturbed area. AA/C.

*Poa arctica* R. Br. Rare; moist meadow and fellfield. A/RM.

*Poa epilis* Scribn. Infrequent; dry and moist meadows, dry ledge, shrub tundra, and krummholz. BM/WNA.

*Poa fendleriana* (Steud.) Vasey. Infrequent; dry and moist meadows, krummholz, and disturbed area. BM/NA.

*Poa leptocoma* Trin. Infrequent; moist meadow, dry ledge, and disturbed area. A/WNA.

*Poa rupicola* Nash ex Rydb. Common; dry and moist meadows, fellfield, dry ledge, krummholz, patterned ground, and rock debris habitats. A/WNA.

*Poa sandbergii* Vasey. Very rare; dry meadow. BM/NA.

*Stipa lettermanii* Vasey. Very rare; dry meadow. M/RM.

*Trisetum spicatum* (L.) Richter. Ubiquitous; dry, moist, and wet meadows, fellfield, dry and moist ledges, shrub tundra, krummholz, talus, patterned ground, rock debris habitats, and disturbed area. AA/C.

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