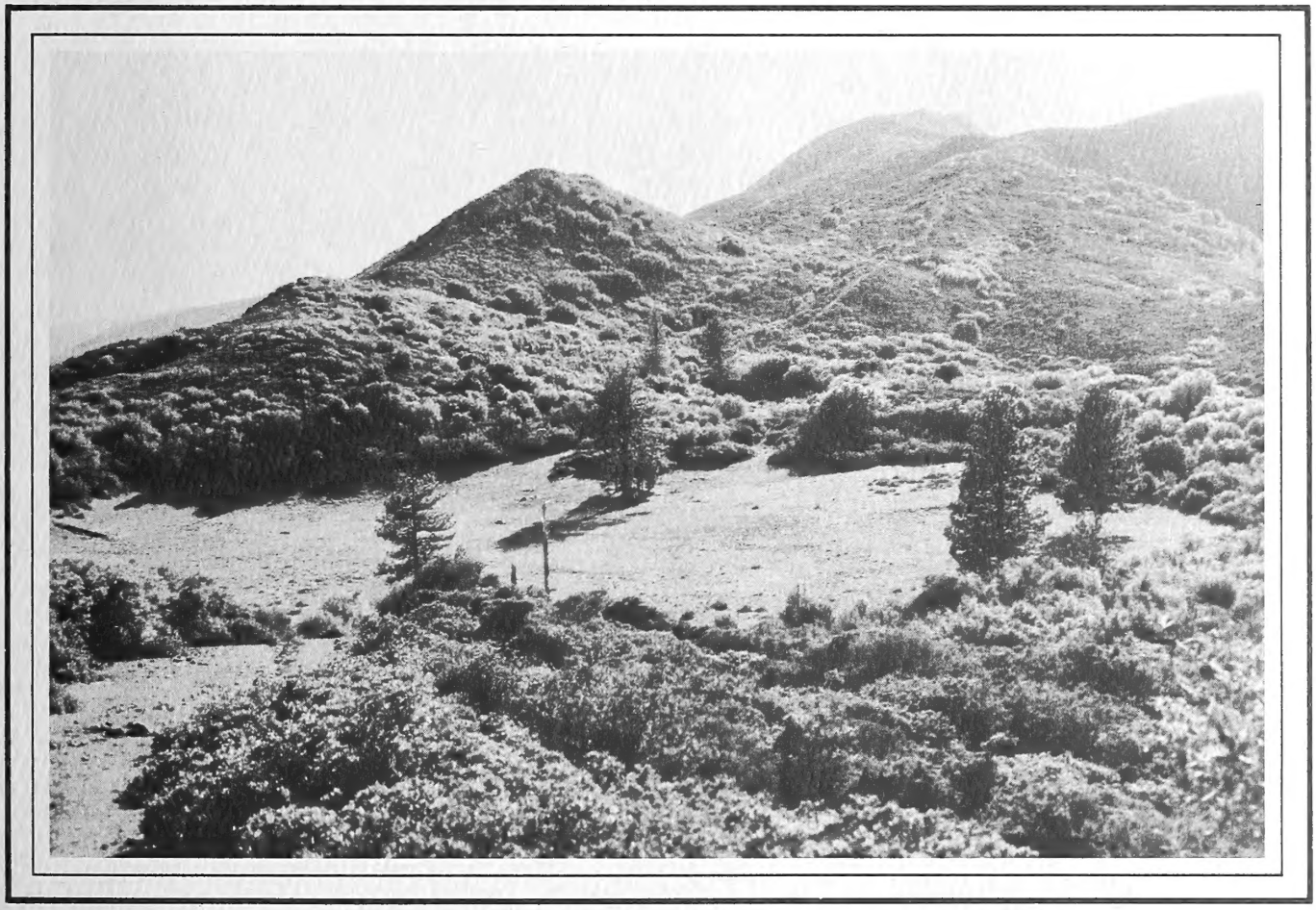
A FLORA OF DRY LAKES RIDGE

Ventura County, California

David L. Magney



The Herbarium
Department of Biological Sciences
University of California, Santa Barbara
Publication Number 5
1986

Cover: VIEW OF BASIN 3, WESTWARD FROM WEST OF BASIN 2B. Ponderosa Pines are scattered throughout the basins on the summit of Dry Lakes Ridge. This basin is dominated by Cismontane Native Grassland, which is surrounded by Canyon Oak Forest. Manzanita Chaparral occurs in surrounding areas of shallow soil and steep slopes.

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F O R E W O R D

Manuscripts accepted for presentation in the Publication Series of the Herbarium, Department of Biological Sciences, University of California, Santa Barbara, include primarily those with a floristic emphasis and those for which voucher specimens are deposited at UCSB. This endeavor is consistant with the goals of the UCSB Herbarium, summarized as follows: 1) to maintain a botanical collections repository; 2) to provide educational programs; 3) to provide botanical services; 4) to function as a research facility within the Department of Biological Sciences.

UCSB Herbarium Publication Number 5, A Flora of Dry Lakes Ridge, Ventura County, California, is a product of research conducted by a herbarium staff member. This work was originally compiled for a senior thesis as part of the requirements for a degree in Environmental Studies at UCSB. The study was conducted over a period of three and a half years. Funding for this publication was provided in part by the California Native Plant Society, Channel Islands Chapter, the Ojai Wilderness Institute, and additional extramural funds raised by the UCSB Herbarium.

Wayne R. Ferren, Jr.

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PURPOSE

The objective of this investigation was to provide an assessment of the botanical resources of Dry Lakes Ridge. Relative to this objective I present herein: 1) background information on the physical environment of the study area; 2) description, classification, and map of the vegetation; 3) an interpretation of the floristic history of the study area; 4) an inventory of the vascular plants and an annotated catalogue of the taxa; 5) identification of the botanical resources (vegetation or species) of special concern; 6) analysis of the environmental sensitivity of the botanical resources and their habitats; and 7) recommendations for management procedures.

METHODS

Information on the physical environment of the study area was obtained from review of pertinent literature, documents, and aerial photographs. Soil samples were analyzed for soil texture, pH, and nutrient availability. Soil texture was determined by the fruit jar method (measurement of relative amounts of sand, silt, and clay following settling in an aqueous solution). Soil pH was determined using an hydrometer. Nutrient availability for nitrogen, phosphorus, and potassium was determined with a La Mott test kit. Climatic data were collected for Dry Lakes Ridge by placement of two storage-type rain gauges and a maximum/minimum thermometer along the summit of the study area and measured for approximately one year, from 15 January 1983 through 20 March 1984 for rainfall and June 1985 for temperature. These data were compared with precipitation records

from surrounding stations provided by the Ventura County Flood Control District. The major habitat types also were identified during field work.

A base map of the study area was drawn from an aerial infrared transparency using a Map-O-Graph at the UCSB Geography Department Cartography Lab. The transparency for the base map was obtained from the Ventura County Flood Control District (March 1979). Topographic maps of the study area were redrawn from USGS Wheeler Springs and Lion Canyon Quadrangles.

The botanical resources were investigated for four years during approximately 100 trips to the study area. These trips were conducted during every month of each year, but more frequently during the spring months. The vegetation was mapped initially from an enlargement of the prefire aerial photograph. Boundaries of the plant communities were checked in the field, at which time the dominant and characteristic species were determined visually. Plant communities were classified using Cheatham and Haller (1975) for the upland vegetation and Cowardin et al. (1979) for the wetland vegetation. Voucher specimens for the vascular flora were collected and deposited in the UCSB Herbarium. Information on the occurrence, abundance, habitats, plant communities, and associated species for each taxon was recorded, and an annotated catalogue of the plants was prepared.

An analysis of the vegetation of the easternmost basin (Basin 1A/B) was conducted during the Spring of 1983 and the plots were classified utilizing TWINSPAN and DECORANA computer programs. A 30 meter grid pattern was surveyed and staked using a survey compass and a 30 meter tape. Deviations from equidistant survey points were necessary at the basin perimeters. A total of 21 permanent 10 meter line transects were located systematically at 30, 25, and 20

meter intervals depending on topography and/or Chaparral growth. Each 10 meter line transect was oriented north from marked transect points. Only the Great Basin Sagebrush and Cismonane Native Grassland communities were sampled in this manner. Percent cover, frequency, and diversity of plants and soil temperature were measured at each transect.

Botanical resources of special concern, including both plant communities and taxa, were identified and described for the study area. This information was utilized to aid in the analysis of the environmental sensitivity of the study area.

P H Y S I C A L E N V I R O N M E N T

LOCATION AND TOPOGRAPHY

Dry Lakes Ridge is located in the Transverse Ranges in northern Ventura County, California (Fig. 1). It lies entirely within the Ojai Ranger District of the Los Padres National Forest at 34°32'30"N Latitude, 119°16'00"W Longitude; more specifically, it occurs in Sections 1, 2, and 3 of T5N R23W of the San Bernardino Meridian on the Wheeler Springs Quadrangle (Fig. 2).

Dry Lakes Ridge, like most ridges in the Transverse Ranges, has an east-west axis. The ridge is at the headwaters of the North Fork of Matilija Creek, which drains southward to the Ventura River. Its north flank is drained by Sespe Creek, which flows eastward at this point, later to turn south and draining into the Santa Clara River at Fillmore (Fig. 1).

The north and south slopes of the ridge are steep, angling 60° or more in many areas. The topography exhibited at the summit is unusual in that there are four depressions (henceforth referred to as basins) or "dry lakes" located there. These basins are numbered 1 through 4, east to west, of which the two easternmost basins are further divided into subunits designated by A, B or C. The highest point on the ridge is 4854 ft. (1480 m). The relief ranges 2500 ft. (762 m) in the study area and fluctuates approximately 350 ft. (107 m) locally at the summit (Fig. 3).

Pine Mountain occurs to the north of Dry Lakes Ridge and is dominated by Reyes and Haddock Peaks, 7510 ft. (2289 m) and 7206 ft. (2196 m) in elevation, repectively. Located to the southeast are, from west to east, Nordhoff Ridge with

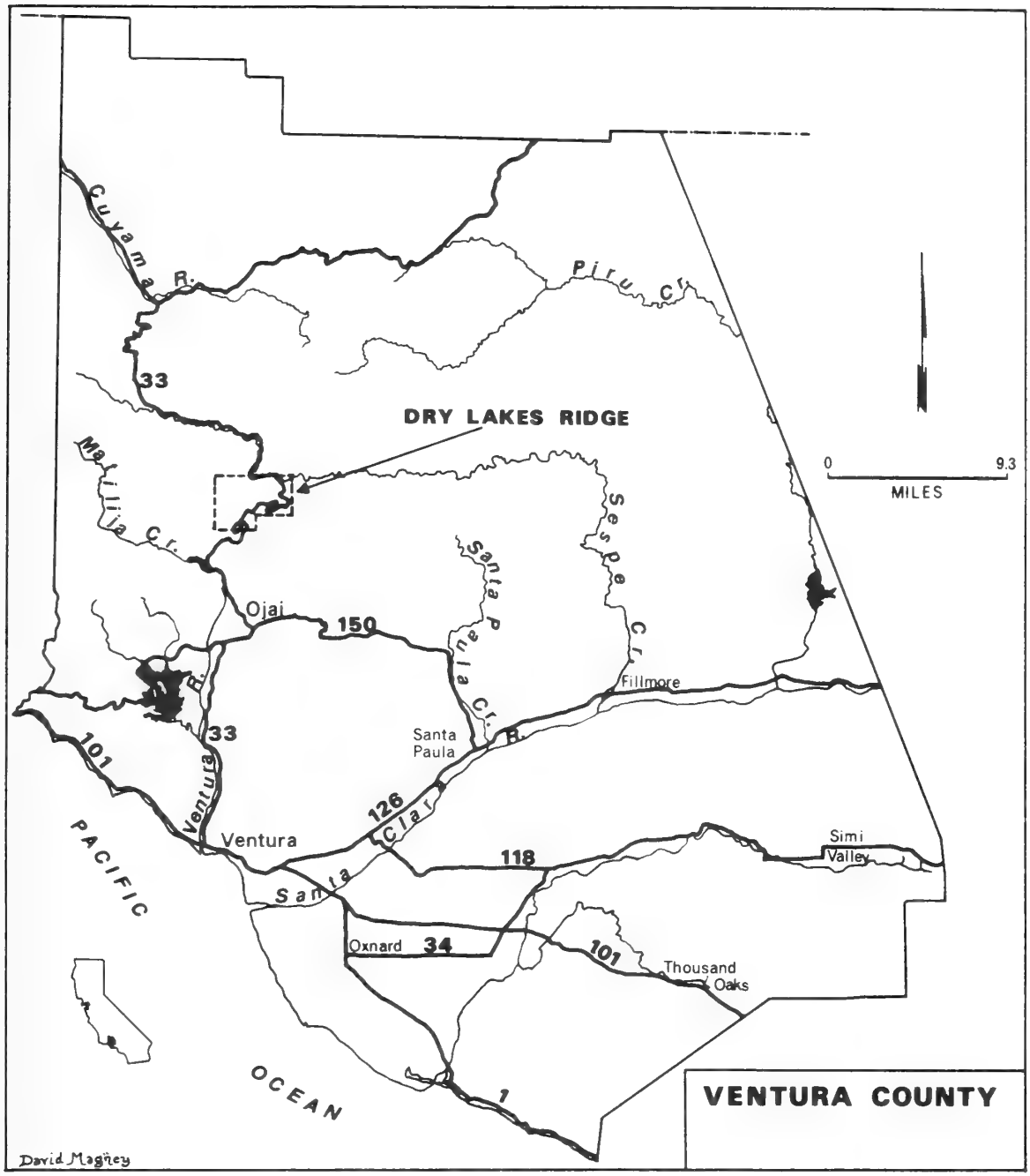

Fig. 1. INDEX MAP OF DRY LAKES RIDGE.

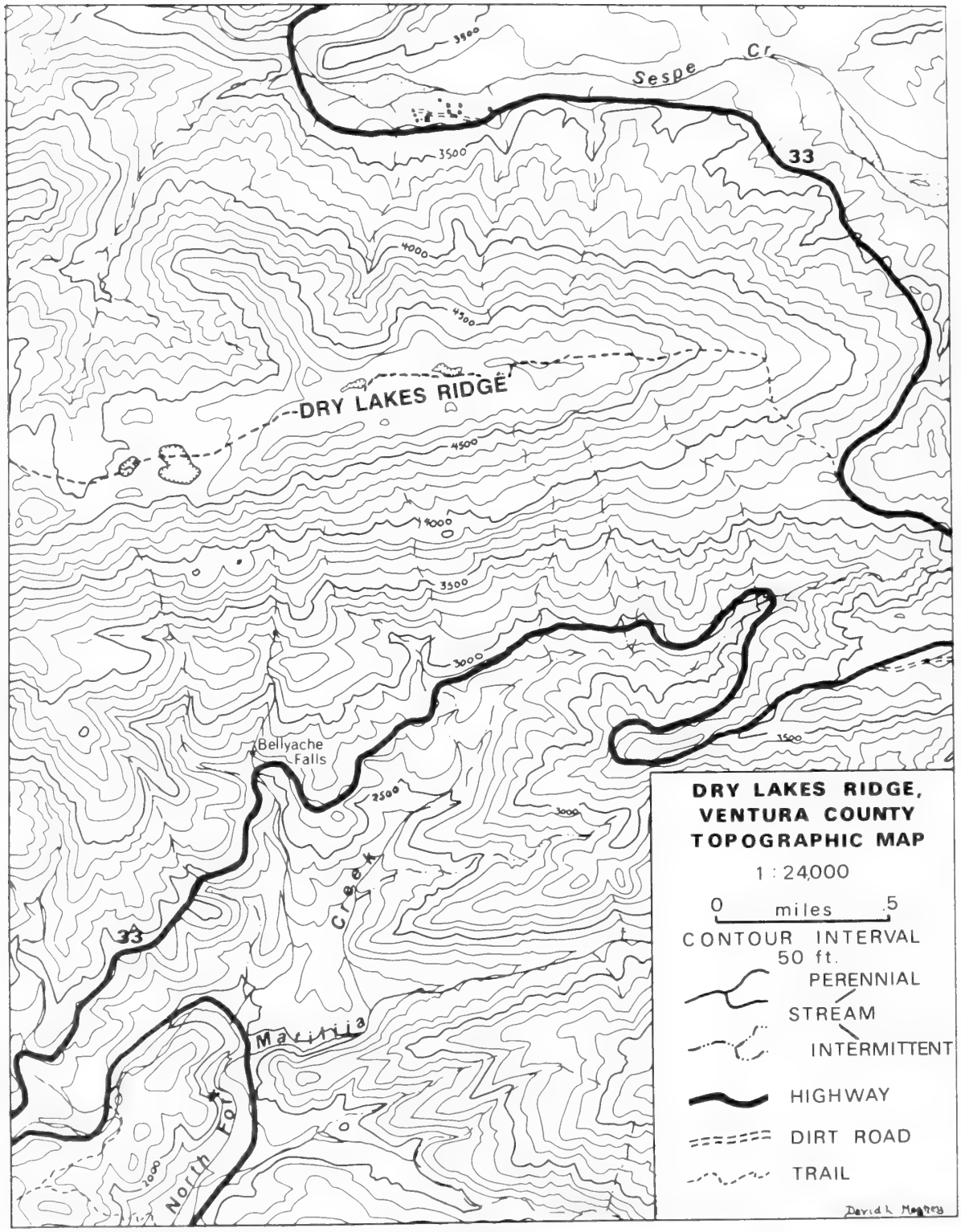

Fig 2. TOPOGRAPHIC MAP OF DRY LAKES RIDGE, WHEELER SPRINGS QUADRANGLE.

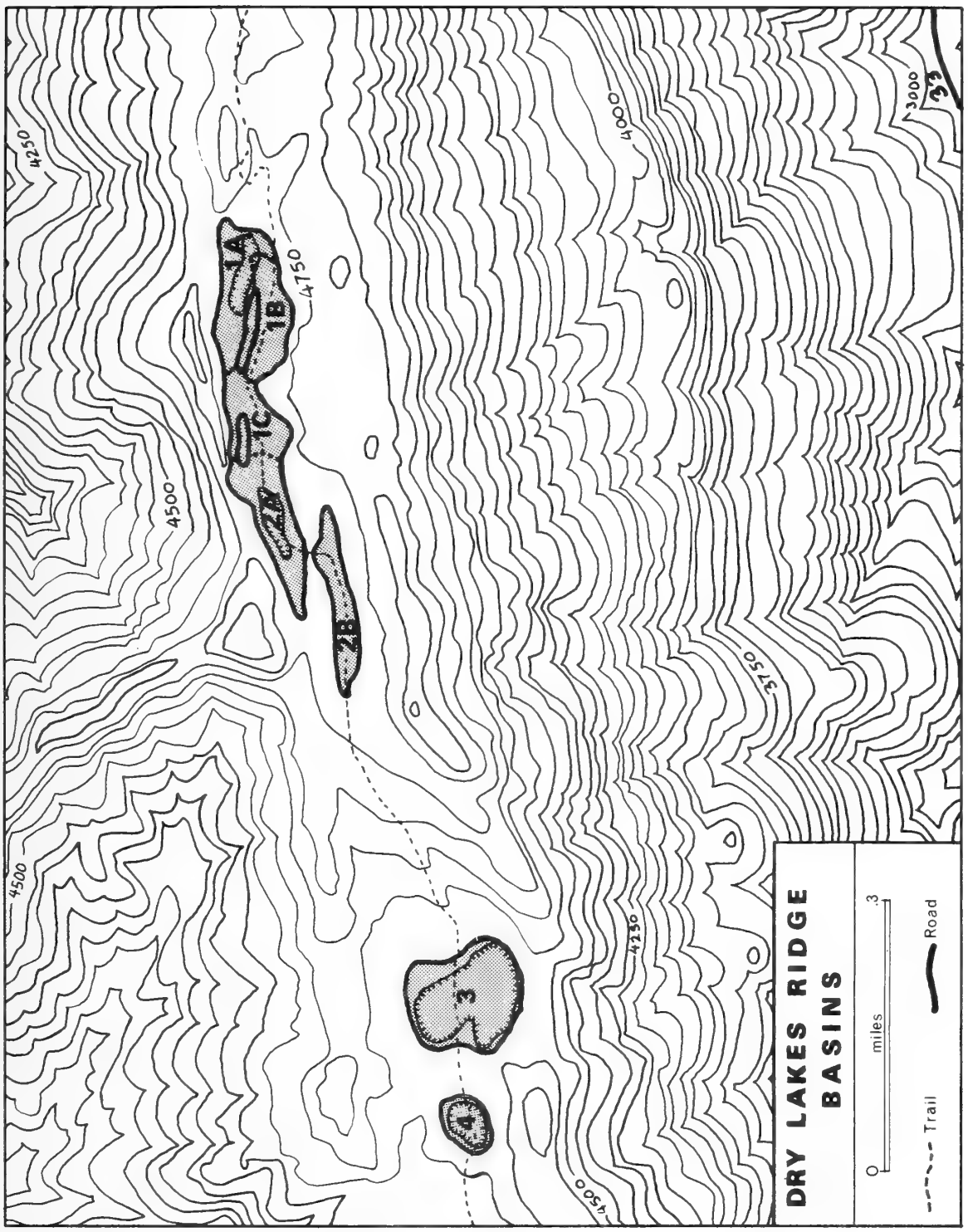

Fig. 3. ENLARGED TOPOGRAPHIC MAP INDICATING BASINS.

Nordhoff and Chief Peaks at 4477 ft. (1365 m) and 5526 ft. (1684 m), and the Topatopa Mountains with Hines, Topatopa and Devils Heart Peaks at 6704 ft. (2043 m), 6210 ft. (1893 m), and 5203 ft. (1586 m), respectively. White Ledge Peak occurs to the southwest in the Santa Ynez Mountains at 4640 ft. (1414 m); Ortega Hill occurs to the west northwest at 5650 ft. (1722 m).

Access to Dry Lakes Ridge is obtained by foot from two directions: one from the east via a bulldozed firebreak from Highway 33 (formerly Highway 399), approximately one mile north of the Rose Valley/Piedra Blanca Road, at mile marker 26.99, (USFS Road 6N31.3), or from the west via the same firebreak/trail from Ortega Hill, which connects with USFS Trail 23W08. A trail from Tule Creek at Highway 33 connects with the aforementioned firebreak west of Dry Lakes Ridge. None of these firebreaks are indicated on topographic or Forest Service recreation maps, but portions are visible on the ground and on aerial photographs.

CLIMATE

The overall climate for Dry Lakes Ridge area is the Mediterranean type, with wet winters, dry summers and relatively mild winter temperatures. Summer thundershower activity is negligible in adding to the total precipitation, but the occurrence is evident from lightning scars on many of the older Ponderosa Pines.

Snowfalls are fairly common, but rarely accumulate. I have seen snow drifts up to 6 inches; however, these do not last for more than a few days. I have collected meterological data, including precipitation amounts and temperature information, from 15 January 1983 through 20 March 1984 (Table 1), after which time a resident Black Bear disturbed both rain gauges. Temperature data continued to be acquired until June 1985, after which the thermometer was destroyed in the Wheeler Fire of July 1-19, 1985. Additional data were used from nearby meteorolgical stations (Piedra Blanca, Ortega Hill, Pine Mountain, Matilija Canyon, and others) of the Ventura County Flood Control District.

The average annual precipitation for Dry Lakes Ridge is estimated from the above gauges to be 30" and 32" (76.2 cm and 81.3 cm) (VCFCD, 1978; Fig. 4). A storage type rain gauge was stationed in Basin 1A and another in Basin 3. Total rainfall for the 1983 season was 44.0" (1117.6 mm) in Basin 1A at 4700 ft. (1433 m) and 45.8" (1163.3 mm) in Basin 3 at 4500 ft. (1372 m) from January 15 to August 31, 1983. Considerable rainfall also occurred during Fall 1982 but was not recorded at the site because the gauges were not installed until January 15, 1983. The '82-'83 season was an anomalous year for precipitation in southern California, far exceeding the average amount. Figure 5 is a climatograph in which data from the site and surrounding stations were used to determine mean monthly average temperature and mean month-

TABLE 1. METEOROLOGICAL DATA LOG FOR DRY LAKES RIDGE. Data collected from 15 January 1983 thru 1 June 1985. Temperature in °F; precipitation in inches. Numbers represent interval between readings. Key: clr= clear; cld= cloudy; hcl= high clouds; pcl= partially cloudy; fog= foggy (locally); wnd= windy; brz= breezy; sno= snowing; rai= raining; hai= hailing.

	TEMPERATURE						PRECIPITATION			
							GAUGE #1		GAUGE #2	
DATE	HI	LO	MEAN	RA	TIME	WEATHER	READ	TOT	READ	TOT
01-18-83	70	28	49	42	1430	fog	01.0	00.0	01.0	00.0
01-30-83	50	25	37.5	25	1130	clr	12.5	11.5	13.2	12.1
02-04-83	48	22	35	26	1030	cld/wnd/sno	13.1	12.1	13.9	12.9
02-11-83	59	29	44	30	1205	hcl/brz	13.1	12.1	13.9	12.9
02-13-83	60	33	46.5	27	1151	clr/brz	15.8	14.8	16.8	15.8
02-20-83	74	32	53	42	1130	hcl/brz	15.8	14.8	00.6	15.8
02-28-83	68	30	49	38	1230	cld/wnd/rai	22.5	21.5	07.3	22.5
03-16-83	70	30	50	40	1730	cld/rai	11.2	32.2	19.1	34.3
03-24-83	56	27	41.5	29	1215	cld/sno/hai	14.8	35.8	22.8	38.0
04-04-83	79	29	54	50	1230	clr/wnd	15.1	36.1	00.8	38.3
04-09-83	71	29	50	42	1430	fog/wnd	15.2	36.2	01.0	38.5
04-21-83	68	27	47.5	41	1255	fog/cld	20.9	41.9	06.6	43.6
04-26-83	60	28	44	32	1540	fog	21.0	42.0		
05-03-83	68	31	49.5	37	1730	clr/brz	02.3	44.0	08.8	45.8
05-12-83	75	31	53	44	1815	pcl	Trace		Trace	
05-15-83	72	40	56	32	1250	clr/brz				
05-17-83	74	43	58.5	31	1622	clr/brz				
05-25-83	88	40	64	48	1426	clr/brz				
05-26-83	88	67	75.5	21	1424	pcl				
05-30-83	89	46	67.5	43	1426	clr/brz	02.3	44.0	08.8	45.8
08-06-83							Trace		Trace	
08-13-83	89	50	69.5	39	1310	pcl/brz				
08-21-83	86	45	65.5	41	1334	cld/brz	03.4	45.1	10.4	47.4
08-30-83							Trace		Trace	
09-13-83	91	47	69	44	1224	clr/brz	03.5	45.2	10.5	47.5
09-25-83	87	39	63	48	1434	hcl/wnd				
End of '82-83 season, begin of '83-84 season.										
10-09-83	72	37	54.5	35	1900	fog/cld	09.9	05.4	record	
11-13-83	75	35	55	40	1200	fog/clr/brz	12.1	07.6	disturbed	
11-27-83	55	29	42	26	1122	clr/brz	13.8	09.3		
01-15-84	61	22	41.5	39	1???	clr/brz	????	????		
03-20-84	80	35	57.5	45	1???	clr/wnd	record disturbed			
04-23-84	82	33	57.5	49	1606	clr/brz				
05-06-84	80	37	58.5	43	1410	clr/brz				
06-30-84	89	46	67.5	43	1???	clr				
10-17-84	78	31	54.5	47	1???	clr/brz	rain on 10-16			
06-01-85	84	31	57.5	53	1630	clr/brz				
07-02-85	Wheeler Fire destroyed thermometer									

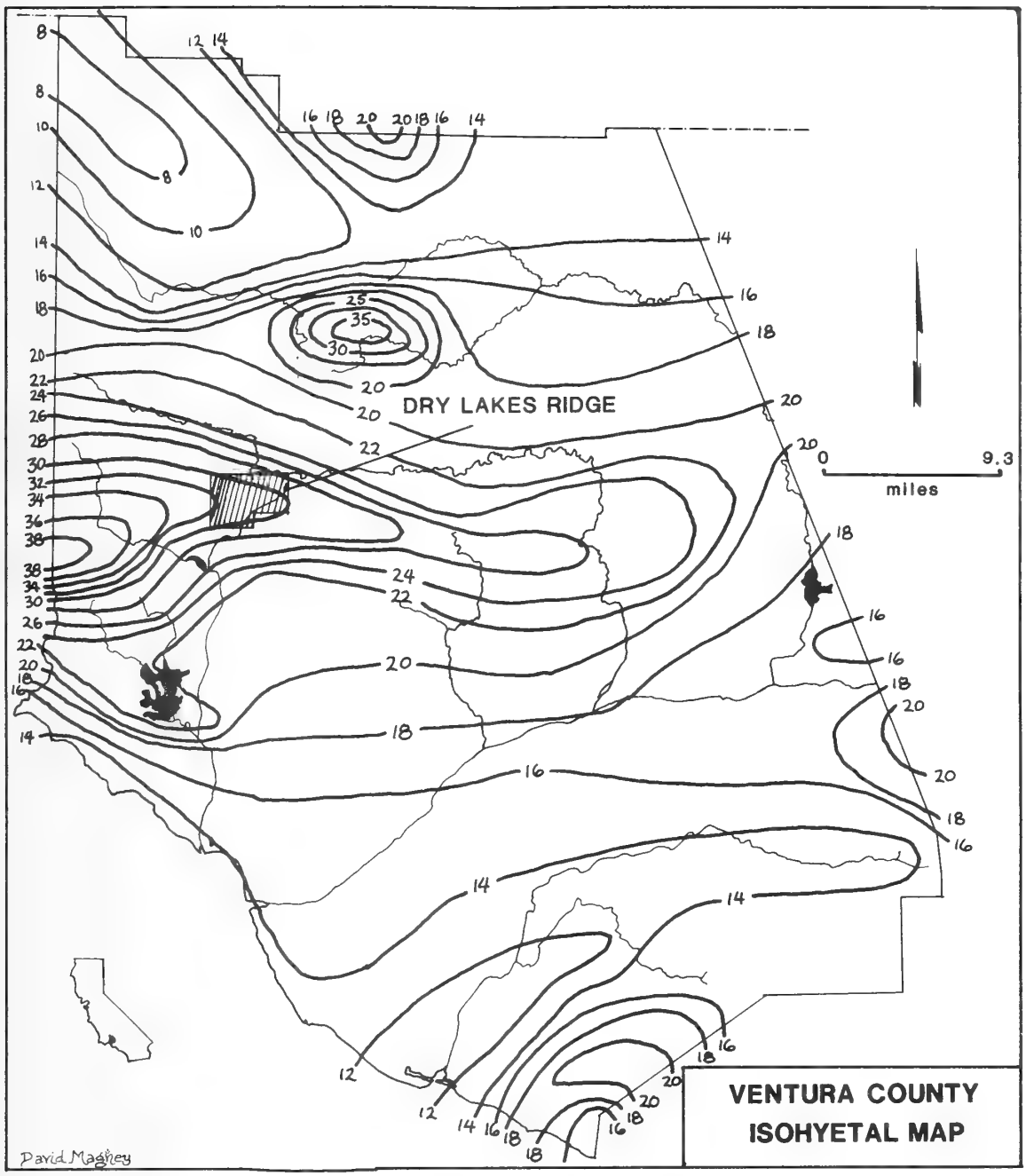

Fig. 4. ISOHYETAL MAP OF VENTURA COUNTY. Precipitation amounts from numerous rain gauge stations were averaged over a 38 year period to produce an average rainfall distribution pattern. (Redrawn from VCFCD, 1978). Precipitation measured in inches.

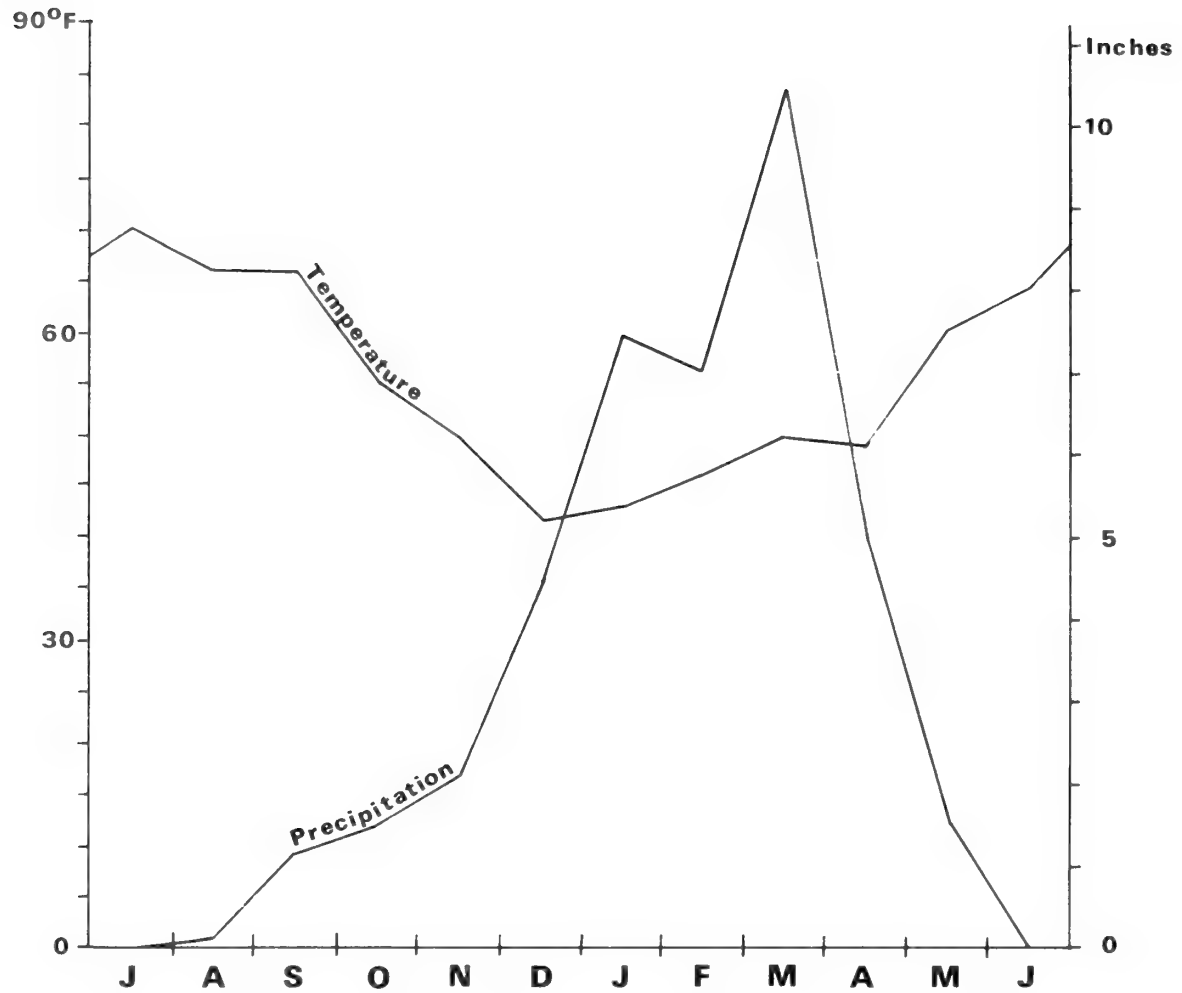

Fig. 5. CLIMATOGRAPH OF DRY LAKES RIDGE. Mean monthly temperature data were compiled from data collected at the summit of Dry Lakes Ridge between 15 January 1983 and 1 June 1985. Mean monthly precipitation data were compiled from rain gauge data collected at the summit of Dry Lakes Ridge between 15 January 1983 and 27 November 1983. Monthly mean totals were averaged over several years from Ventura County Flood Control District rain gauge stations located at Matilija Canyon, Ortega Hill, Sespe Gorge, Pine Mountain, Murietta Divide, Piedora Blanca, and Chief Peak.

ly average precipitation. Snowfall usually occurs during January, February and March, but can occur from September through April.

Temperature data for Dry Lakes Ridge were monitored beginning January 15, 1983 until June 1985. The monthly average temperature range varied from 32.6°F (3°C) in February to 46°F (7.8°C) in September (Fig. 6), with greater and lesser ranges of 50°F (10°C) and 21°F (6.1 °C) occurring for shorter periods of time (Fig. 7). Temperature ranges of this magnitude and the average winter minima are indicative of a transitional area between continental and maritime climates (Trewartha, 1968). The highest temperature recorded at the summit during the sample period was 91°F (32.8°C) during September, whereas the lowest recorded temperature was 22°F (-5.6°C) during January and February.

Fog drip (moisture condensed on the leaves of shrubs and trees) most likely adds to the local precipitation (Lockmann, 1981), as evidenced by the persistant presence of fog in the region of the basins (Table 1). This phenomenon is most noted on the needle-like leaves of Pseudotsuga macrocarpa (Big-Cone Spruce) and Pinus ponderosa (Ponderosa Pine). The fog is most common during the winter months. Fog was present 20.7% of the days during which I collected meteorological data from the site.

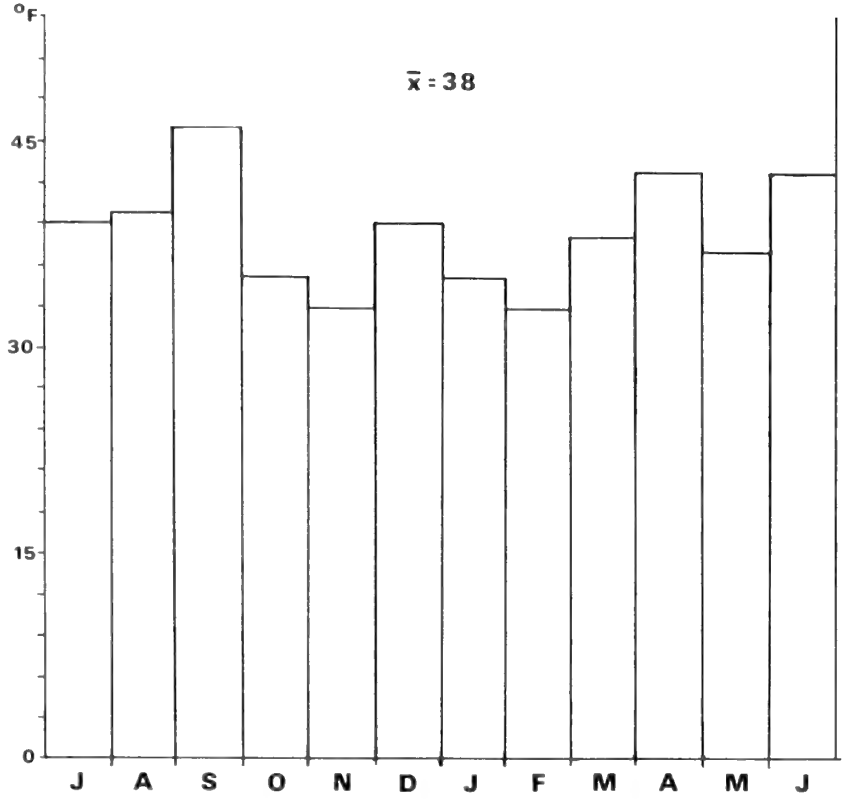

Fig. 6. TEMPERATURE RANGE BAR GRAPH. Mean monthly average temperature range was calculated from temperature data collected at the summit of Dry Lakes Ridge from 15 January 1983 to 1 June 1985. The annual mean temperature range was 38° F.

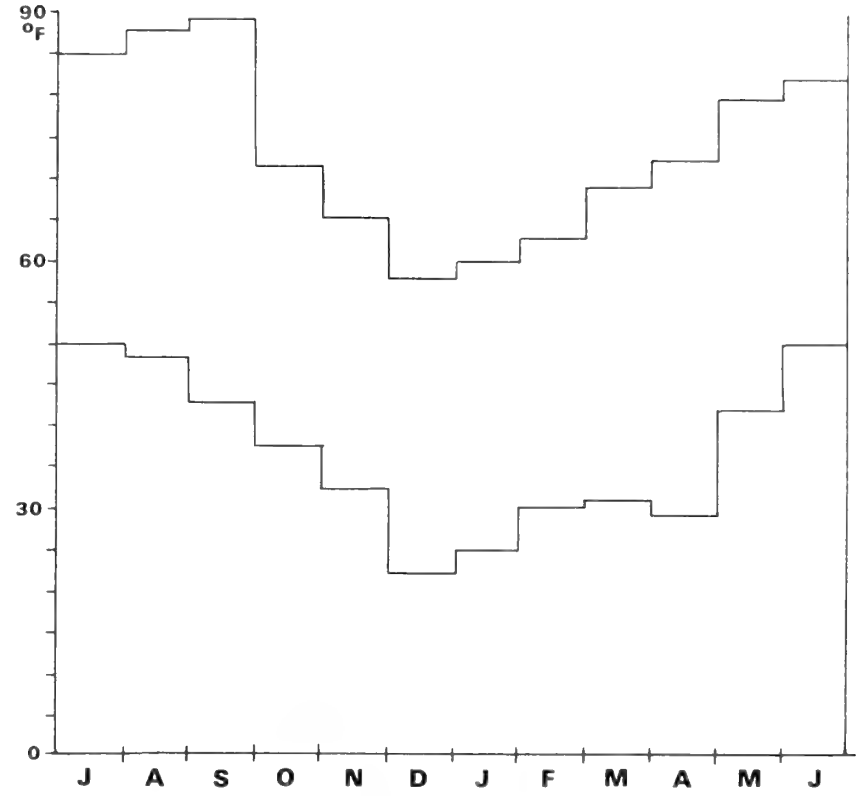

Fig. 7. HIGH/LOW TEMPERATURE GRAPH. Mean high and low monthly temperature was graphed from data collected at the summit of Dry Lakes Ridge from 15 January 1983 through 1 June 1985.

GEOLOGY

Dry Lakes Ridge is composed of Upper Eocene marine sediments of the Coldwater, Cozy Dell, Matilija and Juncal Formations, which are sandstones, siltstones, and shales, and Quartenary alluvial and landslide deposits (Dibblee, 1966; Hollis Record, pers. comm., 1983; USFS, unpublished; Gross, 1958) (Fig. 8).

The sandstone member of the Coldwater Formation is exposed in the southwest portion of the study area along Hwy. 33 south of Belly Ache Falls. It is underlain conformably by the Cozy Dell Formation at Dry Lakes Ridge and overlain unconformably by the nonmarine Sespe Formation outside the study area north of the Tule Creek Fault and south of the Santa Ynez Fault.

The exposed sandstone outcrops, seen especially well on the south flank of the ridge prior to the burn, belong to the sandstone (middle) member of the Cozy Dell Formation. This rock member is particularly resistant and impervious to water movement; however, it has been eroded entirely from the summit and has fractured in several localities, allowing water seepage to the surface from older sediments, as is the case at Belly Ache Falls.

The Lower Cozy Dell Formation is composed of nonresistant, highly fractured, well-sorted, micaceous, olive-drab siltstone and is visible in several roadcuts along Hwy. 33 (Fig. 9) and is overlain conformably by the Coldwater and underlain by the Matilija Formation.

The Matilija Formation (Fig. 10) is composed of 1) resistant, massively bedded (8-30 ft. thick), light gray or tan to brown or buff, sometimes iron stained, medium- to course-grained sandstone consisting of approximately 70% quartz, 25% feldspar, and 5% biotite, and 2) nonresistant, greenish-

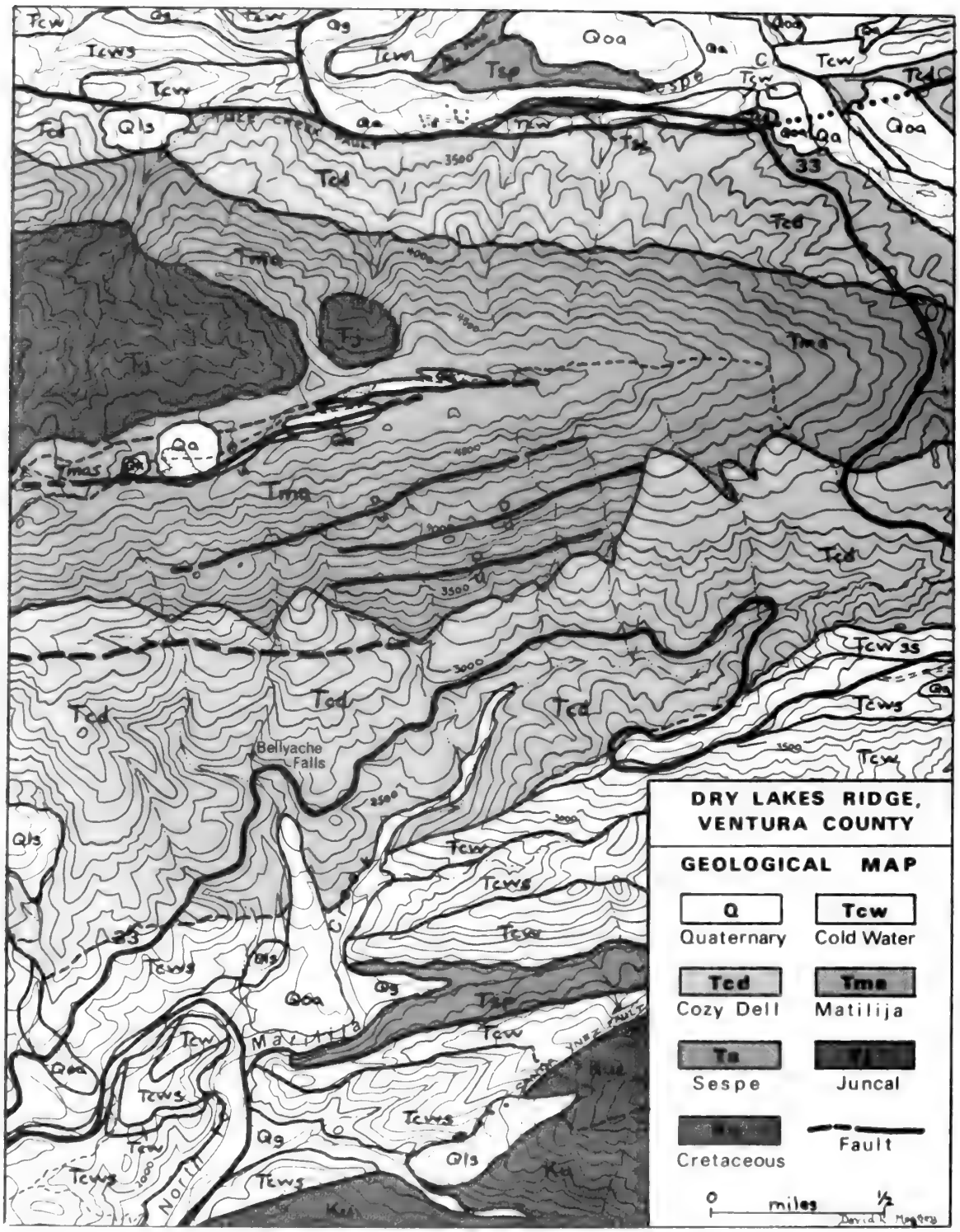

Fig. 8. GEOLOGIC MAP OF DRY LAKES RIDGE. (Redrawn from Dibblee and Hollis, unpubl.)

Fig 9. ROADCUT ON SOUTH SLOPE OF DRY LAKES RIDGE. View northeastward across a south-facing slope showing exposed sedimentary beds of Lower Cozy Dell Formation siltstones (foreground), with a dip angle of approximately 40°. Outcrops of impervious Cozy Dell Formation sandstones can be seen through the thick blanket of chaparral vegetation in the upper portion of the photo. Here, the chaparral is dominated by *Ceanothus crassifolius* ssp. *planus, Rhus laurina*, and *Quercus turbinella* ssp. *californica.*

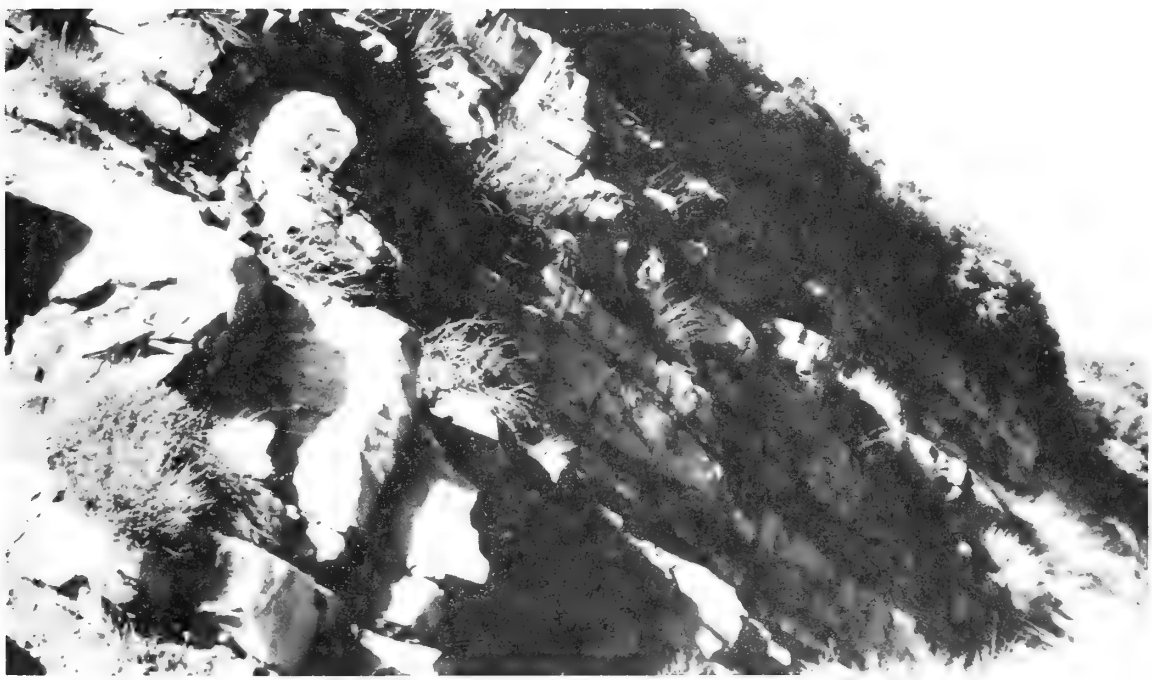

Fig. 10. MATILIJA FORMATION. These beds are exposed along Hwy. 33 at the eastern edge of Dry Lakes Ridge and viewed northwestward. At an elevation of about 3550 ft., the Chaparral vegetation on this formation is dominated by *Ceanothus leucodermis, Adenostoma fasciculatum* and *Quercus turbinella* ssp. *californica.* These plants are replaced by *Arctostaphylos glandulosa* at about 4000 ft.

brown to dark-brown, well-compacted, highly fractured siltstone. This formation is exposed in all the basins, is the predominant rock exposed on most of the ridgetop, with older beds exposed westward, and is underlain conformably by the Juncal Formation.

The Juncal Formation is composed of shale and sandstone, with shale predominating. The shales are dark slate-gray to dark brownish-gray, weather to lighter gray to grayish-buff, and are finely micaceous and argillaceous to silty. Limestone occurs occasionally as concretions or lenses one or two feet thick.

Juncal sandstones are hard, well-cemented, gray to gray-white to buff or buff-white, arkosic, and fine- to medium-grained sand. They weather to angular to subrounded grains composed of quartz, feldspar, and some mica. The Juncal Formation weathers readily to low or recessive relief and supports moderately dense vegetation (Dibblee, 1966).

Quaternary alluvium and landslide deposits are located in the basins and north- and south-facing slopes and are characterized by either Great Basin Sagebrush, Coast Range Ponderosa Pine Forest, Cismontane Native Grassland, Palustrine Wetlands, or disturbed, successional stages of Chaparral.

The ridge is the result of uplifting, folding, and faulting due to compressional forces attributable to tectonic activity along the San Andreas Fault Zone. Locally, the Tule Creek Anticline (Dry Lakes Ridge) is a compressed and uplifted horst (an uplifted fault block) bounded by five relatively small thrust faults on the south flank of the ridge (Fig. 11). The basins are the result of accelerated erosion along one of these faults. The entire anticline is bounded by the Tule Creek Fault on the north and the Santa Ynez Fault on the south, both reverse faults running parallel to the anti-

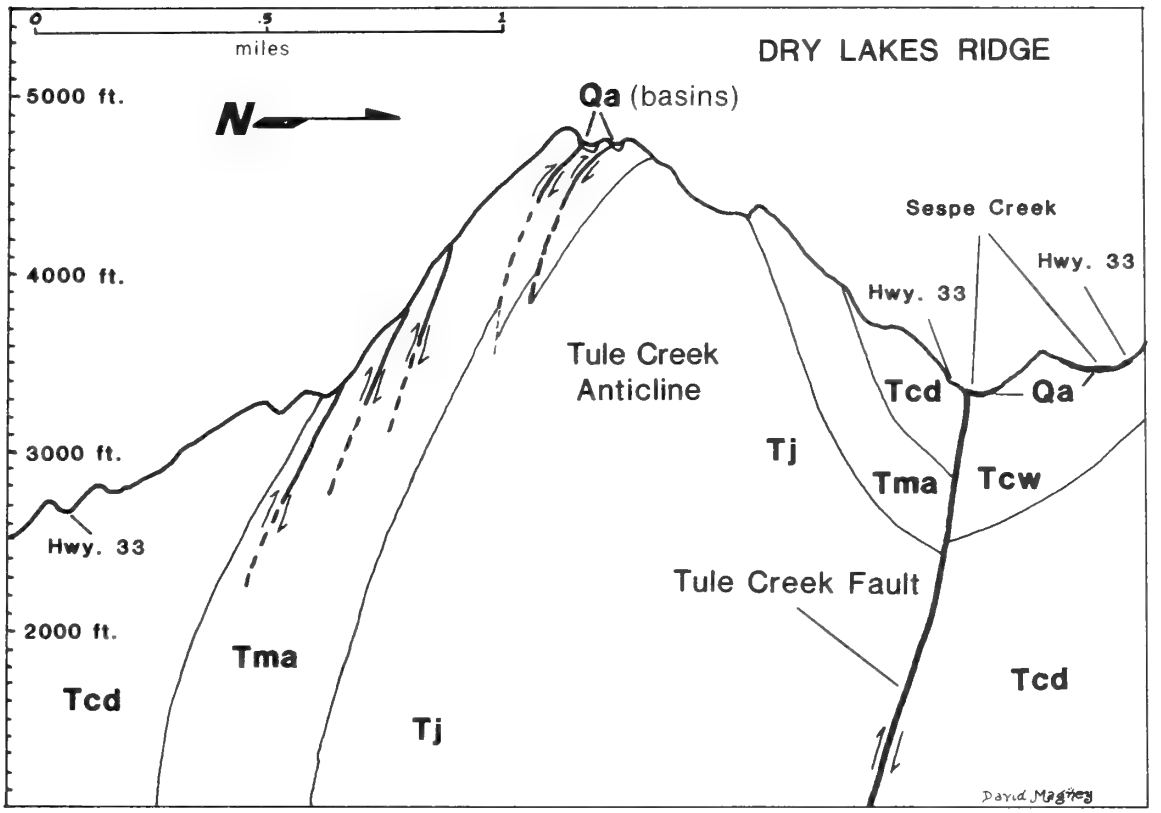

Fig. 11. GEOLOGIC PROFILE OF DRY LAKES RIDGE; TULE CREEK ANTICLINE. Qa = Alluvium; Tcw = Tertiary Cold Water; Tcd = Tertiary Cozy Dell; Tma = Tertiary Matilija; Tj = Tertiary Juncal. The Sespe Creek follows the Tule Creek Fault along the north side of Dry Lakes Ridge (Tule Creek Anticline). A series of thrust faults are situated parallel along the ridge and have accelerated erosion, producing a series of basins on the ridge summit.

clinal axis (Gross, 1958). The latest stage of orogeny was apparently during middle Pliocene time (Axelrod, 1976).

The locations of the various vegetation types are correlated to a large extent with the geology. That is, different plant communities are commonly found on certain rock types and/or geomorphic conditions controlled by the underlying rock type, as well as by a moisture gradient. Certain plant species are more or less associated with specific geologic formations or conditions. For example, Arctostaphylos glandulosa (Eastwood Manzanita) is found on ridgetops of Matilija sandstones. The presence of faults may allow for increased weathering and/or seeps and springs along these faults, producing different habitats for various plant assemblages (Fig. 12).

The reliable year-round water flow from Belly Ache Springs on the south-facing slope of Dry Lakes Ridge suggests that a large volume of water is retained in the strata. Because the Cozy Dell Formation is relatively impervious and the older Matilija and Juncal Formations allow easy water infiltration, and because the bedding planes are near vertical and exposed at the ridge summit, it can be assumed that the entire ridge acts as a water reservoir released at a steady rate at fractures in the retaining wall of the Cozy Dell Formation, such as at Belly Ache Springs. The several seeps located at various places along the north- and south-facing slopes are not the result of water release from the aforementioned reservoir, but rather from moisture collected from seasonal precipitation that filters through the pervious beds until blocked by the impervious beds, at which point the water will move laterally and finally become exposed as seeps. These seeps have a limited supply of water and will dry up in the drier years (Hollis Record, pers. comm.). The increased moisture at or near these seeps permits mesic plants to occur rather than the dominant vegetation on the more xeric locations.

SOILS

All soils on Dry Lakes Ridge were apparently formed in situ or transported locally from surrounding rock outcrops of marine sandstones and shales.

Representative samples from each basin and surrounding areas were taken from the top 6" of the soil. The soil samples varied in texture from a rocky sand to loamy sand in the chaparral areas, to a sandy loam or sandy silt loam in the basins (Tables 2 & 3). Soil depth appears to be correlated with texture (Table 2).

The chaparral and steep slope areas possessed very shallow soils 2 to 7 cm deep, whereas the soil depth in the basins is undetermined but greater than 1 meter. There is no evidence of a clay or hard pan in any of the basins. The term "Dry Lakes", suggesting the possibility of water retention during the rainy season, appears to unfounded, based upon personal observation during and immediately following rainstorms. There was evidence, however, of standing water in Basin 3 of a depth of approximately 1 meter for, at most, a few hours. This is supported by a waterline composed of organic debris deposited along the south "wall" of the mentioned basin, but I never observed standing water. If a clay pan exists, water would have been retained for longer periods of time (Fig. 13).

Soil pH ranges from 5.85 to 6.5 (slightly acidic) and has no obvious correlation between slopes and basins (Table 4).

Nutrient availability tests were performed by the Ventura College Agriculture Department for nitrogen (N), phosphorus (P) and potassium (K) (Table 4). All samples were deficient in N, possessing between 1.12 and 2.25 kg/m^2.

Fig 12. BASIN 1A/B. This westward view of the easternmost basins shows clear distinctions between soil depth and vegetation. The basins are dominated by Cismontane Native Grassland, Great Basin Sagebrush, and Coast Range Ponderosa Pine Forest. Areas with shallow soils (e.g., as around the basins) contain elements of Big Cone Spruce — Canyon Live Oak Forest (basin perimeter and north-facing slope) and chaparral (foreground and left and right edges of photo).

Fig 13. BASIN 3. This southwestward view of Basin 3 shows the area most likely to retain water; however, no water was ever observed standing in any of the basins. The soil in the basin is of a silt loam texture, is very deep, and supports Cismontane Native Grassland and patches of Coast Range Ponderosa Pine Forest rimmed by Canyon Oak Forest, which in turn is surrounded by Manzanita Chaparral.

TABLE 2. SOIL DEPTH/TEXTURE COMPARISON CHART.
Key: MCh= Manzanita Chaparral; BSF= Bigcone Spruce Forest; Gr= Grassland; Rb= Rabbitbrush; GBS= Great Basin Sagebrush; PPF= Ponderosa Pine Forest; Ch= Chaparral.

LOCATION	SOIL DEPTH	SOIL TEXTURE	VEGETATION TYPE
S-facing slope	10cm	rocky loamy sand	MCh
N-facing slope	5cm	coarse loamy sand	BSF
Basin 1A	>100cm	coarse sandy loam	Gr/Rb
Basin 1A	>100cm	fine sandy loam	Gr/Lupine
Basin 1B	>100cm	coarse sandy loam	GBS
Basin 2A	>100cm	fine sandy loam	GBS
Basin 2A	30cm	coarse sandy loam	PPF/Ch
Basin 2B	>100cm	fine sandy loam	PPF/Gr
Basin 2B	>100cm	coarse sandy loam	GBS
Basin 3	>100cm	coarse silt loam	PPF/Gr
Basin 4	>100cm	coarse silt loam	PPF/Gr

TABLE 3. SOIL TEXTURE ANALYSIS--fruit jar method.
Key: Ch= Chaparral; MCh= Manzanita Chaparral; Rb= Rabbitbrush; GBS= Great Basin Sagebrush; PPF= Ponderosa Pine Forest; Gr= Grassland.

SAMPLE #	SAMPLE LOCATION	ASSOCIATED VEGETATION	% SAND	% SILT	% CLAY	TEXTURE CLASS
1	So. slope firebreak	MCh	78	22	0	Loamy sand
2	Basin 1A	Rb/Gr	40	56	4	Silt loam
3	Basin 2A	GBS	53	41	6	Loam
4	Basin 2B	PPF	56	41	3	Sandy loam
5	Basin 2B	GBS	57	40	3	Sandy loam
6	Basin 3 <8cm	Gr	68	29	3	Sandy loam
7	Basin 3 >8cm	Gr	47	52	1	Silt loam
8	Basin 4	Gr/Rb	37	62	1	Silt loam

TABLE 4. SOIL pH AND NUTRIENT AVAILABILITY.

SAMPLE #	SAMPLE LOCATION	pH	NUTRIENTS (kg/m^2) N	P	K
1	S-slope	6.4	1.12	11.2	16.8
2	Basin 1A	5.9	2.25	11.2	24.7
3	Basin 2A	6.1	2.25	11.2	28.1
4	Basin 2B	6.5	2.25	16.8	28.1
5	Basin 2B W-edge	6.5	1.12	16.8	29.2
6	Basin 3 <8cm	6.4	1.12	16.8	26.9
7	Basin 3 8-30cm	6.3	1.12	11.2	19.6
8	Basin 4	6.3	1.12	16.8	28.1

Both P and K were of adequate amounts (11.2-16.8 kg/m^2 P and 16.8-29.2 kg/m^2 K) for plant utilization according to agricultural standards (Foth and Turk, 1972).

Thus, the soils of Dry Lakes Ridge are of coarse to medium texture, vary from a few centimeters in depth on the chaparral areas (slopes) to several meters or more in the basin areas, possess a slightly acidic pH, and are deficient in N but possess adequate quantities of P and K for plant utilization. The entire area is well-drained and sandy in nature.

H I S T O R Y

HISTORY AND LAND USE

Limited accessibility has restricted agricultural uses of the basins. In the last century, however, the basins were used occasionally for sheep grazing. Since 1898, Dry Lakes Ridge area has been administered by the Forest Service or its predecessor, the Forest Reserve system. The Forest Reserve system was established to protect the watershed of such areas as Dry Lakes Ridge. Near the turn of the century, hunting groups such as the Sisquoc Rangers (Magney, 1982), from nearby towns of Ojai (known as Nordhoff prior to 1917), Santa Barbara, Ventura, and Santa Paula, used areas such as Dry Lakes Ridge for hunting Grizzly Bear (replaced by the Black Bear after extinction of the California Grizzly by hunting), Deer, Bobcat, and Mountain Lion.

A trail and two campgrounds, Dry Lakes Ridge East and Dry Lakes Ridge West, were established in the mid-20th century after the fire of 1948. These two trail camps were removed in 1974 due to lack of funds. Trail maintenance was also discontinued at this time. The firebreak was regraded by the Forest Service while fighting the Wheeler Fire of 1985. Other than a few hardy botanists, hunters are the most frequent users of the ridge.

Presently, the area of the basins on Dry Lakes Ridge has been proposed as a Botanical Reserve by the Forest Service.

FIRE HISTORY

Three fires (1932, 1948 and 1985) are recorded to have burned the vegetation of Dry Lake Ridge. These fires are

known as the Matilija, Wheeler Springs, and Wheeler fires, respectively (Fig. 14). The Matilija fire started near Matilija Hot Springs, a few miles south of Dry Lakes Ridge, and burned the entire study area, whereas the Wheeler Springs fire started at Wheeler Hot Springs and burned only the southern portion of Dry Lakes Ridge up to the basins. It was during this fire that a bulldozed firebreak, thereafter used as a trail, was installed to stop the northern advance of the fire. The Wheeler fire burned the ridge once again, leaving only a few patches of unburned area. This fire was caused by arson and was set near the double tunnels in Wheeler Gorge on July 1 and burned 118,000 acres. Most of the older Ponderosa Pines on the ridge were not burned severely; however, a majority of the younger pines, growing nearer the chaparral, were destroyed (Fig. 15). Hand crews created a hand line around Basin 3, preventing it from burning (Fig. 16).

A study of the dendrochronology of the Ponderosa Pines on Dry Lakes Ridge could add significantly to the fire history of the study area. Many of the Ponderosa Pines were destroyed or damaged by the 1932, 1948, and earlier unrecorded fires as evidenced by fire scars on living specimens, charred tree stumps, snags, and fallen and decaying logs. Prior to the 1985 Wheeler fire, I noted 64 dead trees, which included stumps, logs and unsuccessful saplings.

BOTANICAL COLLECTING HISTORY

The botanical collecting history of Dry Lakes Ridge apparently began after the construction of California State Highway 399 in 1933 (later redesignated Hwy. 33). Although many collections can be found from localities along Hwy. 33, few botanists have made the strenuous climb to collect from the basins. These include L. E. Allen, Clifton F. Smith,

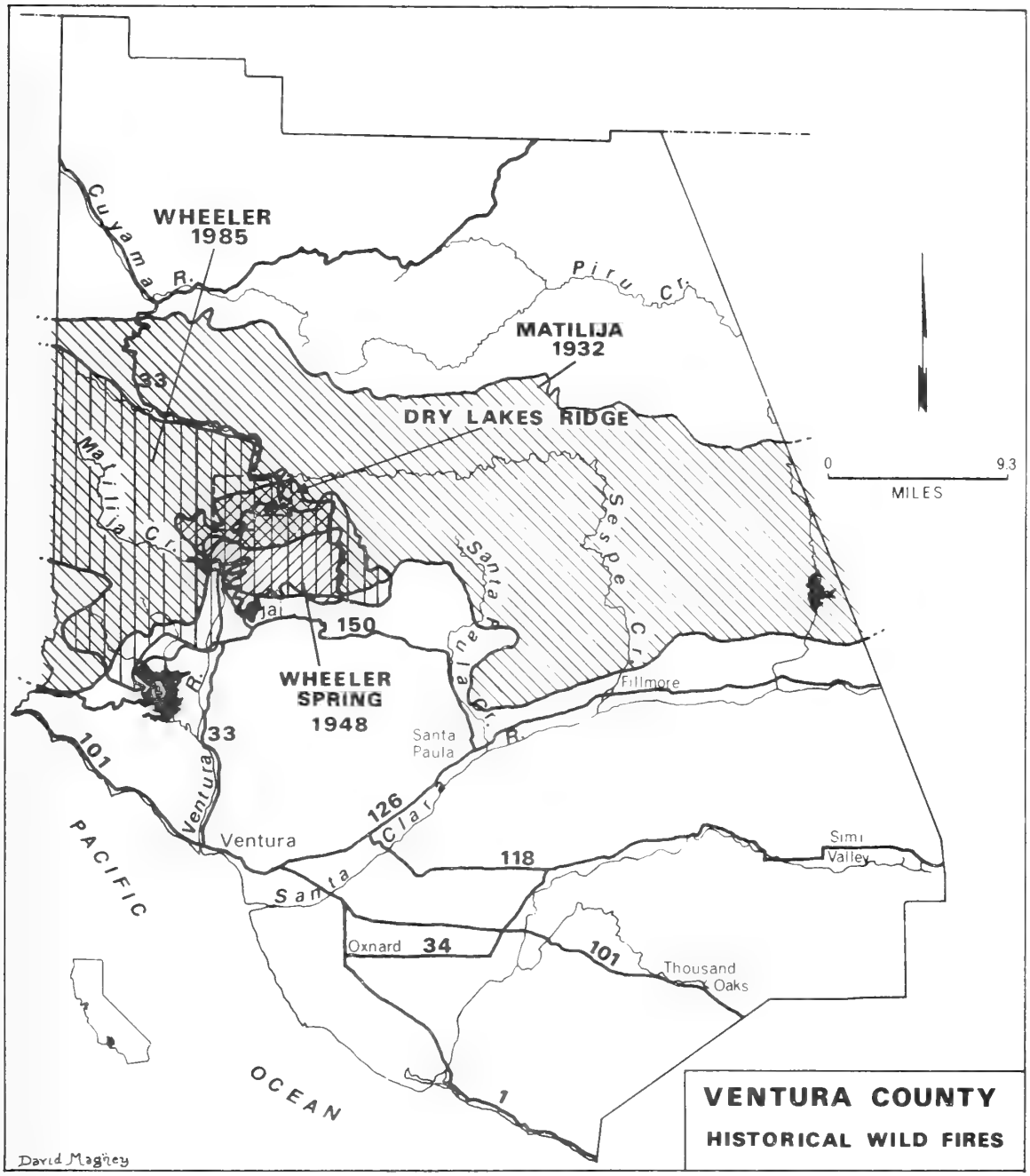

Fig. 14. MAP OF HISTORICAL FIRES.

Fig. 15. WHEELER FIRE, BASIN 2A. Stumps and logs of Ponderosa Pine still smolder in this westward view of Basin 2A, dominated formerly by Great Basin Sagebrush. Many young Ponderosa Pines were destroyed in this fire of July 1985. The pine grove on the left was the locality of the high/low thermometer.

Fig. 16. BASIN 3 AFTER WHEELER FIRE. Large quantities of ash can be seen beneath the burned branches and trunks of *Quercus chrysolepis* and *Q. wislizenii* in this westward view of Basin 3. The grassland and large pines were not burned due to the construction of hand lines by Forest Service firefighters.

and the late Henry M. Pollard. The Forest Service mapped extensively the vegetation of the entire forest during the 1940's. No other collectors were identified who have contributed to the Los Padres National Forest Herbarium (now at UCSB), SBM (now at SBBG), SBBG, and UCSB.

B O T A N I C A L R E S O U R C E S

HABITATS

"Habitats" as defined herein are the combination of environmental conditions that result in the existence of various associations of plants at a particular point in time. Factors influencing the plant habitats on Dry Lakes Ridge include, for example, topographic relief, water regime, slope, aspect, substrate, density and seasonality of vegetation, disturbances, weather and climate, and elevation.

Dry Lakes Ridge may be divided for convenience into two main habitat types--uplands and wetlands. Wetland habitat consists primarily of perennial and intermittent streams and seeps of varying size, occurring under different conditions such as: slope angle, aspect, substrate, and volume of water. The study area, composed geomorphically of one main anticlinal ridge on an east-west axis dissected by many side canyons, is topographically and geologically complex and provides a variety of habitats.

The upland habitats occur on the steep north- and south-facing slopes and east- and west-facing slopes of the side canyons and in the relatively level areas of the basins on the summit of the ridge. The upland basins have deeper, finer-grained soils than the slopes. All areas are well drained. The firebreak traversing the ridge summit east to west and Hwy. 33 provide disturbed areas in which many naturalized escapes and weedy natives occur. The remainder of the study area is in a relatively natural state, including changes due to fire.

VEGETATION

Vegetation of the study area was classified (Appendices I, II) using modified schemes by Cheatham and Haller (1975) for uplands and Cowardin *et al*. (1979) for wetlands, and was mapped (Fig. 17) as 5 major vegetation types from aerial photographs (e.g., Fig. 18) and verified by field work. Below is a discussion of each plant community or plant association occurring in the study area.

Upland Vegetation

The upland vegetation of Dry Lakes Ridge possesses representatives of four major habitat types: Scrub and Chaparral, Grasslands, Woodlands, and Forests. These contain a total of 8 subdivisions or communities: Great Basin Sagebrush, Californian Mixed Chaparral, Chamise Chaparral, Lower Montane Chaparral, Cismontane Native Grassland, Southern Oak Woodlands, Coast Range Ponderosa Pine Forest, and Bigcone Spruce-Canyon Oak Forest. Although a forest is usually associated with a closed canopy, the occurrence of such a forest of Ponderosa Pine does not occur on Dry Lakes Ridge. Scattered individuals, however, may represent a relict of a past forest and, therefore, I have retained this designation. Listed below are descriptions of the eight upland communities in the order in which they appear in this classification (Appendix I).

GREAT BASIN SAGEBRUSH -- This community, dominated by *Artemisia tridentata* (Basin Sagebrush) and *Chrysothamnus nauseosus* ssp. *consimilis* (Rabbitbrush) occupies the upper basins, Basins 1B, 1C, 2A (Fig. 19), and 2B. Although Rabbitbrush typically occurs in this community, it has little value as an indicator because it is found in disturbed sites in many plant communities. Here it is found intermixed with Great Basin Sagebrush in Basins 1A/B and in Basins 3 and 4,

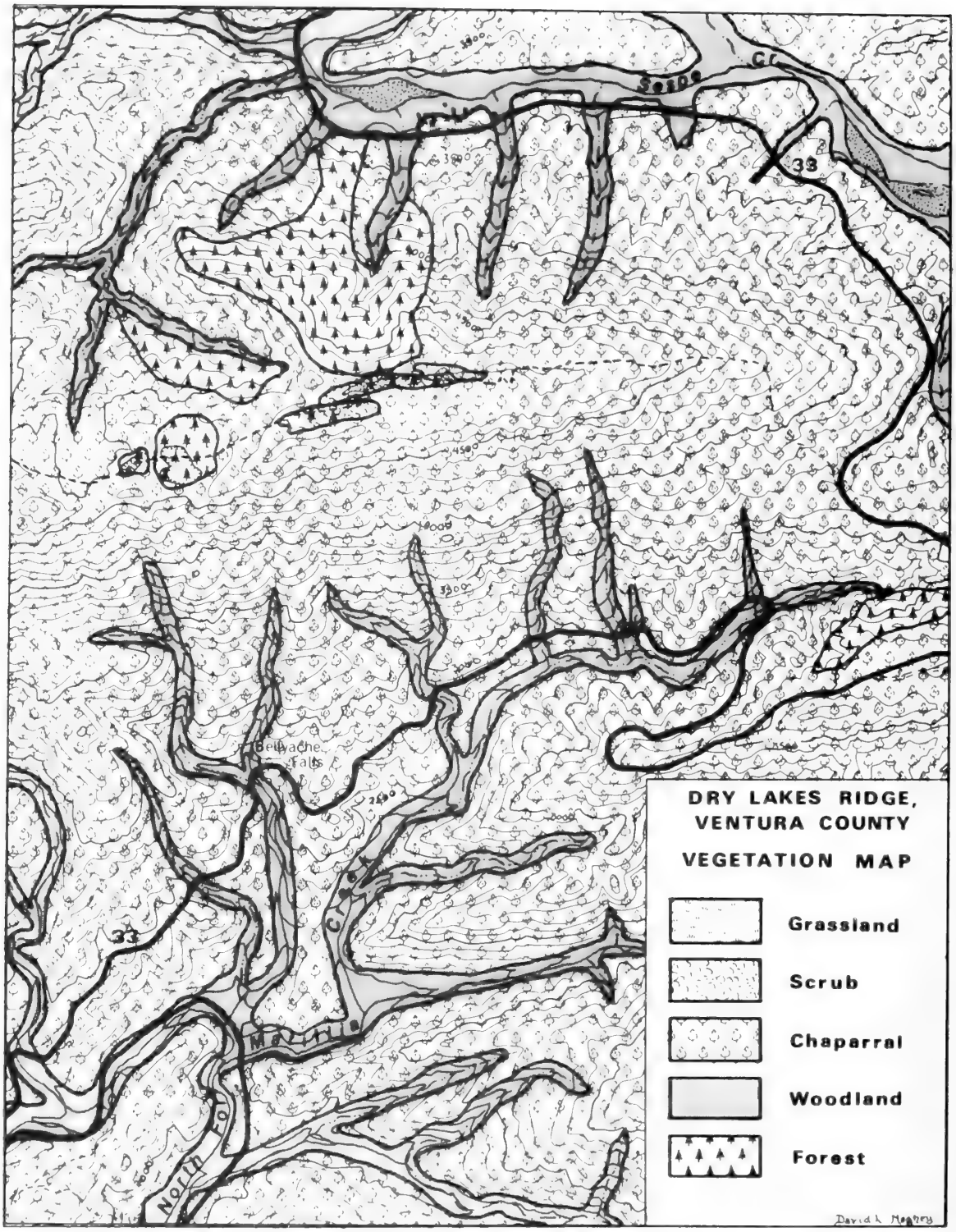

Fig. 17. VEGETATION OF DRY LAKES RIDGE.

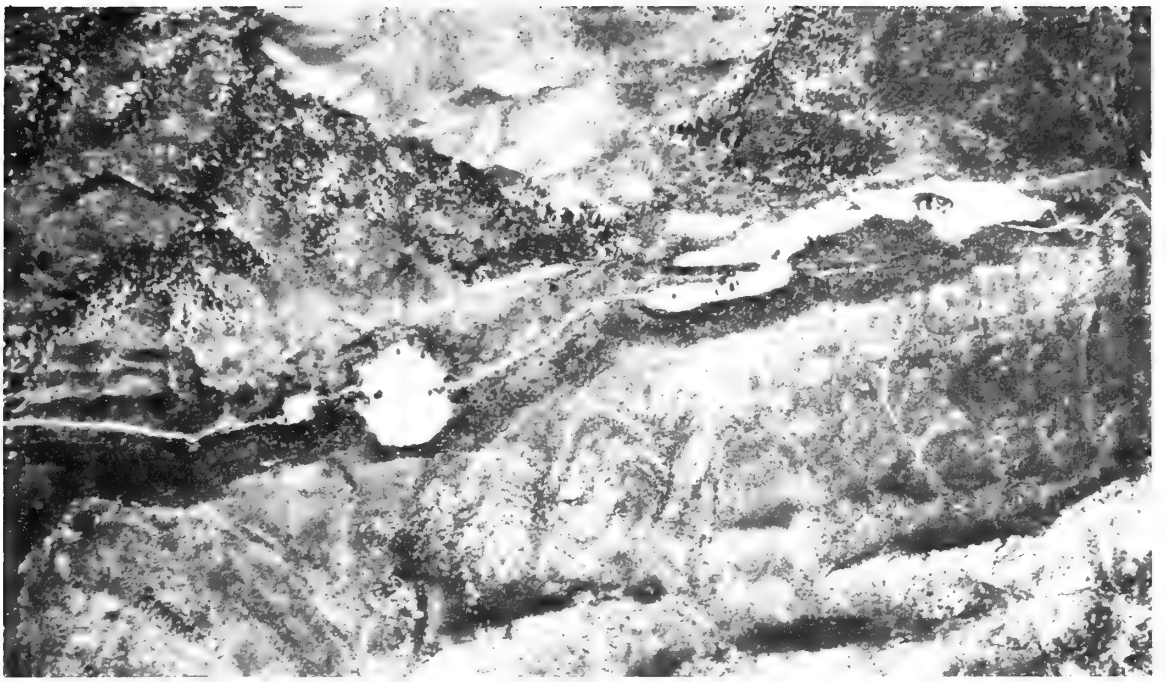

Fig. 18. AERIAL PHOTOGRAPH OF DRY LAKES RIDGE. This photo, taken in 1978 for the U.S. Forest Service, shows clearly the basins and portions of the north- and south-facing slopes. Individual Ponderosa Pine trees can be seen in the basins, especially in Basin 3 in the left center. The trees on the north slope (top half of photo) are *Pseudotsuga macrocarpa* (Bigcone Spruce). The south slope (bottom half of photo) is dominated by chaparral. The firebreak is quite evident, traversing the ridgetop from east to west (r-l).

Fig 19. GREAT BASIN SAGEBRUSH. This westward view of Basin 2A shows the extensive areas of *Artemisia tridentata* (Basin Sagebrush), which dominates Basins 1B, 2A, and 2B. Compare this figure with Figure 15 for a similar view after the Wheeler Fire.

as well as scattered individuals along the firebreak and Hwy. 33. Artemisia tridentata is found in fairly deep soils in Basins 1A/B/C and 2A/B. The Sagebrush is replaced by grassland in the lower areas of the basins where the soils are relatively better developed and moister. Chaparral and/or Bigcone Spruce-Canyon Oak Forest occurs on the knoll and rims of the basins as soil depth decreases and slope increases. Patches of Coast Range Ponderosa Pine Forest occur throughout the basins, usually along the upper margins of the sagebrush. Psoralea physodes (California Tea) is the dominant understory herb and grows extensively throughout the basins with the Sagebrush.

CALIFORNIAN MIXED CHAPARRAL -- This community occurs commonly on both the north- and south-facing slopes in areas of shallow, rocky, sandy, loam soils on the sandstones and shales of the Coldwater, Cozy Dell, Matilija, and Juncal Formations in more mesic habitats than that of the Chamise Chaparral. Californian Mixed Chaparral (Fig. 20) intergrades with the Southern Oak Woodland and other nearby communities as moisture and soil factors change. Californian Mixed Chaparral is dominated on Dry Lakes Ridge by Adenostoma fasciculatum (Chamise), Ceanothus crassifolius var. planus (Snowball), Cercocarpus betuloides (Mountain Mahogany), Heteromeles arbutifolia (Toyon), Prunus ilicifolia (Holly-leaf Cherry), Quercus dumosa (Scrub Oak), Q. turbinella var. californica (Desert Oak), Q. wislizenii (Interior Live Oak), Rhamnus crocea (Buckthorn or Redberry), and Rhus laurina (Laural-leaf Sumac).

CHAMISE CHAPARRAL -- This community is less rich in species than is Californian Mixed Chaparral and is dominated by Adenostoma fasciculatum. It is located on the slopes (primarily the south-facing slope) with the poorest soil conditions. This community intergrades with the Californian Mixed Chaparral as soil moisture and depth increases. The

Chamise Chaparral is less dense and lower in stature than Californian Mixed Chaparral, and usually contains open areas of bare ground (bedrock areas). Arctostaphylos glandulosa (Eastwood Manzanita), Ceanothus crassifolius var. planus, and C. leucodermis (Whitethorn Ceanothus), also occur here and may be locally dominant, the associated species changing with elevation. Ceanothus species often dominate the lower areas (Ceanothus Chaparral) and Manzanita often dominates the higher areas, occasionally occurring in pure stands (Manzanita Chaparral) (Hanes, 1977).

CISMONTANE NATIVE GRASSLAND -- This community is best developed in Basins 1A (Fig. 12), 3 (Fig. 21), and to a lesser extent in Basin 4. The species composition is a mixture of native and introduced species, which is typical of most grasslands in California today. The dominant native grasses represented in the study area are Koeleria macrantha (Junegrass), Melica imperfecta (Melic), Poa scabrella (Pine Bluegrass), Sitanion hystrix (Squirreltail), Stipa elmeri (Elmer's Needlegrass). The naturalized grasses include Bromus tectorum (Downy Brome) and Vulpia bromoides [=Festuca dertonensis] (Fescue), and to a much lesser extent Avena barbata (Slender Wild Oat), Bromus hordeaceus [=B. mollis] (Soft Chess), and Bromus rubens (Red Brome), which are found in the basins and disturbed areas. Erodium cicutarium (Redstem Filaree) is a common associate of Cismontane Introduced Grasses and is widespread in all the basins containing grassland and in waste areas.

The Cismontane Native Grassland community exhibits high richness. Numerous native forbs are found in the grassland areas and include Agoseris retrorsa (Mountain Dandelion), Arabis sparsiflorum var. arcuta (Rock Cress), Calochortus catalinae (Catalina Mariposa Lily), C. weedii var. vestus (Weed's Mariposa Lily), Calystegia malacophylla ssp. pedicellata (Woolly Morning-glory), Camissonia intermedia

(Evening-Primrose), C. micrantha (Tiny Camissonia), Chaenactis glabriuscula var. curta (Pincushion), Cirsium proteanum (Red Thistle), Clarkia purpurea (Purple Clarkia), Corethrogyne filaginifolia var. glomerata (Cudweed-aster), Cryptantha muricata (Popcorn Flower), Eriogonum davidsonii (Davidson's Buckwheat), E. nudum (Naked Buckwheat), Gilia latiflora ssp. davyi (Davy's Gilia), Linanthus androsaceus ssp. luteus (Toad Flax), Lupinus bicolor ssp. marginatus (Bicolored Lupine), Lupinus breweri (Brewer's Lupine), Madia elegans (Elegant Tarweed), M. minima (Tiny Tarweed), Mentzelia congesta (Congested Blazing Star), Mimulus brevipes (Monkey-flower) Mondardella lanceolata (Small Horsemint), Nemophila pedunculata (Meadow Nemophila), Phacelia egena (Rock Phacelia), Silene verecunda var. platyota (Campion), Streptanthus coulteri, and Trifolium longipes var. atrorubens (Clover).

SOUTHERN OAK WOODLAND-COAST LIVE OAK FOREST -- The oak woodlands/forests occupy the deeper, moister soils of many of the side canyons on the south-facing slope (Fig. 22), intergrading with Palustrine Wetlands on wetter sites, and Californian Mixed Chaparral on drier sites. This community represents an ecotone between woodland and forest. The primary difference between the forest and woodland designation is determined by the density of the canopy. Woodland trees are more widely spaced than the tree canopy of forest. The Southern Oak Woodland is further divided into Coastal and Interior subdivisions. The difference between the Coast and Interior Woodland is represented by a slight change in the species composition. Both communities are dominated by Quercus agrifolia (Coast Live Oak). The Coastal subdivision contains Rhamnus californica (Coffeeberry), Heteromeles arbutifolia, Sambucus mexicana (Elderberry), and Toxicodendron diversilobum (Poison Oak), whereas the Interior subdivision also contains Juglans californica (California Black Walnut), and Rhus trilobata (Squaw Bush).

Fig. 20. CALIFORNIAN MIXED CHAPARRAL. The lower slopes of Dry Lakes Ridge are dominated by *Adenostoma fasciculatum, Ceanothus crassifolius* ssp. *planus, Cercocarpus betuloides, Rhus laurina, Quercus turbinella* ssp. *californica,* etc., as is seen in this westward view of the south-facing slope.

Fig. 21. CISMONTANE NATIVE GRASSLAND. This northeastward view of Basin 1A shows the general aspect of this community, which is dominated by *Bromus tectorum, Erodium cicutarium, Sitanion hystrix, Poa scabrella, Lupinus breweri, L. bicolor,* etc. This community is bounded by Great Basin Sagebrush in the basins and Canyon Live Oak on the slopes around the basins. A quantitative vegetation analysis was performed in the easternmost basin and included the entire grassland area seen in this photograph.

Both communities are found largly below 3000 ft.

COAST LIVE OAK FOREST -- Quercus agrifolia and Umbellularia californica (California Bay), dominate this community, and may be associated with Acer macrophyllum (Bigleaf Maple), and Quercus chrysolepis (Golden Cup Oak). This community is found in patches in moist soils and primarily on the north- and south-facing slopes; it often intergrades with the Palustrine Forested Wetland near streams and Californian Mixed Chaparral on the drier sites. As discussed above, the distinction between this and the Southern Oak Woodland communities is difficult due to their widespread intergradation. This and the Oak Woodland variants are often represented by a single dominant (or indicator) species such as Quercus agrifolia or Umbellularia californica.

COAST RANGE PONDEROSA PINE FOREST -- The Pinus ponderosa (Ponderosa pine) groves or remnant individual trees are found in the basins along the summit of the study areas. The pines are usually grouped in small groves, primarily along the margins of the basins, and have a thick litter of needles (Fig. 23). Prior to the Wheeler fire in 1985, there were 96 trees (including saplings) and 64 logs and/or stumps. The Ponderosa pine population appears to be declining due to insect infestation, emphasized by the death of a large pine during the winter of 1984. Other mature pines show dead crowns as evidence of damage.

BIGCONE SPRUCE-CANYON OAK FOREST -- Dominants of this community occupy the north-facing slope of the ridge (Fig. 24) and the knolls in the basins and include Pseudotsuga macrocarpa (Bigcone Spruce), Quercus chrysolepis, and Umbellularia californica; understory plants include Ceanothus integerrimis (Deer Brush), Galium hallii (Hall's Bedstraw), Ribes roezlii (Gooseberry), and Claytonia perfoliata var. depressa (Miner's Lettuce).

Fig. 22. SOUTHERN OAK WOODLAND. This northward view shows a streamside Southern Coastal/Interior Oak Woodland-Coast Live Oak Forest dominated almost exclusively by *Quercus agrifolia* and bounded by Californian Mixed Chaparral on the drier slopes and a lone *Platanus racemosa* growing directly in the intermittent streambed. This photo (taken in April, 1986) shows the burned chaparral slopes and the singed oaks located in the southwest corner of the study area.

Fig. 23. COAST RANGE PONDEROSA PINE FOREST. A group of older Ponderosa pines is seen in this westward view of Basin 2B. A few scattered younger pines occurred along the perimeter of the basins but were destroyed during the Wheeler Fire of 1985. Such groups of pines may represent relic stands of this community that had a wider distribution during the Pleistocene.

Wetland Vegetation

According to Cowardin *et al*. (1979), wetlands are defined as "lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water". Wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season each year." This classification is divided into five major categories (Systems): Marine, Estuarine, Riverine, Lacustrine, and Palustrine. These are then divided into subsystems and then into classes.

Dry Lakes Ridge contains wetlands that fall entirely within the Palustrine System, which is divided into eight classes. The study area possesses five of these classes: Rock Bottom, Unconsolidated Bottom, Emergent Wetland, Scrub-Shrub Wetland, and Forested Wetland. Due to the relatively dry climate and geomorphic conditions at Dry Lakes Ridge, several of these classes are weakly developed or represented by very narrow bands of vegetation and may be difficult to determine in the field.

The Palustrine System includes nontidal wetlands dominated by trees, shrubs, perennial emergents, etc., and may be located along lakes, river channels and floodplains, isolated catchments, or on slopes (Cowardin, *et al*. 1979).

PALUSTRINE EMERGENT WETLAND -- This community is represented on Dry Lakes Ridge in a narrow zone at Belly Ache Falls and several other unnamed side canyons with intermittant streams. It is characterized by *Eleocharis parishii*, *Juncus oxymeris*, *Lobelia dunnii* var. *serrata*, *Mimulus*

guttatus, Rorippa naturtium-aquaticum, Typha domingensis, and the roots of shrubs and trees associated with wetland communities discussed below. Many of the species above do not occur together on Dry Lakes Ridge, but are found in similar habitat.

PALUSTRINE SCRUB/SHRUB WETLAND -- A strip of vegetation dominated by shrubs and requiring large volumes of water occupies a zone immediately adjacent to streams. This community may be overshadowed by Forested Wetland dominants discussed below, Oak Woodlands along larger streams, or Californian Mixed Chaparral along smaller intermittent streams. Characteristic species include Baccharis glutinosa (Mule Fat), B. pilularis ssp. consanguinea (Coyote Brush), Rubus ursinus (California Blackberry), Salix exigua (Narrowleaf Willow), S. laevigata (Red Willow), and S. lasiolepis (Arroyo Willow).

PALUSTRINE FORESTED WETLAND -- Two forms of this community can be found along stream coarses of Dry Lakes Ridge. Perennial streams are dominated by Alnus rhombifolia (White Alder) nearest the water (Fig. 25) and Platanus racemosa (Western Sycamore), Populus trichocarpa (Black Cottonwood), and Salix laevigata outward slightly from the perennial streams or in the bed of intermittent streams. Wetter areas are characterized by Emergent and/or Scrub/Shrub Wetlands, whereas drier upland areas are characterized by Oak Woodlands and/or Chaparral.

Vegetation Analysis of the Easternmost Basin

I sampled the easternmost basin (Basin 1A/B) using twenty-one 10 m transects. Thirty-seven species were recorded (Table 5). Data were ordinated and classified using the programs DECORANA and TWINSPAN, respectively (Hill, 1973,

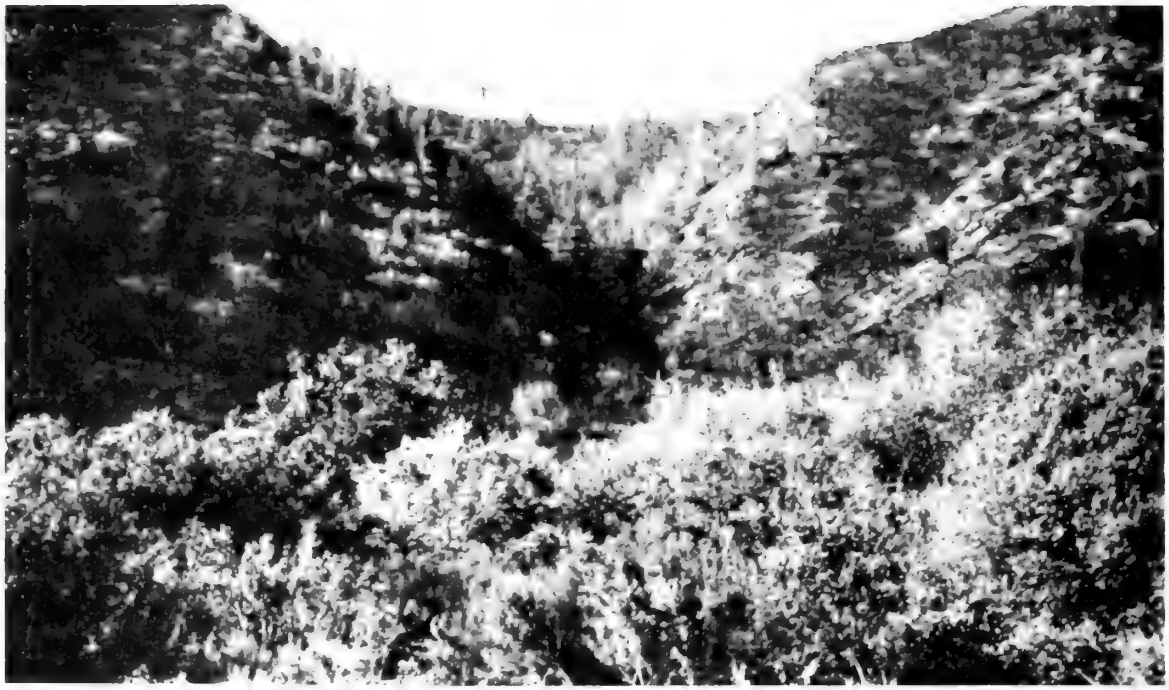

Fig. 24. BIGCONE SPRUCE — CANYON OAK FOREST. This southward post-fire view of the north-facing slope of Dry Lakes Ridge shows the typical habitat for *Pseudotsuga macrocarpa*. Burned Manzanita and Chamise Chaparral communities once dominated the upper slopes in this photo. A patch of Californian Mixed Chaparral has been left unburned in the foreground. Bigcone Spruce Forests are rarely severely burned in fires such as the Wheeler Fire of 1985.

Fig. 25. PALUSTRINE FORESTED WETLAND. *Alnus rhombifolia* (White Alder) dominates the immediate banks of perennial streams such as at Belly Ache Spring. This southward view, taken from Hwy. 33 just below Belly Ache Falls, shows White Alder in its deciduous stage as late as March. Such a phenomenon may be due in part to damage caused by the Wheeler Fire of 1985.

1979). The results of these analyses are presented below.

Total vegetation cover comprises 77% of the area sampled, with the remaining 23% occurring as bare ground, rocks, or fallen logs. Fifty-two percent of the easternmost basin (Basin 1A/B) is comprised of grassland species with the remaining 48% occurring as sagebrush.

Artemisia tridentata and Bromus tectorum were present in 14/21 of the transects, whereas Lupinus breweri and Vulpia bromoides occurred in 11/21 and 10/21 of the transects, respectively. All other taxa occurred less frequently (Table 5).

A correlation between species diversity and grassland can be made from the sampling data. Transects that included 19% or more of the species sampled were within grassland areas. Conversely, all transects with less than 19% of the total sampled species were within sagebrush areas, dominated by Artemisia tridentata, representing 33% to 91% of the cover. Transect 27 was anomalous because it only was represented by 5% of the species (2 spp.). Both plants were annual grasses and, therefore, transect 27 was included within the grassland group.

In Table 5, several plants stand out as dominants, Artemisia tridentata occupies 31.2% of the total cover of all transects and occurs in 67% of the transects. Artemisia tridentata is the main representative of the Great Basin Sagebrush community. Similarly, Bromus tectorum, Lupinus breweri, Erodium cicutarium, and Vulpia bromoides dominate the Cismontane Native Grassland community, with 12%, 8.5%, 5.2%, and 4.5% of the total cover and occurring in 67%, 52%, 29%, 48% of the transects, respectively.

DECORANA (DEtrended CORrespondence ANAlysis) is an ordi-

TABLE 5. VEGETATION ANALYSIS OF EASTERNMOST BASIN. Sampled species list indicating % cover, % frequency and diversity. Species occur in order in which they were sampled in the field.

#	TAXON	% cover	% frequency	transects %	transects #
1	Taushia parishii	.3	5	5%	1
2	Artemisia tridentata	31.2	67	67	14
3	Penstemon centranthifolius	.2	14	14	3
4	Chrysothamnus nauseosus	1.2	19	19	4
5	Bromus tectorum	12.0	67	67	14
6	Camissonia intermedia	1.4	19	19	4
7	Lupinus breweri	8.5	52	52	11
8	Madia minima	.9	29	29	6
9	Erodium cicutarium	5.2	29	29	6
10	Cryptantha muricata	.1	10	10	2
11	Eriogonum davidsonii	.4	24	24	5
12	Vulpia bromoides	4.5	48	48	10
13	Viola purpurea	.9	33	7	7
14	Salvia columbariae	.1	5	5	1
15	Camissonia micrantha	1.2	24	24	5
16	Monardella lanceolata	.7	19	19	4
17	Linanthus androsaceus	.6	29	29	6
18	Sitanion hystrix	.1	5	5	1
19	Unknown 1	.1	5	5	1
20	Psoralea physodes	.7	14	14	3
21	Agoseris retrorsa	.1	10	10	2
22	Galium andrewsii	.1	5	5	1
23	Phacelia egena	.4	14	14	3
24	Koelaria macrantha	.6	14	14	3
25	Poa scabrella	1.2	14	14	3
26	Calystegia malacophylla	.1	10	10	2
27	Lupinus bicolor	.8	14	14	3
28	Corethrogyne filaginifolia	1.4	14	14	3
29	Quercus wislizenii	.2	5	5	1
30	Amorpha californica	.2	5	5	1
31	Vulpia reflexa	.3	14	14	3
32	Madia elegans	.2	10	10	2
33	Silene verecunda	.1	10	10	2
34	Lotus humistratus	.3	5	5	1
35	Stipa elmeri	.1	5	5	1
36	Trifolium longipes	.1	5	5	1
37	Galium hallii	.1	5	5	1
B	Bare ground, rock, etc.	21.4	90	90	19
L	Fallen log (Ponderosa Pine)	1.7	10	10	2

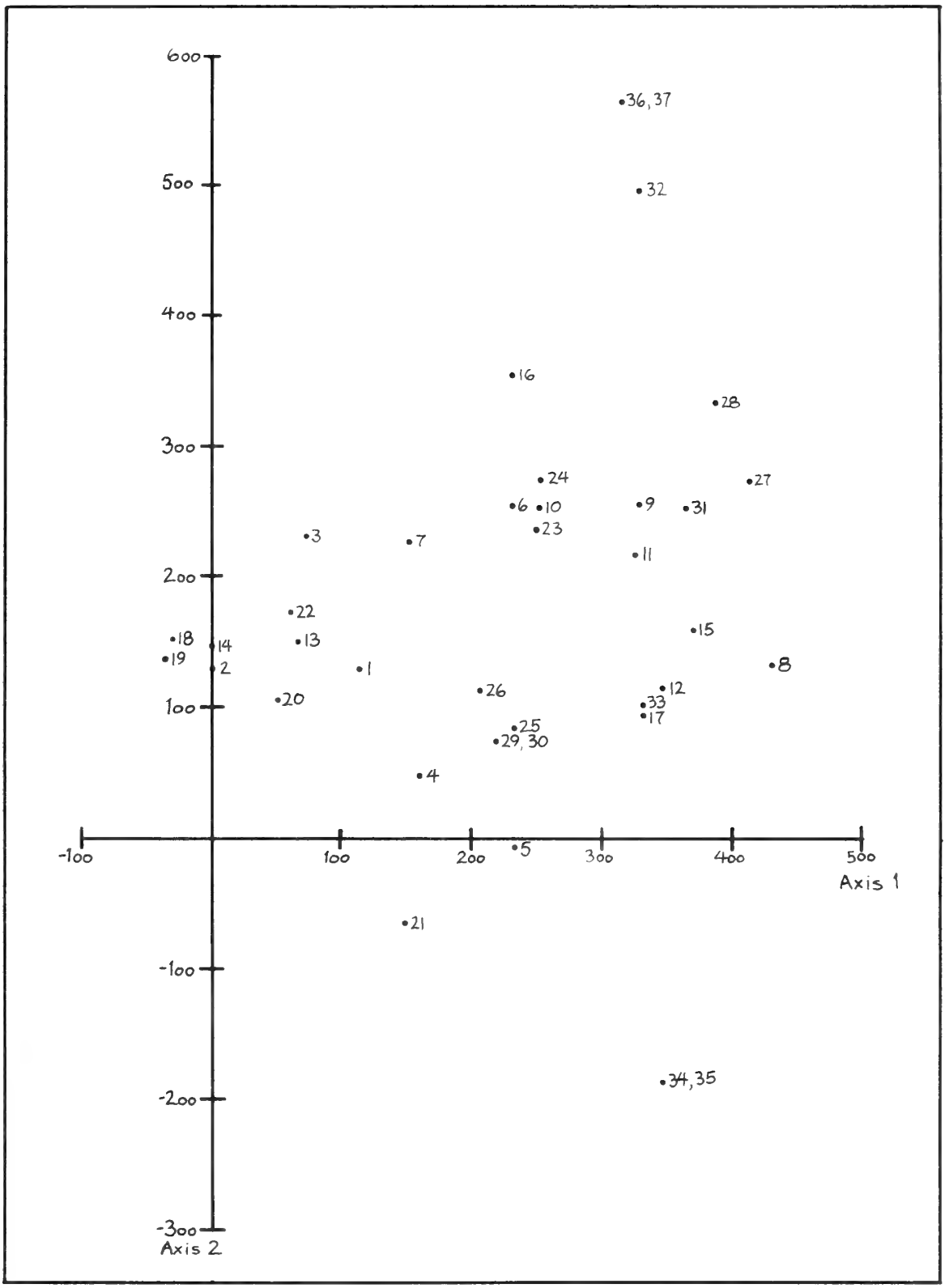

Fig. 26. DECORANA SPECIES ORDINATION. The 37 species sampled in the 21 transects are located in ordinal space along 2 axes. Numbers represent species sampled and are found in Table 5. Seventy-eight percent of the floristic information was captured in the first axis. While clustering of species is not great, generally, those points left of 200 on Axis 1 fall within Great Basin Sagebrush and those to the right occur in Cismontane Native Grassland. Species richness in the latter vegetation type explains in part the wider spacing of points in the ordination.

TABLE 6. TWINSPAN SAMPLE AND SPECIES OUTPUT.

Two-way table resulting from application of TWINSPAN to the Dry Lakes Ridge data. Values denote categories of abundance defined by pseudospecies cut levels. The cut levels were the default values 0,2,5,10,20, and the raw data specified abundance by percent biomass.

			Transcripts	
			33322342252344445553	
			36297835814148952100X	
16	MONA	LANC	33-2---------------1-	00000
31	VULP	REFL	32---1----------------	000010
27	LUPI	BICO	323-------------------	000011
28	CORE	FILA	433-------------------	000011
32	MADI	ELEG	12--------------------	000011
36	TRIF	LONG	-1--------------------	000011
37	GALI	HALL	-1--------------------	000011
11	ERIO	DAVI	1-21---12------------	000100
15	CAMI	MICR	1134----3------------	000100
9	EROD	CICU	4455---45------------	000101
8	MADI	MINI	114--2-1-------------	000110
23	PHAC	EGEN	21----2---------------	000110
24	KOEL	MACR	31----2---------------	000110
26	CALY	MALA	--1---1---------------	000110
33	SILE	VERE	-1---1----------------	000110
12	VULP	BROM	4452532-32----------2	000111
17	LINA	ANDR	1113-12---------------	000111
25	POA	SCAB	--2---1--5------------	001000
10	CRYP	MURI	-------21------------	001001
29	QUER	WISL	---------2------------	001001
30	AMOR	CALI	---------2------------	001001
34	LOTU	HUMI	-----3----------------	00101
35	STIP	ELME	-----2----------------	00101
5	BROM	TECT	112555544513--21-----	0011
6	CAMI	INTE	-1-----54-2-----------	0011
4	CHRY	NAUS	-----313--4-----------	01
21	AGOS	RETR	-----2---------1-----	01
7	LUPI	BREW	45-----445555--2--1-2	10
20	PSOR	PHYS	---------2---3-1-----	1100
18	SITA	HYST	--------------------1-	110100
19	UNKN	1	-------------------1--	110100
2	ARTE	TRID	---3--5-4-55555555555	110101
3	PENS	CENT	-1--------1---------2	110110
14	SALV	COLU	--------------------2	110110
1	TAUS	PARI	----------4----------	110111
22	GALI	ANDR	------------1--------	110111
13	VIOL	PURP	212--1------------115	111
			00000000001111111111	
			00001111110011111111	
			00010001110110000001	
			001 001001 0001111	
			0110001	
			001	

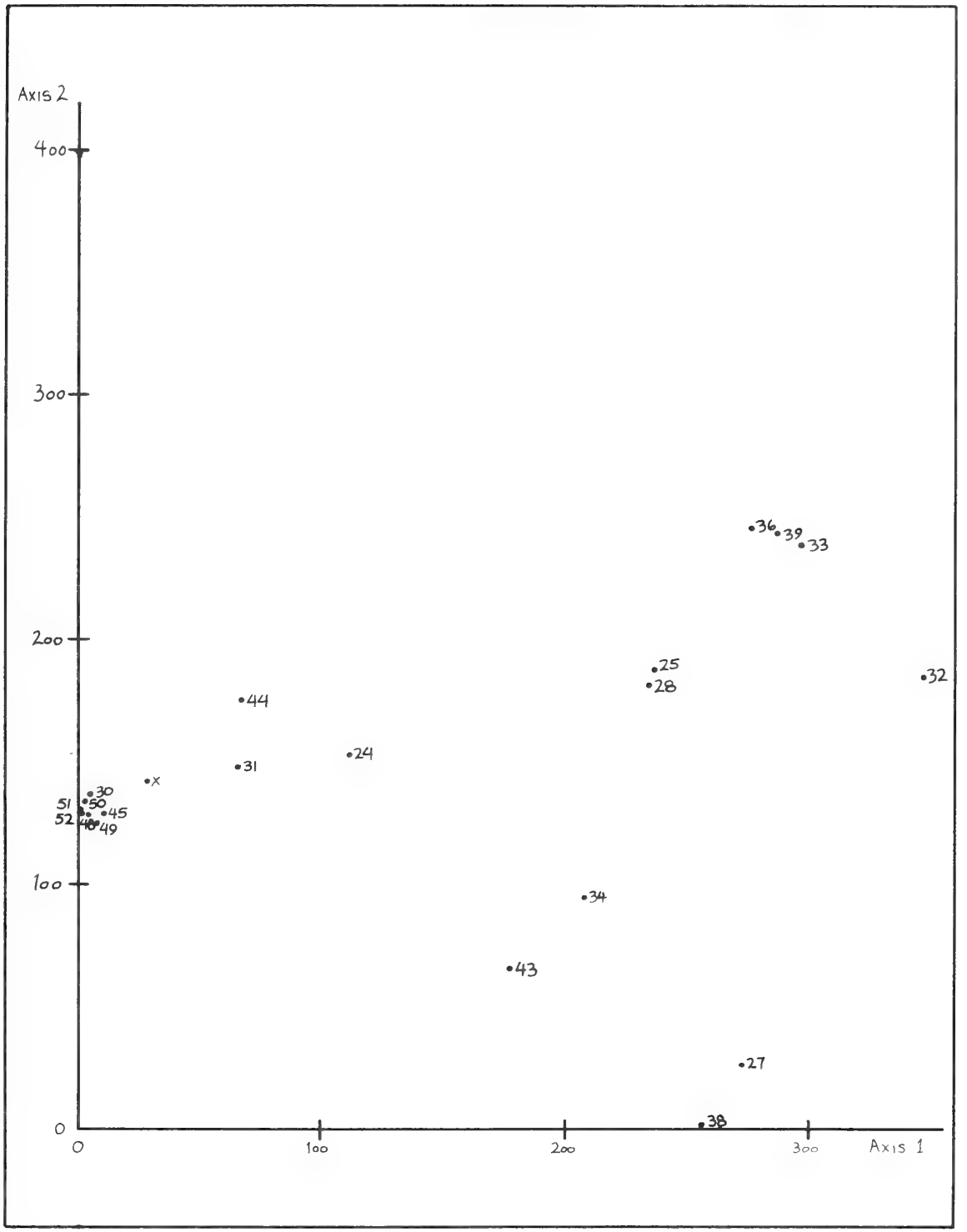

Fig. 27. DECORANA SAMPLE ORDINATION. The 21 transects (randomly numbered) are located in ordinal space along 2 axes. Approximately 78% of the information is contained in Axis 1. Clustering of points indicates similarity, whereas distance indicates dissimilarity. Two vegetation types are evident in this ordination. The cluster on the left represents transects occupying Great Basin Sagebrush, whereas the more widely spaced points to the right represent Cismontane Native Grassland. The greater species richness in the latter group explains their greater spacial distribution in the ordination. Species composition in each transect is shown in Table 6.

nation technique derived from a method known as reciprocal averaging or correspondence analysis (Hill, 1973). TWINSPAN is an polythetic divisive method of classification that is designed to construct ordered two-way tables (Hill, 1979).

The DECORANA results using relative cover data yielded an eigenvalue of 0.78205 for the first axis and 0.28498 for the second axis, indicating that much of the floristic variation was captured by the first axis of the transect ordination. Figures 26 and 27 show scatter plots of first and second axis scores for the species and transect ordinations. Clustering of species and/or samples indicate ordinal similarity. Two major classes or communities are recognized, Great Basin Sagebrush and Cismontane Native Grassland.

Although there are some transitional transects, the ordinations emphasize the strong floristic distinction between these two community types. Transects in Great Basin Sagebrush were more homogenous than those in grassland, so they are clustered more strongly in the scatter plot. They have much lower species richness than grassland transects, as shown clearly in the ordered table provided by TWINSPAN (Table 6).

The ordination of the species sampled are not clustered as clearly as the samples; however, community dominants of the Great Basin Sagebrush, Artemisia tridentata (2), Psoralea physodes (20), and Cismontane Native Grassland, Bromus tectorum (5), Vulpia bromoides (12), Poa scabrella (25), etc., show definite dissimilarity on the community level and some similarity on the species level (Fig. 26). This is more evident along axis 1 alone. Chrysothamnus nauseosus ssp. consimilis (4), Lupinus breweri (7), and Agoseris retrorsa (21), are very similar on axis 1 and in an intermediate position in the ordination and may represent an ecotone between the two plant communities (Fig. 26), which is quite evident in the field.

The two-way table TWINSPAN summarizes the relationship between species and samples (Table 6). The two plant communities mentioned above are separated by the first division of TWINSPAN, and occupy opposite ends of the first DECORANA axis (Fig. 27). Transects 25, 27, 29, 43, 32, 34, 33, 38, and 36 constitute the class Great Basin Sagebrush, and Transects X, 52, 51, 30, 31, 50, 49, 48, 45, and 44 make up the class Cismontane Native Grassland. Transect 24 is classified as Cismontane Native Grassland by TWINSPAN; however, it more likely represents an ecotone between the two because it contains dominants from the Great Basin Sagebrush, as well as grassland species not generally found in other transects of the Great Basin Sagebrush class (Table 6).

In summary, quantitative analysis of the vegetation reveals a very abrupt boundary between Great Basin Sagebrush and Cismontane Native Grassland community types on Dry Lakes Ridge. The Cismontane Native Grassland type is more variable in composition and contains more species than the Great Basin Sagebrush type. There is little evidence of floristic or environmental gradients between these two types.

Post-Fire Vegetation

On 2 July 1985, the Wheeler Fire burned nearly the entire study area, leaving only small patches of vegetation unburned. Prior to this, it had been 37 years since the previous fire, the Wheeler Spring Fire of 1948, which burned the south-facing slope of Dry Lakes Ridge up to the basins. The basins had not been burned since 1932.

Many pre-fire dominant species of chaparral reappear from ligno-tubers as early as two weeks after a fire. Other dominant shrub species return with the advent of the winter rains via seed deposited in the soil the previous year.

Following the rains, a large number of annual species appear. Known as fire-followers, these species are rarely found when the chaparral is in or near climax stage; however, several species found in the burn area following the Wheeler Fire also were found prior to the fire in various disturbed habitats. Many species known to occur on Dry Lakes Ridge (Smith, 1976) but not seen for several years have been discovered or rediscovered during the Winter and Spring of 1986. These include Amsinckia menziesii (Small-flowered Fiddleneck), Antirrhinum kelloggii (Kellogg's Snapdragon), Calyptridium monandrum, Camissonia californica (California Sun-cups), Emmenanthe penduliflora (Whispering Bells), Eschscholzia caespitosa (Tufted Poppy), Gilia achilleaefolia (Yarrow Phlox), Lemmonia californica (California Lemmonia), Lotus stipularis (Balsam Lotus), Malacothrix floccifera, Mentzelia micrantha (Small-flowered Stickleaf), Nicotiana attenuata, Phacelia brachyloba (Short-lobed Phacelia), and Silene multinerva (Ribbed Campion).

The lower slopes of the ridge were seeded with Lolium multiflorum (Italian Ryegrass) by the Forest Service in an effort to control erosion. The seed was sown via helicopter at a rate of 6 lbs./acre. This seeding has introduced a few exotic species new to Dry Lakes Ridge, or has greatly increased their abundance. Two such examples are Hordeum vulgare var. trifurcatum (Beardless Barley) and H. v. var. vulgare (Common Barley). The firebreak was hand-seeded with Bromus hordeaceus (Soft Chess) except for the area of the basins. Below is a list of annual herbs occurring in the burn area where Chaparral had dominated:

Amsinckia menziesii
Antirrhinum kelloggii
Avena sativa*
Bromus diandrus*
Bromus hordeaceus*
Calyptridium monandrum
Camissonia californica
Camissonia intermedia
Camissonia micrantha
Capsella bursa-pastoris*

Chaenactis glabriuscula
Chenopodium album*
Claytonia perfoliata
Coreopsis bigelovii
Cryptantha corollata
Cryptantha muricata
Emmenanthe penduliflora
Eschscholzia caespitosa
Gilia achilleaefolia
Hordeum vulgare trifurcatum*
Hordeum vulgare vulgare*
Lemmonia californica
Linanthus parryae
Lolium multiflorum*
Lotus stipularis
Lupinus hirsutissimus
Lupinus luteolus
Malacothrix floccifera
Mentzelia congesta
Mentzelia micrantha
Mentzelia montana
Microseris linearifolia
Mimulus brevipes
Mimulus johnstonii
Nicotiana attenuata
Phacelia brachyloba
Phacelia cicutaria hubbyi
Phacelia longipes
Phacelia tanacetifolia
Polemonium micranthum
Salvia columbariae
Silene multinervia
Trifolium albopurpureum
Vulpia megalura*

* Introduced species

FLORA

Due to the difficulty of reaching the summit of Dry Lakes Ridge, few botanists have visited this site, as mentioned previously. Henry M. Pollard took extensive notes on the flora of Ventura and Santa Barbara Counties (especially the Ventura River drainage) and collected a great many plants on Dry Lakes Ridge. Clifton F. Smith (1976) noted many plants that either he or Pollard saw on Dry Lakes Ridge and he emphasized the area's uniqueness. Many other botanists known to have made collections in the area have restricted their collecting to along Hwy. 33.

ANALYSIS OF THE INVENTORY -- The inventory of the native and naturalized taxa of vascular plants, conducted by Rick Burgess and me between June 1982 and June 1986, resulted in the collection of 416 specimens. From these plants and those seen by myself or noted by Smith (1976) or Pollard (card file (CF) at SBBG), or from various herbarium specimens (from UCSB, SBM, or SBBG), 273 taxa were identified, belonging to 62 families, 173 genera, and 268 species (Appendix III). This flora consists of 234 native and 38 introduced (36 naturalized and 2 planted) species, comprising 86.3% and 13.7% of the flora, respectively. The three largest families are the Asteraceae (38 taxa, 6 of which are naturalized), Poaceae (30 taxa, including 15 naturalized), and the Fabaceae (26 taxa, including 3 naturalized). These 3 families represent 34.4% of the flora. Table 10 contains the fifteen largest families, which represent a total of 67.8% of the flora.

TABLE 7. FIFTEEN LARGEST FAMILIES OF DRY LAKES RIDGE.

FAMILY	% Flora	# Taxa*	# Naturalized
Asteraceae	13.9	38	6
Poaceae	11.0	30	15
Fabaceae	9.5	26	2
Scrophulariaceae	5.1	14	1
Hydrophyllaceae	3.3	9	0
Polygonaceae	3.3	9	2
Lamiaceae	3.0	8	1
Polemoniaceae	3.0	8	0
Rosaceae	3.0	8	0
Brassicaceae	2.6	7	3
Rhamnaceae	2.6	7	0
Onagraceae	2.2	6	0
Boraginaceae	1.8	5	0
Fagaceae	1.8	5	0
Rubiaceae	1.8	5	0

* Species and infraspecific taxa.

ENDEMICS -- Although there are no known endemics to Dry Lakes Ridge, the study area contains five plants endemic to the general region: Brickellia nevinii (Asteraceae), Ceanothus crassifolius var. planus (Rhamnaceae; Fig. 28), Eriodictyon crassifolium var. denudatum (Hydrophyllaceae), Galium cliftonsmithii (Rubiaceae), and Romneya trichocalyx (Papaveraceae).

MORPHOLOGICAL INTERMEDIATES -- Intermediates occur between two subspecies of manzanita: Arctostaphylos glandulosa ssp. adamsii (Fig. 29) and A. glandulosa ssp. mollis. The former subspecies has not been reported previously from the study area but is found characteristically in San Diego and Riverside Counties. At best, the taxonomy of this species complex is confusing (Knight, 1981; Wells, pers. comm., 1985). The distinguishing characteristics of the two subspecies overlap to varying degrees in the morphologic intermediates. Arctostaphylos glandulosa ssp. adamsii possesses light-colored, puberulent branchlets without long hairs, whereas ssp. mollis has dark, puberulent branchlets with long soft hairs. The intermediate plants have a few long, white hairs scattered along the branchlets and a greater variation in leaf shape than representives of either subspecies.

A putative hybrid (Quercus Xalvordiana) between Quercus douglasii and Q. turbinella ssp. californica has been identified (K. P. Steele and K. Nixon, pers. comm., 1986) from Dry Lakes Ridge. Quercus douglasii (Blue Oak), however, is not known to occur within Ventura County. The nearest locality for it is in the foothills of the Santa Ynez Mountains above Santa Barbara.

Brickellia nevinii (Fig. 30) is known to hybridize with B. californica in the general area of Dry Lakes Ridge. In fact, both species occur together within the study area, such as at Belly Ache Falls where a hybrid plant exhibits intermediate characteristics of both parent species.

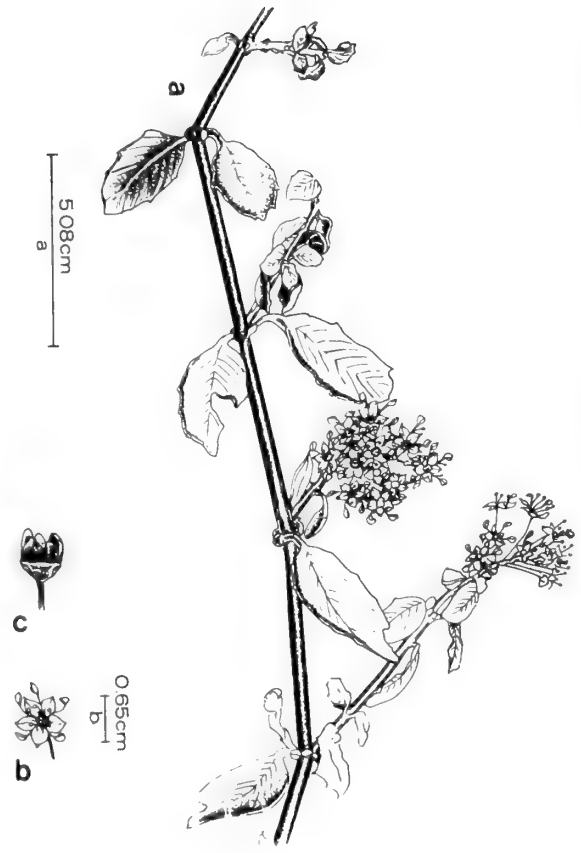

Fig. 28. *Ceanothus crassifolius* var. *planus*. a. habit; b. flower; c. capsule.

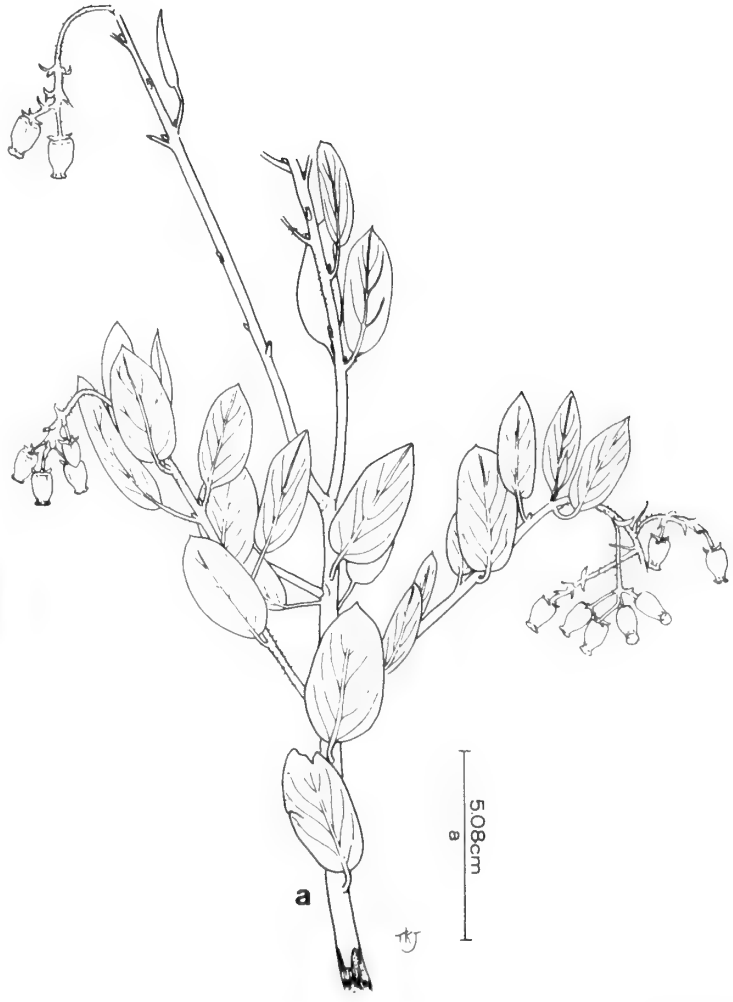

Fig. 29. *Arctostaphylos glandulosa* ssp. *adamsii*. a. habit.

RARE, ENDANGERED, OR THREATENED PLANTS -- There are no plants known in the study area that are found on any Federal (USDI, 1985), or State lists (CDFG, 1985). Two plants from Dry Lakes Ridge, Brickellia nevinii and Galium clifton-smithii are found on List 4, Plants of Limited Distribution, by the California Native Plant Society (Smith and York, 1984).

OTHER NOTEWORTHY COLLECTIONS -- Several noteworthy plants from Dry Lakes Ridge are as follows:

-- Apocynum pumilum (Apocynaceae): Only known locality in the Ventura/Santa Barbara County area (Smith, 1976).

-- Chrysothamnus nauseosus ssp. consimilis (Asteraceae; Fig. 31): Most commonly associated with Pinyon-Juniper Woodland in high desert areas and not like the region of Dry Lakes Ridge.

-- Boschniakia strobilacea (Orobanchaceae; Fig. 32): Only known locality in Ventura and Santa Barbara Counties. The nearest stations include: Mt. Williamson in the western San Gabriel Mountains, Los Angeles County: the Scodie Mountains in the southern Sierra Nevada, Kern County; and on San Benito Peak, San Benito County. The Dry Lakes Ridge population fills a large gap in the known distribution of this species and is considered extraelevational for southern California (Thorne, pers. comm., 1985).

-- Orobanche bulbosa (Orobanchaceae; Fig. 33): An uncommon parasitic plant occurring in disturbed chaparral areas; only Ventura County locality.

-- Ericameria arborescens (Asteraceae; Fig. 34): An uncommon shrub found in disturbed areas such as along firebreaks at the summit of Dry Lakes Ridge and on the eastern Santa Ynez Mountains.

Fig. 30. *Brickellia nevinii.* This local endemic occurs on dry, loose, south-facing slopes in chaparral, as at Belly Ache Falls where this photo was taken. It has been known to hybridize with *B. californica* in the vicinity of Dry Lakes Ridge.

Fig. 31. *Chrysothamnus nauseosus* ssp. *consimilis.* This taxon is usually found associated with Pinyon-Juniper Woodland in the Mojave Desert. Here it is found in open areas of the basins and along Hwy. 33 in the Sespe Creek drainage, as in this photo.

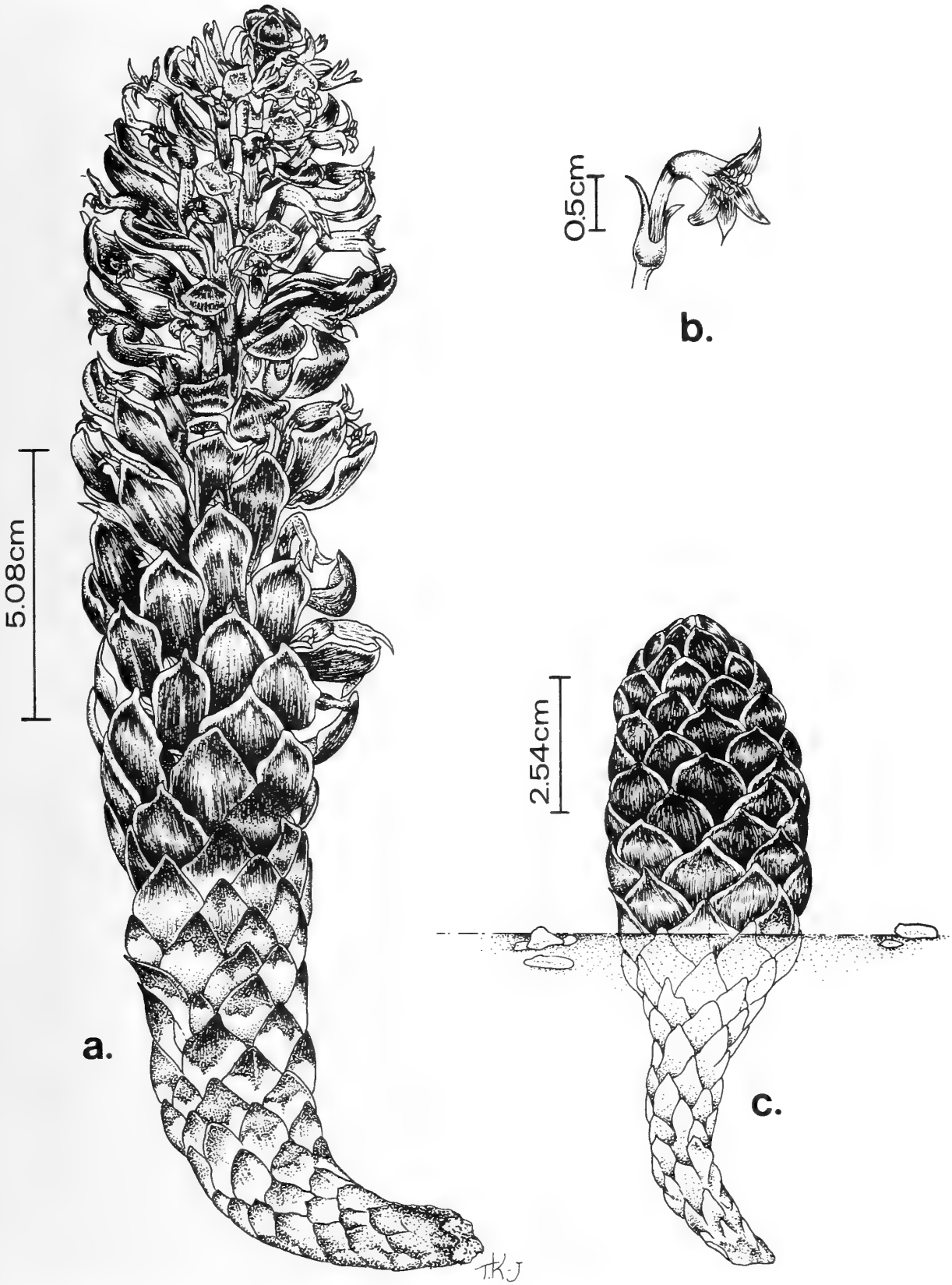

Fig. 32. *Boschniakia strobilacea. a. habit; b. flower; c. emergent shoot.*

Fig. 33. *Orobanche bulbosa*. This parasitic plant attaches itself to the roots of *Adenostoma fasciculatum* and other chaparral species and was found growing on the steep, south-facing slope on the firebreak.

Fig. 34. *Ericameria arborescens*. This plant, although uncommon, typicaly occupies disturbed habitats such as firebreaks including those on Dry Lakes Ridge. This westward view shows a portion of Basin 1A in the background, prior to the Wheeler Fire of 1985.

-- Lotus stipularis (Fabaceae): One of two known localities in Ventura County. It has not been reported from Santa Barbara County.

-- Calochortus weedii var. vestus (Liliaceae): An uncommon species that has not been seen on Dry Lakes Ridge since July 1978.

-- Pinus ponderosa (Pinaceae): An isolated stand. The nearest locality is on Pine Mountain, six miles northward, where Ponderosa Pine occurs only as scattered individuals in a forest dominated by Jeffrey Pine.

-- Stipa elmeri (Poaceae): Extraelevational outlier and one of only two known stations in Ventura and Santa Barbara Counties. This plant is usually found between 7,000-11,000 ft.

PALEOBIOGEOGRAPHY

The orogeny of Dry Lakes Ridge has been suggested as middle Pliocene (Axelrod, 1976, 1980) and major deformation as middle Pleistocene (Gross, 1958). Few Pliocene floras have been described near Dry Lakes Ridge; however, inferences can be drawn from the fossil floras located to the north of the study area.

The climate during the late Pliocene was apparently wetter and cooler overall than today in the Dry Lakes Ridge region, as indicated by the presence of Coastal Mixed Conifer Forest in the Sonoma floras in the San Francisco Bay region (Axelrod, 1976) and the Mt. Reba, Turlock Lake and Broken Hills floras (Axelrod, 1980). With the Coast Ranges (including Dry Lakes Ridge) not appreciably elevated during that time, the marine influence extended inland to the Sierra Nevada. Milder winters along the western foothills of the southern Sierra Nevada were the result of this marine influence, as were higher water temperatures, about $2^{\circ}F$ higher than today (Kern, 1973; Axelrod, 1980). Summer rain was apparently still prevalent during Pliocene time. This mild climatic regime allowed Ceanothus spinosus, Karwinskia, Lyonothamnus, Malosma laurina, Persea, Robinia, Sapindus, and others to survive as far north as the San Francisco Bay region. These plants are now restricted to coastal and insular southern California, the Southwest, or Mexico. Of these, only Ceanothus spinosus and Malosma laurina are found at Dry Lakes Ridge today. The Dry Lakes Ridge area still had not risen out of the sea, at least not appreciably. Terrain was still low, permitting a more even distribution of precipitation. Drought stress was lower than at present due to the cooler summers, allowing migration of some species into areas of lower precipitation than would presently support them. Axelrod (1980) proposes that many of the taxa from various vegetation zones at this time

intermingled to a greater degree than they do under the current Mediterranean climate.

Fossil evidence of the Mt. Reba, Broken Hills, Turlock Lake, Oakdale, and Mulholland floras of central California supports the idea that the topography of southern and central California was not substantially elevated until the Pleistocene. The Mt. Reba flora (7 million years B.P., today at 8,700 ft. (2675 m) in Alpine County, apparently was growing under a mean annual temperature of 56°F and at a maximum elevation of 3,000 ft. (923 m), based on inferences from modern relations of vegetation and climate in the Sierra Nevada. The flora is a combination of taxa similar to those of modern Douglas Fir and Mixed Evergreen Forests in the 2,000-3,000 ft. (615-923 m) foothill belt of the Sierra Nevada. Elements of this flora found on Dry Lakes Ridge today include Pinus ponderosa, Quercus chrysolepis, and Salix lasiolepis. The estimated difference in the mean annual temperature of 22°F between the fossil site and that now at Mt. Reba implies that the area has been elevated about 6,000 ft. (1846 m) in the last 5-7 million years.

The Broken Hills flora (Axelrod, 1980), from approximately 5 million years B.P., near Kettleman City in the San Joaquin Valley supported Oak Woodland vegetation like that now found on the interior slopes of the Santa Lucia Mountains. The mild, warm climate of the fossil site allowed Magnolia, Persea, Populus, Sapindus, and Ulmus to grow. Of these, only Populus trichocarpa is found today of Dry Lakes Ridge. The fossil area is now at a height of 715 ft. (220 m) above sea level, which indicates the relief of this locality has changed very little in the past 5+ m.y. and supports semi-desert vegetation.

The Turlock Lake flora (Axelrod, 1980), now at an elevation of 240 ft. (74 m) and dated at 4.5 million years B.P., is located on the lower foothills of the Sierra Nevada, east of Fresno. The fossil flora contained species now in the Oak Woodland belt, close to Mixed Evergreen Forest, apparently indicating a slight rise in precipitation due possibly to the build-up in the icecaps in the boreal region. The increase is suggested by the comparisons with the older, more xeric, Oakdale flora (6 million years B.P.) located a few miles northwest of the Turlock Lake flora (Axelrod, 1944c).

Chaparral taxa became most diverse during the Middle Hemphillian (=late Miocene time) (6 million years B.P.) which was the driest part of the Tertiary Epochs in this region. Chaparral components migrated in large numbers northward into the San Francisco Bay Area at this time, as shown by the Mulholland flora (Axelrod, 1944b; 1980). Axelrod's (1980) comparison of the Hemphillian floras of central California suggested a distributional gradient of the vegetation from Closed-Cone Forest along the coastal strip that was replaced inland by (Live-) Oak Woodland, and by Broadleaved Evergreen (Sclerophyll) Forest on higher, cooler levels of the coastal zone. Oak Woodland/Cismontane Native Grasslands occupied areas of the Central Valley north of the marine embayment, up the Sierra piedmont. Between 1,000-1,500 ft. (307-461 m), broadleaved sclerophyll vegetation dominated the landscape, intermingling with Lower Montane Coniferous Forests near 2,500-3,000 ft. (769-923 m), which extended eastward over the Sierran summit divide. Oak-Juniper Woodland took over in the lowlands in the lee of the Sierra Nevada. This migration episode brought components of several vegetation types to lower elevations than occurs today and, therefore, allowed various units to occupy areas such as Dry Lakes Ridge which include Hemphilian chaparral, coniferous forest, oak woodland, etc.

With the onset of glaciation during the Pleistocene Epoch, accompanied by the rapid orogeny of the Sierra Nevada and the Coast, Transverse and Peninsular Ranges, many shifts in the florule units occurred relatively rapidly. The late Wisconsin climate was wetter and cooler than at present or during the Upper Pliocene. The presence of Pseudotsuga and/or Sequoia in the Carpinteria (Chaney & Mason, 1934), Tomales (Mason, 1934), and Willow Creek (Santa Cruz Island) (Chaney, 1934) flosas indicates a southward shift of these coastal forests 150-200 miles (240-320 km) south of their Pliocene and present distribution (Axelrod, 1981).

The Carpinteria flora (Chaney & Mason, 1934) contains many elements of the present Closed-Cone Pine Forest that occurs 200 miles (320 km) farther north on the Monterey Peninsula. Some of the taxa contained in the flora are Cupressus goveniana, Juniperus californica, Myrica californica, Pinus muricata, P. radiata, P. sabiniana, Pseudotsuga menziesii, Ceanothus thyrsiflorus, none of which now occurs as far south as Carpinteria.

The Willow Creek or Santa Cruz Island flora (Chaney, 1934), dated at 14,000 B.P., still contained Pseudotsuga menziesii, Pinus remorata, Cupressus goveniana and others, indicating the continued effects of glaciation to the northeast. A drying trend was indicated in the San Bruno flora of the San Francisco Bay Area at this time (Potbury, 1934; Axelrod, 1981).

Woodrat middens from the Mojave Desert (Wells and Berger, 1967) indicate a downward shift of Pinyon-Juniper Woodland by as much as 1,800 ft. (553 m) during Pleistocene glaciation. Radiocarbon dates of 7,400 to 19,500 and 40,000 years B.P. firmly affix ages of the middens.

It can be reasonably assumed from the above evidence that the Transverse Ranges, which were mountainous by Pleistocene time, were invaded by Mixed Conifer Forests that periodically extended to lower elevations (around 3,000 ft. (923 m)) than equivalents are found today.

During the Holocene, the climate became warmer and drier, peaking in the Xerothermic (=Hypsithermal) between 8,000-4,000 B.P. (Johnson, 1977; Axelrod, 1981). This is supported by Heusser (1978) in her analysis of 12,000 years of pollen deposited in the Santa Barbara Basin. The pollen record indicated a decrease in conifers and an increase in Quercus and more xeric taxa with time. The coniferous forests, which had previously migrated southward, now retreated northward, leaving disjunct occurrences in the more favorable localities such as the Purisima Hills for Pseudotsuga menziesii (Smith, 1976) and Dry Lakes Ridge for Pinus ponderosa. Xeric taxa moved northward and coastward during this time only to be restricted to the driest sites as the post-Xerothermic climate became moister.

The modern result is a highly complex flora at Dry Lakes Ridge, formed under varying climatic and topographic conditions with contributions from several earlier floras.

It seems most probable that Pinus ponderosa and its associates on Dry Lakes Ridge are relicts of the Pleistocene. Although climatic conditions today may be favorable for a more widespread distribution, competition with chaparral species probably keeps P. ponderosa from expanding to poorer sites.

Similarly, the occurrence of Artemisia tridentata and associates is probably relictual, persisting either from the Xerothermic period or from a dry phase of the Pleistocene, as described above.

ENVIRONMENTAL SENSITIVITY

The basin areas at the summit of Dry Lakes Ridge are more sensitive to disturbance than the chaparral and are the areas of greatest concern. The relatively low percentage of introduced species probably indicates a rather low level of alteration of the natural environment by man. I have noticed during the course of this study that disturbances caused by human activities either by machine or by horse, are very slow to recover. This is exaggerated in the basins where hoof prints, tire tracks and footpaths severely disturb the topsoil and apparently inhibit native plant growth.

The practice of seeding exotic Lolium multiflorum and Bromus hordeaceus, two non-native grasses, over the burn area and firebreaks, by the Forest Service may have a detrimental effect on the regeneration of chaparral species. Ceanothus crassifolius seedlings, for example, are apparently reduced by increased competition from L. multiflorum (Odion and Nadkarni, manuscript; Magney, 1985).

RECOMMENDATIONS AND COMMENTS

I strongly believe that because of the uniqueness of the relictual, disjunct populations of Ponderosa Pine and Great Basin Sagebrush, and of the Cismontane Native/Introduced Grassland community, as well as the general diversity of the plant assemblages found on Dry Lakes Ridge, careful management practices are warranted. Therefore, the Forest Service should give a protective status to the summit area of Dry Lakes Ridge--especially the site around the basins--by designating the area as Wilderness or a Botanical Reserve. The ridgetop areas containing Manzanita Chaparral with morphological intermediates of Arctostaphylos gland-

ulosa ssp. adamsii and A. glandulosa ssp. mollis, is of significant botanical interest and should be included in the above protection.

The proposed expanded fuelbreak along Dry Lakes Ridge either should be eliminated or it should be constructed in such a manner as to maintain the native flora without disturbance to the plants in the basins. Because the introduced species represent only a small portion of the flora, special emphasis should be given to containing or even reducing the number of these exotics where possible. If a new fuelbreak must be constructed (possibly a moot point after the Wheeler Fire), it should be restricted to the areas of chaparral with a minimum of soil disturbance and no introduction of exotic or native species. This procedure will help maintain the integrity of the native flora.

A program of prescribed burning is advisable to 1) maintain a low level of fuel in the chaparral areas to avoid another intense conflagration as the Wheeler Fire, and 2) increase diversity of the chaparral communities.

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Cirsium proteanum J.T. Howell

APPENDICES

A P P E N D I X I

CLASSIFICATION OF UPLAND VEGETATION

Based on Cheatham and Haller 1975

* = Naturalized or planted species.

MAJOR CATEGORY: Scrub and Chaparral
HABITAT TYPE: High Desert Scrub
MAJOR SUBDIVISION: Sagebrush Scrub
MINOR SUBDIVISION: Great Basin Sagebrush
CHARACTERISTIC SPECIES:

Artemisia tridentata	Chrysothamnus nauseosus

HABITAT TYPE: Chaparral
MAJOR SUBDIVISION: Mixed Chaparral
MINOR SUBDIVISION: Californian Mixed Chaparral
CHARACTERISTIC SPECIES:

Adenostoma fasciculatum	Arctostaphylos glandulosa
Arctostaphylos glauca	Ceanothus crassifolius
Ceanothus leucodermis	Ceanothus oliganthus
Cercocarpus betuloides	Eriodictyon crassifolium
Heteromeles arbutifolia	Lotus scoparius
Mimulus longiflorus	Pickeringia montana
Prunus ilicifolia	Quercus dumosa
Quercus wislizenii	Rhamnus californica
Rhamnus crocea	Rhus laurina
Toxicodendron diversilobum	

MAJOR SUBDIVISION: Chamise Chaparral
CHARACTERISTIC SPECIES:

Adenostoma fasciculatum	Arctostaphylos glandulosa
Ceanothus crassifolius	Ceanothus leucodermis

MAJOR CATEGORY: Grasslands
HABITAT TYPE: Valley and Foothill Grasslands
MAJOR SUBDIVISION: Cismontane Native/Introduced Grassland
CHARACTERISTIC SPECIES:

Avena barbata*	Avena fatua*
Bromus breviaristatus	Bromus hordeaceus*
Bromus rubens*	Bromus tectorum*
Camissonia spp.	Clarkia purpurea
Erodium cicutarium*	Lupinus bicolor
Lupinus breweri	Poa scabrella
Stipa elmeri	Vulpia bromoides
Vulpia reflexa	

MAJOR CATEGORY: Woodlands
HABITAT TYPE: Oak Woodlands
MAJOR SUBDIVISION: Southern Oak Woodland
MINOR SUBDIVISION: Southern Coastal/Interior Oak Woodland; C = Coastal; I = Interior
CHARACTERISTIC SPECIES:

Heteromeles arbutifolia C	Juglans californica I
Quercus agrifolia C & I	Rhamnus californica C
Rhus trilobata I	Sambucus mexicana C
Toxicodendron diversilobum C & I	

MAJOR CATEGORY: Forests
HABITAT TYPE: Broadleaved Evergreen Forest
MAJOR SUBDIVISION: Live Oak Forest
MINOR SUBDIVISION: Coast Live Oak Forest
CHARACTERISTIC SPECIES:
Quercus agrifolia

HABITAT TYPE: Lower Montane Coniferous Forest
MAJOR SUBDIVISION: Coast Range Coniferous Forest
MINOR SUBDIVISION: Coast Range Ponderosa Pine Forest
CHARACTERISTIC SPECIES:
Pinus ponderosa

MINOR SUBDIVISION: Bigcone Spruce-Canyon Oak Forest
CHARACTERISTIC SPECIES:

Pseudotsuga macrocarpa	Quercus chrysolepis

A P P E N D I X I I

CLASSIFICATION OF WETLAND VEGETATION

Based on Cowardin et al. 1979

SYSTEM: Palustrine
- CLASS: Emergent Wetland
  - SUBCLASS: Persistent
    - HABITAT: Bedrock, perennial stream
      - DOMINANCE TYPES:
        - *Lobelia dunii*
        - *Typha domingensis*
  - SUBCLASS: Nonpersistent
    - HABITAT: Seep, seasonal
      - DOMINANCE TYPES:
        - *Eleocharis parishii*
        - *Juncus oxymeris*
        - *Mimulus guttatus*
        - *Rorippa nasturtium-aquaticum*
- CLASS: Scrub-Shrub Wetland
  - SUBCLASS: Broad-leaved Deciduous
    - HABITAT: Streambank, seasonal/perennial
      - DOMINANCE TYPES:
        - *Rubus ursinus*
        - *Salix exigua*
        - *Salix lasiolepsis*
  - SUBCLASS: Broad-leaved Evergreen
    - HABITAT: Streambank, seasonal/perennial
      - DOMINANCE TYPES:
        - *Baccharis glutinosa*
        - *Baccharis pilularis* ssp. *consanguinea*
- CLASS: Forested Wetland
  - SUBCLASS: Broad-leaved Deciduous
    - HABITAT: Streambank, perennial/seasonal
      - DOMINANCE TYPES:
        - *Alnus rhombifolia*
        - *Platanus racemosa*
        - *Populus trichocarpa*
        - *Salix laevigata*
  - SUBCLASS: Broad-leaved Evergreen
    - HABITAT: Streambank/seep, seasonal/perennial
      - DOMINANCE TYPES:
        - *Umbellularia californica*

A P P E N D I X I I I

ANNOTATED CATALOGUE OF THE VASCULAR PLANTS

INTRODUCTION -- The Annotated Catalogue includes all native, naturalized, and planted species of plants found on Dry Lakes Ridge during the study and those cited in the literature and found in local herbaria. The catalogue is arranged phylogenetically for ferns, club mosses, gymnosperms, and angiosperms; thereafter, families, genera, species, and infraspecific taxa are arranged alphabetically.

Included for each species in the catalogue below are scientific name, common name, occurrence/abundance (abundant, common, scattered, occasional, uncommon, and rare), habit (annual, biennial, perennial, herb, vine, grass, shrub, and tree), habitat, plant community, collection number, and "naturalized" or "planted" if not native. Occurrence refers to the frequency in which the plant occurs in the study area, whereas abundance identifies the abundance at local sites. Habitat refers to the kind of place where the plant was found (slope, aspect, soil/ substrate, sun/ shade). Plant community identifies the general plant associations noted for the individual species and follows the Cheatham and Haller classification described in Appendix I (upland) or the Cowardin et al. classification described in Appendix II (wetland). Collection number is the number of the voucher specimen(s) of the taxa that are deposited at the UCSB Herbarium. Three numbering systems are used: 1) a continuous sequential system denoted by three digits, e.g. 305, 306... (collected by Rick Burgess), 2) a yearly sequential system beginning each year, e.g. 128-82, 202-83, 18-84, etc. (collected by the author), the last two digits represent the year of the collection, and 3) those numbers following the last name of various collectors. The latter

include the acronym for the Herbarium in which it is housed, e.g., Santa Barbara Botanic Garden (SBBG). Several taxa have not been seen and collected by the author; in these instances, reference is made as to literature citation or notes, such as those of Henry Pollard, for which a card file is kept at SBBG. Naturalized species are those that have either escaped from cultivation or where otherwise purposefully or incidentally introduced from areas beyond California (e.g. Europe). Acer negundo var. californica and Pinus radiata, although native to California, were planted in the study area under direction of either the Highway Department or the Forest Service and are not native to the study area.

A N N O T A T E D C A T A L O G U E

DIVISION TRACHEOPHYTA

SUBDIVISION LYCOPSIDA

CLASS LYCOPODIAE

ORDER SELAGINELLALES

SELAGINELLACEAE Spike-Moss Family

Selaginella bigelovii Underw. Bigelow's Little Club-Moss. Perennial forming mats; scattered/common; in shade, north-facing slopes; Coast Live Oak Forest, Bigcone Spruce-Canyon Oak Forest; 228-83, 2-84.

SUBDIVISION PTEROPSIDA

CLASS FILICAE

ORDER FILICALES

ASPIDIACEAE Wood Fern Family

Dryopteris arguta (Kaulf.) Watt. Coastal Wood Fern. Perennial fern; uncommon/occasional; shade, north-facing slope, seep; Southern Riparian Woodland/Coast Live Oak Forest; 229-83.

PTERIDACEAE Bracken Family

Adiantum capillus-veneris L. Venus-Hair Fern. Perennial fern; uncommon/rare; shade, moist soil; Palustrine Emergent Wetland, Coast Live Oak Forest; 185-83.

Cheilanthes clevelandii D.C. Eaton. Cleveland's Lip Fern. Perennial fern; rare/rare; rock outcrops along north rim of easternmost basin (Basin 1A); Californian Mixed Chaparral; 204.

Pellaea mucronata (D.C. Eat.) D.C. Eat. var. mucronata. Bird's Foot Fern. Perennial fern; uncommon/occasional; rock outcrops, south-facing slopes; Californian Mixed Chaparral; 145.

Pityogramma triangularis (Kaulf.) Maxon. Goldenback Fern. Perennial fern; rare/uncommon; rock outcrops along rims of basins; Californian Mixed Chaparral.

CLASS CONIFERAE

ORDER CONIFERALES

PINACEAE Pine Family

Pinus ponderosa Laws. Ponderosa Pine or Yellow Pine. Tree; occasional/scattered; basins and perimeters of basins; Coast Range Ponderosa Pine Forest; 198-83.

*Pinus radiata D. Don. Monterey Pine. Tree; rare (planted); south-facing slope along Hwy. 33 at base of firebreak (burned in 1985 fire); Californian Mixed Chaparral.

Pseudotsuga macrocarpa (Vasey) Mayr. Bigcone Spruce. Tree; scattered/common; steep north-facing slopes; Bigcone Spruce-Canyon Oak Forest; 1-84.

CLASS ANGIOSPERMAE

SUBCLASS DICOTYLEDONEAE

ACERACEAE Maple Family

Acer macrophyllum Pursh. Big-Leaf Maple. Tree; common/scattered; stream courses or moist slopes; Palustrine Forested Wetland, Coast Live Oak Forest; 226-83.

*Acer negundo L. ssp. californicum (T.& G.) Wesmael. Box Elder. Tree; rare/rare; planted at Highway Dept. sand tank along Hwy. 33 on south-facing slope; Palustrine Forested Wetland/Californian Mixed Chaparral.

ANACARDIACEAE Sumac Family

Rhus laurina Nutt. in T.& G. [Malosma l. Nutt. ex Abrams.] Laural Sumac. Shrub; common/abundant; south-facing slopes mostly below 3,000 ft.; Californian Mixed Chaparral, Shrub-Scrub Wetland; 191-83.

Rhus trilobata Nutt. ex T.& G. var. quinata (Greene) Jeps. Squaw Bush. Shrub; scattered/common; slopes and edges of basins; Oak Woodlands; 169-83.

Toxicodendron diversilobum (T.& G.) Greene. Poison-Oak. Shrub or vine; scattered/common; shaded areas on slopes; Southern Oak Woodland, Coast Live Oak Forest.

APIACEAE Carrot Family

Lomatium dasycarpum (T.& G.) Coult.& Rose ssp. dasycarpum. Hairy Wing-fruit. Perennial herb; scattered/rare; shaley soil on north-facing slope, as at Hwy. 33; Californian Mixed Chaparral; 78-86.

Sanicula crassicaulis Poepp. ex DC. Sanicle, Snakeroot. Perennial herb; scattered/uncommon; shaded areas along north-facing slope; Californian Mixed Chaparral; 31-83.

Tauschia parishii (Coult. & Rose) Macbr. Parish's Tauschia. Perennial herb; uncommon/uncommon; sandy loam soil along eastern portion of Basin 1A and north rim of Basin 2A; Cismontane Native Grassland, Canyon Oak Forest; 78-82, 123-84.

APOCYNACEAE Dogbane Family

Apocynum pumilum (Gray) Greene var. pumilum. Dogbane. Perennial herb; uncommon/rare; shade of Ponderosa Pine in Basin 2A; Coast Range Ponderosa Pine Forest; 152-83.

ASCLEPIADACEAE Milkweed Family

Asclepias eriocarpa Benth. Broadleaf Milkweed. Perennial herb; occasional/scattered; basins and base of firebreak, south-facing slope; Cismontane Native Grassland, Californian Mixed Chaparral; 300.

ASTERACEAE Sunflower Family

Agoseris retrorsa (Benth.) Greene. Mountain Dandelion. Perennial herb; common/scattered; basins and open areas along south-facing slope; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest, Southern Oak Woodland/Californian Mixed Chaparral; 66-82, 83-82, 53-83, 80-83.

Artemisia douglasiana Bess. in Hook. Mugwort. Perennial herb; common/scattered; shaded areas along streams and/or under trees; Southern Oak Woodlands, Palustrine Forested Wetland; 55-86.

Artemisia dracunculus L. Tarragon. Perennial herb; scattered/occasional; open and semi-shaded areas about Basin 4; Coast Range Ponderosa Pine Forest; 155-83, 197-83.

Artemisia tridentata Nutt. spp. tridentata. Basin Sagebrush. Shrub; scattered/common; Basins 1B, 2A, 2B, and a few along firebreak near Basins 3 and 4; Great Basin Sagebrush; 205-83.

Baccharis glutinosa Pers. Mule Fat, Water Wally. Shrub; scattered/common; streambanks in moist soil; Palustrine Scrub-Shrub Wetland; 25-83.

Baccharis pilularis DC. ssp. consanguinea (DC.) C.B. Wolf. Coyote Brush. Shrub; scattered/common; disturbed places such as firebreaks and along stream courses; Palustrine Scrub-Shrub Wetland, Californian Mixed Chaparral; 232-83.

*Bidens pilosa L. Beggar-Ticks. Perennial herb; uncommon/scattered; moist soil in disturbed areas, south-facing slope; Palustrine Scrub-Shrub Wetland, Californian Mixed Chaparral; 23-84, 188.

Brickellia californica (T.& G.) Gray. California Brickel Bush. Shrub; scattered/common; south-facing slopes and intermittent stream courses; Californian Mixed Chaparral, Palustrine Scrub-Shrub Wetland; 182-83, 306.

Brickellia californica X B. nevinii 'Hybrid'. Hybrid Brickel Bush. Shrub; rare/rare; south-facing slope in shalely soil, Belly Ache Falls; Californian Mixed Chaparral; 95-86.

Brickellia nevinii Gray. Nevin's Brickel Bush. Shrub; scattered/uncommon; south-facing slopes, Belly Ache Falls; Californian Mixed Chaparral; 201-83.

*Centaurea melitensis L. Star Thistle, Tocalote. Annual herb; occasional/common; waste areas along Hwy. 33, south-facing slope near Ortega Hill Trail; Southern Oak Woodland, Californian Mixed Chaparral; 65-82, 51-86.

Chaenactis glabriuscula DC. var. curta (Gray) Jeps. Pincushion, Golden Girls. Annual herb; scattered/uncommon; along north edge of Basin 1A, south-facing slope, more com-mon on lower slopes after burn; Cismontane Native Grassland, Californian Mixed Chaparral (burn); 122-84.

Chrysothamnus nauseosus (Pall.) Britton. ssp. consimilis (Greene) Hall & Clem. Rabbit-Brush. Shrub; scattered/common; Basins 1A, 1C, 2A, 3, and 4 and occasionally along Hwy. 33; Great Basin Sagebrush, Chamise Chaparral (Manzanita Chaparral); 204-83, 209-83.

Cirsium proteanum J. T. Howell. Red Thisle. Annual herb; occasional/scattered, in basins, especially Basin 3; Cismontane Native Grassland; 158-83, 52-86.

*Conyza canadensis (L.) Cronq. Horseweed. Annual herb; uncommon/scattered; base of firebreak; Californian Mixed Chaparral, Palustrine Emergent Wetland; 200-83.

Coreopsis bigelovii (Gray) Hall. Bigelow's Coreopsis, Tickseed. Annual herb; occasional/scattered; talus slopes, south-facing slopes; Californian Mixed Chaparral; 15-83.

Corethrogyne filaginifolia (H.& A.) Nutt. var. glomerata Hall. Cudweed-Aster. Perennial herb; scattered/occasional; Basins 1A, 2B, 3, and open areas on slopes after fire; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest, Californian Mixed Chaparal; 165-83, 293.

Ericameria arborescens Greene. [Haplopappus a. (Gray) Hall] Golden Fleece. Shrub; scattered/uncommon; firebreak on ridgetop; Manzanita Chaparral, Californian Mixed Chaparral; 199-83.

Erigeron foliosus Nutt. Fleabane. Perennial herb; uncommon/common; tree stumps in Basin 3; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest; 159-83.

Eriophyllum confertiflorum (DC.) Gray var. confertiflorum Golden-Yarrow. Perennial herb/subshrub; common/abundant; south-facing slope in open areas such as firebreak, scattered about south-facing slopes of basins; Californian Mixed Chaparral, Cismontane Native Grassland; 69-83, 239.

Gnaphalium californicum DC. California Everlasting. Biennial herb; scattered/common; firebreak, south-facing slope, open areas; Californian Mixed Chaparral; 64-82, 295.

*Gnaphalium luteo-album L. Everlasting, Cudweed. Annual herb; uncommon/scattered; damp soil in seasonally wet area at base of firebreak at Hwy. 33; Palustrine Emergent Wetland, Californian Mixed Chaparrral; 83-83.

Hazardia squarrosa (H.& A.) Greene var. obtusa (Greene) Jeps. [Haplopappus s. H.& A.] Prickly Haplopappus. Shrub; occasional/scattered; firebreak, south-facing slope; Californian Mixed Chaparral; 208-83.

Heterotheca camphorata (Eastw.) Semple. [Chrysopsis villosa (Push) Nutt. var. echioides (Benth.) Gray]. Golden-Aster, Telegraph Weed. Perennial herb; uncommon/scattered; open area in Basin 2A; Great Basin Sagebrush; 180-83.

Hulsea heterochroma Gray. Bicolored Hulsea. Biennial herb; scattered/uncommon; edges of Basins 1A, 2A, and 4; Cismontane Native Grassland, Californian Mixed Chaparral, Coast Range Ponderosa Pine Forest; 76-82.

*Lactuca serriola L. Prickly Lettuce. Annual herb; rare/uncommon; disturbed areas such as following burn, Basin 1C/2A; Great Basin Sagebrush/Canyon Live Oak Forest; 34-86.

Madia elegans D. Don ssp. elegans. Elegant Tarweed. Annual herb; occasional/common, in open area in Basin 2A; Great Basin Sagebrush; 77-83.

Madia minima (Gray) Keck. Tiny Tarweed. Annual herb; scattered/common; open area between Basins 1B and 1C; Cismontane Native Grassland/Great Basin Sagebrush; 38-83.

Malacothrix floccifera (DC.) Blake. Woolly Malacothrix. Annual herb; occasional/common; dry talus slopes following burn, south slope; Californian Mixed Chaparral; 44-86.

Matricaria matricarioides (Less.) Porter. Pineapple Weed, Manzanilla. Annual herb; rare/rare; disturbed area, north-facing slope along Hwy. 33; Californian Mixed Chaparral; 88-86.

Microseris linearifolia (DC.) Sch.-Bip. Narrow-leaf Dandelion. Annual herb; uncommon/scattered; open area of south-facing slope of Basin 1A, following burn; Cismontane Native Grassland; 26-86.

Rafinesquia californica Nutt. California Rafinesquia. Annual herb; scattered/uncommon; firebreak, south-facing slope; Chamise Chaparral, Californian Mixed Chaparral; 87-83, 49-86, 54-86.

Senecio douglasii DC. var. douglasii. Douglas' Groundsel, Ragwort. Shrub; common/scattered; disturbed areas along south slope, Belly Ache Falls; Californian Mixed Chaparral; 184-83.

Solidago californica Nutt. California Goldenrod, Oreja De Liebre. Perennial herb; uncommon/common; tree stump in Basin 3: Coast Range Ponderosa Pine Forest, Cismontane Native Grassland; 196-83.

Solidago occidentalis (Nutt.) T.& G. Western Goldenrod. Perennial herb; uncommon/occasional; moist soil near seep, north-facing slope; Palustrine Emergent Wetland; 119-84.

*Sonchus oleraceus L. Sow-Thistle. Annual herb; scattered/occasional; Hwy. 33 about seep at eastern end of Dry Lakes Ridge; Palustrine Emergent Wetland; 218-83.

Stephanomeria cichoriacea Gray. Fort Tejon Milk-Aster. Perennial herb/subshrub; scattered/uncommon; rock outcrops, east-facing slope; Californian Mixed Chaparral; 220-83.

Stephanomeria virgata Benth. ssp. virgata. Wand Milk-Aster. Annual herb; uncommon/common; Ponderosa pine in Basin 3; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest; 157-83.

BETULACEAE Birch Family

Alnus rhombifolia Nutt. White Alder. Tree; occasional/abundant; perennial streambanks, Belly Ache Falls, North Fork Matilija Creek; Palustrine Forested Wetland; 202-83.

BORAGINACEAE Borage Family

Amsinckia menziesii (Lehm.) Nels.& Macbr. Small-flowered Fiddleneck. Annual herb; rare/rare; open area on firebreak following burn; Manzanita Chaparral; 38-86.

Cryptantha corollata (Jtn.) Jtn. Crowned Forget-Me-Not. Annual herb; scattered/common; disturbed places, south-facing talus slopes; Californian Mixed Chaparral; 18-83, 23-86.

Cryptantha muricata (H.& A.) Nels.& Macbr. var. denticulata (Greene) Jtn. Nettle Forget-Me-Not. Annual herb; scattered/common; firebreak west of Basin 2B following burn and on north-facing slope; Manzanita Chaparral, Californian Mixed Chaparral; 41-86, 90-86.

Cryptantha muricata (H.& A.) Nels.& Macbr. var. muricata Nettle Forget-Me-Not. Annual herb; scattered/common; sandy area of Basin 1A; Cismontane Native Grassland; 90-83, 207-83.

Cryptantha torreyana (Gray) Greene. Torrey's Forget-Me-Not. Annual herb; scattered/common; north side of Dry Lakes Ridge along Hwy. 33 (C. Smith, 1976); Californian Mixed Chaparral; 115-83.

BRASSICACEAE Mustard Family

Arabis sparsiflora Nutt. in T.& G. var. arcuata (Nutt.) Roll. Few-Flowered Rock-Cress. Perennial herb; uncommon/scattered; north edge (south-facing slope) of Basin 1A; Cismontane Native Grassland; 94-83.

*Brassica geniculata (Desf.) J. Ball. Summer Mustard. Perennial herb; common/scattered; waste places, Belly Ache Falls; Californian Mixed Chaparral, Southern Oak Woodlands; 65-83, 112-84.

*Capsella bursa-pastoris (L.) Medic. Shepherd's Purse. Annual herb; rare/rare; disturbed roadside of Hwy. 33, north-facing slope; Californian Mixed Chaparral; 91-86.

Erysimum capitatum (Dougl.) Greene. Western Wallflower. Biennial herb; rare/uncommon; rocky areas, intermittent streambank, north slope; Palustrine Scrub-Shrub Wetland, Californian Mixed Chaparral; 114-84.

*Rorippa nasturtium-aquaticum (L.) Schinz & Thell. Water-Cress. Perennial herb; scattered/common; seep at east end of Dry Lakes Ridge along Hwy. 33; Palustrine Emergent Wetland; 213-83.

Streptanthus coulteri (Wats.) Greene var. coulteri [Caulanthus c. Wats.] Coulter's Twisted-Flower. Annual herb; scattered/common; Basin 3; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest; 82-82, 73-86.

Thysanocarpus laciniatus Nutt. ex T.& G. var. crenatus (Nutt.) Brewer. Lace-Pod, Fringe-Pod. Annual herb; scattered/occasional; north-facing slope; Californian Mixed Chaparral; 30-83, 92-86.

CAPRIFOLIACEAE Honeysuckle Family

Lonicera subspicata H.& A. var. johnstonii Keck [L. j. McMinn] Chaparral Honeysuckle. Shrub; scattered/occasional; under Ponderosa Pine in Basin 1B, north-facing slope; Coast Range Ponderosa Pine Forest/Great Basin Sagebrush, Californian Mixed Chaparral; 206-83, 262.

Sambucus caerulea Raf. Mountain Elderberry. Shrub; occasional/rare; gully adjacent to Belly Ache Falls, south-facing slope (usually at higher elevations); Southern Oak Woodlands/Californian Mixed Chaparral; 72-83.

Sambucus mexicana Presl. Elderberry. Shrub; common/scattered; slopes and about edges of basins; Californian Mixed Chaparral, Southern Oak Woodlands, Palustrine Scrub-Shrub Wetland, Coast Range Ponderosa Pine Forest; 95-83.

CARYOPHYLLACEAE Pink Family

Silene multinervia Wats. Campion. Annual herb; occasional/scattered; burned south-facing slope; Californian Mixed Chaparral; 24-86.

Silene verecunda Wats. ssp. platyota (Wats.) Hitchc. & Maguire. Catchfly. Perennial herb; uncommon/scattered; south-facing slope of Basin 1A; Cismontane Native Grassland; 92-83, 260.

*Stellaria media (L.) Vill. Chickweed. Annual herb; uncommon/rare; knoll in Basin 2A after burn; Bigcone Spruce-Canyon Oak Forest/Great Basin Sagebrush; 43-86.

CHENOPODIACEAE Goosefoot Family

*Chenopodium album L. Lamb's Quarters. Annual herb; rare/scattered; disturbed areas along Hwy. 33, north-facing slope; Californian Mixed Chaparral; 89-86.

*Salsola iberica Sennen & Pau. Russian-Thistle. Annual herb; common/scattered; waste places such as at base of fire-break; Californian Mixed Chaparral; 87-86.

CONVOLVULACEAE Morning-Glory Family

Calystegia macrostegia (Greene) Brummit ssp. intermedia (Abrams) Brummit. Morning-Glory. Perennial vine; common/abundant; sometimes covering shrubs, south-facing slope as at Belly Ache Falls; Palustrine Scrub-Shrub Wetland, Californian Mixed Chaparral; 164-84.

Calystegia malacophylla (Greene) Munz ssp. pedicellata (Jeps.) Munz. Wooly Morning-Glory. Perennial vine; common/scattered; slopes and basins; Cismontane Native Grassland, Californian Mixed Chaparral, Coast Range Ponderosa Pine Forest; 17-83.

CRASSULACEAE Stonecrop Family

Dudleya lanceolata (Nutt.) Brit. & Rose. Live-Forever. Perennial herb; uncommon/occasional; rock outcrops, slopes; Californian Mixed Chaparral; 96-86.

CUCURBITACEAE Gourd Family

Marah fabaceus (Naud.) Greene var. agrestis (Greene) Stocking. Wild Cucumber, Wild Cucumber. Perennial vine; common/abundant; sometimes covering shrubs on slopes; Californian Mixed Chaparral; Southern Oak Woodlands; 170-83, 23-84.

CUSCUTACEAE Dodder Family

Cuscuta ceanothi Behr. Dodder, Witch's Hair. Annual parasitic vine; scattered/common; shrubs, north- and south-facing slopes; Californian Mixed Chaparral; 25-84, 85-86.

DATISCACEAE Datisca Family

Datisca glomerata (Presl.) Baill. Durango Root. Perennial herb; rare/rare; moist soil as at seep on north-facing slope and Hwy. 33, intermittent stream drainages; Palustrine Emergent Wetland; 225-83.

ERICACEAE Heath Family

Arctostaphylos glandulosa Eastw. ssp. adamsii (Munz) Munz. Adams' Eastwood Manzanita. Shrub; common/abundant; dominating on ridgetop in shallow sandstone soils of Matilija and Juncal Formations; Manzanita Chaparral; 116-84.

Arctostaphylos glandulosa Eastw. ssp. mollis (Adams) Wells. Eastwood Manzanita. Shrub; abundant/common; dominating the ridgetop in shallow soils on the Matilijia and Juncal Formations; Manzanita Chaparral; 75-82.

Arctostaphylos glauca Lindl. Big-Berry Manzanita. Shrub; scattered/occasional; north-facing slope and south-facing slope near Wheeler Gorge; Californian Mixed Chaparral; 171-83.

EUPHORBIACEAE Spurge Family

Eremocarpus setigerus (Hook.) Benth. Dove Weed, Turkey-Mullein. Annual herb; occasional/scattered; disturbed areas such as at base of firebreak; Palustrine Emergent Wetland, Californian Mixed Chaparral; 31-85.

FABACEAE Pea Family

Amorpha californica Nutt. California False Indigo. Shrub; scattered/occasional; basins and firebreak nearby; Coast Range Ponderosa Pine Forest, Canyon Live Oak Forest; 89-83.

Lathyrus vestitus Nutt. ex T.& G. ssp. puberulus (White ex Greene) C.L. Hitchc. Wild Pea. Perennial vine; common/scattered; south-facing slope; Californian Mixed Chaparral, Southern Oak Woodland; 9-83, 154.

Lathyrus vestitus Nutt. ex T.& G. ssp. violaceus (Greene) Abrams. Wild Pea. Perennial vine; scattered/occasional; edges of basins; Bigcone Spruce-Canyon Oak Forest, Manzanita Chaparral; 92-82.

Lotus argophyllus (Gray) Greene ssp. decorus (Jtn.) Munz. Silver Lotus. Perennial herb; rare/rare; basins; Great Basin Sagebrush, Cismontane Native Grassland; Pollard 19JUN63 (SBBG).

Lotus crassifolius (Benth.) Greene. Buck Lotus. Perennial herb; rare/rare; one locality on firebreak just west of Basin 2B; Californian Mixed Chaparral; 81-82.

Lotus davidsonii Greene. Davidson's Lotus. Perennial herb; rare/rare; basins "Lakes Ridge", "Maricopa Rd. Matilija-Sespe divide" and Ortega Hill Trail @ 4,000 ft.; Coast Range Ponderosa Pine Forest, Californian Mixed Chaparral; Pollard 22JUN55 (SBBG), Pollard 4MAY46 (SBBG).

Lotus humistratus Greene. Annual herb; scattered/occasional; north- and south-facing slopes; Californian Mixed Chaparral; 29-83, 80-86.

Lotus micranthus Benth. Annual herb; uncommon/occasional; seasonal wetland at base of firebreak at Hwy. 33; Palustrine Emergent Wetland; 179-83.

Lotus scoparius (Nutt.) Ottley var. scoparius. Deerweed, Bird's Foot Trefoil. Perennial herb/subshrub; common/abundant; disturbed areas such as firebreak; Californian Mixed Chaparral; 178-83.

Lotus stipularis (Benth.) Greene. Balsam Lotus. Perennial herb; common/abundant; south-facing slope following fire, reported from basins by Henry Pollard (SBBG); Californian Mixed Chaparral, Coast Range Ponderosa Pine Forest; 22-86.

Lotus strigosus (Nutt. in T.& G.) Greene var. hirtellus (Greene) Ottley. Bishop's Lotus. Annual herb; rare/rare; ridge (Henry Pollard, SBBG); Californian Mixed Chaparral.

Lotus strigosus (Nutt. in T.& G.) Greene var. strigosus. Bishop's Lotus. Annual herb; common/abundant; sandy loam soil, basins; Canyon Oak Forest, Great Basin Sagebrush; 70-86.

Lupinus bicolor Lindl. ssp. marginatus D. Dunn. Bicolored Lupine. Annual herb; common/abundant; basins; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest; 86-82, 29-86.

Lupinus breweri Gray var. breweri. Brewer's Lupine. Perennial herb; common/abundant; basins; Coast Range Ponderosa Pine Forest, Great Basin Sagebrush, Cismontane Native Grassland; 85-82, 60-86.

Lupinus excubitus Jones var. hallii (Abrams) C.P. Smith. Hall's Bush Lupine. Perennial herb/subshrub; scattered/occasional; disturbed slopes along Hwy. 33; Californian Mixed Chaparral; 11-83, 164.

Lupinus hirsutissimus Benth. Nettle Lupine. Annual herb; common/scattered; disturbed areas, burns, along south-facing slope; Californian Mixed Chaparral; 26-84.

Lupinus longifolius (Wats.) Abrams. Bush Lupine. Perennial herb/subshrub; scattered/common; disturbed areas along south slope; Californian Mixed Chaparral; 12-83, 202.

Lupinus luteolus Kell. Yellow Lupine. Annual herb; scattered/rare; shalely soil, north-facing slope; Californian Mixed Chaparral; 94-86.

*Medicago sativa L. Alfalfa. Perennial herb; rare/rare; south-facing slope, Hwy. 33, Belly Ache Falls, seed possibly falling off hay trucks; Californian Mixed Chaparral; 66-83.

*Melilotus albus Desr. White Sweet-Clover. Annnual herb; scattered/common; disturbed areas like Belly Ache Falls; Californian Mixed Chaparral, Palustrine Emergent Wetland; 183-83.

Pickeringia montana Nutt. Chaparral Pea. Shrub; uncommon/scattered; firebreak on shallow soil of the Matilija Formation; Californian Mixed Chaparral, Manzanita Chaparral; 74-82.

Psoralea physodes Dougl. California Tea. Perennial herb; common/abundant; all basins; Great Basin Sagebrush, Coast Range Ponderosa Pine Forest; 93-82, 75-83.

*Spartium junceum L. Spanish Broom. Shrub; common/common; invadinng disturbed areas along Hwy. 33; Californian Mixed Chaparral; 245.

Thermopsis macrophylla H.& A. var. macrophylla. False Lupine. Perennial herb; occasional/common; Basins 3 and 4; Coast Range Ponderosa Pine Forest; 156-83, 103-84.

Trifolium albopurpureum T.& G. Rancheria Clover. Annual herb; scattered/common; basins; Cismontane Native Grassland; 61-86.

Trifolium longipes Nutt. ssp. atrorubens (Greene) J.M. Gillet. Clover. Perennial herb; occasional/scattered; basins; Coast Range Ponderosa Pine Forest, Cismontane Native Grassland; 61-83, 96-83.

FAGACEAE Beech Family

Quercus agrifolia Nee var. agrifolia. Coast Live Oak, Encina. Tree; common/abundant; gullies, streambanks, and mesic north-facing slopes, mostly below 3,000 ft. (1,000 m); Southern Oak Woodlands/Coast Live Oak Forest; 194-83.

Quercus chrysolepis Liebm. Canyon Live Oak, Golden-cup Oak, Maul Oak. Tree/shrub; common/scattered; edges and knolls of basins and on north-facing slope; Bigcone Spruce-Canyon Oak Forest, Californian Mixed Chaparral; 105-84, 74-86.

Quercus dumosa Nutt. Scrub Oak. Shrub; common/abundant; slopes, primarily south-facing; Californian Mixed Chaparral; 14-83, 167-83, 181-83, 19-84 (Ortega Hill).

Quercus turbinella Greene ssp. californica Tucker. Desert Oak. Shrub; common/abundant; more xeric slopes than Q. dumosa; Californian Mixed Chaparral; 113-84.

Quercus wislizenii A. DC. Interior Live Oak. Tree/shrub; common/scattered; north- and south-facing slopes, knolls, and edges of basins; Bigcone Spruce-Canyon Oak Forest, Californian Mixed Chaparral; 129-82, 52-83, 53-83.

FUMARIACEAE Bleeding-Heart Family

Dicentra chrysantha (H.& A.) Walp. Golden Eardrops. Perennial herb; rare/uncommon; open areas along Hwy. 33 as at near Rose Valley turnoff, north-facing slope; Californian Mixed Chaparral; 302.

GARRYACEAE Silk-Tassel Family

Garrya veatchii Kell. Silk-Tassel Bush. Shrub; scattered/occasional; north- and south-facing slopes; Californian Mixed Chaparral; 2-83, 146.

GERANIACEAE Geranium Family

*Erodium cicutarium (L.) L'Her. Redstem Filaree, Afilerillo. Annual herb; common/abundant; basins and disturbed areas on slopes; Cismontane Native Grassland, Californian Mixed Chaparral; 55-83.

HYDROPHYLLACEAE Waterleaf Family

Emmenanthe penduliflora Benth. Whispering Bells. Annual herb; scattered/common; slopes following burn; Californian Mixed Chaparral; 15-86.

Lemmonia californica Gray. Lemmon's California Waterleaf. Annual herb; rare/scattered; divide between Basin 2A and 2B following burn; Coast Range Ponderosa Pine Forest; 42-86, Smith 4264 (SBBG).

Nemophila pedunculata Dougl. ex Benth. Little-Foot Nemophila. Annual herb; uncommon/scattered; southern edge of Basin 3; Bigcone Spruce-Canyon Oak Forest/Coast Range Ponderosa Pine Forest/Cismontane Native Grassland; 27-83, 191.

Phacelia brachyloba (Benth.) Gray. Short-lobed Phacelia. Annual herb; common/abundant; slopes after burn, especially dense near ridgetop; Manzanita Chaparral, Californian Mixed Chaparral; 20-86, 30-86.

Phacelia cicutaria Greene var. hubbyi (Macbr.) J.T. Howell. Catepillar Phacelia. Annual herb; scattered/common; south-facing slope; Californian Mixed Chaparral; 64-83, 21-86, 45-86, 200.

Phacelia egena (Greene ex Brand) Const. Rock Phacelia. Perennial herb; scattered/common; south-facing slopes and basins, Basin 1A; Californian Mixed Chaparral, Coast Range Ponderosa Pine Forest, Cismontane Native Grassland; 97-83, 258, 66-86.

Phacelia longipes Torr. ex Gray. Long-stem Phacelia. Annual herb; scattered/common; dry south-facing talus slopes; Californian Mixed Chaparral; 16-83.

Phacelia tanacetifolia Benth. Wild-Heliotrope. Annual herb; scattered/common; south-facing slopes, especially after burn: Californian Mixed Chaparral; 46-86.

Turricula parryi (Gray) Macbr. Poodle-Dog Bush, Sticky Nama. Perennial herb/subshrub; rare/rare; ridge along firebreak in 1955 (Smith, 1976), nearest current populations are along firebreaks on Nordhoff Ridge and Murrieta Divide (9-85); Californian Mixed Chaparral, Manzanita Chaparral; Smith 4273A (SBBG).

JUGLANDACEAE Walnut Family

Juglans californica Wats. California Black Walnut. Tree/shrub; occasional/scattered; streamcourses, south-facing slope; Southern Oak Woodlands, Palustrine Forested Wetland; 188-83.

LAMIACEAE Mint Family

*Marrubium vulgare L. Horehound. Perennial herb; scattered/common; disturbed areas along Hwy. 33, Belly Ache Falls; Californian Mixed Chaparral, Palustrine Scrub-Shrub Wetland; 67-83.

Monardella lanceolata Gray. Small Horsemint. Annual herb; common/abundant; basins, primarily under Ponderosa Pines; Coast Range Ponderosa Pine Forest, Cismontane Native Grassland; 153-83.

Salvia apiana Jeps. Bee Sage, White Sage. Shrub; scattered/abundant; dry slopes, primarily south-facing; Californian Mixed Chaparral; 236.

Salvia columbariae Benth. Chia. Annual herb; scattered/abundant; dry talus slopes, south-facing and in basins; Californian Mixed Chaparral; 13-83.

Salvia mellifera Greene. Black Sage. Shrub; scattered/common; south-facing dry slope at base of firebreak; Californian Mixed Chaparral; 237.

Scutellaria austiniae Eastw. Skullcap. Perennial herb; rare/rare; south-facing slope at base of firebreak; Californian Mixed Chaparral; 255.

Stachys albens Gray. Woolly Hedge-Nettle. Perennial herb; rare/occasional; soggy soil at seep on north-facing slope at Hwy. 33; Palustrine Emergent Wetland; 118-84.

Trichostema lanatum Benth. Woolly Blue-Curls, Romero. Shrub; scattered/common; open areas such as on the firebreak, south-facing slope; Californian Mixed Chaparral; 177-83.

LAURACEAE Laurel Family

Umbellularia californica (H.& A.) Nutt. California Bay, California Laurel, Oregon Myrtle. Tree; occasional/scattered; north-facing slopes, seeps, and streambanks; Palustrine Forested Wetland, Bigcone Spruce-Canyon Oak Forest, Southern Oak Woodlands; 222-83.

LOASACEAE Stick-Leaf or Blazing Star Family

Mentzelia congesta T.& G. Congested Blazing Star. Annual herb; rare/uncommon; fluffy sandy loam soil in Basin 1A; Cismontane Native Grassland/Great Basin Sagebrush; 89-82, 69-86.

Mentzelia laevicaulis (Dougl. ex Hook.) T.& G. Blazing Star. Perennial herb; scattered/occasional; loose dry soil on south-facing slope, along Hwy. 33; Californian Mixed Chaparral; 192-83.

Mentzelia micrantha (H.& A.) T.& G. Stick-Leaf. Annual herb; common/common; north- and south-facing slopes after fire; Californian Mixed Chaparral; 14-86.

Mentzelia montana (Davids.) Davids. Mountain Blazing Star. Annual herb; rare/rare; "Lakes Ridge" divide west of Hwy. 33 in open meadows with Ponderosa Pines; Coast Range Ponderosa Pine Forest; 62-86, C. Smith 4273 (SBBG).

LOBELIACEAE Lobelia Family

Lobelia dunnii Greene var. serrata (Gray) McVaugh. Dunn's Lobelia. Perennial herb; rare/scattered; rocks in water and seeps, Belly Ache Falls; Palustrine Emergent Wetland; 53-86.

MALVACEAE Mallow Family

*Malva parviflora L. Cheeseweed. Annual herb; rare/rare; disturbed areas along Hwy. 33, north-facing slope; Californian Mixed Chaparral; 79-86.

OLEACEAE Olive Family

Fraxinus dipetala H.& A. Flowering Ash. Tree; mostly north-facing slope; Californian Mixed Chaparral; 230-83.

ONAGRACEAE Evening-Primrose Family

Camissonia californica (Nutt. ex T.& G.) Raven. California Camissonia. Annual herb; scattered/occasional; dry south-facing slopes following burn; Californian Mixed Chaparral; 48-86.

Camissonia intermedia Raven. Intermediate Camissonia. Annual herb; scattered/common; disturbed areas, north- and south-facing slopes, base of firebreak, especially common after burn, basins; Californian Mixed Chaparral; 27-86, 203, 59-86, 86-86.

Camissonia micrantha (Hornem. ex Spreng.) Raven. Tiny Camissonia. Annual herb; occasional/scattered; sandy loam soil in Basin 1A; Cismontane Native Grassland; 79-83, 25-86.

Clarkia deflexa (Jeps.) Lewis & Lewis. Nodding Clarkia. Annual herb; occasional/common; dry south-facing slope, near Belly Ache Falls; Californian Mixed Chaparral; 74-83, 243.

Clarkia purpurea (Curt.) Nels.& Macbr. Purple Clarkia. Annual herb; common/common; Basins 1A, 3 and 4; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest; 253.

Zauschneria californica Presl. ssp. latifolia (Hook.) Keck. California-Fuchsia. Perennial herb; scattered/common; knoll between Basin 1A and 1B, south-facing slope; Bigcone Spruce-Canyon Oak Forest, Coast Range Ponderosa Pine Forest, Californian Mixed Chaparral; 175-83.

OROBANCHACEAE Broom-Rape Family

Boschniakia strobilacea Gray. Ground Cone. Perennial parasitic herb; rare/scattered; on roots of Arctostaphylos glandulosa at eastern edge of Basin 1A; Manzanita Chaparral; 195-83, 124-84, 31-86, 32-86.

Orobanche bulbosa (Gray) G. Beck. Broom-Rape. Perennial parasitic herb; rare/uncommon; firebreak, south-facing slope, apparently on roots of Adenostoma fasciculatum; Chamise Chaparral/Californian Mixed Chaparral; 73-82.

Orobanche fasciculata Nutt. var. franciscana Achey. Broom-Rape. Perennial parasitic herb; rare/uncommon; loose talus near Eriodictyon crassifolium along Hwy. 33 near Rose Valley turnoff; Californian Mixed Chaparral; 27-84.

PAEONIACEAE Peony Family

Paeonia californica Nutt. ex T.& G. California Peony. Perennial herb; scattered/common; slopes under shrubs; Californian Mixed Chaparral; 19-83.

PAPAVERACEAE Poppy Family

Dendromecon rigida Benth. ssp. rigida. Tree Poppy, Bush Poppy. Shrub; scattered/occasional; dry slopes; Californian Mixed Chaparral; 231-83.

Eschscholzia caespitosa Benth. ssp. caespitosa. Tufted Poppy. Annual herb; scattered/common; south-facing slopes following burn; Californican Mixed Chaparral; 13-86.

Romneya trichocalyx Eastw. Matilija Poppy. Perennial herb; occasional/scattered; disturbed areas as along Hwy. 33, as near Belly Ache Falls and base of firebreak; Californian Mixed Chaparral, Southern Oak Woodlands; 73-83, 242.

PLATANACEAE Sycamore Family

Platanus racemosa Nutt. California Sycamore, Aliso. Tree; scattered/common; stream courses; Palustrine Forested Wetland; 193-83.

POLEMONIACEAE Phlox Family

Allophyllum violaceum (Heller) A.& V. Grant. Violet Phlox. Annual herb; occasional/common; sandy loam soil, firebreak west of Basin 4; Bigcone Spruce-Coast Live Oak Forest; 166-83, 294.

Eriastrum sparsiflorum (Eastw.) Mason. Few-Flowered Woolly Phlox. Annual herb; rare/rare; under sagebrush along firebreak in Basin 1B; Great Basin Sagebrush; 176-83, 298.

Gilia achilleaefolia Benth. ssp. achilleaefolia. Achilleas Gilia. Annual herb; scattered/common; south-facing slopes following burn; Californian Mixed Chaparral; 19-86.

Gilia latiflora (Gray) Gray ssp. davyi (Mlkn.) A.& V. Grant. Davy's Gilia. Annual herb; rare/rare; fluffy soil of Basin 1A, firebreak; Manzanita Chaparral, Cismontane Native Grassland/Great Basin Sagebrush; 88-83, 257, 58-86.

Linanthus androsaceus (Benth.) Greene ssp. luteus (Benth.) Mason. Toad Flax, Linanthus. Annual herb; common/abundant; basins, primarily Basin 1A; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest; 90-82, 63-86.

Linanthus parryae (Gray) Greene. Parry's Linanthus. Annual herb; rare/uncommon; Basin 2B following burn; Coast Range Ponderosa Pine Forest, Great Basin Sagebrush; 39-86.

Linanthus pygmaeus (Brand) J.T. Howell ssp. continentalis Raven. Pygmy Linanthus. Annual herb; rare/rare; Dry Lakes Ridge, basins 4,700 ft.; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest; Pollard 29JUN65 (SBBG).

Polemonium micranthum Benth. Phlox. Annual herb; rare/rare; north-facing slope following burn; Californian Mixed Chaparral; 93-86.

POLYGONACEAE Buckwheat Family

Chorizanthe staticoides Benth. ssp. staticoides. Turkish Rugging. Annual herb; occasional/scattered; firebreak and disturbed areas; Californian Mixed Chaparral; 88-82.

Eriogonum davidsonii Greene. Davidson's Buckwheat. Annual herb; scattered/common; basins, especially Basins 1A and 1C; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest, Great Basin Sagebrush; 164-83, 292.

Eriogonum fasciculatum Benth. ssp. fasciculatum. California Buckwheat. Shrub; common/abundant; open areas of slopes; Californian Mixed Chaparral; 299.

Eriogonum inflatum Torr.& Frem. var. deflatum Jtn. Deflated Desert Trumpet. Perennial herb; rare/common; shalely soil on north-facing slope; Californian Mixed Chaparral; 82-86.

Eriogonum nudum Dougl. ex Benth. var. pubiflorum Benth. Naked Buckwheat. Perennial herb; scattered/common; basins; Great Basin Sagebrush, Cismontane Native Grassland; 174-83, 297.

*Polygonum aviculare L. Smartweed, Knotweed. Annual herb; uncommon/occasional; seep east end of ridge along Hwy. 33; Palustrine Emergent Wetland; 221-83.

Polygonum punctatum Ell. Smartweed, Knotweed. Perennial herb; uncommon/occasional; seep, east end of ridge along Hwy. 33; Palustrine Emergent Wetland; 210-83.

Pterostegia drymarioides F.& M. Fairy Mist. Annual herb; scattered/common; shade of shrubs, such as at base of firebreak, south-facing slope; Californian Mixed Chaparral; 21-83, 201.

*Rumex crispus L. Curly Dock. Perenial herb; uncommon/occasional; seasonally moist sites such as at base of firebreak at Hwy. 33; Palustrine Emergent Wetland.

PORTULACACEAE Purslane Family

Calyptridium monandrum Nutt. in T.& G. One-Cap Calyptridium. Annual herb; scattered/common; basins following burn; Coast Range Ponderosa Pine Forest, Great Basin Sagebrush, Bigcone Spruce-Canyon Oak Forest; 35-86, 71-86.

Calyptridium parryi Gray ssp. parryi. Parry's Calyptridium. Annual herb; rare/rare; firebreak west of Basin 2B prior to burn; Manzanita Chaparral; 79-82.

Claytonia perfoliata Donn var. depressa (Gray) v. Poellnitz. [Montia p. var. d. Jeps.] Miner's Lettuce. Annual herb; scattered/common; shaded areas around basins, north-facing slope; Bigcone Spruce-Canyon Oak Forest, Californian Mixed Chaparral; 176.

Claytonia perfoliata Donn var. parviflora (Dougl.ex Hook.) Torr. [Montia parviflora Howell] Miner's Lettuce. Annual herb; common/common; north-facing slope; Californian Mixed Chaparral; 83-86.

RANUNCULACEAE Crowfoot Family

Clematis lasiantha Nutt. in T.& G. Virgin's Bower, Pipestem Clematis. Perennial vine; common/scattered; climbing on shrubs, about slopes; Californian Mixed Chaparral, Palustrine Scrub-Shrub Wetland; 24-84, 101-84.

Delphinium cardinale Hook. Scarlet Larkspur. Perennial herb; uncommon/scattered; open areas on south-facing slope; Californian Mixed Chaparral, Southern Oak Woodlands; 22-85.

RHAMNACEAE Buckthorn Family

Ceanothus crassifolius Torr. var. planus Abrams. Snowball. Shrub; abundant/dominant; slopes; Californian Mixed Chaparral, Ceanothus Chaparral; 1-83, 8-83, 147, 153.

Ceanothus integerrimus H.& A. Deer Brush. Shrub; occasional/scattered; north-facing slope and about basins; Bigcone Spruce-Canyon Oak Forest, Coast Range Ponderosa Pine Forest, Californian Mixed Chaparral; 55-82, 248.

Ceanothus leucodermis Greene. Chaparral Whitethorn, Whitethorn Ceanothus. Shrub; common/abundant; slopes above 3,500 ft.; Californian Mixed Chaparral, Chamise Chaparral; 53-82, 54-82.

Ceanothus oliganthus Nutt. in T.& G. Hoary Ceanothus. Shrub; occasional/scattered; moist north-facing slopes on south slope below 3,500 ft.; Californian Mixed Chaparral, Southern Oak Woodlands; 71-83.

Rhamnus californica Esch. ssp. tomentella (Benth.) C.B. Wolf. Coffeeberry. Shrub; scattered/common; slopes and edges of basins; Californian Mixed Chaparral, Southern Oak Woodlands, Coast Range Ponderosa Pine Forest, Bigcone Spruce-Canyon Oak Forest; 249.

Rhamnus crocea Nutt. in T.& G. Buckthorn, Redberry. Shrub; scattered/occasional; north- and south-facing slopes; Californian Mixed Chaparral; 189-83.

Rhamnus ilicifolia Kell. Hollyleaf Redberry. Shrub; uncommon/occasional; south-facing slope; Californian Mixed Chaparral.

ROSACEAE Rose Family

Adenostoma fasciculatum H.& A. Chamise, Greasewood. Shrub; abundant/dominant; dry slopes and ridgetop, primarily south-facing slopes; Chamise Chaparral, Californian Mixed Chaparral; 82-83.

Cercocarpus betuloides Nutt. ex T.& G. Mountain Mahogany. Shrub; common/scattered; slopes, especially steep dry shale; Californian Mixed Chaparral; 172-83.

Heteromeles arbutifolia M. Roem. Toyon, California Holly, Christmas-Berry. Shrub; scattered/common; moist areas of south-facing slope; Californian Mixed Chaparral, Southern Oak Woodlands; 190-83.

Potentilla glandulosa Lindl. ssp. glandulosa. Cinquefoil. Perennial herb; uncommon/occasional; seep on north slope at Hwy. 33 and Basins 3 and 4; Coast Range Ponderosa Pine Forest, Palustrine Emergent Wetland; 162-83.

Prunus ilicifolia (Nutt.) Walp. Islay, Holly-Leaved Cherry. Shrub; common/scattered; south-facing slope; Californian Mixed Chaparral; 187.

Prunus virginiana L. var. demissa (Nutt.) Sarg. Western Choke Cherry. Shrub; uncommon/occasional; north-facing slope west of Basin 4; Californian Mixed Chaparral, Bigcone Spruce-Canyon Oak Forest; 168-83.

Rosa californica C.& S. California Rose. Shrub; uncommon/scattered; north-facing slope, seep at Hwy. 33; Palustrine Scrub-Shrub Wetland; 223-83.

Rubus ursinus C.& S. California Blackberry. Perennial vine; rare/uncommon; seep along Hwy. 33, north-facing slope; Palustrine Scrub-Shrub Wetland; 227-83.

RUBIACEAE Madder Family

Galium andrewsii Gray ssp. andrewsii. Andrew's Bedstraw. Perennial herb; scattered/common; basins and north-facing slope; Coast Range Ponderosa Pine Forest, Bigcone Spruce-Canyon Oak Forest, Californian Mixed Chaparral; 161-83.

Galium angustifolium Nutt. ssp. angustifolium. Bedstraw. Perennial herb/subshrub; occasional/scattered; slopes; Californian Mixed Chaparral; 63-83, 235.

Galium cliftonsmithii (Demp.) Demp. & Steb. Clifton Smith's Bedstraw. Perennial herb; rare/rare; north-facing slope in partial shade, along Hwy. 33; Californian Mixed Chaparral; 102-84.

Galium hallii M.& J. Hall's Bedstraw. Perennial herb; rare/uncommon; north-facing slope, shaded; Bigcone Spruce-Canyon Oak Forest; 84-82.

Galium triflorum Michx. Sweet-Scented Bedstraw. Perennial herb; rare/rare; north-facing slope, shade; Bigcone Spruce-Canyon Oak Forest; 121-84.

SALICACEAE Willow Family

Populus trichocarpa T.& G. var. trichocarpa. Black Cottonwood. Tree; occasional/common; stream courses, Belly Ache Falls; Palustrine Forested Wetland; 203-83, 219-83.

Salix exigua Nutt. Narrow-Leaf Willow. Shrub; scattered/common; streambanks; Palustrine Scrub-Shrub Wetland, Palustrine Forested Wetland; 215-83.

Salix laevigata Bebb var. laevigata. Red Willow. Tree; scattered/occasional; streambanks and seeps; Palustrine Forested Wetland, Palustrine Scrub-Shrub Wetland; 187-83.

Salix lasiolepis Benth. var. lasiolepis. Arroyo Willow. Shrub/tree; scattered/common; streambanks and seeps; Palustrine Scrub-Shrub Wetland, Palustrine Forested Wetland; 216-83.

SAXIFRAGACEAE Saxifrage Family

Ribes malvaceum Sm. var. malvaceum. Chaparral Currant. Shrub; scattered/occasional; south-facing slope; Californian Mixed Chaparral, Southern Oak Woodlands; 20-83.

Ribes roezlii Regel. Sierra Currant. Shrub; rare/rare; north-facing slope, shaded; Bigcone Spruce-Canyon Oak Forest; 28-83, 192.

Ribes speciosum Pursh. Fuchsia-Flowered Gooseberry. Shrub; occasional/scattered; moist slopes of south slope, mostly below 3,000 ft.; Southern Oak Woodlands, Californian Mixed Chaparral; 7-83, 152.

SCROPHULARIACEAE Figwort Family

Antirrhinum kelloggii Greene. Kellogg's Snapdragon. Annual vine; occasional/scattered; slopes following burn; Californian Mixed Chaparral; 17-86.

Castilleja jepsonii Bacig.& Heckard. Jepson's Indian Paintbrush. Perennial herb; scattered/occasional; basins; Great Basin Sagebrush, Cismontane Native Grassland, Coast Range Ponderosa Pine Forest; 87-82, 28-86.

Cordylanthus ferrisianus Penn. Bird's Beak. Annual herb; scattered/common; firebreak and in basins; Californian Mixed Chaparral, Coast Range Ponderosa Pine Forest, Great Basin Sagebrush; 163-83.

Keckiella cordifolia (Benth.) Straw. Heart-Leaf Penstemon. Shrub; common/scattered; south slope at below 3,000 ft.; Californian Mixed Chaparral, Southern Oak Woodlands; 240.

Keckiella ternata (Torr. ex Gray) Straw. ssp. septentrionalis (M.& J.) Straw. Bush Penstemon. Shrub; scattered/common; north-facing slope and edges of basins; Californian Mixed Chaparral, Bigcone Spruce-Canyon Oak Woodland, Coast Range Ponderosa Pine Forest; 173-83, 296.

Mimulus brevipes Benth. Short Monkey Flower. Annual herb; uncommon/scattered; south-facing slope (after burn), Basin 1A, open areas; Cismontane Native Grassland/Bigcone Spruce-Canyon Oak Forest, Californian Mixed Chaparral; 77-82, 18-86 65-86.

Mimulus guttatus Fisch. ex DC. ssp. guttatus. Monkey Flower. Perennial herb; occasional/scattered; seeps along Hwy. 33, open east- and north-facing slopes; Palustrine Emergent Wetland; 212-83.

Mimulus johnstonii Grant. Johnston's Monkey Flower. Annual herb; rare/rare; south-facing slope above Basin 2A, north-facing slope, after burn; Californian Mixed Chaparral; 72-86, 84-86.

Mimulus longiflorus (Nutt.) Grant ssp. longiflorus [Diplacus l. Nutt.] Sticky Monkey Flower. Shrub; occasional/common; south-facing slope, mostly below 2,500 ft.; Californian Mixed Chaparral; 241, 261.

Mimulus pilosus (Benth.) Wats. Pilose Monkey Flower. Annual herb; uncommon/scattered; moist soil about base of firebreak at Hwy. 33; Palustrine Emergent Wetland; 86-83.

Penstemon centranthifolius Benth. Scarlet Bugler. Perennial herb; scattered/common; open areas such as firebreak and in basins; Californian Mixed Chaparral, Coast Range Ponderosa Pine Forest; 98-83.

Penstemon grinnellii Eastw. ssp. scrophularioides (Jones) Munz. Beard-Tongue. Perennial herb; occasional/scattered; firebreak above 4,000 ft. and about basins; Chamise Chaparral (Manzanita Chaparral), Coast Range Ponderosa Pine Forest; 80-82.

Penstemon heterophyllus Lindl. var. heterophyllus. Blue Beard-Tongue. Annual herb; uncommon/common; open area at base of firebreak; Californian Mixed Chaparral; 160-83.

*Veronica anagallis-aquatica L. Speedwell. Perennial herb; occasional/common; emergent in seeps and at Belly Ache Falls; Palustrine Emmergent Wetland; 24-83, 217-83.

SOLANACEAE Nightshade Family

Nicotiana attenuata Torr. Coyote Tobacco. Annual herb; occasional/common; basins, north-facing slope; Great Basin Sagebrush, Californian Mixed Chaparral; 68-86.

Solanum douglasii Dunal in DC. Douglas Nightshade. Perennial herb; scattered/common; shaded areas on south-facing slope; Californian Mixed Chaparral, Palustrine Scrub-Shrub Wetland; 186-83.

Solanum xantii Gray var. xantii. Chaparral Nightshade, Purple Nightshade. Subshrub; common/common; dry slopes; Californian Mixed Chaparral; 250.

VERBENACEAE Vervain or Verbena Family

Verbena lasiostachys Link. Hairy-Spike Verbena. Perennial herb; uncommon/scattered; open areas as at base of fire-break; Californian Mixed Chaparral; 85-83.

VIOLACEAE Violet Family

Viola purpurea Kell. not Stev. ssp. purpurea. Purple Violet. Perennial herb; common/common; basins; Coast Range Ponderosa Pine Forest, Cismontane Native Grassland; 91-82, 193.

VISCACEAE Mistletoe Family

Phoradendron tomemtosum (DC.) Engelm. ex Gray ssp. macrophyllum (Engelm.) Weins. Bigleaf Mistletoe. Perennial herb; uncommon/occasional; semi-parasitic on Platanus racemosa; Palustrine Forested Wetland.

Phoradendron villosum (Nutt. in T.& G.) Nutt. Oak Mistletoe. Perennial herb; uncommon/occasional; semi-parasitic on Quercus turbinella ssp. californica; Californian Mixed Chaparral; collected on Ortega Hill 14-84.

SUBCLASS MONOCOTYLEDONEAE

AGAVACEAE Agave Family

Yucca whipplei Torr. Our Lord's Candle. Shrub; common/scattered; dry south-facing slopes; Californian Mixed Chaparral, Chamise Chaparral; 47-86.

AMARYLLIDACEAE Amaryllis Family

Bloomeria crocea (Torr.) Cov. var. crocea. Golden Stars. Perennial herb; rare/uncommon; shalely soil, north-facing slope; Californian Mixed Chaparral; 77-86.

Dichelostemma pulchellum (Salisb.) Heller. Blue Dicks, Wild-Hyacinth. Perennial herb; common/scattered; slopes and canyons, base of firebreak, usually in deeper soil; Californian Mixed Chaparral, Southern Oak Woodlands; 84-83.

CYPERACEAE Sedge Family

Eleocharis parishii Britton. Parish's Spike-Rush. Perennial herb; rare/abundant; soggy soil of seep on north-facing slope at Hwy. 33; Palustrine Emergent Wetland; 100-84.

JUNCACEAE Rush Family

Juncus oxymeris Engelm. Sharp-edged Rush. Perennial herb; rare/common; soggy soil on north-facing slope at Hwy. 33; Palustrine Emergent Wetland; 224-83.

LILIACEAE Lily Family

Calochortus catalinae Wats. Catalina Mariposa Lily. Perennial herb; occasional/common; basins, especially Basins 1A and 3; Cis-montane Native Grassland, Coast Range Ponderosa Pine Forest; 91-83, 254.

Calochortus weedii Wood var. vestus Purdy. Weed's Mariposa. Perennial herb; rare/rare; basins, not seen since July 1978 when photographed; Cismontane Native Grassland/Coast Range Ponderosa Pine Forest; 28-84.

Zigadenus brevibracteatus (Jones) Hall. Desert Zygadene. Perennial herb; rare/rare; basins, 4,700 ft.; Californian Mixed Chaparral, Canyon Oak Forest; Pollard 29JUN65 (SBBG).

Zigadenus fremontii Torr. Chaparral Zygadene, Star-Lily. Perennial herb; occasional/scattered; knoll and edges of basins; Bigcone Spruce-Canyon Oak Forest, Californian Mixed Chaparral; 33-86, 259.

POACEAE Grass Family

*Agrostis sp. Bentgrass. Perennial grass; uncommon/scattered; moist to wet soils, Belly Ache Falls; Palustrine Emergent Wetland; 163-84.

*Avena barbata Brot. Slender Wild Oat. Annual grass; scattered/common; disturbed places along Hwy. 33, less common at higher elevations here; Californian Mixed Chaparral, Cismontane Native Grassland; 263.

*Avena sativa L. Oat. Annual grass; occasional/scattered; disturbed areas along Hwy. 33; Californian Mixed Chaparral; 81-83.

Bromus breviaristatus Buckl. Short-awned Bromegrass. Perennial grass; scattered/occasional; Basin 1A; Cismontane Native Grassland; 60-83.

Bromus carinatus H.& A. California Brome. Annual grass; uncommon/uncommon; Hwy. 33, north-facing slope; Californian Mixed Chaparral.

*Bromus diandrus Roth. Ripgut Grass. Annual grass; uncommon/rare; disturbed areas along Hwy. 33; Californian Mixed Chaparral; 56-86.

*Bromus hordeaceus L. [B. mollis L.] Soft Chess. Annual grass; common/common; open areas, seeded along firebreak after fire; Californian Mixed Chaparral, Chamise Chaparral; 40-83.

*Bromus rubens L. Foxtail Chess, Red Brome. Annual grass; scattered/common; open areas, primarily south-facing slope; Californian Mixed Chaparral, Cismontane Native Grassland; 39-83, 244.

*Bromus stamineus Devs. in Gay. Brome Grass. Annual grass; rare/rare; open area of Basin 2A; Cismontane Native Grassland, Great Basin Sagebrush, Coast Range Ponderosa Pine Forest; 76-83.

*Bromus tectorum L. var. tectorum. Cheat Grass, Downy Brome. Annual grass; common/abundant; all basins and disturbed slopes; Cismontane Native Grassland, Californian Mixed Chaparral; 37-83, 57-83.

*Cynodon dactylon (L.) Pers. Bermudagrass. Perennial grass; rare/rare; seep along Hwy. 33, Wheeler Gorge Campground, south-facing slope at 2,000 ft.; Palustrine Emergent Wetland, Californian Mixed Chaparral; 161-84.

Elymus condensatus Presl. Giant Rye. Perennial grass; occasional/scattered; moist slopes; base of firebreak at Hwy. 33, Belly Ache Falls; Californian Mixed Chaparral; 238.

Elymus glaucus Buckl. ssp. glaucus. Western Rye. Perennial grass; occasional/scattered; north- and south-facing slopes; Californian Mixed Chaparral, Southern Oak Woodlands; 154-83.

Elymus triticoides Buckl. Alkali Rye. Perennial grass; rare/uncommon; seep along Hwy. 33 at eastern end of ridge, collected 8.3 miles north of Rose Valley turnoff along Sespe Creek; Palustrine Emergent Wetland; Keefe 936 (UCSB).

*Hordeum leporinum Link. Foxtail. Annual grass; uncommon/uncommon; disturbed places along Hwy. 33, north-facing slope; Californian Mixed Chaparral; 111-84.

*Hordeum vulgare L. var. trifurcatum (Schlecht) Alefeld. Beardless Barley. Annual grass; rare/rare; south-facing slope along Hwy. 33, possibly introduced by aerial seeding of Ryegrass; Californian Mixed Chaparral; 16-86.

*Hordeum vulgare L. var. vulgare Common Barley. Annual grass; uncommon/occasional; disturbed areas, possibly introduced by aerial seeding of Ryegrass; Californian Mixed Chaparral; 75-86.

Koeleria macrantha (Ledeb.) Spreng. Junegrass. Perennial grass; common/abundant; basins, especially Basins 1A, 2B, and 3; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest; 58-83, 78-83.

*Lolium multiflorum Lam. Italian Ryegrass. Annual grass; common/abundant; seeded on south-facing slope below 4,000 ft. by Forest Service after fire; especially dense on level areas; Californian Mixed Chaparral; 154-83, 99-84.

Melica imperfecta Trin. Coast Range Melic. Perennial grass; common/scattered; slopes and basins; Californian Mixed Chaparral, Cismontane Native Grassland; 22-83, 93-83, 189.

Muhlenbergia rigens (Benth.) Hitchc. Deer Grass. Perennial grass; uncommon/rare; open moist areas such as at base of firebreak at Hwy. 33; Palustrine Emergent Wetland, Californian Mixed Chaparral; 125-84.

Paspalum distichum L. Knotgrass. Perennial grass; scattered/uncommon; base of firebreak at Hwy. 33 in seasonally moist soil; Palustrine Emergent Wetland; 211-83.

Poa scabrella (Thurb.) Benth. ex Vasey. Bluegrass. Perennial grass; common/abundant; basins; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest; 26-83, 190.

*Polypogon monspeliensis (L.) Desf. Rabbitsfoot Grass. Annual grass; scattered/common; soggy soil of seeps and at Belly Ache Falls; Palustrine Emergent Wetland; 70-83.

Sitanion hystrix (Nutt.) J. G. Sm. var. hystrix. Squirreltail. Perennial grass; common/scattered; basins and scattered in open areas of slopes; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest, Californian Mixed Chaparral; 81-83, 251, 252.

Stipa coronata Thurb. in Wats. Giant Stipa, Needlegrass. Perennial grass; common/occasional; dry slopes, south-facing, near Belly Ache Falls; Californian Mixed Chaparral; 68-83.

Stipa elmeri Piper & Brodie ex Scribn. Elmer's Needlegrass. Perennial grass; scattered/common; basins, extraelevational; Cismontane Native Grassland, Coast Range Ponderosa Pine Forest; 99-83.

*Vulpia bromoides (L.) Gray [Festuca dertonensis (All.) Asch.& Graebn.] Foxtail Fescue. Annual grass; common/abundant; basins and disturbed areas such as base of firebreak; Cismontane Native Grassland, Californian Mixed Chaparral; 54-83.

Vulpia megalura Rydb. [Festuca m. Nutt.] Foxtail Fescue. Annual grass; rare/rare; sandy disturbed soil of firebreak; Manzanita Chaparral; 57-86.

Vulpia reflexa Rydb. [Festuca r. Buckl.] Side Oats. Annual grass; scattered/occasional; basins; Cismontane Native Grassland; 56-83, 117-84, 67-86.

TYPHACEAE Cat-Tail Family

Typha domingensis Pers. Cat-Tail. Perennial herb; rare/rare; one small colony at seep above Wheeler Gorge Campground at Hwy. 33, south-facing slope at 2,000 ft.; Palustrine Emergent Wetland; 160-84.

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