A BOTANICAL INVENTORY OF KANE LAKE CIRQUE, PIONEER MOUNTAINS, IDAHO INCLUDING MANAGEMENT RECOMMENDATIONS FOR RARE PLANT POPULATIONS

by

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ABSTRACT

Preliminary evidence indicated that the alpine flora of Kane Lake Cirque, in the Pioneer Mountains, ca. 13 miles northeast of Ketchum, contained many widely disjunct species, including several Forest Service Sensitive Species. Based on these preliminary data, the Idaho Department of Fish and Game's Conservation Data Center[1], in a cooperative project with the Challis National Forest, conducted an extensive botanical inventory of the area in July, 1991. We collected 180 species of vascular plants, including five species that have not previously been reported from Idaho: *Carex incurviformis, Draba fladnizensis*, *Potentilla nivea*, *Ranunculus gelidus*, and *Ranunculus pygmaeus*. Four additional species that are rare in Idaho also occur in the study area, including *Erigeron humilis* and the Forest Service Sensitive Species, *Parnassia kotzebuei, Saxifraga adscendens*, and *Saxifraga cernua*. We present a complete checklist of the vascular flora, along with a description of the physical characteristics and plant communities of the study area. We also make suggestions concerning the management of rare plant populations and habitats. Data presented in this report suggest that the Kane Lake Cirque is of extraordinary biological significance in the state of Idaho and should be designated as a Special Interest Botanical Area.

[1] Formerly the Idaho Natural Heritage Program.

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PREFACE

Recent botanical exploration of the Kane Lake Cirque has revealed that it is of great phytogeographical importance, containing disjunct populations of many arctic-alpine species that are rare in Idaho. Several of these species are regionally-designated Forest Service Sensitive Species. The Kane Lake Cirque is also a beautiful, idyllic alpine setting and is visited by many recreationists each year. Recognizing the sensitivity of the rare plant populations and alpine habitats, and that high recreation use could potentially impact these values, the Challis National Forest entered into a cooperative Challenge Cost-share project with the Idaho Department of Fish and Game's Conservation Data Center to inventory the botanical features of the area.

Our objectives in this project are twofold: (1) provide the Challis NF with a botanical inventory of the Kane Lake Cirque, concentrating on delimiting populations of rare plants; and (2) make management recommendations to the Forest concerning the long-term management of rare plant populations and habitats in the cirque.

This report is divided into two parts to reflect the two objectives. The results of our botanical inventory are summarized in Part 1, which includes a description of the Pioneer Mountains, in general, and Kane Lake Cirque, in particular, a description of the plant communities and rare plants, and a checklist of the alpine and high subalpine flora of the cirque. Part 1 is in manuscript form and will be submitted to the *Great Basin Naturalist* for publication. *Great Basin Naturalist* is a regional journal pertaining to the biological natural history of western North America. By publishing this checklist of the vascular flora of the Kane Lake Cirque, we hope to make the results of our floristic inventory and phytogeographic significance of the cirque more widely known to scientists than could be accomplished through this report alone.

In Part 2, we make recommendations to the Challis NF concerning the management, protection, and interpretation of the rare plant populations and their habitats in the cirque. To facilitate publication of Part 1, we have prepared both parts as stand-alone documents.

PART 1

THE VASCULAR FLORA OF KANE LAKE CIRQUE, PIONEER MOUNTAINS, IDAHO

INTRODUCTION

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-1970's were the first to systematically explore the alpine zone of Idaho. Through numerous collections (Henderson 1978, Henderson *et al*. 1981, Brunsfeld 1981, Brunsfeld *et al*. 1983, Caicco *et al*. 1983, Lackshewitz *et al*. 1983, Hartman and Constance 1985), he and coworkers documented Idaho's alpine flora to be unique in many respects. Nearly all these investigations took place in the large Basin and Range-like massifs in east-central 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). 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 in order 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, and are oriented northwest to southeast. Topography varies from sharp horns, serrate ridges, and broad upland surfaces in the alpine to steep-sided valleys and rounded ridges in the foothills. Elevations range from 1,900 m (6,233 feet) in the valleys on the western slope to 3,658 m (12,009 feet) at the summit of Hyndman Peak.

The Pioneer Mountains are composed of Tertiary Challis Volcanics, consisting of interbedded lava and tuffaceous units, which lie uncomformably 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 geomorphologic setting has been greatly influenced by Quaternary glacial and fluvial activity. Most streams in glaciated valleys are underfit and 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 which move eastward from the Pacific Ocean. During May and June, most of the precipitation results from high altitude convectional storms moving northward from the Gulf of Mexico and the California coast. The

combination of maritime and continental influence creates two wet seasons, during the winter and late spring, respectively (Caicco 1983). No climatic data are available from high elevations in the alpine zone of the Pioneer Mountains, however, Moseley (1985) estimates the mean annual precipitation at 2,835 m (9,300 feet) in the southern part of the range to be 813 mm (32 inches). Throughout the mountainous regions of the world, the altitude of upper treeline has long been observed to coincide with the 10ºC (50ºF) isotherm of the warmest month (Griggs 1937, Daubenmire 1954, Wardle 1974). Extrapolation of temperatures from valley stations in the vicinity to timberline (3,000 m; 9,842 feet) using an adiabatic lapse rate of 0.62ºC/100 m (0.33ºF/328 feet) (Baker 1944) substantiate this observation for the Pioneer Mountains.

DESCRIPTION OF KANE LAKE CIRQUE

The Kane Lake Cirque encompasses approximately 567 ha (1,400 acres) at the head of Kane Creek, in the western Pioneer Mountains, 21 km northeast of Ketchum, Custer County, Idaho (43º44'N 114º6'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 there are several small ponds scattered throughout the basin, 5.3 ha (13 acre) Kane Lake is the only large body of water. The only appreciable soil development is in depositional areas, such as along streams and rivulets, around ponds and Kane Lake, and in the coniferous woodland on the north side of Kane Lake. Elevations of the study area range from 2,800 m (9,186 feet) to 3,648 m (11,968 feet).

The vegetation in the cirque reflects a moister regime than has been noted at high elevations elsewhere in Idaho (Brunsfeld 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, provide adequate moisture to nearly all habitats throughout the growing season.

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 doesn't exceed about 2,850 m (9,350 feet). Alpine habitats cover most of the area and are generally sparsely vegetated. 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*, with lesser amounts of *Abies lasiocarpa* and *Picea engelmannii* occupy the level bench north of Kane Lake. The relatively xeric understory is characterized by *Vaccinium scoparium, Poa nervosa,* and *Senecio streptanthifolius.*

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, Danthonia intermedia, Erigeron simplex,* and *Potentilla diversifolia*.

Tree Islands and Krummholz Isolated tree islands, consisting of small, upright *Abies lasiocarpa* with

an understory dominated by *Phyllodoce* spp., occur as high as 3,050 m (10,000 feet) on benches south of the lake. These relatively moist sites are surrounded by bedrock or alpine meadow communities. Because the cirque is largely protected from the prevailing southwesterly winds by steep headwalls, 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 3,230 m (10,597 feet) 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* is the dominant here along with scattered forbs, such as *Erigeron peregrinus, Senecio cymbalarioides,* and *Gentiana calycosa*. Low shrubs, including *Salix planifolia* and *Ledum glandulosum,* 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* 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* being the most constant species, along with several species of *Saxifraga*. The dry 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* and *Senecio fremontii*, while *Saxifraga cernua, Luzula spicata*, and *Androsace septentrionale* 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, Juncus drummondii,* and *Sibbaldia procumbens*. *Carex elynoides* 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 Idaho, are sharp aretes with no well-developed vegetation.

RESULTS AND DISCUSSION

The vascular flora of the 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).

Taxa New to Idaho

Carex incurviformis This species is endemic to two areas in the North American Cordillera: var. *incurviformis*, known from the Rocky Mountains of British Columbia, Alberta, Montana, and now Idaho, and var. *danaensis* (Stacey) Hermann endemic to the southern Rocky Mountains of Colorado and the Sierra Nevada and White Mountains of California. The population in Kane Creek is disjunct south from the next closest known population in Deer Lodge County, Montana, by about 260 km (161 miles) (Lesica and Shelly 1991). We found one small population in the Kane Lake Cirque, occurring in a steeply-sloping meadow on seepy ledges at 3,350 m (10,990 feet), at the southern end of the cirque.

Draba fladnizensis A widespread circumpolar species, *Draba fladnizensis* is sparsely distributed in North America, from the arctic, south through the Rocky Mountains to Utah and Colorado. 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 (161 miles) (unpublished data of the Montana Natural Heritage Program, Helena). 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 This species is endemic to the arctic and alpine regions of North America, being previously known in western North America from the main crest of the Rocky Mountains in Montana, Wyoming, Colorado and east to Utah and Nevada. The Kane Lake Cirque population is disjunct from the nearest Montana populations by perhaps 280 km (174 miles). 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 2,950 m (9,678 feet).

Ranunculus gelidus A North American endemic, this species is distributed across the arctic, southward in the Rocky Mountains to Colorado. The very small population in Kane Creek Cirque represents a disjunction southwestward of about 350 km (217 miles) from the Beartooth Plateau, Carbon County, Montana (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 3,170 m (10,500 feet).

Ranunculus pygmaeus This buttercup is also a North American endemic, occurring from Alaska to Greenland, south along the Rocky Mountain crest to Colorado. Its presence in the Kane Lake Cirque represents a disjunction of about 200 km (124 miles) southwest, from the next nearest known populations in the Pioneer Mountains, Beaverhead County, Montana. *Ranunculus pygmaeus* 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 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 of 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. Individuals in these populations outnumber all others known in the state, combined.

Parnassia kotzebuei 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. The Kane Lake Cirque populations are larger than the combined totals of all others in the state.

Saxifraga adscendens The North American representative of this wideranging species, var. *oregonensis*, occurs throughout the Rocky Mountains and northern Cascade Range. 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). The populations in Kane Lake Cirque occur throughout the area on moist scree, sand and gravel, often along streams, and are by far the largest known in the state.

Saxifraga cernua 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 2,800 m (9,186 feet), to ledges and cracks on the headwall at 3,400 m (11,154 feet).

Annotated Checklist of Vascular Plants

The checklist is arranged alphabetically by family, genus, and species without regard to phylogenetic order. Nomenclature generally follows Hitchcock and Cronquist (1973), exceptions being *Salix* (Brunsfeld and Johnson 1985), *Carex incurviformis* and *C. scopulorum* var. *bracteosa* (Hermann 1970), and *Eriogonum capistratum* (Reveal 1989). The list is based on 263 collections, made mostly by ourselves in July and August, 1987, and July, 1991. Other collectors include Barbara Ertter, who visited Kane Lake in July, 1977, and Steven Caicco, who collected in the cirque during July, 1981, and August, 1982. Unless otherwise noted, the collection numbers are ours. A nearly complete set of specimens is deposited at the University of Idaho Herbarium (ID), with duplicates distributed widely. Ertter's collections are deposited at the Albertson College of Idaho (CIC).

Apiaceae

***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.

Asteraceae

***Achillea millefolium* L. ssp. *lanulosa* (Nutt.) Piper var. *alpicola* (Rydb.) Garrett.** Common on dry, subalpine and alpine slopes. 2262.

***Agoseris aurantiaca* (Hook.) Greene.** Uncommon in subalpine meadows north of Kane Lake. 2387.

***Antennaria alpina* (L.) Gaertn. var. *media* (Greene) Jeps.** Common in moist, sandy soil in alpine. 1186, 2336.

***Antennaria dimorpha* (Nutt.) T. & G.** Rare in dry forest opening north of Kane Lake. 2393.

***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.

***Arnica latifolia* Bong. var. *gracilis* (Rydb.) Cronq.** Common in deep soil of subalpine and alpine slopes and boudlerfields. 2246.

***Arnica mollis* Hook.** Common in moist subalpine and lower alpine meadows and boulderfields. 1177, 2319, 2343.

***Artemisia michauxiana* Bess.** Uncommon in moist, unstable, rocky drainage bottoms; subalpine and lower alpine. 2363.

***Artemisia tridentata* Nutt.** Rare on dry subalpine slopes north of Kane Lake. 2261.

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

***Aster foliaceus* Lindl. var. *apricus* Gray.** Common in moist alpine meadows east of Kane Lake. 1175.

***Aster stenomeres* Gray.** Dry rocky ledges in forest openings north of Kane Lake. 2235.

***Chaenactis alpina* (Gray) Jones.** Uncommon in subalpine and alpine dry, sandy scree. 2361.

***Cirsium tweedyi* (Rydb.) Petr.** Common in moist meadows and on ledges in alpine. 2378.

***Erigeron acris* L. var. *debilis* Gray.** Common in moist sandy soil; subalpine and alpine. 1183, 2287, 2344.

***Erigeron asperuginus* (Eat.) Gray.** Dry slopes and ledges; common in subalpine and uncommon in lower alpine. 2250, 2350.

***Erigeron compositus* Pursh var. *glabratus* Macoun.** Common on dry subalpine and alpine ledges. 2265.

***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; Caicco 284.

***Erigeron peregrinus* (Pursh) Greene ssp. *callianthemus* (Greene) Cronq. var. *scaposus* (T. & G.) Cronq.** Common in moist to wet subalpine meadows around Kane Lake. 2306, 2367.

***Erigeron simplex* Greene.** Common subalpine and alpine; moist meadows and slopes. 1188, 2270, 2338; Caicco 476; Ertter 2108.

***Haplopappus lyallii* Gray.** Uncommon on dry alpine ledges. 2402.

***Haplopappus macronema* Gray.** Uncommon on dry, subalpine knoll, within forest north of Kane Lake. Not collected.

***Haplopappus 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.

***Hulsea algida* Gray.** Common in alpine talus. 2403.

***Microseris nutans* (Geyer) Schultz-Bip.** Uncommon in subalpine meadows north of Kane Lake. 2385.

***Senecio cymbalarioides* Buek.** Common in moist subalpine and alpine meadows. 1173.

Senecio fremontii* T. & G. var. *fremontii. Common in alpine talus. 2400.

***Senecio streptanthifolius* Greene.** Common in subalpine; dry slopes and forest understory. 2255.

***Solidago multiradiata* Ait. var. *scopulorum* Gray.** Dry, rocky, subalpine and alpine ledges. 2258.

***Taraxacum lyratum* (Ledeb.) DC.** Common alpine; moist meadows and slopes. 1185, 2289.

***Taraxacum officinale* Weber.** 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.** Uncommon in dry to moist forest openings north of Kane Lake. 2375.

Arabis lemmonii* Wats. var. *lemmonii. Common on dry, unstable alpine slopes. 2313, 2356.

Arabis microphylla* Nutt. var. *microphylla. Common on subalpine ledges and slopes north of Kane Lake. 2248.

***Arabis microphylla* Nutt. var. *saximontana* Rollins.** Uncommon in moist soil of alpine. 2374.

***Draba* sp.** Rare; seen only in one small, steeply-sloping, moist meadow at 11,000 feet, east of Kane Lake. 2412.

***Draba crassifolia* R.Grah.** Common in moist soil throughout cirque; alpine and subalpine. 2274.

***Draba fladnizensis* Wilfen.** Rare on disturbed, bare-soil microsites of steep alpine slopes and along rivulets. 1107.

Draba lonchocarpa* Rydb. var. *lonchocarpa. Common throughout cirque on moist ledges and slopes; alpine. 1106, 2314; Ertter 2106.

Draba oligosperma* Hook. var. *oligosperma. Rare on dry alpine slopes and ledges. 2357, 2362; Ertter 2102.

***Draba paysonii* Macbr. var. *treleasii* (Schulz) Hitchc.** Uncommon in dry, sandy alpine soil. 2405.

***Erysimum asperum* (Nutt.) DC.** Rare in dry, subalpine talus north of Kane Lake. 2377.

***Smelowskia calycina* (Steph.) C.A. Mey. var. *americana* (Regel & Herd) Drury & Rollins.** Uncommon on dry, exposed alpine slopes. 2349; Ertter 2107.

Caryophyllaceae

***Arenaria aculeata* Wats.** Dry, sandy slopes; common subalpine and rare alpine. 2236, 2351.

***Arenaria congesta* Nutt.** Uncommon on dry alpine slopes east of Kane Lake. 1187.

***Arenaria obtusiloba* (Rydb) Fern.** Dry, exposed slopes and ledges; common alpine and uncommon subalpine. 2354.

***Arenaria rubella* (Wahlenb.) J.E. Smith.** Uncommon on moist to dry alpine ledges. 2424.

***Cerastium berringianum* Cham. & Schlecht.** Common in alpine throughout cirque; moist slopes, meadows, and ledges. 2321, 2413.

***Sagina saginoides* (L.) Britt.** Uncommon in moist alpine meadows. 1179, 2260.

Silene douglasii* Hook. var. *douglasii. Dry rocky ledges; uncommon subalpine and lower alpine. 2364.

***Silene repens* Pers. var. *australe* Hitchc. & Mag.** Rare among rocks of boulderfield east of Kane Lake. Caicco 286.

***Stellaria longipes* Goldie var. *altocaulis* (Hulten) Hitchc.** Uncommon in moist, sandy sites and scree in 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.

Cupressaceae

***Juniperus communis* L. var. *montana* Ait.** Rare on dry ledges of lower alpine and krummholz. 2355.

Cyperaceae

***Carex atrata* L. var. *erecta* Boott.** Rare in moist soil of boulderfield north of Kane Lake; subalpine. Ertter 2110.

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

***Carex elynoides* 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 11,000 feet, 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; Caicco 475.

***Carex phaeocephala* Piper.** Widely scattered in dry alpine sites. 1190, 2430; Ertter 2110A.

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

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

***Carex scirpoidea* Michx. var. *pseudoscirpoidea* (Rydb.) Cronq.** Common on moist, sandy subalpine and alpine slopes. 1189, 2254, 2432; Caicco 473.

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

***Carex subnigricans* Stacey.** Uncommon in moist alpine and subalpine meadows. 2429.

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 glandulifera* (Hook.) Cov.** Common on moist subalpine and alpine slopes. 2302.

***xPhyllodoce intermedia* (Hook.) Camp.** Common on moist subalpine and alpine slopes. 2301.

***Phyllodoce empetriformis* (Sw.) D.Don.** Common on moist subalpine and alpine slopes. 2300.

***Vaccinium scoparium* Leiberg.** Common in dry sites in understory of forest and krummholz. 2237.

Fabaceae

***Astragalus alpinus* L.** Common in moist meadows throughout cirque; subalpine and alpine. 2318, 2373; Caicco 474.

***Astragalus eucosmus* Robins.** Rare in cracks of moist cliff near stream; alpine. 2396.

***Astragalus kentrophyta* Gray var. *implexus* (Canby) Barneby.** Common on exposed, dry alpine slopes and ledges. 2352; Ertter 2101.

***Trifolium longipes* Nutt. var. *pedunculatum* (Rydb.) Hitchc.** Uncommon in deep soil along subalpine stream north of Kane Lake. 2380.

Gentianaceae

***Frasera speciosa* Dougl.** Uncommon in dry subalpine talus north of Kane Lake. 2415.

***Gentiana calycosa* Griseb. var. *asepala* (Maguire) Hitchc.** Common in moist subalpine and low alpine meadows. 1172.

***Gentiana prostrata* Haenke.** Rare; seen only in moist, steeply-sloping meadow above ponds east of Kane Lake; alpine. 2408.

Grossulariaceae

***Ribes cereum* Dougl. var. *inebrians* (Lindl.) Hitchc.** Uncommon in subalpine and alpine; dry ledges and boulderfields. 2409.

***Ribes hendersonii* Hitchc.** Rare and local in dry boulderfield east of Kane Lake; alpine. 2416.

***Ribes lacustre* (Pers.) Poir.** Uncommon along subalpine creek near outlet of Kane Lake. 2398.

***Ribes montigenum* McClatchie.** Common in boulderfields and dry forest understory; subalpine. 2310.

Hydrophyllaceae

***Phacelia hastata* Dougl. var. *alpina* (Rydb.) Cronq.** Uncommon in moist to dry alpine talus. 2406.

Juncaceae

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

***Juncus mertensianus* Bong.** Common in moist alpine meadows. 1195.

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

***Luzula spicata* (L.) DC.** Common on moist unstable slopes of subalpine and alpine. 1197, 2323; Caicco 480; Ertter 2103.

Liliaceae

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

***Allium brevistylum* Wats.** Common in moist, steeply-sloping meadows in subalpine and low alpine. 2334.

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

***Zigadenus elegans* Pursh.** Common in moist, sloping meadows of alpine. 2340; Caicco 478.

Onagraceae

***Epilobium alpinum* L. var. *alpinum*.** Common on moist, unstable subalpine and alpine slopes. 2333.

***Epilobium angustifolium* L.** Rare in dry forest opening north of Kane Lake. 2418.

***Epilobium glaberrimum* Barbey var. *fastigiatum* (Nutt.) Trel.** Uncommon in moist meadow along stream east of Kane Lake; alpine. 2258.

***Oenothera andina* Nutt.** Rare in disturbed microsites in dry, subalpine meadows north of Kane Lake. 2264.

Pinaceae

***Abies lasiocarpa* (Hook.) Nutt.** Common in forest and krummholz. 2392.
***Picea engelmannii* Parry.** Common in forest and krummholz. 2391.
***Pinus albicaulis* Engelm.** Common in forest and krummholz. 2263.

Poaceae

***Agropyron scribneri* Vasey.** Uncommon on dry, unstable alpine and subalpine slopes. 2272.
***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. 2365.
***Danthonia intermedia* Vasey.** Locally common in subalpine meadows north of Kane Lake. 2389.
Deschampsia cespitosa* (L.) Beauv. var. *cespitosa. Common throughout cirque in subalpine and alpine moist meadows; often dominant. 1192, 2325; Caicco 481.
Festuca idahoensis* Elmer var. *idahoensis. Uncommon in dry forest openings north of Kane Lake. 2241.
***Festuca ovina* L. var. *brevifolia* (R.Br.) Wats.** Uncommon in alpine; 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. 1191, 2281.
***Poa alpina* L.** Common subalpine and alpine; moist meadows and slopes. 1193, 2322; Caicco 479.
Poa cusickii* Vasey var. *cusickii. Uncommon in moist to dry subalpine meadow. 2296.
***Poa cusickii* Vasey var. *epilis* (Scribn.) Hitchc.** Uncommon in moist subalpine meadows. 2382.
***Poa gracillima* Vasey.** Uncommon on dry ledges in forest openings. 2238.
***Poa incurva* Scribn. & Will.** Uncommon in dry subalpine meadows. 2381.
***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 2427.
Sitanion hystrix* (Nutt.) Smith var. *hystrix. Uncommon in subalpine and alpine; dry, rocky ledges and slopes. 2243.
***Trisetum spicatum* (L.) Richter.** Common in alpine and subalpine; moist meadows and ledges. 2280.

Polemoniaceae

***Phlox pulvinata* (Wherry) Cronq.** Common on dry, exposed, alpine slopes. 2348.
***Polemonium viscosum* Nutt.** Common throughout cirque in talus and unstable sites on ledges; alpine. 2311; Ertter 2104.

Polygonaceae

***Eriogonum caespitosum* Nutt.** Uncommon on dry subalpine knoll north of Kane Lake. 2359.

Eriogonum capistratum* Rev. var. *capistratum. Locally common in subalpine and alpine; dry rocky slopes and ledges. 2360.

***Eriogonum ovalifolium* Nutt. var. *depressum* Blank.** Common in subalpine and alpine; dry, unstable slopes and ledges. 2249.

***Oxyria digyna* (L.) Hill.** Common throughout cirque on moist, rocky slopes; alpine. 2286.

***Polygonum bistortoides* Pursh.** Common in moist to wet subalpine and alpine meadows. 2267.

***Polygonum kelloggii* Greene.** Uncommon in dry forest openings. 2390.

***Polygonum viviparum* L.** Common in moist, alpine meadows. 2395; Caicco 477.

Polypodiaceae

***Cryptogramma crispa* (L.) R.Br.** Uncommon in moist, subalpine and alpine talus. 2292.

***Cystopteris fragilis* (L.) Bernh.** Common among rocks in moist alpine sites. 2294.

***Pellaea breweri* D.C. Eat.** Uncommon in subalpine and alpine; stabilized scree, rocky ledges, and boulderfields. 2293.

***Woodsia scopulina* D.C.Eat.** Common on rocks in subalpine. 2252.

Portulacaceae

Claytonia megarhiza* (Gray) Parry var. *megarhiza. Uncommon in alpine talus. 2404.

Lewisia pygmaea* (Gray) Robins. var. *pygmaea. Common in dry subalpine and alpine sites. 2271, 2369.

Primulaceae

***Androsace septentrionale* L.** Common on dry, sandy alpine slopes. 2353, 2422.

***Dodecatheon pulchellum* (Raf.) Merrill var. *watsonii* (Tidestrom) Hitchc.** Common in moist subalpine and alpine meadows. 2341.

Ranunculaceae

***Anemone parviflora* Michx.** Rare in moist alpine meadow south of Kane Lake; alpine. 2339.

***Aquilegia formosa* Fisch.** Common in moist, sloping meadows; subalpine and low alpine. 2269; Caicco 472.

Caltha leptosepala* DC. var. *leptosepala. Common throughout cirque in alpine and subalpine; wet meadows along streams and around lakes and ponds. 1181, 2298.

***Delphinium depauperatum* Nutt.** Uncommon in dry subalpine meadows north of Kane Lake. 2257.

Ranunculus eschscholtzii* Schlecht. var. *eschscholtzii. Common throughout cirque on moist subalpine and alpine slopes. 2284; Ertter 2109.

***Ranunculus gelidus* Kar. & Kir.** Rare; seen only in moist, alpine meadow at about 10,400 feet, along stream east of Kane Lake; alpine. 1182.

***Ranunculus pygmaeus* Wahlenb.** Locally common in moist to wet sites in alpine; along rivulets, ledges, and cracks on rock face. 1110, 2315, 2346.

***Ranunculus verecundus* Robins.** Rare in moist alpine boulderfield at 10,000 feet, southwest of Kane Lake. 2345.

Rosaceae

***Potentilla brevifolia* Nutt.** Locally common on dry outcrops at 10,000 feet, southwest of Kane Lake. 2399.

***Potentilla diversifolia* Lehm. var. *diversifolia*.** Common throughout cirque in moist, subalpine and alpine meadows. 2283, 2307, 2372.

***Potentilla fruticosa* L.** Common on moist ledges and in boulderfields; subalpine and alpine. 1171, 2317.

***Potentilla glandulosa* Lindl. var. *pseudorupestris* (Rydb.) Breit.** Local on dry subalpine ledges. 2366.

***Potentilla nivea* L.** Rare alpine; seen only in moist, sloping meadow at head of waterfall south of Kane Lake. 2379.

***Rubus idaeus* L. var. *gracilipes* Jones.** Common in subalpine boulderfields. 2414.

***Sibbaldia procumbens* L.** Common in alpine and subalpine; moist, sandy slopes and ledges. 2288.

Salicaceae

***Salix arctica* Pall. var. *petraea* Andress.** Common throughout cirque in moist subalpine and alpine sites. 2276, 2342, 2376A, 2397; Ertter 2100.

***Salix* sp. (*cf. S. eastwoodiae*) Cockerell *ex* Heller.** Uncommon in wet subalpine meadow adjacent to the north shore of Kane Lake. 2386.

***Salix nivalis* Hook. var. *nivalis*.** Rare on moist slopes in subalpine and alpine. 2337.

***Salix planifolia* Pursh.** Uncommon in subalpine meadow west of Kane Lake. 2266.

***Salix tweedyi* (Bebb) Ball.** Rare; only one robust plant seen at base of small cascade at 9400 feet, west of Kane Lake; subalpine. 2421.

Saxifragaceae

***Heuchera cylindrica* Dougl. var. *alpina* Wats.** Common in subalpine and low alpine; on dry ledges and outcrops and moderately stabilized scree. 2239.

***Lithophragma bulbifera* Rydb.** Uncommon on moist subalpine slopes. 2370.

***Mitella pentandra* Hook.** Uncommon in low alpine and subalpine; 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, 2328; Caicco 280.

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

***Saxifraga arguta* D.Don.** Common along streams and rivulets in subalpine and low alpine. 1178, 2335.

***Saxifraga cernua* L.** Uncommon and widely scattered in moist scree and sloping meadows and

on ledges; alpine and subalpine. 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. 2358.

Selaginellaceae

***Selaginella densa* Rydb.** Common in subalpine and alpine; moist to dry slopes and ledges and stabilized scree. 2245.

Scrophulariaceae

***Castilleja miniata* Dougl.** Common in moist to wet, subalpine and low alpine meadows. 2299.

***Mimulus tilingii* Regel var. *caespitosus* (Greene) Grant.** Common along alpine streams and rivulets. 1169.

***Penstemon procerus* Dougl. var. *formosus* (A.Nels.) Cronq.** Common subalpine and uncommon alpine on dry rocky ledges. 2259.

***Veronica wormskjoldii* Roem. & Schult.** Common in moist to wet alpine and subalpine meadows. 1184, 2295.

Violaceae

***Viola adunca* Sm. var. *bellidifolia* (Greene) Harr.** Common subalpine and alpine; moist meadows and slopes. 2290, 2371.

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

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PART 2

MANAGEMENT RECOMMENDATIONS

RARE PLANTS OF KANE LAKE CIRQUE

The National Forest Management Act and Forest Service policy require that Forest Service land be managed to maintain populations of all existing native animal and plant species at or above the minimum viable population level. A minimum viable population consists of the number of individuals, adequately distributed throughout their range, necessary to perpetuate the existence of the species in natural, genetically stable, self-sustaining populations.

The Forest Service, along with other Federal and State agencies, has recognized the need for special planning considerations in order to protect the flora and fauna on lands in public ownership. Species recognized by these two agencies as needing such considerations are those that (1) are designated under the Endangered Species Act as endangered or threatened, (2) are under consideration for such designation, or (3) appear on a regional Forest Service sensitive species list.

As discussed in Part 1, nine species that are rare in Idaho, are now known to occur in the Kane Lake Cirque. From a global perspective, all are relatively widespread arctic-alpine species, therefore, are not listed under the Endangered Species Act or under consideration for listing. All, however, have a limited distribution in Idaho, being known from between one and nine occurrences in the state. Only three of the nine species, however, are currently on the Region 4 Sensitive Species List: *Parnassia kotzebuei*, *Saxifraga adscendens*, and *Saxifraga cernua* (Spahr *et al.* 1991).

Below is a summary of the conservation status of each of the nine rare species known from the cirque, as well as recommendations concerning changes in status, where, applicable. See also, Appendix 1 for a line drawing of the nine species, Appendix 2 for the mapped location of the species in Kane Lake Cirque, Appendix 3 for occurrence records from our data base, containing additional data on distribution, abundance, and habitat of the species, and Appendix 4 for slides of the species and their habitats.

Carex incurviformis Prior to our discovery of *Carex incurviformis* in the study area, this species was not known to occur in Idaho. This species is Sensitive in Montana, that is, it is known from a limited number of populations (Lesica and Shelly 1991). It is also considered rare in Wyoming and Alberta (Lesica and Shelly 1991).

The Kane Lake Cirque population is very small, occupying an area of only a few square meters. It occurs with three other rare species, *Erigeron humilis*, *Saxifraga adscendens*, and *Saxifraga cernua*, and an as yet unidentified *Draba* species (discussed below). Further botanical exploration of the western Pioneer Mountains, especially in the Wildhorse Creek drainage, may reveal additional populations. Due to its limited distribution in the Northern Rocky Mountains, we recommend that it be added to the Region 4 Sensitive Species List.

Erigeron humilis **(low fleabane)** Known from only eight small sites in Idaho, the population of low fleabane in the Kane Lake Cirque is by far the largest. This circumpolar species is rare in the Rocky Mountains, including the states of Colorado, Wyoming, and Montana, in addition to Idaho (Moseley 1989).

In his status survey of low fleabane, Moseley (1989) recommended that low fleabane be added to the Regional Sensitive Species List for the Challis NF. No information has come to light in the last two years that would change its status, and we again recommend that it be added to the Regional List.

***Draba fladnizensis* (Austrian draba)** The small population of Austrian draba in Kane Lake Cirque represents the only known site in Idaho for this circumpolar species. It occurs sporadically in the Rocky Mountains and is considered rare in Montana and Idaho. The population in Kane Lake Cirque is limited in extent and occurs with five other rare species. Further botanical exploration of the western Pioneer Mountains, especially in the Wildhorse Creek drainage, may reveal additional populations. Due to its limited distribution in Idaho and in the Northern Rocky Mountains, we recommend that it be added to the Region 4 Sensitive Species List.

***Parnassia kotzebuei* (Kotzebue's grass-of-Parnassus)** This Forest Service Sensitive Species is only known from four sites in Idaho, all on the Challis NF, with the Kane Lake Cirque population being the largest known in the state. In addition to Idaho, Kotzebue's grass-of-Parnassus is considered Sensitive in Washington (Washington Natural Heritage Program 1990). We recommend that it remain a Forest Service Sensitive Species.

Potentilla nivea (snow cinquefoil) Prior to our discovery of snow cinquefoil in Kane Lake Cirque, it was not known to occur in Idaho, although a late-season specimen collected in 1990, in the White Cloud Peaks appears to be this species; the White Cloud population must be reconfirmed with material from earlier in the season. This species is more common along the main crest of the Rocky Mountains, from the arctic, south to New Mexico (Duft and Moseley 1989).

The Kane Lake Cirque population is very small, occupying an area of about a square meter, and containing few individuals. This population could easily be disturbed. Because of its limited distribution in Idaho, we recommend that it be added to the Region 4 Sensitive Species List.

Ranunculus gelidus (arctic buttercup) Prior to our discovery of arctic buttercup in Kane Lake Cirque in 1987, it was not known to occur in Idaho. Because it was part of a larger collection made in the Kane Lake area in 1987, and not identified until later in the year, the precise location of arctic buttercup in Kane Lake Cirque was not known. During 1991, we searched the general area of the 1987 collection (ca. 0.5 mile or 1 km east of Kane Lake) but could not relocate the population. It either disappeared from the cirque between 1987 and 1991, for some unknown reason, or the population is very small and was overlooked by us in 1991. Intensive searches throughout the rest of the study area revealed no new populations.

Arctic buttercup is rare in Montana, being known from only one site (Lesica and Shelly 1991), and is rare in Utah (Utah Natural Heritage Program 1990). Because of its rarity in the northern Rocky Mountains, we recommend that it be added to the Region 4 Sensitive Species List.

Ranunculus pygmaeus (pygmy buttercup) Prior to our discovery of pygmy buttercup in the study area, it was not known to occur in Idaho. It is more common along the main crest of the Rocky Mountains from the arctic, south to Colorado. Because of its rarity in Idaho, we recommend that it be added to the Region 4 Sensitive Species List.

***Saxifraga adscendens* (wedge-leaf saxifrage)** This Forest Service Sensitive Species is known from nine sites in Idaho, with the Kane Lake Cirque population being the largest known in the state. In addition to Idaho, wedge-leaf saxifrage is considered endangered in Oregon (Oregon Natural Heritage Program 1991) and rare in Utah (Utah Natural Heritage Program 1990). We recommend that it remain a Forest Service Sensitive Species.

***Saxifraga cernua* (nodding saxifrage)** This Forest Service Sensitive Species is known from seven small populations in Idaho, with the Kane Lake Cirque population being the largest known in the state. In addition to Idaho, wedge-leaf saxifrage is considered Sensitive in Washington (Washington Natural Heritage Program 1990) and rare in Utah (Utah Natural Heritage Program 1991). We recommend that it remain a Forest Service Sensitive Species.

***Draba* sp.** A small, completely glabrous, perennial draba with white flowers was found high at the eastern end of the cirque, in the same steeply-sloping meadow where we found *Carex incurviformis*. Although the alpine drabas of Idaho have been relatively well-studied (Brunsfeld 1981, Fox and Moseley 1990), none have been found previously that include the characteristics of these plants discovered in Kane Lake Cirque. Also, we could not identify these plants using several regional floras. This draba appears to be new to Idaho, at least, or possibly new to science.

MANAGEMENT OF RARE PLANT POPULATIONS AND HABITATS

Kane Lake sits in an idyllic alpine setting. Because of its beauty and its exposure in several hiking and climbing guides (Fuller 1982, Hollingshead and Moore 1987, Lopez 1990), the area has received considerable use by hikers over the years. Two factors, however, have limited the impacts of this use: (1) the trail into the Kane Lake Cirque dead-ends at the lake; there is no easy way to continue on longer, multi-day hikes on this trail; and (2) ledges and boulderfields traversed by the access trail limit the use to hikers; mountain bikes, horses, and ORVs cannot reach the lake (easily?).

A majority of the recreational impacts occur around Kane Lake. Numerous campsites dot the coniferous woodlands and uplands meadows along the north edge of the lake. Some of the campsites have done significant damage to the meadows and woodlands. The meadows surrounding Kane Lake, which are highlighted in Fuller (1982) and Hollingshead and Moore (1987), show signs of many years of trampling. Beyond this, however, impacts are slight. It appears that a vast majority of the visitors stop at the lake. The only signs of use above the lake are a series of (unnecessary) cairns through the only gully in the cliffs south of the lake. Although few people appear to use this route, it does traverse several rare plant populations near the top of the gully.

During our six day inventory of the area in 1991, we found that no rare plant populations occur in areas of recreational impact. No rare plant populations were found in the coniferous woodland, upland meadow, or lakeside meadow habitats. Nearly all populations occurred in areas not normally traversed by Kane Lake visitors. The exception is along the relatively level inlet stream south of the lake that comes from the biggest waterfall. This area is relatively accessible to hikers circumnavigating the lake. In 1987, we found scattered individuals of Austrian draba and pygmy buttercup in the streamside gravels here. We could find no individuals of either species there in 1991. This habitat is highly unstable, however, and in 1991 there were indications that either flooding and/or avalanches had deposited new gravel along the streamcourse, and that human impacts did not play a role in their disappearance. These streamside

habitats appear to be ephemeral and not the primary habitat for either species; they only occasionally colonize this substrates and don't last long on them.

Although not many hikers go above Kane Lake presently, the likely travel routes used in this area are along the alpine meadows that line the streams and rivulets. If visitor use above the lake increases, these sensitive habitats, could easily be impacted along with the rare plants for which this is the primary habitat, including *Erigeron humilis, Parnassia kotzebuei, Ranunculus gelidus,* and *Saxifraga adscendens*. The very small *Potentilla nivea* population occurs near the top of the waterfalls south of the lake and could easily be impacted by increased use in that area. The primary habitat for the remaining species is on cliffs and ledges or in steeply-sloping wet meadows that are relatively isolated from routes of travel. We foresee no recreational impacts to these habitats.

SPECIAL INTEREST AREA DESIGNATION

The Kane Lake Cirque is of extraordinary biological significance in the state of Idaho. Nine rare plant species are now known from the basin, although this will probably increase to ten when the white-flowered draba is identified or described. Of the nine rare plants known from the basin, five occur nowhere else in Idaho, and are disjunct from the next nearest known populations by at least 200 km (124 miles). In addition, alpine meadows in the cirque are more extensive and floristically diverse than similar communities elsewhere in the state.

The National Environmental Policy Act of 1970, section 101(b) 3 and 4, declares the responsibility of federal agencies to attain the widest range of beneficial uses of the environment without degradation, risk to health and safety, or other undesirable or unintended consequences, and to preserve important historic, cultural, and natural aspects of our national heritage, maintaining, wherever possible, an environment that supports biological diversity. Special Interest Areas (SIAs) can be established on National Forests by the regional forester to preserve historically, culturally, and biologically significant areas pursuant to 36 CFR 294.1a. SIAs are addressed in section 2360 of the Forest Service Manual (FSM). The objectives of SIAs as identified in the FSM are to protect and, where appropriate, foster public use and enjoyment of areas with scenic, historical, geological, botanical, zoological, paleontological, or other special characteristics. The definition of a Botanical Area, found in FSM 2362.43 and 2372.05 is as follows: a unit of land that contains plant specimens, plant groups, or plant communities that are significant because of their occurrence, habitat, location, life history, ecology, rarity, or other features. FSM 2362.43 also states that an inventory of National Forest land and waters that have such characteristics will be maintained. FSM 2670 also gives direction to National Forests to protect and maintain the habitats of Sensitive Species. We believe that the botanical significance of Kane Lake Cirque qualifies it for designation as a Special Interest Botanical Area and the Challis NF should pursue such a designation.

The goal of a Botanical Area designation, which is a recreation designation, is to acknowledge and highlight a special area of the National Forest. The unique botanical features of an area are protected, yet the purpose is also to provide appropriate access and interpretation of these features for public appreciation and enjoyment of the area. The area should have some public access, including a road or trail, and should lend itself to interpretation to the public. The Kane Lake Cirque fits these goals well.

Following are some suggestions on how the Challis NF can interpret, promote, and protect the Botanical Area once it is established by the Regional Forester (adapted from ideas put forth by Barbara Williams, Botanist, Klamath NF):

- A botanical and community inventory has been completed. The Forest should create brochures for distribution in offices and at the trailhead that outline and interpret the unique natural values of Kane Lake Cirque. This brochure could be produced cooperatively with interested organizations such as the Idaho Native Plant Society. Although revealing the precise locations of rare species is not recommended, educating the users about the rare plants and habitats of the cirque in a general way, will hopefully foster a sensitivity in their use of the area.

- Make sure the area gets added to the next mapping updates on the Forest, and make sure the trail is correctly placed and labeled.

- Make signs to place at the trailhead describing its values and interest, including rules for protection of the site. Low-impact camping should be specifically mentioned and encouraged.

- Prepare and distribute publicity and educational material for local newspapers and newsletters of interested organizations.

Below is a draft outline for a possible management plan of the Kane Lake Cirque Botanical Area (from Barbara Williams, Botanist, Klamath NF):

- Review Forest Service Manual and Forest Plan direction; amend Forest Plan if necessary.

- Description of the area and its botanical values.

- Location of area and description of access.

- Plan for interpretation; signs, brochures, etc.

- Maintenance plan for trails and camping areas.

- Activities allowed and prohibited and under what circumstances.

The following management prescription for SIAs on the Sequoia NF (from their Forest Plan) may be useful to the Challis NF in developing similar management direction for Kane Lake Cirque or other SIAs on the Forest:

> "Timber and firewood harvesting will not occur except where in accord with their establishment. Dispersed recreation, consistent with the emphasis, will be encouraged. ORV use will be allowed on designated trails if such use does not threatened values within the SIA. Developed recreation will not occur. Watershed improvements will occur only to protect special features. Transportation system management will favor the emphasis. Wildlife habitat will be provided by maintaining a natural state, but manipulation strictly for wildlife will not occur. Grazing may be compatible. Consider mineral withdrawal subject to existing claims. Fire suppression will be done with minimum ground disturbance."

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Appendix 1

Line drawings of rare plants found in Kane Lake Cirque.

Carex incurviformis (from Hermann 1970).

Draba fladnizensis (from Vascular Plants of the Pacific Northwest)

Erigeron humilis (from Vascular Plants of the Pacific Northwest)

Parnassia kotzebuei (from Vascular Plants of the Pacific Northwest)

Potentilla nivea (from Vascular Plants of the Pacific Northwest)

Ranunculus gelidus (from Vascular Plants of the Pacific Northwest)

Ranunculus pygmaeus (from Vascular Plants of the Pacific Northwest)

Saxifraga adscendens (from Vascular Plants of the Pacific Northwest)

Saxifraga cernua (from Vascular Plants of the Pacific Northwest)

Appendix 2

Location of rare plant populations in Kane Lake Cirque
(portion of the 1967 Phi Kappa Mtn. 7.5' USGS quadrangle).

KEY

Study Area Boundary
(potential SIA)

Rare Plant Populations:

Carex incurviformis

Draba fladnizensis

Erigeron humilis

Parnassia kotzebuei

Potentilla nivea

Ranunculus gelidus

Ranunculus pygmaeus

Saxifraga adscendens

Saxifraga cernua

Appendix 3

Occurrence records for selected rare plants occurring in the Kane Lake Cirque.

NOTES: *Carex incurviformis* and *Potentilla nivea* were only recently discovered in Idaho and occurrence records have not been produced by the Conservation Data Center yet.

Three digit code refers to the species' occurrence number in the Conservation Data Center data base.

Draba fladnizensis 001

Erigeron humilis 001

Parnassia kotzebuei 001

Ranunculus gelidus 001

Ranunculus pygmaeus 001

Saxifraga adscendens 001

Saxifraga cernua 006

Idaho Conservation Data Center
Element Occurrence Record

DRABA FLADNIZENSIS
AUSTRIAN WHITLOW-GRASS

Occurrence Number: 001

Survey Site Name: KANE LAKE CIRQUE
County: Custer
USGS quadrangle: PHI KAPPA MTN.

Location:
Kane Lake cirque in the Pioneer Mountains.

Survey Date: 1991-07-26
Last Observed: 1991-07-26
First Observed: 1987

Population Data:
1987: few individuals in streamside gravel below big waterfall.
1991: Not present in area noted in 1987 survey; about 75 individuals, 10% in bud, 90% in flower, in 2 very small populations (20' x 20' is the largest) -- none seen elsewhere in the cirque.

Habitat Description:
Moist; bottom and mid-slope; flat and N aspects; 0-3% and 15% to vertical slope; shade; moist sandy sites in Salix arctica community; sandy open sites -- gneiss parent material; associated with Oxyria digyna, Stellaria longiseta, Luzula spicata, Festuca ovina, Parnassia kotzebuei var. kotzebuei, Saxifraga adscendens var. oregonensis, Erigeron humilis, Ranunculus pygmaeus, Saxifraga cernua.

Elevation: 9400 - 9700 feet Size: 5 - 10 SQ YD

Land Owner/Manager:
CHALLIS NATIONAL FOREST, LOST RIVER RD

Ownership Comments:
Challis NF, Lost River RD

Comments:
COLLECTION: Moseley 1107 (ID)

Idaho Conservation Data Center
Element Occurrence Record

ERIGERON HUMILIS
LOW FLEABANE

Occurrence Number: 001

Survey Site Name: KANE LAKE CIRQUE
County: Custer
USGS quadrangle: PHI KAPPA MTN.

Location:
Kane Lake cirque in the Pioneer Mountains.

Survey Date: 1991-07-26
Last Observed: 1991-07-26
First Observed: 1981

Population Data:
1981: Only a few individuals (11-50). 1982: no plants seen during a brief visit. 1991: ca 800 individuals seen in a wider search of area, 50% in bud, 50% in flower; the plants are in 7 populations in the cirque -- populations range in size from few to ca 150 individuals in very small patches. There are possibly more plants at small isolated sites elsewhere in the area.

Habitat Description:
Moist (mesic); lower to upper slope; N and NE aspect; 0-35% slope; open light and shade; Deschampsia cespitosa communities on ledges and slopes; deep sandy soil with much organic matter -- gneiss parent material; associated with Erigeron lonchophyllus, Erigeron simplex, Parnassia kotzebuei var. kotzebuei, Saxifraga adscendens, Ranunculus pygmaeus, Draba fladnizensis, Saxifraga cernua, Parnassia fimbriata, Saxifraga debilis, Aquilegia formosa, Carex nova, Poa alpina, Deschampsia cespitosa.

Elevation: 9400 - 11,000 feet

Ownership Comments:
Challis NF, Lost River RD

Comments:
COLLECTIONS: Caicco 284(ID); Moseley 2275, 2410 (ID).

Idaho Conservation Data Center
Element Occurrence Record

PARNASSIA KOTZEBUEI VAR KOTZEBUEI
KOTZEBUE'S GRASS-OF-PARNASSUS

Occurrence Number: 001

Survey Site Name: KANE LAKE CIRQUE
County: Custer
USGS quadrangle: PHI KAPPA MTN.

Location:
Kane Lake cirque in the Pioneer Mountains.

Survey Date: 1991-07-26
Last Observed: 1991-07-26
First Observed: 1981

Population Data:
1981 & 1982: more than a dozen individuals in flower. 1991: ca 2000 individuals seen at 6 populations in cirque -- possibly more at small isolated sites that weren't surveyed; plants are in flower.

Habitat Description:
Moist (mesic); lower to upper slopes; N and NE aspect; 0-35% slope; open light and shade; sandy, moist soil -- gneiss parent material; moist Deschampsia cespitosa and Salix arctica communities on ledges and steep slopes; associated with Parnassia fimbriata, Saxifraga debilis, Aquilegia formosa, Carex nova, Poa alpina, Saxifraga adscendens var. oregonensis, Erigeron humilis, Ranunculus pygmaeus, Draba fladnizensis, Saxifraga cernua.

Elevation: 9400 - 10,100 feet

Ownership Comments:
Challis NF, Lost River RD

Comments:
COLLECTIONS: Caicco 280 (ID); Moseley, 2285, 2328 (ID).

Idaho Conservation Data Center
Element Occurrence Record

RANUNCULUS GELIDUS
ARCTIC BUTTERCUP

Occurrence Number: 001

Survey Site Name: KANE LAKE BASIN
County: Custer
USGS quadrangle: PHI KAPPA MTN.

Location:
0.5 mi E of Kane Lake; ca 13 mi E of Ketchum.

Survey Date: 1991-07-26
Last Observed: 1987-08-22
First Observed: 1987

Population Data:
1987: "common". 1991: Moseley could not relocate.

Habitat Description:
Deschampsia cespitosa meadow; stringer along cascading creek.

Elevation: 10,400 feet

Ownership Comments:
Challis NF, Lost River RD

Comments:
COLLECTION:
Moseley 1182 (ID); elevation is approximate.

Idaho Conservation Data Center
Element Occurrence Record

RANUNCULUS PYGMAEUS
PYGMY BUTTERCUP

Occurrence Number: 001

Site Name: KANE LAKE CIRQUE
County: Custer
USGS quadrangle: PHI KAPPA MTN.

Location:
Kane Lake cirque in the Pioneer Mountains.

Survey Date: 1991-07-26
Last Observed: 1991-07-26
First Observed: 1988

Population Data:
1991: ca 1500-2000 individuals, 90% in flower, 10% in immature fruit, in 6 small populations in cirque; populations range in size from few to ca 300 individuals in very small patches; possibly more plants at small isolated sites in cirque that were not surveyed.

Habitat Description:
Moist; bottom to mid-slope; N and NE aspects; 0% to vertical slope; shade; gravelly areas near rivulets, base of cliffs, and in cracks of moist cliff faces; gravelly soil -- gneiss and granite parent material; associated with Ranunculus eschscholtzii, Parnassia kotzebuei, Saxifraga adscendens var. oregonensis, Erigeron humilis, Draba fladnizensis, Saxifraga cernua.

Elevation: 9400 - 10,000 feet

Land Owner/Manager:
CHALLIS NATIONAL FOREST, LOST RIVER RD

Comments:
COLLECTIONS: Moseley 1110, 2315, 2346 (ID)

Idaho Conservation Data Center
Element Occurrence Record

SAXIFRAGA ADSCENDENS VAR OREGONENSIS
WEDGE-LEAF SAXIFRAGE

Occurrence Number: 001

Survey Site Name: KANE LAKE CIRQUE
County: Custer
USGS quadrangle: PHI KAPPA MTN.

Location:
Kane Lake cirque in the Pioneer Mountains.

Survey Date: 1991-07-26
Last Observed: 1991-07-26
First Observed: 1981

Population Data:
1981 & 1982: more than a dozen individuals. 1991: ca 1000 individuals seen at 13 populations in cirque; populations range in size from <10 individuals to ca 200; possibly more plants at small isolated sites elsewhere in the cirque that weren't surveyed; plants in flower.

Habitat Description:
Moist; bottom to upper slope; N, W, NE, NW, and SW aspects; 0% to vertical slope; open light; gravelly and bare-soil areas in scree, on ledges, and on edges of rivulets; gravelly soil -- gneiss and granite parent material; with Parnassia kotzebuei var. kotzebuei, Erigeron humilis, Ranunculus pygmaeus, Draba fladnizensis, Saxifraga cernua, S. oppositifolia, S. arguta, S. occidentalis, S. debilis.

Elevation: 9400 - 11,100 feet

Land Owner/Manager:
CHALLIS NATIONAL FOREST, LOST RIVER RD

Ownership Comments:
Challis NF, Lost River RD

Comments:
COLLECTIONS: Caicco 282 (ID); Moseley 2331 (ID).

Idaho Conservation Data Center
Element Occurrence Record

SAXIFRAGA CERNUA
NODDING SAXIFRAGE

Occurrence Number: 006

Survey Site Name: KANE LAKE CIRQUE
County: Custer
USGS quadrangle: PHI KAPPA MTN.

Location:
Kane Lake cirque in the Pioneer Mountains.

Survey Date: 1991-07-26
Last Observed: 1991-07-26
First Observed: 1991

Population Data:
1991: ca 300 individuals, 90% in bud, 10% in flower, in 8 populations in cirque; all populations are small, isolated populations ranging in size from 1 individual to ca 75; there are probably more population sites in the cirque.

Habitat Description:
Moist; lower to upper slope; N aspect; 0% to vertical slope; filtered light and shade; moist ledges and cliff faces; gneiss and granite parent material; associated with S. adscendens var. oregonensis, S. oppositifolia, S. arguta, S. occidentalis, S. debilis, Parnassia kotzebuei var. kotzebuei, Erigeron humilis, Ranunculus pygmaeus, Draba fladnizensis.

Elevation: 9200 - 11,300 feet

Ownership Comments:
Challis NF, Lost River RD

Comments:
COLLECTIONS: Moseley 2420 (ID).

Appendix 4

Slides of rare plants and habitats in Kane Lake Cirque
(we have no photographs of *Potentilla nivea* and *Ranunculus gelidus*).

1. *Carex incurviformis* - close-up of pressed specimen.

2. *Draba fladnizensis* - close-up of plant in flower.

3. *Draba fladnizensis* - close-up of plant in fruit.

4. *Erigeron humilis* - close-up of plant.

5. *Erigeron humilis* - habitat in alpine meadow; this is also habitat for *Parnassia kotzebuei* and *Saxifraga adscendens*.

6. *Parnassia kotzebuei* - close-up of plant.

7. *Ranunculus pygmaeus* - close-up of plant; lid of film container is provided for scale.

8. *Ranunculus pygmaeus* - habitat occurs on edges of turf.

9. *Saxifraga adscendens* - close-up of plant along alpine rivulet.

10. *Saxifraga cernua* - close-up of plant on wet ledge.