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VASCULAR FLORA OF KANE LAKE CIRQUE, PIONEER MOUNTAINS, IDAHO

Robert K. Moseley and Susan Bernatas

ABSTRACT.—Kane Lake Cirque lies in the western Pioneer Mountains of south central Idaho. An inventory of the high-elevation flora of the cirque revealed the presence of 180 vascular taxa representing 95 genera and 30 families. Five alpine taxa are here documented from Idaho for the first time: Carex inaequiflora Mack., Dryas integrifolia Will.et., Potentilla nivea L., Remunculus gelidus Kar. & Kir., and Ranunculus pygmaeus Wahlenb. Kane Lake Cirque also contains populations of four additional alpine taxa considered to be of conservation concern in Idaho: Ertigeron humilis Graham, Paronycha kotzebuea Cham., Saxifraga adoensia L., and Saxifraga cerina L.

Key words: Idaho, Pioneer Mountains, Kane Lake Cirque, alpine vascular flora, state records, rare flora.

Studies of alpine flora have been numerous throughout the North American Cordillera, but only recently have investigations of this kind been undertaken in Idaho. Floristic studies initiated by Douglass Henderson of the University of Idaho Herbarium in the mid-1970s were the first to systematically explore the alpine zone of Idaho. Through numerous collections, he and co-workers documented Idaho’s alpine flora to be unique in many respects (Henderson 1978, Brunsfeld 1981, Henderson et al. 1981, Brunsfeld et al. 1983, Caicco et al. 1983, Lackshevitz et al. 1985, Hartman and Constance 1985). Nearly all these investigations took place in the large Basin and Range-like massifs in eastern Idaho, with few extending into the western Pioneer Mountains of south central Idaho.

Rare plant inventories initiated by the U.S. Forest Service were the first to point out the phytogeographic importance of the cirques in the western Pioneer Mountains, in general, and Kane Lake Cirque, in particular (Caicco and Henderson 1981, Brunsfeld et al. 1983). Barbara Erter’s collections in 1977 and our collections in 1987 further highlighted the significance of Kane Lake Cirque. Because of increasing recreational use of the Kane Lake area, sensitivity of the habitats, and preliminary nature of the floristic inventory, we undertook this study in cooperation with the Challis National Forest to provide them with adequate data on the distribution and abundance of rare plants and habitats in the basin for future management.

STUDY AREA

The Pioneer Mountains rise abruptly from the northern edge of the Snake River Plain in central Idaho between the Big Lost and Big Wood rivers. These mountains form a large, complex block about 60 km long and 50 km wide, oriented northwest to southeast. Topography varies from sharp horns, serrate ridges, and broad upland surfaces in the alpine zone to steep-sided valleys and rounded ridges in the foothills. Elevations range from 1900 m in the valleys on the western slope to 3658 m at the summit of Hyndman Peak.

The Pioneer Mountains are composed of Tertiary Challis Volcanics consisting of interbedded lava and tuffaceous units, which lie unconformably over a core of Precambrian metamorphic and Paleozoic sedimentary units. During the formation of the Cretaceous Idaho Batholith, small “satellite” intrusive bodies were emplaced in the western Pioneer Mountains. Tertiary and Quaternary block faulting is believed to be the cause of the subsequent uplift and present relief (Dover 1981). The geomorphic setting has been greatly influenced by Quaternary glacial and fluvial activity. Most streams in glaciated valleys are underfit, and

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335
uplands display classic alpine-type glaciated features including cols, aretes, horns, and cirques (Evenson et al. 1982).

The Pioneer Mountains lie in a transition zone between the maritime climate of northern and western Idaho and the continental climate of southeastern Idaho, and are affected by two basic storm patterns. From November through March most precipitation comes from low-altitude cyclonic storms that move eastward from the Pacific Ocean. During May and June most precipitation results from high-altitude convectional storms moving northward from the Gulf of Mexico and California coast. The combination of maritime and continental influence creates two wet seasons, winter and late spring, respectively (Caicco 1983). No climatic data are available from high elevations in the Pioneer Mountains; however, Moseley (1985) estimates mean annual precipitation at 2835 m in the southern part of the range to be 813 mm. Throughout the mountainous regions of the world, the altitude of upper treeline has long been observed to coincide with the 10 C isotherm of the warmest month (Griggs 1937, Daubenmire 1954, Wardle 1974). Extrapolation of temperatures from valley stations in the vicinity to timberline (3000 m) using an adiabatic lapse rate of 0.62 °C/100 m (Baker 1944) substantiates this observation for the Pioneer Mountains.

**DESCRIPTION OF KANE LAKE CIRQUE**

Kane Lake Cirque encompasses approximately 567 ha at the head of Kane Creek in the western Pioneer Mountains 21 km northeast of Ketchum, Custer County, Idaho (43°44′N 114°6′W; T5N R20E, Boise Meridian). The cirque is characterized by permanent snowfields, glacially scoured bedrock (gneiss and quartz diorite), and unstable talus and morainal deposits. Although several small ponds are scattered throughout the basin, 5.3-ha Kane Lake is the only large body of water. Elevations of the study area range from 2800 m to 3648 m. The only appreciable soil development is in depositional areas such as along streams and rivulets, around ponds and lakes, and in the coniferous woodland on the north side of Kane Lake.

Vegetation in the cirque reflects a moister regime than has been noted at high elevations elsewhere in Idaho (Brunsfield 1981, Caicco 1983, Moseley 1985). This mesic environment can be attributed to several factors, including the north-facing orientation of the cirque, a massive headwall on the south, and high peaks on the east, south, and west sides of the basin. These features contribute collectively to a heavy snow accumulation in the winter and its retention throughout the summer. Late-lying snow and an impermeable substrate, augmented by summer thundershowers, appear to provide plentiful moisture to nearly all habitats throughout the growing season, except the south-facing slopes north of Kane Lake.

Habitats in the cirque can be divided into two distinct groups: subalpine and alpine. Subalpine vegetation is restricted to areas immediately adjacent to Kane Lake and generally does not exceed 2850 m. Alpine habitats cover most of the area and are generally sparsely vegetated, although small areas with continuous vegetative cover occur along streams and rivulets throughout the basin and contain much of the plant species diversity of the alpine zone. Plant associations of the study area are not included in published vegetation classifications of the region and are subjectively characterized below.

**Subalpine Communities**

**Coniferous woodland.** Open stands of *Pinus albicaulis* Engelm., with lesser amounts of *Abies lasiocarpa* (Hook.) Nutt. and *Picea engelmannii* Parry, occupy the level bench north of Kane Lake. The relatively xeric understory is characterized by *Vaccinium scoparium* Leiberg, *Poa nervosa* (Hook.) Vasey, and *Senecio streptanthifolius* Greene.

**Upland meadows.** Interspersed in low-lying areas within the coniferous woodland are meadows dominated by graminoids and forbs. Species characteristic of these sites include *Festuca idahoensis* Elmer, *Danthonia intermedia* Vasey, *Erigeron simplex* Greene, *Carex microptera* Mack., and *Potentilla diversifolia* Lehmann.

**Tree islands and krummholz.** Isolated tree islands, consisting of small, upright *Abies lasiocarpa* with an understory dominated by *Phyllodoce spp.*, occur as high as 3050 m on benches south of the lake. These relatively moist sites are surrounded by bedrock or alpine meadow communities. Areas of krummholz are rare in the study area. Small isolated patches consisting of low-growing *A. lasiocarpa* and
Pinus albicaulis occur as high as 3230 m on the steep south-facing slopes north of Kane Lake.

**Lakeside meadows.** Surrounding Kane Lake and radiating out along inlet and outlet streams are meadows that have soil saturated to the surface and are high in organic matter. *Carex scopulorum* Holm is dominant here along with scattered forbs, such as *Erigeron peregrinus* (Pursh) Greene, *Senecio cymbalariaoides* Buek., and *Gentiana calycosa* Griseb. Low shrubs, including *Salix planifolia* Pursh and *Ledum glandulosum* Nutt., occur occasionally in these meadows.

Alpine Communities

**Meadows.** This mesic community is limited in extent and generally occurs in isolated patches around seeps or as stringers along streams and rivulets. *Deschampsia cespitosa* (L.) Beauv. is by far the dominant species here, with a high diversity of forbs and other graminoids occurring in low cover.

**Cliffs and ledges.** This is the most common community in the cirque. Most cliffs and ledges are north-facing and wet to mesic, with *Draba lonchocarpa* Rydb. being the most constant species, along with several species of *Saxifraga*. The xeric counterparts occur only on the south-facing slopes northeast of Kane Lake and have few vascular plants.

**Talus and scree.** Common at upper elevations in the cirque, this relatively mesic community is characterized by a unique suite of species able to withstand constantly shifting substrates. Species characteristic of material greater than 5 cm in diameter (talus) include *Hulsea algida* Gray and *Senecio fremontii* T. & G., while *Saxifraga cernua* L., *Luzula spicata* (L.) DC., and *Androsace septentrionalis* L. characterize small-diameter material (scree).

**Fellfield.** Dry fellfield habitats are rare, occurring only in small pockets on bedrock slabs on the cirque floor east of Kane Lake. Species typical of this poorly developed community include *Potentilla brevifolia* Nutt., *Juncus drummondii* E. Meyer, and *Sibbaldia procumbens* L. *Carex elynoides* Holm also occurs in this community but does not develop into the extensive turfs that are found elsewhere in central Idaho (Caicco 1983). All ridges surrounding the basin, typical sites for fellfield communities elsewhere in the state, are sharp aretes with no well-developed vegetation.

METHODS

The checklist is based on 263 collections, made mostly by the authors in July and August 1987 and July 1991. Other collectors include Barbara Erter, who visited Kane Lake in July 1977, and Steven Caicco, who collected in the cirque during July 1981 and August 1982. A nearly complete set of specimens is deposited at the University of Idaho Herbarium (ID), with duplicates distributed widely. Erter’s collections are deposited at the Albertson College of Idaho (CIC).

Collections thought to be new records for Idaho were confirmed by experts in a particular taxon and/or from a search of up to 59 local, regional, and national herbaria (Moseley 1989). Range-extension data for these state-record taxa were determined from herbarium records and from the atlases and data bases maintained by the Idaho Conservation Data Center and Montana Natural Heritage Program on the location, distribution, numbers, and condition of rare plant populations in their respective states (Jenkins 1986). The Idaho Conservation Data Center data base was also consulted concerning the current distribution of additional rare species in Idaho.

RESULTS AND DISCUSSION

The vascular flora of Kane Lake Cirque consists of 180 species representing 95 genera in 30 families of pteridophytes, gymnosperms, and angiosperms. Of these, 53 species (29%) are restricted to subalpine communities in the cirque, while 58 species (33%) are restricted to alpine habitats. The remaining 69 species (38%) transcend the subalpine-alpine boundary and occur in both types of communities. Our collections of five species from the study area represent their first documented occurrence in Idaho. In addition, four other arctic-alpine species are known from Idaho from only a few occurrences and are considered rare in the state (Moseley and Groves 1990). Only one alien taxon, *Taraxacum officinale* Weber, was found in the study area.

**Taxa New to Idaho**

**Carex incurviformis** Mack. This species occurs in two areas of the North American Cordillera: var. *incurviformis*, known from the Rocky Mountains of British Columbia, Alberta,
Montana, and now Idaho; and var. danaensis (Stacey) Hermann, occurring in the southern Rocky Mountains of Colorado and the Sierra Nevada and White Mountains of California (J. Mastrogiuseppe, Washington State University, personal communication, 1991). The population in Kane Creek is disjunct south from the next closest known population in Deer Lodge County, Montana, by about 260 km (Lackschewitz 3938 MONTU; Lesica and Shelly 1991). We found one small population in the Kane Lake Cirque, occurring in a steeply sloping meadow on seepy ledges at 3350m at the southern end of the cirque.

**Draba fladnizensis Wilfen.** A widespread circumpolar species, *Draba fladnizensis* is sparsely distributed in North America, from the arctic south through the Rocky Mountains to Utah and Colorado (Hitchcock 1941). As with *Carex incurviformis*, the Kane Lake Cirque population is disjunct south from the next closest known population in the Storm Lake area of the Pintlar Range, Deer Lodge County, Montana, by about 260 km (Lackschewitz 6120 MONTU). Several very small populations occur on ledges and in rocky areas south of Kane Lake, including spray zones of waterfalls, bare stream gravels, and on steep, rocky slopes near seeps.

**Potentilla nivea L.** This circumpolar species occurs in arctic and alpine regions of North America, being previously known in western North America from Alaska south along the main crest of the Rocky Mountains to Montana, Wyoming, Colorado, and Utah and east to Nevada (Hitchcock and Cronquist 1973). The Kane Lake Cirque population is disjunct from the nearest Montana populations by perhaps 280 km. A small population of about a dozen plants was seen in a moist, sloping meadow at the top of the waterfalls south of Kane Lake at 2950m.

**Ranunculus gelidus Kar. & Kir.** A North American endemic, this species is distributed across the arctic, southward in the Rocky Mountains to Colorado (Benson 1948). The very small population in Kane Creek Cirque represents a disjunction southwestward of about 350 m from the Beartooth Plateau, Stillwater County, Montana (Stickney 4 MRC; Lesica and Shelly 1991). In the study area it occurs in a stringer of *Deschampsia cespitosa* along the northeastern tributary of Kane Lake at about 3170 m.

**Ranunculus pummaeus Wahlenb.** This buttercup is circumpolar, occurring south along the Rocky Mountain crest to Colorado (Benson 1948). Its presence in the Kane Lake Cirque represents a disjunction of about 200 km southwest from the next nearest known populations in the Pioneer Mountains, Beaverhead County, Montana (Hitchcock and Muhlick 12899 WS). *Ranunculus pummaeus* is relatively common in the Kane Lake Cirque, occurring in moist, exposed soil along creeks, on ledges and slopes, and occasionally in cracks in cliffs.

**Additional Rare Species**

**Erigeron humilis Grahm.** This circumpolar species was not known from Idaho until Henderson et al. (1981) reported it from the Lemhi and Lost River ranges. Eight occurrences are now known from the state, with the Kane Lake Cirque populations being the only ones known outside the two ranges mentioned above (unpublished data on file at the Idaho Conservation Data Center, Boise). *Erigeron humilis* is relatively common in moist *Deschampsia cespitosa* meadows throughout the lower portion of the cirque.

**Parnassia kotzebuei Cham.** This species was also not known from Idaho until recently when Brunsfeld et al. (1983) reported it from the Lost River Range and Pioneer Mountains. Four occurrences are now known from the state (unpublished data on file at the Idaho Conservation Data Center, Boise). It is relatively common on moist ledges and in sloping *Deschampsia cespitosa* meadows throughout the lower portion of the cirque.

**Saxifraga adscendens L.** The North American representative of this wide-ranging species, var. oregonenensis (Raf.) Breit., occurs throughout the Rocky Mountains and northern Cascade Range (Hitchcock and Cronquist 1973). In Idaho it is known from nine sites in the White Cloud Peaks, Pioneer Mountains, and Lost River Range (unpublished data on file at the Idaho Conservation Data Center, Boise). Kane Lake Cirque populations occur throughout the area on moist scree, sand, and gravel, often along streams.

**Saxifraga cernua L.** Seven small populations of this circumboreal species are known from Idaho (unpublished data on file at the Idaho Conservation Data Center, Boise). At Kane Lake Cirque it is widely scattered in small populations from moist subalpine ledges north of Kane Lake at 2500 m to ledges and cracks on the headwall at 3400 m.
The checklist is arranged by division and class (in Magnoliophyta), then alphabetically by family, genus, and species within these major groupings. Nomenclature generally follows Hitchcock and Cronquist (1973), exceptions being Salts (Brunsfeld and Johnson 1985), Carex incana variformis and C. scopulorum var. bracteosa (Hermann 1970), and Eriogonum capistratum (Reveal 1989). Unless otherwise noted, the collection numbers are the authors'.

**DIVISION LYCOPODIOPHYTA**
Selaginellaceae

_Selaginella denea_ Rydb. Common in subalpine and alpine zones; moist to dry slopes and ledges and stabilized scree. 2245.

**DIVISION POLYPODIOPHYTA**
Polypodiaceae

_Cryptogramma crispa_ (L.) R. Br. Uncommon in moist subalpine and alpine talus; circumalpine. 2292.

_Cystopteris fragilis_ (L.) Bernh. Common among rocks in moist alpine sites; circumalpine. 2294.

_Pellaea brevifolia_ D.C. Eat. Uncommon in subalpine and alpine zones; stabilized scree, rocky ledges, and boulder fields. 2295.

_Woodsia scopulina_ D.C. Eat. Common on rocks in subalpine zone. 2252.

**DIVISION PINOPHYTA**
Cupressaceae

_Juniperus communis_ L. var. montana Ait. Rare on dry ledges of lower alpine zone and in krummholz. 2356.

_Finetia_ L.

_Abies lasiocarpa_ (Hook.) Nutt. Common in woodland and krummholz communities. 2362.


_Pinus albicaulis_ Engelm. Common in woodland and krummholz communities. 2263.

**DIVISION MAGNOLIOPHYTA**
CLASS MAGNOLIOPSIDA
Asteraceae

_Lomatium idahoense_ Math. & Const. Rare in disturbed microsites in moist subalpine meadows north of Kane Lake. 2256.

_Osmorhiza chilensis_ H. & A. Uncommon in deep soil of forest understory. 2376B.

_Achillea millefolium_ L. var. lanulosa (Nutt.) Piper var. alpicola (Ryd.) Garrett. Common on dry subalpine and alpine slopes. 2262.

_Agoseria aurantiaca_ (Hook.) Greene. Uncommon in subalpine meadows north of Kane Lake. 2287.

_Antennaria alpina_ (L.) Gaertn. var. media (Greene) Jeps. Common in moist, sandy soil in alpine zone. 1186, 2236.

_Antennaria dimorpha_ (Nutt.) T. & G. Rare in dry forest opening north of Kane Lake. 2203.

_Antennaria microphylla_ Rydb. Common on dry subalpine and alpine slopes. 2244.

_Antennaria umbrinella_ Rydb. Common in dry to moist subalpine and alpine meadows. 2308, 2312.

_Arnicas latifolia_ Bong. var. gracilis (Ryd.) Cronq. Common in deep soil of subalpine and alpine slopes and boulder fields. 2246.

_Arnicas mollis_ Hook. Common in moist subalpine and lower alpine meadows and boulder fields. 1177, 2319, 2434.

_Artemisia michauxiana_ Bess. Uncommon in moist, unstable, rocky drainage bottoms; subalpine and lower alpine zones. 2383.

_Artemisia tridentata_ Nutt. Rare on dry subalpine slopes north of Kane Lake. 2261.

_Aster alpinus_ (T. & G.) Gray var. haydenii (Porter) Cronq. Dry openings in forest north of Kane Lake. 2419.

_Aster foliacus_ Lindl. var. apricus Gray. Common in moist meadows east of Kane Lake. 1175.

_Aster stenomeres_ Gray. Dry, rocky ledges in forest openings north of Kane Lake. 2255.

_Chaenactis alpina_ (Gray) Jones. Uncommon in subalpine and alpine dry, sandy scree. 2361.

_Cirsium tweedyi_ (Ryd.) Petr. Common in moist meadows and on ledges in alpine zone. 2378.

_Erigeron acris_ L. var. debilis Gray. Common in moist, sandy soil; subalpine and alpine zones. 1183, 2287, 2244.

_Erigeron aspergus_ (Eat.) Gray. Dry slopes and ledges; common in subalpine and uncommon in lower alpine zones. 2230, 2250.

_Erigeron compositus_ Pursh var. glabratus Macoun. Common on dry subalpine and alpine ledges. 2205.

_Erigeron coulteri Porter. Rare in alpine meadows along creek east of Kane Lake. 1174.

_Erigeron humilis_ Graham. Locally common in moist alpine meadows. 2274, 2410; Caico 294.

_Erigeron peregrinus_ (Pursh) Greene var. callianthemus (Greene) Cronq. var. scopalus (T. & G.) Cronq. Common in moist to wet subalpine meadows around Kane Lake. 2306, 2367.

_Erigeron simplex_ Greene. Common in subalpine and alpine zones; moist meadows and slopes. 1188, 2270, 2338; Caico 476; Etter 2108.

_Haplappus hyalii_ Gray. Uncommon on dry alpine ledges. 2202.

_Haplappus macrocorna_ Gray. Uncommon on dry subalpine knoll, within forest north of Kane Lake. Not collected.

_Haplappus suffruticosus_ (Nutt.) Gray. Uncommon on dry subalpine knoll, within forest north of Kane Lake. Not collected.

_Hieracium gracile_ Hook. Uncommon in dry forest openings north of Kane Lake. 2305.


_Microseris nutans_ (Geyer) Shulz-Bip. Uncommon in subalpine meadows north of Kane Lake. 2385.

_Senecio cymbalarioides_ Buck. Common in moist subalpine and alpine meadows. 1173.


_Senecio strepantanifolius_ Greene. Common in subalpine zone; dry slopes and forest understory. 2235.
Solidago multiradiata Ait. var. scopulorum Gray. Dry, rocky subalpine and alpine ledges. 2258.
Taraxacum lyratum (Ledeb.) DC. Common in alpine zone; moist meadows and slopes. 1185, 2289.
Taraxacum officinale Weber. Allen; rare in subalpine meadows north of Kane Lake. 2388.

Boraginaceae

Mertensia ciliata (Torr.) G. Don. Common along subalpine and lower alpine rivulets. 2268.

Brassicaceae

Arabis sp. Immature and unidentifiable to species. Uncommon in dry to moist forest openings north of Kane Lake. 2375.
Arabis lemmonii Watts. var. lemmonii. Common on dry, unstable alpine slopes. 2313, 2356.
Arabis microphylla Nutt. var. microphylla. Common on subalpine ledges and ledges north of Kane Lake. 2249.
Arabis microphylla Nutt. var. saximontana Rollins. Uncommon in moist soil of alpine zone. 2374.
Draba sp. Unable to identify; possibly a new taxon. Rare; seen only in one small, steeply sloping, moist meadow at 3353 m, east of Kane Lake. 2412.
Draba fladnizensis Wilcox. Circumpolar; rare on disturbed, bare-soil microsites of steep alpine slopes and along rivulets. 1107.
Draba lonicocarpa Rydb. var. lonicocarpa. Common throughout cirque on moist ledges and slopes; alpine zone. 1106, 2314; Erter 2106.
Draba oligosperma Hook. var. oligosperma. Rare on dry alpine slopes and ledges. 2357, 2366; Erter 2102.
Draba paysonii Macbr. var. treleassii (Schulz) Hitch. Uncommon in dry, sandy alpine soil. 2405.
Erysimum asperum (Nutt.) DC. Rare in dry subalpine talus north of Kane Lake. 2377.
Snelowskaia calycina (Steph.) C.A. Mey. var. americana (Regel & Herd) Drury & Rollins. Uncommon on dry, exposed alpine slopes 2349; Erter 2107.

Caryophyllaceae

Arenaria aculeata Wats. Dry, sandy slopes; common in subalpine and rare in alpine zone. 2236, 2351.
Arenaria congesta Nutt. Uncommon on dry alpine slopes east of Kane Lake. 1187.
Arenaria obtusiloba (Rydby) Fern. Dry, exposed slopes and ledges; common in alpine and uncommon in subalpine zone. 2354.
Arenaria rubella (Wahlenb.) J.E. Smith. Circumpolar; uncommon on dry alpine ledges. 2424.
Cerastium beringianum Cham. & Schlch. Common in alpine zone throughout cirque; moist slopes, meadows, and ledges. 2321, 2415.
Sagina saginoides (L.) Britt. Circumpolar; uncommon in moist alpine meadows. 1179, 2260.
Silene douglasii Hook. var. douglasii. Dry, rocky ledges; uncommon in subalpine and lower alpine zone. 2364.
Silene repens Pers. var. australis Hitch, & Mag. Rare among rocks of boulder field east of Kane Lake. Caicco 2956.
Stellaria longipes Goldie var. altoalpinus (Hulten) Hitch. Uncommon in moist, sandy sites and scree on alpine meadows. 1180, 2327.
Stellaria umbellata Turcz. Rare in wet to moist gravels along alpine rivulets. 2326, 2347.

Crassulaceae

Sedum lanceolatum Torr. var. lanceolatum. Common on moist to dry subalpine and alpine slopes and ledges. 2240.

Ericaceae

Kalmia microphylla (Hook.) Heller. Common in moist to wet subalpine and alpine meadows. 2304.
Ledum glandulosum Nutt. var. glandulosum. Common in moist subalpine forest and meadows around Kane Lake. 2303.
Phyllodoce empetriformis (Sw.) D. Don. Common on moist subalpine and alpine slopes. 2300.
Phyllodoce glandulifera (Hook.) Cov. Common on moist subalpine and alpine slopes. 2302.
Vaccinium scoparium Leiberg. Common in dry sites in understory of forest and krummholz. 2337.

Fabaceae

Astragalus alpinus L. Circumboreal. Common in moist meadows throughout cirque; subalpine and alpine zones. 2318, 2373; Caicco 974.
Astragalus eucosmus Robins. Rare in cracks of moist cliff near stream; alpine zone. 2396.
Astragalus kentrophyta Gray var. impexus (Canby) Barneby. Common on exposed, dry alpine slopes and ledges. 2332; Erter 2102.
Trifolium longipes Nutt. var. pedunculatum (Rydby.) Hitch. Uncommon in deep soil along subalpine streambank north of Kane Lake. 2380.

Gentianaceae

Fraseria speciosa Doug. Uncommon in dry subalpine talus north of Kane Lake. 2415.
Gentiana prostrata Huenke. Rare; seen only in moist, steeply sloping meadow above pond east of Kane Lake; alpine zone. 2415.

Grossulariaceae

Ribes cereum Dougl. var. iuebrians (Lindl.) Hitch. Uncommon in subalpine and alpine zones; dry ledges and boulder fields. 2409.
Ribes hensdorffii Hitch. Rare and local in dry boulder field east of Kane Lake; alpine zone. 2416.
Ribes lacustre (Pers.) Poir. Uncommon along subalpine creek near outlet of Kane Lake. 2396.
Ribes montigenum McClatchie. Common in boulder fields and dry forest understory; subalpine zone. 2310.

Hydrophyllaceae

Phacelia hastata Doug. var. alpina (Rydby.) Cronq. Uncommon in moist to dry alpine talus. 2406.

Onagraceae

Epilobium alpinum L. var. alpinum. Common on moist, unstable subalpine and alpine slopes; circumboreal. 2333.
Epilobium angustifolium L. Rare in dry forest opening north of Kane Lake. 2418.
Epilobium glaberrimum Barbey var. fastigiatum
Kane Lake Cirque Vascular Flora

Poaceae

Potentilla brevifolia Nutt. Locally common on dry alpine outcrops at 3050 m, southwest of Kane Lake. 2399.

Potentilla dicerafolia Lehmann var. dicerafolia.

Common throughout cirque in moist subalpine and alpine meadows. 2353, 2307, 2372.

Potentilla fruticosa L. [Pentaphylloideae floribunda (Pursh) Löve]. Common on moist ledges and in boulder fields of subalpine and alpine zones; circumboreal. 1171, 2317.

Potentilla glandulosa Lindl. var. pseudrapestris (Rydberg) Breit. Local on dry subalpine ledges. 2366.

Potentilla nivea L. Circumpolar. Rare in moist subalpine and alpine zones; circumboreal. 1171.

Salix alba L. (Rydb.) Breit. Local in moist subalpine and alpine meadows. 2337.

Salix planifolia Pursh. Common in subalpine meadows west of Kane Lake. 2286.

Salix tweedii (Bebb) Ball. Rare; only one robust plant seen at base of small cascades at 2865 m, west of Kane Lake; subalpine zone. 2421.

Rosaceae

Heuchera cylindrica Dougl. var. alpina Wats. Common in subalpine and lower alpine zones on dry ledges and outcrops and moderately stabilized scree. 2339.

Lithophragma bulbiferum Rydberg. [L. glabrum Nutt.]. Uncommon on moist subalpine slopes. 2370.

Mitella benthamii Hook. Uncommon in lower alpine and subalpine zones; moist meadows and slopes. 2330.

Parnassia fimbriata Common. var. fimbriata. Locally common in moist subalpine and alpine meadows. 1176; Caicco 283.

Parnassia kotzebuei Cham. var. kotzebuei. Uncommon and local in gently to steeply sloping alpine meadows and on ledges. 2285, 2329; Caicco 280.

Saxifraga adscendens L. var. oregonensis (Raf.). Breit. Uncommon in moist, sloping meadows and talus and along rivulets in alpine zone. 2331; Caicco 282.

Saxifraga arguta D. Don [S. odontoloma Piper]. Common along streams and rivulets in subalpine and lower alpine zones. 1178, 3335.

Saxifraga cernua L. Uncommon and widely scattered in moist scree and sloping meadows and on ledges of alpine and subalpine zones; circumboreal. 2420.

Saxifraga debilis Engelm. Common on moist and protected alpine ledges and slopes. 1108, 1109, 2324; Caicco 281; Ertter 2105.

Saxifraga occidentalis Wats. var. occidentalis. Common in moist subalpine and alpine meadows. 2242, 2277, 2316, 2329, 2401.
Saxifraga oppositifolia L. Common on moist alpine cliff faces; circumboreal. 2358.

Scrophulariaceae

Castilleja miniata Doug. Common in moist to wet subalpine and low alpine meadows. 2290.

Mimulus tilingii Regel var. caespitosus (Greene) Grant. Common along alpine streams and rivulets. 1189.

Penstemon procercus Doug. var. formosus (A. Nels.) Cronq. Common in subalpine zone and uncommon in alpine zone on dry, rocky ledges. 2259.

Veronica wormskjoldii Roem. & Schult. Common in moist to wet and alpine subalpine meadows, 1184, 2285.

Viola

Viola adunca Sm. var. bellidifolia (Greene) Harr. Common in subalpine and alpine zones on moist meadows and slopes. 2390, 3371.

Viola macloskeyi Lloyd var. macloskeyi. Common in wet subalpine meadow adjacent to Kane Lake. 2309.

CLASS LILIOPSIS

Cyperaceae

Carex atrata L. var. erecta Boott. Rare in moist soil of boulder field north of Kane Lake; subalpine. Erter 2110.

Carex capillaris L. Circumboreal. Uncommon in moist, steeply sloping meadow south of Kane Lake; lower alpine zone. 2332.

Carex elymioides Holm. Uncommon on exposed alpine ledges east of Kane Lake. 2425.

Carex haydeniana Olney. Common in moist subalpine and alpine meadows. 2278, 2431.

Carex incurviformis Mack. cf. var. incurviformis. Rare; seen only in one small, steeply sloping, moist meadow at 3553 m. east of Kane Lake. 2411.

Carex microptera Mack. Uncommon in moist subalpine meadows north of Kane Lake. 2383.

Carex nova Bailey. Common in moist alpine meadows. 2291, 2428; Caico 475.

Carex pheocephala Piper. Widely scattered in dry alpine sites. 1190, 2430; Erter 2110A.

Carex proposita Mack. Common on moist subalpine and alpine slopes. 2279.

Carex rossii Boott. Uncommon in dry areas of forest understory. 2247.

Carex scirpoides Michx. var. pseudoscirpoides (Ryd.) Cronq. Common on moist, sandy subalpine and alpine slopes. 1180, 2254, 2432; Caico 473.

Carex scopulorum Holm var. bracteosa Hermann. Common in wet meadows along creeks and around Kane Lake in subalpine and alpine zones. 2282.

Carex submigrans Stacey. Uncommon in moist alpine and subalpine meadows. 2428.

Juncaceae

Juncus drummondii E. Meyer var. drummondii. Common in moist to dry, sandy soil of subalpine and alpine slopes. 2253, 2297.


Lusula parviflora (Ehrh.) Desv. Common in moist subalpine and low alpine meadows. 2320.

Lusula spicata (L.) DC. Common on moist, unstable slopes of subalpine and alpine zones; circumboreal. 1197, 2323; Caico 490; Erter 2103.

Liliaceae

Allium brandegei Wats. Rare in dry forest openings north of Kane Lake. 2394.

Allium brevistylum Wats. Common in moist, steeply sloping meadows in subalpine and lower alpine zones. 2334.

Calochortus eurycairpus Wats. Rare in dry areas of subalpine meadow north of Kane Lake. 2384.

Zigadenus elegans Purb. Common in moist, sloping alpine meadows. 2340; Caico 478.

Poaceae

Agropyron scribneri Vasey [Elymus scribneri (Vasey) Jones]. Uncommon on dry, unstable alpine and subalpine slopes. 2372.

Agrostis humilis Vasey. Uncommon on moist, sandy alpine ledges. 1196, 2368.

Agrostis variabilis Rydb. Uncommon in moist alpine meadows. 1194.

Calamagrostis purpurascens R. Br. Uncommon on dry, rocky subalpine and alpine ledges. 2265.

Dianthus intermedius Vasey. Commonly in subalpine meadows north of Kane Lake. 2356.

Deschampsia cespitosa (L.) Beauv. var. cespitosa. Common throughout cirque in subalpine and alpine meadows where it is often dominant; circumboreal. 1192, 2325; Caico 481.

Festuca idahoensis Elmer var. idahoensis. Uncommon in dry forest openings north of Kane Lake. 2241.

Festuca ovina L. var. brevifolia (R. Br.) Wats. [F. brachypyllya Schult. & Schult..]. Uncommon in alpine zone; moist to dry meadows and ledges. 2273, 2407.

Oryzopsis exigua Thurb. Common in dry subalpine sites north of Kane Lake. 2251.

Phleum alpinum L. Common in wet to moist subalpine and alpine meadows; circumboreal. 1191, 2281.

Poa alpina L. Common in wet to moist subalpine and alpine meadows. 2296.

Poa cusickii Vasey var. cusickii. Uncommon in moist to dry subalpine meadows. 2296.

Poa cusickii Vasey var. epilis (Scribn.) Hitchc. Uncommon in moist subalpine meadows. 2282.

Poa gracillima Vasey. Uncommon on dry ledges in forest openings. 2238.

Poa incurva Scribn. & Will. Uncommon in dry subalpine meadows. 2281.

Poa interior Rydb. Uncommon on dry alpine slopes and in scree. 2426.

Poa nervosa (Hook.) Vasey var. wheeleri (Vasey) Hitchc. Common on dry ledges and in forest understory north of Kane Lake. 2234.

Poa rupicola Nash. Uncommon on dry, rocky alpine slopes. 2247.

Sitanion hystric (Nutt.) Smith var. hystric (Elymus elymoides (Raf.) Swezy]. Uncommon in subalpine and alpine zones on dry, rocky ledges and slopes. 2243.


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**Literature Cited**


