

Signature Page
for
Research Natural Area Establishment Record
Snow Canyon Research Natural Area
Eldorado National Forest
Alpine County, CA

The undersigned certify that all applicable land management planning and environmental analysis requirements have been met and that boundaries are clearly identified in accordance with FSM 4063.21, Mapping and Recordation and FSM 4063.41 5. e(3) in arriving at this recommendation.

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TITLE PAGE

Establishment Record for
Snow Canyon Research Natural Area
within Eldorado National Forest
Alpine County, CA

Snow Canyon Research Natural Area

Maps

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A. INTRODUCTION

The Research Natural Area (RNA) system is a national network of areas designated in perpetuity for research and education, and to maintain biological diversity on the Forest Service and other public lands. Only non-manipulative research, observation, and study are allowed in the RNAs. RNAs are representative of a broad array of ecosystem types, and many contain unique ecosystems. There are more than 300 RNAs already established in the nation.

In California, the selection of RNAs on National Forest lands is based on the identification of “target elements”. These target elements include plant communities described in various ecological reference works (e.g. Kuchler 1966, Eyre 1980, Sawyer and Keeler-Wolf 1995), and unique ecosystems (such as aquatic and geologically unusual areas). The purpose of the RNA system is to accurately reflect the natural diversity of vegetation types on Forest Service lands in California, and to provide opportunities for the long-term study of these representative and unique ecosystems.

Most RNAs contain a greater diversity of vegetation types than just the designated target elements. The representation of these vegetation types within the RNA is as important as the representation of the target elements. For an overview of California’s RNAs, please refer to Keeler-Wolf (1990), “Ecological Surveys of Forest Service Research Natural Areas in California” (USDA Forest Service General Technical Report PSW-125).

The Snow Canyon Research Natural Area (SCRNA) is located in Alpine County, California on the Amador Ranger District of the Eldorado National Forest. It is approximately 81 miles (130 km) east of Sacramento and 30 miles (48 km) south of South Lake Tahoe. The RNA lies entirely on lands managed by the Eldorado National Forest, which is the sole administrator of the RNA.

Prior to 1988, Snow Canyon area was used for grazing domestic cattle and sheep. Currently there is little evidence of livestock use and the meadows are in good condition. The area has never been logged. From the wear of trail track the area has been lightly used for backpacking and hiking (McDonald and others 1989).

Snow Canyon was first recognized as interesting and unique for the nearly pure stand of old and large western white pine (*Pinus monticola*¹) in the upper part of the valley (Veirs 1978). Snow Canyon was nominated by the Eldorado National Forest as a candidate RNA for this western white pine forest as a unique ecosystem in the central Sierra Nevada. Scientists from the Forest Service Pacific Southwest Research Station (PSW) carried out a formal reconnaissance (McDonald and others 1989) and concluded that Snow Canyon be recommended as a candidate for RNA designation. A further detailed evaluation of the candidate Snow Canyon Research Natural Area is compiled in a subsequent ecological survey (Nachlinger 1992).

(1) Land Management Planning

¹ Scientific name of plant species follows the Jepson Manual – Higher Plants of California (Hickman 1993); common name and family name are compiled using the CalFlora Database (CalFlora 2002).

The establishment of the SCRNA is recommended and evaluated in the Eldorado National Forest Land and Resource Management Plan (LRMP) and Final Environmental Impact Statement and Appendices for the LRMP (USDA Forest Service 1988a, b) (Appendix A). The land allocation for the Snow Canyon RNA was implemented by the signing of the Record of Decision for the LRMP by the Regional Forester in 1988. The establishment of the RNA will be completed by the signing of this Establishment Record with concurrence of the Station Director.

SCRNA is part of Management Area 3, which emphasizes the maintenance of values for which the RNA was established (Appendix A).

B. OBJECTIVES

SCRNA is established to represent the western white pine type (Society of American Foresters [SAF] type 215, Eyre 1980) for the Sierra Nevada Ecological Section (M261E) (Miles and Goudey 1997). This RNA contains many uncommonly large western white pines in an unusually pure stand. Establishing the RNA also serves to protect the habitat of one California Native Plant Society (CNPS)-listed sensitive species (*Silene invisa*), associated alpine and subalpine plant communities, headwater streams and meadows, and the geologic features that are representative of the high-elevation central Sierra Nevada. The RNA provides opportunities for: 1) measuring long-term ecological changes in western white pine forests and associated plant communities, 2) acting as a control for manipulative research activities in comparable areas.

C. JUSTIFICATION STATEMENT

Western white pine is widely distributed across several ecological divisions – M330, M240, and M260 – in the mountains of Dry (300) and the Humid Temperate (200) domains in western North America (Bailey 1995, McNab and Avers 1994). However, it is only in the middle elevations of the Northern Rocky Mountains Forest-Steppe-Coniferous Forest-Alpine Meadow Ecological Province (M333) that it forms a forest cover type where western white pine is the dominant component (Eyre 1980).

Snow Canyon RNA is within the Mediterranean Regime Mountains Division (M260) (Miles and Goudey 1997). Within the Mediterranean Regime Mountains Division, western white pine is distributed along all the higher elevations of the Sierra Nevada Section (M261E), to its southernmost extent on the Kern Plateau of the southern Sierra Nevada (Griffin and Critchfield 1976). Western white pine is found mostly as a minor component of other forest types and becomes increasingly restricted to subalpine and alpine habitats towards the southern part of its range. Potter (1998) classified forested communities in the southern two-thirds of Sierra Nevada Section and did not identify any communities where western white pine is dominant. The pure western white pine forest in SCRNA is unusual.

There are two RNAs in the Sierra Nevada Section where stands of western white pine occur: the Babbit Peak RNA in the Tahoe – Truckee Subsection (M261Ej), approximately 65 miles (105

km) north of Snow Canyon on the boundary of the Tahoe and Humboldt-Toiyabe National Forests, and the Mountaineer Creek RNA in the Upper Batholith Subsection (M261Eq), approximately 193 miles (310 km) south of Snow Canyon in the Sequoia National Forest (Keeler-Wolf 1990). SCRNA is centrally located within the Glaciated Batholith and Volcanic Flows Subsection (M261Ek), where western white pine is geographically more broadly distributed from east to west than in any other central Sierra Nevada subsection. There is no other RNA in the central Sierra Nevada that supports stands of western white pine.

The western white pine stands in SCRNA have many individual trees of unusually large diameters for this region and is in exemplary condition. Some of these trees may be among the largest on earth (Veirs 1978).

SCRNA encompasses an entire headwater watershed with very little disturbance. It contains 5 other plant communities (see map 3) in exemplary condition that are representative of alpine and subalpine habitats in the Sierra Nevada Section, including a spectacular example of high-montane Sierran meadow.

Worthy of note geologically, the RNA contains an excellent exposure of the contact between the Mehrten Formation volcanics and the Sierra Nevada granitic batholith, as well as some very interesting and beautiful boulders with concentric weathering. The area has great value for research, both as a control for manipulative research activities in comparable areas, as well as for baseline monitoring.

D. PRINCIPAL DISTINGUISHING FEATURES

Snow Canyon contains a relatively small area of central Sierra subalpine landscape, yet included within it are diverse topographic features, extraordinary geology, and several vegetation types.

Two types of rock are found in the RNA, volcanic rock on the ridge defining the northern boundary and granitic rock in remaining areas. The contact of these two rock types is observable at elevations around 9200 ft (2804 m), and along this contact several seeps and springs issue.

Numerous ephemeral streams (map 1) exist in the RNA. In the northern half of the RNA, three major perennial streams flow southward and gradually merge into one stream. Confluences of these streams concentrate in the central part of RNA where the canyon abruptly flattens at the relatively large alluvial-filled valley floor of Snow Canyon. The main stream then meanders through the entire southern half of the RNA. It turns eastwardly at the mouth of the watershed and drains into Meadow Lake, which is about half mile (0.8 km) to the east of SCRNA. Meadows and riparian plant communities thrive along the perennial water courses.

Western white pine forest, the target element, occurs in the lower two thirds of the RNA covering slopes above meadows and riparian corridors. The forest cover is open with some very large trees (one measured 66 inches [168 cm] dbh). One CNPS-listed 1B plant, *Silene invisa*, occurs in this forest type.

E. LOCATION

(1) National Forests Involved

Snow Canyon RNA is located entirely on the Amador Ranger District, Eldorado National Forest.

(2) Latitude and Longitude

The approximate latitude and longitude at the center of SCRNA is 38°7'N and 119°59'W.

(3) Boundary Description (map 2)

SCRNA is on land administered by the Eldorado National Forest in portions of sections 14, 15, 16, 21, 22, 23, and 27 T9N, R18E, MDBM. The boundaries are defined by topographic features (ridgelines and watersheds) as shown on the USGS Carson Pass and Pacific Valley 7½ minute quadrangle maps (map 2).

More specifically as follows:

- (a) Beginning at the point just to the south of the center of section 27 T9N, R18E, where the creek draining Snow Canyon turns from flowing south to an easterly direction (point a) as shown on map 2; thence in a north-northeasterly direction following the ridge line upslope for about 820 ft (250 m) to a knoll of about 8400 ft (2560 m) elevation (point b);
- (b) thence in a north-northeasterly direction upslope following the crest of the north-northeast trending ridge for about 2100 ft (640m) to a peak of approximately 8700 ft (2652 m) elevation (point c);
- (c) thence following the ridge line descend for about 164 ft (50 m) to a saddle, then upslope for about 985 ft (300 m) to a peak of about 8860 ft (2700 m) elevation (point d);
- (d) thence in a northerly direction for about 410 ft (125 m) descend to a saddle, then in a easterly direction uphill for about 246 ft (75 m) to a knoll of about 8780 ft (m) elevation (point e);
- (e) thence in a north-northeasterly direction following the narrow ridge line upslope for about 1640 ft (500 m) to a saddle of about 8830 ft (2690 m) and meet the Eldorado Forest Foot Trail 18E08 (point f);
- (f) thence in a north-northwesterly direction following the ridge line upslope for about 820 ft (250 m) then turn northeasterly, again following the ridge line for about 1230 ft (400 m) to a peak of about 9165 ft (2793 m) elevation (point g);

- (g) thence following the ridge line in a north-northeasterly direction for about 1395 ft (425 m), passing through a saddle to a knoll of about 9130 ft (2783 m) where the main east-west trending ridge line is met (point h);
- (h) thence in a north-westerly direction following the ridge line for about 574 ft (175 m), passing through a saddle to a peak of about 9300 ft (2835 m) elevation (point i);
- (i) thence in a southwesterly direction following the ridge line for about 410 ft (125 m) descending to a saddle and uphill to a peak of about 9300 ft (2835 m) elevation (point j);
- (j) thence in a northwesterly direction upslope along the crest of the prominent ridge for about 820 ft (250 m) to a peak of about 9530 ft (2905 m) elevation (point k);
- (k) thence in a southwesterly direction following the ridge line for about 984 ft (300 m) passing through a saddle to a peak of about 9530 ft (2905 m) elevation (point l);
- (l) thence in a generally west-northwesterly direction following the ridge line for about 0.6 mile (1 km), past a peak, to the highest point (Deadwood Peak, elevation 9846 ft [3001 m]) of the ridge (point m);
- (m) thence following a spur ridge steeply downslope in a south-southwesterly direction, then in a more southwesterly direction, to where the ridge becomes less steeply down slope and turns in a south-southeasterly direction for about 2050 ft (625 m) to the Forest Foot Trail 18E08 (point n);
- (n) thence continuing downslope in a southwesterly direction along the narrow ridge line, through a saddle and then upslope past another saddle to a prominent peak at about 9300 ft (2835 m) elevation (point o);
- (o) thence turn southeast and continue for about 1476 ft (450 m) downslope to a spur ridge which ends abruptly above Snow Canyon, thence turn south and proceed downslope along a south and then south-southeast trending spur ridge to a saddle, thence upslope to the western peak of a set of twin peaks at about 8730 ft (2660 m) (point p);
- (p) thence continue downslope in a south-southeasterly direction to a spur ridge for about 1312 ft (400 m) descending into a broad saddle, continuing across the saddle in a southeasterly direction to a south and then south-southwesterly trending ridge; thence upslope along this ridge to a peak of about 8660 ft (2640 m) elevation (point q);

- (q) thence turn southeast and continue for about 1476 ft (450 m) downslope onto a southeast trending ridge, thence through a saddle and then upslope to a peak of about 8720 ft (2658 m) elevation (point r);
- (r) thence turn east-northeast and for about 1230 ft (375 m) continue first gently downslope along a spur ridge until it ends, and then continue in a northeasterly direction steeply downslope to the stream (point a and the pint of beginning).

(4) Acreage

The total acreage of SCRNA as described above is 888.6 acres (359.6 ha).

(5) Elevation

Elevations in SCRNA range from 9846 ft (3001 m) at Deadwood Peak, the northwest edge of SCRNA, to 8180 ft (2493 m) at the mouth of the watershed. This represents an elevation range of 1666 ft (508 m).

(6) Access (map 1)

Access to Snow Canyon RNA is possible from State Highway 88 via the following route:

From Jackson, drive east on Highway 88 to about two miles (3.2 km) before the junction with State Highway 89. At this point, watch for a sign that signals a right turn on a paved road to Blue Lake. Proceed along this road for about 7 miles (11.3 km) past the Hope Valley campground, through Faith and Charity valleys, to the end of the paved road. Some barns and outbuildings will be on the left. Here the road surface changes to gravel. Proceed along this road for about 5 miles (8 km), past campsites on the east shore of Lower Blue Lake to the spillway area below the dam at the south end of Upper Blue Lake, where a dirt parking lot on the left (west) marks the trailhead for Grouse Lake. Take Eldorado Forest Foot Trail 18E08, which proceeds southwest for a short distance, then crosses Middle Creek over a log, and crosses the well-marked Mokelumne Wilderness Boundary at approximately 0.5 mile (0.8 km) from the trailhead. The trail continues in a generally westerly direction, skirts the edge of Granite Lake, passes through the upper reaches of Snow Canyon at approximately 2.7 miles (4.4 km), and continues on to Grouse Lake.

SCRNA is largely inaccessible during the winter and early spring months due to heavy snow and road blockages. State Highways 88 and 89 can be intermittently closed during the winter due to heavy snow. During the late spring and early summer months it is advisable to check with the Amador Ranger District on road closures and accessibility to the area before departing for SCRNA.

F. AREA BY COVER TYPES

VEGETATION TYPE	Percent	acres	hectares
SAF FOREST COVER TYPE (Eyre 1980)			
Western white pine (215) or California mixed subalpine (256)	24	213.3	86.3
Unclassified	76	675.3	273.3
Totals	100	888.6	359.6
KUCHLER TYPE (Kuchler 1966)			
Alpine meadows and barrens (K 45)	68	604.2	244.5
Lodgepole pine-subalpine forest (K 8)	24	213.3	86.3
Unclassified	8	71.1	28.8
Totals	100	888.6	359.6
Holland Type (Holland 1986)			
[California Natural Diversity Database Type (California Dept. of Fish and Game 2002)]			
Alpine talus and scree slope (91200)	17.9	159.1	64.4
[Alpine and talus scree slope (91.200.00)]			
Alpine dwarf scrub (94000)	0.1	1.0	0.4
[Subalpine upland shrub habitat (91.160.00)]			
Sierran mixed subalpine coniferous forest (86200)	23.9	212.8	86.1
[Western white pine woodland (87.170.00)]			
Mountain riparian scrub (63500)	0.5	4.0	1.6
[Montane riparian scrub (63.903.00)]			
Subalpine and alpine meadow (45200)	7.9	69.9	28.3
[Subalpine meadow (45.320.00)]			
Unclassified	49.7	441.8	178.8
[Mountain juniper woodland and barrens (89.200.00)]			
Totals	100.0	888.6	359.6

G. PHYSICAL AND CLIMATIC CONDITIONS

SCRNA is in the upper watershed of the North Fork of the Mokelumne River just to the west of the watershed divide at the crest of the central Sierra Nevada. The RNA encompasses the whole watershed of the creek draining Snow Canyon, which drains generally from north to south through the RNA. Uppermost elevations include examples of gentle to steep talus slopes, outcrop knolls, and a well-defined ridgeline that drops abruptly to the north. The mostly south-facing slopes below the ridgeline are open, moderately steep and composed of talus and cobble-sized stones. At approximately 9200 ft (2804 m) in elevation, a contact between overlying volcanic rock and the granodiorite batholith is readily apparent. Several notable seeps and springs issue from this contact and feed incipient streams.

Topographic features of middle and lower elevations include open, broad slopes, glacially-scoured rock lands, gullies of decomposed granite, knolls, a flat canyon bottom, and several perennial streams. Above 8800 ft (2682 m), the landscape is dominated by bedrock and talus with only a few scattered trees. Below that elevation a subalpine forest occupies a 500-foot-wide

(152 m) band on gentle to steep slopes. The most common aspects are west, southwest, south, southeast and east. Numerous south-trending streams drain the middle slopes and merge at about 8270 ft (2520 m) where the canyon abruptly flattens at the relatively large alluvial valley floor of Snow Canyon. The main stream meanders south about 0.7 mile (1.1 km) across the alluvium in a channel lined with decomposed granite. A natural constriction turns the creek east toward Meadow Lake and provides a natural feature to define the lower limit of the RNA.

No climatic data exist for Snow Canyon itself, but cooperators with the California State Dept. of Water Resources record weather data at Twin Lakes, located 6.5 miles (10.5 km) northwest of the SCRNA. This station offers a reasonable approximation of climatic conditions at Snow Canyon. The Twin Lakes weather station is at 7800 ft (2377 m) in elevation and is very representative of the climatic conditions at lower elevations within the RNA. In this area near the crest of the Sierra Nevada freezing temperatures can occur in any month of the year. Data from Twin Lakes is summarized in the following table (Western Regional Climate Center 2003):

Station	Twin Lakes
Distance from Snow Canyon RNA	6.5 miles (10.5 km) NW
Elevation	7800 ft (2377 m)
Latitude / Longitude	38.7070° N / 120.0480° W
Maximum temperature recorded	95°F (35°C)
Minimum temperature recorded	-26°F (-32°C)
years recorded	1948 – 2000

	Average Temperature			Average Precipitation		
	max °F (°C)	°F (°C)	Min °F (°C)	<i>water</i> Inches (mm)	<i>snowfall</i> in. (cm)	<i>snow depth</i> Inches (cm)
January	38 (3.2)	27 (-2.7)	16 (-8.7)	8.99 (228)	79.5 (201.9)	50 (127.0)
February	39 (4.2)	28 (-2.2)	16 (-8.6)	7.29 (185)	73.3 (186.1)	68 (172.7)
March	41 (5.2)	30 (-1.3)	18 (-7.8)	6.71 (170)	75.9 (192.8)	78 (198.1)
April	47 (8.1)	34 (1.3)	22 (-5.4)	3.94 (100)	36.6 (93.0)	58 (147.3)
May	54 (12.2)	42 (5.3)	29 (-1.5)	2.46 (62)	14.5 (36.8)	23 (58.4)
June	63 (16.9)	50 (9.7)	36 (2.4)	1.12 (28)	2.3 (5.8)	1 (2.5)
July	71 (21.8)	57 (13.8)	43 (6.0)	0.65 (17)	0 (0)	0 (0)
August	70 (21.3)	56 (13.5)	42 (5.8)	0.74 (19)	0.2 (0.5)	0 (0)
September	65 (18.3)	52 (10.9)	39 (3.6)	1.22 (31)	1.1 (2.8)	0 (0)
October	56 (13.4)	44 (6.5)	31 (-0.4)	2.58 (66)	10.3 (26.1)	0 (0)
November	45 (7.3)	34 (1.3)	23 (-4.8)	6.05 (154)	40.9 (103.9)	6 (15.2)
December	39 (4.1)	29 (-1.8)	18 (-7.9)	7.84 (199)	66.4 (168.7)	25 (63.5)
for the year	52 (11.3)	40 (4.5)	28 (-2.3)	49.6 (1260)	401 (1018.8)	26 (66.0)

H. VALUES

(1) Flora

The flora of SCRNA is moderately rich for the alpine and subalpine elevations represented in the RNA with 223 species observed (Nachlinger 1992). It is a mixture of circumpolar, western North America, Sierra Nevada, and Great Basin species. Appendix B lists taxa of vascular plants found on the RNA sorted by vegetation type.

No Federally-listed endangered, threatened or candidate plants are known to occur in the area. One CNPS List 1B species, *Silene invisa*, is known to occur at middle elevations in the western white pine forest (McDonald and others 1989). It is endemic to California and occurs in the Southern Cascade (M261D) and Sierra Nevada (M261E) ecoregional sections. The California Native Plant Society places this species on List 1B: plants rare, threatened, or endangered in California and elsewhere (Tibor 2002). Many newly discovered populations have been found on the Eldorado, Plumas, Stanislaus, and Tahoe national forests recently and the US Forest Service has developed an interim management guide for this sensitive plant species (USDA Forest Service 1988c).

Following is a brief description of the six plant communities found within the boundaries of the SCRNA. Descriptions are based on Nachlinger (1992). The equivalent Holland type (Holland 1986) name and the vegetation community type recognized by the California Natural Diversity Database (NDDDB) (California Dept. of Fish and Game 2002) are listed following each vegetation type name. Approximate boundaries of these plant communities are shown on map 3. See Section F above for acreages and the corresponding SAF (Eyre 1980) and Kuchler (1966) types.

(a) Alpine barren and scree

Holland type 91200: Alpine talus and scree slope

NDDDB type 91.200.00: Alpine and talus scree slope

The alpine barren and scree vegetation type is found at the highest elevations in SCRNA on substrates derived from volcanic rocks. It occurs on south- and southwest-facing slopes that vary from gentle to steep. These slopes are most likely wind-swept and snow free in winter. This vegetation type covers about 159 acres (64 ha) and is dominated by herbaceous perennials and low-growing shrubs. Plants cover may be as little as 2 percent on exposed sites, but as much as 25 percent on moist, protected sites. The most common dominants are *Polygonum davisiae* and *Ericameria suffruticosa*; on certain sites these can be up to 25 percent of cover.

Several alpine and alpine steppe communities for the Carson Pass area (about 5 miles, 8.1 km, to the north of the RNA) have been described by Taylor (1977), which may be similar to this community. The communities in Carson Pass area include *Stenotus acaulis* (*Haplopappus acailis*), *Polygonum davisiae*-*Eriogonum incanum*, and *Antennaria alpina*-*Penstemon heterodoxus* associations.

(b) Alpine shrub steppe

Holland type 94000: Alpine dwarf scrub

NDDDB 91.160.00: Subalpine upland shrub habitat

The alpine shrub steppe vegetation type is found at one high-elevation location, about 9500 ft (2896 m), on a southwest-facing, moderately-inclined slope. It occurs on volcanic substrates at a windswept site kept moist from seepage from a higher snowbank. This vegetation type covers less than one acre (0.4 ha) of the total area.

Low shrubs dominate this alpine shrub steppe vegetation type. *Artemisia tripartita* is the most common woody species with 26 to 50 percent cover. Other shrubs present include *Eriogonum umbellatum* var. *nevadense*, *Ericameria discoidea*, *Ericameria suffruticosa*, and *Leptodactylon pungens* with less than 1 to 5 percent cover. Scattered among the shrubs are herbaceous grasses and broad-leaved perennials common in the adjacent alpine barrens.

(c) Subalpine barrens and bedrock

No Holland equivalent

NDDB type 89.200.00: Mountain juniper woodland and barrens alliance

The subalpine barrens and bedrock type is found at high elevations, about 8600-9200 ft (2621-2804 m), on granitic substrates between the alpine community on volcanic substrates upslope and the continuous forest below. It occurs on southwest-, south-, and southeast-facing slopes of moderate inclinations. This vegetation type covers about 442 acres (179 ha) within the boundary of Snow Canyon – the most extensive plant community in the RNA.

This vegetation type has developed on a substrate that limits plant growth. The substrate is extensive outcrops of bedrock scoured by Pleistocene glacier activity and left exposed to present severe climate elements. Little soil has developed except in crevices and depressions. Accordingly, few trees are present, although scattered individuals of *Juniperus occidentalis* ssp. *austalis*, *Pinus albicaulis*, *P. jeffreyi*, and *P. monticola* occur with little cover. *Holodiscus microphyllus* var. *microphyllus* is a commonly occurring shrub with 1 to 5 percent cover, whereas *Polygonum davisiae* and *Elymus elymoides* are the most common perennials, also with up to 5 percent cover.

This vegetation type is similar to the *Juniperus occidentalis*-*Holodiscus microphyllus* association of the shrub steppe community described by Taylor (1977) for the Carson Pass area. Rundel and others (1977) provide descriptions of successional development on granite outcrops of the Sierra montane zone that appear to be very descriptive of the subalpine area in Snow Canyon (Nachlinger 1992).

(d) Subalpine western white pine forest

Holland type 86200: Sierran mixed coniferous forest

NDDB type 87.170.00: Western white pine woodland alliance

The subalpine western white pine forest is found at middle elevations, 8250-8800 ft (2525-2682 m), in SCRNA on granitic substrates. Slopes may be east-, southeast-, south-, southwest-, and west-facing with gentle to steep inclinations. This subalpine forest type covers about 213 acres (86 ha) in the SCRNA. The forest is dominated by *Pinus monticola*; though pure stands are not present. In some areas, *Tsuga mertensiana* is common – generally on slightly moist sites with west-facing exposures. Other tree species occurring in low numbers are *Abies magnifica*, *Juniperus occidentalis* ssp. *australis*, *Pinus albicaulis*, *P. contorta* var. *murrayana*, and *P. jeffreyi*.

The forest understory may be well-developed with up to 70 percent of the forest floor covered by herbaceous plants. The most common species associated with the western white pine stands are *Polygonum davisiae*, *Festuca viridula*, and *Poa wheeleri*, which each may obtain up to 50 percent cover.

A relatively pure western white pine forest occurs at the Babbitt Peak RNA in the northern Sierra. At Babbitt Peak RNA, western white pine forest occurs at an elevation of 7600-8695 ft (2316-2650 m). Slopes are gentle northwest- to northeast-facing near the ridge summits. Associated trees include *Abies concolor* and *A. magnifica*. In comparison to the forest at SCRNA, the forest at Babbitt Peak RNA is lower in elevation, on opposite-facing slopes, and has greater tree densities and basal areas (Keeler-Wolf 1989). Stands of subalpine conifers dominated by western white pine are uncommon in the Sierra although the species is commonly present throughout the upper montane and subalpine zones. The western white pine forest at SCRNA is a good example of this forest type for the central Sierran region.

(e) Subalpine riparian scrub

Holland type 63500: Mountain riparian scrub

NDDB type 63.903.00: Montane riparian scrub habitat

The subalpine riparian scrub vegetation type lines major drainages from elevations of 8250 ft to 9100 ft (2515-2774 m). It typically occurs within the subalpine barrens and bedrock type and subalpine western white pine forest. Riparian scrub sometimes is found in close association with subalpine meadows. It forms narrow corridors of streamside vegetation along perennial streams.

The canopy in subalpine riparian scrub is dominated by shrubs, which may form open or closed thickets. *Salix jepsonii* or *S. orestera* may dominate a given reach with greater than 75 percent cover. *Alnus incana* ssp. *tenuifolia*, *Cornus sericea* ssp. *sericea*, *Prunus emarginata*, and *Sambucus racemosa* var. *microbotrys* may co-dominate at middle to lower elevations and may each provide up to 25 percent cover.

Undergrowth may be sparse where canopies are closed or where local geomorphology limits the width of the riparian area. Many herbaceous plants occur where adequate light penetrates. Mosses, liverworts, and foliaceous lichens are found at ground level.

This vegetation type is similar to the mesic herbaceous and meadow association (*Salix eastwoodiana*—*Senecio triangularis*) described by Taylor (1977) for the Carson Pass area, also is comparable to the *Salix rigida* association described by Beguin and Major (1975) for the Sierra Nevada region.

(f) Subalpine meadow

Holland type 45200: Subalpine and alpine meadow

NDDDB type 45.320.00: Subalpine meadow alliance

The subalpine meadow type occurs at elevations from 8200 to 9200 ft (2499-2804 m), on flat to gently-sloping terrain. At its higher elevational limits, this vegetation type tends to cover small areas at seeps, especially at the interface between volcanic and granitic substrates. Throughout its elevational range, it may be found along gentle drainages within the subalpine barrens and bedrock type and subalpine western white pine forest, and is often associated with the riparian scrub vegetation type. In the southern half of the RNA, an extensive meadow occurs in the bottom of the drainage with the main creek meandering along its eastern half. This type covers about 70 acres (28 ha) in the RNA.

The subalpine meadow is dominated by herbaceous plant species that are from 1 to 2 ft tall (0.3-0.6 m). Wet, moist, and dry phases of this type occur along a moisture gradient defined by the depth of the water table and distance to flowing water. Drier phases tend to occur at the outer margins of meadow, where soils are well-drained and soil texture is coarse.

The dry phase is dominated by *Polygonum davisiae*, *Penstemon heterodoxus* var. *heterodoxus*, and *Calyptridium umbellatum*. The dry phase has the least total plant cover for the subalpine meadow type. The moist phase meadows are very common in the RNA and are dominated by species such as *Festuca viridula*, *Lupinus lepidus* var. *sellulus*, and *Phyllodoce breweri*. Meadows of wet phase occur in close association with flowing water – soils are saturated throughout the growing season – and may have high organic matter content. *Graminoids*, such as *Carex aquatilis*, *C. nebrascensis*, and *C. scopulorum* var. *bracteosa*, dominate wet phase meadows.

The subalpine meadow vegetation type can often be very diverse in species. Both moist and wet phases may have up to 100 percent plant cover, but in the wet phase most of the cover may be from just one to a few species.

This meadow type is comparable to three mesic herbaceous and meadow associations (*Vaccinium nivictum-Calamagrostis breweri*, *Carex scopulorum*, and *Salix arctica-Juncus mertensianus*) in Carson Pass area (Taylor 1977) and several meadow associations in Sierra Nevada described by Beguin and Major (1975).

(2) Fauna

Appendix C is a list of animals that potentially inhabit in the SCRNA. The list is compiled by the Eldorado National Forest based on species known to occur in habitats present at subalpine elevations in the central Sierra Nevada.

SCRNA provides habitats for two Federally-listed endangered birds, the bald eagle (*Haliaeetus leucocephalus*²) and peregrine falcon (*Falco peregrinus anatum*). In addition, it provides habitats for a State-listed endangered bird, the great gray owl (*Strix nebulosa*), and a State-listed rare animal, the wolverine (*Gulo gulo*). Wolverine and peregrine falcon sightings have been made about 4 miles (6.4 km) west and 5 miles (8 km) northwest of SCRNA, respectively.

Sensitive species listed by the U.S. Forest Service that may occur in the SCRNA include 3 birds and 2 mammals: northern goshawk (*Accipiter gentilis*), great gray owl (*Strix Nebulosa*), willow flycatcher (*Empidonax traillii*), fisher (*Martes pennanti*), and Sierra Nevada red fox (*Vulpes vulpes necator*).

(3) Geology

Central Sierra Nevada is underlain by granites of Mesozoic age that form the core of the Sierra Nevada Batholith. The granites are overlain by volcanics of the Mehrten formation of Miocene and Pliocene age. Koenig (1963) indicates the presence of these two rock types in the SCRNA.

Pliocene volcanic rock predominates on the ridgeline at highest elevations and covers about 14 percent of the RNA. These volcanics have not been expressly studied and are of unknown composition. They date from a period governed by eruptions following fault-blocking when the Sierra uplifted and tilted westward.

The Mesozoic granodiorite makes up the remainder of the Snow Canyon area. This granodiorite forms the core of the Sierra and dates from the period when several pulses of subsurface magma intruded into older rocks. These granitic rocks were scoured during several glacial periods in the Pleistocene. The interface between Pliocene volcanic and Mesozoic granitic rocks is quite evident at 9200 ft (2804 m) on the upper slopes of SCRNA.

(4) Soils

A Level 4 soil survey has been conducted for the Eldorado National Forest area (Mitchell 1985), which includes the SCRNA. The soil survey maps four map units on SCRNA as shown on figure 1: map unit 103 – Aquepts and Umbrepts, map unit 120 – Cryumbrepts Association, map unit 161 – Lithic Cryumbrepts, and map unit 198 – Rock Outcrop. Followings are brief descriptions of each soil type; detailed descriptions can be found in appendix D.

Map unit 103 – Aquepts and Umbrepts, 0 to 15 percent slopes – is poorly-drained, deep soil, developed over stratified granitic alluvium on gently sloping to flat sites.

² Nomenclature of animal species follows Laudenslayer and others (1991).

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This soil is associated with the subalpine meadows found along drainages and on broad valley flat. It occupies approximately 45 acres (18 ha) or 5 percent of the RNA.

Aquepts soil has a dark grayish brown silt loam A1 layer (0-18 inches, 0-46 cm) and a grayish brown silty clay loam A2 layer (18-28 inches, 46-71 cm), with no B layer. Umbrepts soil is similar to Aquepts soil, with a very dark grayish brown fine sandy loam A1 layer (0-12 inches, 0-31 cm), a gravelly sandy clay loam A2 layer (12-20 inches, 31-51 cm), and no B layer. They are subject to flooding and support meadow grasses and forbs with occasional lodgepole pines.

Map unit 120 – Cryumbrepts Association, 5 to 50 percent slopes – is on glacial moraines, outwash terraces, and alluvial plains. The association comprises 55 percent Cryumbrepts and 15 percent Cryumbrepts, wet. The percentage varies from one area to another. The soil is deep with a dark surface horizon and a loamy to sandy loam texture.

The Cryumbrepts is moderately-deep, deep, or very-deep and moderately-well-drained or well-drained soil. It has a dark surface layer and loamy sand, coarse-sandy loam, or sandy loam texture throughout the profile with rock fragments ranging from 15 to 60 percent. One example profile shows that on the surface there is a 2 inches (0-5 cm) layer of fresh and decomposed litter, with an A1 layer (0-3 inches, 0-7.6 cm) of very dark grayish brown sandy loam, A2 layer (3-17 inches, 7.6-43.3 cm) of dark brown cobbly sandy loam, and Bw layer (17-25 inches, 43.3-63.6 cm) of dark yellowish brown cobbly sandy loam.

The Cryumbrepts, wet soil has properties similar to Cryumbrepts, but is distributed along drainages and on flood plains, therefore, poorly drained. Typically its surface horizon is dark with high organic matter.

This soil occupies a small area, about 8 acres (3 ha) or 1 percent of the total area, at the far southern end of the RNA.

Map unit 161 – Lithic Cryumbrepts, 15 to 75 percent slopes – formed on andesic lahars and is found on the ridgeline at the highest elevations of SCRNA. It is associated with the alpine barrens and scree vegetation type. It is excessively drained, shallow soil classified as sandy loam, fine sandy loam, or loam with coarse fragments ranging from 20 to 80 percent of the soil volume. Up to 20% of this unit has included areas of rock outcrop and small areas of Andic Cryumbrepts. One example profile shows that A1 layer is from 0 to 3 inches (0-7.6 cm), dark brown gravelly sandy loam, A2 layer is from 3 to 12 inches (7.6-30.5 cm), very gravelly sandy loam, and Bw layer is from 12 to 19 inches (30.5-48.3 cm), yellowish brown extremely gravelly sandy loam.

This soil occupies 113 acres (46 ha) or 13 percent of the RNA.

Map unit 198 – Rock Outcrop – is exposed granitic or andesitic lahar rock with very little to no soil development. This is the result of Pleistocene Glaciers scouring the resistant volcanic and granite rocks. This unit has a thin mantle of skeletal soil occurs in crevices, depressions, and on gentle slopes. Included in this unit are scattered areas of mixed, shallow, Typic Cryopsamments, and somewhat deeper soils that classify as mixed Typic Cryopsamments. These soils are slightly to medium-acid, well-drained, and have low erosion potential. The shallow soils support an open subalpine forest, while the deeper soils support the somewhat dense subalpine (western white pine) forest (Nachlinger 1992).

723 acres (293 ha) or 81 percent of the SCRNA is covered by this soil type.

(5) Lands

All land within the boundaries of SCRNA is under the management of the Eldorado National Forest. The SCRNA is in the Mokelumne Wilderness Area administered by the Eldorado National Forest; the management objectives of these two administrative areas are compatible.

(6) Cultural

There are no known cultural or archaeological sites within SCRNA. Historical maps show that two trails dating to at least 1911 pass through the canyon, but there have been no archaeological survey to verify the presence or absence of historic or prehistoric sites. It is likely that there are prehistoric and historic sites located within the area. The USGS Pacific Valley 7 ½ minute quadrangle map identifies a grave site approximately ¼ mile east of the RNA and silver mining occurred just to the north of the area (McLemore 2003).

I. IMPACTS / CONFLICTS

(1) Mineral Resources

The mineral development potential of the area has been classified as low, and the area has been withdrawn from mineral location and entry since 1 January 1984. There are no existing mining claims within SCRNA. Based on the low mineral potential, the lack of existing claims and the withdrawn status of the lands, the impact of RNA establishment on the minerals resource is very low.

(2) Grazing

SCRNA is within the Indian Valley grazing allotment. The most recent livestock permit, issued for cattle, expired in 1988. Currently there is no allotment management plan or

annual operating plan. Since the allotment has been vacant since that date, the impact of RNA establishment on the grazing resource is very low. If a new grazing permit were issued, the RNA would be required to be protected from grazing, and the appropriate method to protect the RNA would be addressed in the preparation of an Allotment Management Plan.

(3) Timber

SCRNA is within the Mokelumne Wilderness Area. The area has been withdrawn from timber production since the designation of wilderness area. Establishing SCRNA will have no impact on the timber resource of the area.

(4) Watershed Values

Establishment of the SCRNA will protect the watershed of Snow Canyon and the associated plant and wildlife communities.

(5) Recreation Values

SCRNA is within the Mokelumne Wilderness Area, which prohibits motorized travel within the RNA. A hiking trail (Forest Trail 18E08) to Grouse Lake cuts across the upper elevation slopes of SCRNA. Judging by the wear of trail tracks, traffic appears light; in some areas the trail is obscure from lack of use. Recreational use, such as camping, is light and poses no conflicts with RNA status. The relatively isolated location of Snow Canyon restricts most impacts and conflicts by humans. Establishment of the RNA will have no impact on the recreational values of the area.

(6) Wildlife and Plant Values

SCRNA is within the Mokelumne Wilderness Area. Establishment of the RNA will not change the wildlife and plant values of the area, and will continue to provide suitable habitat for the plant and wildlife species native to the area.

(7) Special Management Area Values

SCRNA is within the Mokelumne Wilderness Area. Establishment of the RNA is compatible with the purpose and management of the wilderness area.

(8) Transportation Plans

SCRNA is within the Mokelumne Wilderness Area and there are no roads permitted. Eldorado Forest Foot Trail 18E08 is the only designated transportation facility within the RNA. Trail use in this area and in the RNA is light. There are no plans for additional transportation facilities. Establishment of the RNA will not change the transportation net or adversely impact the forest transportation system.

(9) Cultural Values

There is no conflict between the RNA establishment and the cultural values of the area. RNA status will provide protection for any potential cultural sites in the SCRNA.

J. MANAGEMENT PRESCRIPTION

Management direction for Research Natural Areas is stated in the Eldorado National Forest Land and Resource Management Plan (LRMP) on pages 4-37 and 4-137 through 1-141 (USDA forest Service 1988a). The LRMP presents the standards and guidelines that provide a framework for the land management decision for the lands on the Eldorado National Forest. Please see appendix A in this Establishment Report for a copy of the LRMP management direction. This document presents the standards and guidelines that provide a framework for the land management decisions for all the lands on the Eldorado National Forest.

1) RNA Management Strategy

The Eldorado National Forest will develop a specific management strategy to maintain the target element and other resource values in the best possible condition. These are to maintain SCRNA in a natural condition and to limit use to research, study, observation, monitoring and educational activities that are nondestructive and non-manipulative.

2) Wilderness Management

Activities within the RNA must comply with the management direction for the Mokelumne Wilderness, as contained in both the LRMP and the Mokelumne Wilderness Management Guidelines, September 1995. These include a group size limit of 15 (unless special permission for a larger group for scientific study is granted), and prohibitions of the use of wheeled vehicles or power equipment.

K. ADMINISTRATION RECORDS AND PROTECTION

The official responsibility for administration and protection of Snow Canyon RNA is with the District Ranger, Amador Ranger District, 26820 Silver Drive, Pioneer, CA 95666; tel. (209) 295-4251.

The research coordinator is the Director, USDA Forest Service, Pacific Southwest Research Station, 800 Buchanan Street, Albany, CA 94710; tel. (510) 559-6300. The Director is responsible for approving and coordinating observational or non-manipulative applied research, and for maintaining a research data file.

L. ARCHIVING

The Station Director shall establish and maintain a system for archiving data and reports from Research Natural Areas in a manner that will facilitate the exchange and transfer of information among Stations, Forests, and scientists.

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Appendix A: Excerpts from Eldorado National Forest Land and Resource Management Plan and
Final Environmental Impact Statement (USDA Forest Service 1988a, b)

APPENDIX B: Plant list of Snow Canyon RNA (Nachlinger, 1992)

Alpine barrens and scree (Holland type 91200, NDDB type 91.200.00):

taxon	common name	family
<i>Allium campanulatum</i>	Sierra Onion	Liliaceae
<i>Arabis lemmonii</i> var. <i>lemmonii</i>	Lemmon's Rockcress	Brassicaceae
<i>Arabis lyallii</i>	Lyall's rockcress	Brassicaceae
<i>Arabis platysperma</i> var. <i>howellii</i>	Howell's Rockcress	Brassicaceae
<i>Arabis puberula</i>	Blue Mountain rock-cress	Brassicaceae
<i>Bromus suksdorfii</i>	Suksdorf's brome	Poaceae
<i>Calyptridium umbellatum</i>	Pussypaws	Portulacaceae
<i>Castilleja applegatei</i> ssp. <i>pallida</i>	Brewer's paintbrush	Scrophulariaceae
<i>Castilleja nana</i>	dwarf alpine-paintbrush	Scrophulariaceae
<i>Chaenactis douglasii</i> var. <i>douglasii</i>	Douglas' dustymaiden	Asteraceae
<i>Cirsium scariosum</i>	elk thistle	Asteraceae
<i>Collinsia parviflora</i>	Blue-Eyed Mary	Scrophulariaceae
<i>Crepis modocensis</i>	Modoc hawksbeard	Asteraceae
<i>Crepis occidentalis</i>	western hawksbeard	Asteraceae
<i>Cymopterus terebinthinus</i> var. <i>californicus</i>	turpentine cymopterus	Apiaceae
<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Poaceae
<i>Ericameria discoidea</i>	Macronema goldenbush	Asteraceae
<i>Ericameria suffruticosa</i>	Alpine macronema	Asteraceae
<i>Erigeron breweri</i> var. <i>porphyreticus</i>	Brewer's fleabane	Asteraceae
<i>Erigeron compositus</i>	cutleaf daisy	Asteraceae
<i>Eriogonum incanum</i>	frosted buckwheat	Polygonaceae
<i>Eriogonum ovalifolium</i> var. <i>nivale</i>	cushion buckwheat	Polygonaceae
<i>Eriogonum umbellatum</i> var. <i>nevadense</i>	Nevada buckwheat	Polygonaceae
<i>Eriophyllum lanatum</i> var. <i>integrifolium</i>	Oregon sunshine	Asteraceae
<i>Erysimum capitatum</i> ssp. <i>perenne</i>	mountain wallflower	Brassicaceae
<i>Festuca kingii</i>	spike fescue	Poaceae
<i>Festuca viridula</i>	mountain bunch-fescue	Poaceae
<i>Gayophytum ramosissimum</i>	pinyon gayophytum	Onagraceae
<i>Hackelia nervosa</i>	Sierra stickseed	Boraginaceae
<i>Ivesia gordonii</i>	Alpine Ivesia	Rosaceae
<i>Leptodactylon pungens</i>	Granite gilia	Polemoniaceae
<i>Linum lewisii</i>	Western blue flax	Linaceae
<i>Lomatium nevadense</i> var. <i>nevadense</i>	Nevada lomatium	Apiaceae
<i>Lupinus lepidus</i> var. <i>lobbii</i>	Lobb's Lupine	Fabaceae
<i>Lupinus lepidus</i> var. <i>sellulus</i>	dwarf tidy-lupine	Fabaceae
<i>Luzula comosa</i>	Pacific woodrush	Juncaceae
<i>Melica stricta</i>	Nodding melic	Poaceae
<i>Mimulus mephiticus</i>	skunky monkeyflower	Scrophulariaceae
<i>Monardella glauca</i>	grey monardella	Lamiaceae

taxon	common name	family
<i>Penstemon speciosus</i>	Royal Beardtongue	Scrophulariaceae
<i>Phacelia hastata</i> ssp. <i>compacta</i>	Timberline Phacelia	Hydrophyllaceae
<i>Phlox condensate</i>	condensed phlox	Polemoniaceae
<i>Phlox diffusa</i>	spreading phlox	Polemoniaceae
<i>Poa cusickii</i>	Cusick's bluegrass	Poaceae
<i>Poa glauca</i> ssp. <i>rupicola</i>	timberline bluegrass	Poaceae
<i>Polygonum davisiae</i>	Davis' knotweed	Polygonaceae
<i>Pyrrocoma apargioides</i>	alpine pyrrocoma	Asteraceae
<i>Raillardella argentea</i>	silky raillardella	Asteraceae
<i>Raillardella scaposa</i>	green-leaved raillardella	Asteraceae
<i>Ribes montigenum</i>	mountain gooseberry	Grossulariaceae
<i>Senecio canus</i>	woolly groundsel	Asteraceae
<i>Senecio fremontii</i> var. <i>occidentalis</i>	dwarf mountain ragwort	Asteraceae
<i>Stenotus acaulis</i>	stemless mock goldenweed	Asteraceae
<i>Trisetum spicatum</i>	Narrow Oatgrass	Poaceae
<i>Valeriana californica</i>	California valerian	Valerianaceae

Alpine shrub steppe (Holland type 9400, NDDB type 91.160.00)

taxon	common name	family
<i>Arabis puberula</i>	Blue Mountain rock-cress	Brassicaceae
<i>Artemisia ludoviciana</i> ssp. <i>incompta</i>	mountain mugwort	Asteraceae
<i>Artemisia tripartite</i>	threetip sagebrush	Asteraceae
<i>Castilleja applegatei</i> ssp. <i>pallida</i>	Brewer's paintbrush	Scrophulariaceae
<i>Chaenactis douglasii</i> var. <i>douglasii</i>	Douglas' dustymaiden	Asteraceae
<i>Crepis occidentalis</i>	western hawkbeard	Asteraceae
<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Poaceae
<i>Ericameria discoidea</i>	Macronema goldenbush	Asteraceae
<i>Ericameria suffruticosa</i>	Alpine macronema	Asteraceae
<i>Erigeron breweri</i> var. <i>porphyreticus</i>	Brewer's fleabane	Asteraceae
<i>Eriogonum umbellatum</i> var. <i>nevadense</i>	Nevada buckwheat	Polygonaceae
<i>Eriophyllum lanatum</i> var. <i>integrifolium</i>	common woolly sunflower	Asteraceae
<i>Erysimum capitatum</i> ssp. <i>perenne</i>	mountain wallflower	Brassicaceae
<i>Leptodactylon pungens</i>	Granite gilia	Polemoniaceae
<i>Linum lewisii</i>	Western blue flax	Linaceae
<i>Lupinus lepidus</i> var. <i>lobbii</i>	Lobb's Lupine	Fabaceae
<i>Melica stricta</i>	Nodding melic	Poaceae
<i>Monardella glauca</i>	pale monardella	Lamiaceae
<i>Penstemon speciosus</i>	Royal Beardtongue	Scrophulariaceae
<i>Phacelia hastata</i> ssp. <i>compacta</i>	Timberline Phacelia	Hydrophyllaceae
<i>Phlox diffusa</i>	spreading phlox	Polemoniaceae
<i>Poa cusickii</i>	Cusick's bluegrass	Poaceae
<i>Senecio canus</i>	woolly groundsel	Asteraceae
<i>Silene sargentii</i>	Sargent's catchfly	Caryophyllaceae
<i>Wyethia mollis</i>	mountain mule-ears	Asteraceae

Subalpine barrens and bedrock (no Holland type equivalent, NDDB type 89.200.00)

taxon	common name	family
<i>Achillea millefolium</i>	common yarrow	Asteraceae
<i>Achnatherum occidentale</i> ssp. <i>californicum</i>	California needlegrass	Poaceae
<i>Allium obtusum</i>	red Sierra onion	Liliaceae
<i>Antennaria rosea</i>	rose pussytoes	Asteraceae
<i>Antennaria umbrinella</i>	brown pussytoes	Asteraceae
<i>Arabis lyallii</i>	Lyall's rockcress	Brassicaceae
<i>Arenaria kingii</i> var. <i>glabrescens</i>	King's smooth sandwort	Caryophyllaceae
<i>Arnica mollis</i>	cordilleran arnica	Asteraceae
<i>Aster integrifolius</i>	entire-leaved aster	Asteraceae
<i>Barbarea orthoceras</i>	erectpod wintercress	Brassicaceae
<i>Calochortus leichtlinii</i>	Leichtlin's Mariposa Lily	Liliaceae
<i>Calyptidium umbellatum</i>	Pussypaws	Portulacaceae
<i>Carex rossii</i>	Ross' sedge	Cyperaceae
<i>Castilleja nana</i>	dwarf alpine Indian paintbrush	Scrophulariaceae
<i>Cheilanthes gracillima</i>	lace lipfern	Pteridaceae
<i>Cirsium scariosum</i>	elk thistle	Asteraceae
<i>Claytonia lanceolata</i>	western spring beauty	Portulacaceae
<i>Cymopterus terebinthinus</i> var. <i>californicus</i>	turpentine cymopterus	Apiaceae
<i>Cystopteris fragilis</i>	brittle bladderfern	Dryopteridaceae
<i>Danthonia intermedia</i>	timber oatgrass	Poaceae
<i>Draba densifolia</i>	denseleaf draba	Brassicaceae
<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Poaceae
<i>Ericameria suffruticosa</i>	Alpine macronema	Asteraceae
<i>Eriogonum incanum</i>	frosted buckwheat	Polygonaceae
<i>Eriogonum lobbii</i> var. <i>lobbii</i>	Lobb's buckwheat	Polygonaceae
<i>Eriogonum marifolium</i>	Marum-Leaved Buckwheat	Polygonaceae
<i>Eriogonum umbellatum</i> var. <i>nevadense</i>	Nevada buckwheat	Polygonaceae
<i>Eriogonum wrightii</i> var. <i>subscaposum</i>	Wright's buckwheat	Polygonaceae
<i>Eriophyllum lanatum</i> var. <i>integrifolium</i>	common woolly sunflower	Asteraceae
<i>Erysimum capitatum</i> ssp. <i>perenne</i>	mountain wallflower	Brassicaceae
<i>Hackelia micrantha</i>	Small-flowered Stickseed	Boraginaceae
<i>Heuchera micrantha</i> var. <i>erubescens</i>	crevice alumroot	Saxifragaceae
<i>Hieracium horridum</i>	prickly hawkweed	Asteraceae
<i>Holodiscus microphyllus</i> var. <i>microphyllus</i>	little-leaf creambush	Rosaceae
<i>Ivesia gordonii</i>	Alpine Ivesia	Rosaceae
<i>Ivesia santolinoides</i>	Mouse-tail Ivesia	Rosaceae
<i>Juniperus occidentalis</i> var. <i>australis</i>	Sierra western juniper	Cupressaceae
<i>Leptodactylon pungens</i>	Granite gilia	Polemoniaceae
<i>Lewisia pygmaea</i>	alpine lewisia	Portulacaceae
<i>Lomatium nevadense</i> var. <i>nevadense</i>	Nevada lomatium	Apiaceae
<i>Lupinus argenteus</i> var. <i>meionanthus</i>	Lake Tahoe lupine	Fabaceae
<i>Lupinus lepidus</i> var. <i>sellulus</i>	Torrey's Lupine	Fabaceae

taxon	common name	family
<i>Monardella glauca</i>	pale monardella	Lamiaceae
<i>Pellaea bridgesii</i>	Bridges' cliffbrake	Pteridaceae
<i>Penstemon davidsonii</i> var. <i>davidsonii</i>	Davidson's penstemon	Scrophulariaceae
<i>Penstemon heterodoxus</i> var. <i>heterodoxus</i>	Sierra beardtongue	Scrophulariaceae
<i>Penstemon newberryi</i> var. <i>newberryi</i>	Newberry's penstemon	Scrophulariaceae
<i>Phlox condensate</i>	condensed phlox	Polemoniaceae
<i>Phlox diffusa</i>	spreading phlox	Polemoniaceae
<i>Pinus albicaulis</i>	whitebark pine	Pinaceae
<i>Pinus jeffreyi</i>	Jeffrey pine	Pinaceae
<i>Pinus monticola</i>	western white pine	Pinaceae
<i>Poa</i> spp.	ukn bluegrass	Poaceae
<i>Polygonum davisiae</i>	Davis' knotweed	Polygonaceae
<i>Polygonum shastense</i>	Shasta knotweed	Polygonaceae
<i>Potentilla drummondii</i> ssp. <i>breweri</i>	Brewer's potentilla	Rosaceae
<i>Potentilla glandulosa</i> ssp. <i>nevadensis</i>	Nevada cinquefoil	Rosaceae
<i>Raillardella argentea</i>	silky raillardella	Asteraceae
<i>Ribes montigenum</i>	mountain gooseberry	Grossulariaceae
<i>Rumex salicifolius</i> var. <i>denticulatus</i>	toothed willow dock	Polygonaceae
<i>Saxifraga bryophora</i>	bud saxifrage	Saxifragaceae
<i>Sedum lanceolatum</i>	lance-leaf stonecrop	Crassulaceae
<i>Sedum obtusatum</i>	Sierra stonecrop	Crassulaceae
<i>Silene sargentii</i>	Sargent's catchfly	Caryophyllaceae
<i>Stephanomeria spinosa</i>	thorny skeleton-plant	Asteraceae
<i>Streptanthus tortuosus</i> var. <i>orbiculatus</i>	mountain jewelflower	Brassicaceae
<i>Trisetum spicatum</i>	Narrow Oatgrass	Poaceae
<i>Valeriana californica</i>	California valerian	Valerianaceae
<i>Veratrum californicum</i> var. <i>californicum</i>	Western false hellebore	Liliaceae
<i>Viola pinetorum</i>	pine violet	Violaceae

Subalpine western white pine forest (Holland type 86200, NDDB type 87.170.00)

taxon	common name	family
<i>Abies magnifica</i> var. <i>magnifica</i>	California red fir	Pinaceae
<i>Achnatherum occidentale</i> ssp. <i>californicum</i>	California needlegrass	Poaceae
<i>Agoseris glauca</i> var. <i>monticola</i>	pale agoseris	Asteraceae
<i>Alnus incana</i> ssp. <i>tenuifolia</i>	Creek Alder	Betulaceae
<i>Amelanchier pallida</i>	pale serviceberry	Rosaceae
<i>Angelica breweri</i>	Brewer's angelica	Apiaceae
<i>Antennaria rosea</i>	rose pussytoes	Asteraceae
<i>Arabis drummondii</i>	Drummond's rockcress	Brassicaceae
<i>Arabis platysperma</i> var. <i>howellii</i>	Howell's Rockcress	Brassicaceae
<i>Arabis</i> spp.	unkn rockcress	Brassicaceae
<i>Arctostaphylos nevadensis</i>	pinemat manzanita	Ericaceae
<i>Arenaria kingii</i> var. <i>glabrescens</i>	King's smooth sandwort	Caryophyllaceae
<i>Arnica mollis</i>	cordilleran arnica	Asteraceae
<i>Aster breweri</i>	Brewer's aster	Asteraceae
<i>Bromus carinatus</i>	California brome	Poaceae
<i>Calochortus leichtlinii</i>	Leichtlin's Mariposa Lily	Liliaceae
<i>Calyptidium umbellatum</i>	Pussypaws	Portulacaceae
<i>Carex athrostachya</i>	slenderbeak sedge	Cyperaceae
<i>Carex fracta</i>	fragile sheath sedge	Cyperaceae
<i>Carex microptera</i>	smallwing sedge	Cyperaceae
<i>Carex rossii</i>	Ross' sedge	Cyperaceae
<i>Carex stramineiformis</i>	Shasta sedge	Cyperaceae
<i>Castilleja miniata</i>	scarlet paintbrush	Scrophulariaceae
<i>Castilleja nana</i>	dwarf alpine Indian paintbrush	Scrophulariaceae
<i>Castilleja pilosa</i>	pilose paintbrush	Scrophulariaceae
<i>Cheilanthes gracillima</i>	lace lipfern	Pteridaceae
<i>Collinsia parviflora</i>	small-flowered collinsia	Scrophulariaceae
<i>Cryptogramma acrostichoides</i>	American rockbrake	Pteridaceae
<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Poaceae
<i>Epilobium ciliatum</i> ssp. <i>ciliatum</i>	fringed willowherb	Onagraceae
<i>Erigeron coulteri</i>	large mountain fleabane	Asteraceae
<i>Erigeron peregrinus</i> var. <i>callianthemus</i>	wandering fleabane	Asteraceae
<i>Erigeron</i> spp.	unkn fleabane	Asteraceae
<i>Eriogonum incanum</i>	frosted buckwheat	Polygonaceae
<i>Eriogonum marifolium</i>	marumleaf buckwheat	Polygonaceae
<i>Eriogonum nudum</i> var. <i>deductum</i>	naked buckwheat	Polygonaceae
<i>Eriogonum umbellatum</i> var. <i>nevadense</i>	Nevada buckwheat	Polygonaceae
<i>Eriogonum wrightii</i> var. <i>subscaposum</i>	Wright's buckwheat	Polygonaceae
<i>Erysimum capitatum</i> ssp. <i>perenne</i>	mountain wallflower	Brassicaceae
<i>Festuca viridula</i>	mountain bunch-fescue	Poaceae
<i>Gayophytum diffusum</i> ssp. <i>parviflorum</i>	diffuse gayophytum	Onagraceae
<i>Hackelia micrantha</i>	Small-flowered Stickseed	Boraginaceae

taxon	common name	family
<i>Heracleum lanatum</i>	cow parsnip	Apiaceae
<i>Heuchera rubescens</i> var. <i>alpicola</i>	pink alumroot	Saxifragaceae
<i>Hieracium horridum</i>	prickly hawkweed	Asteraceae
<i>Holodiscus microphyllus</i> var. <i>microphyllus</i>	little-leaf creambush	Rosaceae
<i>Hypericum anagalloides</i>	Creeping St. John'swort	Hypericaceae
<i>Juncus chlorocephalus</i>	greenhead rush	Juncaceae
<i>Juncus parryi</i>	Parry's rush	Juncaceae
<i>Juniperus occidentalis</i> var. <i>australis</i>	Sierra western juniper	Cupressaceae
<i>Ligusticum grayi</i>	Gray's licorice-root	Apiaceae
<i>Lomatium dissectum</i> var. <i>multifidum</i>	fern-leaved lomatium	Apiaceae
<i>Lupinus argenteus</i> var. <i>meionanthus</i>	Lake Tahoe lupine	Fabaceae
<i>Lupinus polyphyllus</i> var. <i>burkei</i>	Burke's lupine	Fabaceae
<i>Melica bulbosa</i>	Big oniongrass	Poaceae
<i>Mimulus</i> spp.	unkn monkeyflower	Scrophulariaceae
<i>Minuartia nuttallii</i> ssp. <i>gracilis</i>	Nuttall's sandwort	Caryophyllaceae
<i>Monardella glauca</i>	pale monardella	Lamiaceae
<i>Pedicularis semibarbata</i>	pinewoods lousewort	Scrophulariaceae
<i>Penstemon davidsonii</i> var. <i>davidsonii</i>	Davidson's penstemon	Scrophulariaceae
<i>Penstemon heterodoxus</i> var. <i>heterodoxus</i>	Sierra beardtongue	Scrophulariaceae
<i>Penstemon newberryi</i> var. <i>newberryi</i>	Newberry's penstemon	Scrophulariaceae
<i>Penstemon speciosus</i>	royal penstemon	Scrophulariaceae
<i>Phacelia hydrophylloides</i>	waterleaf phacelia	Hydrophyllaceae
<i>Phlox diffusa</i>	spreading phlox	Polemoniaceae
<i>Pinus contorta</i> ssp. <i>murrayana</i>	lodgepole pine	Pinaceae
<i>Pinus monticola</i>	western white pine	Pinaceae
<i>Poa cusickii</i>	Cusick's bluegrass	Poaceae
<i>Poa nevadensis</i>	Sierra blue grass	Poaceae
<i>Poa</i> spp.	ukn bluegrass	Poaceae
<i>Poa wheeleri</i>	Wheeler's bluegrass	Poaceae
<i>Polygonum davisiae</i>	Davis' knotweed	Polygonaceae
<i>Polygonum shastense</i>	Shasta knotweed	Polygonaceae
<i>Potentilla glandulosa</i> ssp. <i>nevadensis</i>	Nevada cinquefoil	Rosaceae
<i>Prunus emarginata</i>	bitter cherry	Rosaceae
<i>Pteridium aquilinum</i> var. <i>pubescens</i>	bracken-fern	Dennstaedtiaceae
<i>Quercus vaccinifolia</i>	huckleberry oak	Fagaceae
<i>Ranunculus alismifolius</i> var. <i>alismellus</i>	plantainleaf buttercup	Ranunculaceae
<i>Ribes montigenum</i>	mountain gooseberry	Grossulariaceae
<i>Ribes velutinum</i>	desert gooseberry	Grossulariaceae
<i>Salix jepsonii</i>	Jepson's willow	Salicaceae
<i>Salix orestera</i>	Sierra willow	Salicaceae
<i>Sambucus racemosa</i> var. <i>microbotrys</i>	Mountain red elderberry	Caprifoliaceae
<i>Sedum obtusatum</i>	Sierra stonecrop	Crassulaceae
<i>Senecio integerrimus</i> var. <i>exaltatus</i>	Columbia ragwort	Asteraceae

taxon	common name	family
<i>Senecio triangularis</i>	arrowleaf ragwort	Asteraceae
<i>Sidalcea glaucescens</i>	waxy checkermallow	Malvaceae
<i>Spiraea densiflora</i>	mountain spirea	Rosaceae
<i>Streptanthus tortuosus</i> var. <i>orbiculatus</i>	mountain jewelflower	Brassicaceae
<i>Symphoricarpos rotundifolius</i> var. <i>rotundifolius</i>	mountain snowberry	Caprifoliaceae
<i>Thalictrum fendleri</i> var. <i>fendleri</i>	Fendler's meadow-rue	Ranunculaceae
<i>Triteleia ixioides</i> ssp. <i>Anilina</i>	mountain pretty face	Liliaceae
<i>Tsuga mertensiana</i>	mountain hemlock	Pinaceae
<i>Valeriana californica</i>	California valerian	Valerianaceae
<i>Viola pinetorum</i>	pine violet	Violaceae
<i>Wyethia mollis</i>	woolly mule-ears	Asteraceae

Subalpine riparian scrub (Holland type 63500, NDDB type 63.903.00)

taxon	common name	family
<i>Agoseris glauca</i> var. <i>monticola</i>	pale agoseris	Asteraceae
<i>Allium tribracteatum</i>	threebract onion	Liliaceae
<i>Alnus incana</i> ssp. <i>tenuifolia</i>	mountain alder	Betulaceae
<i>Amelanchier pallida</i>	pallid service-berry	Rosaceae
<i>Angelica breweri</i>	Brewer's angelica	Apiaceae
<i>Antennaria rosea</i>	rose pussytoes	Asteraceae
<i>Aquilegia formosa</i>	western columbine	Ranunculaceae
<i>Arabis drummondii</i>	Drummond's rockcress	Brassicaceae
<i>Arctostaphylos nevadensis</i>	pinemat manzanita	Ericaceae
<i>Arnica mollis</i>	cordilleran arnica	Asteraceae
<i>Aster breweri</i>	Brewer's aster	Asteraceae
<i>Athyrium filix-femina</i> var. <i>cyclosum</i>	lady fern	Dryopteridaceae
<i>Bromus carinatus</i>	California brome grass	Poaceae
<i>Calyptidium umbellatum</i>	Pussypaws	Portulacaceae
<i>Carex aquatilis</i>	water sedge	Cyperaceae
<i>Carex athrostachya</i>	slenderbeak sedge	Cyperaceae
<i>Carex fracta</i>	fragile sheath sedge	Cyperaceae
<i>Carex heteroneura</i> var. <i>heteroneura</i>	nerved sedge	Cyperaceae
<i>Carex lanuginosa</i>	woolly sedge	Cyperaceae
<i>Carex praegracilis</i>	clustered field sedge	Cyperaceae
<i>Castilleja applegatei</i> ssp. <i>pallida</i>	wavyleaf Indian paintbrush	Scrophulariaceae
<i>Castilleja miniata</i>	scarlet paintbrush	Scrophulariaceae
<i>Castilleja pilosa</i>	parrothead Indian paintbrush	Scrophulariaceae
<i>Claytonia lanceolata</i>	western spring beauty	Portulacaceae
<i>Cornus sericea</i> ssp. <i>sericea</i>	Creek Dogwood	Cornaceae
<i>Cryptogramma acrostichoides</i>	American parsley fern	Pteridaceae
<i>Cystopteris fragilis</i>	brittle bladder fern	Dryopteridaceae
<i>Delphinium polycladon</i>	mountain marsh larkspur	Ranunculaceae
<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Poaceae
<i>Ericameria suffruticosa</i>	Alpine macronema	Asteraceae
<i>Erigeron coulteri</i>	large mountain fleabane	Asteraceae
<i>Erigeron peregrinus</i> var. <i>callianthemus</i>	wandering fleabane	Asteraceae
<i>Eriogonum nudum</i> var. <i>deductum</i>	naked buckwheat	Polygonaceae
<i>Eriogonum umbellatum</i> var. <i>nevadense</i>	Nevada buckwheat	Polygonaceae
<i>Eriogonum wrightii</i> var. <i>subscaposum</i>	Wright's buckwheat	Polygonaceae
<i>Eriophyllum lanatum</i> var. <i>integrifolium</i>	common woolly sunflower	Asteraceae
<i>Festuca viridula</i>	mountain bunch-fescue	Poaceae
<i>Gayophytum diffusum</i> ssp. <i>parviflorum</i>	spreading groundsmoke	Onagraceae
<i>Hackelia micrantha</i>	Small-flowered Stickseed	Boraginaceae
<i>Hackelia nervosa</i>	Sierra stickseed	Boraginaceae
<i>Heracleum lanatum</i>	cow parsnip	Apiaceae
<i>Heuchera rubescens</i> var. <i>alpicola</i>	pink alumroot	Saxifragaceae

taxon	common name	family
<i>Holodiscus microphyllus</i> var. <i>microphyllus</i>	little-leaf creambush	Rosaceae
<i>Juncus chlorocephalus</i>	greenhead rush	Juncaceae
<i>Kelloggia galioides</i>	milk kelloggia	Rubiaceae
<i>Ledum glandulosum</i>	western Labrador tea	Ericaceae
<i>Leptodactylon pungens</i>	Granite gilia	Polemoniaceae
<i>Linum lewisii</i>	Western blue flax	Linaceae
<i>Lonicera conjugialis</i>	double honeysuckle	Caprifoliaceae
<i>Lupinus polyphyllus</i> var. <i>burkei</i>	Burke's lupine	Fabaceae
<i>Melica bulbosa</i>	Big oniongrass	Poaceae
<i>Mimulus breweri</i>	Brewer's monkeyflower	Scrophulariaceae
<i>Mimulus guttatus</i>	common yellow monkeyflower	Scrophulariaceae
<i>Mimulus leptaleus</i>	slender monkeyflower	Scrophulariaceae
<i>Mitella breweri</i>	Brewer's miterwort	Saxifragaceae
<i>Monardella glauca</i>	pale monardella	Lamiaceae
<i>Penstemon davidsonii</i> var. <i>davidsonii</i>	Davidson's Beardtongue	Scrophulariaceae
<i>Penstemon newberryi</i> var. <i>newberryi</i>	Newberry's penstemon	Scrophulariaceae
<i>Phacelia hydrophylloides</i>	waterleaf phacelia	Hydrophyllaceae
<i>Phlox diffusa</i>	spreading phlox	Polemoniaceae
<i>Pinus contorta</i> ssp. <i>murrayana</i>	lodgepole pine	Pinaceae
<i>Pinus monticola</i>	western white pine	Pinaceae
<i>Poa cusickii</i>	Cusick's bluegrass	Poaceae
<i>Poa keckii</i>	Keck's bluegrass	Poaceae
<i>Poa nevadensis</i>	Sierra blue grass	Poaceae
<i>Poa spp</i>	ukn bluegrass	Poaceae
<i>Poa wheeleri</i>	Wheeler's bluegrass	Poaceae
<i>Polygonum davisiae</i>	Davis' knotweed	Polygonaceae
<i>Potentilla glandulosa</i> ssp. <i>nevadensis</i>	Nevada cinquefoil	Rosaceae
<i>Prunus emarginata</i>	bitter cherry	Rosaceae
<i>Pteridium aquilinum</i> var. <i>pubescens</i>	Western bracken fern	Dennstaedtiaceae
<i>Ranunculus alismifolius</i> var. <i>alismellus</i>	plantainleaf buttercup	Ranunculaceae
<i>Ribes montigenum</i>	mountain gooseberry	Grossulariaceae
<i>Ribes roezlii</i> var. <i>amictum</i>	Sierra gooseberry	Grossulariaceae
<i>Ribes velutinum</i>	desert gooseberry	Grossulariaceae
<i>Salix jepsonii</i>	Jepson's willow	Salicaceae
<i>Salix orestera</i>	Sierra willow	Salicaceae
<i>Sambucus racemosa</i> var. <i>microbotrys</i>	Mountain red elderberry	Caprifoliaceae
<i>Saxifraga aprica</i>	Sierra saxifrage	Saxifragaceae
<i>Sedum lanceolatum</i>	lance-leaf stonecrop	Crassulaceae
<i>Sedum obtusatum</i>	Sierra stonecrop	Crassulaceae
<i>Senecio canus</i>	woolly groundsel	Asteraceae
<i>Senecio triangularis</i>	arrowleaf ragwort	Asteraceae
<i>Sidalcea glaucescens</i>	waxy checkermallow	Malvaceae
<i>Silene invisa</i>	red fir catchfly	Caryophyllaceae

taxon	common name	family
<i>Spiraea densiflora</i>	mountain spirea	Rosaceae
<i>Streptanthus tortuosus</i> var. <i>orbiculatus</i>	mountain jewelflower	Brassicaceae
<i>Symphoricarpos rotundifolius</i> var. <i>rotundifolius</i>	mountain snowberry	Caprifoliaceae
<i>Thalictrum fendleri</i> var. <i>fendleri</i>	Fendler's meadow-rue	Ranunculaceae
<i>Triteleia ixioides</i> ssp. <i>anilina</i>	mountain pretty face	Liliaceae
<i>Veratrum californicum</i> var. <i>californicum</i>	California false hellebore	Liliaceae
<i>Wyethia mollis</i>	woolly mule-ears	Asteraceae

Subalpine meadow (Holland type 45200, NDDB type 45.320.00)

taxon	common name	family
<i>Achnatherum nelsonii</i> ssp. <i>dorei</i>	mountain needlegrass	Poaceae
<i>Agoseris glauca</i> var. <i>monticola</i>	mountain pale agoseris	Asteraceae
<i>Antennaria umbrinella</i>	brown pussytoes	Asteraceae
<i>Arabis</i> spp.	unkn rockcress	Brassicaceae
<i>Arenaria kingii</i> var. <i>glabrescens</i>	King's smooth sandwort	Caryophyllaceae
<i>Arnica mollis</i>	cordilleran arnica	Asteraceae
<i>Aster alpigenus</i> var. <i>andersonii</i>	Alpine Aster	Asteraceae
<i>Aster integrifolius</i>	entire-leaved aster	Asteraceae
<i>Athyrium filix-femina</i> var. <i>cyclosorum</i>	Western Lady Fern	Dryopteridaceae
<i>Barbarea orthoceras</i>	erectpod wintercress	Brassicaceae
<i>Bromus suksdorfii</i>	Suksdorf's Bromegrass	Poaceae
<i>Calamagrostis breweri</i>	shorthair reedgrass	Poaceae
<i>Calyptidium umbellatum</i>	Pussypaws	Portulacaceae
<i>Carex aquatilis</i>	water sedge	Cyperaceae
<i>Carex heteroneura</i> var. <i>heteroneura</i>	vari-nerved sedge	Cyperaceae
<i>Carex luzulaifolia</i>	littleleaf sedge	Cyperaceae
<i>Carex nebrascensis</i>	Nebraska sedge	Cyperaceae
<i>Carex scopulorum</i> var. <i>bracteosa</i>	mountain sedge	Cyperaceae
<i>Carex spectabilis</i>	showy sedge	Cyperaceae
<i>Castilleja applegatei</i> ssp. <i>pallida</i>	wavyleaf Indian paintbrush	Scrophulariaceae
<i>Castilleja nana</i>	dwarf alpine Indian paintbrush	Scrophulariaceae
<i>Claytonia lanceolata</i>	western spring beauty	Portulacaceae
<i>Collinsia parviflora</i>	Few-flowered blue-eyed mary	Scrophulariaceae
<i>Crepis modocensis</i>	Modoc hawksbeard	Asteraceae
<i>Cryptantha</i> spp.	unkn cryptantha	Boraginaceae
<i>Danthonia intermedia</i>	timber oatgrass	Poaceae
<i>Deschampsia elongata</i>	slender hairgrass	Poaceae
<i>Descurainia californica</i>	Sierra tansymustard	Brassicaceae
<i>Dodecatheon alpinum</i>	alpine shootingstar	Primulaceae
<i>Dodecatheon subalpinum</i>	Sierra shootingstar	Primulaceae
<i>Draba albertina</i>	slender draba	Brassicaceae
<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Poaceae
<i>Epilobium oregonense</i>	Oregon willowherb	Onagraceae
<i>Ericameria suffruticosa</i>	Alpine macronema	Asteraceae
<i>Erigeron coulteri</i>	large mountain fleabane	Asteraceae
<i>Erigeron peregrinus</i> var. <i>callianthemus</i>	wandering fleabane	Asteraceae
<i>Eriogonum incanum</i>	frosted buckwheat	Polygonaceae
<i>Eriogonum umbellatum</i> var. <i>nevadense</i>	Nevada buckwheat	Polygonaceae
<i>Eriophyllum lanatum</i> var. <i>integrifolium</i>	common woolly sunflower	Asteraceae
<i>Festuca viridula</i>	mountain bunch-fescue	Poaceae
<i>Gayophytum</i> spp.	unkn gayophytum	Onagraceae
<i>Gnaphalium palustre</i>	western marsh cudweed	Asteraceae

taxon	common name	family
<i>Hackelia micrantha</i>	Small-flowered Stickseed	Boraginaceae
<i>Hackelia nervosa</i>	Sierra stickseed	Boraginaceae
<i>Hypericum anagalloides</i>	Creeping St. John'swort	Hypericaceae
<i>Ivesia gordonii</i>	Gordon's ivesia	Rosaceae
<i>Juncus chlorocephalus</i>	greenhead rush	Juncaceae
<i>Juncus mertensianus</i>	Mertens' rush	Juncaceae
<i>Juncus parryi</i>	Parry's rush	Juncaceae
<i>Ledum glandulosum</i>	western Labrador tea	Ericaceae
<i>Lewisia pygmaea</i>	alpine lewisia	Portulacaceae
<i>Ligusticum grayi</i>	Gray's licorice-root	Apiaceae
<i>Linum lewisii</i>	Western blue flax	Linaceae
<i>Lupinus lepidus</i> var. <i>sellulus</i>	Torrey's Lupine	Fabaceae
<i>Lupinus polyphyllus</i> var. <i>burkei</i>	Burke's lupine	Fabaceae
<i>Luzula comosa</i>	hairy wood rush	Juncaceae
<i>Mimulus floribundus</i>	manyflowered monkeyflower	Scrophulariaceae
<i>Mimulus primuloides</i> ssp. <i>primuloides</i>	primrose monkeyflower	Scrophulariaceae
<i>Minuartia nuttallii</i> ssp. <i>gracilis</i>	Nuttall's sandwort	Caryophyllaceae
<i>Monardella glauca</i>	pale monardella	Lamiaceae
<i>Penstemon heterodoxus</i> var. <i>heterodoxus</i>	Sierra beardtongue	Scrophulariaceae
<i>Phacelia hastata</i> ssp. <i>compacta</i>	compact phacelia	Hydrophyllaceae
<i>Phleum alpinum</i>	mountain timothy	Poaceae
<i>Phlox diffusa</i>	spreading phlox	Polemoniaceae
<i>Phyllodoce breweri</i>	Brewer's mountain-heather	Ericaceae
<i>Pinus contorta</i> ssp. <i>murrayana</i>	lodgepole pine	Pinaceae
<i>Platanthera sparsiflora</i>	sparse-flowered bog orchid	Orchidaceae
<i>Poa cusickii</i>	Cusick's bluegrass	Poaceae
<i>Poa glauca</i> ssp. <i>rupicola</i>	timberline bluegrass	Poaceae
<i>Poa nevadensis</i>	Sierra blue grass	Poaceae
<i>Poa</i> spp.	ukn bluegrass	Poaceae
<i>Polygonum davisiae</i>	Davis' knotweed	Polygonaceae
<i>Polygonum polygaloides</i> ssp. <i>kelloggii</i>	Kellogg's knotweed	Polygonaceae
<i>Potentilla glandulosa</i> ssp. <i>nevadensis</i>	Nevada cinquefoil	Rosaceae
<i>Potentilla gracilis</i> var. <i>fastigiata</i>	slender cinquefoil	Rosaceae
<i>Ranunculus alismifolius</i> var. <i>alismellus</i>	plantainleaf buttercup	Ranunculaceae
<i>Ribes montigenum</i>	mountain gooseberry	Grossulariaceae
<i>Rumex salicifolius</i> var. <i>denticulatus</i>	toothed willow dock	Polygonaceae
<i>Salix jepsonii</i>	Jepson's willow	Salicaceae
<i>Salix orestera</i>	Sierra willow	Salicaceae
<i>Sambucus racemosa</i> var. <i>microbotrys</i>	Mountain red elderberry	Caprifoliaceae
<i>Saxifraga aprica</i>	Sierra saxifrage	Saxifragaceae
<i>Saxifraga bryophora</i>	bud saxifrage	Saxifragaceae
<i>Saxifraga odontoloma</i>	brook saxifrage	Saxifragaceae
<i>Senecio fremontii</i> var. <i>occidentalis</i>	Fremont's groundsel	Asteraceae

taxon	common name	family
<i>Senecio triangularis</i>	arrowleaf ragwort	Asteraceae
<i>Sibbaldia procumbens</i>	creeping sibbaldia	Rosaceae
<i>Sidalcea glaucescens</i>	waxy checkermallow	Malvaceae
<i>Silene sargentii</i>	Sargent's catchfly	Caryophyllaceae
<i>Smilacina racemosa</i>	Western Solomon's Seal	Liliaceae
<i>Swertia radiata</i>	Giant Frasera	Gentianaceae
<i>Thalictrum fendleri</i> var. <i>fendleri</i>	Fendler's meadow-rue	Ranunculaceae
<i>Trifolium longipes</i>	longstalk clover	Fabaceae
<i>Trisetum spicatum</i>	Narrow Oatgrass	Poaceae
<i>Vaccinium caespitosum</i>	dwarf bilberry	Ericaceae
<i>Valeriana californica</i>	California valerian	Valerianaceae
<i>Veratrum californicum</i> var. <i>californicum</i>	California false hellebore	Liliaceae
<i>Veronica wormskjoldii</i>	American alpine speedwell	Scrophulariaceae
<i>Viola pinetorum</i>	pine violet	Violaceae

APPENDIX C: Potential wildlife list of Snow Canyon RNA (Compiled by Eldorado National Forest)

Amphibians

scientific name	common name
<i>Ambystoma macrodactylum</i>	Long-toed salamander
<i>Bufo boreas</i>	Western toad
<i>Bufo canorus</i>	Yosemite toad
<i>Ensatina eschscholtzii</i>	Ensatina
<i>Hyla regilla</i>	Pacific treefrog
<i>Rana muscosa</i>	Mountain yellow-legged frog

Reptiles

scientific name	common name
<i>Charina bottae</i>	Rubber boa
<i>Crotalus viridis</i>	Western rattlesnake
<i>Gerrhonotus coeruleus</i>	
<i>Sceloporus graciosus</i>	Sagebrush lizard
<i>Sceloporus occidentalis</i>	Western fence lizard
<i>Thamnophis elegans</i>	Western terrestrial garter snake

Birds

scientific name	common name
<i>Accipiter gentilis</i>	Northern Goshawk
<i>Accipiter striatus</i>	Sharp-shinned Hawk
<i>Actitis macularia</i>	Spotted Sandpiper
<i>Aegolius acadicus</i>	Northern Saw-whet Owl
<i>Aeronautes saxatalis</i>	White-throated Swift
<i>Anthus spinoletta</i>	Water Pipit
<i>Aquila Chrysaetos</i>	Golden Eagle
<i>Buteo jamaicensis</i>	Red-tailed Hawk
<i>Carduelis pinus</i>	Pine Siskin
<i>Carduelis psaltria</i>	Lesser Goldfinch
<i>Carpodacus cassinii</i>	Cassin's Finch
<i>Catharus guttatus</i>	Hermit Thrush
<i>Certhia Americana</i>	Brown Creeper
<i>Ceryle alcyon</i>	Belted Kingfisher
<i>Charadrius vociferus</i>	Killdeer
<i>Chordeiles minor</i>	Common Nighthawk
<i>Cinclus mexicanus</i>	American Dipper
<i>Columba fasciata</i>	Band-tailed Pigeon
<i>Contopus borealis</i>	Olive-sided Flycatcher
<i>Contopus sordidulus</i>	Western Wood-Pewee
<i>Corvus corax</i>	Common Raven

scientific name	common name
<i>Cyanocitta stelleri</i>	Stellar's Jay
<i>Dendragapus obscurus fuliginosus</i>	Blue Grouse
<i>Dendroica coronata</i>	Yellow-rumped Warbler
<i>Dendroica petechia</i>	Yellow Warbler
<i>Dendroica townsendi</i>	Townsend's Warbler
<i>Dryocopus pileatus</i>	Pileated Woodpecker
<i>Empidonax difficilis</i>	Western Flycatcher
<i>Empidonax hammondii</i>	Hammond's Flycatcher
<i>Empidonax oberholseri</i>	Dusky Flycatcher
<i>Empidonax traillii</i>	Willow Flycatcher
<i>Euphagus cyanocephalus</i>	Brewer's Blackbird
<i>Falco mexicanus</i>	Prairie Falcon
<i>Falco peregrinus anatum</i>	Peregrine Falcon
<i>Falco sparverius</i>	American Kestrel
<i>Gallinago gallinago</i>	Common Snipe
<i>Haliaeetus leucocephalus</i>	Bald Eagle
<i>Ixoreus naevius</i>	Varied Thrush
<i>Junco hyemalis</i>	Dark-eyed Junco
<i>Leucosticte tephrocotis</i>	Gray-crowned Rosey Finch
<i>Loxia curvirostra</i>	Red Crossbill
<i>Melospiza lincolnii</i>	Lincoln's Sparrow
<i>Molothrus ater</i>	Brown-headed Cowbird
<i>Myadestes townsendi</i>	Townsend's Solitaire
<i>Nucifraga columbiana</i>	Clark's Nutcracker
<i>Oreortyx pictus</i>	Mountain Quail
<i>Otus flammeolus</i>	Flammulated Owl
<i>Parus gambeli</i>	Mountain Chickadee
<i>Passerina amoena</i>	Lazuli Bunting
<i>Phalaenoptilus nuttallii</i>	Common Poorwill
<i>Pica pica</i>	Black-billed Magpie
<i>Picoides arcticus</i>	Black-backed Three-toed Woodpecker
<i>Picoides villosus</i>	Hairy Woodpecker
<i>Pinacola enucleator</i>	Pine Grosbeak
<i>Pipilo chlorurus</i>	Green-tailed Towhee
<i>Regulus calendula</i>	Ruby-crowned Kinglet
<i>Regulus satrapa</i>	Golden-crowned Kinglet
<i>Selasphorus rufus</i>	Rufous Hummingbird
<i>Selasphorus sasin</i>	Allen's Hummingbird
<i>Sialis currucoides</i>	Mountain Bluebird
<i>Sitta canadensis</i>	Red-breasted Nuthatch
<i>Sitta carolinensis</i>	White-breasted Nuthatch
<i>Sitta pygmaea</i>	Pygmy Nuthatch
<i>Sphyrapicus throideus</i>	Williamson's Sapsucker

scientific name	common name
<i>Spizella breweri</i>	Brewer's Sparrow
<i>Spizella passerina</i>	Chipping Sparrow
<i>Stellula calliope</i>	Calliope Hummingbird
<i>Strix nebulosa</i>	Great Gray Owl
<i>Tachycineta bicolor</i>	Tree Swallow
<i>Tachycineta thalassina</i>	Violet-green Swallow
<i>Troglodytes aedon</i>	House Wren
<i>Troglodytes troglodytes</i>	Winter Wren
<i>Turdus migratorius</i>	American Robin
<i>Vermivora ruficapilla</i>	Nashville Warbler
<i>Wilsonia pusilla</i>	Wilson's Warbler
<i>Zenaida macroura</i>	Mourning Dove
<i>Zonotrichia leucophrys</i>	White-crowned Sparrow

Mammals

scientific name	common name
<i>Aplodontia rufa</i>	Mountain beaver
<i>Canis latrans</i>	Coyote
<i>Castor Canadensis</i>	American beaver
<i>Eptesicus fuscus</i>	Big brown bat
<i>Erethizon dorsatum</i>	North American Porcupine
<i>Felix concolor</i>	Mountain lion
<i>Glaucomys sabrinus</i>	Northern flying squirrel
<i>Gulo gulo</i>	Wolverine
<i>Lasionycteris noctivagans</i>	Silver-haired bat
<i>Lasiurus cinereus</i>	Hoary bat
<i>Lepus americanus</i>	Snowshoe hare
<i>Lepus californicus</i>	Black-tailed jack rabbit
<i>Lepus townsendi</i>	White-tailed jack rabbit
<i>Lutra Canadensis</i>	River otter
<i>Lynx rufus</i>	Bobcat
<i>Marmota flaviventris</i>	Yellow-bellied marmot
<i>Martes americana</i>	American marten
<i>Martes pennanti</i>	Fisher
<i>Microtus longicaudus</i>	Long-tailed vole
<i>Microtus montanus</i>	Montane vole
<i>Mustela erminea</i>	Ermine
<i>Mustela frenata</i>	Long-tailed weasel
<i>Mustela vison</i>	American mink
<i>Myotis californicus</i>	California myotis
<i>Myotis evotis</i>	Long-eared myotis
<i>Myotis lucifugus</i>	Little brown myotis
<i>Myotis thysanodes</i>	Fringed myotis

scientific name	common name
<i>Myotis volans</i>	Long-legged myotis
<i>Myotis yumanensis</i>	Yuma myotis
<i>Neotoma cinerea</i>	Bushy-tailed woodrat
<i>Ochotona princeps</i>	American pika
<i>Odocoileus hemionus</i>	Mule deer
<i>Ondatra zibethicus</i>	Muskrat
<i>Peromyscus maniculatus</i>	Deer mouse
<i>Phenacomys intermedius</i>	Heather vole
<i>Procyon lotor</i>	Common Raccoon
<i>Reithrodontomys megalotis</i>	Western harvest mouse
<i>Scapanus latimanus</i>	Broad-footed mole
<i>Sciurus griseus</i>	Western gray squirrel
<i>Sorex monticolus</i>	Dusky shrew
<i>Sorex palustris</i>	American water shrew
<i>Sorex vagrans</i>	Vagrant shrew
<i>Spermophilus beecheyi</i>	California ground squirrel
<i>Spermophilus beldingi</i>	Belding's ground squirrel
<i>Spermophilus lateralis</i>	Golden-mantled ground squirrel
<i>Tamiasciurus douglasii</i>	Douglas' squirrel
<i>Tamias alpinus</i>	Alpine chipmunk
<i>Tamias amoenus</i>	Yellow pine chipmunk
<i>Tamias quadrimaculatus</i>	Long-eared chipmunk
<i>Tamias senex</i>	Allen's chipmunk
<i>Tamias speciosus</i>	Lodgepole chipmunk
<i>Taxidea taxus</i>	American badger
<i>Thomomys bottae</i>	Botta's pocket gopher
<i>Thomomys monticola</i>	Mountain pocket gopher
<i>Urocyon cinereoargenteus</i>	Gray fox
<i>Ursus americanus</i>	American black bear
<i>Vulpes vulpes necator</i>	Red fox (Sierra Nevada)
<i>Zapus princeps</i>	Western jumping mouse

Appendix D: Soil descriptions excerpts from Soil Survey, Eldorado National Forest,
California (Mitchell and Silverman 1985)