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Vascular flora of the Liebre Mountains, western Transverse Ranges, California

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INTRODUCTION

The Transverse Ranges are one of southern California's most prominent physiographic features. In contrast to California's other principal cordillera—the Sierra Nevada, Coast Ranges, and Peninsular Ranges—which are oriented north-south, the Transverse Ranges trend east-west. East-west trending ranges are uncommon in North America, and geologic mechanisms responsible for the anomalous orientation of California's Transverse Ranges are not yet fully understood (Norris and Webb 1990). Major units of the Transverse Ranges include, from east to west, the Little San Bernardino, San Bernardino, San Gabriel, Santa Monica, Liebre, Santa Susana, Topatopa, Pine Mountain, and Santa Ynez ranges. Technically, this enumeration should include the northern group of Channel Islands, which are geologically an extension of the Santa Monica Mountains. The Transverse Ranges cover a linear distance of nearly 520 km (320 mi) between their western end at Point Arguello near Santa Barbara and their eastern terminus in the Eagle Mountains near Desert Center (Sharp 1972; Norris and Webb 1990). Physical breaks between the component ranges are often obscure and a rather diverse array of names has been applied to various configurations, particularly in the western portion where circumscription of physiographic units is complicated by convergence of the Tehachapi and Inner Coast ranges.

Although the Transverse Ranges border the Los Angeles Basin, California's most densely populated region, and have been the subject of considerable botanical exploration over the years, published floristic accounts of the component ranges are surprisingly scarce. Broad-scale floristic reports for the San Gabriel Mountains include Johnston's (1919) flora of the pine belt and Peirson's (1935) handbook of trees and shrubs. Published documentation of the San Bernardino Mountains is little better, limited to Parish's (1917) enumeration of the pteridophytes and spermatophytes and McBride et al.'s (1975) checklist for the montane coniferous forest. By far the best-documented element of the Transverse Ranges has been the Santa Monica Mountains, which have been comprehensively covered by Raven et al. (1986). While the body of floristic literature for the Transverse Ranges is certainly augmented by more narrowly focused local studies (e.g., Derby and Wilson 1978, 1979; Lewis and Gause 1966; Muns 1984, 1985a, 1985b, 1986, 1992, 1994; Parish 1890; Sawyer 1987; Swinney 1994) and unpublished technical reports and dissertations (Boyd et al. 1993; Krantz 1994; Mistretta 1995; Robinson 1953; Thorne 1971–1973), many segments of the range remain virtual floristic terra incognita.

The threat to southern California's native flora from urbanization, agriculture, pollution, habitat fragmentation, and invasive exotic taxa is pervasive and growing. Regions such as the Transverse Ranges contain large tracts of natural habitat that are biologically diverse, relatively intact ecologically, and mostly administered in public trust; these areas are vital for meeting societal goals of preserving California's natural heritage. A critical component of any strategy for managing regional biological diversity is developing a baseline account of the resources being managed. Presently, work is ongoing to provide comprehensive documentation for both the San Gabriel Mountains (O. Mistretta, pers. comm.) and San Bernardino Mountains (A. Sanders, pers. comm.). In this paper, I present a preliminary floristic account of another important segment of the Transverse Ranges, the Liebre Mountains.
Fig. 1. Map of the Liebre Mountains study area and vicinity indicating major roads, drainages, and selected peaks and ridge systems.

The Liebre Mountains represent the easternmost end of what is referred to collectively as the Western Transverse Ranges (Hickman 1993), and they occupy a transitional position between the Santa Susana, Topatopa, and Pine Mountain ranges to the west and San Gabriel Range to the east. The northern base of the Liebre Mountains defines the southwestern border of the Mojave Desert. As circumscribed here, the range is a roughly triangular area bounded by the Santa Clara River on the south and southeast, California Aqueduct along the north and northeast, and Interstate 5 along the west (Fig. 1). The study area encompasses approximately 1630 km² (613 mi²), with elevation ranging between 1764 m (5788 ft) on Burnt Peak and 294 m (965 ft) where the Santa Clara River crosses Interstate 5.

Physiography of the Liebre Mountains region is strongly controlled by two of Southern California's major fault systems: the San Andreas on the north and northeast, and the San Gabriel on the west and south (Dibblee 1982). The eastern boundary of the range, and its general separation from the San Gabriel Mountains, is defined by the Soledad Fault. The range can be generally divided into two physiographically and geologically discrete parts; the rugged, mountainous north and northeastern section, and a lower area of rolling hills and small erosional valleys in the west and south (Dibblee 1982).

Portal Ridge (including Ritter Ridge), separates Antelope Valley, the westernmost end of the Mojave Desert, from the rift zone of the San Andreas Fault. The steep escarpments of this narrow, northwest-trending ridge system contrast sharply with the relatively gentle relief along its crest. At its northwest end, the ridge is
dissected by several drainages originating on the northern flanks of Liebre and Sawmill mountains, including Tentrock, Horse Camp, Cow Spring, and Kings canyons. From Kings Canyon southeastward, the crest of Portal Ridge continues unbroken to its southern terminus at Ritter Ridge. Drainage from the northern flank of Portal Ridge is northeastward into the Mojave Desert. The shorter, steeper drainages of the southern flank empty into the San Andreas Fault rift.

The massive San Andreas rift is characterized by a series of deep, elongate valleys separated from each other by low divides. From northwest to southeast these include Oakdale Canyon, Oakgrove Canyon, Pine Canyon, Leona Valley, and Anaverde Valley. The southern edge of the rift zone is marked by another series of steep escarpments comprising the Liebre-Sawmill-Sierra Pelona crest. These relatively narrow, elongate ridges, like Portal Ridge to the north, are characterized by extensive areas of gentle topography across their summits.

To the south of the Liebre-Sawmill-Sierra Pelona crest lies the body of the mountainous portion of the range. Topography is characterized by steep, rugged ridges and narrow, winding canyons. Important topographic features within this area include Del Sur Ridge, Jupiter Mountain, Tule Ridge, Red Mountain, Warm Springs Mountain, Sawtooth Mountain, Burnt Peak, and Red Rock Mountain. A series of subsidiary faults of generally northeast trend divide this block between the San Andreas and San Gabriel fault zones and are mirrored by the principal drainages of the range. These include Soledad, Mint, Bouquet, Elizabeth Lake, and San Francisquito canyons. Much of the western end of the range is drained by tributaries of Castaic Creek, while slopes on the extreme northwestern edge drain into Piru Creek. Ultimately, all drainage from the Liebre-Sawmill-Sierra Pelona crest southward drains to the Santa Clara River, and ultimately, the Pacific Ocean.

In addition to the principal drainages, some of which support year-round surface water, there are several large bodies of water within the range. Most of these represent manmade reservoirs, including Bouquet Reservoir, Castaic Lake, and Pyramid Lake. A large reservoir was once constructed in San Francisquito Canyon, but suffered a catastrophic failure of the earthen dam in 1928 (Sharp 1972). Natural permanent and seasonal lakes are restricted within the range to the valleys within the San Andreas Rift and adjacent Portal Ridge. These are fault sags and include Elizabeth Lake, Munz Lakes, Lake Hughes, and Quail Lake (the latter two now augmented by earthen dams), as well as Tweedy and Gookins lakes on Portal Ridge.

Geology

The Liebre Mountains region is geologically complex (Jennings and Strand 1969). An excellent, detailed geologic overview of the range is provided by Dibblee (1982), and I will present only a brief synopsis here. The Liebre-Sawmill-Sierra Pelona crest and adjacent uplands are eroded largely from pre-Cenozoic basement complex, as are significant portions of Portal Ridge. Liebre Mountain itself is predominantly composed of granitic rocks, while Sawmill Mountain is dominated by gneiss. An extensive area of ancient Pelona schist nearly bisects the range from Sierra Pelona and adjacent Portal Ridge southwestward to San Francisquito Canyon. The lower, hilly regions to the west, south, and southeast of the Liebre-Sawmill-Sierra Pelona crest are characterized by Cenozoic sedimentary and volcanic rocks, these often highly deformed and eroded. The area occupied by these substrates represent two ancient depositional basins, the Ridge Basin along the west, and Soledad Basin along the southeastern edges of the range. These sediments were originally deposited under largely marine conditions. Subsequently, they have been extensively uplifted and deformed, resulting in areas of striking badlands topography, as well as the unusual formations in the Vasquez Rocks area near Agua Dulce.

Climate

The Liebre Mountains region experiences a typical Mediterranean-type climate of warm, dry summers and cool, moist winters. Under this regime, most precipitation falls as rain resulting from Pacific frontal storms during the months of November through March (Fig. 2). Winter snow, although generally light and short-lived, is frequent along the highest ridges of the Lie-
bre-Sawmill-Sierra Pelona crest. Exceptionally strong, cold storms bring snow to extensive areas above 1000 m, and sometimes even lower. While precipitation patterns are relatively uniform throughout the range, there is considerable variation in average annual precipitation between different sites (Table 1). Topography, regional rainshadow effects, marine layer penetration, and cold air drainage all exert their effect on local microclimates, and are reflected in the distribution of various floristic elements and vegetation types.

**HISTORY OF BOTANICAL EXPLORATION**

Based on herbarium specimens deposited at RSA and elsewhere, I have been able to document from the range, collections made by at least 188 individual primary collectors (excluding associated collectors) covering a span of more than one century (1883–1998). A majority of these are limited, ad hoc efforts, frequently restricted to areas serving as the principal transportation corridors of the time. It appears that the Liebre Mountains was not an area of intense floristic interest to earlier botanists. Aside from the present study's efforts, very few collectors visited the range repeatedly over a series of years. Most notable of those who did include LeRoy Abrams, Elbert Benjamin, Anstruther Davidson, F. Raymond Fosberg, Ralph Hoffmann, Marcus E. Jones, Philip A. Munz, Frank W. Peirson, Bonnie C. Templeton, Ernest C. Twisselmann, and Louis C. Wheeler. A complete listing of primary collectors and their associates is presented in Table 2.

A summary of collecting activity by decade, as expressed by the number of specimens collected, and number of primary collectors, is presented in Fig. 3 and 4 respectively. It is readily apparent from these graphs that, exclusive of the present study, greatest interest and activity in the range was during the 1920s and 1930s. Work and travel restrictions during the war years of the 1940s clearly had considerable impact, drastically reducing botanical activity in the range. A slight renewed interest during the 1950s, 1960s, and 1970s, was followed by another decline during the 1980s. Except for the collecting efforts associated with this project, the downward trend would have continued during the present decade.

**VEGETATION**

The vegetation of the Liebre Mountains region is a complex mosaic superimposed upon a backdrop of the area's diversity of geologic substrates, topography, and microclimate. The vegetation patterns of the range are further complicated by the past history of wildland fire and other disturbance, both natural and anthropogenic.

While a detailed circumscription of vegetation was beyond the scope of this study, a brief overview is appropriate to place subsequent discussion of the flora.
Table 2. Summary of botanical collectors in the Liebre Mountains region.

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<th>Years</th>
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<td>Anonymous</td>
<td></td>
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<td>E. R.</td>
<td>1934</td>
</tr>
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<td>L. R. Abrams w/E. A. McGregor</td>
<td>1908, 1924, 1927</td>
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<td>E. L. Adams</td>
<td>1924</td>
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<td>H. J. Arnott</td>
<td>1955</td>
</tr>
<tr>
<td>E. K. Balls w/ L. W. Lenz</td>
<td>1950</td>
</tr>
<tr>
<td>L. Benson w/ Robert Benson</td>
<td>1952</td>
</tr>
<tr>
<td>E. M. Bolton</td>
<td>1933</td>
</tr>
<tr>
<td>S. Boyd w/ D. Kelly</td>
<td>1986</td>
</tr>
<tr>
<td>S. Boyd w/ D. Bramlet, H. Spilman, N. Hanson, and S. Hobbs</td>
<td>1997</td>
</tr>
<tr>
<td>S. Boyd w/ K. Hughes</td>
<td>1998</td>
</tr>
<tr>
<td>S. Boyd w/ L. Moore, M Wall</td>
<td>1997</td>
</tr>
<tr>
<td>S. Boyd w/ L. Raz &amp; M. Kinney</td>
<td>1998</td>
</tr>
<tr>
<td>S. Boyd w/ L. Raz</td>
<td>1996, 1997</td>
</tr>
<tr>
<td>S. Boyd w/ T. S. Ross</td>
<td>1997</td>
</tr>
<tr>
<td>S. Boyd w/ O. Mistretta</td>
<td>1996</td>
</tr>
<tr>
<td>S. Boyd w/ O. Mistretta, J. Dolan</td>
<td>1996</td>
</tr>
<tr>
<td>S. Boyd w/ O. Mistretta, V. Soza</td>
<td>1996</td>
</tr>
<tr>
<td>S. Boyd w/ T. S. Ross, L. Moore, V. Soza</td>
<td>1997</td>
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<tr>
<td>S. Boyd w/ T. S. Ross, L. Raz, and D. Hannon</td>
<td>1997</td>
</tr>
<tr>
<td>S. Boyd w/ V. Soza</td>
<td>1998</td>
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<tr>
<td>S. Boyd w/ V. Soza, M. Kinney, &amp; J. M. Porter</td>
<td>1998</td>
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<tr>
<td>S. Boyd w/ V. Soza, V. Jotikasthira, L. Raz</td>
<td>1996</td>
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<tr>
<td>K. Brandegee</td>
<td>s.d., 1910</td>
</tr>
<tr>
<td>T. S. Brandegee</td>
<td>1883, 1889(?)</td>
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<tr>
<td>J. P. Broughton w/ K. Muller</td>
<td>1930</td>
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<tr>
<td>K. Budlong</td>
<td>1947</td>
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<tr>
<td>T. Burch</td>
<td>1940</td>
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<tr>
<td>T. Burch w/ Wilson &amp; Munson</td>
<td>1940</td>
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<tr>
<td>J. Burtt Davy</td>
<td>1896, 1901</td>
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<tr>
<td>G. Campbell</td>
<td>1946</td>
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<tr>
<td>M. Canby</td>
<td>1925</td>
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<tr>
<td>G. Cantwell</td>
<td>1930</td>
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<tr>
<td>D. Charlton w/ R. Fishman</td>
<td>1991</td>
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<tr>
<td>D. Charlton w/ R. Fishman, G. Pratt</td>
<td>1990</td>
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<td>D. Charlton w/ T. Martin</td>
<td>1991</td>
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<tr>
<td>T. Clare</td>
<td>1930, 1931</td>
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<tr>
<td>T. Clare w/ McDougal</td>
<td>1930</td>
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<tr>
<td>C. Clark</td>
<td>1929</td>
</tr>
<tr>
<td>O. M. Clark</td>
<td>1928, 1929</td>
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<tr>
<td>I. W. Clokey</td>
<td>1930</td>
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<tr>
<td>I. W. Clokey w/ B. C. Templeton</td>
<td>1930</td>
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<tr>
<td>J. T. Columbus w/ C. R. Annable, C. dos Santos, J. M. Porter, M. E. Siqueiros</td>
<td>1996</td>
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Table 2. Continued.

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<td>1927, 1932, 1933</td>
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<tr>
<td>T. Craig w/ M. Hilend</td>
<td>1927</td>
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<td>C. C. Crampton</td>
<td>1941</td>
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<tr>
<td>? Crawford</td>
<td>1936</td>
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<tr>
<td>E. Crow</td>
<td>1929</td>
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<tr>
<td>K. Curran</td>
<td>1883</td>
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<tr>
<td>C. Davidson</td>
<td>1973, 1975</td>
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<td>G. Davis</td>
<td>1967</td>
</tr>
<tr>
<td>M. DeDecker</td>
<td>1959</td>
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<tr>
<td>F. Detmers</td>
<td>1931</td>
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<tr>
<td>J. Denhame</td>
<td>1983</td>
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<tr>
<td>J. Doty</td>
<td>1969</td>
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<tr>
<td>R. L. Dressier</td>
<td>1949</td>
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<tr>
<td>? Dronovich</td>
<td>1940</td>
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<tr>
<td>W. R. Dudley w/ H. Lamb</td>
<td>1896</td>
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<tr>
<td>A. N. Dunn</td>
<td>1931</td>
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<tr>
<td>D. B. Dunn w/ C. Epling</td>
<td>1946</td>
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<tr>
<td>A. D. E. Elmer</td>
<td>1902</td>
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<tr>
<td>D. E. Emery</td>
<td>1958</td>
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<tr>
<td>C. Epling</td>
<td>1927, 1937</td>
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<tr>
<td>C. Epling w/ L. C. Wheeler</td>
<td>1933</td>
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<td>P. C. Everett</td>
<td>1935, 1936, 1937</td>
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<tr>
<td>P. C. Everett w/ E. K. Balls</td>
<td>1959</td>
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<td>P. C. Everett w/ N. E. Lolonis</td>
<td>1962</td>
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<td>J. Ewan</td>
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<td>F. R. Fosberg</td>
<td>1930, 1931, 1932, 1983</td>
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<td>1952</td>
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<td>1962, 1963</td>
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<td>R. Gustafson w/ C. Davidson</td>
<td>1977</td>
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<td>R. Gustafson w/ Gary Wallace</td>
<td>1982</td>
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<td>H. M. Hall</td>
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<td>1908</td>
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<td>1927, 1931, 1950</td>
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<td>I. M. Porter w/J. Travis Columbus, G. dos Santos</td>
<td>1996</td>
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<tr>
<td>B. Prigge</td>
<td>1986</td>
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<tr>
<td>H. J. Ramsey w/Mrs. H. J. Ramsey</td>
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<td>P. H. Raven</td>
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<td>L. Raz w/S. Boyd &amp; M. Kinney</td>
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<td>F. M. Reed</td>
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<td>J. L. Reveal</td>
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<td>R. E. Riefler</td>
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<td>H. D. Ripley w/R. C. Barneby</td>
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<td>L. S. Rose</td>
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<td>T. S. Ross w/D. Banks</td>
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<tr>
<td>T. S. Ross w/S. Boyd &amp; P. Fritsch</td>
<td>1990</td>
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<tr>
<td>T. S. Ross w/S. Boyd &amp; S. Burns</td>
<td>1994</td>
</tr>
<tr>
<td>T. S. Ross w/V. W. Steinmann</td>
<td>1995</td>
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<td>C. B. Rossbach</td>
<td>1955</td>
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<td>F. Runyan</td>
<td>1955, 1971, 1973</td>
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<td>H. G. Rush</td>
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<td>V. Rutherford</td>
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<td>C. W. Sharsmith</td>
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<td>M. Shaw w/E. Spaulding, Mrs. C. L. Walton</td>
<td>1917</td>
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<td>J. R. Shevock</td>
<td>1971, 1972</td>
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<td>A. Simontacchi</td>
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<td>G. E. Sindel</td>
<td>1935</td>
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<td>G. Sphon</td>
<td>1955, 1959</td>
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<td>G. Sphon w/Diane Hearn</td>
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<td>E. E. Stanford</td>
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<td>B. D. Stark</td>
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<td>1995</td>
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<tr>
<td>P. Stockwell</td>
<td>1935, 1936</td>
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<tr>
<td>H. H. Stone</td>
<td>1936</td>
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<tr>
<td>B. C. Templeton w/H. J. Andrews</td>
<td>1938</td>
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<td>B. C. Templeton w/L. W. Clokey</td>
<td>1930</td>
</tr>
<tr>
<td>B. C. Templeton w/L. W. Clokey &amp; C. B. Clokey</td>
<td>1930</td>
</tr>
<tr>
<td>D. Thomason</td>
<td>1987</td>
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<td>D. M. Thompson</td>
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<td>R. F. Thorne</td>
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<td>1931, 1935, 1936</td>
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<tr>
<td>S. R. Tyson</td>
<td>1940</td>
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<td>? Venkatesh</td>
<td>1957</td>
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<tr>
<td>M. Vincent</td>
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<td>1966</td>
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<td>G. D. Wallace</td>
<td>1966, 1979</td>
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<tr>
<td>A. Watry</td>
<td>1931</td>
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<tr>
<td>W. G. Webb</td>
<td>1935</td>
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<td>D. Weins</td>
<td>1953, 1960</td>
</tr>
</tbody>
</table>

Table 2. Continued.
in its proper context. In the most general sense, the vegetation of the Liebre Mountains region can be divided into three broad, physiognomic units—scrub, woodland, and grassland—depending on whether the dominant plants are shrub, tree, or herbaceous species respectively. Within each unit, major and minor subunits may be recognized, and names have been variously assigned to these by botanists attempting to describe and classify California vegetation (e.g., Munz and Keck 1949, 1950; Thorne 1976; Holland 1986; Sawyer and Keeler-Wolf 1995). The most recent attempt at a state-wide vegetation classification, that of Sawyer and Keeler-Wolf (1995), is floristically based. Although highly detailed, it nevertheless provides a workable scheme which will be followed here in discussing characteristic vegetation series within the Liebre Mountains region.

Scrub Vegetation Series

Scrub is the most abundant and diverse kind of vegetation within the range, and is characterized by a predominance of one or more species of shrubs and subshrubs. Tree species are absent, or of only minor importance. Scrub vegetation may be relatively uniform physiognomically from stand to stand, but species composition can vary greatly depending on factors such as seral stage, exposure, slope, substrate, and moisture availability. Characteristic shrub-dominated series found in the range are presented in Table 3. For convenience, these have been grouped into four physiognomic/ecological categories—chaparral, sage and sagebrush scrub, desert scrub, and riparian scrub.

Chaparral.—The dominant components of chaparral vegetation series are hard-wooded, evergreen, sclerophyllous shrubs. The composition and relative dominance of shrub species is highly variable between different series; however, the unifying physiognomic characteristic is the relatively dense, frequently impen-
Table 3. Scrub vegetation series of the Liebre Mountains region.

<table>
<thead>
<tr>
<th>Chaparral</th>
<th>Sage and sagebrush scrub</th>
<th>Desert scrub</th>
<th>Riparian scrub</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bigberry manzanita</td>
<td>big sagebrush</td>
<td>creosote bush</td>
<td>mulefat</td>
</tr>
<tr>
<td>Birchleaf mountain mahogany-California buckwheat</td>
<td>black sage</td>
<td>Joshua tree</td>
<td>narrowleaf willow</td>
</tr>
<tr>
<td>Brewer oak</td>
<td>California buckwheat</td>
<td></td>
<td>scalebroom</td>
</tr>
<tr>
<td>Canyon live oak shrub</td>
<td>California buckwheat-white sage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chamise</td>
<td>California sagebrush</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chamise-bigberry manzanita</td>
<td>California sagebrush-California buckwheat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chamise-black sage</td>
<td>mixed sage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chamise-cupleaf ceanothus</td>
<td>purple sage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chamise-Eastwood manzanita</td>
<td>rubber rabbitbrush</td>
<td></td>
<td></td>
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<tr>
<td>Chamise-hoaryleaf ceanothus</td>
<td>white sage</td>
<td></td>
<td></td>
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<tr>
<td>Chamise-wedgeleaf ceanothus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chamise-white sage</td>
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<td></td>
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</tr>
<tr>
<td>Chaparral whitethorn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastwood manzanita</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoaryleaf ceanothus</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Interior live oak shrub</td>
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<td></td>
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<tr>
<td>Interior live oak-canyon live oak shrub</td>
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</tr>
<tr>
<td>Interior live oak-scrub oak</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Scrub oak</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Scrub oak-birchleaf mountain-mahogany</td>
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<tr>
<td>Scrub oak-chamise</td>
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<td></td>
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<tr>
<td>Scrub oak-chaparral whitethorne</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Wedgeleaf ceanothus</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

In the birchleaf mountain-mahogany-California buckwheat series (with *Cercocarpus betuloides* and *Eriogonum fasciculatum*) and the scrub oak-birchleaf mountain-mahogany series. Although found throughout the range at nearly all elevations, series characterized by *Adenostoma* are most prevalent at the lower to mid-elevations, and on relatively xeric exposures.

Second in importance to chamise-dominated stands are those chaparral series where various shrub forms of *Quercus* species are dominant or codominant. These include Brewer oak (*Quercus garryana* var. *breweri*), canyon live oak shrub (*Q. chrysolepis*), interior live oak shrub (*Q. wislizeni* var. *frutescens*), interior live oak-canyon live oak shrub, interior live oak-chaparral whitethorn (with *Ceanothus leucoderms*), interior live oak-scrub oak, scrub oak, and scrub oak-chaparral whitethorn series, as well as the scrub oak-chamise series mentioned above. Oak-dominated series are most prevalent at mid- to upper elevations, especially across the southern flank of the Liebre-Sawmill-Sierra Pelona crest. At lower elevations, scrub oak-dominated series are restricted to relatively mesic exposures.

Series dominated by species of *Arctostaphylos* or *Ceanothus* are of more limited distribution within the range, generally appearing as localized stands adjacent to mixed chamise or oak series. Most frequent are stands of the Eastwood manzanita and wedgeleaf ceanothus series. Stands of the hoaryleaf ceanothus series are restricted to the south-central edge of the range, between the Agua Dulce area and Soledad Canyon. Conversely, stands dominated by cupleaf ceanothus are largely restricted to the northern edge of the range, along Portal Ridge.

The understory of chaparral series is equally variable with respect to the composition and abundance of annuals, perennial herbs, and suffruticose species. Nevertheless, a characteristic suite of chaparral understory plants can be enumerated. Species generally associated with xeric exposures include *Lotus scoparius*, *Helianthemum scoparium*, *Corethogyne filaginifolia* var. *filaginifolia*, *Pellaea mucronata*, *Gutierrezia californica*, *G. sarothrae*, *Selaginella bigelowii*, *Stipa coronata*, *Chaenactis glabriuscula*, *Crypantanha muricata*, *C. intermedia*, *Lupinus hirsutissimus*, *L. sparsiflorus*, *L. truncatus*, *Phacelia cicutaria*, *P. distans*, *P. minor*, *Salvia columbariae*, *Camarionia californica*, *Mimus brevipes*, *Galium angustifolium*, *Calystegia peirsonii*, *Helianthus gracilentus*, and *Solanum xanti*. Species generally associated with mesic exposures include *Sanicula capsicaulis*, *Gnaphalium filaginifolia*, *Cirsium occidentale* var. *californicum*, *Solidago californica*, *Lomatium dasycarpum*, *Acourtia microcephala*, *Pentagramma triangularis*, *Dryopteris arguta*, *Melica imperfecta*, *Poa secunda*, *Marah fabaceus*, *M. macrocarpus*, *Galium andrewssii*, *G. angustifolium*, *G. porrigen*, *Chenopodium californicum*, *Clarkia purpurea*, *C. unguiculata*, *C. cylindrica*, *Claytonia parvifolia*, *C. perforata*, *Epilobium canum*, *Crypantanha microstachys*, *Erysimum capitatum*, *Phacelia ramosissima*, *Encycropa chrysanthemifolia*, and *Tauschia arguta*. 
Sage and sagebrush scrub.—Compared with chaparral series, the sage and sagebrush scrub series are a lower-statured vegetation, being dominated by relatively soft-wooded, malacophyllous, facultatively drought-deciduous shrubs and subshrubs. Within the Liebre Mountains region, these scrub series exhibit a patchy distribution, often in close association with areas of chaparral. Best-developed stands are found at lower elevations at the southwestern end of the range. The Santa Clarita Valley area, including Newhall, Sau- gus, Valencia, and Agua Dulce, probably supported the region’s most extensive development of sage and sagebrush scrub prior to urbanization.

Five shrub species, in various combinations of presence and relative dominance, characterize the majority of the sage and sagebrush scrub series represented in the range (Table 3). These include Salvia mellifera (black sage), Eriogonum fasciculatum (California buckwheat), Artemisia californica (California sagebrush), Salvia leucophylla (purple sage), and Salvia apiana (white sage). The most common and widespread series are those where Eriogonum fasciculatum is dominant or codominant. These include the California buckwheat, California buckwheat-white sage, and California sagebrush-California buckwheat series. Stands of the California buckwheat series are especially prevalent on the southern flank of Liebre Mountain, and are associated with areas of deep, loose decomposed granite. Stands of the purple sage series are well developed on sedimentary substrates at the western edge of the range, especially about Castaic Lake.

The sage and sagebrush series discussed above are largely characterized by shrub taxa of cismontane Californian affinity. Two other important members of the sage and sagebrush series are dominated by shrubs of more interior, Great Basin affinity. These are the big sagebrush and rubber rabbitbrush series. The big sagebrush series is dominated by Artemisia tridentata and exhibits a scattered, patchy distribution across the northern edge of the range. Stands are often encountered in areas of deeper soil with cold air drainage. This series is particularly common on the northern flank of Sierra Pelona, and valleys of the San Andreas Rift zone. The rubber rabbitbrush series is dominated by Chrysothamnus nauseosus, often with more than one variety of the species being present within a given stand. This series is also best developed along the northern edge of the range, especially at the margin of the Antelope Valley.

The understory within sage and sagebrush scrub series is generally better developed than in the various chaparral series, although overall species composition is similar.

Desert scrub.—Two shrub-dominated vegetation types characteristic of the Mojave Desert, the creosote bush and Joshua tree series, are represented within the Liebre Mountains region by small outlier stands (Table 3). The creosote bush series, with open stands of Larrea tridentata, occurs as scattered patches on xeric exposures of volcanic substrate at the northeastern end of the range, between Acton and Vincent. Associated with these stands are shrubs such as Juniperus califor­nica, Ephedra nevadensis, Encelia actoni, Erica meria cooperi, Hymenoclea sallosa, Tetradymia axil­laris var. longispina, Chrysothamnus nauseosus, Opuntia acanthocarpa, Krascheninnikovia lanata, Grayia spinosa, Salazaria mexicana, Eriogonum fasci­culatum var. polifolium, Lycium cooperi, and Yucca whipplei. Notably absent is Ambrosia dumosa, a frequent associate of Larrea throughout the California deserts.

Herbaceous perennial and annual understory taxa include Chaenactis stevioides, Coreopsis bigelovii, Lasthenia californica, Layia glandulosa, Syntrich­us pappus fremontii, S. lemonnii, Xylorhiza tortifolia, Amsinckia tesselata, Cryptantha pterocarya, C. nevadensis, Pectocarya linearis ssp. ferocula, P. penicil­lata, P. recurvata, Caulanthus lasiophyllus, Descu­rainia pinnata, Lotus strigosus, L. wrangelianus, Lu­pinus sparsiflorus, Erodium cicutarium, Phacelia fre­montii, P. distans, Pholistoma membranaceum, Salvia columbariae, Camissonia californica, Eschscholzia minuti­flora, Gilia latiflora ssp. davyi, Linanthus bigelovi­ii, Eriogonum angulosum, Dichelostemma pulchel­lum, Calochortus kennedyi, Bromus rubens, B. tecto­rum, Poa secunda, Schismus barbatus, Stipa speciosa, Vulpia myuros, and V. octoflora.

The Joshua tree series is named for its most physi­ognomically distinctive species, Yucca brevifolia. Stands most closely approaching the shrub species composition typically associated with this series within the Mojave Desert proper are found at the northeastern base of the range, near Palmdale and Harold. Common shrub associates here include Juniperus californica, Opuntia echinocarpa, Tetradymia axillaris var. longispina, Salazaria mexicana, Eriogonum fasciculatum var. polifolium, Grayia spinosa, Yucca whipplei, Lycium cooperi, and Salvia dorthii. Yucca brevifolia in this area is the typical variety, characterized by having a distinct monopodial growth form with well-branched crown.

Scattered stands of Yucca brevifolia occur across the northern edge of the range, where locally present within other vegetation series. Most of these small stands would probably not warrant mapping as Joshua tree series, however. An unusual manifestation of the Joshua tree series is found at the extreme northwestern end of the range. Here, Yucca brevifolia is strongly clonal, forming dense, impenetrable thickets. Even the largest “individuals” have poorly branched crowns. These plants represent the variety herbertii. Associated
shrubs are scarce within the thickets, but surrounding vegetation generally is a manifestation of the big sagebrush and rubber rabbitbrush series.

Understory taxa within the Joshua tree series, especially in the eastern stands, are similar to those of the creosote bush series.

Riparian scrub.—Vegetation associated with moist to wet soils of drainage courses, springs, and fluctuating lake margins, includes both shrub- and tree-dominated series. These are distributed across a variety of environmental gradients, including the nature and frequency of past flooding, fire, and other disturbance; the duration and reliability of surface water; the texture of alluvial overburden and depth to bedrock; and the stream gradient. As a general rule, areas with greater water availability, and less disturbance, tend to support tree-dominated vegetation. These will be addressed later in the context of woodland vegetation series. Portions of drainages with less reliable supplies of water, areas subject to more frequent scouring floods, and heavily or periodically disturbed situations are characterized by various shrub-dominated series, collectively treated here as riparian scrub.

Important kinds of riparian scrub in the Liebre Mountains region include the mulefat, narrowleaf willow, and scalebroom series (Table 3). The mulefat series, characterized by dense open stands of Baccharis salicifolia (mulefat), is the most common and widespread of the three. It is common in the periodically flooded areas about the margins of lakes and reservoirs, frequently scoured wet areas in the larger drainages, and in minor drainages throughout the range. The narrowleaf willow series, characterized by Salix exigua (narrowleaf willow), is typically associated with locations with reliable sources of water near the soil surface, as about springs and along sluggish streams.

Stands of the scalebroom series, dominated by Lepidospartium squamatum (scalebroom), are generally restricted to relatively broad, low-gradient washes which are sandy and frequently scoured by seasonal floods. Historically, this was likely the predominant vegetation along portions of the Santa Clara River and the lower reaches of the Castaic, San Francisquito, Bouquet, Elizabeth Lake Canyon, and Mint Canyon drainages. Much of this habitat has been lost or radically altered by urbanization, sand and gravel mining, channelization, and agriculture. The best-developed remnants are now found in lower San Francisquito Canyon, and along the Santa Clara River downstream from the mouth of Soledad Canyon.

The scalebroom series is the most floristically diverse of the three basic kinds of riparian scrub found in the range. Common associates include Brickellia californica, Ericameria linearifolia, Senecio flaccidus var. douglasii, Lotus scoparius, and Eriogonum fasciculatum var. foliolosum. Other shrub elements which are frequently present include Juniperus californica, Sambucus mexicana, Rhus trilobata, Artemisia tridentata var. parishii, Chrysothamnus nauseosus, Ribes aureum, Eriodyctyon crassifolium var. nigrescens, Salvia apiana, Prunus ilicifolia, and Yucca whipplei. Occasionally, a few trees may be scattered on the drier benches, especially Quercus agrifolia, Platanus racemosa, and Populus fremontii.


Woodland Vegetation Series

Vegetation series dominated by arborescent species, although much less extensive in areal coverage than various types of scrub, nevertheless form an important part of the landscape throughout the Liebre Mountains region. Characteristic tree-dominated series found in the range are presented in Table 4. For convenience of
discussion, these may be grouped into three broad types—oak woodland, conifer woodland, and riparian woodland. I have excluded from the discussion of woodland series, those situations where conifers have been established in artificial plantations by the National Forest.

**Oak woodland.**—The Liebre Mountains are noteworthy in the diversity of oak-dominated series found in the range (Table 3, 4). Important arborescent species of oaks include *Quercus kelloggii* (black oak), *Q. douglasii* (blue oak), *Q. chrysolepis* (canyon live oak), *Q. agrifolia* (coast live oak), and *Q. lobata* (valley oak) (Table 4).

The black oak series is best developed along the crest of Liebre and Sawmill mountains, although small stands are present at higher elevations along Sierra Pelona. Within the range, this series is characterized by rather open and savannalike stands of *Quercus kelloggii*, with scattered *Q. chrysolepis*. The broader openings are often characterized by local stands of *Chrysothamnus nauseosus*, *Artemisia tridentata*, *Eriogonum fasciculatum*, *E. umbellatum* var. *munzii*, and *Ribes roezlii*. Areas between clusters of trees exhibit a rich assemblage of herbaceous species, including *Agoseris retrorsa*, *A. grandiflora*, *Athisanus pustillus*, *Bloberia crocea*, *Bromus hordeaceus*, *B. rubens*, *Calochortus venustus*, *Camissonia campestris*, *Clarkia purpurea*, *Corethrygone filagornings*, *Elymus glauca*, *E. elymoides*, *Epilobium brachycarpum*, *Erigeron foliosus*, *E. roseum*, *Eriophyllum confertiflorum*, *Gilia ochroleuca* ssp. *bizonata*, *Linanthus androsaceus* ssp. *micranthus*, *Nemophila menziesii*, *Penstemon centranthifolius*, *P. labrosus*, *P. rostriflorus*, *Phacelia davidsonii*, *Platystemon californicus*, *Thysanocarpus curvipes*, *T. laciniatus*, and *Vulpia microstachys*. On northerly slopes, black oak woodland grades into mixed oak, canyon live oak, and big cone Douglas fir woodland, while on the southerly slopes it generally gives way to chaparral dominated by shrub species of *Quercus*, especially *Q. wislizeni*.

Stands of the blue oak series are limited to the northwestern end of the range, especially at the western end of Portal Ridge and in the vicinity of Sandberg on the northwestern foot of Liebre Mountain. Within the study area, this series is typically found on mesic exposures of gentle to moderately sloping hills and ridges, and is relatively open and savannalike. In addition to *Quercus douglasii*, the dominant tree, scattered individuals of *Q. lobata* and *Pinus sabini* are frequently present.

Most of the best-developed stands of the blue oak series are found on private ranch lands that were not accessible during the course of this study. Although similar overall to that of black oak woodlands, the herbaceous understory of the blue oak series remains poorly sampled within the range. Common shrub associates include *Juniperus californica*, *Aesculus californica*, *Artemisia tridentata*, *Chrysothamnus nauseosus*, and *Quercus john-tuckeri*.

Those stands of the blue oak series found in the range are among the most southerly known in California. I suspect the understory may support a number of additional taxa common to this vegetation association further north, but otherwise absent from the study area. Trees and arborescent shrubs suggesting intergradation between *Quercus douglasii*, *Q. john-tuckeri*, and *Q. lobata* are not uncommon at the northwestern end of the range, and were included in studies by Benson et al. (1967) of hybrid swarms in oaks.

The canyon live oak series is dominated by tree forms of *Quercus chrysolepis*, and is generally found within the Liebre Mountains at elevations above 1000 m. Best development within the range is on steep slopes with mesic exposures, particularly across the northern flank of Liebre-Sawmill-Sierra Pelona crest, and in upper Cold Canyon at the western end of Liebre Mountain. Within the range, the canyon live oak series is typically part of a complex vegetation mosaic which includes the black oak and big-cone Douglas fir series on mesic exposures, and various chaparral series on xeric slopes. Boundaries between the different vegetation assemblages are indistinct with considerable overlap in component species. Physiognomy of these woodland series is controlled by the relative abundance of the three principal tree species, *Quercus chrysolepis*, *Q. kelloggii*, and *Pseudotsuga macrocarpa*.

The canyon live oak series is characterized by dense stands of *Quercus chrysolepis*, with only scattered *Q. kelloggii*, or *Pseudotsuga macrocarpa*. The herbaceous understory is frequently rather poorly developed in stands with dense overstory crown cover, but may be diverse in relatively open stands. In general, shade-tolerant taxa, including *Bromus grandis*, *Claytonia exigua*, *C. perfoliata*, *C. rubra*, *Cystopteris fragilis*, *Delphinium patens* ssp. *montanum*, *Dryopteris arguta*, *Erysimum capitatum*, *Heterogaura heterandra*, *Lithophragma bolanderi*, *L. heterophyllum*, *L. parviflorum*, *Melica imperfecta*, and *Osmorhiza brachypoda*. Understory shrubs, although frequently lacking, include *Rhamnus tomentella*, *Ribes roezlii*, and *Symphoricarpos albus* var. *laevigatus*.

The coast live oak series is dominated by dense to open stands of *Quercus agrifolia*. Examples of this series may be found scattered across the southwestern quarter of the range, particularly in the larger, broader drainages, such as San Francisquito, Bouquet, and Mint canyons. The best-developed examples of the coast live oak series are most often found on deeper alluvial soils, at elevations below 1000 m. In many areas, trees have been thinned by cutting or clearing to produce open, parklike stands. These are often the
sites of rural residences. Other areas still support dense stands with nearly continuous crown cover. Depending on the frequency and intensity of past and present disturbance, the understory may be relatively depauperate and weedy, or support a rich assemblage of understory shrubs, perennial herbs, and annuals.

In the most-disturbed woodlands, especially those subjected to intense grazing, the understory is densely invaded by introduced annual grasses and forbs, especially Bromus diandrus, B. hordeaceus, B. rubens, Avena barbata, Vulpia myuros, Centaurea melitensis, Brassica geniculata, and Erodium cicutarium. In less-disturbed situations, especially those stands on mesic slopes, an open to relatively dense shrub understory may be present. Frequent shrub associates include Sambucus mexicana, Rhus trilobata, Toxicodendron diversilobum, Eriodictyon crassifolium var. nigrescens, Rhamnus ilicifolia, Heteromeles arbutifolia, Prunus ilicifolia, Galiurn angustifolium, Keckiella cordifolia, Solanum xanti, Lonicera interrupta, Symphoricarpos albus var. laevigatus, Salvia apiana, S. mellifera, Eriogonum fasciculatum, and Yucca whipplei.

The composition and diversity of the herbaceous understory is equally variable, but may be quite rich in less-disturbed woodlands on mesic soils. Common grasses include Adiantum jordani, Pellaea andromedifolia, Pentagramma triangularis, and Dryopteris arguta. Among the frequently encountered perennial grasses are Elymus condensatus, E. glaucus, Melica imperfecta, and Poa secunda. Other common perennial herbs include Osmorhiza brachypoda, Sanicula crassicaulis, Tauschia arguta, Ambrosia psilostachya var. californica, Artemisia douglasiana, Cirsiurn occidentale, Corethrogynne filaginifolia, Erigeron foliosus var. stenophyllus, Eriphyllum conferiforum, Gnaphalium californicum, Solidago californica, Chenopodium californicum, Marius macrocarpus, Penstemon centranthifolius, and P. grinnelli var. scrophularioides. Characteristic annuals include Thysanocarpus curvipes, T. laciniatus, Nemophila menziesii, Monardella lanceolata, Salvia columbariae, Clarkia purpurea, C. unguiculata, Claytonia spp., Galium aparine, Collinsia heterophylla, and Cordylanthus rigidus spp. setiger.

Valley oak woodland, like blue oak woodland, is best developed at the northwestern end of the study area, although historically well-developed stands ranged southward along the western edge of the range into the Valencia and Saugus area. Typically, stands dominated by Quercus lobata are characterized by gentle relief and deep, often alluvial soils. The herbaceous and shrub understory of valley oak woodland is virtually identical to blue oak woodland, and to a lesser extent, black oak woodland.

Conifer woodland.—Relative to woodland series characterized by species of Quercus, natural vegetation dominated by arborescent conifers is limited in both areal and geographic extent within the range. Nevertheless, several distinctive series are locally important components in the Liebre Mountains vegetation mosaic (Table 4). The important coniferous trees include Pseudotsuga macrocarpa (big cone Douglas fir), Juniperus californica (California juniper), Pinus sabini­ana (fothill pine), P. ponderosa (ponderosa pine), and P. monophylla (singleleaf pinyon).

Woodlands of the big cone Douglas fir and big cone Douglas fir-canyon live oak series are best developed in the steep, moist canyons draining the northern flank of Liebre and Sawmill mountains, but occur at scattered sites throughout the range in areas of similar habitat. In addition to Pseudotsuga, and to varying degrees, Quercus chrysolepis, other trees which are sometimes present include Pinus sabiniana, P. ponderosa, Q. kelloggii, and Acer macrophyllum. Across the northern flank of Liebre and Sawmill mountains, these woodlands are intimately associated with the canyon live oak and black oak series at the upper elevations, and the valley oak series near the foot of the slopes. Understory composition is virtually identical to that found in canyon live oak woodlands.

The California juniper series is found in the southeastern end of the Liebre Mountains region, but is best developed in the region between Agua Dulce and Acton. The dominant overstory species, Juniperus californica, is most often found as an arborescent shrub in the study area. It is discussed here, vs. with other shrub-dominated series, only because Sawyer and Keeler-Wolf (1995) specifically grouped this vegetation type with other tree-dominated series. Stands of the California juniper series are typically somewhat open and savannalike, with considerable open areas between clusters of Juniperus. The areas between junipers support an open, low scrub of Eriogonum fasciculatum, Artemisia tridentata, and Chrysothamnus nauseosus. The herbaceous understory may be fairly diverse, with numerous wildflowers, such as Amsonia menziesii, A. tesselata, Nemophila menziesii, Phacelia distans, Camissonia bistorta, Oenothera californica, Gilia spp., Eriastrum sapphirinum, Layia glandulosa, Lasthenia californica, Salvia columbariae, Cryptantha spp., and Plagiobothrys arizonicus, as well as native grasses, such as Melica imperfecta, Poa secunda, Elymus elymoides, and Stipa speciosa. Other areas have a more depauperate herbaceous understory, having been degraded by past human activity and subsequently invaded by weedy annual grasses, such as Bromus hordeaceus, B. rubens, Avena barbata, A. fatua, and Schismus barbatus.

The California juniper series seems to be especially vulnerable to repeated fires with short return intervals. Most of the areas supporting this vegetation series within the study area occur outside of the National
Forest boundaries and are being rapidly degraded by fragmentation and fires associated by low-density semirural development.

The Foothill pine series, like the floristically related blue oak and valley oak series, reaches the southern limit of its distribution within the Liebre Mountains region. Vegetation dominated by *Pinus sabiniana* is confined to the northern edge of the range, along Portal Ridge and the northerly flank of Liebre and Sawmill mountains. In well-developed stands, the overstory may be dense to relatively open, but rarely forming the deeply shaded conditions seen in big cone Douglas fir and canyon live oak woodlands. Understory composition of the foothill pine series within the range is virtually identical to that of the blue oak and valley oak series.

The most limited conifer-dominated vegetation type in the range is the ponderosa pine series. Compared with the higher San Gabriel Mountains to the southeast, and Mount Pinos region to the northwest, native stands of *Pinus ponderosa* in the Liebre Mountains are small and floristically depauperate. Within the study area, this vegetation series is limited to the highest portions of the Sawmill Mountain summit, surrounded by more extensive stands of the black oak and big cone Douglas fir-canyon live oak series. Understory shrubs include *Chrysothamnus nauseosus*, *Ribes roezlii*, *Rhamnus tomentella*, *Eriogonum umbellatum*, *E. wrightii var. subscaposum*, and *E. fasciculatum*. The herbaceous understory is similar to that of the adjacent black oak series.

Singleleaf pinyon, *Pinus monophylla*, is found in two widely separated areas of the Liebre Mountains region, the northerly flank of Sierra Pelona south of Palmdale, and the steep, sedimentary hills at the northwestern corner of the range. Vegetation dominated by singleleaf pinyon is only found at the northwestern area, however. In addition to *Pinus monophylla*, common associated arborescent and shrub species include *Juniperus californica*, *Quercus john-tuckeri*, *Arctostaphylos glauca*, *Artemisia tridentata*, *Ephedra viridis*, *Salvia dorrrii*, *Yucca whipplei*, *Y. brevifolia*, and *Cercocarpus betuloides*. Common herbaceous understory elements include *Lasthenia californica*, *Thysanocarpus lacinatus*, *T. curvipes*, *Poa secunda*, *Coreopsis bigelovii*, *Layia glandulosa*, *Phacelia distans*, *Claytonia* spp., and *Calochortus kennedyi*.

**Riparian woodland.**—Several tree-dominated vegetation series occur within the Liebre Mountains region (Table 4). As with riparian scrub, the riparian woodland series occur across a variety of environmental gradients. The floristic composition and relative dominance of component taxa may be correlated with the nature and frequency of past flood events and the duration and reliability of surface water, as well as the effects of fire and past anthropogenic disturbance. Collectively, the best development of riparian woodland series in the range may be found in the larger drainage systems, such as Castaic, Elizabeth Lake, San Francisquito, Bouquet, and Soledad canyons and their major tributaries. Riparian vegetation remains relatively intact within the portion of the range administered by the Angeles National Forest, but at lower elevations, especially near the confluence of the principal drainages with the Santa Clara River, there has been extensive clearing and channelization with subsequent loss of woodland.

**Grassland Vegetation Series**

Within the Liebre Mountains, there is less diversity of vegetation dominated by grasses and other herbaceous taxa as compared with the scrub and woodland series discussed above. Only four series are of regional importance in the range, the California annual grassland, nodding needle grass, common reed, and giant reed series.

California annual grassland is a floristically heterogeneous series, characterized by the physiognomic prevalence of annual grasses, especially introduced species. This broad category doubtless includes both natural, herb-dominated vegetation, and stands resulting from anthropogenic degradation of other scrub and woodland vegetation.

The most extensive development of California annual grassland within the range is found along the northern border of the study area, at the southern edge of the Antelope Valley, on Portal Ridge, Bald Mountain, and across the summits of the Liebre-Sawmill-Sierra Pelona crest. Although introduced taxa, such as *Avena barbata*, *A. fatua*, *Bromus hordeaceus*, *B. rubens*, *Schismus barbatus*, and *Erodium cicutarium*, are important in these stands, there is a noteworthy diversity of native taxa. Common native elements include *Coreopsis bigelovii*, *Lasthenia californica*, *Eschscholzia californica*, *Lupinus bicolor*, *Dichelostemma pulchellum*, *Tropidocarpum gracile*, *Chaenactis xantiana*, *Phacelia tanacetifolia*, *Salvia columbariae*, *S. carduacea*, *Gilia latiflora* ssp. *davyi*, *G. ochroleuca* ssp. *bisonata*, *Hologarpha heermannii*, *Lotus wrangelianus*, *Eriogonum roseum*, *E. cithariforme*, *Camissonia campestris*, *C. graciliflora*, *Plagiobothrys arizonicus*, and *Pectocarya penicillata*.

In contrast, the more anthropogenically disturbed stands of California annual grassland are concentrated in the southern half of the range, particularly in the Santa Clarita Valley. Here, only the most hardy and vigorous of the native elements, such as *Lupinus bicolor*, *Eschscholzia californica*, *Cryptantha muricata*, and *Dichelostemma pulchellum* are able to compete favorably with the aggressive exotics.
Grasslands dominated by nodding needle grass, *Stipa cernua,* are small and uncommon within the range. The most intact examples are found at the western edge of the study area, in Osito Canyon. Here they are developed on deposits of locally weathered heavy soil within a broader matrix of better-drained sandstone-derived soils which support various chaparral and sage scrub series. Although exotic annual grasses have invaded these areas, as elsewhere, *Stipa cernua* is still dominant. Common herbaceous elements associated with these grasslands include *Plantago erecta,* *Lotus wrangelianus,* *Cryptantha microstachys,* *Hemizonia vulturina,* *Eriogonum* species, *Astragalus* gambelianus, *Ancistrocarphus filagineus,* *Poa secunda,* and *Calystegia peirsonii.*

The common reed series, characterized by nearly pure stands of *Phragmites australis,* is restricted to low-gradient portions of the Apple Canyon drainage, just east of Interstate 15. This area is periodically inundated when Pyramid Lake is filled to capacity, perhaps accounting for the abundance of this coarse grass at the site. The giant reed series, characterized by nearly pure stands of *Arundo donax,* is limited to the floodplain of the Santa Clara River at the eastern edge of the study area.

**FLORA**

*Numerical summary and phytogeography*

The inventory of the Liebre Mountains flora presented here is limited to “naturally” occurring taxa, that is, indigenous natives and those nonnatives thought to be growing and reproducing without direct, conscious human intervention (i.e., outside of cultivation). In this context, I have excluded long-persistent plantings of trees and shrubs, unless there was a clear indication that there has been subsequent adventive establishment. On the other hand, waifs of exotic annuals and short-lived perennial herbs were included, although I recognize that some will not be transitory participants in the dynamic floristic diversity of the region.

Based on fieldwork conducted to date, as well as examination of specimens housed at RSA-POM and elsewhere, 1010 vascular plant taxa (species, subspecies, varieties, and natural hybrids) are documented from the Liebre Mountains region. These represent 104 families and 400 genera (Table 5). The largest families include *Asteraceae* (68 genera/150 species), *Poaceae* (40/96), *Fabaceae* (17/71), *Scrophulariaceae* (12/49), *Polygonaceae* (9/47), *Brassicaceae* (17/41), *Polemoniaceae* (9/39), *Onagraceae* (6/31), and *Boraginaceae* (6/26). Other important families include, *A픽aceae,* *Caryophyllaceae,* *Chenopodiaceae,* *Convolvulaceae,* *Cyperaceae,* *Fagaceae,* *Hydrophyllaceae,* *Lamiaceae,* *Ranunculaceae,* *Rhamnaceae,* and *Solanaceae.* The nine largest families account for nearly 55% of the total flora of the range. The largest genera include *Eriogonum* (26 taxa), *Lupinus* (23), *Bromus* (13), *Camissonia* (14), *Phacelia* (14), *Quercus* (14), *Gilia* (13), *Lotus* (13), *Chenopodium* (12), *Cryptantha* (12), and *Mimulus* (10). Additional well-represented genera include *Allium,* *Astragalus,* *Atriplex,* *Calochortus,* *Calystegia,* *Carex,* *Ceanothus,* *Clarkia,* *Claytonia,* *Collinsia,* *Elymus,* *Galium,* *Gnaphalium,* *Hordeum,* *Juncus,* *Linanthus,* *Lomatium,* *Salvia,* *Scirpus,* *Trifolium,* and *Vulpia.*

A complete listing of the taxa is presented below in the annotated catalogue. Several taxa were excluded from the present enumeration of the flora, although voucher specimens at RSA suggest they were collected within the boundaries of the Liebre Mountains study area. In all instances, I questioned the veracity of the records because the locality information on the specimen is vague and the characteristic habitat of the taxa involved is different from that inferred by the purported collection station. Nevertheless, I have included references to these excluded taxa as an addendum to the annotated catalogue so their status may be re-examined should the taxa be encountered during future floristic work in the range.

The flora of the Liebre Mountains region is comparable to other areas of southern California in exhibiting a ratio of native to nonnative taxa of approximately 4:1 (Table 6). Although the percentage of natives is the highest of those areas compared, this may reflect a certain sampling bias, as field efforts of the present study were largely focused on relatively less-disturbed public lands. It is likely that further floristic documentation of habitats in the wildland-urban interface within the Liebre Mountains region will increase the number of adventive and naturalized exotic taxa.

A comparison of percentage distribution of taxa among life-forms within the Liebre Mountains and other selected regions is presented in Table 7. A typical floristic feature of areas with Mediterranean-type climate is the preponderance of annual and herbaceous perennial taxa (Thorne 1967; Shmida 1981). The Liebre Mountains region conforms to this general pattern, although the representation of native annuals is slight.
likely higher than documented in either the Santa Ana or Santa Monica mountains. In part this may reflect greater the climatic diversity of the Liebre Mountains region which includes considerably more xeric conditions along the southwestern margin of the Mojave Desert.

The Similarity Index (SI) of Soerensen (SI = 2C/A + B × 100%; where A = number of taxa in one area, B = number of taxa in a second area, and C = number of taxa common to both areas), provides a simple method of comparing relative floristic similarity of two areas (Balgooy 1971). Two southern California regions suitable for comparison with the Liebre Mountains are the Santa Ana and Santa Monica mountains. These ranges are of generally similar size and topographic diversity to the Liebre Mountains region, and have relatively well-documented floras (Lathrop and Thorne 1978, 1985; Boyd et al. 1995, Boyd, Ross, and Roberts 1995, Raven et al. 1986; Wishner 1997; Ross 1996).

The total floras of the Liebre and Santa Ana mountains exhibit a SI of 56.5%. A comparison of both the native and nonnative elements of these areas exhibit similar SI values, 56.6% and 56.1% respectively. Comparison of the Liebre Mountains with the Santa Monica Mountains gives a SI of 53.3% for the total flora, 53.7% for the native component, and 51.8% for nonnative elements. As a point of further comparison, SI calculated for the Santa Ana vs. Santa Monica mountains is higher than for either range compared with the Liebre Mountains (SI = 64.4% for total flora; 67.9% for native flora).

As with life-forms, climatic diversity likely plays an important role in shaping the similarities and differences observed among the floras of these three areas. The Santa Ana and Santa Monica ranges are similar in having climatically disparate coastal and interior cismontane slopes (Lathrop and Thorne 1978; Raven et al. 1986). Although the drier interior slopes support a number of "desert" taxa, both ranges lack the strong Mojave Desert influence present in the Liebre Mountains region. Conversely, the Liebre Mountains lack the lowland, coastal influences found in the Santa Ana, and especially, Santa Monica mountains.

A major impetus for selecting the Liebre Mountains region for study was its proximity to the borders of several major physiographic and phytogeographic units of southern California. The area is situated at the nexus of the Transverse Ranges, Coast Ranges, Sierra Nevada, Mojave Desert, and coastal plains (Hickman 1993; McLaughlin 1992). Ecotone areas such as this are often characterized by higher biological diversity than similar-sized areas within the core of a physiographic region. This pattern seems to hold for the Liebre Mountains region when compared with the Santa Ana or Santa Monica ranges, especially with respect to the native elements (Table 6).

A logical extension of the floristic analysis discussed above would be comparison of the Liebre Mountains with the somewhat larger, but closely juxtaposed San Gabriel, Pine Mountain, and Tehachapi ranges. Unfortunately, such analysis must await formal enumeration of the flora of those regions.

**Sensitive taxa**

Another goal of this study was to provide better documentation of plant taxa of conservation concern within the Liebre Mountains region. Much of the upland portions of the range are public lands managed by the Angeles National Forest. A baseline account of the resources being managed is required for establishing effective, long-term management plans. Large, ecologically intact units such as the Liebre Mountain uplands represent critical refugia for long-term conservation of southern California's low- and mid-elevation native flora. Areas which exhibit exceptional biological diversity are of even greater importance in this context.

Plants of conservation concern are those which have been designated "special plants" by California Department of Fish and Game, Natural Diversity Database (CDFG-NDDB 1998). The term "special plants"
Table 7. Comparison of life-form spectra for the Liebre Mountains region and other selected regions of southern California.

<table>
<thead>
<tr>
<th>Floristic unit</th>
<th>No. of taxa</th>
<th>Percentage distribution of taxa among life-forms*</th>
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<tr>
<td></td>
<td></td>
<td>Tr  Shl Shs Li SfP PH G An Ep Pa Su Aq</td>
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<td>Liebre Mountains region</td>
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<tr>
<td>Native taxa</td>
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<td>3 6 9 &gt;1 5 24 7 41 0 3 1 1</td>
</tr>
<tr>
<td>Total taxa</td>
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</tr>
<tr>
<td>San Mateo Cyn Wilderness</td>
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<tr>
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<tr>
<td>Total taxa</td>
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<td>3 6 7 &lt;1 6 22 7 44 0 &lt;1 2 1</td>
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<tr>
<td>Santa Rosa Plateau</td>
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<tr>
<td>Native taxa</td>
<td>463</td>
<td>3 6 7 &lt;1 7 24 8 38 0 &lt;1 1 5</td>
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<tr>
<td>Total taxa</td>
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<td>3 6 5 &lt;1 6 24 7 43 0 &lt;1 1 4</td>
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<td>Santa Ana Mtns s.l.</td>
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<tr>
<td>Native taxa</td>
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</tr>
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<td>Total taxa</td>
<td>1023</td>
<td>3 6 8 &lt;1 7 24 6 39 0 &lt;1 2 3</td>
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<tr>
<td>Santa Monica Mtns</td>
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<td>Total taxa</td>
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<td>Santa Catalina Is.</td>
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<td>California mediterranean areas</td>
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<tr>
<td>(Shmida 1981)</td>
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<td>4 7 13 2 14 29 3 27 0 &lt;1 0 0</td>
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<tr>
<td>Raunkiaer’s Normal Spectrum</td>
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<tr>
<td>(Raunkiaer 1934)</td>
<td>400</td>
<td>6 17 20 9 27 3 13 3 0 1 1</td>
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</tbody>
</table>

* Tr = trees (mesophanerophytes, 8–25 m tall); Shl = large shrubs (microphanerophytes, 2–8 m tall); Shs = small shrubs (nanophanerophytes, 0.5–2 m tall); Li = lianas (climbing phanerophytes with persistent stems); SfP = suffruticose perennials (chamaephytes, vegetative buds not over 0.5 m above the ground); PH = perennial herbs (hemicyryptophytes, vegetative buds at or just below soil surface); G = geophytes (herbaceous, vegetative buds well below soil surface); An = annuals (therophytes, including facultative biennials); Ep = epiphytes (nonparasitic); Pa = strict parasites (depending on other plants for much or all of their sustenance); Su = succulents (including stem succulents, leaf succulents, and rosette-leaved shrubs); Aq = aquatic plants (obligate hydrophytes, submersed or floating).

is a broad reference to all plant taxa inventoried by CDFG-NDDB, without regard to their legal or protection status (CDFG-NDDB 1998). Other common terms used to refer to such plants (e.g., rare, threatened, endangered, or sensitive) have taken on specific legal connotations in the highly politicized and litigious arena of species conservation. In the subsequent discussion, my use of the term “sensitive plants” should be interpreted as equivalent to CDFG-NDDB’s “special plants” as opposed to other narrower definitions.

A total of 32 sensitive plant taxa have been documented within the Liebre Mountains region (Table 8). Four are formally listed under the federal Endangered Species Act (ESA)—Berberis nevinii (Endangered), Dodecahema leptoceras (Endangered), Navarretia fossalis (Threatened), and Orcuttia californica (Endangered). The Berberis, Dodecahema, and Orcuttia are also listed as Endangered under the California ESA. Castilleja gleasonii is listed by the State as Rare. The majority of sensitive plants documented from the range are taxa considered by the California Native Plant Society (CNPS) as rare, threatened, or endangered (Skinner and Pavlik 1994).

Several of the sensitive plant taxa of the range are phytogeographically noteworthy. Berberis nevinii, Orcuttia californica, Dodecahema leptoceras, and Harpagonellapalmeri reach the northern limits of their range within the Liebre Mountains region. Navarretia fossalis may also share this distinction, depending upon interpretation of an anomalous collection from San Luis Obispo County (Boyd and Sanders, in press).

ANNOTATED CATALOGUE OF THE VASCULAR FLORA

The following list includes all vascular plant taxa documented during fieldwork in the Liebre Mountains region, and through herbarium specimens deposited at RSA-POM and elsewhere. A representative voucher specimen is cited for each taxon listed, including collector name(s), number, and collection date. Unless otherwise cited, voucher specimens are deposited at RSA-POM. Herbarium acronyms follow Index Herbariorum, 8th ed. (Holmgren, et al. 1990).

An alphabetical arrangement has been followed for families within subdivisions, classes, or subclasses, as well as for genera within families, and species within genera. Nomenclature used in this list largely follows Hickman (1993). Family nomenclature is that of Thorne.
Table 8. Sensitive plant taxa documented within the Liebre Mountains region.

<table>
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<tr>
<th>Taxon</th>
<th>Status</th>
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<tr>
<td>Acanthomintha obovata ssp. cordata</td>
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<td>Allium howelli var. clokeyi</td>
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<tr>
<td>Androsace elongata ssp. acuta</td>
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<td>Arenaria macradenia var. kushel</td>
<td>Fsoc; CNPS 3</td>
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<tr>
<td>Aster greatae</td>
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</tr>
<tr>
<td>Berberis nevini</td>
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<td>Calochortus clavatus var. gracilis</td>
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<td>Calystegia peisonii</td>
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<td>Castilleja gleasonii</td>
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<td>Castilleja plagiotoma</td>
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<td>Chorizanthe breviri</td>
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<tr>
<td>Chorizanthe parryi var. fernandina</td>
<td>CNPS 1A</td>
</tr>
<tr>
<td>Chorizanthe parryi var. parryi</td>
<td>Fsoc, CNPS 3</td>
</tr>
<tr>
<td>Cupressus arizonica ssp. nevadensis</td>
<td>CNPS 1B</td>
</tr>
<tr>
<td>Dodecachema leptoceras</td>
<td>FE, SE, CNPS 1B</td>
</tr>
<tr>
<td>Gilia latiflora ssp. cuyamensis</td>
<td>CNPS 4</td>
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<tr>
<td>Harpagonella palmeri</td>
<td>Fsoc, CNPS 2</td>
</tr>
<tr>
<td>Hordeum intercedens</td>
<td>CNPS 3</td>
</tr>
<tr>
<td>Juglans californica var. californica</td>
<td>CNPS 4</td>
</tr>
<tr>
<td>Juncus acutus ssp. leopoldi</td>
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<tr>
<td>Lilium humboldtii ssp. occidentum</td>
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<td>Lupinus excubitus var. johnstonii</td>
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<td>Navarretia fossalis FT, CNPS 1B</td>
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<td>Navarretia jaredii</td>
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<td>Orcuttia californica</td>
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<tr>
<td>Perideridia pringlei</td>
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<tr>
<td>Sidalcea neomexicana ssp. thurberi</td>
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<td>Stylocline masonii</td>
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<td>Syntrichopappus lemmontii</td>
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<tr>
<td>Thermopsis californica var. argentata</td>
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</table>

FE = federal listed endangered; Fr = federal listed threatened; Fsoc = federal species of concern; SE = California State listed endangered; SR = CA State listed rare; CNPS = California Native Plant Society listed (see Skinner & Pavlik [1994] for discussion of list ranking).

(1992) for the flowering plants, and Crabbe, et al. (1975) for ferns.

Nonnative taxa are indicated by an asterisk (*) before the name. Plants considered sensitive by the Angeles National Forest, California Native Plant Society, California Department of Fish and Game, and/or United States Fish and Wildlife Service are indicated by a dagger.

LYCOPODIAE

SELAGINELLACEAE


EQUISETACEAE


FILICAEE

ADIANTEACEAE


ASPLENIAEE


AZOLLACEAE

Azolla filiculoides Lam. Aquatic perennial herb. Local on surface of standing water and spring outflow, as at Knapp Ranch. Boyd 8693, 25 Apr 1996.

DENSTAEATDIACEAE


MARSILEACEAE

Marsilea vestita Hook. & Grev. Aquatic perennial herb. Scarce, documented from Bouquet Reservoir, but to be expected along margins of other water bodies, such as Lake Hughes, Elizabeth Lake, and other sag ponds along the San Andreas Fault Rift. Raven 16748, 24 Sep 1961.

POLYPODIACEAE


CONIFERAE

CUPRESSACEAE

*CALOCEDRUS DECURRENS (Torr.) Florin Tree. Introduced at scattered sites throughout the range in Forest Service plantations and occasionally becoming adventive. Apparently no natural stands are present in the range. Ross & Boyd 8319, 21 Sep 1994.

*CUPRESSUS ARIZONICA Greene ssp. ARIZONICA Tree. Introduced at scattered sites throughout the range, especially in Forest Service plantations and occasionally becoming adventive. Ross & Boyd 8321, 21 Sep 1994.

CUPRESSUS ARIZONICA Greene ssp. NEVADENSIS (Abrams) E. Murray Tree. Local in scrub along ridgeline of Warmsprings Mountain, west of the summit. Boyd, Brummitt, & Moore 10232, 26 May 1998. This population is composed of fewer than 50 nonreproductive juvenile plants, scattered about the vicinity of fire-killed parental trees. It is unclear whether this represents a natural population or adventive individuals derived from originally cultivated material. Although the plants observed were adjacent to a Forest Service road, given the overall isolated nature of the site, I have treated this as a presumably natural stand. To verify this interpretation, additional searches should be made for the taxon in the vicinity of Warmsprings and Red Rock Mountains. If the population is natural, it represents a significant extension of the known range southward from the southern Sierra Nevada.

JUNIPERUS CALIFORNICA Carrière Large shrub. Widespread and locally common in more xeric areas, as at the northwest end of the range, and in the vicinity of Agua Dulce and Acton. Ross & Boyd 2808, 6 Jun 1990.

EPHEDRACEAE


PINACEAE

PINUS COULTERI D. Don Tree. A few occurrences along the north face of Liebre and Sawmill mountains appear to be natural populations. The species has been introduced at scattered sites throughout the range, however, especially in Forest Service plantations. Clark 1205, 1 Oct 1928.

PINUS MONOPHYLLA Torr. & Frém. Tree. Locally common in a limited area at the northwest end of the range, generally restricted to ridges of sedimentary substrate. Boyd, Mistletoe, & Dolan 8586, 18 Apr 1996. A few individuals are found on the northeastern flank of Sierra Pelona and are noteworthy in possessing both single and two-needle leaves. Boyd, Ruiz, & Kinney 10089, 17 May 1998.

PINUS Ponderosa Douglas ex Lawson & C. Lawson Tree. A few occurrences along the north face of Liebre and Sawmill mountains appear to be natural populations. The species has been introduced at scattered sites throughout the range, however, especially in Forest Service plantations. Ross & Boyd 7809B.

PINUS SABINIANA Douglas Tree. Locally common from the edge of the Antelope Valley southward across Portal and Ritter ridges to the northern flanks of Sawmill and Liebre Mountains, with isolated individuals observed as far south as Red Rock Mountain. Wolf 8310, 27 Jan 1937.

PSEUDOTSUGA MACROCARPA (Vasey) Mayr Tree. Locally common in steep, shaded, mesic draws, especially along the northern flank of Liebre and Sawmill mountains and the Cold Canyon drainage. Boyd et al. 10001, 8 Jul 1997.

ANGIOSPERMAE-DICOTYLEDONES

ACERACEAE

ACER MACrophyllum Pursh Tree. Local in mesic, shaded canyons at scattered sites throughout the range. Boyd & Raz 9800, 20 May 1997.

ADoxACEAE


AZOIOCAEAE

Sesuvium verrucosum Raf. Perennial herb. Scarse. Documented from the margin of Elizabeth Lake, but to be expected in similar situations, as at Bouquet Reservoir, Lake Hughes, Quail Lake, and sag ponds along the San Andreas Fault Rift. Boyd & Raz 9098, 29 Oct 1996.

AMARANTHACEAE

*AMARANTHUS ALBUS L. Annual. Local at widely scattered, seasonally moist disturbed sites. Boyd et al. 8906, 11 Jul 1996.


ANACardiACEAE

Malosma Laurina (Nutt.) Abrams Large shrub. Very scarce, known from a single historic collection in Elizabeth Lake Canyon south of Warm Springs. Gifford 696, 8 May 1935.

RhUs INTEGRIFOLIA (Nutt.) Brewer & S. Watson x RhUs OVATA S. Watson Large shrub. Infrequent at the southwestern edge of the range, as in Charlie and San Francisquito canyons. Boyd & Wall 6536, 4 Apr 1996.

RhUs OVATA S. Watson Large shrub. Scattered in chaparral across the range, and apparently more common in the south west. Ross 8365, 7 Apr 1995.


RhUs TRiLOBATA NUT. ex Torr. & A. Gray var. QUINATA (Greene) Jeps. Small shrub, apparently the most common form of the species, locally common in oak woodland, mesic chaparral, and riparian woodland throughout the range. Ross & Banks 7534, 13 Apr 1994.

**Tocuscodendron diversilobum** (Torr. & A. Gray) Greene Small shrub or liana. Widespread and locally common on mesic slopes and in drainages. Tempieton 7702, 5 Aug 1951.

**APIACEAE**


*Corenocum vulgare* Mill. Suffruticose perennial. Uncommon, documented from a disturbed riparian area in lower Aguac Dulce Canyon, but to be expected in ruderal situations throughout the range. Boyd & Raz 9028, 14 Oct 1996.


*Sanicula crassicaulis* DC. Geophyte. Widespread and often common in understory of chaparral on mesic slopes. Boyd, Raz, & Ross 9468, 1 Apr 1997.


**APOCYNACEAE**


*Asclepias eriocarpa* Bentl. Perennial herb. Occasional at scattered sites throughout the range in grassland and openings in scrub and oak woodland. Ross, Mistretta, & Quici 4007, 28 Jun 1990.


**ASTERACEAE**


*Ambrosia psilostachya* DC. var. californica (Ryd-B.) S. F. Blake Perennial herb. Common in understory of riparian and oak wood-
land in drainages throughout the range. *Boyd & Raz* 8926, 24 Sep 1996.

*Anisocoma filaginiana* A. Gray Annual. Local on open, low competition sites, especially heavy soils, low to mid-elevation areas in the western half of the range. *Boyd, Mistretta*, & *Dolan* 8548, 18 Apr 1996.


*Artemisia tridentata* Nutt. ssp. tridentata Small shrub. Locally common on the northern flank of Sierra Pelona, and at scattered sites westward along the higher ridges. *Boyd & Raz* 9011, 8 Oct 1996.

*Aster frondosus* Torr. & A. Gray Annual. Known from a single collection at Lake Hughes, but to be expected about other bodies of water along the San Andreas Rift Zone. *Chariton* 4115, 7 Oct 1989.

*Aster greatae* Parish Perennial herb. Local about springs in understory of oak woodland, near Cienaga Campground in Fish Canyon; also documented by an early collection from Acton. *Raz & Boyd* 063, 23 Oct 1996.

*Aster supulatorius* Michx. var. *ligulatus* Shinn. Annual. Known from a single collection at Quail Lake, but to be expected about other bodies of water along the San Andreas Rift Zone. *Boyd & Raz* 9085, 14 Oct 1996.


*Brickellia nevini* A. Gray Small shrub. Local on steep, xeric slopes and cliffs, western and southwestern parts of the range. *Boyd & Raz* 8992, 8 Oct 1996.


*Chaenactis santolinoides* Greene Perennial herb. Scattered, but locally common openings in oak woodland and chaparral on the higher ridges, generally in loose soil or scree. *Boyd & Raz* 9264, 20 May 1997.


*Chaenactis xantiana* A. Gray Annual. Widespread and locally common across the northern edge of the range from the Antelope Valley to the summits of the higher ridges, especially in grassland and sandy openings on granitic substrate. *Ross 8378A, 24 Apr 1995.*


*Cirsium vulgare* (Savi) Ten. Perennial herb. Widespread and locally common in wetland situations, especially where there has been recent livestock grazing. *Boyd & Raz* 8940, 24 Sep 1996.

*Conceus benedictus* L. Annual. Infrequent in disturbed and ruderal sites scattered throughout the range. *Boyd & Ross* 7631, 4 May 1994.

*Conyza canadensis* (L.) Cronquist Annual (sometimes treated as introduced). Widespread in most habitats, but generally not com-


Coreyssomyge filaginifolia (Hook. & Arn.) Nutt. var. personii M. L. Canby Suffruticose perennial. Widespread and common, xeric openings in scrub, open oak woodland, and grassland, and various areas recovering from past disturbance. Munz 7785, 7 Oct 1923 (Holotype).


Eclipta prostrata (L.) L. Annual. Locally common on mud along the shores of Elizabeth Lake and to be expected in other bodies of water along the San Andreas Fault Rift. Boyd & Raz 9097, 29 Oct 1996.


Ericameria cooperi (A. Gray) H. M. Hall spp. Cooperi Small shrub. Local in xeric scrub on the desert margin westward through the Antelope Valley and southwest into the head of Soledad and Mint canyons. Everett & Balls 23803, 22 May 1959.

Ericameria cooperi (A. Gray) H. M. Hall spp. Cooperi × Ericameria linearifolia (DC.) Urbatsch & Wussow Small shrub. Locally common at the northern base of Portal Ridge at the mouth of Myrick Canyon. All plants here were uniform in overall morphology, and neither putative parent species was readily apparent in the immediate vicinity. Boyd & Raz 9365, 26 Mar 1997.


Ericameria pinnata (A. Gray) H. M. Hall Small shrub. Infragren in scrub, scattered sites in the southern and central portions of the range, locally common on the lower slopes in the vicinity of Lake Hughes. Gifford 419, 24 Jun 1935.


Eriophyllum confertiflorum (DC.) A. Gray var. trifidum (Nutt.) A. Gray Suffruticose perennial. Widespread and common in xeric scrub, openings in oak woodland, and margins of grassland. Ross & Boyd 7705, 10 May 1994.


Euthamia occidentalis Nutt. Perennial herb. Local along drainages and about springs throughout the range. Raz & Boyd 005, 23 Oct 1996.


Gnaphalium bicolor Borelii Suffruticose perennial. Scarcely, collected on Soledad Canyon. Mullins s.n., 1 Apr 1931.


Grindelia camporum Greene var. camporum Perennial herb. Locally common in over-grazed pastures and intermittently cultivated grain fields in Leona Valley. Lane 3093, 6 Sep 1986.


Gutierrezia sarothrae (Pursh) Britton & Rusby Suffruticose perennial. Widespread, occasional in openings in scrub, more common locally in old disturbed areas. Boyd & Raz 8958, 24 Sep 1996.

Hazardia squarrosa (Hook. & Arn.) Greene var. gramineifolia (DC.) W. D. Clark Small shrub. Infrequent, openings in scrub and oak woodland, mostly in the western half of the range. Wolf 4353, 19 Oct 1932.

HELIANTHUS ANNUUS L. ssp. LENTICULARIS (Douglas) Cockerell Annual. Widespread and locally common along drainages, and especially in moist disturbed or heavily grazed areas. Porter, Columbus, & dos Santos 10914, 5 Jun 1996.


HEMIZONIA FASCICULATA (DC.) Tort. & A. Gray Annual. Widespread, but generally uncommon, except locally in areas of heavy, seasonally moist soil, as in upper Oso Canyon and in the Cuzcan Mesa area. Boyd & Ray 9749, 6 May 1997.


HETEROTHeca SESSILIFLORA (Nutt.) Shimins ssp. ECNIOIDES (Benth.) Semple Perennial herb. Scarcely documented by early collections from lower elevations in the Newhall-Saugus area. Wolf 4081, 15 Sep 1932.

HETEROTHeca SESSILIFLORA (Nutt.) Shimins ssp. FASTIGIATA (Greene) Semple Perennial herb. Locally common at scattered sites in the northern part of the range, generally on well drained soils in grassland and open, xeric scrub. Ross & Boyd 8287, 21 Sep 1994.


HYMENOCLEA SALSOLEA Tort. & A. Gray Small shrub. Occasional in open, xeric scrub, areas of desert transition at the northeastern corner of the range. Cantwell s.n., May 1930.


IVA AXILLARIS Pursh ssp. ROBUSTIOR (Hook.) Bassett Perennial herb. Local in seasonally moist openings in scrub and on benches along drainages, scattered sites in the western half of the range. Boyd & Ray 9895, 28 May 1997.

*LACTUCA SEREOLA L. Annual. Widespread, occasional to locally common on benches along drainages, and especially in moist, disturbed areas. Ross & Boyd 8340, 21 Sep 1994.


LASTHENIA CALIFORNICA DC. ex Lindl. Annual. Widespread and common in grassland and open areas in scrub and woodland, including recent burns. Ross 8392, 26 Apr 1995.

LAGOPHYLLA GLANDULOSA (Hook.) Hook. & Arn. Annual. Widespread and common in grassland and open areas in scrub and woodland, especially on well drained soils. Ross & Steinmann 8559, 8 May 1995.


LESINGIA GLANDULIFERA A. Gray var. GLANDULIFERA Annual. Locally common, openings in xeric scrub and on alluvial benches, mostly in the southern half of the range. Boyd & Ray 9058, 14 Oct 1996.

LESINGIA LEMMONII A. Gray var. PEIRONII (J. T. Howell) Ferris Annual. Locally common, grassland, openings in woodland and xeric scrub, and on alluvial benches, mostly in the northern part of the range. Peirson 3550, 9 Jun 1923 (Isotype).

LESINGIA LEMMONII A. Gray var. RAMULOSISSIMA (A. Nelson) Ferris Annual. Openings in xeric scrub and on alluvial benches, southeastern end of the range, as near Acton and Mint Canyon. Wolf 4078, 15 Sep 1932.


MALACOTRAX CALIFORNICA DC. Annual. Widespread, but apparently only locally common, open, sandy habitats. Boyd & Ray 9369, 16 Apr 1997.


*MATRICARia MATRICARIOIDES (Less.) Porter Annual. Widespread, generally in somewhat disturbed situations, especially on compacted soil, as along dirt roads or foot trails. Ross & Boyd 7724, 10 May 1994.

MICROPSUS CALIFORNICUS Fisch. & C. A. Mey. var. CALIFORNICUS Annual. Infrequent, but locally common on heavy soils, openings in scrub. Boyd & Wall 8775, 16 May 1996.


MICRORHIZUS LINDLEYI (DC.) A. Gray Annual. Widespread and locally common, grassland, openings in scrub and woodland, and especially on recent burns. Wheeler 9349, 8 May 1967.

MONOLopia LANCOLATa Nutt. Annual. Local in open habitats, lower elevations, northern and eastern edges of the range. Epling & Wheeler 1843, 4 Jun 1933.

RAFINESQUIA CALIFORNICA Nutt. Annual. Widespread and locally common in openings and understory of scrub and woodland, and especially on recent burns. Boyd & Raz 9695, 6 May 1997.

ROGIOAPPUS LEPTOCLADUS A. Gray Annual. Locally common in openings of scrub and woodland along the crests of the higher ridges, and scattered elsewhere, as in upper Osito Canyon and Portal Ridge. Boyd & Raz 9645, 1 May 1997.

SENECIO BREWERI Burk Dasy Perennial herb. Widespread, but uncommon in understory of chaparral. Peterson 3088, 3 Jun 1922.


SENECIO VULGARIS L. Annual. Widespread, occasional in somewhat disturbed situations within grassland, scrub, and woodland, more frequent in recently burned areas. Boyd & Raz 91428, 4 Mar 1997.


*SORBUS OBERACEUS L. Annual. Widespread, most frequently in moist disturbed situations, but occasionally elsewhere in relatively undisturbed habitats. Porter, Columbus, & dos Santos 10927, 5 Jun 1996.

STEPHANOMERIA CICHORIACEA A. Gray Perennial herb. Local on open, steep rocky slopes at scattered sites throughout the range, as in Spunky, Ruby, and Elizabeth Lake canyons, and about Knapp Ranch. Ross & Boyd 8266, 20 Sep 1994.

STEPHANOMERIA EXIGUA Nutt. ssp. CORONARIA (Greene) Gottlieb Annual. Widespread, occasional to locally common in grassland and openings in scrub and woodland. Boyd & Raz 9677, 24 Sep 1996.


SYNTRICHOPAPPUS LEUCCONII A. Gray Annual. Infrequent in open habitats, areas of desert transition, eastern end of the range. Boyd & Misrett 8738, 1 May 1996.


TETRADYMIA COMOSA A. Gray Small shrub. Uncommon in open scrub along the southern edge of the range, generally seen in small colonies. Wolf 4077, 15 Sep 1932.

XANTHIM STRUMARIUM L. Annual. Widespread and locally common along streams in the larger drainages, and occasionally in seasonally wet disturbed areas. Raz & Boyd 001, 23 Oct 1996.

XYLORHIZA TORTIFOLIA (Torr. & A. Gray) Greene Suffruticose perennial. Uncommon, documented from rocky hillsides in Mint Canyon, presumably from the area of desert transition at the upper end. Templeton 1456, 19 May 1931.

BERBERIDACEAE


BETULACEAE

ALNUS RHOMBIFOLIA Nutt. Tree. Widespread and locally common in larger drainages with reliable water supply, especially in Castaic Creek and its tributaries, and along the northern flank of Liebre and Sawmill mountains. Raz & Boyd 030, 23 Oct 1996.

BORAGINACEAE


AMSINCKIA TESSELLATA A. Gray var. TESSELLATA Annual. Widespread and common, especially in grassland and open areas in scrub and woodland in the northern half of the range. Boyd & Raz 9332, 26 Mar 1997.


CRYPTANTHA CLEVELANDII Greene Annual. Occasional in open habitats, scattered sites in the western half of the range. Boyd & Raz 9719, 6 May 1997.

CRYPTANTHA DECIPIENS (M. E. Jones) A. Heller Annual. Occasional in open habitats, scattered sites in the western half of the range. Boyd & Raz 9594, 30 Apr 1997.


CRYPTANTHA MICRANTHA (Torr.) I. M. Johnst. Annual. Uncommon,
open alluvial benches of Soledad Canyon Wash near Acton. El­mer 3682, Jun 1902.


CRYPTANTHA SIMULANS Greene Annual. Uncommon, documented from xeric habitats at both the eastern and western ends of the range. Ross, Boyd, & Arnseth 4855, 29 Apr 1991.

HARPAGONELLA PALMERI A. Gray Annual. Uncommon and very local, open clay soil in Plum Canyon near Cruzan Mesa, and historically near Saugus. This is the northern limit for the species. Boyd & Raz 9134, 4 Mar 1997.


PECTOCARYA SETOSA A. Gray Annual. Widespread and locally common in grassland, sandy openings in scrub and woodland, and open alluvial benches. Petison 1016, 13 May 1917.


PLAGIOTHYRIS ARIZONICUS (A. Gray) Greene ex A. Gray & PLAGIOTHYRIS THOROUGH (A. Gray) A. Gray Annual. Plants of intermediate morphology have been documented from grassland and open areas in scrub along the crest of Sierra Pelona. Boyd & Raz 9635B, 1 May 1997.


PLAGIOTHYRIS NOTHOFULIS (A. Gray) A. Gray Annual. Occasional in open habitats, mostly along the southern and western edges of the range. Ross & Banks 7500, 12 Apr 1994.

BRASSICACEAE


ARABIS PULCHRA M. E. Jones var. GRACILIS M. E. Jones Perennial herb. Scarce, documented from near Saugus. Cooper 2715, 21 Apr 1948.

ARABIS PULCHRA M. E. Jones var. PULCHRA Perennial herb. Infrequent, openings in scrub and woodland in the northern and eastern half of the range. Boyd & Raz 9623, 30 Apr 1997.

ARABIS PARSIFLORA TOTT. & A. Gray var. ARCUTA (Nutt.) Rollins Perennial herb. Uncommon, about rock outcrops in open areas, crest of Liebre Mountain and Sierra Pelona. Ross, Mistretta, & Quici 3959, 28 Jun 1990.

ARABIS PARSIFLORA TOTT. & A. Gray var. CALIFORNICA Perennial herb. Scarce, documented from Elizabeth Lake Canyon near Cottonwood Camp. Thompson 22, 8 Apr 1964.


BARBAREA ORTHECERAS Lede. var. DOLICHOCARPUS Fernald Biennial herb. Uncommon along streams and about seepages, as in Ruby and San Francisquito canyons. Ross 7585, 28 Apr 1994.


*BRASSICA NEGRA (L.) W. D. J. Koch Annual. Locally common on recent burn northwest of Castaic Lake, generally in somewhat disturbed areas, as along pipeline alignments. Perhaps originally introduced as a slope stabilizer following pipeline construction. Boyd et al. 9130, 11 Feb 1997.

*CAPSILLA BURSA-PASTORIS (L.) Medikus Annual. Widespread, but generally uncommon, except in shaded areas with active or recent grazing activity. Ross & Porter 8460, 4 May 1995.


CAULANTHUS COULTERI S. Watson var. COULTERI Annual. Occasional to locally common in openings within scrub and woodland in the northwestern portion of the range. Ross 8382, 26 Apr 1995.

CAULANTHUS LASIOPHYLLUS (Hook. & Arn.) Payson var. LASIOPHYLL- LUS Annual. Uncommon, recent burns and xeric open areas in chaparral in the northwestern part of the range. Boyd, Raz, & Ross 9476, 1 Apr 1997.


*LEPIDIUM VIRGINICUM* L. var. PUBESCENS (Greene) C. L. Hitchcock Annual. Uncommon, documented along the southern edge of the range. *Craig 483*, 19 Jun 1927.

*ROIPPA CURVISILICIA* (Hook.) Bessey ex Britton Annual or biennial herb. Scarce, marshy ground along Quail Lake. *Boyd & Raz* 9088.


*Sisymbrium altissimum* L. Annual. Widespread and common in grassland and openings in scrub and woodland, especially on recent burns and disturbed or grazed areas. *Boyd & Raz* 9872, 28 May 1997.


*Sisymbrium orientale* L. Annual. Widespread and common in grassland and openings in scrub and woodland, especially on recent burns and disturbed or grazed areas. *Boyd, Raz* & *Ross 9465*, 1 Apr 1997.


**SYMPHORICARPUS MOLLIS** Nutt. in Torr. & A. Gray Small shrub. Scarce, documented by an early collection from near Acton. *Hasse s.n., Aug 1893.*

**CARYOPHYLLACEAE**


**ARENARIA MACRAGRENSIS** S. Watson var. kuschei (Eastw.) Maguire Suffruticose perennial. Infrequent in scattered populations on the crest of Liebre Mountain on decomposed granite soils, open areas in oak woodland and scrub oak dominated chaparral. Found in mixed populations with var. arcuifolia, except in the western-most populations. *Ross, Boyd & Burns* 8123, 7 Jul 1994. Two collections from Soledad Canyon, one near Ravenna (Johnstone s.n., 22 Jun 1930) the other between Bee and Agua Dulce canyons (White & Devries 6771, 23-24 Jun 1998) approach var. kuschei in the glanularity of calyx, pedicels, and upper inflorescence branches.


**SPRECHLARIA MARINA** Griseb. Annual. Local on drying mud along Castaic Creek above Elderberry Forebay, and along stream in Grasshopper Canyon. *Boyd & Mattreia* 8817, 23 May 1996.


**CHENOPODIACEAE**

**ATRIPLEX CANESCENS** (Pursh) Nutt.ssp. CANESCENS Small shrub. Widespread and locally common in xeric scrub, especially areas of sedimentary substrate along the southern and western edges of the range, and in desert transition about the northeast corner. Also seeded on road cuts, pipeline scars and other disturbed sites. *Boyd & Raz* 9040, 14 Oct 1996.


**ATRIPLEX SEMIBACATA** R. Br. Suffruticose perennial. Occasional at scattered sites along the southern edge of the range, primarily in disturbed situations on sedimentary substrates. *Boyd et al.* 8907, 11 Jul 1996.


**BASILIS HYSSOPIFOLIA** (Pall.) Kuttee Annual. Locally established in disturbed periodically flooded alluvial flats along Castaic Creek just above Elderberry Forebay. *Boyd et al.* 8914, 11 Jul 1996.


**CHENOPODIUM LEPTOPHYLLUM** Moq. Annual. Local, open woodland and grassland on western summit of Liebre Mountain, especially on recently cleared fuelbreak. *Boyd 10030, 10 Sep 1997.


*Salvia tragus* L. Annual. Widespread, generally in areas of recent disturbance where it may be abundant. Boyd & Raz 8972, 24 Sep 1996.

Cistaceae


*Cistus ladanifer* L. Small shrub. Established in scrub along the Old Ridge Route near Templin Highway and the historic site of Tumble Inn. also along the Leona Divide Road above Dowd Canyon at the western end of Sierra Pelona. Ross 8357, 7 Apr 1995.


Clusiaceae


Convolvulaceae


*Calystegia malacophylla* (Greene) Munz ssp. pedicillata (Jeps.) Munz x *Calystegia peisonii* (Abrams) Brunnmerr Perennial herb. Plants of intermediate morphology between the putative parents are locally common in grassland and open oak woodland at western crest of Liebre Mountain. Ross et al. 3897, 27 Jun 1990.


*Cuscuta californica* Hook. & Arn. var. californica Parasitic annual. Widespread and locally common, especially on *Eriogonum fasciculatum* and other coastal sage scrub shrubs. Ross, Boyd, & Arnseth 9492, 30 Apr 1991.


Cornaceae


*Coronus sericea* L. *ssp. sericea* Large shrub. Local at margin of intermittent stream, upper Shake Canyon, north flank of Sawmill Mountain. Thompson s.n., 5 Sep 1968.

Crassulaceae

*Crassula connata* (Ruiz & Pav.) A. Berger Annual. Widespread and locally common in relatively undisturbed open habitats, especially old formation alluvial benches. Ross 8351, 7 Apr 1995.


*Dudleya lanceolata* (Nutt.) Britton & Rose Succulent perennial herb. Widespread and locally common, rocky openings in scrub, shaded cliffs, steep rocky slopes, etc. Ross & Boyd 7265, 23 May 1993.


Cucurbitaceae


*Cucurbita foetidissima* Kunth var. pulcherrima Britton Annual herb. Uncommon, lower Red Fox Canyon near the west end of Liebre Mountain.

*Marah fabaceus* (Naudin) Greene Geophyte. Locally common in scrub and open woodland across the western and northern edges of the range. Boyd, Raz, & Ross 9450, 1 Apr 1997.


*Marah macrocarpus* (Greene) Greene Geophyte. Widespread and locally common in scrub and woodland, especially in the southern half of the range. Hood s.n., 13 May 1939.

Datisaceae


Elatitaceae

ERICACEAE

ARCTOSTAPHYLOS GLANDULOSA Eastw. ssp. GLAUCOMOLLIS P. V. Wells
Large shrub. Widespread and locally common in chapparral, especially on mesic exposures; occasional in understory of woodland on Liebre and Sawmill mountains. Ross & Boyd 8760, 1 May 1996.


ARCTOSTAPHYLOS PARRYANA Lemmon Large shrub. Scarce, documented by an early collection at Sprague’s. Dudley & Lamb 4345, 5 Jun 1896.

EUPHORBIAEAE


FABACEAE


ASTRAGALUS DOUGLASII (Torr. & A. Gray) A. Gray var. DOUGLASII Perennial herb. Widespread and locally common, openings in scrub, mostly on sedimentary substrates, western half of the range. Ross 8348, 7 Apr 1995.

ASTRAGALUS PACHYPUS Greene var. PACHYPUS Suffrutticose perennial. Scarce, xeric scrub and foothill pine woodland at the northwest end of the range. Webb s.n., 19 Apr 1935.


ASTRAGALUS TRICHOPODUS (Nutt.) A. Gray var. PHOXUS (M. E. Jones) Barneby Perennial herb. Widespread and locally common in openings in scrub, mostly on sedimentary substrates, western half of the range. Ross 8348, 7 Apr 1995.

ASTRAGALUS GYLCYRRHEZA LEPIDOTA Pursh Perennial herb. Local on benches in riparian woodland and about seeps at scattered sites across the range. Boyd & Wall 8782, 16 May 1996.


LOTUS GRANDIFLORUS (Benth.) Greene var. GRANDIFLORUS Perennial herb. Occasional to locally common in open, xeric scrub, generally on decomposed granite, northwestern end of the range. Ross & Boyd 7683, 4 Apr 1994.


LOTUS HEMANNII (Durand & Hill.) Greene ssp. HEMANNII Perennial herb. Widespread and common on alluvial benches and about seeps. Macfadden 2654, 22 Apr 1931.


LOTUS OBLONGIFOLIUS (Benth.) Greene var. OBLONGIFOLIUS Perennial herb. Common in moist soil along streams and about seeps. McHargue & Miller s.n., 6 Jul 1963.

LOTUS PROCUMBENS (Greene) Greene var. PROCUMBENS Perennial herb. Locally common in grassland and open situations in scrub and woodland, summits of Liebre and Sawmill mountains northward to the edge of the Antelope Valley. Boyd & Raz 9932, 29 May 1997.

LOTUS SALISUGINOSUS Greene var. SALISUGINOSUS Annual. Widespread and common in openings of scrub and woodland, especially plentiful on recent burns. Boyd, Raz. & Ross 9452, 1 Apr 1997.

LOTUS SCOPARIUS (Nutt.) Ortlepp var. SCOPARIUS Suffrutticose perennial. Widespread, occasional in xeric openings in scrub, locally common on recent burns, old fuelbreaks, etc. Ross & Porter 8422, 4 May 1995.

LOTUS STROGOSUS (Nutt.) Greene var. HIRTILLUS (Greene) Ottery Annual. Widespread and common in grassland and openings in scrub and woodland. Especially common on recent burns. Boyd & Raz 9926, 29 May 1997.


LUPINUS ALBIFRONS Bentham var. EMINENS (Greene) C. P. Sm. Small shrub. Uncommon, documented from low elevations near Newhall and Valencia. Wisura & Kelly 4109, 16 Apr 1986.


LUPINUS BENTHAMII A. Heller Annual. Uncommon, documented from the base of the range at the extreme western end of the Antelope Valley and adjacent Peace Valley. Abrams 11726, 20 Apr 1927.


LUPINUS BICOLOR Lindl., var. TRIDENTATUS (Eastw.!! C. P. Sm.) D. B. Dunn Annual. Widespread in grassland, open scrub and woodland, and especially recent burns. Clokey & Templeton 4716, 8 Apr 1930.


LUPINUS EXCUBITUS M. E. Jones var. JOHNSTONII C. P. Sm. in Jeps. Sulfurfixe perennial. Plants approaching this variety have been documented from grassland and open woodland on the central summit area of Liebre Mountain. Ross & Boyd 7768, 11 May 1994.


LUPINUS FORMALIS Greene ssp. ROBUSTUS (C. P. Sm.) Conrad Perennial herb. Infraguent in grassland and openings in scrub and woodland, scattered sites in the northern half of the range. Everatt & Balls 23800, 22 May 1959.


LUPINUS MICROCARPUS Sims var. MICROCARPUS Annual. Widespread, occasional in open situations in grassland, scrub, and woodland, especially on loose, decomposed granite soil and recent burns. Boyd & Raz 9778, 6 May 1997.


LUPINUS SUCCULENTUS Douglas ex Koch Annual. Occasional to locally common, especially on heavy soil, western edge of the range. Boyd, Raz & Ross 9475, 1 Apr 1997.


*LUPINUS LUPULINA L. Perennial herb. Occasional in damp soil along streams and other moist disturbed places, scattered sites throughout the range. Ross, Boyd & Burns 8909, 6 Jul 1994.

*LUPINUS POLYMORPHA L. var. BREVISPINA (Benth.) Heyn. Annual. Apparently scarce, documented from Grasshopper Canyon, where present with the typical variety. White & Leatherman 6631, 4–5 Jun 1998.


*MELILOTUS INDICUS (L.) All. Annual. Widespread and locally common along streams, about seeps, and especially in moist disturbed areas. Wheeler 9252, 2 May 1967.

*PARKINSONIA ACULEATA L. Tree or large shrub. Locally adventive in generally disturbed situations, scattered across the southern half of the range. White & Devries 6778, 23–24 Jun 1998.


*SPARTIUM JUNCEUM L. Large shrub. Occasional to locally common on road cuts and fill slopes, less frequent along drainages. Boyd & Wall 8776, 16 May 1996.


TRIFOLIUM ALBOPURPUREUM Tort. & A. Gray var. ALBOPURPUREUM Annual. Widespread and locally common in openings in scrub and woodland, and especially in grassland, Runyan 27, 7 Apr 1955.


TRIFOLIUM VARIETATUM Nutt. Annual. Uncommon, moist soil along
stream, Castaic Creek near confluence with Fish Creek. Boyd, Mistr., & Soza 8844, 12 Jun 1996.


Vicia americana Willd. var. AMERICANA Perennial herb. Infrequent in open woodland and on alluvial benches, northwestern quarter of the range. Boyd et al. 9787, 10 May 1997.


AGACEAE


Quercus berberidophylla Nutt. Large shrub. Widespread and locally common in scrub and woodland, especially in the southern half of the range. Boyd & Raz 9016, 8 Oct 1996.

Quercus chrysolepis Lieb. Tree or large shrub. Widespread, forming dense woodlands on mesic exposures of the Liebre, Sawmill, and Sierra Pelona ridge complexes; also abundant as arborescent shrubs in dense oak chaparral on more xeric exposures of these and other ridges. An exceptionally large individual can be found crowning the western summit of Liebre Mountain and other notably large individuals are present on the crest of Sierra Pelona west of Mt. McDill. Ross & Boyd 7877, 25 May 1994.

Quercus douglasii Hook. & Arn. Tree. Locally common in open woodlands at the northwestern end of the range and sporadically southward along the western edge of the range near Oak Flat. Ross & Boyd 8315, 21 Sep 1994.

Quercus douglasii Hook. & Arn. × Quercus john-tuckeri Nixon & C. H. Mull. Tree. Plants of intermediate morphology between the putative parents are occasionally in the northwestern corner of the range and at the western edge near Oak Flat. Ross et al., 28 Jun 1990.

Quercus douglasii Hook. & Arn. × Quercus lobata Nee Tree. Plants of intermediate morphology between the putative parents are occasional in the northwestern corner of the range and at the western edge near Oak Flat. Benson 14291, 17 Nov 1949.


Quercus kelloggii Newb. × Quercus wislizenii A. DC. var. frutescens Engelm. Large shrub to tree. Plans of intermediate morphology between the putative parents are occasionally encountered where the two parental taxa occur together, especially on Liebre and Sawmill Mountains. Boyd 10029, 10 Sep 1997.

Quercus lobata Née Tree. Locally common in open woodlands at the northwestern end of the range and sporadically southward along the western edge of the range, especially near Valencia and Newhall. Ross & Boyd 8316, 21 Sep 1994.


FRANKENIAEACEAE


GERANIACEAE


GENTIANACEAE

Gentianella exaltata (Grieseb.) Piper Annual. Local in drying stream bed along Castaic Creek, upstream from Elderberry Forebay, and at edge of drying fault sag, north base of Liebre Mountain at Cow Spring Canyon. Ross & Boyd 8322, 21 Sep 1994.


GERANIACEAE


GROSSULARIACEAE


Ribes quercetorum Greene Small shrub. Locally common in scrub and woodland on alluvial benches and slopes with mesic exposures, northern half of the range. Particularly common at the northwestern end of the range and often forming dense thickets on certain slopes. Boyd & Raz 9348, 26 Mar 1997.

HIPPOCASTANACEAE

AESCULUS CALIFORNICA (Spach) Nutt. Tree. Locally common in oak and foothill pine woodlands across Portal Ridge and the northern flank of Liebre and Sawmill mountains, eastward to the vicinity of Elizabeth Lake Canyon. Natural populations observed south of Hiatt Canyon in the east and upper Liebre Gulch and the Gillette Mine area of Bear Canyon in the west. Boyd, Ross, & Burns 8140, 7 Jul 1994. Plants found further south, in the vicinity of Powerhouse No. 2 in San Francisquito Canyon, are presumed to be derived from former plantings.

HYDROCOTYLAECES


HYDROPHYLLACEAE

EMMENANTHE PENDULIFLORA Benth. var. PENDULIFLORA Annual. Widespread, occasional in xeric openings in scrub, but especially common on recent burns. Boyd & Raz 9745, 6 May 1997.

ERIODICTYON CRASSIFOLIUM Benth. var. CRASSIFOLIUM Large shrub. A single collection from Kings Canyon appears to be this taxon, otherwise, the variety is not known from the range. Dudley & Lamb 4343, 8 Jun 1896.

ERIODICTYON CRASSIFOLIUM Benth. var. NIGRESCENS Brand Large shrub. Widespread and common in scrub and open woodland, especially on recovering burns, old fuelbreaks, and open aluvial benches. Ross & Porter 8511, 4 May 1995.


EUCRYPTA CHRYSANTHEMIFOLIA (Benth.) Greene var. CHRYSANTHEMIFOLIA Annual. Widespread and locally common, mesic openings and understory of chaparral and woodland, often about shaded bases of boulder outcrops, especially common on recent burns. Ross & Porter 8406, 4 May 1995.


PHACELIA BRACHYLOBA (Benth.) A. Gray Annual. Generally scarce except on recent burns in scrub, where locally common, western half of the range. Ross & Boyd 2820, 6 Jun 1990.


PHACELIA DAVIDSONII A. Gray Annual. Locally common in grassland and open understory of pine and oak woodlands from the edge of the Antelope Valley to the crests of the Liebre, Sawmill, and Sierra Pelona ridge systems. Davidson 2525, 25 May 1975.


PHACELIA DOUGLASII (Benth.) Tott. Annual. Uncommon, scattered sites in the eastern half of the range, including Leona Valley and upper Soledad Canyon. Ross & Steinmann 8564, 8 May 1995.


PHACELIA IMBRICATA Greene ssp. IMBRICATA Perennial herb. Local on rocky slopes and aluvial bench in scrub and woodland openings, scattered sites across the range. Boyd & Wall 8778, 16 May 1996.


PHOLISTOMA MEMBRANACEUM (Benth.) Constance Annual. Occasional, areas of desert transition at the northeastern end of the range. Broughton & Muller 1350, 21 Apr 1971.


JUGLANDACEAE

JUGLANS CALIFORNICA S. Watson var. CALIFORNICA Tree or large shrub. Occasional in scrub and woodland of lower Bouquet Canyon, scarce at other sites in lower elevations to the west and south. Boyd & Raz 8991, 8 Oct 1996.


LAMIACEAE

ACANTHOMINTHA OBOVATA Jeps. ssp. CORDATA Jekerst Annual. Scarce on moist, low competition sites on clay soil deposit in upper Otiso Canyon. Likely present in other islands of clay soil lower in Otiso Canyon and adjacent areas at the western edge of the range. Boyd, Mistretta, & Dolan 8558, 18 Apr 1996.


LEPECHNIA sp. var. Small shrub. Occasional in chaparral, documented in the Liebre Mountains region only from the summit and northern flank of Red Mountain in upper Clearwater and Ruby canyons. Boyd & Raz 9733, 6 May 1997. A paper describing this shrub is in preparation and will be presented elsewhere. It combines floral and vegetative characters of L. calycina and L. cardiophylla, but differs from those taxa in its floral bracts and in-
floriculture, among other characters. Another population of this putative new species occurs approximately 35–40 km to the southwest in the Topa Topa Mountains of Ventura County, in the vicinity of Tar Canyon near its confluence with Sespe Canyon.

*Marrubium vulgare* L. Suffruticose perennial. Widespread, but generally only common in areas of past disturbance, and especially intensive grazing. *Boyd & Raz* 8944, 24 Sep 1996.

*Mentha arvensis* L. Perennial herb. Local in moist soil along streams in understory of riparian woodland, such as lower Ruby Canyon, central San Francisquito Canyon, and Soledad Canyon near Ravenna. *Raz & Boyd* 003, 23 Oct 1996.


*Rosmarinus officinalis* L. Small shrub. A prostrate selection of this species has been introduced as a roadside planting/slope stabilizer along the Old Ridge Route and other roads in the National Forest. Apparently capable of spreading locally, but not aggressively so. *Ross 8358*, 7 Apr 1995.


*Salvia carduacea* Bentham. Widespread and locally common in welldrained soils, northwestern end of the range and areas bordering the Antelope Valley; infrequent and scattered elsewhere throughout the range, especially in the vicinity of Acton. *Boyd 8707*, 25 Apr 1996.


*Salvia leucophylla* Greene Small shrub. Locally common in scrub, southwestern quarter of the range. *Doby 672*, 16 May 1969.


*Satureja microloides* (Benth.) Briq. Sufiroticose perennial. Scarce, documented from an early collection near Acton. *Hasse s.n.*, Jul 1895.


*Umbellularia californica* (Hook. & Arn.) Nutt. Tree. Documented from an early collection near Sandberg, where possibly planted. Not observed during our surveys. *Clare s.n.*, 7 Apr 1930.


*Lythrirum californicum* Torr. & A. Gray Perennial herb. Local in moist soil along stream, Castaic Creek upstream from Elderberry Forebay, and about a fault sag, Peace Valley just west of Quail Lake. *Boyd, Mistretta, & Soza 8838*, 12 Jun 1996.


*Sidalcea malvaeflora* (DC) A. Gray ex Bentham. sp. *malvaeflora*
PERENNIAL HERB. Scarcely in Bouquet Canyon. *Clokey s.n.*, 13 May 1930.


NYCTAGINACEAE


OLEACEAE

*FORESTERA PUBESCENS* Nutt. Large shrub. Uncommon on alluvial benches and about springs, scattered sites including Bouquet, Mint, and Clearwater canyons, etc. *Henrickson 2262*, 17 Apr 1966.


ONAGRACEAE


*CAMISSONIA BOOTHII* (Douglas) P. H. Raven ssp. DECORTICANS (Hook. & Arn.) P. H. Raven Annual. Local on open, shaley or clayey outcrops in xeric scrub; most frequent in the western end of the range, but scattered eastward to the Agua Dulce area. *Boyd, Raz, & Ross 9457*, 1 Apr 1997.


*CAMISSONIA HIRTELLA* (Greene) P. H. Raven Annual. Widespread, occasional in grassland and xeric openings of scrub and woodland; locally common on recent burns. *Craig 480*, 19 Jun 1927.


*EPILIBIUM CANUM* (Greene) P. H. Raven ssp. CANUM Suffruticos perennial. Widespread, occasional in mesic situations within scrub and woodland; locally common on open, rocky slopes with mesic exposures. *Peirson 758*, 31 Aug 1916.

*EPILIBIUM CANUM* (Greene) P. H. Raven ssp. LATIFOLIUM (Hook.) P. H. Raven Suffruticos perennial. Infrequent on open, rocky slopes with mesic exposures and mesic situations within scrub and woodland, northern half of the range. *Raz & Boyd 9123*, 29 Oct 1996.


**EPILOBIUM FICMAEUM** (Speg.) P. Hoeh & P. H. Raven Annual. Locally common in drying bed of vernal pools, Plum Canyon and Cucamonga Mesa. *Porter, Columbus & dos Santos* 10916, 5 Jan 1996.


**PAEONIACEAE**

**PAEONIA CALIFORNICA** Nutt. ex Torr. & A. Gray Perennial herb. Locally common in open scrub, upper Cienaga Canyon about Knapp Ranch, also documented from Newhall area by early collections. *Boyd* 8678, 25 Apr 1996.

**PAPAVERACEAE**

**ARGEMONE COYAMOSA** Greene Perennial herb. Uncommon, documented from Mint, Soledad, and Bouquet canyons by early collections. *Cantwell* s.n., May 1930.


**DICTENTRA CHRYSANTHA** (Hook. & Arn.) Walp. Saururaceae perennial. Widespread, at least in western half of the range. Generally rather infrequent, locally disturbed sites in scrub, but locally common in areas recovering from recent burns. *Boyd & Raz* 9775, 6 May 1997.


**ESCHSCHOLZIA CALIFORNICA** Cham. var. PENINSULARIS (Greene) Munz Annual. Widespread, occasional in grassland, xeric openings in scrub and woodland; locally common on recent burns. *Boyd & Raz* 9419, 31 Mar 1997.

**ESCHSCHOLZIA MINUTIFLORA** S. Watson Annual. Uncommon in open, xeric scrub, areas of descent transition, northern and southeastern margins of the range. *Wheeler* 598, 10 Apr 1932.

**PLANTAGINACEAE**


**PLATANACEAE**


**POLEMONIACEAE**


**ALLOPHYLLUM GILIOIDES** (Benth.) A. D. Grant & V. E. Grant ssp. VIOLACEUM (A. Heller) A. G. Day Annual. Widespread and common in recently burned slopes, mouth of Fish Canyon. *Boyd & Raz* 9781, 6 May 1997.

**ALLOPHYLLUM GLUTINOSUM** (Benth.) A. D. Grant & V. E. Grant Annual. Scarse, documented by an early collection from Newhall area. *Burch* s.n., 17 Mar 1940.


**ERIATRUM DENSIFOLIUM** (Benth.) H. Mason ssp. AUSTRUMONTANUM (T. T. Craig) H. Mason Saururaceae perennial. Locally common in sandy and rocky openings in scrub, especially on granitic substrates, mostly in the northern half of the range. *Ross, Boyd & Burns* 8124, 7 Jul 1994.

**ERIATRUM DENSIFOLIUM** (Benth.) H. Mason ssp. ELONGATUM (Benth.) H. Mason Saururaceae perennial. Locally common in sandy and rocky openings in scrub, especially on granitic substrates, mostly in the southern half of the range. *Porter, Columbus & dos Santos* 10923, 5 Jun 1996.


**ERIATRUM SAPPHENINUUM** (Eastw.) H. Mason ssp. AMBIGUUM (M. E. Jones) H. Mason Annual. Occasional, southern half of the range in open, low competition sites within scrub. *Boyd & Raz* 9753, 6 May 1997.

**ERIATRUM SAPPHENINUUM** (Eastw.) H. Mason ssp. DASYANTHUM (Brand) H. Mason Annual. Widespread and common, grassland and open situations in scrub and woodland. *brongegee* s.n., Jun 1910.


**GELIA ALIQUANTA** A. D. Grant & V. E. Grant ssp. ALIQUANTA Annual. Scarse, open xeric situations on Parker Mountain, also documented by an early collection from near Sanguis. *Ross, Boyd & Arnseth* 4833, 29 Apr 1991.


**GELIA BRECCIARUM** M. E. Jones ssp. BRECCIARUM Annual. Locally common, grassland and openings in scrub, northern half of the range. *Boyd & Raz* 9646, 1 May 1997.
CENTROSTEGIA THUNBERGI (Gray) A. Gray ex Benth., in DC. Annual. Local in open, decomposed granite within oak woodland along crest of Liebre Mountain; also known from areas of desert transition, as at Acton and along Portal Ridge. Ross & Boyd 8073, 23 Jun 1994.

CHORIZANTHE BREVICORNUS Torr. var. BREVICORNUS Annual. Scarce, a few plants found growing in dried bed of Castaic Creek, at confluence with Fish Creek. Boyd & Mistretta 8830A, 25 May 1996.


POLYGONACEAE

ERIOGONUM BRACHYANTHUM Coville Annual. Scarcely documented by an early collection from near Acton. Elmer 3657, Jun 1902.


ERIOGONUM DAVIDSONI Greene Annual. Infrequent, but locally common in scrub openings, and on open, sandy benches, scattered throughout the range. Ross & Boyd 8254, 20 Sep 1994.


ERIOGONUM FASCICULATUM Benth. var. FASCICULATUM Small shrub. Scarce, introduced locally as soil stabilizer at an electrical transmission facility and becoming adventive, Crown Valley at southern base of Sierra Pelona. Boyd & Raz 9157, 4 Mar 1997.


ERIOGONUM GRACILE Benth. var. GRACILE Annual. Widespread and locally common in grassland, openings in scrub and woodland, and on recent burns. Boyd & Raz 8954, 24 Sep 1996.


ERIOGONUM NUDUM Benth. var. PAUCIFLORUM S. Watson Perennial herb. Locally common on steep, open slopes of asbestos and gneiss with mesic exposures, openings in scrub and woodland and occasionally in grasslands, western half of the range. Ross & Boyd 8293, 21 Sep 1994.


ERIOGONUM ORDII S. Watson Annual. Locally common on steep slopes of barren gray clay exposed in lower Bouquet Canyon, northeast of Cauzan Mesa, and in upper West Fork Liebre Gulch. Boyd & Mistrutta 8742, 1 May 1996. An historical collection from "Liebre Station" (Hoffmann s.n., 6 Jun 1930) may have been from similar substrate in a portion of Liebre Gulch now inundated by Pyramid Lake.


ERIOGONUM SAXATILE S. Watson Perennial herb. Local in xeric, rocky openings and scree deposits in scrub at scattered sites such as saddle between Burnt Peak and Little Burnt Peak, summit of Red Mountain, and central summit of Sawmill Mountain. Ross & Boyd 7829, 11 May 1994.


LACTARIAEAE CORIACEA (Goodman) Hoover Annual. Scarcely documented by open gravelly alluvial benches along Castaic Creek at confluence with Fish Creek, and in Plum Canyon. Boyd, Ross, & Arnseth 4917, 30 Apr 1991.


POLYGONUM AMPHIBIUM L. var. EMERSUM Michx. Perennial herb. Locally common on margins of Elizabeth Lake and occasional at other lakes and sag ponds along the San Andreas Rift. Boyd & Raz 9073, 14 Oct 1996.


POLYPOGON LACTEUS L. Perennial herb. Widespread and common in understory of scrub and woodland, and on recent burns, especially on mesic exposures. Boyd & Raz 9743, 6 May 1997.


*RUMEX PULCHER L. Annual. Scarcely, moist sand along Castaic Creek, just upstream from Elderberry Forebay. Boyd et al. 8913B, 11 Jul 1996.


spread and common in open sandy situations is grassland, scrub and woodland openings, and especially on recent burns. Boyd & Raz 9313, 25 Mar 1997.


Pimulaceae


Dodecatheon clevelandii Greene ssp. sanctiarius (Greene) Abratis Geophyte. Scarse, but common locally on heavy soil, lower San Francisco Canyon and adjacent areas to the west, south of Red Mountain. Boyd & Wall 8541, 4 Apr 1996.

Ranunculaceae


Rhamnaceae


Cercocarpus betuloides Nutt. ex Torr. & A. Gray var. betuloides


Potentilla glandulosa Lindl. ssp. glandulosa


Potentilla glandulosa Lindl. ssp. reflexa (Greene) D. D. Keck


*Prunus dulcis (Mill.) D. A. Webb

Large shrub. Adventive in grassland and scrub at scattered sites across the northern half of the range, especially on Portal Ridge. Ross & Boyd 8404, 4 May 1995.


*Prunus persica Batsch Tree.Scarce, as a waif along road in Martindale Canyon, northwestern end of Sierra Pelona. Boyd & Raz 9376, 26 Mar 1997.


Psorria tridentata (Parsh) DC. var. glandulosa (Curtis) M. E. Jones Large shrub. Scarce, documented by an early collection from Bouquet Canyon. Templeton 6267, 21 May 1947.


Rubiaceae


*Galium parisiense L. Annual. Scarce, disturbed sandy benches along Castaic Creek near confluence with Fish Creek. Boyd & Mistretta 8816, 23 May 1996.


Salicaceae


Salix exigua Nutt. Large shrub. Widespread and locally common along streams, margins of lakes, ponds, reservoirs, and about larger seeps. Boyd & Wall 8781, 16 May 1996.

Salix gooddingii C. Ball Tree. Infrequent along streams and about lakes, reservoirs, and sag ponds, mostly along the northern edge of the range. Boyd, Elvin, & Jotikashira 8881, 25 Jun 1996.

Salix laevigata Bebb Tree. Widespread and locally common along streams, margins of lakes, ponds, and reservoirs, and about larger seeps. Wolf 1581, 29 Mar 1928.


Saururaceae


Saxifragaceae

Lithophragma affine A. Gray Geophyte. Scarce, documented by early collections from near Newhall and in Bouquet Canyon. Benjamin 177, 28 Apr 1929.

Lithophragma bolanderi A. Gray Geophyte. Common in shaded woodland understory across north face of Liebre and Sawmill mountains; also documented by an early collection from near Newhall. Peirson 3079, 3 Jun 1922.


Scrophulariaceae

Antirrhinum californianum Benth. in DC. Annual. Widespread, occasional in open situations on xeric slopes, more frequent in recently burned scrub. McHargue & Miller s.n., 6 Jul 1965.


Antirrhinum multiflorum Pennell ssp. multiflorum Pennell Widespread and common, generally on recent burns in scrub and woodland, and occasionally cleared areas such as fuelbreaks and road berms. Ross & Boyd 6611, 5 Jul 1997.


Castilleja applegatei Fern. ssp. martini (Abrams) T. I. Chuang &


**CASTILLEJA GLEASONII** Elmer Parasitic perennial herb. Scarce. Plants matching this taxon in vestiture and general leaf and floral morphology were encountered on a steep, east-facing rocky ridge just west of the Knapp Ranch, upper Cienaga Canyon, and at the west end of Liebre Mountain at saddle between Liebre Gulch and Salt Creek. Castilleja gleasonii is generally considered to be endemic to the central San Gabriel Mountains, where typical habitat is understory of montane coniferous forest (Mistretta & Brown 1987). Chuang & Heckard (1993) have suggested that C. gleasonii is a hybrid between C. affinis and C. foliolosa. At Knapp Ranch, C. gleasonii is closely associated with C. foliolosa, but C. affinis was not documented. Boyd & Raz 9437, 31 Mar 1997.

**CASTILLEJA LINDAMANII** Benth. Parasitic perennial herb. Scarce, documented by an early collection from near Acton. Elmer 3608, Jun 1902.


**COLLINSIA CALLOSA** Parish Annual. Infrequent, grassland and woodland understory, northern edge of the range. Howell 6669, 6 Jun 1931.


**COLLINSIA HETEROPHYLLA** Buist ex Graham var. AUSTROMONTANA (Newsom) Munz Annual. Local in scrub and woodland openings at the western end of the range. Ross & Boyd 7725, 10 May 1994.


**KECKIELLA ANTHROKINOIDES** (Benth.) Straw var. ANTHROKINOIDES Small shrub. Local in scrub, lower San Francisco Canyon. Thompson 3, 11 Apr 1964.

**KECKIELLA BREVIPLORA** (Lindl.) Straw var. BREVIPLORA Small shrub. Occasional, rocky openings in scrub, especially in the northern half of the range. Mickener 3696, 1 Jul 1980.


**MIMULUS BREVIPLORA** Benth. Annual. Widespread, occasional in open situations on xeric slopes, more frequent on recent burns in scrub and woodland. Boyd & Raz 9750, 6 May 1997.


**MIMULUS CONSTRUCTUS** (A. L. Grant) Pennell Annual. Local in areas of open decomposed granite on Liebre and Sawmill mountains, and on Portal Ridge. Most populations with plants suggesting intergradation with M. johnstonii (A. L. Grant, Griesel & Miller s.n., 2 Jul 1963 (RSA 165691).


**MIMULUS GUTTATUS** DC. Annual or perennial herb. Widespread and common in moist soil along streams, about seeps, and in seasonally wet soil on rock outcrops. Boyd & Raz 9774, 6 May 1997.


**MIMULUS PARSHII** Greene Annual. Scarce, documented by early collections from Soledad Canyon. Craig 489, 19 Jun 1927.


**ORTHOCARPUS PURPURACENS** Benth. var. PALLIDUS D. D. Keck Parasitic annual. Scarce, low elevations at the southern edge of the range. Wisura & Kelly 4108, 16 Apr 1986.

**ORTHOCARPUS PURPURACENS** Benth. var. PURPURACENS Parasitic annual. Widespread and locally common in grassland and openings in scrub and woodland. Ross 8349, 7 Apr 1995.


**PENSTEMON HETEROPHYLLUS** Lindl. var. AUSTRALIS Munz & I. M.


*PENSTEMON ROSTRIFLORUS* Kellogg Suffruticose perennial. Occasional in scrub and woodland openings on the upper slopes of Liebre and Sawmill mountains; also documented by an early collection from near Acton. *BOYD et al. 10005, 8 Jul 1997.

*VERBASCUM* *VERBASCUM THAPSUS* *NICOTIANA GLAUCA* Graham Large shrub. Widespread, occasional in mosaic of grassland and open oak woodland, crest of Liebre and Sawmill mountains; also documented by an early collection from near Acton. *BOYD et al. 10005, 8 Jul 1994.

*AILANTHUS ALTISSIMA* (Mill.) Swingle Tree. Locally established about old homesteads, and occasionally along roads, scattered sites throughout the range. *ROSS & PORTER 8505, 4 May 1995.

*SIMAROBA* *CALIFORNICUM (Torr.) Coville Large shrub. Local in areas of desert transition at the eastern end of the range. *ROSS, BOYD, & ARNSETH 4944, 30 Apr 1991.

*SOLANUM* *SOLANUM DOUGLASII* Baker Suffruticose perennial. Widespread and common along streams, lakes, reservoirs, sag ponds, and seeps. *ROSS & BOYD 8339, 21 Sep 1994.

*ULMUS* *ULMUS MINOR* Mill. Tree. Scarse as waif, Green Valley Pasture area of upper San Francisquito Canyon. *ROSS & BOYD 2857, 6 Jun 1990.

*URTICA* *URTICA DIOICA* Annual. Locally common in beds of vernal pools on Cruzan Mesa and in Plum Canyon, also about cattle ponds in Grasshopper Canyon. *BOYD & RAZ 9138, 4 Mar 1997.

*VERBASCUM* *VERBASCUM XANTHIC* (Kunth) Pennell Annual. Locally common in beds of vernal pools on Cruzan Mesa and in Plum Canyon, also about cattle ponds in Grasshopper Canyon. *RODAH, BOYD & ARNSETH 4944, 30 Apr 1991.

*Solanaceae* *DATURA WRIGHTII* Regel Perennial herb. Widespread, generally infrequent except in ruderal and over-grazed situations. *BOYD & RAZ 9044, 14 Oct 1996.

*LYCUM COOPERI* A. Gray Small shrub. Local in areas of desert transition at the eastern end of the range. *ROSS, BOYD, & ARNSETH 5011, 30 Apr 1991.


*Nicotiana attenuata* Torr. Annual. Scarse, documented by early collections from along the southern and western margins of the range. *MUNZ & JOHNSTON 11179, 4 Sep 1928.

*N. glauca* Graham Large shrub. Widespread, occasional to locally common in disturbed riparian areas, about old habitations, and overgrazed sites; scattered elsewhere in generally disturbed situations. *ROSS & BANKS 7519, 13 Apr 1994.

*Nicotiana quadrivalvis* Pursh Annual. Widespread, but generally infrequent, openings in scrub, alluvial benches, and especially on recent burns. *ROSS & BOYD 7749, 10 May 1994.


*SOLANUM ELAEAGNIFOLIUM* Cav. Perennial herb. Local in disturbed grassland on fuelbreaks along the Old Ridge Route, west of Castaic Canyon; also documented from a railroad embankment in Soledad Canyon. *BOYD, ELVIN, & JOTIKASTHRA 8869, 25 Jun 1996.


*Solanaceae* *Solanum xanti* A. Gray var. *XANTI* Suffruticose perennial. Widespread in scrub and woodland. *ROSS & BOYD 7718, 10 May 1994.

*STERculiaceae* *Fremontodendron californicum* (Torr.) Coville Large shrub. Local in chaparral, upper eastern flank of Liebre Mountain, north flank of Red Mountain in upper Clearwater Canyon, and on the southern end of Sierra Pelona. *BOYD & RAZ 9731, 6 May 1997.

*Tamaricaceae* *TAMARIX PARVIFLORA* DC. Large shrub. Widespread and common in disturbed situations. *ROSS 8354, 7 Apr 1995.


*Tropaeolaceae* *Tropaeolum majus* L. Perennial herb. Scarse as roadside waif in San Francisquito Canyon. *ROSS & BANKS 7509, 12 Apr 1994.

*Ulmaceae* *Ulmus minor* Mill. Tree. Scarse as waif, Green Valley Pasture area of upper San Francisquito Canyon. *ROSS & BOYD 2857, 6 Jun 1990.


*Valerianaceae* *PLECTRITIS CILIOSA* (Greene) Jeps. ssp. *INSIGNIS* (Suksd.) D. Morey Annual. Locally common in mosaic of grassland and oak woodland, crest of Sierra Pelona, west of Mount McDill. *ROSS & BOYD 9658, 1 May 1997.


*Violaceae* *Viola purpurea* Kellogg ssp. *Mohavensis* (M. S. Baker & J. C. Clausen) J. C. Clausen Geophyte. Uncommon in grassland and


**VISCACEAE**


*Phoradendron macrophyllum* (Engelm.) Cockeili Parasitic perennial herb. Widespread and common on *Salix, Populus, Platanus,* and other riparian trees; infrequently observed on *Baccharis salicifolia*. *Boyd & Raz 9864, 28 May 1997.*


**ZYGOPHYLLACEAE**


**ANGIOSPERMAE—MONOCOTYLEDONES**

**AGAVACEAE**

*Yucca brevifolia* Engel. var. *brevifolia* Tree. Locally common in xeric scrub, areas of desert transition at the northeastern end of the range. *Boyd & Raz 9062, 14 Oct 1996.*


**ALLIACEAE**


*Allium lacunosum* S. Watson var. *davisiae* (M. E. Jones) McNeal & Ownbey Geophyte. Scarce, documented by an early collection from the Antelope Valley at the northeastern end of the range. *Minthorn s.n., 4 Apr 1928.*


*Bloomeria crocea* (Torr.) Coville var. *crocea* Geophyte. Widespread and common in grassland, scrub, and woodland, generally in the southern half of the range. *Boyd & Raz 9772, 6 May 1997.*


*Dicheelostemma pulchellum* (Salisb.) A. Heller Geophyte. Widespread and common in grassland, scrub, and woodland; especially abundant on recent burns. *Boyd & Ross 9246, 21 Mar 1997.*


**AMARYLLIDACEAE**

*Narcissus papyracaeus* Ker Gaw Geophyte. Scarce, documented as a waif along the Old Ridge Route, just west of Castaic Creek. *Boyd et al. 9127, 11 Feb 1997.*

**ARECACEAE**


**CYPERACEAE**


*Carex schottii* Dewey Perennial herb. Scarce, documented by an early collection from south end of Bouquet Canyon. *Clokey s.n., 13 May 1930.*


*Eleocharis macrostachya* Britton Perennial herb. Local, bed of vernal pool in Plum Canyon, and about cattle ponds in Grasshopper Canyon. *Columbus et al. 2690, 5 Jun 1996.*

*Eleocharis pariflora* Britton Perennial herb. Widespread and common, moist soil along streams and about seeps. *Boyd & Wall 8788, 16 May 1996.*
SciRpus CERNUUS  SciRpus ROBUSTUS  SCIrpUs MICROCARPUS
CHLOROGALUM
SciRpus PUNGENS  SCIrpUs ACUTUS
SISyRIpHUM
JuncUS MEXICANUS

LILACEAE

LEnMACEAE
LEMNA MINOR L. Aquatic annual. Locally common in slow-moving water, extensive wetland area along San Francisquito Canyon at east base of Red Mountain.

LILIACEAE
CALOCHORTUS PLUMMERAE  LEOPOLDII (Pari.) Snogerup Perennial herb. Widespread and common in grassland and openings in scrub and woodland in the northern half of the range. Tigridia pavonia (L.) Roëz & Leichtlin ssp. OCELLATUM (Kellogg) Thorin Geophyte. Widespread, but generally rather scattered, shaded benches along streams.

ORCHIDACEAE


*Arctisa purpurea* Nutt. var. parishii (Hitchc.) Allred. Perennial herb. Scarce, documented by early collection from near Saguaro. *Dry v.s.n., 20 Jan 1901.*


*Avena fatua* L. Annual. Widespread and common is grassland, xeric openings in scrub and woodland, and ruderal situations. *Boyd, Raz, & Ross 9487, 1 Apr 1997.*


*Bromus rubens* L. Annual. Widespread and common, grassland, openings and understory of scrub and woodland, and especially disturbed ruderal situations. *Wolf 1602, 29 Mar 1928.*

*Bromus sterilis* L. Annual. Infrequent in dry, disturbed situations at the western edge of the range. *Boyd & Raz 9714, 6 May 1997.


*Cryptis schoenoides* (L.) Lam. Annual. Locally common on drying mud at margins of lakes, sag ponds, and reservoirs in the northern half of the range; also documented from dampa soil along Ruby Creek, near confluence with Elizabeth Lake Canyon. *Raven 16750, 24 Sep 1961.*


*Dichanthium antoniioides* (Trin.) Benth. Annual. Locally common in vernal pools on Cuzco Mesa and in Plum Canyon; also documented along seasonally moist drainage, Portal Ridge east of Cow Spring drainage. *Boyd & Raz 9921, 29 May 1997.*


*Elymus condensatus* C. Presl Perennial herb. Widespread and locally common on mesic exposures in scrub and woodland, silvial benches, and about seeps. *Ross, Mistretta, & Quici 3983, 28 Jun 1990.*


*Elymus trifolius* Buckley Perennial herb. Local in wetlands about Knapp Ranch, upper Cienega Canyon, along stream in Bouquet Canyon, and in Grasshopper Canyon; also documented by early collection from Acton. *Boyd & Raz 9895, 8 Oct 1996.*


*Eragrostis pectinacea* (Michx.) Nees var. pectinacea Annual. Uncommon in moist soil at widely scattered sites including Ruby Canyon at confluence with Elizabeth Lake Canyon, about margin of Bouquet Reservoir, near Agua Dulce, and in the Antelope Valley at the northeastern corner of the range. *Raven 16752, 24 Sep 1961.*


*Hordeum brachyantherum* Nevski ssp. californicum (Covas &


*Leptochloa fascicularis* (Lam.) A. Gray Perennial herb. Scarce on moist soil along stream in Ruby Canyon at confluence with Elizabeth Lake Canyon; also documented from east end of Bouquet Reservoir. *Ross & Boyd* 038, 23 Oct 1996.


*Muhlenbergia asperifolia* (Nees & Meyen) Parodi Perennial herb. Occasional to locally common in moist alkaline areas, drainages on the western edge of the range. *Boyd, Mistretta, & Soza* 8836, 12 Jun 1996.


*Orcuttia californica* Vasey Annual. Locally common in vernal pools on Cruzan Mesa and in Plum Canyon. These appear to be the only extant populations in Los Angeles County, and Cruzan Mesa represents the northern-most known station for this species. *Columbus et al.* 2687, 5 Jun 1996.


*Polygono maritimus* Willd. Annual. Scarce in dry bed of Fish Creek, just upstream from confluence with Castaic Creek. *Boyd & Raz* 9737B, 6 May 1997.


*Setaria viridis* (L.) Beauv. Annual. Scarce in dry bed of Fish Creek at confluence with Castaic Creek, and near Agua Dulce. *Boyd & Raz* 9741, 6 May 1997.


*Stipa coronata* Thurb. *var. depauperata* (M. E. Jones) A. Hitchc.


**Stipa lepida** A. Hitchc. Perennial herb. Widespread and common in grassland, openings in scrub and woodland, and especially on recent burns. Boyd, Raz, & Ross 9478, 1 Apr 1997.


**Vulpia microstachys** (Nutt.) Benth. var. *ciliata* (Beal) Lonard & Gould Annual. Widespread and locally common in grassland and openings in scrub and woodland. Often growing in mixed populations with one or more other vars. of *V. microstachys*. Ross 8391, 26 Apr 1995.

**Vulpia microstachys** (Nutt.) Benth. var. *confusa* (Piper) Lonard & Gould Annual. Widespread and locally common in grassland and openings in scrub and woodland. Often growing in mixed populations with one or more other vars. of *V. microstachys*. Boyd & Raz 9648A, 1 May 1997.

**Vulpia microstachys** (Nutt.) Benth. var. *microstachys* Annual. Widespread, occasional in grassland and openings in scrub and woodland. Often growing in mixed populations with one or more other vars. of *V. microstachys*. Boyd & Raz 9806, 20 May 1997.

**Vulpia microstachys** (Nutt.) Benth. var. *pauciflora* (Beal) Lonard & Gould Annual. Widespread and locally common in grassland and openings in scrub and woodland. Often growing in mixed populations with one or more other vars. of *V. microstachys*. Ross & Boyd 7798A, 11 May 1994.


**Vulpia octoflora** (Walker) Rydb. var. *hertella* (Piper) Henrard Annual. Locally common on open, sandy alluvial benches in Soledad Canyon wash near Acton and in Plum Canyon. Ross, Boyd, & Arnseif 4955B. Within the range this taxon was always found growing in mixed populations with var. *octoflora*. An interesting form with the lowest lemma of each spikelet glabrous and the others pubescent was encountered in a mixed population in Plum Canyon. Boyd et al. 10117C, 24 Mar 1998.

**Vulpia octoflora** (Walker) Rydb. var. *octoflora* Annual. Widespread, occasional in grassland and openings in scrub and woodland. Ross, Boyd, & Arnseif 4955A.

**Potamogetonaceae**


**Typhaceae**


**Zannichelliaceae**


**ADDENDUM**—**EXCLUDED TAXA**

Although voucher specimens suggest they were collected within the boundaries of the Liebre Mountains study area, I have excluded several taxa from the flora. In all instances, the locality information on the specimen is sufficiently vague, and the characteristic habitat of the taxa involved sufficiently different from that inferred by the purported collection station, the veracity of the records is in question. References to these excluded taxa is provided here as an addendum to the annotated catalogue so their status may be re-examined should the taxa be encountered during future floristic work in the range.

**Calochortus albus** Doug. (Liliaceae). Geophyte. Putatively collected from “wooded slopes and canyons, Mohave Desert”. Kusche s.n., May 1922. Although the location is vague, Kusche apparently included the adjacent mountains in his concept of the Mojave Desert. Therefore the collection could have come from the Liebre Mountains or perhaps the Tehachapi, Southern Sierra Nevada, or even San Gabriel mountains.

**Ceanothus megacarpus** Nutt. var. *megacarpus* (Rhamnaceae). Large shrub. Putatively collected in “Bouquet Canyon, Sierra Pelona Mts.” Kline s.n., May 1923. More likely this was taken in the Santa Monica Mountains.

**Coleogyne ramosissima** Torr. (Rosaceae). Small shrub. Putatively growing in mixed populations with one or more other vars. of *C. Ciliata* (Beal) Lonard & Boyd & Raz 8347, 21 Sep 1994.

**Collinsia torreyi** A. Gray (Scrophulariaceae). Annual. Putatively collected along the Ridge Route. deForest s.n., Jun 1931. Although originally the name “Ridge Route” was restricted to that portion of the original north-south highway between Castaic and Sandberg, it was later applied to newer highways running over Tehachapi pass. This specimen may actually have been collected in the Tehachapi Mountains, or in the Frazier Park area of Mount Pinos, or even further north in the Sierra Nevada on a trip which passed over Tehachapi Pass via the “Ridge Route”.

**Cordylanthus nevadensis** A. Gray (Scrophulariaceae). Annual. Putatively collected along the Ridge Route. deForest s.n., Jun 1931. This taxon is not otherwise known from Los Angeles County desert areas and more likely was collected in the Southern Sierra Nevada Mountains, or elsewhere on the Mojave Desert in a trip which included travel through Bouquet Canyon.

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Tiquilia plurata (Tott.) A. Richardson (Boraginaeae). Perennial herb. Putatively collected along the Ridge Route. deForest s.n., Jun 1921. See discussion under Collinia toreyyi above regarding use of the name "Ridge Route". This specimen is almost certainly from somewhere else on the Mojave Desert in association with sandy soils.

Zigadenus brevibracteatus (M. E. Jones) H. M. Hali (Melanthiaceae). Geophyte. Putatively collected from "deep soil on brushy hillsides, Mohave Desert". Kusche s.n., May 1922. See discussion under Calochortus albus. This specimen and the following are mounted on the same sheet (RSA 378417).

Zigadenus tremontii (Tott.) S. Wats. (Melanthiaceae). Geophyte. Putatively collected from "deep soil on brushy hillsides, Mohave Desert". Kusche s.n., May 1922.

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This work is dedicated to Timothy S. Ross, a peerless field botanist, and my respected colleague and friend. It was Tim who first articulated a need to document the flora of the Liebre Mountains when, during the spring and summer of 1990, we had the opportunity to work in the range as part of a broader program of botanical studies on the Angeles National Forest, work coordinated by Orlando Mistretta of Rancho Santa Ana Botanic Garden and William J. Brown, Jr. of the Angeles National Forest. Tim provided inspiration and leadership in early years of this project, and his collections form the backbone of the data recorded here. When circumstances prevented Tim from continuing an active involvement in the study, I forged on ahead with the thought that he would remain a co-author. In discussions with Tim shortly before I completed this manuscript and he left southern California to reside in western Washington, he made it clear that it was his wish I be listed as the sole author. Although I have honored his wishes, and take full responsibility for any errors of omission or commission, Tim will remain in my mind a co-author in this work.

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