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A FLORA OF VALENTINE EASTERN SIERRA RESERVE

PART I VALENTINE CAMP

Ann M. Howald

PART II SIERRA NEVADA AQUATIC RESEARCH LABORATORY

Bruce K. Orr

THE HERBARIUM
Department of Biological Sciences
University of California, Santa Barbara
Publication Number 1
1981

This publication series is issued at irregular intervals from the Herbarium, Department of Biological Sciences, University of California, Santa Barbara, California 93106

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Cover: Aerial view from Long Valley southwestward toward the eastern escarpment of the Sierra Nevada. Mount Morrison is on the skyline to the left of center, Convict Creek Basin, extending to the crest of the range, is in the center and Laurel Mountain is on the right. SNARL is visible along the lower portion of Convict Creek, to the left of center. Photo by J. R. Haller.

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FOREWORD

The Publication Series of the Herbarium, Department of Biological Sciences, University of California, Santa Barbara, serves as a publication vehicle for UCSB students, faculty, staff, and other associated investigators. Manuscripts accepted for publication include primarily those with a floristic emphasis and those for which voucher specimens are deposited at UCSB. Papers published in this series might not be available otherwise to the general scientific community. This endeavor is consistent with the goals of the UCSB Herbarium, summarized as follows: (1) to maintain a collections repository; (2) to provide botanical services; (3) to function as a research facility within the Department of Biological Sciences; (4) to provide educational programs.

UCSB Herbarium Publication Number 1, A Flora of the Valentine Eastern Sierra Reserve, is a product of floristic research conducted by UCSB students. The research for Part I, Valentine Camp, by Ann Howald, and for Part II, Sierra Nevada Aquatic Research Laboratory, by Bruce Orr, was conducted independently by the respective authors although each assisted the other during various phases of this work. I thank them for their patience during the editorial process. The Valentine Endowment Fund assumed publication costs, and the staff of the Marine Science Institute of UCSB, particularly Fran Ciluaga and Mary Ankeny, assisted with production of the final manuscript. The Editorial Committee and I are grateful for this assistance.

Wayne R. Ferren, Jr.

NATURAL LAND AND WATER RESERVES SYSTEM

Valentine Eastern Sierra Reserve (VESR) is managed by the University of California at Santa Barbara (UCSB) as part of the University of California's Natural Land and Water Reserves System (NLWRS). This system presently comprises 26 reserves broadly dispersed throughout the state and includes a selected variety of ecosystems. It was established in 1965 by the Board of Regents in response to increasing disruption and loss of field sites which posed a significant problem for University researchers and classes in the late 1950's. A faculty committee under the leadership of Professors Kenneth S. Norris and Mildred W. Mathias recommended the creation of NLWRS to protect undisturbed samples of California's natural habitats as a resource to assist in the University's teaching, research and public service functions.

The NLWRS periodically publishes materials about the Reserve System and this publication is considered NLWRS Contribution No. 5.

The NLWRS is a systemwide program of the University of California, administered under the auspices of the President of the University and the Vice President -- Agriculture and University Services. Individual reserves are assigned to one of the nine general campuses for day-to-day administration, maintenance and management. VESR is one of four reserves administered through UCSB's Marine Science Institute. Faculty advisory committees on the systemwide and campus levels oversee reserve operations and advise the managers of the individual reserves.

Valentine Eastern Sierra Reserve became part of NLWRS in 1973. Its two separate parcels, Valentine Camp and the Sierra Nevada Aquatic Research Laboratory (SNARL), are located about eight miles apart. They are situated in Mono County on the eastern slope of the Sierra Nevada, near the town of Mammoth Lakes (see Map 1).

Valentine Camp

Mrs. Edward L. Valentine donated Valentine Camp to the University in 1973 and provided a generous endowment fund for its support. The property consists of 136 acres immediately below the Mammoth Lakes Basin at an elevation of 8,000 ft (2,400 m). This parcel provides an unusually diverse sample of eastern Sierran habitats on the climatic ecotone between the sagebrush desert of the Great Basin and the coniferous forests of the higher Sierra Nevada. Mammoth Creek flows through the property, and numerous springs arise within its boundaries. The terrain is varied, including steep and gentle slopes; a variety of morainal material is found on the rocky surface. Relatively minor changes in the topography, exposure, soil and moisture regimes produce strongly differentiated plant communities, including Great Basin Sagebrush, Montane Chaparral, Sierran Upper Montane Forest, Meadow Vegetation, and High Mountain Riparian Vegetation.

Five log cabins at Valentine Camp provide accommodations for the Resident Manager and fourteen visiting researchers. The facilities are open, as weather permits, from approximately June 1 through October 15.

Sierra Nevada Aquatic Research Laboratory

SNARL was originally established in 1935 by the Bureau of Sports Fisheries and Wildlife for the purpose of studying the survival rate of hatchery-raised trout after their release into a stream. The SNARL facilities were turned over to the University in 1973; the land remains the property of the City of Los Angeles Department of Water and Power, under lease to the University of California.

Situated eight miles southeast of the community of Mammoth Lakes, at an elevation of 7,000 ft (2,100 m), SNARL's 53 acres lie just below the steep eastern slope of the Sierra Nevada. Convict Creek, a typical eastern Sierra trout stream, flows through the property, draining a basin of alpine and subalpine lakes surrounded by peaks reaching 12,000 ft (3,660 m) in elevation.

Within SNARL the creek has a natural section and four controlled sections with dams and weirs. Typical High Desert Riparian Woodland of willow, aspen and birch follows the stream, and a Great Basin Sagebrush community occupies the surrounding valley. Elements of Riparian Meadow Vegetation are also found within SNARL's boundaries.

Facilities at SNARL include wet and dry labs, a radiobiology lab, a fish house, fish ponds and observation towers, offices and a library. Housing accommodations are available for sixteen persons, and camping may be arranged for larger class groups. A resident caretaker is present year-round to assist and advise visitors.

Applications and further information regarding VESR and other UCSB reserves are available from: Marine Science Institute, University of California, Santa Barbara, California 93106.

Henry W. Offen, Director
Marine Science Institute

Map 1. Valentine Eastern Sierra Reserve: Location of Valentine Camp and the Sierra Nevada Aquatic Research Laboratory (SNARL).

A FLORA OF VALENTINE EASTERN SIERRA RESERVE

PART I VALENTINE CAMP

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Valentine Camp

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Cover: Eastward across Valentine Camp toward Long Valley. Patches of Sierran Upper Montane Chaparral are visible near the bottom, the sagebrush knoll is prominent toward the left and center, Sierran Upper Montane Forest dominates most of the upper right and the big meadow appears toward the lower right, at the base of the sagebrush knoll. Photo by Ann M. Howald.

Introduction

Valentine Camp is a small, remarkably pristine area that preserves a remnant of the diverse natural vegetation found in the immediate vicinity of the town of Mammoth Lakes, Mono County, California. This area is currently undergoing rapid change as a result of the expansion of ski facilities on and near Mammoth Mountain and of commercial and residential development of the town.

Although it is on the drier eastern slope of the Sierra Nevada, the Mammoth Basin lies east of a low elevation pass in the Sierran crest; and thus it receives more precipitation than similar areas to the north and south. The flora of Valentine Camp reflects this in its composition. Species characteristic of both the wetter western and drier eastern Sierran slopes are here, as well as representatives of the Great Basin flora that reaches its southwesternmost limits of distribution in eastern California.

The flora of the Mammoth Lakes area has not been systematically studied. To date, there have been few botanical studies in Mono County. J. T. Howell collected in the county, particularly in the Convict Creek basin, in the 1940's. The Convict Creek watershed also was investigated by Major and Bamberg (1963). DeDecker (1979) has studied the flora of Glass Mountain Ridge. Peirson collected in parts of the county, including the vicinity of Convict Creek in the 1930's.

This flora includes a brief discussion of the physical characteristics and vegetation types of Valentine Camp, with an annotated catalog of the vascular plant taxa.

Location and Topography

Valentine Camp is located on the eastern slope of the Sierra Nevada approximately one and one-half miles (2.4 km) southwest of the town of Mammoth Lakes (Figure 1). The camp covers 136 acres (55.1 ha), with elevations ranging from approximately 8,000 to 8,500 ft (2,440 to 2,590 m). Access to the Camp is from Old Mammoth Road, which also forms part of the southern boundary of the property. The northern boundary is formed in part by Lake Mary Road. The eastern boundary runs across a small sagebrush-covered moraine (referred to as the sagebrush knoll) and the western boundary crosses a steep, northeast-facing slope. The land to the north and southwest of the Camp is within Inyo National Forest, and the land to the east is under private ownership.

The topography of the Camp is quite varied with respect to its small size. Some of the more notable features include a gently sloping glacial moraine, a stream-cut canyon with a small waterfall, and steep north-east- and south-facing slopes. Permanent and intermittent springs flow from several sites on the northeast and south-facing slopes. The property is bisected by Mammoth Creek, which flows north from Twin Lakes

and through the Camp from west to east. Two man-made trout ponds, dug in 1920 and 1954, are fed by a small diversion of Mammoth Creek.

Geology

The following discussion of the geology of Valentine Camp is based on studies by Lipshie (1976). He identified the rock types and mappable geologic units of the Camp. Several distinct rock and sediment types occur within the boundaries of Valentine Camp, including basalt, obsidian, pumice, granite, quartz latite, and glacial till. These rock and sediment types, either alone or in combination, occur within one or more of four mappable geologic units: andesite, rhyodacite, glacial deposits, and "low ground." The last includes meadows and areas of saturated soils, and as defined here, is not technically a geologic unit. However, it can be mapped and separated from the other units on the basis of distinctive physical characteristics.

Andesite, derived from andesitic lava, informally named the Valentine Andesite, crops out along Mammoth Creek for a distance of about 1,000 ft (305 m). It is at least 50 ft (15.3 m) thick near the creek and probably flowed from a source vent somewhere to the west. This andesite was dated by the potassium-argon method to an age of $83,000 \pm 10,000$ years b.p.

Rhyodacite (quartz latite) from Mammoth Mountain crops out along Mammoth Creek upstream from the andesite unit, and again along Lake Mary Road upslope from Valentine Camp. Mammoth Mountain, to the west, is a massive volcano built of rhyodacite lava extruded in a series of at least ten flows. These flows have potassium-argon dates ranging from approximately 180,000 to 50,000 years b.p. The rhyodacite flows in the northwest and southwest parts of Valentine Camp extended westward from source vents on the western flank of Mammoth Mountain.

Glacial deposits that cover most of Valentine Camp probably date from the Tioga (late Wisconsin) glacial stage that occurred about 20,000 years b.p. A glacier of Tioga age formed in the Mammoth Lakes Basin below Mammoth Crest and flowed northward through the gap between Gold Mountain and Mammoth Mountain. Moving east, it flowed into the Mammoth Creek valley, now occupied by Old Mammoth. This glacier advanced east along Mammoth Creek to a point one-half mile (0.8 km) east of the present-day junction of Sherwin Creek and Old Mammoth Roads. Boulders and cobbles in the glacial till at Valentine Camp consist of three main rock types: granitic, basaltic, and metamorphic. The till contains all rock sizes from silt to large boulders. The sagebrush-covered knoll, on the northeastern boundary of the Camp, is part of a long lateral moraine of Tioga age that extends eastward for about a mile (1.6 km).

All of the geologic units of the Camp have been blanketed with pumice ash from volcanic eruptions, some of which occurred in the past several thousand years. Volcanic vents in the Inyo and Mono Craters chains were the source of widespread ash falls in the region, dated at about 1,200 and 700 years b.p. Obsidian flakes, probably transported to the area by indigenous Paiutes, are scattered in the pumice deposits.

Climate

The climate and weather patterns of Valentine Camp are generally typical of the eastern slope of the Sierra Nevada, although the area receives relatively high annual precipitation. Two sources of climatological data for the area are Lake Mary Store, approximately 2 miles (3.2 km) south of the Camp (Roberts and Associates, 1973) and Mono Lake, approximately 20 miles (32 km) north of the Camp (USNOAA, 1980). Estimations of average annual rainfall and temperature characteristics are based on extrapolations of data from Mono Lake and Lake Mary Store, data taken at Valentine Camp during the summer months between 1955 and 1979, and observations of summer weather during a five-year period 1975-1979.

The eastern slope of the Sierra Nevada lies in the "rain shadow" of the Sierran crest, and as a result, the average annual rainfall on the eastern slope is substantially less than at comparable elevations on the western slope. This effect is ameliorated somewhat in the Mammoth region because it lies east of the Mammoth Pass and Minaret Summit gaps, low areas along the Sierran crest that allow passage to the east of substantial amounts of moisture. Estimated average annual precipitation is 25 inches (63 cm) at Valentine Camp, compared with approximately 45 to 50 inches (115-128 cm) on the western slope at about the same elevation and latitude. It is estimated that eastern slopes at similar elevations to the north and south of Valentine Camp receive approximately 15-20 inches (38-51 cm) of precipitation annually.

Most precipitation falls as snow in winter, but snow may fall in any month. Typical midwinter snow depth is 5-6 feet and snow usually covers the ground from November through May in forested areas. Some snow has fallen at Valentine Camp during June for each year from 1955 to 1979. Rain from summer thunderstorms may occur every day for periods of up to two weeks, but usually it is much more sporadic and it contributes only a small part of the total annual precipitation.

During the summer months, mean daily maxima range between 65 and 80 degrees Fahrenheit (18-27°C), with mean daily minima between 40 and 50 degrees Fahrenheit (4-10°C). Freezing temperatures can occur at any time of the year, although they are uncommon in July and August. In winter, mean daily maxima range between about 35 and 45 degrees Fahrenheit (2-7°C), with mean daily minima from about 15 to 25 degrees Fahrenheit (-9 to -4°C).

Vegetation

The varied topography and geology of Valentine Camp have contributed to the development of diverse vegetation. Haller and Howald have classified the vegetation into seven types adapted from those described by Cheatham and Haller (1975):

- 1) Sierran Upper Montane Forest
- 2) Sierran Upper Montane Chaparral
- 3) Great Basin Sagebrush
- 4) High Montane Riparian Vegetation
- 5) Meadow Vegetation

- 6) Sagebrush-Meadow Vegetation
- 7) Seep and Spring Vegetation

A generalized vegetation map is shown in Figure 2.

Sierran Upper Montane Forest is the most widespread vegetation type of the Camp. It is represented by three intergrading phases: the Red Fir Phase, the Jeffrey Pine Phase, and the Lodgepole Pine Phase. The Red Fir Phase is found on the steep northeast-facing slope, at elevations generally above those of the rest of the forest vegetation. This phase is dominated by Red Fir (Abies magnifica), with some Western White Pine (Pinus monticola) and Mountain Hemlock (Tsuga mertensiana) at one high elevation sight. The understory is heavily shaded, and contains very sparse plant cover. The Jeffrey Pine Phase occupies the gradual slope at the base of the steep northeast-facing slope. It is dominated by Jeffrey Pine (Pinus jeffreyi) and White Fir (Abies concolor). The understory varies from shaded to sunny. Dry sunny forest openings support patches of chaparral or sagebrush vegetation. Areas of moist soil, which may be shaded or sunny, support lush seep vegetation. The Lodgepole Pine Phase occupies the lower flats west of the entrance road, around the cabins and around the big meadow. Lodgepole Pine (Pinus murrayana) and White Fir are the dominant tree species. The understory varies from shaded to sunny and supports a large variety of shrubs and herbaceous plants characteristic of this phase.

Sierran Upper Montane Chaparral is most extensive on the steeper portion of the south-facing slope below Lake Mary Road. It also occurs in patches in some dry sunny forest openings. The dominant shrubs of this vegetation include Pinemat Manzanita (Arctostaphylos nevadensis), Greenleaf Manzanita (A. patula), Tobacco Brush (Ceanothus velutinus), Snowbush (C. cordulatus), Huckleberry Oak (Quercus vaccinifolia), and Bitter Cherry (Prunus emarginata).

The Great Basin Sagebrush community covers the gentle west-facing slope of the moraine (sagebrush knoll) in the northeast corner of Valentine Camp. This vegetation also occurs in some dry sunny forest openings. The dominant shrubs include Great Basin Sagebrush (Artemisia tridentata), Antelope Bitterbrush (Purshia tridentata), and Snowberry (Symphoricarpos vaccinioides). This vegetation type contains a higher percentage of annual plants than any other found at the Camp.

High Montane Riparian vegetation is restricted primarily to the immediate borders of Mammoth Creek. The dominants of this vegetation are small trees and large shrubs, including Quaking Aspen (Populus tremuloides), Mountain Alder (Alnus tenuifolia), American Dogwood (Cornus stolonifera), and willows (Salix caudata and S. planifolia). The understory is made up of a dense growth of mesophytic herbs and grasses found additionally in other moist-soil vegetation types of the Camp.

Meadow Vegetation is found in the two meadows at Valentine Camp; a large one north of Mammoth Creek near the center of the Camp; and a smaller one (Woody's meadow), near the caretaker's cabin and the entrance road. Meadow Vegetation is dominated by herbaceous perennials such as Corn Lily (Veratrum californicum), Cow Parsnip (Heracleum sphondylium), Meadow Lupine (Lupinus polyphyllus), Willow-herb (Epilobium exaltatum and E. pringleanum), Meadow Paintbrush (Castilleja miniata), a sedge (Carex jonesii), and Mexican Rush (Juncus mexicanus). Many species found here also occur in meadows on the western slope of the Sierra Nevada.

Sagebrush-Meadow Vegetation is a transitional type that includes dominants of Great Basin Sagebrush and Meadow Vegetation, as well as some species not found in other vegetation types at Valentine Camp. This type is found in a broad band at the base of the sagebrush knoll.

Seep and Spring Vegetation occurs in the vicinity of seeps and springs in many locations throughout the Camp. These are concentrated at the base of the steep northeast-facing slope and on the steep south-facing slope below Lake Mary Road. The environmental conditions of the seep and spring habitats vary somewhat from those of meadow and riparian habitats, although all are characterized by high amounts of soil moisture. Seeps and springs have generally lower flow rates and intermittent flow patterns, which may vary substantially from year to year. Some springs dry up completely in drought years but may flow throughout the summer in wet years. Most seeps and springs at Valentine Camp are on slopes in areas characterized by good drainage. The riparian habitat has uninterrupted flow with potential for scouring and overflowing of the streambanks during the high runoff period in early summer. Meadows of the Camp are usually moist until fall and have boggy, poorly drained soils not subject to scouring. However, these soils may be flooded in the early summer of wet years as a result of snowmelt and abundant seep and spring flow.

The vegetation of seeps and springs includes elements of both Meadow and High Montane Riparian Vegetations, with a few species not found in other types. Characteristic species of seeps and springs include Quaking Aspen (Populus tremuloides), willows (Salix spp.), Ranger's Buttons (Spenosciadium capitellatum), Sierra Rein Orchid (Habenaria leucostachys), Meadow Paintbrush (Castilleja miniata), Common Monkeyflower (Mimulus nasutus), and rushes (Juncus spp.).

The Vascular Flora

General Remarks

The flora of Valentine Camp was studied during the summer months from 1975 to 1979. References used to identify vascular plant species include Munz and Keck (1959), Munz (1968), Hitchcock (1951), Mason (1969), Abrams (1923, 1944, 1951) and Abrams and Ferris (1960). Non-vascular plant

Figure 2. Valentine Camp: Vegetation, topography and landmarks.

species were not studied. Common names used in this report were obtained primarily from Crampton (1974), Niehaus (1974), Horn (1976), Munz and Keck (1959), Munz (1963, 1974), and Smith (1976). Voucher specimens are deposited in the Herbarium of the University of California, Santa Barbara (UCSB).

The flora of Valentine Camp consists of 247 species from 54 families, distributed among the vascular plants as shown below:

	Families	Genera	Species
Subdivision Sphenopsida	1	1	1
Subdivision Pteropsida			
Class Filicae	2	3	3
Class Coniferae	2	4	7
Class Angiospermae	49	157	236
Subclass Dicotyledones	40	125	186
Subclass Monocotyledones	9	31	50
Total	54	165	247

Although the vegetation of Valentine Camp is dominated in large part by coniferous trees, the flora is comprised mainly of flowering plants. The 11 largest families of the Camp, which contain 140 species and make up 56.8 percent of the flora, are all members of Class Angiospermae, as shown below:

Eleven Largest Families	No. Species	Percent Flora
Asteraceae	32	13.0
Poaceae	25	10.1
Scrophulariaceae	12	4.9
Polemoniaceae	11	4.5
Polygonaceae	10	4.1
Rosaceae	10	4.1
Brassicaceae	10	4.1
Apiaceae	8	3.2
Fabaceae	8	3.2
Ranunculaceae	7	2.8
Liliaceae	7	2.8
Total	140	56.8

The flora of Valentine Camp is composed almost entirely of native species. Ten species are introduced, constituting 4.1 percent of the flora.

Annotated Catalog

The following is an annotated list of vascular plants which occur at Valentine Camp. Families used here are recognized by Munz and Keck (1959), and along with the genera and species, are arranged alphabetically. The scientific name is given according to a recent and widely accepted source, usually Munz and Keck (1959). Common names of popular usage are given for some species. When a species is considered introduced (naturalized), its name is followed by (I). Species that are native to the Sierra Nevada but planted at Valentine Camp are indicated by (I/N). For each species the general abundance and distribution at the Camp are given. For flowering plants, the period of peak bloom at the Camp, based on five years of observations, is indicated (e.g., late June through mid-July).

DIVISION TRACHEOPHYTA

Subdivision Sphenopsida Class Equisetae

Equisetaceae. Horsetail Family

Equisetum arvense L. Scouring Rush. Horsetail.

Occasional in low-lying wet places, around man-made trout ponds and meadows, and along Mammoth Creek.

Subdivision Pteropsida Class Filicae Order Filicales

Aspidiaceae

Athyrium filix-femina (L.) Roth. var. californicum Butters. Lady Fern.

A few large plants occur beside the waterfall trail near the waterfall.

Cystopteris fragilis (D.) Bernh. Brittle Fern.

Scattered along waterfall trail near its junction with the meadow trail.

Pteridaceae

Pteridium aquilinum (L.) Kuhn var. pubescens Underw. Bracken Fern.

Occasional on south-facing slope above Mammoth Creek near the waterfall.

Subdivision Pteropsida
Class Coniferae. Cone-bearing plants.
Order Coniferales

Cupressaceae. Cypress Family

Juniperus occidentalis Hook. ssp. australis Vasek. Western Juniper.
Sierra Juniper.

A few young trees on a south-facing slope near the northern boundary and a large Jeffrey Pine beside the meadow trail. One young tree beside entrance road near the gate.

Pinaceae. Pine Family

Abies concolor (Gord. & Glend.) Lindl. White Fir.

Common on flats west of entrance road, around cabins and at base of steep, northeast-facing slope.

Abies magnifica A. Murr. Red Fir.

Common on steep, northeast-facing slope; occasional at its base. A few trees along Lake Mary Road and on south-facing slope below.

Pinus jeffreyi Grev. & Balf. in A. Murr. Jeffrey Pine.

Common on slope behind University cabin. Occasional near Mammoth Creek, on sagebrush knoll, on south-facing slope and west of entrance road.

Pinus monticola Dougl. Western White Pine.

Occasional on steep, northeast-facing slope from southwestern Reserve boundary down to about level of forest trail. A solitary tree on the

sagebrush knoll near the northeast boundary corner. More common at higher elevations.

Pinus murrayana Grev. & Balf. in A. Murr. Lodgepole Pine.

Common near entrance road, around cabins, around meadows, and near Mammoth Creek. Occasional on steep, northeast-facing slope and at its base.

Tsuga mertensiana (Bong.) Carr. Mountain Hemlock.

A few trees near the southwestern corner on a north-facing slope above Mammoth Creek.

Subdivision Pteropsida
Class Angiospermae. Flowering plants
Subclass Dicotyledones

Apiaceae. Carrot Family

Angelica lineariloba Gray. Sierra Angelica. Sierra Soda Straw.

A few plants on the steep, south-facing slope near Lake Mary Road. Mid-August to mid-September.

Heracleum sphondylium L. ssp. montanum (Schleicher ex Gaudin) Briq.
Cow Parsnip.

Common in wet, low-lying places, around the meadows and man-made trout ponds and along Mammoth Creek. Occasional near Valentine Cabin along meadow trail. Early July to early August.

Lomatium dissectum (Nutt.) Math. & Const. var. multifidum (Nutt.)
Math. & Const.

Occasional in understory of Lodgepole Pine forest, Jeffrey Pine forest and in dry openings in these forests. Mid-June to mid-July.

Osmorhiza chilensis H. & A. Sweet-cicely.

Occasional in Lodgepole Pine forest understory, especially in moist places. Early June to mid-July.

Osmorhiza occidentalis (Nutt.) Torr. Sweet-cicely.

Common in Lodgepole Pine forest understory, especially in moist places. Mid-June to late July.

Perideridia parishii (Coult. & Rose) Nels. & Macbr. Yampah.
Queen Anne's Lace.

Common in meadows; occasional about seeps and springs. Mid-July to mid-August.

Pteryxia terebinthina (Hook.) Coult. & Rose var. californica (Coult. & Rose) Math.

Occasional in forest understory on steep, south-facing slope and on sagebrush knoll. Mid-June to late July.

Sphenosciadium capitellatum Gray. Ranger's Buttons. Swamp Whiteheads.

Common in and around the meadows, at the base of the sagebrush knoll, along Mammoth Creek and around seeps and springs. Mid-July to mid-August.

Apocynaceae. Dogbane Family

Apocynum androsaemifolium L. Dogbane. Indian Hemp.

Occasional in openings in chaparral on south-facing slope near Lake Mary Road. Late July to late August.

Apocynum pumilum (Gray) Greene var. pumilum. Dogbane. Indian Hemp.

Occasional in the understory of the Jeffrey Pine and Lodgepole Pine forests behind the University Cabin. Late July to late August.

Asteraceae. Sunflower Family

Achillea millefolium L. var. lanulosa (Nutt.) Piper. Yarrow Milfoil.

Common on meadow margins at the base of the sagebrush knoll. Occasional on sagebrush knoll. Mid-July to late August.

Agoseris aurantiaca (Hook.) Greene. Mountain Dandelion.

Rare on southeast-facing slope near seeps. Early June to late July.

Agoseris glauca (Pursh) Greene var. laciniata (D. C. Eat.) Smiley.
Mountain Dandelion.

Occasional in openings in sagebrush scrub on sagebrush knoll. Early June to mid-July

Antennaria rosea Greene. Pussytoes.

Rare in openings in sagebrush scrub near Old Mammoth Road. Late June to mid-July.

Arnica chamissonis Less. ssp. foliosa (Nutt.) Maguire. Meadow Arnica.

Rare in big meadow near Mammoth Creek. Late July to early September.

Artemisia cana Pursh ssp. cana. Hoary Sagebrush.

Occasional in sagebrush-meadow transition zone on south side of meadow trail. Early September to early October.

Artemisia ludoviciana Nutt. ssp. ludoviciana. Wormwood.

Common in wet, low-lying places, on meadow margins and near Mammoth Creek. Late August to early October.

Artemisia tridentata Nutt. ssp. tridentata. Great Basin Sagebrush.
Big Sagebrush.

Common on sagebrush knoll and often forming a patchy understory in the dry soils of Lodgepole and Jeffrey Pine forests. Occasional on south-facing slope. Mid-August to early October.

Aster eatonii (Gray) Howell. Aster.

Common in meadows and along Mammoth Creek. Mid-August to late September.

Chrysopsis breweri Gray. Golden-aster.

Occasional in understory of Red Fir forest. Mid-July to late August.

Chrysothamnus parryi (Gray) Greene ssp. (?)

One shrub noticed in 1977 beneath large Jeffrey Pine beside meadow trail. First flowered in 1979, late in season. A possible hybrid because characteristics of inflorescence and leaves are between those of C. parryi and C. nauseosus. Material is not sufficiently mature to complete the identification of this plant.

Chrysothamnus viscidiflorus (Hook.) Nutt. ssp. puberulus (D. C. Eat.) Hall & Clem. Rabbit-brush.

Occasional on sagebrush knoll and on south-facing slope near Lake Mary Road. Mid-August to late September.

Cirsium congdonii Moore & Frankton (C. drummondii T. & G.). Dwarf Thistle.

Occasional in meadow near streamlets and meadow trail and in sagebrush-meadow transition. Early August to early September.

Crepis modocensis Greene ssp. modocensis. Hawksbeard.

Occasional in Lodgepole Pine forest understory. Mid-July to mid-August.

Erigeron breweri Gray. Fleabane.

Occasional in forest understory. Mid-July to mid-August.

Erigeron lonchophyllus Hook. Fleabane.

Rare near streamlets in meadow. Mid-August to late September.

Erigeron peregrinus (Pursh) Greene ssp. callianthemus (Greene) Cronq. Fleabane.

Occasional in meadow. Mid-August to mid-September.

Erigeron peregrinus (Pursh) Greene var. hirsutus Cronq. Fleabane.

Occasional in Lodgepole Pine and Jeffrey Pine forest understory.
Mid-July to late August.

Eupatorium occidentale Hook.

Rare at top of northeast-facing slope, at cliff base. Early July
to mid-August.

Gnaphalium palustre Nutt. Pearly Everlasting

Occasional in Jeffrey Pine forest understory. Late July to late
August.

Haplopappus nanus (Nutt.) D. C. Eat. Goldenbush.

Occasional on sagebrush knoll and on steep, south-facing slope near
Lake Mary Road. Mid-August to late September.

Hieracium albiflorum Hook. Hawkweed.

Occasional in shaded understory of Jeffrey Pine and Red Fir forests.
Late July to late August.

Machaeranthera canescens (Pursh) Gray ssp. canescens.

Rare in forest openings along Old Mammoth Road near entrance road.
Late July to late August.

Madia elegans D. Don ssp. wheeleri (Gray) Keck. Elegant Madia.

Rare, growing up through shrubs near base of sagebrush knoll. Late
July to early September.

Senecio integerrimus Nutt. var. exaltatus (Nutt.) Cronq. Single-stemmed
Groundsel.

Occasional in understory of Jeffrey Pine and Lodgepole Pine forests
and on sagebrush knoll. Early June to mid-July.

Senecio hydrophilus Nutt. Groundsel.

Common in the meadows, along Mammoth Creek and in low-lying wet places. Mid-August to late September.

Senecio triangularis Hook. Arrowleaf Butterweed.

Common in moist places along Mammoth Creek, around man-made trout ponds and at seeps and springs. Not common in true meadows. Mid-July to mid-August.

Solidago canadensis L. ssp. elongata (Nutt.) Keck. Creek Goldenrod.

Common around man-made trout ponds, along Mammoth Creek and in moist places at the base of the sagebrush knoll. Mid-July to late September.

Stephanomeria tenuifolia (Torr.) Hall.

Occasional in the understory of Jeffrey Pine and Red Fir forests. Late July to early September.

Taraxacum officinale L. Common Dandelion. (I)

Occasional weed in lawns around the caretaker's cabin and the man-made trout ponds. Late June to late September.

Tetradymia canescens DC. Spineless Horsebrush.

Occasional on sagebrush knoll. Mid-August to late September.

Wyethia mollis Gray. Mule's Ears.

Common on sagebrush knoll and in openings in Lodgepole Pine and Jeffrey Pine forests. Mid-June to early August.

Betulaceae. Birch Family

Alnus tenuifolia Nutt. Mountain Alder.

Common along Mammoth Creek and around seeps and springs at the base of the steep, northeast-facing slope. Mid-June to mid-July.

Boraginaceae. Borage Family

Cryptantha torreyana (Gray) Greene.

Occasional on sagebrush knoll, especially in open places and near path. Early July to early August.

Cryptantha watsonii (Gray) Greene.

Occasional on sagebrush knoll and at top of steep, south-facing slope near Lake Mary Road. Mid-July to mid-August.

Hackelia jessicae (McGreg.) Brand. Jessica's Stickseed.

Common in understory of Lodgepole Pine forest. Early June to late July.

Hackelia mundula (Jeps.) Ferris. Stickseed.

Rare on south-facing slope and in understory of Lodgepole Pine forest. Late June to late July.

Plagiobothrys cusickii (Greene) Jtn.

Occasional in openings at base of sagebrush knoll. Mid-June to mid-August.

Brassicaceae. Mustard Family

Arabis divaricarpa A. Nels. Bent-pod Rockcress.

Occasional in the understory of Red Fir and Lodgepole Pine forests. Late June to late July.

Arabis drummondii Gray. Drummond's Rockcress.

Common in openings in Lodgepole Pine and Jeffrey Pine forests. Late June to early August.

Arabis fernaldiana Roll. var. stylosa (Wats.) Roll. Rockcress.

Occasional on shaded northeast-facing slope, in the understory of Red Fir forest. Mid-June to early July. Identification of this material is uncertain and needs further study.

Arabis holboellii Hornem. var. retrofracta (Grah.) Rydb. Rockcress.

Occasional in openings on sagebrush knoll. Mid-June to mid-July.

Capsella bursa-pastoris (L.) Medic. Shepherd's Purse. (I)

Occasional in cleared areas near cabins and along trails. Early July to late August.

Descurainia californica (Gray) O. E. Schulz. Tansy-mustard.

Common at the base of the sagebrush knoll and on south-facing slope. Mid-July to mid-August.

Descurainia richardsonii O. E. Schulz ssp. incisa (Engelm.) Dett.
Tansy mustard.

Occasional along trails, especially waterfall trail, and in understory of Lodgepole Pine forest. Late July to mid-September.

Erysimum perenne (Wats. ex Cov.) Abrams. Western or Sierra Wallflower.

Common in openings and in understory of Lodgepole Pine and Jeffrey Pine forests. Late June to early August.

Lepidum virginicum L. var. pubescens (Greene) Thell. Peppergrass.

Rare along Old Mammoth Road. Late June to early August.

Rorippa nasturtium-aquaticum (L.) Schinz & Thell. Watercress. (I)

Common in Mammoth Creek, in small streams in meadow and near larger seeps. Mid-June to early August.

Caprifoliaceae. Honeysuckle Family

Lonicera conjugialis Kell. Dwarf Honeysuckle.

Occasional in shaded understory of Lodgepole Pine and Red Fir forests. Late June to late July.

Sambucus caerulea Raf. Blue Elderberry.

Rare, one shrub beside waterfall trail near waterfall. A few small plants in Red Fir forest near high trail. Mid-July to mid-August.

Symphoricarpos vaccinoides Rydb. Snowberry.

Common everywhere except wet places. Mid-June to late July.

Caryophyllaceae. Pink Family

Cerastium vulgatum L. Mouse-ear Chickweed. (I)

Occasional in lawn around man-made trout ponds. Mid-July to mid-September.

Sagina saginoides (L.) Karst var. hesperia Fern. Arctic Pearlwort.

Rare near seeps at southwestern corner of Reserve. Mid-June to late July.

Stellaria longipes Goldie. Long-stalked Starwort.

Occasional in meadow and at base of sagebrush knoll. Mid-July to mid-August.

Stellaria obtusa Engelm. Starwort.

Rare near seeps at southwestern corner of Reserve. Mid-June to late July.

Chenopodiaceae. Goosefoot Family

Chenopodium atrovirens Rydb. Goosefoot.

Common on sagebrush knoll, especially at base, on south-facing slope and beside trails. Mid-July to late August.

Cornaceae. Dogwood Family

Cornus stolonifera Michx. American Dogwood. Creek Dogwood.

Common along Mammoth Creek. Late July to late August.

Cuscutaceae. Dodder Family

Cuscuta suksdorfii Yunck. var. subpedicellata Yunck. Dodder.

Rare, on Erigeron, on south-facing slope in opening in chaparral.
Mid-July to early August.

Ericaceae. Heath Family

Arctostaphylos nevadensis Gray. Pinemat manzanita.

Occasional in openings in Red Fir forest and on south-facing slope. Early June to early July.

Arctostaphylos patula Greene. Greenleaf Manzanita.

Common on steep, south-facing slope and in openings in Jeffrey Pine forest. Early June to early July.

Fabaceae. Pea Family

Astragalus purshii Dougl. var. lectulus Jones. Woolly Rattlepod.

Rare on sagebrush knoll. Late May to mid-June.

Lupinus andersonii Wats. Anderson's Lupine.

Common in openings in Lodgepole Pine and Jeffrey Pine forests.
Early July to early August.

Lupinus polyphyllus Lindl. ssp. superbus (Heller) Munz. Meadow Lupine.

Common in wet places and meadows, near seeps and springs and at base of sagebrush knoll. Early July to mid-August.

Trifolium cyathiferum Lindl. Bowl Clover.

Occasional in meadow and at base of sagebrush knoll and in understory of Lodgepole Pine forest. Mid-July to mid-August.

Trifolium longipes Nutt. Long-stalked Clover.

Common in meadow and at base of sagebrush knoll. Mid-June to late July.

Trifolium monanthum Gray var. monanthum. Carpet Clover.

Occasional in openings in Jeffrey Pine forest. Late June to mid-August.

Trifolium repens L. White Clover. (I)

Occasional in lawns and in disturbed openings in Lodgepole Pine forest. Early July to late September.

Trifolium wormskioldii Lehm. Mountain Clover.

Occasional in meadow and near seeps and springs. Mid-July to mid-August.

Fagaceae. Beech Family

Chrysolepis sempervirens (Kell.) Hjelmquist. Chinquapin.

Occasional on steep, south-facing slope and in openings in Red Fir forest. Mid-July to late August.

Quercus vaccinifolia Kell. Huckleberry Oak.

Common on steep, south-facing slope and in openings in Jeffrey Pine forest. Late May to mid-July.

Gentianaceae. Gentian Family

Frasera speciosa Dougl. ex Griseb. in Hook. Giant Green Gentian.
Monument Plant.

Occasional colonies in understory of Lodgepole Pine forest.
Early to late July.

Gentiana holopetala (Gray) Holm. Sierra Gentian.

Rare in meadow near streamlets. Late August to late September

Haloragaceae. Water-Milfoil Family

Hippurus vulgaris L. Mare's Tail.

Occasional in shallow water of man-made trout ponds. Early August to mid-September.

Myriophyllum spicatum L. ssp. exalbescens (Fern.) Hult.
American Milfoil.

Occasional in shallow water of man-made trout ponds. Identification based on immature material.

Hydrophyllaceae. Waterleaf Family

Nemophila breviflora Gray.

Rare near seeps and at base of sagebrush knoll. Early June to late July.

Phacelia frigida Greene.

Occasional on south-facing slope, especially near Lake Mary Road. Mid-July to mid-August.

Phacelia hastata Dougl. ex Lehm. var. compacta (Greene) Macbr.

Common in understory of Lodgepole Pine and Jeffrey Pine forests. Mid-July to mid-August.

Phacelia hydrophylloides Torr. ex Gray. Waterleaf Phacelia.

Occasional in understory of Red Fir forest. Mid-July to late August.

Phacelia ramosissima Dougl. ex Lehm. var. eremophila (Greene) Macbr.

Common on steep, south-facing slope. Rare on sagebrush knoll. Early July to late August.

Hypericaceae. St. John's Wort Family

Hypericum anagalloides Cham. & Schlecht. Tinker's Penny.

Rare near seep in southwestern corner of Reserve. Mid-July to mid-August.

Lamiaceae. Mint Family

Agastache urticifolia (Benth.) Kuntze. Giant Hyssop.

Occasional near seeps and springs on otherwise dry slopes. Mid-July to mid-August.

Monardella odoratissima Benth. ssp. pallida (Heller) Epl.
Mountain Pennyroyal.

Common on steep, south-facing slope in chaparral and in openings in Jeffrey Pine forest. Late July to late August.

Stachys albens Gray. White Hedge-nettle.

Common in meadow, along Mammoth Creek and in low-lying wet places. Mid-July to mid-August.

Loasaceae. Sandpaper Plant Family

Mentzelia congesta (Nutt.) T. & G.

Occasional on sagebrush knoll. Mid-July to early August.

Mentzelia laevicaulis (Dougl.) T. & G. Blazing Star.

Rare in openings in chaparral on steep, south-facing slope near Lake Mary Road. Early July to mid-August.

Malvaceae. Mallow Family

Sidalcea oregana (Nutt.) Gray ssp. spicata (Regel) C. L. Hitch.
Spike Mallow.

Common in meadows, along Mammoth Creek and near seeps and springs. Mid-July to mid-August.

Onagraceae. Evening-primrose Family

Circaea alpina L. var. pacifica (Asch. & Magnus) Jones.
Enchanter's Nightshade.

Occasional in deep shade near Mammoth Creek. Mid-July to mid-August.

Epilobium angustifolium L. ssp. circumvagum Mosquin. Fireweed.

Common in moist or wet disturbed places, especially around cabins.
Mid-July to late August.

Epilobium exaltatum E. Drew. Willow-herb.

Common in wet places, in meadows and near seeps and springs.
Early July to mid-August.

Epilobium paniculatum Nutt. ex T. & G. Willow-herb.

Rare at base of sagebrush knoll in sagebrush-meadow transition.
Late July to late August.

Epilobium pringleanum Hausskn. Willow-herb.

Common in wet places, in meadows and near seeps and springs. Early
July to mid-August.

Gayophytum diffusum T. & G. ssp. parviflorum Lewis & Szweykowski.
Diffuse Gayophytum.

Common in open dry places on sagebrush knoll, on south-facing
slope and in forest openings especially along trails. Early
June to mid-August.

Orobanchaceae. Broom-rape Family

Orobanche californica C. & S. ssp. feudgei (Munz) Heckard.
California Broomrape.

Rare, on Artemisia tridentata, on sagebrush knoll. Late July to
late August.

Orobanche uniflora L. var. sedi (Suksd.) Achey. Naked Broomrape.

Rare, on Senecio (?) and Osmorhiza (?), in deep shade on meadow trail near Valentine Cabin. Early to late July.

Papaveraceae. Poppy Family

Argemone munita Dur. & Hilg. ssp. rotundata (Rydb.) G. Ownbey.
Prickly Poppy.

Rare at top of south-facing slope near Lake Mary Road. Early July to mid-August.

Plantaginaceae. Plantago Family

Plantago major L. Common Plantain. Broad-leaved Plantain. (I)

Rare in road near cookhouse beneath Lodgepole Pines. Only vegetative growth observed.

Polemoniaceae. Phlox Family

Allophyllum integrifolium (Brand) A. & V. Grant.

Common in openings in Jeffrey Pine forest. Early July to early August.

Allophyllum violaceum (Heller) A. & V. Grant.

Common on sagebrush knoll and in openings in Jeffrey Pine forest. Mid-June to early August.

Collomia grandiflora Dougl. ex Lindl. Large-flowered Collomia.

Occasional on south-facing slope and in dry forest openings. Mid-July to late August.

Collomia linearis Nutt. Narrow-leaved Collomia.

Occasional in meadow and at base of sagebrush knoll. Early July to mid-August.

Eriastrum wilcoxii (A. Nels.) Mason. Wilcox's Eriastrum.

Occasional on sagebrush knoll. Mid-July to mid-August.

Gilia cana (Jones) Heller ssp. cana.

Rare at the top of the sagebrush knoll. Early to late June.

Ipomopsis aggregata (Pursh) V. Grant ssp. aggregata. Scarlet Gilia.
Firecracker Flower.

Common in understory of Lodgepole Pine and Jeffrey Pine forests
and in openings in these forests. Mid-July to late August.

Linanthus ciliatus (Benth.) Greene var. neglectus (Greene) Jeps.
Whisker-brush. Bristly-leaved Linanthus.

Common in openings in Jeffrey Pine forest and on sagebrush knoll.
Mid-June to early August.

Microsteris gracilis (Hook.) Greene ssp. humilis (Greene) V. Grant.

Occasional on sagebrush knoll. Early June to mid-July.

Phlox diffusa Benth. Spreading Phlox.

Occasional at top of sagebrush knoll and in dry openings in Lodge-
pole Pine forest near Old Mammoth Road. Mid-June to mid-July.

Phlox stansburyi (Torr.) Heller. Stansbury Phlox.

Occasional at top of sagebrush knoll. Mid-June to mid-July.

Polygonaceae. Buckwheat Family

Eriogonum nudum Dougl. ex Benth. var. nudum. Nude Buckwheat.

Common in openings in Lodgepole Pine and Jeffrey Pine forests, on
south-facing slope and on sagebrush knoll. Early July to mid-
August.

Eriogonum spergulinum Gray. Wild Buckwheat.

Common on sagebrush knoll, in dry openings in forest and on south-facing slope, especially near paths. Mid-June to late July.

Eriogonum umbellatum Torr. var. umbellatum. Sulphur Buckwheat.

Common on sagebrush knoll and on south-facing slope. Late June to late August.

Polygonum aviculare L. Knotweed. (I)

Occasional in lawns around man-made trout ponds and cabins. Late July to mid-September.

Polygonum douglasii Greene var. douglasii. Knotweed.

Common in meadow and at base of sagebrush knoll. Mid-July to mid-August.

Polygonum douglasii Greene var. johnstonii Munz. Knotweed.

Occasional in dry openings in Jeffrey Pine forest. Mid-July to mid-August.

Rumex acetosella L. Sheep Sorrel. (I)

Occasional in openings in chaparral and along trail on steep, south-facing slope. Late June to mid-July.

Rumex californicus Rech. f. Dock.

Occasional along Mammoth Creek. Mid-July to late August.

Rumex occidentalis Wats. Dock.

Common in meadows. Mid-August to mid-September.

Rumex triangulivalvis (Danser) Rech. f. Dock. (I)

Occasional near seeps at base of northeast-facing slope. Late July to late August.

Portulacaceae. Purslane Family

Calyptridium umbellatum (Torr.) Greene. Pussypaws.

Occasional in openings in chaparral on south-facing slope and in openings in Jeffrey Pine forest. Late June to late July.

Crunocallis chamissoi (Ledeb.) Rydb. Toad Lily.

Common on banks of man-made trout ponds, in the meadows, and at base of sagebrush knoll. Mid-June to mid-July.

Lewisia nevadensis (Gray) Rob. in Gray. Nevada Lewisia.

Rare in loose pumice soil in semi-shade of Lodgepole Pine forest. Seen only in 1978. Early to mid-July.

Pyrolaceae. Wintergreen Family

Pterospora andromedea Nutt. Pinedrops.

Rare saprophyte, widely scattered in understory of Jeffrey Pine and Lodgepole Pine forests. Late July to late August.

Pyrola californica Kribs. Pink Pyrola.

One colony on south side of Mammoth Creek, between the bridges. Late July to late August.

Pyrola picta Sm. White-veined Shinleaf.

Rare in shaded understory of Lodgepole Pine forest near water tank and east of big meadow. Early August to late September.

Pyrola secunda L. Sidebells. One-sided Pyrola.

A small colony beside forest trail near large Jeffrey Pine and another near water tank. Mid-August to mid-September.

Ranunculaceae. Buttercup Family

Aconitum columbianum Nutt. in T. & G. Monkshood. (I/N)

Planted near spring at head of Woody's Meadow. Mid-August to early September.

Aquilegia formosa Fisch. in DC. var. truncata (F. & M.) Baker.
Red Columbine.

Common in shaded understory of Lodgepole Pine forest, around meadow and near seeps and springs. Early July to mid-August.

Actaea rubra (Ait.) Willd. ssp. arguta (Nutt.) Hult. Baneberry.

Occasional in shaded understory of Jeffrey Pine and Red Fir forests and near seeps. Mid-June to mid-July.

Delphinium glaucum Wats. Giant Larkspur. (I/N)

Planted on south side of University Cabin. Early August to early September.

Delphinium pratense Eastw. Larkspur.

Occasional in shaded understory of Lodgepole Pine forest and at base of sagebrush knoll. Mid-June to early August.

Ranunculus aquatilis L. var. capillaceus (Thuill.) DC. Aquatic Ranunculus.

Common in man-made trout ponds. Early August to early September.

Thalictrum fendleri Engelm. ex Gray. Mountain Meadow Rue.

Common in shaded understory of Lodgepole Pine forest and near seeps. Late June to mid-July.

Rhamnaceae. Buckthorn Family

Ceanothus cordulatus Kell. Snowbush.

Common on steep, south-facing slope and in openings in Jeffrey Pine forest. Mid-June to mid-July.

Ceanothus x lorenzenii (Jeps.) McMinn. (Ceanothus cordulatus x C. velutinus). Snowbush-Tobacco Brush Hybrid.

A large shrub beside forest trail, near spur trail to waterfall view. Late June to late July.

Ceanothus velutinus Dougl. ex Hook. Tobacco Brush.

Common on steep, south-facing slope, especially near Lake Mary Road. Mid-June to late July.

Rhamnus rubra Greene ssp. yosemitana C. B. Wolf. Sierra Coffeeberry.

Occasional in chaparral on steep, south-facing slope. Mid-June to mid-July.

Rosaceae. Rose Family

Amelanchier pallida Greene. Western Serviceberry.

Rare on sagebrush knoll and along meadow trail near western bridge on Mammoth Creek. Early June to mid-July.

Fragaria platypetala Rydb. Wild Strawberry.

Occasional in shaded understory of Lodgepole Pine forest, especially around cabins and cookhouse. Late June to late July.

Geum macrophyllum Willd. Avens.

Occasional along Mammoth Creek and near seeps and springs. Mid-July to late August.

Holodiscus boursieri (Carr.) Rehd. in Bailey. Creambush.

Occasional on south-facing slope and in openings in Jeffrey Pine forest. Mid-July to mid-August.

Potentilla biennis Greene. Cinquefoil.

Rare near spring on south-facing slope and near Old Mammoth Road.
Mid-July to late August.

Potentilla glandulosa Lindl. ssp. hansenii (Greene) Keck.

Common in meadows near seeps and springs and in most other moist places. Early July to mid-August.

Potentilla gracilis Dougl. ex Hook. ssp. nuttallii (Lehm.) Keck.
Cinquefoil.

Common on meadow margins, at base of sagebrush knoll and in moist places such as near seeps and springs. Early July to mid-August.

Prunus emarginata (Dougl.) Walp. Bitter Cherry.

Common on south-facing slope and in openings in Jeffrey Pine forest. Early June to mid-July.

Purshia tridentata (Pursh) DC. Antelope Bitterbrush.

Common on sagebrush knoll and in openings in Jeffrey Pine and Lodgepole Pine forests. Mid-June to mid-July.

Rosa woodsii Lindl. var. ultramontana (Wats.) Jeps. Mountain Wild Rose.

Occasional in shaded forest understory, especially on meadow trail near large Jeffrey Pine. Mid-July to mid-August.

Rubiaceae. Madder Family

Galium bifolium Wats. Bedstraw.

Common on sagebrush knoll, especially at base, around meadows and in other sunny moist places. Mid-June to late July.

Galium triflorum Michx. Bedstraw.

Occasional in understory of Jeffrey Pine forest, especially near seeps. Mid-July to mid-August.

Kelloggia galioides Torr.

Occasional in shaded understory of forests. Mid-July to mid-August.

Salicaceae. Willow Family

Populus tremuloides Michx. Quaking Aspen.

Common along Mammoth Creek, on meadow margins and near seeps and springs. Only vegetative growth observed.

Salix caudata (Nutt.) Heller var. bryantiana Ball & Bracelin. Willow.

Common along Mammoth Creek and near some springs. Early June to early July.

Salix planifolia Pursh var. monica (Bebb.) C. K. Schneid. Willow.

Common along Mammoth Creek and near some springs. Early June to early July.

Saxifragaceae. Saxifrage Family

Heuchera rubescens Torr. var. pachypoda (Greene) Rosend. Alumroot.

Rare on rock outcrops near Mammoth Creek, along waterfall trail and on north-facing slope above. Early July to early August.

Lithophragma bulbifera Rydb. Woodland-star.

Rare in openings in forest, near late-flowing snowmelt streamlets. Seen only in 1978. Early to late July.

Mitella pentandra Hook. Miterwort.

Rare in shaded understory of Lodgepole Pine forest, near seeps around water tank. Mid-June to mid-July.

Ribes cereum Dougl. Squaw Currant.

Common in sunny forest openings and on sagebrush knoll and south-facing slope. Early June to mid-July.

Ribes divaricatum Dougl. var. inerme (Rydb.) McMinn. Straggly Gooseberry.

Rare at base of sagebrush knoll and on meadow borders. Mid-May to Mid-June.

Ribes montigenum McClat. Alpine Prickly Currant.

Common in shaded understory of forests and near Mammoth Creek. Early June to early July.

Scrophulariaceae. Figwort Family

Castilleja chromosa A. Nels. Desert Paintbrush.

Common on sagebrush knoll, in chaparral on south-facing slope and in dry forest openings. Mid-June to late July.

Castilleja miniata Dougl. ex Hook. Meadow Paintbrush.

Common in meadows and near seeps and springs. Late June to mid-August.

Collinsia parviflora Dougl. ex Lindl. Small-flowered Blue-eyed Mary.

Common in sunny open places on sagebrush knoll, especially at the base, and in forest openings and along trails. Mid-June to late July.

Mimulus breweri (Greene) Cov. Brewer's Monkeyflower.

Occasional in sunny open places on sagebrush knoll and in forest openings. Early July to early August.

Mimulus lewisii Pursh. Lewis's Monkeyflower.

Occasional in shaded, moist places in forest understory, especially near seeps, and along Mammoth Creek near top of waterfall. Planted on north side of University Cabin. Mid-July to mid-August.

Mimulus nasutus Greene. Common Monkeyflower.

Common in moist places throughout. Mid-June to late August.

Pedicularis semibarbata Gray. Pine-woods Lousewort.

Occasional in shaded understory of Jeffrey Pine and Red Fir forests. Mid-June to early August.

Penstemon bridgesii Gray. Scarlet Penstemon.

Common on south-facing slope. Early July to early August.

Penstemon newberryi Gray. Pride Of The Mountains. Mountain Penstemon.

Occasional on rock outcrops overlooking Mammoth Creek. Mid-July to late August.

Penstemon oreocharis Greene. Beard Tongue (I/N)

Planted on south side of University Cabin. Mid-August to early September.

Penstemon speciosus Dougl. ex Lindl. ssp. kennedyi (A. Nels.) Keck.
Showy Penstemon.

Rare on south-facing slope near Lake Mary Road. Mid-June to late July.

Veronica americana (Raf.) Schw. Speedwell.

Occasional at base of sagebrush knoll and around man-made trout ponds. Mid-June to mid-August.

Solanaceae. Nightshade Family

Chamaesaracha nana (Gray) Gray.

Occasional in openings in Jeffrey Pine forest near Old Mammoth Road. Mid-July to mid-August.

Nicotiana attenuata Torr. Wild Tobacco.

Rare in sunny openings along Old Mammoth Road. Early to late August.

Solanum xantii Gray var. montanum Munz. Purple Nightshade.

Occasional on south-facing slope near Lake Mary Road. Mid-July to mid-August.

Urticaceae. Nettle Family

Urtica serra Blume. Sierra Nettle.

Occasional on meadow margins, at base of sagebrush knoll, along Mammoth Creek and near seeps and springs. Mid-July to late August.

Valerianaceae. Valerian Family

Valeriana capitata Pall. ex Link spp. californica (Heller) F. G. Mey.
California Valerian.

Occasional in shaded understory of Jeffrey Pine and Lodgepole Pine forests. Early June to mid-July.

Violaceae. Violet Family

Viola macloskeyi Lloyd. White-flowered Violet.

Rare near seep behind University Cabin and near spring above meadow, near boundary tree. Early to late June.

Viola purpurea Kell. ssp. integrifolia Baker & Clausen. Mountain Violet.

Common in forest understory. Early June to mid-July.

Subdivision Pteropsida
Class Angiospermae. Flowering Plants
Subclass Monocotyledones

Amaryllidaceae. Amaryllis Family

Allium bisceptrum Wats. Wild Onion.

Common on sagebrush knoll and in Lodgepole Pine understory. Mid-June to early August.

Brodiaea lutea (Lindl.) Mort. var. analina (Greene) Munz.
Golden Brodiaea.

Rare in sunny openings in Jeffrey Pine and Red Fir forests. Late July to mid-August.

Cyperaceae. Sedge Family

Carex athrostachya Olney. Sedge.

Occasional in shaded understory of Lodgepole Pine forest. Early July to late August.

Carex integra Muhl. Sedge.

Occasional around seeps and springs. Late June to early August.

Carex jonesii Bailey. Sedge.

Common in meadows. Late June to late July.

Carex paucicostata Muhl. Sedge.

Common on meadow margins, along Mammoth Creek, and near seeps and springs. Mid-June to early August.

Hydrocharitaceae. Frogbit Family

Elodea canadensis Michx. Waterweed.

Occasional in shallow water on margins of man-made trout ponds. Early August to mid-September.

Iridaceae. Iris Family

Iris missouriensis Nutt. Western Blue Flag. Wild Iris.

Common in meadows, at base of sagebrush knoll and near seeps and springs. Mid-June to mid-July.

Juncaceae. Rush Family

Juncus macrandrus Cov. Long-anthered Rush.

Occasional along streamlets in meadows and near seeps and springs.
Mid-July to late August.

Juncus mexicanus Willd. Mexican Rush.

Common in and around meadows. Mid-July to late August.

Juncus nevadensis Wats.

Occasional in meadows. Mid-July to mid-August.

Juncus xiphioides E. Mey.

Common in wet areas at base of sagebrush knoll. Mid-July to late August.

Luzula parviflora (Ehrh.) Desv. Wood Rush.

Occasional in shaded understory of Jeffrey Pine and Red Fir forests. Mid-July to late August.

Liliaceae. Lily Family

Calochortus leichtlinii Hook. f. Mariposa Lily.

Common in favorable years on sagebrush knoll and in understory of Jeffrey Pine and Lodgepole Pine forests. Early July to early August.

Fritillaria pinetorum A. Davids. Mountain Fritillary.

Rare on sagebrush knoll and in openings in Lodgepole Pine forest.
Early June to mid-July.

Lilium kelleyanum Lemmon. Sierra Lily.

Common in favorable years on meadow margins and near some seeps and springs. Distribution has probably been increased by human intervention in seed distribution. Early July to early August.

Lilium pardalinum Kell. Leopard Lily.

Rare, one colony south of University Cabin in shade. Early to late August.

Smilacina racemosa (L.) Desf. var. glabra (Macbr.) St. John.
False Solomon's Seal.

Occasional on meadow margins, near seeps and springs and in understory of Red Fir forest. Late June to late July.

Smilacina stellata (L.) Desf. var. stellata. False Solomon's Seal.

Common in meadow, on meadow margins and near seeps and springs. Mid June to mid-July.

Veratrum californicum Durand. Corn Lily.

Common on meadow margins, at base of sagebrush knoll and near seeps and springs. Early July to late August.

Orchidaceae. Orchid Family

Corallorhiza maculata Raf. Spotted Coral-root.

Occasional in shaded understory of Jeffrey Pine and Red Fir forests. Mid-July to mid-August.

Habenaria leucostachys (Lindl.) Wats. Sierra Rein Orchid.

Common in meadows, along Mammoth Creek and near seeps and springs. Late June to early August.

Habenaria unalascensis (Spreng.) Wats. Alaska Orchid.

Rare, a small colony in open area behind University Cabin, and a few plants between lawn and parking area in front of University Cabin. Mid-July to mid-August.

Listera convallaroides (Sw.) Torr. Twayblade.

Rare, one colony along small early season streamlet that crosses forest trail. Mid-July to mid-August.

Poaceae. Grass Family

Agropyron subsecundum (Link.) Hitchc. Bearded Wheatgrass.

Common in meadows. Late August to late September.

Agrostis idahoensis Nash. Bentgrass.

Occasional in vicinity of seeps near southwestern boundary corner.
Late July to early September.

Agrostis lepida Hitchc. Bentgrass.

Occasional near streamlets in meadow and near seeps and springs.
Late July to late August.

Agrostis scabra Willd. Ticklegrass.

Occasional in vicinity of seeps near southwestern boundary corner.
Late July to early September.

Agrostis stolonifera L. var. major (Gaud.) Farwell. Redtop. (I)

Occasional in forest openings near Old Mammoth Road. Mid-July
to mid-August.

Alopecurus aequalis Sobol. Foxtail.

Occasional, growing in shallow water of man-made trout ponds. Late
June to early August.

Bromus marginatus Nees. Mountain Brome Grass.

Common on sagebrush knoll, in chaparral on south-facing slope, and in
sunny forest openings. Mid-July to late August.

Calamagrostis canadensis (Michx.) Beauv. Bluejoint Reedgrass.

Occasional in meadows and near seeps and springs. Mid-July to
late August.

Calamagrostis inexpansa Gray. Reedgrass.

Common in meadows. Mid-August to mid-September.

Elymus aristatus Merr. Wildrye.

Common around cabins, in understory of Lodgepole Pine forest, at base of sagebrush knoll and on south-facing slope. Mid-August to mid-September.

Elymus cinereus Scribn. & Merr. Ashy Wildrye. Basin Wildrye.

Common on sagebrush knoll, especially at base. Mid-July to mid-August.

Elymus glaucus Buckl. Blue Wildrye.

Occasional in understory of Lodgepole Pine forest and at base of sagebrush knoll. Mid-August to mid-September.

Elymus triticoides Buckl. ssp. triticoides. Creeping Wildrye.
Beardless Wildrye.

Common in meadows and near seeps and springs. Mid-August to early September.

Festuca rubra L. Red Fescue. (I/N)

Forming lawns around man-made trout ponds. Mid-July to late August.

Glyceria elata (Nash.) Hitchc. Tall Mannagrass.

Occasional in meadows and near seeps and springs. Mid-July to mid-August.

Hordeum californicum Covas & Steb. California Barley.

Rare, near seeps in northeast corner of Reserve, near boundary tree. Mid-July to mid-August.

Melica bulbosa Geyer ex Porter & Coult. Melicgrass.

Occasional in understory of Jeffrey Pine and Red Fir forests. Early July to mid-August.

Muhlenbergia jonesii (Vasey) Hitchc. Muhly.

Occasional on steep, south-facing slope. Late June to late July.

Muhlenbergia richardsonis (Trin.) Rydb. Mat Muhly.

Occasional near seeps and springs. Mid-July to mid-August.

Phleum pratense L. Timothy Hay. (I)

Occasional around cabins, in understory of Lodgepole Pine forest.
Mid-August to early September.

Poa leptocoma Trin. Bog Bluegrass.

Common in understory of Lodgepole Pine and Jeffrey Pine forests.
Mid-June to early August.

Poa nervosa (Hook.) Vasey. Wheeler Bluegrass.

Occasional in understory of Jeffrey Pine and Red Fir forests.
Mid-July to mid-August.

Poa pratensis L. Kentucky Bluegrass.

Common in meadows. Late July to late August.

Sitanion hystrix (Nutt.) J. G. Sm. Bottlebrush Squirreltail.

Common on sagebrush knoll, on south-facing slope and in sunny
openings in forests. Mid-July to late August.

Stipa occidentalis Thurb. Western Needlegrass.

Rare on sagebrush knoll. Mid-June to mid-July.

Potamogetonaceae. Pondweed Family

Potamogeton pusillus L. Pondweed.

Occasional submerged aquatic in man-made trout ponds. Only
vegetative growth observed.

Acknowledgments

Many people have provided me with assistance during the course of this project, and my thanks go to all of them. Dr. J. Robert Haller, previous Manager of the Valentine Eastern Sierra Reserve, is responsible for suggesting the project and for helping to secure the initial funding. I thank him for providing me with help and encouragement throughout the duration of the study. Woody Sampson, caretaker of Valentine Camp from 1955 to 1979, summoned up for me many useful bits of information from his store of local history, doled out numerous hints as to where certain rare plants might be found, and helped me out with many small chores during my stays at Valentine Camp. My thanks to Bill and Helen Seal, who treated me like one of the family while I lodged at the Sierra Nevada Aquatic Research Lab. Bruce Orr spent many hours on the Valentine Camp trails with me, and I thank him for his valuable assistance. Wayne Ferren, Senior Museum Scientist in charge of the operation of the UCSB Herbarium, initiated the Herbarium Publication Series and has been very helpful in a number of capacities in getting this manuscript into print.

I thank Dr. Dale M. Smith, Dr. J. Robert Haller, Wayne Ferren, and Bruce Orr for critically reading the manuscript, Michael Emerson for providing the drawing of Valentine Camp, and Mary Ankeny for typing the manuscript. Helmut Ehrenspeck did a fine job of drawing the figures that accompany the text. I thank Judy McCaslin for helping me schedule my visits to the eastern Sierra and for providing information of diverse sorts. I am grateful to Dr. John Melack, Faculty Manager of the Valentine Eastern Sierra Reserve, for taking my requests seriously, and for granting them. I am indebted to the Systemwide Office of the NLWRS for providing maps and aerial photographs.

I would like to thank Mrs. Edward Valentine and the Valentine Endowment Fund for providing the initial funding for this project, and I gratefully acknowledge the support of the anonymous donor who provided supplemental funding.

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Penstemon		<u>Potamogeton pusillus</u>	46
<u>bridgesii</u>	39	<u>Potentilla</u>	
<u>newberryi</u>	39	<u>biennis</u>	36
<u>oreocharis</u>	39	<u>glandulosa</u>	36
<u>speciosus</u>	39	<u>gracilis</u>	36
Peppergrass	23	Prickly Poppy	30
<u>Perideridia parishii</u>	17	Pride Of The Mountains	39
Phacelia		<u>Prunus emarginata</u>	9, 36
<u>frigida</u>	27	Pteridaceae	15
<u>hastata</u>	27	<u>Pteridium aquilinum</u>	15
<u>hydrophylloides</u>	27	<u>Pterospora andromedea</u>	33
<u>ramosissima</u>	27	<u>Pteryxia terebinthina</u>	17
<u>Phleum pratense</u>	46	<u>Purshia tridentata</u>	9, 36
Phlox Family	30	Purslane Family	33
Phlox		Pussypaws	33
Spreading	31	Pussytoes	18
Stansbury	31	Pyrolaceae	33
Phlox		<u>Pyrola</u>	
<u>diffusa</u>	31	<u>californica</u>	33
<u>stansburyi</u>	31	<u>picta</u>	33
Pinaceae	15	<u>secunda</u>	33
Pinedrops	33	<u>Pyrola</u>	
Pine Family	15	One-sided	33
Pink Family	24	Pink	33
		Quaking Aspen	9, 10, 37

Queen Anne's Lace	17	Senecio	
<u>Quercus vaccinifolia</u>	9, 26	<u>hydrophilus</u>	21
Rabbit-brush	19	<u>integerrimus</u>	20
Ranger's Buttons	10, 17	<u>triangularis</u>	21
Ranunculaceae	13, 34	Serviceberry, Western	35
Ranunculus, Aquatic	34	Shepherd's Purse	23
<u>Ranunculus aquatilis</u>	34	Shinleaf, White-veined	33
Red Fir	9, 15	<u>Sidalcea oregana</u>	28
Redtop	44	<u>Sidebells</u>	33
Reedgrass, Bluejoint	44	Sierra	
Rhamnaceae	35	Angelica	16
<u>Rhamnus rubra</u>	35	Coffeeberry	35
<u>Ribes</u>		Gentian	27
<u>cereum</u>	37	Juniper	15
<u>divaricatum</u>	38	Nettle	40
<u>montigenum</u>	38	Rein Orchid	10, 43
Rockcress	22, 23	Soda Straw	16
Bentpod	22	<u>Sitanion hystrix</u>	46
Drummond's	22	<u>Smilacina</u>	
<u>Rorippa nasturtium-aquaticum</u>	23	<u>racemosa</u>	43
<u>Rosa woodsii</u>	36	<u>stellata</u>	43
Rosaceae	13, 35	Snowberry	9, 24
Rose Family	35	Snowbush	9, 35
Rubiaceae	36	Solanaceae	39
Rumex		<u>Solanum xantii</u>	40
<u>acetosella</u>	32	<u>Solidago canadensis</u>	21
<u>californicus</u>	32	Solomon's Seal, False	43
<u>occidentalis</u>	32	Sorrel, Sheep	32
<u>triangulivalvis</u>	32	Speedwell	39
Rush		<u>Sphenosciadium capitellatum</u>	10, 17
Long-anthered	42	<u>Spineless Horsebrush</u>	21
Mexican	10, 42	<u>Stachys albens</u>	28
Rush Family	42	<u>Starwort</u>	24
Sagebrush		<u>Stellaria</u>	
Big	18	<u>longipes</u>	24
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<u>Sagina saginoides</u>	24	<u>Stephanomeria tenuifolia</u>	21
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Salicaceae	37	<u>Stipa occidentalis</u>	46
<u>Salix</u>	10	Strawberry, Wild	35
<u>caudata</u>	9, 37	Sunflower Family	17
<u>planifolia</u>	9, 37	Swamp Whiteheads	17
<u>Sambucus caerulea</u>	24	Sweet-cicely	16, 17
Sandpaper Plant Family	28	<u>Symphoricarpos vaccinoides</u>	9, 24
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<u>cyathiferum</u>	25		
<u>longipes</u>	26		
<u>monanthum</u>	26		
<u>repens</u>	26		
<u>wormskioldii</u>	26		
<u>Tsuga mertensiana</u>	9, 16		
Twayblade	43		
<u>Urtica serra</u>	40		
Urticaceae	40		
<u>Valeriana californica</u>	40		
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Valerianaceae	40		
Valerian Family	40		
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<u>Veronica americana</u>	39		
Violaceae	40		
<u>Viola</u>			
<u>macloskeyi</u>	40		
<u>purpurea</u>	40		
Violet Family	40		
Violet			
Mountain	40		
White-flowered	40		
Watercress	23		
Waterleaf Family	27		
Water-milfoil Family	27		
Waterweed	41		
Western			
Blue Flag	41		
Juniper	15		
Needlegrass	46		
Serviceberry	35		
Wallflower	23		
White Pine	9, 15		
Whisker-brush	31		
White Fir	9, 15		
Wildrye			
Ashy	45		
Basin	45		
Beardless	45		
Blue	45		
Creeping	45		
Willow	9, 10, 37		
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Woodland Star	37		
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A FLORA OF VALENTINE EASTERN SIERRA RESERVE

PART II SIERRA NEVADA AQUATIC RESEARCH LABORATORY

Bruce K. Orr

THE HERBARIUM
Department of Biological Sciences
University of California, Santa Barbara
Publication Number 1
1981

Pedicularis crenulata Benth. in DC.

f. candida Macbr.

Scalloped-leaved Lousewort

The only locality known in California for this member of the Figwort Family is a streamside meadow at SNARL. A census in 1980 revealed 133 plants within fenced boundaries here.

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Cover: Northwestward across the grounds of SNARL. The residential and laboratory buildings are clustered toward the left. Convict Creek, with associated riparian and meadow vegetation, flows from left to right. Great Basin Sagebrush vegetation dominates the lower portion. Photo by Bruce K. Orr.

Introduction

The Sierra Nevada Aquatic Research Laboratory (SNARL) is a small reserve that is known more for its stream research facilities than for its vegetation and flora. It is located in an area that is relatively free from the adverse impacts of urban expansion that are affecting natural areas in the immediate vicinity of the town of Mammoth Lakes, only 8 miles (13 km) northwest of SNARL.

Although it is located along the dry eastern slope of the Sierra Nevada, the flora of SNARL includes species characteristic of mesic as well as xeric sites. This is primarily due to the location of the Laboratory along Convict Creek which provides a perennial water supply. As a result of this mixture of mesic and xeric sites, there are elements of both the Great Basin and Sierra Nevada floras present at SNARL.

The flora of Mono County, California, has not been studied in detail. The Convict Creek basin, in addition to Valentine Camp (Howald, 1981) and Glass Mountain Ridge (DeDecker, 1979), is one of the few areas in the Mammoth Lakes region that has been the subject of botanical investigation. J. T. Howell collected in the basin during the 1940's. Major and Bamberg (1963) studied a number of disjunct Cordilleran species in the Convict Creek basin, including one found at SNARL (Pedicularis crenulata). Peirson collected along Convict Creek at lower elevations, near what is now SNARL, during the 1920's and 1930's.

This flora includes a brief introduction to the physical characteristics and vegetation types of SNARL and an annotated catalog of the vascular plant taxa.

Location and Topography

SNARL is located along Convict Creek on the eastern slope of the Sierra Nevada, Mono County, California (Figure 1). The laboratory is approximately 1.0 mile (1.6 km) west of U.S. Highway 395, and 1.75 miles (2.8 km) northeast of Convict Lake. The property on which SNARL is situated covers 51 acres (21 ha) at an elevation ranging from 7,075 to 7,125 feet (2,156 to 2,172 m). It is leased by the University of California from the City of Los Angeles, which also owns the land to the north and east of SNARL. The land to the west and south is part of the Inyo National Forest.

The topography of SNARL is quite uniform. The laboratory is located downstream from Convict Lake on a gently sloping alluvial fan. There is only a slight drop in elevation across the property, from west to east. Convict Creek runs through the property from west to east and within the confines of SNARL is divided into four sections of controlled stream and a flood bypass channel (Figure 2).

Figure 1. Location of the Sierra Nevada Aquatic Research Laboratory (SNARL). Modified from the US Geological Survey Mt. Morrison 7½-Minute Quadrangle.

Figure 2. The Sierra Nevada Aquatic Research Laboratory. Redrawn from Kennedy (1967).

Geology and Soils

SNARL is underlain by recent (Holocene) deposits of alluvium and stream gravel (Mayo, 1934; Rinehart, 1976). Although the surface soils at SNARL are quite sandy, gravel and larger rocks usually lie just below the surface. Soils in the low-lying meadow areas are more fine-grained than the sandier soils typical of higher and drier sites.

There are two sets of Pleistocene glacial moraines near SNARL. To the west are a terminal and a recessional moraine formed during the Tahoe glacial stage. South of the Laboratory lies an older lateral moraine, formed during one of the Post-Sherwin and Pre-Tahoe glacial stages (Mayo, 1934; Rinehart and Ross, 1964; Rinehart, 1976).

The geology of Convict Creek basin, upstream from SNARL, is unusual for the Sierra Nevada in that metamorphic rather than granitic rocks predominate, although some granodiorite is present (Major and Bamberg, 1963). The Ordovician metasedimentary rocks in the Mount Morrison roof pendant found in the basin are the oldest known Sierran rocks (Norris and Webb, 1976). The fragmentary fossils of crinoids and brachiopods that occur in the exposed limestone beds in upper Convict canyon are evidence of their age (Rinehart, 1976).

The large extent of calcareous substrates in the basin is also unusual in comparison with most of the Sierra Nevada. Mount Baldwin marble underlies 1,372 acres in the basin, with another 114 acres underlain by meadow sediments probably derived from it. These calcareous substrates may be an important factor affecting plant distributions in the area (Major and Bamberg, 1963).

Climate

The climatic conditions at SNARL are typical of much of the eastern slope of the Sierra Nevada. Complete climatological data are not available for the Laboratory. However, patterns of temperature and precipitation can be estimated using temperature data gathered at SNARL from 1950 to 1962 (Kennedy, 1964); and temperature and precipitation data from sites at Mono Lake (USNOAA, 1980) and Long Valley Reservoir (Roberts and Associates, 1973), both of which are located at similar elevations and within 25 miles (40 km) of SNARL. Kennedy (1964) also includes one year of precipitation data collected at SNARL.

Typical annual precipitation at SNARL probably varies between 10 and 15 inches (25 to 38 cm). Most precipitation falls as snow in the winter, with smaller amounts coming from summer thundershowers. In 1957-1958 (an unusually wet year) annual precipitation at SNARL was 17.4 inches (44.2 cm), with about 65 percent coming from winter snows and most of the remainder from summer thundershowers (Kennedy, 1964).

The summer season in this area is short and very dry (average daytime humidity of 15 percent), except for the occasional thundershowers (Kennedy, 1964). Summer mean daily maximum temperatures usually range

from 75 to 85 degrees Fahrenheit (24 to 29°C), with mean daily minima between 40 and 50 degrees Fahrenheit (4 to 10°C). July and August are usually the only frost-free months, although frost may occur at any time of the year. July is normally the warmest month of the year (Kennedy, 1964).

During the winter months, mean daily maxima range from 35 to 50 degrees Fahrenheit (2 to 10°C), with mean daily minima ranging between 5 and 20 degrees Fahrenheit (-15 to -7°C). Subfreezing temperatures are common and may persist for prolonged periods. Snowfall is normally moderate, with typical snow depth between 1 and 4 feet (0.3 to 1.2 m) during mid-winter. January is normally the coldest month (Kennedy, 1964). Strong gusty winds are common in the winter, occasionally attaining velocities greater than 80 miles per hour (Nielson et al., 1957).

Vegetation

Three major types of vegetation occur on the relatively uniform terrain found at SNARL. Each is characterized by its floristic composition and accompanying physical features such as soil type, exposure, and water availability. The three vegetation types found at SNARL are:

- 1) Great Basin Sagebrush
- 2) High Desert Riparian Woodland
- 3) Riparian Meadow Vegetation

Great Basin Sagebrush occupies most of the southern half of the Reserve. It occurs mainly in sandy soil, often with rocks just below the surface, and is elevated above the level of the creek by approximately 1 meter. As a result of this combination of topography and soil type, water drainage away from the surface soil is rapid, resulting in lower soil moisture content in the sagebrush areas than in adjacent low-lying meadows and stream banks. The sagebrush community at SNARL is dominated by three species of shrubs: Great Basin Sagebrush (Artemisia tridentata), Rabbit-brush (Chrysothamnus nauseosus), and Antelope Bitterbrush (Purshia tridentata).

High Desert Riparian Woodland occurs along the banks of the various branches of Convict Creek. The greater availability of water near the creek allows relatively large mesophytic plants to survive in a narrow ribbon of land running through this arid region. The dominant species of this community are trees and large shrubs, such as Quaking Aspen (Populus tremuloides), Water Birch (Betula fontinalis), and willows (Salix spp.). Stands of Quaking Aspen occur at the western end of the property on both sides of Convict Creek and along the southern edge of the creek from the western boundary to the area near the laboratory and houses. Extensive willow thickets are found in the northwestern corner. Other characteristic species of High Desert Riparian Woodland can be found just outside the boundaries of SNARL. One example is Jeffrey Pine (Pinus jeffreyi), which occurs along Convict Creek just upstream from SNARL.

A distinctive form of meadow vegetation, referred to here as Riparian Meadow Vegetation, occurs along the banks of Convict Creek in low-lying areas with poorly drained, fine-grained soils. It is most common at the eastern end of SNARL. The waterlogged soil excludes trees and favors certain perennial herbaceous species. The most common plants in these meadows at SNARL are sedges (Carex spp.), rushes (Juncus spp.), Western Blue Flag (Iris missouriensis), and various species of grasses. Many other species of perennial herbs and a few annuals are scattered throughout the meadows.

The Vascular Flora

General Remarks

The flora of SNARL was studied mainly during the summer months of 1978, but additional observations and collections were made in the summers of 1979 and 1980. During this period all observed species of vascular plants at SNARL were collected and identified, with the exception of those introduced species restricted to the lawns and flower beds.

Voucher specimens are deposited in the Herbarium of the University of California, Santa Barbara (UCSB). Munz and Keck (1959) and Munz (1968, 1974) were the primary references used in identification. Hitchcock (1951), Mason (1969), Abrams (1923, 1944, 1951), and Abrams and Ferris (1960) also were consulted. The common names used in the annotated checklist are primarily from the above sources, but Weeden (1975) and Niehaus (1974) also were used.

During this investigation 146 species were collected at SNARL. These are distributed among vascular plants as shown below:

	<u>Families</u>	<u>Genera</u>	<u>Species</u>
Subdivision Sphenopsida	1	1	1
Subdivision Pteropsida			
Class Coniferae	2	2	2
Class Angiospermae			
Subclass Dicotyledones	28	82	109
Subclass Monocotyledones	8	23	34
Total	39	108	146

Flowering plants dominate the flora of SNARL. For example, the ten largest families are angiosperms, containing 93 species and constituting over 63 percent of the total flora. The number of species and the percent of the total flora are given below for each of these families.

<u>Ten Largest Families at SNARL</u>	<u>Number of Species</u>	<u>Percent of Flora</u>
Asteraceae	22	15.1
Poaceae	14	9.6
Scrophulariaceae	9	6.2
Brassicaceae	9	6.2
Fabaceae	8	5.5
Rosaceae	8	5.5
Polygonaceae	7	4.8
Cyperaceae	6	4.1
Liliaceae	5	3.4
Onagraceae	5	3.4
Total	<u>93</u>	<u>63.8</u>

The genera with the largest number of species at SNARL are Carex (Cyperaceae) and Muhlenbergia (Poaceae), containing four species each. Five genera contribute three species each: Arabis (Brassicaceae), Eriogonum (Polygonaceae), Potentilla (Rosaceae), Mimulus (Scrophulariaceae), and Juncus (Juncaceae). Of the remaining genera at SNARL, 22 are represented by two species each.

The flora of SNARL is composed almost entirely of native plant species, except for the horticultural material in the landscaping around the buildings. Apart from these plantings, only 12 species (8.2 percent of the total flora) are introduced. In comparison, the flora of Valentine Camp, located near Mammoth Lakes, contains only 4.1 percent introduced species (Howald, 1981).

Relationships Between the Floras of SNARL and Valentine Camp

Although the flora of SNARL (146 species) contains only about three-fifths as many species as the Valentine Camp flora (247 species; Howald, 1981), it is relatively large and diverse when the high desert setting and small size of SNARL are taken into consideration. The floras of these two reserves have 66 species in common; i.e., 45.2 percent of the species at SNARL also occur at Valentine Camp. These species are listed in Table 1.

The degree of similarity between the two floras is not surprising, considering that the two sites lie within 8 miles (13 km) of each other and support three similar vegetation types. However, Valentine Camp has four additional vegetation types (Howald, 1981) that are not represented at SNARL. The degree of similarity of the two areas is influenced by their close geographical proximity; although this is somewhat offset by differences in physical factors, such as climate and topography, that affect local vegetation and flora. Considering all of the above, a low to moderate degree of similarity would be expected between the high desert flora of SNARL and the montane flora of Valentine Camp. The 66 species shared between SNARL and Valentine Camp account for 20.2 percent of the 327 species that comprise the flora of these two areas combined.

Table 1. Species of Plants Common to SNARL and Valentine Camp

Cupressaceae	
<u>Juniperus occidentalis</u>	
Pinaceae	
<u>Pinus jeffreyi</u>	
Apiaceae	
<u>Angelica lineariloba</u>	
<u>Sphenosciadium capitellatum</u>	
Asteraceae	
<u>Achillea millefolium</u>	
<u>Agoseris glauca</u>	
<u>Antennaria rosea</u>	
<u>Artemisia cana</u>	
<u>Artemisia tridentata</u>	
<u>Chrysothamnus viscidiflorus</u>	
<u>Cirsium congdonii</u>	
<u>Erigeron lonchophyllus</u>	
<u>E. peregrinus</u>	
<u>Gnaphalium palustre</u>	
<u>Machaeranthera canescens</u>	
<u>Senecio hydrophilus</u>	
<u>Solidago canadensis</u>	
<u>Taraxacum officinale</u> *	
Brassicaceae	
<u>Erysimum perenne</u>	
Caprifoliaceae	
<u>Symphoricarpos vaccinoides</u>	
Caryophyllaceae	
<u>Stellaria longipes</u>	
Fabaceae	
<u>Astragalus purshii</u>	
<u>Lupinus polyphyllus</u>	
<u>Trifolium longipes</u>	
<u>T. wormskioldii</u>	
Gentianaceae	
<u>Gentiana holopetala</u>	
Juncaceae	
<u>Juncus macrandrus</u>	
Loasaceae	
<u>Mentzelia congesta</u>	
Onagraceae	
<u>Gayophytum diffusum</u>	
Papaveraceae	
<u>Argemone munita</u>	
Polemoniaceae	
<u>Allophyllum violaceum</u>	
<u>Eriastrum wilcoxii</u>	
<u>Phlox stansburyi</u>	
	Polygonaceae
	<u>Eriogonum spergulinum</u>
	<u>E. umbellatum</u>
	<u>Polygonum douglasii</u>
	<u>Rumex triangulivalvis</u>
	Ranunculaceae
	<u>Aconitum columbianum</u>
	<u>Aquilegia formosa</u>
	<u>Thalictrum fendleri</u>
	Rosaceae
	<u>Potentilla biennis</u>
	<u>P. glandulosa</u>
	<u>Purshia tridentata</u>
	<u>Rosa woodsii</u>
	Salicaceae
	<u>Populus tremuloides</u>
	Saxifragaceae
	<u>Ribes cereum</u>
	Scrophulariaceae
	<u>Castilleja chromosa</u>
	<u>C. miniata</u>
	<u>Mimulus nasutus</u>
	<u>Pentstemon bridgesii</u>
	<u>P. oreocharis</u>
	Violaceae
	<u>Viola purpurea</u>
	Amaryllidaceae
	<u>Allium bisceptrum</u>
	Iridaceae
	<u>Iris missouriensis</u>
	Juncaceae
	<u>Juncus mexicanus</u>
	Liliaceae
	<u>Calochortus leichtlinii</u>
	<u>Fritillaria pinetorum</u>
	<u>Lilium kelleyanum</u>
	<u>Smilacina stellata</u>
	Orchidaceae
	<u>Habenaria unalascensis</u>
	Poaceae
	<u>Elymus cinereus</u>
	<u>E. triticoides</u>
	<u>Muhlenbergia richardsonis</u>
	<u>Phleum pratense</u> *
	<u>Sitanion hystrix</u>
	<u>Stipa occidentalis</u>

* = introduced

Rare Plants

Another important aspect of the SNARL flora is the presence of two plants of special status (Smith et al., 1980). Eriogonum ampullaceum, a small annual in the Buckwheat Family (Polygonaceae) occurs only in Mono County, California, and is considered rare. Several populations are found within the county, and on the whole the populations appear to be stable or increasing (Smith et al., 1980). It is common in the Great Basin Sagebrush community at SNARL. Pedicularis crenulata, a perennial herb in the Figwort Family (Scrophulariaceae), has been considered extinct in California in recent years (Smith et al., 1980). Convict Creek is the only known locality for this species in California (Munz and Keck, 1959; Smith et al., 1980; Howald and Orr, 1981). It is more widespread outside California, especially in the Rocky Mountains. The 1978 collections at SNARL (Howald, 952; Orr, 337) were the first California collections of this species since Peirson collected it along Convict Creek in 1933. Sprague (1962) studied the pollination ecology of Pedicularis crenulata but apparently did not make any collections. She mentions a colony of 25 to 30 white-flowered plants along Convict Creek. Plants seen during the current study also were white flowered (forma candida). A census in August 1980 revealed 133 plants located within the fenced boundaries of SNARL. The meadows at SNARL may be the only suitable habitat in the area that is currently protected from cattle grazing.

Annotated Catalog

The following is an annotated list of vascular plants which occur at SNARL. Families used herein are those recognized by Munz and Keck (1959) and, in addition to genera and species, are arranged alphabetically. The scientific name of each species is given according to the most recent and widely accepted taxonomic treatment and is followed when possible by common names of popular usage. No attempt was made to determine all of the common names that might apply to a given species. When a species is considered introduced its name is followed by (I). The general abundance and distribution at SNARL are given for each species.

DIVISION TRACHEOPHYTA
Subdivision Sphenopsida
Class Equisetae

Equisetaceae. Horsetail Family

Equisetum kansanum J. H. Schaffn. Horsetail.

Occasional in moist areas near Convict Creek, especially near the laboratory and cabins.

Subdivision Pteropsida
Class Coniferae. Cone-bearing plants.
Order Coniferales

Cupressaceae. Cypress Family

Juniperus occidentalis Hook. ssp. australis Vasek.
Western Juniper. Sierra Juniper.

One juvenile at the edge of the aspen grove west of laboratory.

Pinaceae. Pine Family

Pinus jeffreyi Grav. & Balf. in A. Murr. Jeffrey Pine.

One small tree behind the small house; probably planted. Occurs naturally along Convict Creek upstream from SNARL.

Subdivision Pteropsida
Class Angiospermae. Flowering plants.
Subclass Dicotyledones

Apiaceae. Carrot Family

Angelica lineariloba Gray. Sierra Angelica. Sierra Soda Straw.

One plant in flower bed in front of laboratory, apparently a volunteer.

Lomatium nevadense (Wats.) Coult. & Rose. Nevada Lomatium.

Rare in sagebrush near southwestern corner.

Sphenosciadium capitellatum Gray. Ranger's Buttons. Swamp Whiteheads.

Common along wet banks of Convict Creek.

Asclepiadaceae. Milkweed Family

Asclepias speciosa Torr. Showy Milkweed.

Several plants at edge of meadow northeast of control structure 3.

Asteraceae. Sunflower Family

Achillea millefolium L. var. lanulosa (Nutt.) Piper.
Yarrow Milfoil.

Common in moist areas of streambank woodland and meadows.

Agoseris glauca (Pursh) Greene var. laciniata (D. C. Eat.) Smiley.
Short-beaked Agoseris.

Common in damp soil of meadows.

Agoseris glauca (Pursh) Greene var. monticola (Greene) Q. Jones.
Short-beaked Agoseris.

Common in damp soil of meadows, growing with var. laciniata.

Antennaria rosea Greene. Rosy Everlasting. Pussytoes.

Occasional in wet soil along banks of Convict Creek on East Island near flood control structure 4.

Arnica parryi Gray ssp. sonnei (Greene) Maguire.
Nodding Arnica.

Occasional in moist, low-lying, open meadows near eastern boundary.

Artemisia cana Pursh ssp. cana. Hoary Sagebrush.

Rare, in one patch southwest of control structure 3 with
A. tridentata.

Artemisia tridentata Nutt. ssp. tridentata. Great Basin Sagebrush.
Big Sagebrush.

Dominant in dry soils over a large portion of SNARL.

Chaenactis douglasii (Hook.) H. & A. var. rubricaulis (Rydb.)
Ferris. Hoary Chaenactis.

Occasional in sagebrush vegetation.

Chrysothamnus nauseosus (Pall.) Britton ssp. albicaulis (Nutt.) Hall
& Clem. Rabbit-brush.

Occasional throughout sagebrush vegetation in southern half of
SNARL, with ssp. consimilis.

Chrysothamnus nauseosus (Pall.) Britton ssp. consimilis (Greene) Hall
& Clem. Rabbit-brush.

Common throughout sagebrush vegetation in southern half of SNARL,
especially alongside of entrance road.

Chrysothamnus viscidiflorus (Hook.) Nutt. Rabbit-brush.

Common in sagebrush vegetation.

Cirsium congdonii Moore & Franklin (C. drummondii T. & G.)
Dwarf Thistle.

Common in moist areas in meadows.

Cirsium vulgare (Savi) Ten. Bull Thistle. (I)

Rare, one small colony along north bank of flood bypass channel.
First noted in 1980.

Conyza canadensis (L.) Cronq. Horseweed.

Common in disturbed areas, especially along the trails west of the laboratory.

Crepis intermedia Gray. Hawksbeard.

Rare, a few plants in sagebrush vegetation near fence along southern boundary.

Erigeron lonchophyllus Hook. Fleabane.

Scattered along creek bank of West Island near flood control structure 2.

Erigeron peregrinus (Pursh) Greene var. angustifolius (Gray) Cronq.
Fleabane.

Occasional on moist banks of Convict Creek and in meadows.

Gnaphalium palustre Nutt. Pearly Everlasting.

Occasional along moist banks of Convict Creek.

Lactuca serriola L. Prickly Lettuce. (I)

Rare, a few plants in disturbed sagebrush vegetation, approximately 50 meters east of small houses. First collected in 1980.

Machaeranthera canescens (Pursh) Gray ssp. canescens. Hoary Aster.

Rare in dry soil near edge of aspen grove at western end.

Senecio hydrophilus Nutt. Groundsel.

Common in wettest portions of eastern meadow and along wet banks of Convict Creek.

Solidago canadensis L. ssp. elongata (Nutt.) Keck. Creek Goldenrod.

Occasional near Convict Creek.

Stephanomeria pauciflora (Torr.) Nutt. Few-flowered Stephanomeria.
Wire Lettuce.

Occasional in sagebrush vegetation.

Taraxacum officinale L. Common Dandelion. (I)

Common in meadow areas and near cabins.

Betulaceae. Birch Family

Betula fontinalis Sarg. Copper birch. Water Birch.

Occasional along Convict Creek.

Boraginaceae. Borage Family

Coldenia nuttallii Hook. Coldenia.

Rare in sagebrush near eastern fence and along dirt road to fish ponds. More common just outside fence.

Cryptantha circumscissa (H. & A.) Jtn. Cryptantha.

Common in sagebrush vegetation.

Cryptantha simulans Greene. Cryptantha.

Common in sagebrush vegetation, especially in the southwest corner.

Lappula redowskii (Hornem.) Greene. Stickseed.

Common in sagebrush vegetation; also in disturbed areas near buildings.

Brassicaceae. Mustard Family

Arabis hirsuta (L.) Scop. var. glabrata T. & G. Hairy Rockcress.

Occasional in meadows north of Convict Creek.

Arabis puberula Nutt. Blue Mountain Rockcress.

Rare in patches of sagebrush vegetation north of control structure 3.

Arabis pulchra Jones. Beautiful Rockcress.

Occasional in sagebrush vegetation in southwestern portion of SNARL.

Descurainia pinnata (Walt.) Britton ssp. filipes (Gray) Detl.
Tansy Mustard.

Common in disturbed areas along trails, entrance road and some areas of sagebrush.

Erysimum capitatum (Dougl.) Greene. Western Wallflower.

Occasional in sagebrush vegetation at southeastern end.

Erysimum perenne (Wats. ex Cov.) Abrams. Sierra Wallflower.

Occasional in sagebrush vegetation south of entrance road.

Lepidium densiflorum Schrad. Peppergrass.

Common in disturbed areas alongside of entrance road and in lawns around buildings.

Rorippa obtusa (Nutt.) Britton. Yellow-cress.

Rare in wet low-lying areas in eastern meadow.

Sisymbrium altissimum L. Tumble-mustard. (I)

Common in disturbed areas, especially along sides of entrance road and near fish observation ponds.

Cactaceae. Cactus Family

Opuntia erinacea Engelm. & Bigel. var. xanthostemma (K. Schum.)
L. Benson. Old Man Cactus.

One small plant in sagebrush vegetation near fence in southwestern section of Reserve. Occasional in sagebrush vegetation south of SNARL.

Caprifoliaceae. Honeysuckle Family

Symphoricarpos vaccinoides Rydb. Snowberry.

A few plants in sagebrush vegetation near eastern boundary.

Caryophyllaceae. Pink Family

Stellaria longipes Goldie. Starwort.

Occasional in wet soil along banks of Convict Creek and in low-lying wet meadow areas.

Chenopodiaceae. Goosefoot Family

Chenopodium botrys L. Jerusalem-oak. (I)

Occasional in disturbed areas.

Chenopodium incognitum H. A. Wahl. Goosefoot.

Very common in disturbed areas, especially along dirt trail west of lab and around fish observation ponds.

Monolepis spathulata Gray. Club-leaved Monolepis.

Occasional along bank of flood bypass channel.

Salsola iberica Sennin & Pau. Russian Thistle. (I)

Occasional along disturbed borders of entrance road. First collected in 1980.

Euphorbiaceae. Spurge Family

Euphorbia serpyllifolia Pers. Thyme-leaved Spurge.

Common in dry disturbed areas near cabins and along trail to western end.

Fabaceae. Pea Family

Astragalus purshii Dougl. Locoweed.

Occasional in sagebrush vegetation, especially near eastern end.
Common outside northern fence in drier sagebrush sites.

Astragalus whitneyi Gray. Locoweed.

Common throughout SNARL, except in wettest areas.

Lupinus polyphyllus Lindl. ssp. superbus (Heller) Munz. Meadow Lupine.

Common in wet places in meadows and on banks of Convict Creek.

Lupinus pratensis Heller. Inyo Meadow Lupine.

Common in understory of riparian woodland and near buildings, especially in disturbed areas with moist to dry soil. Several plants with pink flowers behind caretaker's residence.

Melilotus albus Desc. Sweet-clover. (I)

A few plants along trail near flood control structure 1.

Trifolium longipes Nutt. Wild Clover.

Common in moist places of streambank woodland and meadow.

Trifolium wormskioldii Lehm. Wild Clover.

Occasional in wet places.

Vicia americana Muhl. ssp. oregana (Nutt.) Abrams. Vetch.

Several plants in flower beds in front of laboratory.

Gentianaceae. Gentian Family

Gentiana holopetala (Gray) Holm. Sierra Gentian.

Scattered colonies in wet soil of eastern meadow.

Hydrophyllaceae. Waterleaf Family

Nama densum Lemmon. Nama.

Common along banks of flood bypass channel.

Phacelia bicolor Torr. ex Wats. Phacelia.

Common in sagebrush vegetation, also along edges of aspen grove at the western end.

Lentibulariaceae. Bladderwort Family

Utricularia minor L. Bladderwort.

Rare, found only in a few pools of water on the south side of control structure 4; with Potamogeton filiformis. Only sterile material was collected.

Loasaceae. Sandpaper Plant Family

Mentzelia albicaulis Dougl. ex Hook. Sandpaper Plant.

Occasional in sagebrush vegetation with the more common M. congesta.

Mentzelia congesta T. & G. Sandpaper Plant.

Common in sagebrush vegetation, especially along southern border.

Malvaceae. Mallow Family

Malva neglecta Wallc. Mallow. (I)

Occasional in disturbed areas near buildings.

Onagraceae. Evening-Primrose Family

Epilobium adenocaulon Hausskn. var. adenocaulon. Willow-herb.

Occasional in moist to wet soil near Convict Creek.

Epilobium oregonense Hausskn. Willow-herb.

Occasional in wet soil of fish observation ponds.

Gayophytum diffusum T. & G. ssp. parviflorum Lewis & Szweykowski.

Common in moist open areas near aspen groves.

Oenothera californica (Wats.) Wats. Evening-primrose.

Occasional, primarily in two patches along fence in southwestern section.

Oenothera hookeri T. & G. ssp. angustifolia (Gates) Munz. Evening-primrose.

Occasional along trail and creek banks west of laboratory, around edges of lawns and in meadows.

Papaveraceae. Poppy Family

Argemone munita Dur. & Hilg. ssp. rotundata (Rydb.) G. Ownbey.

Prickly Poppy.

Several plants along roadside, more common outside Reserve near Highway 395.

Polemoniaceae. Phlox Family

Allophyllum violaceum (Heller) A. & V. Grant.

Common in moist open areas in aspen groves west of laboratory.

Eriastrum wilcoxii (A. Nels.) Mason.

Common in sagebrush vegetation.

Leptodactylon pungens (Torr.) Rydb. ssp. pulchriflorum (Brand)
Mason. Prickly Phlox.

Occasional in sagebrush vegetation.

Phlox stansburyi (Torr.) Heller. Stansbury Phlox.

Occasional in sagebrush vegetation, especially in southwestern section.

Polygonaceae. Buckwheat Family

Chorizanthe brevicornu Torr. ssp. spathulata (Small) Munz. Chorizanthe.

Occasional in sagebrush vegetation near southern boundary.

Eriogonum ampullaceum J. T. Howell. Mono Buckwheat.

Common in sagebrush vegetation; also in some disturbed sites around buildings. Listed as rare in Smith et al. (1980).

Eriogonum spergulinum Gray. Wild Buckwheat.

Occasional in sagebrush vegetation in southeastern section.

Eriogonum umbellatum Torr. ssp. umbellatum. Sulphur Buckwheat.

Occasional in sagebrush vegetation, mainly in southeastern section.

Polygonum douglasii Greene var. johnstonii Munz. Knotweed.

Common in moist to dry areas along edges of meadows and especially in disturbed areas near aspen groves west of laboratory.

Rumex paucifolius Nutt. ex Wats. Alpine Sheep Sorrel.

Rare, a few plants in empty fish observation ponds.

Rumex triangulivalvis (Danser) Rech. Dock.

Occasional in moist meadow areas.

Ranunculaceae. Buttercup Family

Aconitum columbianum Nutt. Monkshood.

Occasional near Convict Creek, especially along edges of willow thickets near picnic area.

Aquilegia formosa Fish. in DC. var. truncata (F. & M.) Baker. Columbine.

Common along banks of Convict Creek, especially at western end.

Thalictrum fendleri Engelm. ex Gray. Mountain Meadow-rue.

Occasional in moist soil near Convict Creek.

Rosaceae. Rose Family

Cercocarpus ledifolius Nutt. Narrow-leaved Mountain Mahogany.

A few shrubs in sagebrush vegetation at eastern end.

Ivesia kingii Wats. Ivesia.

Common in moist soil of sagebrush vegetation between houses and fish observation ponds.

Potentilla biennis Greene. Cinquefoil.

Occasional in moist sandy areas of sagebrush vegetation and along trails to western end. Common in moist disturbed sites on East Island.

Potentilla glandulosa Lindl. ssp. hansenii (Greene) Keck. Cinquefoil.

Common in moist areas near Convict Creek and flood bypass channel.

Potentilla pectinisecta Rydb. Cinquefoil.

Common in moist places.

Prunus andersonii Gray. Desert Peach.

Several plants in sagebrush vegetation near eastern boundary.
More common in sagebrush south of SNARL.

Purshia tridentata (Pursh) DC. Antelope Bitterbrush.

Common in sagebrush vegetation.

Rosa woodsii Lindl. var. ultramontanum (Wats.) Jeps. Mountain Wild Rose.

Common in understory of aspen groves and in moist areas along
Convict Creek.

Salicaceae. Willow Family

Populus tremuloides Michx. Quaking Aspen.

Common along Convict Creek, especially in groves near western
boundary.

Populus trichocarpa T. & G. Black Cottonwood.

Four trees along flood bypass channel.

Salix exigua Nutt. Narrow-leaf Willow.

Common in wet places near Convict Creek and in dense thickets
north of creek.

Salix lutea Nutt. var. watsonii (Bebb) Jeps. Yellow Willow.

Common in wet places near Convict Creek, especially in dense thickets
north of the creek.

Saxifragaceae. Saxifrage Family

Parnassia palustris L. var. californica Gray. Grass-of-Parnassus.

Occasional in wet soil along streamlets in meadow areas.

Ribes cereum Dougl. Squaw currant.

Occasional in sagebrush vegetation.

Scrophulariaceae. Figwort Family

Castilleja chromosa A. Nels. Desert Paintbrush.

Collected in sagebrush vegetation in 1975 (Howald, 561). Not seen during this study.

Castilleja miniata Dougl. ex Hook. Indian Paintbrush.

Common along Convict Creek; occasional in wet portions of meadows.

Mimulus floribundus Dougl. ex Lindl. Floriferous Monkeyflower.

Occasional in wet areas, especially in openings between willow thickets and aspen grove at northwestern end.

Mimulus nasutus Greene. Common Monkeyflower.

Common in wet areas near Convict Creek.

Mimulus primuloides Benth. ssp. primuloides. Primrose Monkeyflower.

Common in wet low-lying meadow areas, especially on the northern side of Convict Creek.

Pedicularis crenulata Benth. in DC. f. candida Macbr.

Margined-leaf Lousewort. Scalloped-leaved Lousewort.

Four plants observed in wet soil along edge of streamlet and in low-lying meadow in 1978. A thorough search in August, 1980, revealed 125 plants in a meadow near control structure 3 and 8 on East Island. Listed as presumed extinct in California by Smith et al. (1980). See illustration on back of cover.

Penstemon bridgesii Gray. Bridge's Penstemon.

Rare at SNARL, three plants along trail near western fork of Convict Creek (near control structure 1).

Penstemon oreocharis Greene. Meadow Penstemon.

Occasional in moist, higher areas of meadow. More common just outside the northern boundary.

Verbascum thapsus L. Common Mullein. (I)

Common in disturbed areas near buildings, in flood bypass channel, and around fish observation ponds. Recent observations (1980) indicate that this species is now spreading to less disturbed areas.

Solanaceae. Nightshade Family

Nicotiana attenuata Torr. Wild Tobacco.

Occasional in disturbed areas along sides of entrance road.

Violaceae. Violet Family

Viola adunca Sm. Western Dog Violet.

Occasional along banks of streamlets in northeastern meadow.

Viola purpurea Kell. ssp. geophyta Baker & Clausen. Wild Mountain Violet.

Occasional in sagebrush vegetation. More common outside of eastern boundary.

Subdivision Pteropsida
Class Angiospermae. Flowering Plants
Subclass Monocotyledones

Amaryllidaceae. Amaryllis Family

Allium atropurpureum Wats. var. inyoense (Jones) Ownbey & Aase.
Dark Red Onion.

Occasional in sagebrush vegetation near southwestern corner.

Allium bisceptrum Wats. Patis Onion.

Common in aspen groves and moist areas at western end.

Cyperaceae. Sedge Family

Carex douglasii Boott. Douglas's Sedge.

Common in moist to dry open areas around western aspen groves and in disturbed soils; also in moister portions of sagebrush vegetation.

Carex lanuginosa Michx. Woolly Sedge.

Occasional in moist areas near Convict Creek and flood bypass channel.

Carex nebrascensis Dewey. Nebraska Sedge.

Occasional in wet soil along banks of flood bypass channel.

Carex rostrata Stokes. Beaked Sedge.

Occasional in wet soil or standing water.

Cyperus aristatus Rottb. Umbrella-sedge.

Occasional along wet banks of flood bypass channel.

Eleocharis acicularis (L.) R. & S. Spike-rush.

Occasional in wet soil, especially in man-made depression near picnic area.

Iridaceae. Iris Family

Iris missouriensis Nutt. Western Blue Flag.

Common in meadows.

Sisyrinchium halophilum Greene. Nevada Blue-eyed Grass.

Occasional in low-lying meadows north of creek.

Juncaceae. Rush Family

Juncus macrandrus Cov. Long-anthered Rush.

Occasional in wet marshy area at eastern end, also along borders of Convict Creek and meadow streamlets.

Juncus mexicanus Willd. Mexican Rush.

Common in wet clearings near aspen and willows in northwest corner and around edges of fish observation ponds.

Juncus orthophyllus Cov. Straight-leaved Rush.

Common in moist to wet areas near Convict Creek.

Liliaceae. Lily Family

Calochortus leichtlinii Hook. f. Mariposa Lily.

Occasional in sagebrush vegetation.

Fritillaria pinetorum Davids. Mountain Fritillary.

Rare, six plants along eastern edge of aspen grove near tool shed.

Lilium kelleyanum Lemmon. Alpine Lily.

Common on wet banks of Convict Creek.

Smilacina stellata (L.) Desf. False Solomon's Seal.

Common in colonies in wet areas near Convict Creek.

Zigadenus paniculatus (Nutt.) Wats. Sand-corn.

Occasional in sagebrush vegetation along southern border.

Orchidaceae. Orchid Family

Habenaria unalascensis (Spreng.) Wats. Alaska Orchid.

Occasional in meadows and in moist soil near irrigation ditch running beside trail from laboratory to western fork of Convict Creek.

Poaceae. Grass Family

Bromus tectorum L. Cheat Grass. Downy Brome. (I)

Occasional in disturbed areas along edge of entrance road near buildings.

Deschampsia caespitosa (L.) Beauv. Tufted Hairgrass.

Occasional in moist soil of eastern meadow.

Elymus cinereus Scribn. & Merr. Ashy Wildrye. Basin Wildrye.

Common in dry soil of sagebrush vegetation and in open areas.

Elymus triticoides Buckl. ssp. triticoides. Creeping Wildrye.
Beardless Wildrye.

Common in moist to dry soil in sagebrush and riparian areas at western end.

Muhlenbergia andina (Nutt.) Hitchc. Hairy Muhly.

Occasional in sandy soil in sagebrush-meadow transition zone near northeastern corner.

Muhlenbergia asperifolia (Nees & Mey.) Parodi. Scratchgrass.

Common in moist soil near Convict Creek at western end; also in shade of aspen grove.

Muhlenbergia minutissima (Steud.) Swall. Muhly.

Uncommon in moist sand near flood bypass channel.

Muhlenbergia richardsonis (Trin.) Rydb. Mat Muhly.

Occasional in sagebrush vegetation near tanks at western end of SNARL.

Oryzopsis hymenoides (R. & S.) Ricker. Indian Rice Grass.

Occasional in sagebrush vegetation.

Phleum pratense L. Timothy Hay. (I)

Rare in sandy soil of sagebrush-meadow transition area in northeastern corner.

Poa palustris L. Fowl Bluegrass. (I)

Common in moist soil at western end around aspens and willows.

Sitanion hystrix (Nutt.) J. G. Sm. Bottlebrush Squirreltail.

Occasional in dry areas near northern fence.

Stipa comata Trin. & Rupr. Bent-awn Grass.

Occasional in sagebrush vegetation.

Stipa occidentalis Thurb. Western Needlegrass.

Occasional in sagebrush vegetation.

Potamogetonaceae. Pondweed Family

Potamogeton filiformis Pers. var. macounii Morong. Pondweed.

Rare, only in a few pools of water on the southern side of control structure 4; with Utricularia minor.

Acknowledgments

This study was produced originally as a portion of a senior thesis (June 1979) in the Environmental Studies Program, UCSB. Many people have assisted me during the course of this project, and I am deeply grateful to them all. I would like to thank Ann Howald for suggesting the project, for her companionship in the field, and for her assistance in plant identification. Dr. Adrian Wenner, my senior thesis advisor, and Dr. J. Robert Haller provided advice and support, especially during the early stages of this study. Bill and Helen Seal, caretakers at SNARL, were always on the lookout for uncommon and inconspicuous plants that might otherwise have been overlooked. I thank the Seals and Woody Sampson for making my stays at SNARL and Valentine Camp enjoyable and nearly trouble-free.

Dr. Dale Smith, Dr. J. Robert Haller, Wayne Ferren, and Ann Howald provided numerous suggestions for improving the manuscript. I thank Wayne Ferren for guiding this manuscript through the publication process, Helmut Ehrenspeck for drawing the maps, Michael Emerson for providing the drawing of Pedicularis crenulata, Mary Ankeny for typing the manuscript, and Judy McCaslin for her help in scheduling the various trips to the Reserve.

Special thanks go to Dr. J. Robert Haller, Dr. John Melack, and the NLWRS for providing space and facilities at the Valentine Eastern Sierra Reserve, and to Mrs. Lillian Shular for providing the unexpected but welcome funding that allowed me to spend most of the summer of 1978 at the Reserve.

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