

Chapter 5 – Potentially Vulnerable Species: Plants

*The earth never tires:
The earth is rude, silent, incomprehensible at first—Nature is rude and
incomprehensible at first;
Be not discouraged—keep on—there are divine things, well enveloped;
I swear to you there are divine things more beautiful than words can tell.
— Walt Whitman (1856)*

Key Questions

- Which plant species are rare or at risk in the coastal mountains and foothills of southern California?
- What is known about the status and distribution of each?
- What factors threaten their continued persistence?

Using the fine-filter screening criteria (see description in the first section of chapter 4), we identified 256 plants occurring within or near the assessment area which warrant individual consideration. Thirty of these species are listed as threatened or endangered (table 5.1) and thus legally protected under the federal Endangered Species Act. Two additional species are proposed for federal listing (table 5.1). Most of the other identified plants are Forest Service Region 5 Sensitive Species. The Forest Service Sensitive (FSS) list is intended as an early alert system, to institute conservation measures before a species declines to levels that necessitate it becoming listed as threatened or endangered. FSS plants are protected through the implementation of Forest Plans and the biological evaluation (BE) process, which considers the potential effects of Forest Service activities on these species.

A few plant species considered in the assessment are neither federally listed nor Forest Service Sensitive species. These are plants which currently do not warrant FSS designation, but information is still gathered about them because they are either locally rare, dis-

joint occurrences, or information is lacking about their distribution and abundance. Some forests have developed a “watch list” to track these plants.

With few exceptions, the plants addressed in this assessment are higher vascular plants and nomenclature follows the *Jepson Manual* (Hickman 1993). Virtually no evaluation was done of the ferns, fern allies, bryophytes, lichens, basidiomycetes, and ascomycetes in the study area; however, their importance in forest ecosystems is well recognized.

Our primary objective was to use the available information on the 256 identified plants to assess their current status and vulnerability within the assessment area, and, where possible, identify their conservation needs. This information can then be used when developing management priorities.

Evaluating Status and Conservation Potential

The potential for conservation, and the actions needed to conserve, vary considerably depending on the individual characteristics of each species. To assess those characteristics, we compiled information on species-habitat relationships. As with the animals, we structured the evaluation process by grouping the plants based on primary habitat associations. The groupings are clearly generalizations and few of the species fit perfectly within the described

Table 5.1. Federally listed plant species occurring within or near the assessment area and their distribution by national forest (y = occurs, p = potential to occur).

Common Name	Scientific Name	Federal Status	C N F	SB N F	A N F	LP N F
Cushenbury milk-vetch	<i>Astragalus albens</i>	Endangered		y		
Braunton's milk-vetch	<i>Astragalus brauntonii</i>	Endangered	p		y	
California jewelflower	<i>Caulanthus californicus</i>	Endangered				p
Slender-horned spineflower	<i>Dodecahema leptoceras</i>	Endangered	y	y	p	
Kern mallow	<i>Eremalche parryi kernensis</i>	Endangered				p
Santa Ana River woollystar	<i>Eriastrum densifolium sanctorum</i>	Endangered		p		
Cushenbury buckwheat	<i>Eriogonum ovalifolium vineum</i>	Endangered		y		
San Bern. Mtns. bladderpod	<i>Lesquerella kingii bernardina</i>	Endangered		y		
Cushenbury oxytheca	<i>Oxytheca parishii goodmaniana</i>	Endangered		y		
Gambel's watercress	<i>Rorippa gambellii</i>	Endangered	p	p		
Bird-footed checkerbloom	<i>Sidalcea pedata</i>	Endangered		y		
Slender-petaled thelypodium	<i>Thelypodium stenopetalum</i>	Endangered		y		
Encinitas baccharis	<i>Baccharis vanessae</i>	Threatened	y			
Santa Monica Mtns. dudleya	<i>Dudleya cymosa ovatifolia</i>	Threatened	y		p	
Hoover's eriastrum	<i>Eriastrum hooveri</i>	Threatened				y
Parish's daisy	<i>Erigeron parishii</i>	Threatened		y		
San Diego thorn-mint	<i>Acanthomintha ilicifolia</i>	Threatened	y			
Munz's onion	<i>Allium munzii</i>	Endangered	y			
Coachella Valley milk-vetch	<i>Astragalus lentiginosus coachellae</i>	Endangered		p		
Triple-ribbed milk-vetch	<i>Astragalus tricarinatus</i>	Endangered		p		
Nevin's barberry	<i>Berberis nevinii</i>	Endangered	y	p	y	
Mexican flannelbush	<i>Fremontodendron mexicanum</i>	Endangered	p			
San Bernardino blue grass	<i>Poa atropurpurea</i>	Endangered	y	y		
California dandelion	<i>Taraxacum californicum</i>	Endangered		y		
Big Bear Valley sandwort	<i>Arenaria ursina</i>	Threatened		y		
Thread-leaved brodiaea	<i>Brodiaea filifolia</i>	Threatened	y	p	p	
Ash-gray Indian paintbrush	<i>Castilleja cinerea</i>	Threatened		y		
Vail Lake ceanothus	<i>Ceanothus ophiochilus</i>	Threatened	y			
La Graciosa thistle	<i>Cirsium loncholepis</i>	Proposd. End				y
Southern mountain buckwheat	<i>Eriogonum kennedyi austromontanum</i>	Threatened		y		
Camatta Canyon amole	<i>Chlorogalum purpureum reductum</i>	Proposed Th.				y
Marsh sandwort	<i>Arenaria paludicola</i>	Endangered		p		

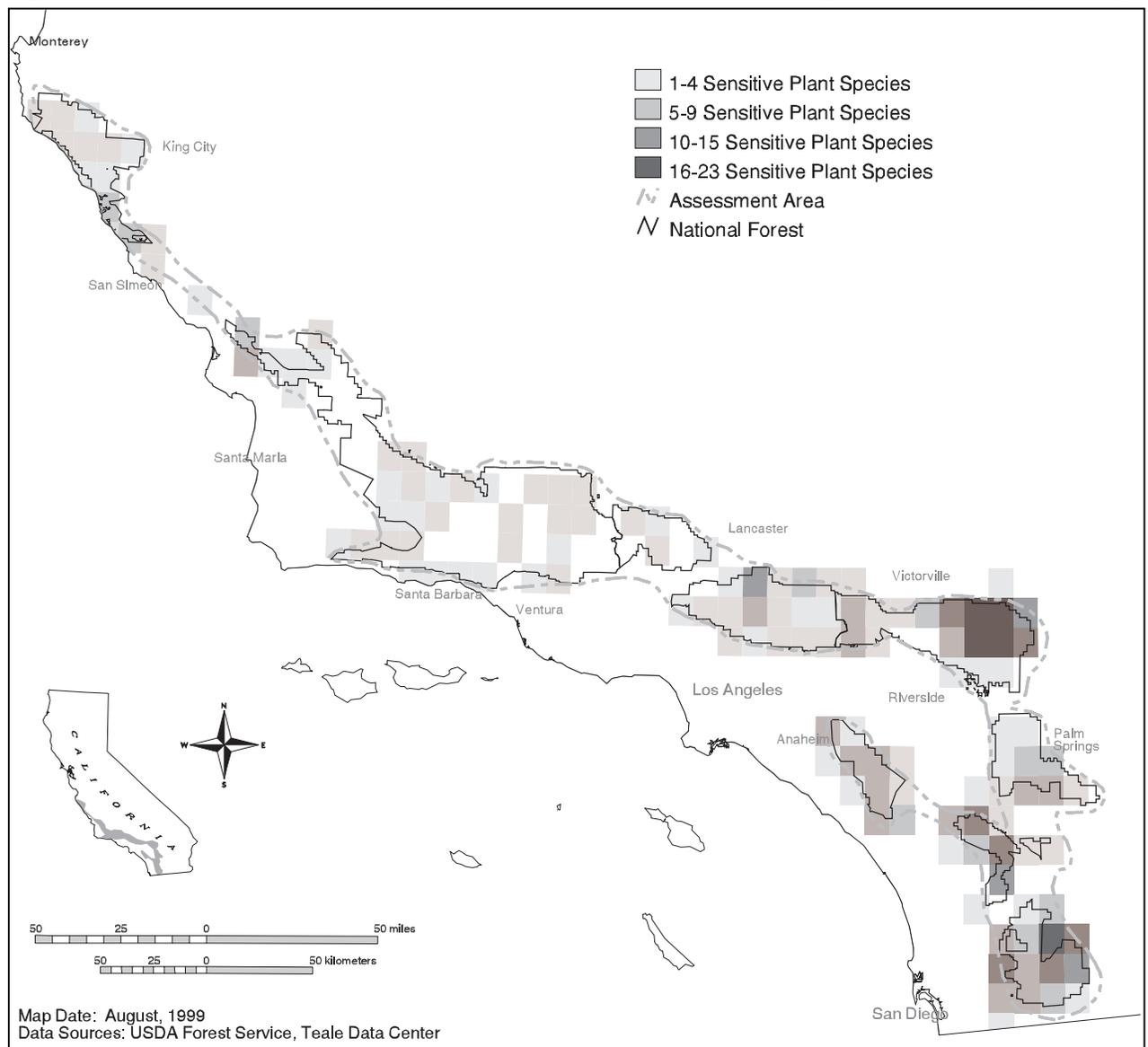
habitat. Many of these species are extremely limited in their distribution and thus occupy only a small portion of the defined habitat association. Still, it is useful to organize species based on general factors that help predict their occurrence. The groups are defined primarily by associations with vegetation types, but soil, geology, moisture, and elevation were also used as habitat indicators.

Many of the focal species are endemic to (i.e., only occur in) one or several mountain ranges and, in some cases, are restricted to portions of a single watershed. Some species continue their distributions into northern Baja California, the Mojave and Sonoran deserts, and the mountains of Arizona and Nevada.

The mapped distribution of all species reveals several key areas of rare plant concentration in the assessment area: the eastern San Bernardino Mountains and the mountains of southern San Diego County (fig. 5.1).

Current and historic occurrences of most of the focal plant species were compiled and stored in a GIS database. In addition, a database was developed to track life-history requirements for many of these plants. Information was captured on (1) occurrence by mountain range, national forest, and watershed; (2) associated soils and vegetation types; and (3) information on the effects of fire, grazing, ground disturbance, and exotic species. Base information was obtained from

Figure 5.1. Concentrations of rare plant species across the assessment area (by USGS 7.5-minute quad map).



CALFLORA (Dennis 1995) and PLANTS (1994). The database is an effort to track information that currently exists and to help identify areas where more data are needed. In general, there is more information on woody species and the communities they define than on herbaceous plants.

We also placed each plant species into conservation categories based on criteria that (1) consider their conservation needs, (2) assess the ability to meet those needs on public lands within the assessment area, and (3) evaluate the type of actions needed. Determinations were made for each species after analyzing available information on life-history characteristics, degree of rarity or endemism, regional context, response to land use, extant population size and trend, and other variables as necessary. A complete listing of all plant species and their assigned conservation categories is located in appendix A. The findings from our evaluations are summarized in the following species accounts.

Species Accounts

In addition to the sources cited in chapter 1, much of the baseline information reported in the following tables and species accounts was obtained from the California Native Plant Society's *Inventory of Rare and Endangered Vascular Plants of California* (Skinner and Pavlik 1994) and the *Jepson Manual* (Hickman 1993).

The acres of known habitat listed in the tables for each species are based on mapped occurrences within national forest system boundaries. For plants which we have no mapped information or where it was determined that our information was clearly inaccurate, a *y* or *p* is listed to denote if the plant occurs or potentially occurs within a particular national forest. Even when acres are listed it does not necessarily provide an accurate portrayal of the plants' distribution; rather, it reflects the state of the Forest Service's mapped information. We hope that if inaccuracies are noticed here, it will help spur

individuals to supply distributional information so that our maps can be updated.

Riparian Plants

General Riparian Associates

Six rare plants are typically found in riparian habitats, but the association is general and the plants tend to occur across a wide elevational range. Summary information is shown in table 5.2.

Boykinia rotundifolia (round-leaved boykinia)

Boykinia rotundifolia is distributed throughout the San Bernardino, San Gabriel, San Jacinto, Santa Ana, Elsinore, Palomar, and Volcan mountains. There are known occurrences on the San Bernardino and Angeles national forests. Occurrences are also reported for the Cuyama Valley, north of the southern Los Padres region, and there are historic occurrences on the Los Padres National Forest (D. Wilken, Santa Barbara Botanic Garden, pers. comm.). The species is found in lower and upper montane conifer habitats—at mesic places in canyons surrounded by chaparral or yellow pine, and on stream banks in riparian woodlands. The species is predicted to be more common than previously thought due to the abundance of potential habitat yet to be surveyed.

Hemizonia mohavensis (Mojave tarplant)

Hemizonia mohavensis is state listed as endangered. It is known from three historic occurrences, including one in the San Jacinto Mountains and another along the Mojave River near Deep Creek at the foot of the San Bernardino Mountains. The species was thought to be extirpated, but several new occurrences have recently been discovered; plants were found along Twin Pines and Brown creeks on the northern slopes of the San Jacinto Mountains, including an estimated six thousand plants counted in the fall of 1994 in the Twin Pines Creek drainage (Sanders, Banks, and Boyd 1997). Additional populations were

Table 5.2. Rare plants found in riparian habitats (general). y = the taxon occurs on the forest; p = has potential to occur; h = is known historically. Trend, knowledge of distribution, and vulnerability information was determined by forest botanists/biologists and generally refers to occurrences on national forest system lands (unkn. = unknown; decl. = declining; incr. = increasing).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Boykinia rotundifolia</i> (round-leaved boykinia)	p	y	5	h	unkn.	unkn.	San Bernardino, San Gabriel, San Jacinto, Santa Ana, Elsinore, Palomar, & Volcan mtns., Cuyama Valley; (low)
<i>Hemizonia mohavensis</i> (Mojave tarplant) <i>state endangered</i>	72	y	p		stable ¹	low	San Bernardino, San Jacinto, & Palomar mtns., S Sierra Nevada; (moderate)
<i>Lilium humboldtii</i> ssp. <i>ocellatum</i> (ocellated Humboldt lily)	y	y	y	y	unkn.	low	Santa Lucia Ranges, S Los Padres & Castaic regions, Peninsular Ranges in SD Co., E San Gabriel, San Bernardino, San Jacinto, Santa Ana, & Santa Monica mtns., Channel Islands; (moderate)
<i>Muhlenbergia californica</i> (California muhly)		y	y		unkn.	unkn.	San Bernardino, San Gabriel, & San Jacinto mtns. (low)
<i>Scutellaria bolanderi</i> ssp. <i>austromontana</i> (southern skullcap) <i>FS sensitive</i>	y	y			unkn.	low on CNF, unkn. on SBNF	San Bernardino & San Jacinto mtns., Peninsular Ranges in SD Co. (low)
<i>Thelypteris puberula</i> var. <i>sonorensis</i> (Sonoron maiden fern)		y	p	y	unkn.	unkn.	coastal to foothills in LA, Riverside, San Bernardino, & Santa Barbara cos., Baja & Sonora, Mexico, AZ; (low)

¹Sanders, Banks and Boyd 1997

found in the Poppet Flat area one year later and, in 1997, in the Baldy Mountain area. In 1996, occurrences were discovered in Cutca Valley and adjacent areas of the Long Creek drainage on the north side of Palomar Mountain in San Diego County. Other San Diego County populations were discovered in the vicinity of Indian Flats and in Chihuahua Valley, north of Warner Springs. The species was also recently documented in the southern Sierra Nevada (CNPS 1999).

***Lilium humboldtii* ssp. *ocellatum*
(ocellated Humboldt lily)**

Lilium humboldtii ssp. *ocellatum* is an uncommon though wide-ranging subspecies,

distributed in the southern Santa Lucia Ranges, the southern Los Padres and Castaic regions, the Peninsular Ranges in San Diego County, the eastern San Gabriel, San Bernardino, San Jacinto, Santa Ana, and Santa Monica mountains, and the Channel Islands (McAuley 1985). Occurrences are known on all four southern California national forests. The plant is included in a conservation strategy for coastal sage scrub (USFS/USFWS/CDFG 1997).

Plants on the Cleveland and San Bernardino national forests are found in low-elevation riparian areas and seeps of chaparral canyons. On the Angeles National Forest the taxon is found in riparian areas with

big-leaf maple or in mixed evergreen forest. Occurrences are known from Lucas Creek (near the Big Tujunga narrows) and Trail and Wilson canyons (Bramlet and Boyd 1998). Occurrences on the Los Padres National Forest range from the Casitas Pass area to San Julian Creek in the Santa Ynez Mountains, and inland to mountainous areas along Sespe Creek and at Thorn Meadows (Smith 1976). The plant generally grows on gravelly soils, in drainages and canyon bottoms. These areas are subject to natural flooding and erosion, and plant occurrences are vulnerable to activities that affect natural water flows. Altered fire regimes in some areas have led to stand densification upslope of riparian areas, which in turn has caused reduced base flows. The plant is also vulnerable to horticultural collecting.

***Muhlenbergia californica*
(California muhly)**

Muhlenbergia californica is a perennial grass found along streams in the San Bernardino, San Gabriel, and San Jacinto mountains. Occurrences are known mainly from coastal-flowing drainages and canyons, but some plants have been found at the southeastern end of the San Bernardino Mountains near the desert interface. Plants grow in perennially mesic areas within chaparral, coastal sage scrub, and lower montane coniferous forest. Most occurrences are found in the chaparral zone between 3,000 and 4,000 feet. Five occurrences are recorded in the CNDDDB, all from 1951 or earlier. Other more recent occurrences are known on the San Bernardino and Angeles national forests, where the species is protected through management of riparian areas and wetlands. The species is vulnerable to flooding and erosion.

***Scutellaria bolanderi* ssp. *austromontana*
(southern skullcap)**

Scutellaria bolanderi ssp. *austromontana* is a Forest Service Sensitive Species. It is known from extant occurrences in the Peninsular Ranges of San Diego County and the San Jacinto Mountains. One historic occurrence

is known from near the San Bernardino Mountains. The CNDDDB lists sixteen occurrences, some on the Cleveland National Forest. At least two more occurrences are known on the San Bernardino National Forest in the San Jacinto Mountains. The plant grows in gravelly soils (sometimes gabbro) along streams.

***Thelypteris puberula* var. *sonorensis*
(Sonoran maiden fern)**

Thelypteris puberula var. *sonorensis* is an uncommon fern distributed in Los Angeles, Riverside, San Bernardino, and Santa Barbara counties. Occurrences are also known from Arizona and Baja and Sonora, Mexico. The plant grows in meadows, seeps, and along streams, in coastal and inland valley areas, and up to around 2,000 feet in the foothills. The CNDDDB contains records for twelve occurrences and at least one additional location is known on the San Bernardino National Forest. The Hemlock Fire of 1997 occurred at this same location but it is still unclear what effects the fire and subsequent flooding and erosion had on this occurrence. Smith (1976) lists six canyons where this fern occurs on the Los Padres National Forest.

Low-Elevation Riparian Associates

Eleven rare plants are found or have potential to occur in low-elevation riparian habitats within the assessment area. Summary information is shown in table 5.3. Three federally endangered species and one proposed endangered species are included in this group.

***Artemisia palmeri*
(San Diego sagewort)**

Artemisia palmeri occurs in moist ravines in southwestern San Diego County (McMinn 1951). The shrub is occasional along perennial coastal drainages and in mesic areas of chaparral farther inland. It grows with willow, sycamore, and cottonwood in riparian areas, and chaparral whitethorn, scrub oak, and coast live oak in areas of chaparral. Reiser (1994) lists numerous historic and extant occurrences,

Table 5.3. Rare plants found in low-elevation riparian habitats. y = the taxon occurs on the forest; p = has potential to occur; h = is known historically). Trend, knowledge of distribution, and vulnerability information was determined by forest botanists/biologists and generally refers to occurrences on national forest system lands (unkn. = unknown; decl. = declining; incr. = increasing).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Artemisia palmeri</i> (San Diego sagewort)	y				decl. ¹	low	coastal & cismontane San Diego Co.; (high)
<i>Astragalus deanei</i> (Dean's milk-vetch) <i>FS sensitive</i>	27				stable/ decl. ²	low	Peninsular Ranges in San Diego Co.; (moderate)
<i>Cirsium loncholepis</i> (La Graciosa thistle) <i>proposed endangered</i>				y	decl.	low	S central coast (Monterey Coast, Guadalupe Dunes); (high)
<i>Dodecahema leptoceras</i> (slender-horned spineflower) <i>federally endangered</i>	8	10	p		unkn./ decl.	mod. ⁴ / high ⁵	Peninsular Ranges of SD Co., base of San Bernardino & San Gabriel mtns., San Jacinto Mtns.; (high)
<i>Dudleya densiflora</i> (San Gabriel Mtns. dudleya) <i>FS sensitive</i>			9			mod.	along San Gabriel River in San Gabriel Mtns.
<i>Eriastrum densifolium</i> ssp. <i>sanctorum</i> (Santa Ana River woollystar) <i>federally endangered</i>		h/p			decl. ³		base of San Bernardino Mtns.; (moderate)
<i>Ericameria palmeri</i> ssp. <i>palmeri</i> (Palmer's goldenbush)	p				decl. ¹		coastal and foothill San Diego Co., Baja; (low)
<i>Hemizonia floribunda</i> (Tecate tarplant) <i>FS sensitive</i>	p				stable ¹		San Diego Co., Baja; (low)
<i>Hemizonia pungens</i> ssp. <i>laevis</i> (smooth tarplant)	p				decl. ¹		SD, LA, Orange, Riverside, San Bernardino, & Kern cos., Baja; (low)
<i>Pedicularis dudleyi</i> (Dudley's lousewort) <i>FS sensitive</i>				224	stable to incr.	mod.	Monterey, Santa Cruz (historically), SLO, & San Mateo cos.; (moderate)
<i>Rorippa gambellii</i> (Gambel's water cress) <i>federally endangered</i>	p	p		p	unkn.		W Santa Barbara & SLO cos., Baja, h in San Diego and San Bernardino cos.; (low)

¹ Reiser 1994 (refers to all known occurrences)

² stable on national forest system lands, declining on private lands

³ White 1990

⁴ on the Cleveland National Forest

⁵ on the San Bernardino National Forest

ranging from sea level to approximately 2,000 feet in elevation. A small amount is known to occur on the Cleveland National Forest.

***Astragalus deanei* (Dean's milk-vetch)**

Astragalus deanei is a Forest Service Sensitive Species. It is distributed in the upper Otay River and Sweetwater River drainages in southwestern San Diego County (Reiser 1994). There are close to ten recorded occurrences, some located on the Cleveland National Forest. The plant is associated with coastal sage scrub and chaparral vegetation. It grows in low-elevation riparian habitat and sandy washes. A conservation strategy for coastal sage scrub includes this species (USFS/USFWS/CDFG 1997).

***Cirsium loncholepis*
(La Graciosa thistle)**

Cirsium loncholepis is proposed for federal listing as endangered. It is a short-lived plant (one to two years) found along the southern central coast. Approximately nine occurrences are known in western and northern Santa Barbara and southern San Luis Obispo counties (fig. 5.2). These occurrences are found in back dunes and coastal wetlands, which are part of the Guadalupe Dune system located at the mouth of the Santa Maria River. The habitat is described as areas where free water is available along dune lakes and swales, marshes, and the edges of willow thickets. The species grows with rush, tule, willow, poison oak, salt grass, and coyote brush. These occurrences are located on private lands and are vulnerable to groundwater pumping and development associated with oil production. The historic distribution of this species has been significantly reduced by the conversion of wetland habitat for agricultural use and other development (USFWS 1998n). In addition, coastal dune habitat where this species is found has been invaded by non-native plants such as veldt grass, European beach grass, iceplant, and crystalline ice plant.

One occurrence is known in Monterey County on the Los Padres National Forest.

This occurrence is not noted in the proposed rule for federal listing (USFWS 1998n). Habitat in Monterey County consists of serpentine seeps surrounded by maritime or coastal chaparral that receives exposure to coastal fog. The one known occurrence on national forest system land is found near Willow Creek, just north of Cape San Martin.

***Dodecahema leptoceras*
(slender-horned spineflower)**

Dodecahema leptoceras is a federally endangered species found along sandy stream terraces. Occurrences are known from Arroyo Seco and Temescal creeks in the mountains of San Diego County, on the east side of the Santa Ana Mountains, along the Santa Ana River at the foot of the San Bernardino Mountains, along Lytle Creek at the foot of the San Gabriel Mountains, and in Bautista Canyon and along the San Jacinto River near the San Jacinto Mountains (fig. 5.3). There are close to a dozen recorded occurrences in all, many of them small, and an estimated one-third to one-half of them are located on federal or state lands. *D. leptoceras* occupies alluvial fan scrub habitat, which is declining in Los Angeles, San Bernardino, and Riverside counties due to urban and agricultural development, sand and gravel mining, and flood control measures (USFWS 1987). In some areas, off-road vehicle activity and trash dumping have degraded the habitat. Plants are typically found in areas with no exotic species or obvious ground disturbance. In the San Jacinto Mountains, plants occur on relatively young alluvial benches and are affected by erosion (M. Lardner, San Bernardino NF, in litt. 1999). The U.S. Fish and Wildlife Service uses the name *Centrostephanos leptoceras* when referring to this species. An interim species management guide was developed for occurrences on the Cleveland National Forest (L. Croft, Cleveland NF, unpubl. doc. 1989) and the plant is included in a conservation strategy for coastal sage scrub (USFS/USFWS/CDFG 1997).

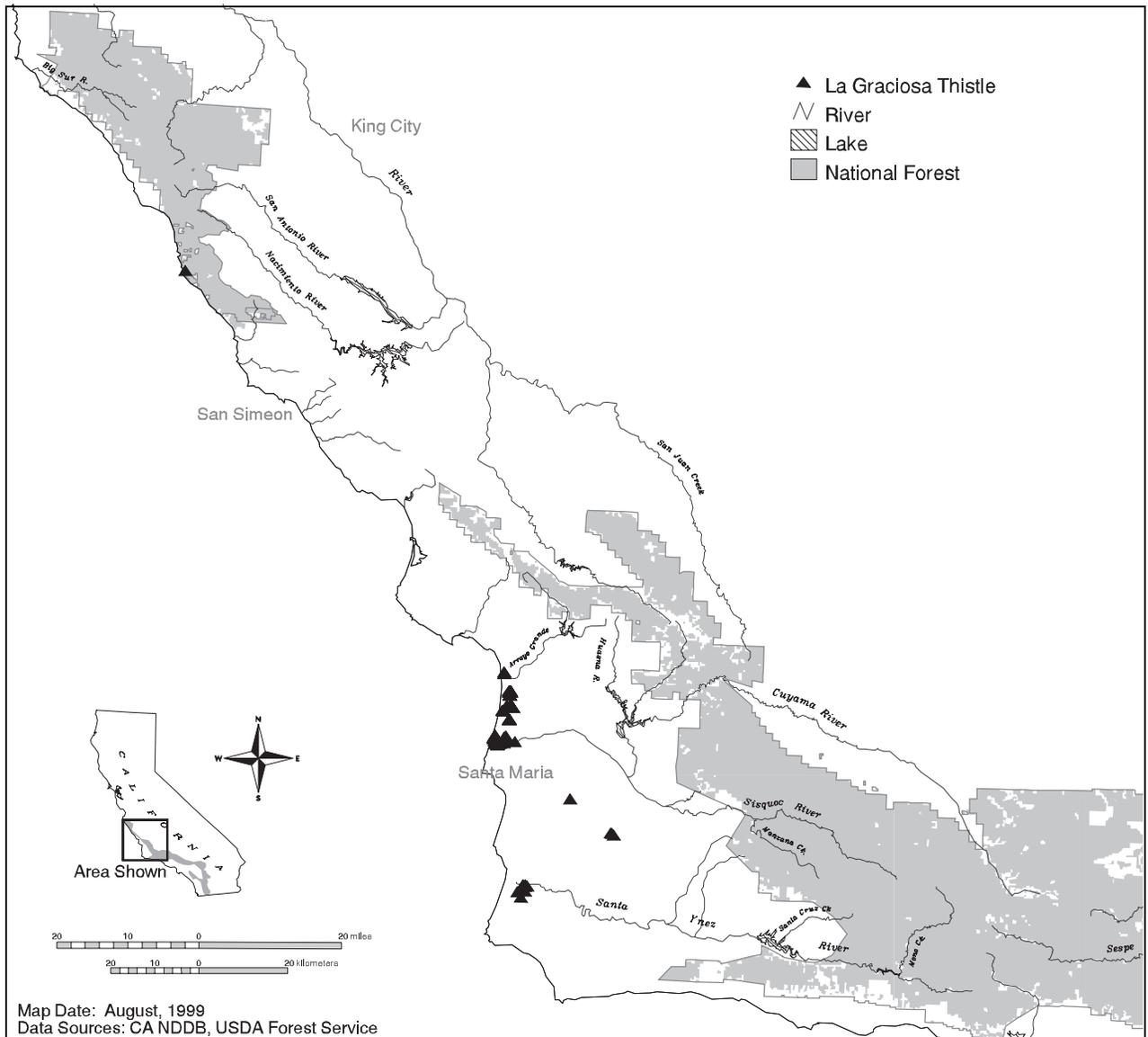


Figure 5.2. Known distribution of *Cirsium loncholepis*, the La Graciosa thistle.

***Dudleya densiflora*
(San Gabriel Mountains dudleya)**

Dudleya densiflora is a Forest Service Sensitive Species. It is known from approximately five occurrences along the San Gabriel River: at Fish Canyon, Roberts Canyon, and the mouth of San Gabriel River Canyon. Close to 1,750 plants were counted at these three sites during surveys in 1989 (Mistretta and Brown 1989). Most of these plants occur on the Angeles National Forest. Since the 1940s there has been a decline in the number of plants at San Gabriel River Canyon and Fish Creek Canyon, especially at lower canyon sites. This decline is attributed mainly to rock quarrying operations on private lands below the forest boundary (Mistretta and Brown 1989).

Like many *Dudleyas*, San Gabriel Mountains dudleya grows on granitic substrates—on cliffs, from crevices in rocks, and on steep canyon walls. The Angeles National Forest has written a management guide for this species (Mistretta and Brown 1989).

***Eriastrum densifolium* ssp. *sanctorum*
(Santa Ana River woollystar)**

Eriastrum densifolium ssp. *sanctorum* is federally and state listed as endangered. It is found along gravelly riverbeds and floodplain terraces in alluvial fan scrub habitat at the base of the San Bernardino Mountains. An estimated 90 percent of its original habitat has been eliminated

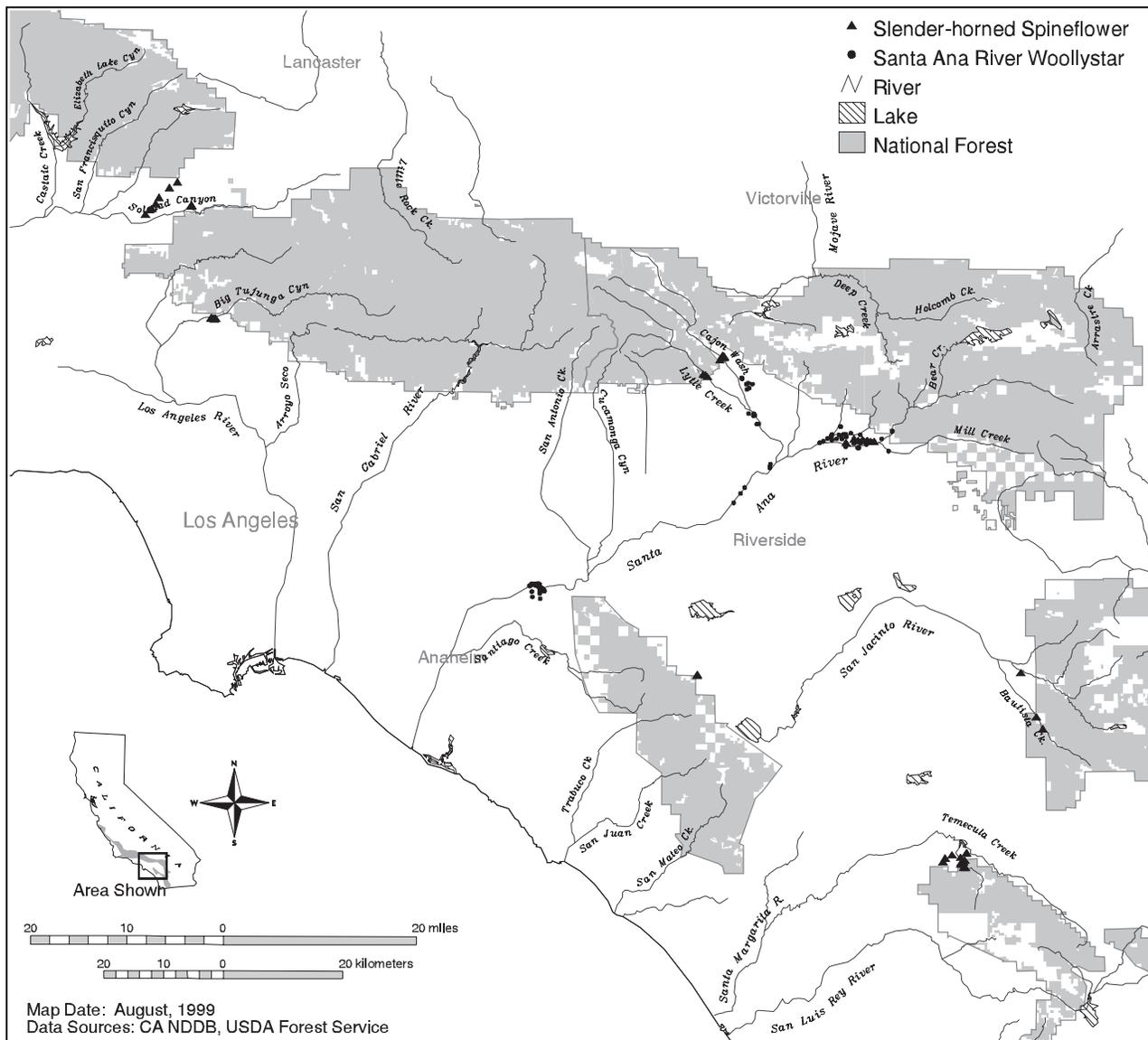
by flood control projects, sand and gravel mining, urbanization, and farming (White 1990). Historic occurrences covered about 60 miles from Rancho Santa Ana in Orange County to near Highland in San Bernardino County; however, the subspecies is now extirpated at many locations. Extant occurrences are recorded at Lytle Creek and along the floodplain of the Santa Ana River (and its tributaries), between the city of Colton and the mouth of Santa Ana Canyon (fig. 5.3). The *CNPS Inventory* notes these occurrences as one extended but fragmented population (Skinner and Pavlik 1994). The amount of occupied habitat was estimated to be 1,800 acres in 1986

(USFWS 1987). One occurrence, located on an inholding of the San Bernardino National Forest, was extirpated in 1993 during the construction of Seven Oaks Dam (M. Lardner, San Bernardino NF, pers. comm.). Periodic natural flooding appears to be a requirement for successful regeneration of this taxon.

Ericameria palmeri* ssp. *palmeri
(Palmer's goldenbush)

Ericameria palmeri ssp. *palmeri* is an evergreen shrub distributed in the Peninsular Ranges of San Diego County and Baja California, Mexico. The subspecies is located mainly at lower elevations outside of the

Figure 5.3. Known distribution of *Dodecahema leptoceras* (slender-horned spineflower) and *Eriastrum densifolium* ssp. *sanctorum* (Santa Ana River woollystar).



assessment area—in coastal sage scrub, riparian scrub, and chaparral communities. In San Diego County, its known range is located adjacent to urban development and there is potential for the species to be extirpated in the United States (Reiser 1994). Reiser (1994) lists eleven occurrences, five of these either extirpated or on land proposed for development projects. The plant is found in significant numbers scattered along the Otay River drainage and appears to tolerate ground disturbance from local dredging operations. Subspecies identification needs to be confirmed at this site as well as others because the plant is difficult to identify and can be confused with other genera.

***Hemizonia floribunda* (Tecate tarplant)**

Hemizonia floribunda is a Forest Service Sensitive Species. It is an annual species known from the Peninsular Ranges of San Diego County and Baja California, Mexico. The CNDDDB contains records for seventeen occurrences, some in the assessment area. The plant inhabits sandy washes in desert habitats.

***Hemizonia pungens* ssp. *laevis* (smooth tarplant)**

Hemizonia pungens ssp. *laevis* is known from occurrences in San Diego, Los Angeles, Orange, Riverside, San Bernardino, and Kern counties. The plant is also documented in Baja California, Mexico. Reiser (1994) cites occurrences along Temecula Creek, near Lake Perris, along the San Jacinto River, north of Tualota Creek, and along Potrero and Lytle creeks. The annual grows on seasonally mesic alkaline substrates, in grasslands or sites with minimal shrub cover. In San Diego County, occurrences are close to being extirpated (Reiser 1994). Plants in western Riverside County are affected by flood control measures and development along drainages. Sixty-one occurrences in all are listed in the CNDDDB. A conservation strategy for coastal sage scrub includes this taxon (USFS/USFWS/CDFG 1997).

***Pedicularis dudleyi* (Dudley's lousewort)**

Pedicularis dudleyi is a Forest Service Sensitive Species. It is a riparian species of concern on the Los Padres National Forest (Los Padres NF 1994) and is listed by the state of California as rare. The plant occupies coastal habitats in Monterey, Santa Cruz (historically), San Luis Obispo, and San Mateo counties. Occurrences are found in serpentine chaparral, grasslands, and shaded areas in redwood or mixed evergreen forest. The *CNPS Inventory* cites fewer than fifteen known occurrences in all (Skinner and Pavlik 1994). Three occurrences are located on the Los Padres National Forest, another occurs within a state park, and some are located on private land owned by the Hearst Corporation. The species is vulnerable to trampling and trail maintenance activities. There is potential for occurrences to be affected by logging, road building, and development projects.

***Rorippa gambellii* (Gambel's water cress)**

Rorippa gambellii is a federally endangered species known from occurrences outside the assessment area in the dune lakes of western Santa Barbara and San Luis Obispo counties, as well as locations in Baja California, Mexico (D. Wilken, Santa Barbara Botanic Garden, pers. comm; Reiser 1994; Mason 1957). Historically, the species was reported from about a dozen locations in southern California, including interior wetland areas of San Diego, San Bernardino, and Los Angeles counties (USFWS 1993c). Habitat for the species is described as freshwater or brackish marshes and swamps, at the margins of lakes, or along slow-flowing streams. Extant occurrences in San Luis Obispo County are known from a series of small freshwater marshes found in association with beach dune habitat. These marshes extend from Oceano south to the Oso Flaco Lakes area, and inland to Black Lake Canyon (USFWS 1993c). Other plants found in the same habitat include cattails, bulrushes, and bur-reeds.

One historic occurrence is noted for San Diego County, in freshwater habitat near the town of Julian and close to the Cleveland National Forest. Another historic occurrence is reported for Arrowhead Hot Springs near the San Bernardino National Forest (S. Eliason, San Bernardino NF, pers. comm.). Other historic occurrences are reported for Los Angeles County at “Cienega” and “Kurtz Street Marsh” (G. Wallace, USFWS, pers. comm.). These occurrences are believed to have been extirpated due to habitat alteration (USFWS 1993c), and it is unknown whether any potential habitat occurs on national forest system lands in the assessment area. Wetland habitats where this species is found have declined significantly in California due to urbanization and agricultural conversion.

Foothill Woodland, Savanna, and Grassland Plants

Nine rare plants are found or have potential to occur in foothill woodland, savanna, or grassland habitat within the assessment area. Summary information is shown in table 5.4. One federally endangered species, one federally threatened species, and one proposed threatened species are included in this group.

***Calycadenia villosa* (dwarf calycadenia)**

Calycadenia villosa is an annual species known from occurrences in the Santa Lucia Ranges of Monterey and San Luis Obispo counties. It was known historically in Kern County but is now believed to be extirpated. The plant occurs on dry hills and ridges with rocky soils, at low elevations (below 3,600 feet) in chaparral, cismontane woodlands, dry meadows, and valley-foothill grasslands. The CNDDDB contains records for twelve occurrences, most of them historic. The species appears to be declining; the *CNPS Inventory* notes that it was at one time known from twelve USGS 7.5-minute quad maps but now has been extirpated from all but two. One unrecorded occurrence is located along with *Chlorogalum purpureum* var. *reductum* at an

area near La Panza on the Santa Lucia Ranger District of the Los Padres National Forest (D. Wilken, Santa Barbara Botanic Garden, in litt. 1998). Four recent occurrences are known east of the forest within Fort Hunter Liggett. These occurrences are affected by military training activities and grazing to some extent, although grazing pressures have been reduced. Overgrazing in other areas continues to be a hazard along with urban development projects, road development, off-highway vehicles, and non-native invasive plants. Some occurrences were lost when the San Antonio Reservoir was constructed. Fire suppression is also a threat because the species appears to be a fire follower.

***Chlorogalum purpureum* var. *reductum* (Camatta Canyon amole)**

Chlorogalum purpureum var. *reductum* is proposed for federal listing as threatened. It is narrowly distributed on the northeast side of the La Panza Range in San Luis Obispo County (fig. 5.4). Plants occur in two discrete locations separated by approximately 3 miles. The larger of the two occurrences is found on both private and national forest system lands (Santa Lucia Ranger District of the Los Padres National Forest) and occupies between 10 and 12 acres of habitat bisected by Highway 58. Several hundred thousand plants are estimated to occur at this location and, despite being partially fenced by the Forest Service, the area is still used as an informal staging area for off-highway vehicles and cattle. The second occurrence covers about one-quarter of an acre and is estimated to contain several hundred plants. This site is located entirely on private land and has been registered by the property owners with The Nature Conservancy's (TNC) private land owner protection program.

At both locations, the plants grow in various size patches and are not uniformly distributed throughout the habitat, which is described as sparsely vegetated annual grasslands surrounded by blue oak woodland and gray/foothill pines. Other native species found in the area include *Brodiaea coronaria*,

Table 5.4. Rare plants found in foothill woodland, savanna, and/or grassland habitats. y = the taxon occurs on the forest; p = has potential to occur. Trend, knowledge of distribution, and vulnerability information was determined by forest botanists/biologists and generally refers to occurrences on national forest system lands (decl. = declining; unkn. = unknown).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Calycadenia villosa</i> (dwarf calycadenia)				26	decl.	unkn.	Santa Lucia Ranges (Monterey & SLO cos.), h in Kern Co.; (low)
<i>Chlorogalum purpureum</i> var. <i>reductum</i> (Camatta Canyon amole) <i>proposed threatened</i>				40	stable	low	La Panza Range (SLO Co.); (high)
<i>Eremalche parryi</i> ssp. <i>kernensis</i> (Kern mallow) <i>federally endangered</i>				p	unkn.		San Joaquin Valley (W Kern Co.); (high)
<i>Eriastrum hooveri</i> (Hoover's eriastrum) <i>federally threatened</i>				67	stable ¹	low	Fresno, Kern, Kings, San Benito, SLO, & Santa Barbara cos. (e.g., Carrizo Plain, Elkhorn Plain, Temblor Range, Caliente Mtns., Cuyama Valley, & Sierra Madre Mtns.); (high)
<i>Eriophyllum lanatum</i> var. <i>hallii</i> (Ft. Tejon woolly sunflower) <i>FS sensitive</i>				13	stable	low-mod.	Sierra Madre Mtns., S Tehachapi Mtns. (Santa Barbara & Kern cos.); (moderate)
<i>Holocarpha virgata</i> ssp. <i>elongata</i> (graceful tarplant)	y				decl. ²	low	coastal areas of central and southern CA; (low)
<i>Lupinus ludovicianus</i> (S. Luis Obispo Co. lupine) <i>FS sensitive</i>				49	decl.	low	Santa Lucia Ranges (endemic to SLO Co.); (moderate)
<i>Pentachaeta exilis</i> ssp. <i>aeolica</i> (slender pentachaeta) <i>FS sensitive</i>				48	unkn.	unkn.	Santa Lucia Ranges (Santa Barbara, Monterey, & San Benito cos.); (moderate)
<i>Sibaropsis hammittii</i> (Hammitt's clay-cross) <i>FS sensitive</i>	y				unkn.	mod. ³	Peninsular Ranges of S. CA (Santa Ana & Cuyamaca mtns.); (moderate)

¹ stable or increasing on nation forest system lands; declining on private lands

² Reiser 1994 (refers to all known occurrences)

³ based on Boyd and Ross 1997

Clarkia purpurea, *Crassula erecta*, *Dichelostemma capitatum*, and another focal species, *Calycadenia villosa* (dwarf calycadenia). Plants grow on clay soils with substantial amounts of pebbles and gravels. The taxon appears to be restricted to areas with rocky, nutrient-poor soils that tend to prevent herbivory from pocket gophers. In areas with better soils, non-native annuals (e.g., red brome, filaree, Mediterranean grass, and slender wild oat) appear to be outcompeting *C. purpureum* var. *reductum* for space, light, nutrients, and water.

The Los Padres National Forest has been monitoring the population dynamics of this taxon by tracking the number and age-class of plants in eleven 0.5-square-meter plots. The study began in 1991 and data were collected until 1997. Analysis of the data has not yet been completed, but preliminary findings suggest the abundance of this taxon is relatively static with some variation on an annual basis due to dormancy, mortality, and recruitment, with recruitment of seedlings generally occurring in years with above-average precipitation. See the proposed rule for federal listing for more information (USFWS 1998h).

***Eremalche parryi* ssp. *kernensis*
(Kern mallow)**

Eremalche parryi ssp. *kernensis* is a federally endangered taxon known only from the San Joaquin Valley in western Kern County. There are no known occurrences on or adjacent to national forest system lands (fig. 5.4). However, plants of uncertain taxonomic affinity assumed to be *E. parryi* ssp. *parryi* are found in and adjacent to the Los Padres National Forest (M. Foster, Los Padres NF, pers. comm.). These two subspecies together form a complex whose taxonomy is currently unresolved. The range, distribution, abundance, habitat requirements, and taxonomy of *E. parryi* ssp. *kernensis* are described in detail in a draft recovery plan (USFWS 1998l). This document also discusses the taxonomy and physical characteristics of the *E. parryi* ssp. *kernensis*/*E. parryi* ssp. *parryi* complex. If understanding of the taxonomy of this complex should change, it may be determined that

some of the populations on national forest system lands are *Eremalche parryi* ssp. *kernensis*. See the final rule for federal listing for more information (USFWS 1990).

***Eriastrum hooveri* (Hoover's eriastrum)**

Eriastrum hooveri is a federally threatened species known from six California counties: Fresno, Kern, Kings, San Benito, San Luis Obispo, and Santa Barbara. The plant was once wide ranging but many populations have been extirpated due to conversion of habitat for agriculture. The U.S. Fish and Wildlife Service has grouped all of the known occurrences into four metapopulations plus several small, scattered populations. Surveys by Lewis (1992) documented 629 occurrences covering an estimated 2,239 acres of occupied habitat. Six occurrences are found on the Mount Pinos Ranger District of the Los Padres National Forest; they are part of one metapopulation that covers the Carrizo Plain, Elkhorn Plain, Temblor Range, Caliente Mountains, Cuyama Valley, and Sierra Madre Mountains. The occurrences are located in the foothills of Sierra Madre Ridge, just south of Cuyama Valley in Castro, Goode, and Tension canyons (fig. 5.4). In 1993, more than thirteen thousand plants were estimated to occur at these six locations. Within metapopulations, *E. hooveri* forms scattered groups of plants with each group typically occupying less than one acre. The density of plants within a group is variable between sites and years, with higher densities observed in years of higher precipitation.

Habitat for this species extends across a wider range of environmental conditions than is typical for narrow endemics. The plant has been found on ridgetops, hillsides, benches, alluvial fans, flats, washes, along roadways, and in pastures, from north-facing to south-facing slopes, and from 280 to 2,770 feet in elevation (Lewis 1992). Danielsen (1993) characterized habitat on the Los Padres National Forest as juniper woodland often in association with California buckwheat. *E. hooveri* has also been found in alkali sinks, valley saltbush scrub, interior coast range

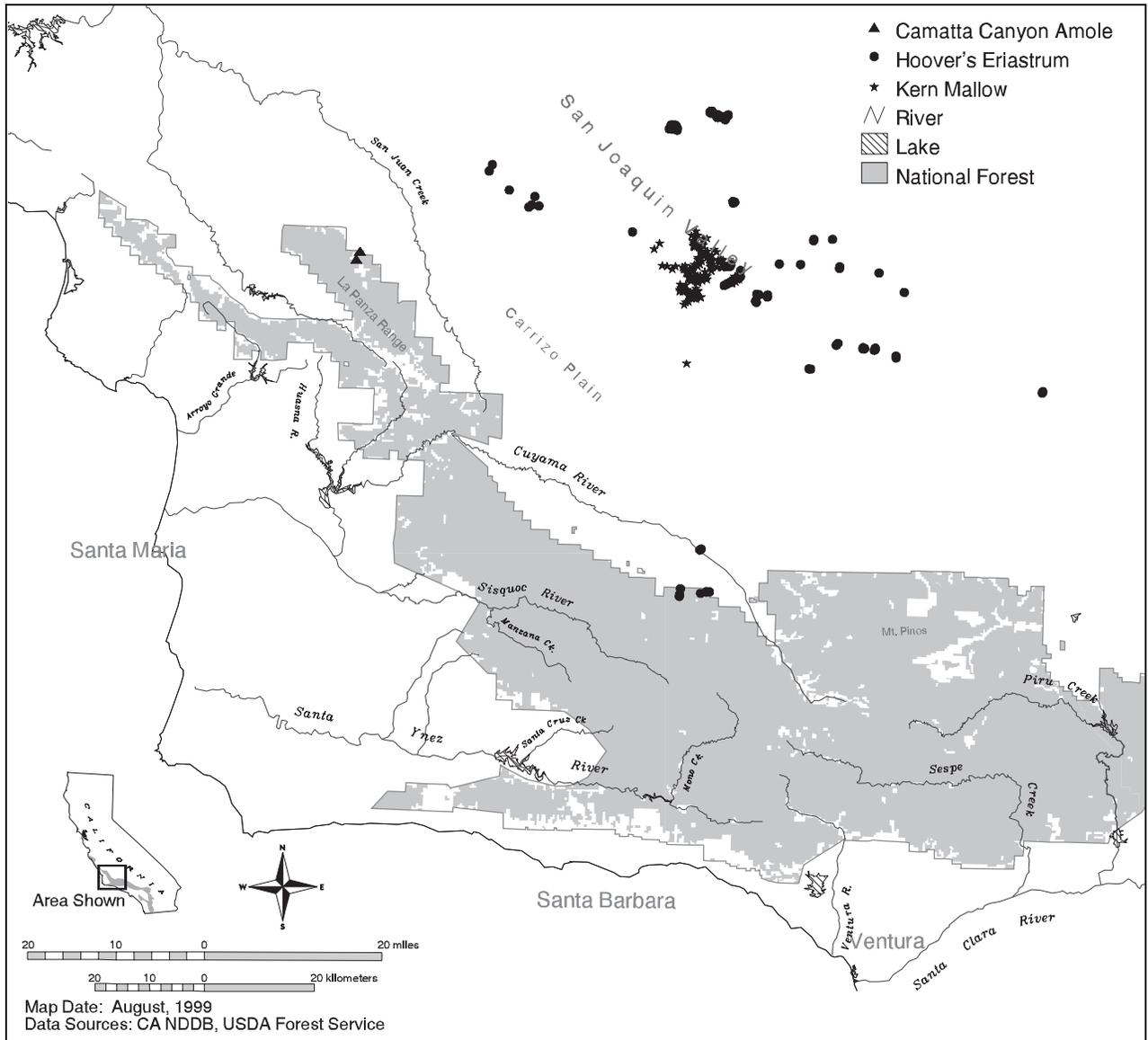


Figure 5.4. Distribution of *Chlorogalum purpureum* var. *reductum* (Camatta Canyon amole), *Eriastrum hooveri* (Hoover's eriastrum), and *Eremalche paryi* ssp. *kernensis* (Kern mallow).

saltbush scrub, and in grasslands. Lewis (1992) reports that matchweed is a good indicator of habitat for *E. hooveri* throughout its range and winged ragweed is an accurate indicator specifically in the Cuyama Valley. High-quality habitat for *E. hooveri* is thought to include stabilized silty to sandy soils, a low cover of competing vegetation, and the presence of cryptobiotic crusts. Moderate-quality habitat is provided by loamy soils that lack cryptobiotic crusts and support fairly dense stands of vegetation.

The species appears to be somewhat tolerant of disturbance. Plants have been observed invading soil surfaces within one year

after disturbances cease. In areas of dense vegetation, the species may benefit from light to moderate soil disturbance if it reduces the abundance of competing non-native plants. On the Los Padres National Forest all of the six known occurrences are found near lightly used roads.

The range, distribution, abundance, and habitat requirements of this annual species are described in detail in a draft recovery plan (USFWS 1998). This report can be referred to for more detailed information, particularly in regards to off-forest distribution, abundance, and threats. Lewis (1992) also provides extensive information on *E. hooveri*. The final

rule for federal listing also has additional information (USFWS 1990).

***Eriophyllum lanatum* var. *hallii*
(Fort Tejon woolly sunflower)**

Eriophyllum lanatum var. *hallii* is a Forest Service Sensitive Species known from the southern Tehachapi and Sierra Madre mountains (Kern and Santa Barbara counties respectively). The taxon occurs at Sierra Madre Ridge on the Los Padres National Forest and is included in a conservation strategy (USFS/USFWS 1996). Generally the perennial occupies dry sites within chaparral and cismontane woodlands, at elevations of 3,900 to greater than 4,900 feet. Livestock grazing is cited as a primary threat to the plant although occurrences on national forest system lands appear stable. The occurrence at Sierra Madre Ridge is fenced and a second occurrence is located in steep terrain believed to be inaccessible to cattle. Road construction and maintenance, erosion associated with roads, and competition from non-native annuals are also thought to adversely affect this plant.

***Lupinus ludovicianus*
(San Luis Obispo County lupine)**

Lupinus ludovicianus is a Forest Service Sensitive Species. It is endemic to (and the official flower of) San Luis Obispo County. The CNDDDB contains records for sixteen occurrences. The species is thought to be declining; at least four historic occurrences may now be extirpated. One extant occurrence is located on the Los Padres National Forest and others are somewhat protected by occurring in remote places. The perennial has been found in chaparral and in open grassy areas in foothill oak woodlands. Plants typically grow in sandy soils associated with the Santa Margarita formation, but one occurrence is found on limestone soil. Habitat conversion for agricultural use and urban development, livestock grazing and trampling, and off-highway vehicle activities are factors believed to be negatively affecting this species.

***Pentachaeta exilis* ssp. *aeolica*
(slender pentachaeta)**

Pentachaeta exilis ssp. *aeolica* is a Forest Service Sensitive Species. It is an annual taxon known from locations in Santa Barbara, Monterey, and San Benito counties. Two occurrences are located on the Los Padres National Forest, where they are vulnerable to fire suppression and the invasion of non-native grasses. The plant is found below 2,200 feet elevation in foothill grasslands or grassy openings within foothill pine woodlands.

***Sibaropsis hammittii*
(Hammitt's clay-cress)**

Sibaropsis hammittii is a Forest Service Sensitive Species. It is a newly described taxon discovered recently on three mountains in the Peninsular Ranges of southern California (Boyd and Ross 1997). The first known collections were made on Elsinore Peak in the Santa Ana Mountains in the spring of 1992. The following spring, collections were made 75 miles to the south on Poser and Viejas mountains. All of these occurrences are located on the Cleveland National Forest, although some spill over onto Indian reservation and private lands. The occurrences are vulnerable to urbanization close to the forest boundary, increased fire frequencies, non-native invasive species, trampling, and habitat damage by off-road vehicles (Boyd and Ross 1997). It appears that a constant supply of moisture and low levels of competition from other plants are required by *S. hammittii* for successful growth.

At all locations the annual is found on vernal saturated clay soils, in purple needlegrass grassland surrounded by chamise chaparral. Occurrences at the Elsinore Peak locale are found on clay soils derived from basalt outcrops or marine sediments. Associated species include blue-eyed-grass, *Lomatium dssycarpum*, *Dichelostemma pulchellum*, purple sanicle, foothill needlegrass, *Allium haematochiton*, chocolate lily, California-aster, and the federally endangered *Allium munzii*. On Poser and Viejas mountains, *S. hammittii* is found on clay soils derived from gabbro. More occurrences of *S. hammittii* are expected

to be found on gabbro and metavolcanic soils in the mountains of San Diego County and northwestern Baja California, Mexico (e.g., Otay, Tecate, San Miguel, Jamul, Cerro Bola, Cuyamaca, McGinty, Guatay, Iron, and Agua Tibia). Basalt outcrops on the Santa Rosa Plateau may also harbor this species.

Scrub and Chaparral Plants

Plants of Both Scrub and Chaparral

Eleven rare plants are found or have potential to occur in both scrub and chaparral habitats within the assessment area. Summary information is shown in table 5.5. Two federally endangered species and two federally threatened species are included in this group.

***Allium munzii* (Munz's onion)**

Allium munzii is a federally endangered and state threatened species distributed within the Santa Ana and Elsinore mountains, and Gavilan Hills of western Riverside County. It grows in clay soils, usually in grassy openings between shrubs on mesas and slopes. It also grows in mesic grasslands (e.g., southern needlegrass grassland), vernal pools, and other wetlands. In the Gavilan Hills the perennial grows with California juniper (R. Minnich, UC Riverside, in litt. 1998).

There are thirteen known occurrences, two located partly on the Cleveland National Forest in the Elsinore Mountains (fig. 5.5). Five populations occur in the Gavilan Hills—three on private lands, one at Harford Springs County Park, and one on land managed by the Riverside County Habitat Conservation Agency (RCHCA). Other populations occur on private lands in the Temescal Valley, north of Walker Canyon, and in or near the Paloma Valley. Some locations in the Paloma Valley are managed by the Reserve Management Committees (Domenigoni Hills and Bachelor Mountain) for the Riverside County multispecies plans. The U.S. Fish and Wildlife Service estimates a total of twenty thousand to seventy thousand plants at all known locations (USFWS 1998m).

An estimated 90 percent of the potential habitat for this plant has been extirpated by development projects and clay mining (K. Winter, Cleveland NF, unpubl. doc. 1992). The species is sensitive to ground-disturbing activities in general; discing of habitat for weed abatement or dry land farming, off-road vehicle activity, trampling/grazing from livestock, and displacement by non-native annual grasses are cited as threats by the U.S. Fish and Wildlife Service (USFWS 1998m). Some occurrences are known from the slopes of Elsinore Peak on the Trabuco Ranger District, Cleveland National Forest. They are located near a Forest Service road and an electronic site. A species management guide was written by the Cleveland National Forest in 1992 to address threats to the species on forest system lands (K. Winter, Cleveland NF, unpubl. doc. 1992). Munz's onion is also included in a conservation strategy for coastal sage scrub (USFS/USFWS/CDFG 1997).

***Arctostaphylos edmundsii* (Little Sur manzanita)**

Arctostaphylos edmundsii is a Forest Service Sensitive Species. It is a shrub that occurs in Monterey County, from Garrapata Creek south to Pfeiffer Point. There are eight known occurrences, two located on the Monterey Ranger District of the Los Padres National Forest. Another occurrence is found on land managed by the U.S. Coast Guard, and the rest occur on private lands. The species occupies habitat described as coastal bluffs and terraces with sandstone soils. The taxon *A. edmundsii* var. *parvifolia* is state-listed rare, but recent taxonomic work calls into question the validity of this variety.

***Astragalus brauntonii* (Braunton's milk-vetch)**

Astragalus brauntonii is a federally endangered species endemic to foothill habitats in the Santa Ana, San Gabriel, and Santa Monica mountains (White 1990). The species is found on small limestone outcrops in gaps or disturbed places within chaparral, coastal sage

Table 5.5. Rare plants which occur in both scrub and chaparral habitats. y = the taxon occurs on the forest; p = has potential to occur. Trend, knowledge of distribution, and vulnerability information was determined by forest botanists/biologists and generally refers to occurrences on national forest system lands (decl. = declining; unkn. = unknown).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Allium munzii</i> (Munz's onion) <i>federally endangered</i>	23				decl.	mod.	Santa Ana & Elsinore mtns., Gavilan Hills (W Riverside Co.); (high)
<i>Arctostaphylos edmundsii</i> (Little Sur manzanita) <i>FS sensitive</i>				7	unkn.	mod.	Monterey Coast; (high)
<i>Astragalus brauntonii</i> (Braunton's milk-vetch) <i>federally endangered</i>	p		p		decl.		foothills of Santa Ana, San Gabriel, & Santa Monica mtns.; (moderate)
<i>Baccharis vanessae</i> (Encinitas baccharis) <i>federally threatened</i>	1				decl.	low	coastal & foothill San Diego Co., Santa Margarita Mtns.; (moderate)
<i>Berberis nevinii</i> (Nevin's barberry) <i>federally endangered</i>	1	h/p	y		decl.	low	foothills, San Gabriel Mtns. to Santa Ana Mtns. (Los Angeles, San Bernardino, Riverside cos.); (moderate)
<i>Chorizanthe parryi</i> var. <i>parryi</i> (Parry's spineflower) <i>FS sensitive</i>		p			unkn.		valley-floor & foothills, Los Angeles, San Bernardino, & Riverside cos.
<i>Chorizanthe rectispina</i> (straight-awned spineflower) <i>FS sensitive</i>				40	stable	low	Santa Lucia Ranges; (low)
<i>Dudleya cymosa</i> ssp. <i>ovatifolia</i> (S. Monica Mtns. dudleya) <i>federally threatened</i>	y		p		decl.	mod.	Santa Ana & Santa Monica mtns.; (moderate)
<i>Lepidium virginicum</i> var. <i>robinsonii</i> (Robinson's pepper-grass)	y				unkn.		San Diego Co.
<i>Nolina cismontana</i> (chaparral beargrass) <i>FS sensitive</i>	y				decl.	low	from Ventura to San Diego cos., foothills of Santa Ynez Mtns., Santa Ana Mtns., Simi Hills, foothills W of Palomar & Cuyamaca mtns.; (high)
<i>Quercus dumosa</i> (Nuttall's scrub oak) <i>FS sensitive</i>				y	decl.	mod.	Orange, Santa Barbara, San Diego cos., Baja; (moderate)

scrub, and closed-cone conifer forest. Much of the potential habitat for this plant occurs on private lands with potential to be developed, and all of the protected habitat is located near expanding urban areas where alteration of natural fire regimes is likely to occur.

The total number of plants at all known locations was estimated in 1997 to be less than one hundred (USFWS 1997a). Occurrences are known from the Simi and Chino hills, Santa Ynez Canyon (Santa Monica Mountains), and Coal and Gypsum canyons (Santa Ana Mountains). Potential habitat occurs on the Trabuco Ranger District of the Cleveland National Forest. Occurrences are documented in the San Gabriel Mountains on private lands adjacent to the Angeles National Forest, and it is highly probable that the species occurs on the forest (P. Krueger, Angeles NF, pers. comm.). Potential habitat occurs near the lower Clam Shell Truck Trail, the Van Tassel Truck Trail, and near the city of Monrovia (G. Wallace, USFWS, pers. comm.; P. Krueger, Angeles NF, pers. comm.). These areas are relatively inaccessible and the only management activities taking place are prescribed burns. Occurrences on private land near the Clam Shell Truck Trail are vulnerable to road maintenance and invasion of exotic species. All of the occurrences in the San Gabriel Mountains are located in an urban interface area with a history of human-caused fires. This species is a short-lived (two to three years) fire follower and, depending on fire-return intervals, may appear only once in twenty to fifty or more years (USFWS 1997a). After the Gypsum Canyon Fire in 1982, several populations (approximately four hundred plants) appeared on the divide between Gypsum and Coal canyons (White 1990). This species is included in a conservation strategy for coastal sage scrub (USFS/USFWS/CDFG 1997) and the US Fish and Wildlife Service has developed a draft recovery plan (USFWS 1998o).

***Baccharis vanessae*
(Encinitas baccharis)**

Baccharis vanessae is a federally threatened species found in coastal and foothill habitats

of San Diego County (fig. 5.5). The shrub is distributed from the coast (near the city of Encinitas) east to Iron Mountain and the Mount Woodson area, where it grows in dense southern mixed chaparral. The bulk of known occurrences, however, are associated with southern maritime chaparral, a habitat type which has declined between 82 and 93 percent due to urban development and conversion of land for agriculture (USFWS 1996a). There are fourteen known extant occurrences containing an estimated two thousand plants, most located on private lands fragmented by development. Four of these occurrences contain fewer than six plants each. Some occurrences are protected within the San Mateo Wilderness Area (Santa Margarita Mountains) on the Cleveland National Forest. Other occurrences are protected in the Elfin Forest Reserve, managed in part by the BLM, and within Oak Crest Park in Encinitas. The species is included in a conservation strategy for coastal sage scrub (USFS/USFWS/CDFG 1997).

***Berberis nevinii* (Nevin's barberry)**

Berberis nevinii is a federally endangered species known from Riverside, San Bernardino, and Los Angeles counties. Its current range extends from the foothills of the San Gabriel Mountains to near the foothills of the Santa Ana Mountains (fig. 5.6). Plants occur as discrete, localized occurrences in two types of habitat—sandy and gravelly places along the margins of dry washes, and on coarse soils in chaparral (USFWS 1995a). Extant native occurrences include those at Dripping Springs (near Aguanga), Scott Canyon, and the largest known occurrence in the Vail Lake/Oak Mountain area. Other occurrences appear to be introduced (e.g., at Arroyo Seco). Occurrences on national forest system lands are located near the Agua Tibia Wilderness Area of the Cleveland National Forest, and in San Francisquito and Lopez canyons on the Angeles National Forest. Surveys of potential habitat on the San Bernardino National Forest have found no new occurrences.

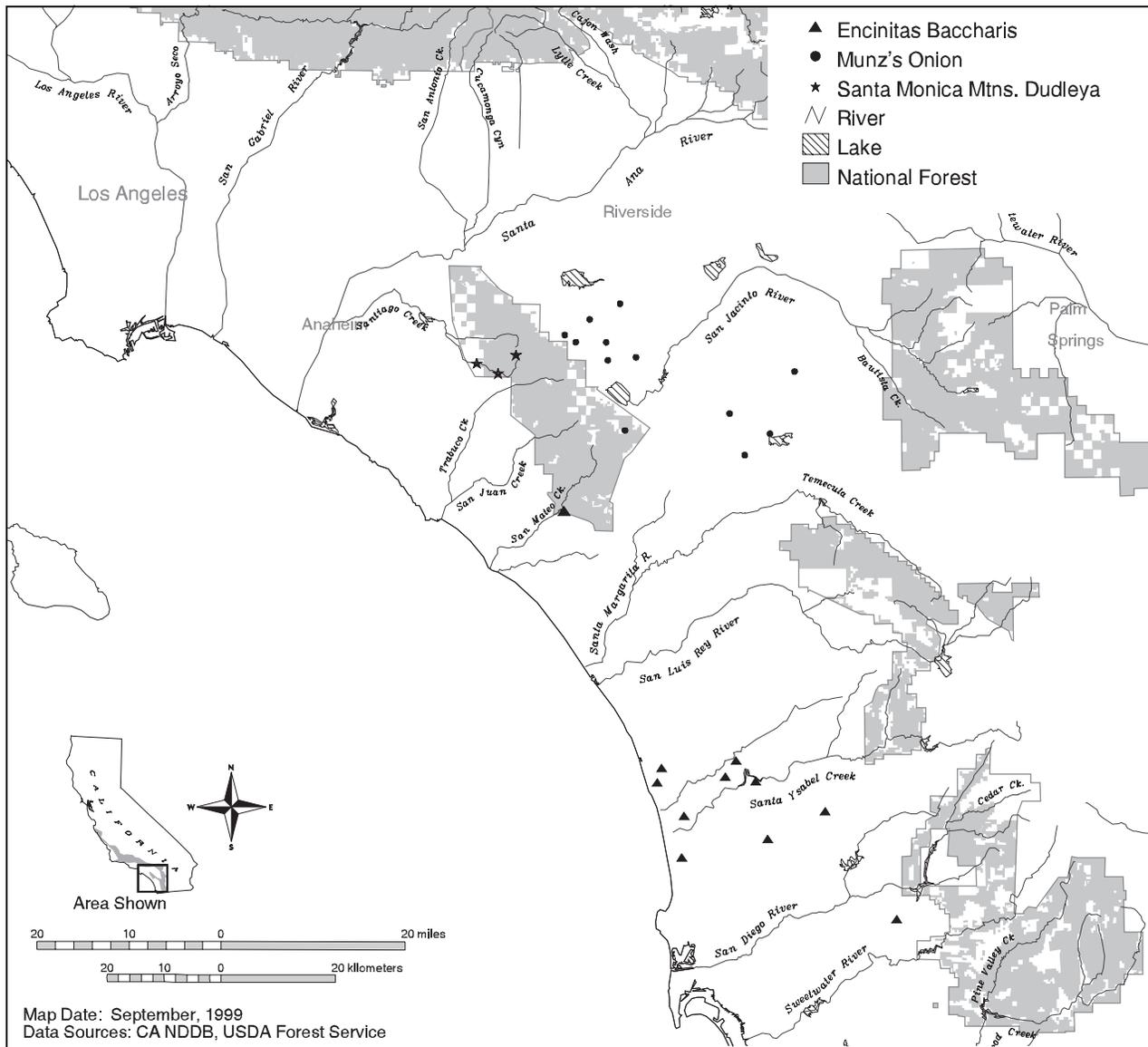


Figure 5.5. Distribution of *Allium munzii* (Munz's onion), *Baccharis vanessae* (Encinitas baccharis), and *Dudleya cymosa* ssp. *ovatifolia* (Santa Monica Mountains dudleya).

This species is known historically from fewer than thirty scattered occurrences (USFWS 1998g). At least seven occurrences are known to have been extirpated, probably due to factors associated with urban development. Currently, there are 500 to 1,000 plants estimated to occur at all known sites (Mistretta and Brown 1989b; USFWS 1998g). Most of these are found on private lands; however, a few are protected on land managed by the BLM and the Forest Service. The Vail Lake/Oak Mountain occurrence contains approximately 200 plants. The San Francisquito Canyon occurrence is estimated to contain 130 to 250 plants.

B. nevini continues to be threatened by development projects on private lands. The species is naturally restricted to areas with alluvial or sedimentary-based substrates, in chaparral or scrub plant communities. The loss of alluvial scrub habitats is estimated to now be over 90 percent (USFWS 1998g). In addition, the species appears to have naturally low rates of regeneration due to sporadic viable seed production (Mistretta and Brown 1989b). Fire suppression and brush clearing activities are further expected to reduce abundance of this species by altering the natural fire regime necessary for its long-term survival. The species is included in a conservation strategy for coastal sage scrub (USFS/USFWS/CDFG

1997) and the Angeles National Forest has developed a species management guide for occurrences on the forest (Mistretta and Brown 1989b).

***Chorizanthe parryi* var. *parryi*
(Parry's spineflower)**

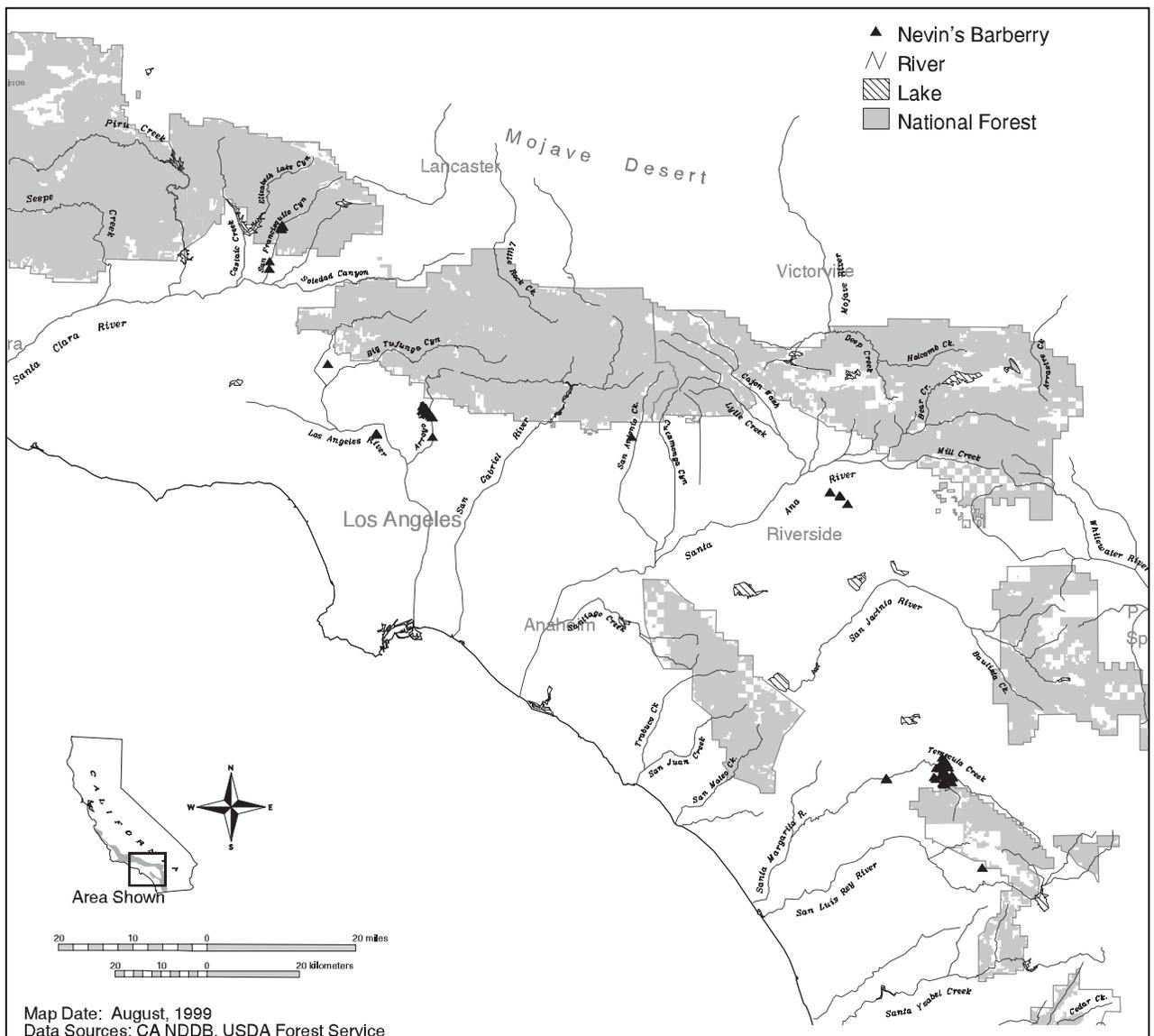
Chorizanthe parryi var. *parryi* is a Forest Service Sensitive Species. It occurs in valley-floor and foothill habitats in San Bernardino, Riverside, and Los Angeles counties. There are twenty-three recorded occurrences, all on private lands; however, some of them are located close to the San Bernardino National Forest and suitable habitat exists on the forest. The plant grows in dry, sandy soils within coastal sage scrub

and chaparral. Most occurrences are vulnerable to flooding or development projects.

***Chorizanthe rectispina*
(straight-awned spineflower)**

Chorizanthe rectispina is endemic to the Santa Lucia Ranges and has been found in Monterey, San Luis Obispo, and Santa Barbara counties. The *CNPS Inventory* cites about twenty known occurrences (Skinner and Pavlik 1994). One occurrence is located on the Los Padres National Forest and three are found on BLM lands. Another occurrence on private land is proposed for development. The annual has been found in woodland habitat in addition to scrub and chaparral.

Figure 5.6. Distribution of *Berberis nevini* (Nevin's barberry).



Dudleya cymosa* ssp. *ovatifolia
(Santa Monica Mountains dudleya)

Dudleya cymosa ssp. *ovatifolia* is a federally threatened and state endangered taxon distributed within the Santa Monica and Santa Ana mountains. The perennial occupies habitat consisting of unstable talus slopes and north-facing cliffs in chaparral. The substrate is further defined as rock outcrops with forms specific to sedimentary conglomerate or volcanic breccia (USFWS 1997a). In the assessment area, plants are found in Modjeska Canyon, on the western flank of the Santa Ana Mountains (fig. 5.5). These occurrences represent a range disjunction of approximately 60 miles from populations in the Santa Monica Mountains, which are outside the assessment area.

Fewer than ten occurrences of this taxon are known. While the major portion of its distribution occurs on private lands affected by development projects, the disjunct occurrences located in the Santa Ana Mountains are not especially threatened at this time. Like many *Dudleyas* however, *D. cymosa* ssp. *ovatifolia* is vulnerable to horticultural collecting. The plant is included in a conservation strategy for coastal sage scrub (USFS/USFWS/CDFG 1997).

Lepidium virginicum* var. *robinsonii
(Robinson's pepper-grass)

Lepidium virginicum var. *robinsonii* is distributed within chaparral and coastal sage scrub communities in San Diego County. Some local botanists believe this taxon to be more widespread and common than originally thought. A number of occurrences are on the Cleveland National Forest. On private lands the taxon may be unprotected and threatened by development projects that remove its habitat.

Nolina cismontana
(chaparral beargrass)

Nolina cismontana is a Forest Service Sensitive Species. It is distributed in coastal drainages below 3,000 feet from Ventura to

San Diego counties. Occurrences are known from the foothills of the Santa Ynez Mountains, south through the Simi Hills and Santa Ana Mountains to the foothills west of the Palomar and Cuyamaca mountains (Hess and Dice 1995). Its habitat is described as chaparral vegetation with sandstone and gabbro-derived substrates. Throughout its range, the species is threatened by residential and commercial land development. Protected occurrences of significant size exist at Viejas Mountain on the Cleveland National Forest, in the Coal Canyon Ecological Reserve in the Santa Ana Mountains, and at scattered locations on the Trabuco Ranger District of the Cleveland National Forest (Santa Ana Mountains). This species appears to be a fire follower; it has been observed in greater abundance in burned Tecate cypress stands at Coal Canyon than in unburned stands (Scott 1990). The species is included in the conservation strategy for coastal sage scrub (USFS/USFWS/CDFG 1997).

***Quercus dumosa* (Nuttall's scrub oak)**

Quercus dumosa is a Forest Service Sensitive Species. It is a rare evergreen shrub known from occurrences in southern Santa Barbara, Orange, and San Diego counties, and northwestern Baja California, Mexico (Roberts 1995). Scattered occurrences are found on the south-facing slopes of the Santa Ynez Mountains. At least one occurrence is known on Santa Cruz Island. Another occurrence is found in Torrey Pines State Reserve. One occurrence is known on the Los Padres National Forest and another is located on land managed by the Santa Barbara Botanic Garden. The species grows in low-elevation habitat close to the coast (i.e., chaparral, coastal sage scrub, maritime succulent scrub, and closed-cone conifer forest) on sandstone or clay loam. Some occurrences are vulnerable to development projects and fuels modification (mechanical thinning, spring burning, and fire suppression). The species hybridizes with *Q. berberidifolia* (Hickman 1993).

Plants of Coastal Sage Scrub

Three rare plants are found or have potential to occur in coastal sage scrub habitat within the assessment area. Summary information is shown in table 5.6.

Dudleya multicaulis (many-stemmed dudleya)

Dudleya multicaulis is a Forest Service Sensitive Species. It is distributed in coastal and foothill areas of Los Angeles, Orange, western Riverside, and San Diego counties. Occurrences are known from the Santa Ana and San Gabriel mountains, and San Onofre Mountain in San Diego County. The CNDDDB contains records for ninety-four occurrences and sixteen general locations. Most are located on private lands with potential for development. The species forms vegetative parts and inflorescences above ground each year and then dies back in late spring leaving just the underground corm. If surveys are done between approximately July and the following March, the species will probably be missed (White 1990).

Occurrences are found on the Cleveland National Forest near Lucas Canyon and Oak Flat in the San Mateo Wilderness Area. Other

occurrences are known from the Angeles National Forest and Camp Pendleton. In addition to openings in scrub and chaparral vegetation, the species has been found in grasslands and occupies the same habitat as *Chorizanthe staticoides* ssp. *chrysacantha* at some coastal locations (Reiser 1994). It grows on dry, stony soils, often with a high clay content. This species is included in a conservation strategy for coastal sage scrub (USFS/USFWS/CDFG 1997).

Dudleya viscida (sticky dudleya)

Dudleya viscida is a Forest Service Sensitive Species. It is a perennial species found in coastal, foothill, and mountain areas of Orange, Riverside, and San Diego counties. In coastal areas, the species occupies bluffs, while farther inland it usually grows in steep and rocky riparian canyons and is sometimes found on a gabbro substrate. An estimated thirty occurrences are known, about half located on federal or state lands. A significant occurrence containing an estimated ten thousand plants is found at Devil's Gorge, where Devil's Canyon and San Mateo Creek meet, in the northeastern corner of Camp Pendleton (Reiser 1994). Other occurrences are documented on the Cleveland National Forest,

Table 5.6. Rare plants which occur in coastal sage scrub habitats. y = the taxon occurs on the forest; p = has potential to occur. Trend, knowledge of distribution, and vulnerability information was determined by forest botanists/biologists and generally refers to occurrences on national forest system lands (decl. = declining; unkn. = unknown).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Dudleya multicaulis</i> (many-stemmed dudleya) <i>FS sensitive</i>	8		y		decl.	low–mod.	coastal & foothill areas of LA, Orange, W Riverside, & SD cos.; Santa Ana & San Gabriel mtns., San Onofre Mtn.; (high)
<i>Dudleya viscida</i> (sticky dudleya) <i>FS sensitive</i>	202				stable/ decl.	low	Orange, Riverside, and SD cos.; (high)
<i>Malacothamnus davidsonii</i> (Davidson's bush mallow)			1	p	unkn.	unkn.	LA (W San Gabriel Mtns.), SLO, & Monterey cos.; (low)

most in canyons within the San Mateo Wilderness Area and one large occurrence found along the Ortega Highway in San Juan Canyon. A conservation strategy for coastal sage scrub includes this species (USDA Forest Service et al. 1997).

***Malacothamnus davidsonii*
(Davidson's bushmallow)**

Malacothamnus davidsonii is a shrub species known to occur at low elevations in Los Angeles, San Luis Obispo, and Monterey counties. However, occurrences reported for the mountains of northwestern San Luis Obispo County and adjacent Monterey County may prove to be misidentifications (Bramlet and Boyd 1998). The *CNPS Inventory* reports that this species intergrades with *M. fasciculatus* (Skinner and Pavlik 1994). In Los Angeles County, occurrences of *M. davidsonii* are known from the San Fernando Valley and western end of the San Gabriel Mountains. In the mountains, plants are recorded for the Bear Divide area, Little Tujunga Canyon, near the Tujunga District headquarters, at Lopez Canyon, upper Haines Canyon, Loop Canyon, Big Tujunga Wash, and Pacoima Canyon (Bramlet and Boyd 1998). The species is typically found in sandy washes and in openings of coastal sage scrub or chaparral. A fire follower, it usually appears in the first three to four years after a fire and then may not be found until the next fire event.

Plants Specific to Chaparral Habitats

Thirty-six rare plants are found or have potential to occur in chaparral habitat within the assessment area. Summary information is shown in table 5.7. One federally threatened species is included in this group.

***Arabis johnstonii*
(Johnston's rock cress)**

Arabis johnstonii is a Forest Service Sensitive Species known mainly from the Garner Valley area of the San Jacinto Mountains in Riverside County. It was proposed for federal listing as threatened in 1985 but the proposal

was subsequently withdrawn. Eight occurrences are distributed in two distinct population centers at Garner Valley (where the species is affected by livestock grazing) and about 4 miles east on the desert divide. Most of the occurrences are located on the San Bernardino National Forest within two grazing allotments. The species grows between 4,400 and 5,000 feet, in dry areas on clay and gravelly soils. Plants are found in openings within chaparral and at the edges of meadows. In one of the grazing allotments it grows on stock driveways. In the second allotment, the plant grows in openings within chaparral uphill from the meadow, an area cattle naturally avoid, so the plant may not be heavily disturbed at this location. Adverse effects to the species began in the late 1800s with increasing settlement and cattle grazing in the Garner Valley and construction of the Desert Divide Trail (Pacific Crest Trail) (USFWS 1995b). Portions of some occurrences are protected within enclosures.

***Arctostaphylos luciana*
(Santa Lucia manzanita)**

Arctostaphylos luciana is a Forest Service Sensitive Species. It is distributed within the southern Santa Lucia Range, southeast of Cuesta Pass. There are eight recorded occurrences in all, five located on the Los Padres National Forest and the rest on private lands. The distribution of this species may be linked to disturbance as some of the occurrences are found near roads. The shrub grows on shale substrates within chaparral vegetation. It has also been found among Coulter pines. Nine acres of occupied habitat mapped on the Angeles National Forest need to be re-examined because the species is known as a San Luis Obispo County endemic.

***Arctostaphylos peninsularis* ssp.
peninsularis
(Peninsular manzanita)**

Arctostaphylos peninsularis ssp. *peninsularis* is a Forest Service Sensitive Species. This shrub is known from occurrences on the north side of the Santa Rosa Mountains (Riverside

County) and in the In-Ko-Pah Mountains (San Diego County), east of the Cleveland National Forest (CNDDDB 1997). Plants on the Cleveland National Forest, once thought to be this species, have now been identified as *Arctostaphylos rainbowensis*. Occurrences in the Santa Rosa Mountains are located on land which the San Bernardino National Forest may acquire and there is other potential habitat on the forest. Appropriate habitat is described as chaparral between 4,000 and 5,000 feet elevation. Fire suppression and trail construction could affect this species.

***Arctostaphylos pilosula*
(Santa Margarita manzanita)**

Arctostaphylos pilosula is a Forest Service Sensitive Species. This shrub is endemic to the Santa Lucia Ranges. It occurs in Monterey County and San Luis Obispo County near Santa Margarita. Twelve occurrences are recorded in the CNDDDB (1997). One occurrence is located on the Los Padres National Forest, one is on county land, and others are on private land or the ownership is unknown. The taxon grows on shale substrates in chaparral and with Sargent cypress.

***Arctostaphylos rainbowensis*
(Rainbow manzanita)**

Arctostaphylos rainbowensis is a Forest Service Sensitive Species. It is a newly described shrub found in Riverside and San Diego counties. It is found in relative abundance at three locations: on the Pala/Temecula Road, near Pala Creek (an estimated five thousand individuals were identified during a 1990 survey), and on Magee Road (Reiser 1994). Smaller populations are distributed from Pala west to the eastern slopes of the Santa Margarita Mountains. The species appears to be declining; populations that occur within the western Agua Tibia Mountains are protected in a wilderness area on the Cleveland National Forest; however, other populations occur on private lands proposed for development. The expansion of agriculture in the Pala and De Luz regions is also expected to remove habitat for this species (Reiser 1994).

***Arctostaphylos refugioensis*
(Refugio manzanita)**

Arctostaphylos refugioensis is a Forest Service Sensitive Species. It is an evergreen shrub found within the Santa Ynez Mountains of Santa Barbara County. Known habitat occurs on south-facing slopes and ridgelines in areas of sandstone soil and chaparral. Eight known occurrences are documented, some protected within the Los Padres National Forest. They range from above Canada del Cojo near Lompoc to San Pedro Canyon near San Marcos Pass. Numerous plants occur along Camino Cielo Road. Most occurrences on the Santa Ynez quadrangle were burned in 1916 and again in the 1955 Refugio Fire; however, other populations are experiencing reduced habitat capability due to fire suppression.

***Arenaria macradenia* var. *kuschei*
(Forest Camp sandwort)**

Arenaria macradenia var. *kuschei* is a Forest Service Sensitive Species. It was originally known from one historic collection at "Forest Camp, Mohave Desert," a locality subject to interpretation. The next recognized recollection was in 1995 when the plant was found near the western summit of Liebre Mountain (Ross et al. 1995). "Sunny, rocky openings in mosaic of chaparral and oak woodland vegetation on granitic substrate" are the habitat parameters described at this location. A subsequent study in 1997 surveyed potential habitat on Liebre Mountain and adjacent areas and located six new populations (Boyd 1997). All of the recently discovered populations are small, both in number of individual plants and area covered. All occur on decomposed granite and are found in areas of gentle relief along the summit of Liebre Mountain within the Angeles National Forest.

The largest populations were found at the eastern end of the mountain on the ridge dividing the Bear Canyon and Fish Canyon watersheds. Two smaller populations were found along the crest of the eastern end of Liebre Mountain: one to the east, due north of Atmore Meadow; the other to the west, near

Table 5.7. Rare plants which occur in chaparral habitats. y = the taxon occurs on the forest; p = has potential to occur. Trend, knowledge of distribution, and vulnerability information was determined by forest botanists/biologists and generally refers to occurrences on national forest system lands (decl. = declining; unkn. = unknown).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Arabis johnstonii</i> (Johnston's rock cress)				83	unkn.	mod.	Garner Valley, San Jacinto Mtns.; (high)
<i>Arctostaphylos luciana</i> (Santa Lucia manzanita)			9	3,179	unkn.	low	S Santa Lucia Mtns.; (high)
<i>Arctostaphylos peninsularis</i> ssp. <i>peninsularis</i> (Peninsular manzanita)		p			unkn.		Santa Rosa & In-ko-pah mtns., Baja; (low)
<i>Arctostaphylos pilosula</i> (Santa Margarita manzanita)				10	unkn.	low	Santa Lucia Ranges; (moderate)
<i>Arctostaphylos rainbowensis</i> (Rainbow manzanita)	1				decl.	low	Riverside & SD cos., Santa Margarita Mtns., W Agua Tibia Mtns. (low)
<i>Arctostaphylos refugioensis</i> (Refugio manzanita)				367	stable	low	Santa Ynez Mtns.; (moderate)
<i>Arenaria macradenia</i> var. <i>kuschei</i> (Forest Camp sandwort)			34 ¹		stable ¹		Liebre Mtn.; (moderate)
<i>Aster greatae</i> (Greata's aster)		p	1				San Gabriel Mtns.; (low)
<i>Calochortus clavatus</i> var. <i>gracilis</i> (slender mariposa lily)			y		unkn.		San Gabriel Mtns.
<i>Calochortus plummerae</i> (Plummer's mariposa lily)		y	y	p	unkn.	mod/ high	San Gabriel, San Bernardino, San Jacinto, Santa Ana, & Santa Monica mtns.; (moderate)
<i>Calochortus weedii</i> var. <i>vestus</i> (late-flowered mariposa lily)				753	stable	low	Monterey Coast, Santa Lucia Ranges, S Los Padres, Santa Ynez Mtns. (Mont., SLO, SB, & Vent. cos.); (mod.)
<i>Ceanothus cyaneus</i> (Lakeside ceanothus)	82				decl./ stable ²	low	SD Co. (El Cajon Mtn.), Baja; (high)
<i>Ceanothus ophiochilus</i> (Vail Lake ceanothus) <i>federally threatened</i>	63				decl./ stable	low	Vail Lake area of S Riverside Co.; (high)
<i>Chaenactis parishii</i> (Parish's chaenactis)	41	1+			stable	low	Riverside (Santa Rosa & San Jacinto mtns.), & San Diego (Laguna & Cuya- maca mtns.) cos., Baja; (mod. – high)
<i>Chorizanthe blakleyi</i> (Blakely's spineflower)				15	unkn.	low	Sierra Madre Mtns. (Santa Barbara & SLO cos.); (moderate)
<i>Chorizanthe polygonoides</i> var. <i>longispina</i> (long-spined spineflower)	y	y			decl.	low	Riverside, SD (Black Mtn.), & Santa Barbara cos., Baja; (moderate)
<i>Dudleya cymosa</i> ssp. <i>crebrifolia</i> (San Gabriel River dudleya)	y						San Gabriel Mtns.

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Erigeron breweri</i> var. <i>bisanctus</i> (pious daisy)			y	y		unkn.	San Gabriel & San Bernardino mntns.; (low)
<i>Eriogonum butterworthianum</i> (Butterworth's buckwheat)				65	stable	low	n Santa Lucia Mtns. (Monterey Co.); (low)
<i>Heuchera rubescens</i> var. <i>versicolor</i> (San Diego County alumroot)	y				stable	low	Peninsular Ranges of SD Co., N Baja, TX
<i>Lepechinia cardiophylla</i> (heart-leaved pitcher sage)	y				stable	low	Santa Ana Mtns., San Diego Co. (Iron Mtn.), Baja; (high)
<i>Lepechinia fragrans</i> (fragrant pitcher sage)		p	4		unkn.	unkn.	San Gabriel & Santa Monica mtns., Santa Cruz, Santa Rosa, & Santa Catalina islands; ((low)
<i>Lepechinia ganderi</i> (Gander's pitcher sage)	371					low	Santa Ana to Otay Mtns. (SD Co.), to Baja; (low)
<i>Malacothamnus aboriginum</i> (Indian Valley bush mallow)	13			p	unkn.	mod.	SD, Fresno, Monterey, & San Benito cos.; (high)
<i>Malacothamnus palmeri</i> var. <i>lucianus</i> (Arroyo Seco bush mallow)				y	stable	low	Monterey & SLO cos. (Santa Lucia Mtns.); (moderate)
<i>Malacothrix saxatilis</i> var. <i>arachnoidea</i> (Carmel Valley cliff-aster)				y	unkn.	low	(moderate)
<i>Monardella viridis</i> ssp. <i>saxicola</i> (rock monardella)		y	y		unkn.	low	San Gabriel Mtns.; (low)
<i>Orobanche valida</i> ssp. <i>valida</i> (Rock Creek broomrape)			1+	2	unkn.	low	San Gabriel & Topatopa mtns.; (low)
<i>Oxytheca emarginata</i> (white-margined oxytheca)		y					San Jacinto & Santa Rosa mtns., Garner Valley
<i>Oxytheca parishii</i> var. <i>abramsii</i> (Abram's oxytheca)				28	unkn.	low	San Rafael Mtns., W Transverse Ranges (Mt. Pinos & Topatopa Mtns.); (moderate)
<i>Penstemon californicus</i> (California beardtongue)	p	126			unkn.	mod.	San Jacinto & Santa Rosa mtns., Garner Valley, Sierra Juarez & Sierra San Pedro Martir (Baja); (low)
<i>Phacelia suaveolens</i> ssp. <i>keckii</i> (Santiago Peak phacelia)	51				unkn.	mod.	Santa Ana Mtns., Peninsular Ranges of San Diego Co.; (low)
<i>Plagiobothrys uncinatus</i> (hooked popcorn-flower)				8	unkn.	low	Santa Lucia & Gabilan ranges (Monterey, San Benito, Santa Clara, & SLO cos.); (low)
<i>Ribes canthariforme</i> (Moreno currant)	y				stable	low	San Diego Co.; (moderate to high)
<i>Sidalcea hickmanii</i> ssp. <i>hickmanii</i> (Hickman's checkerbloom)				429	unkn.	low	N Santa Lucia Mtns.; (moderate)
<i>Thermopsis macrophylla</i> (Santa Ynez false lupine)				565	unkn.	low	Santa Ynez Mtns (Santa Barbara Co.); (moderate)

¹ Boyd 1997

² occurrences on private land appear to be declining, those on federal land appear stable

Bear Gulch Camp. Three other populations were found near the head of Tent Rock Canyon (Boyd 1997). Based on these new occurrences, the taxon is probably stable within forest boundaries. Activities such as light grading may benefit the perennial by creating openings or gaps within the habitat for seedling establishment.

***Aster greatae* (Greata's aster)**

Aster greatae is a perennial species known from the southern slopes of the San Gabriel Mountains. One of the two known occurrences is located in Gold Canyon on the Angeles National Forest. The species is found in damp places within foothill and lower montane conifer habitats. Potential habitat for the species also exists on the San Bernardino National Forest.

***Calochortus clavatus* var. *gracilis*
(slender mariposa lily)**

Calochortus clavatus var. *gracilis* is a perennial species found in the San Gabriel Mountains. Plants occupy shaded foothill canyons with chaparral. RAREFIND contains records for nine occurrences: either historic, located on private lands, or on the Angeles National Forest (CNDDDB 1997). Occurrences are vulnerable to landfill expansion, development projects, sand and gravel mining, and off-road vehicle activity.

***Calochortus plummerae*
(Plummer's mariposa lily)**

Calochortus plummerae is found in the San Gabriel, San Bernardino, San Jacinto, Santa Ana, and Santa Monica mountains. The CNDDDB lists fifty-eight occurrences, some of them located on the Angeles and San Bernardino national forests. Many, however, are located on private lands slated for development. In addition to chaparral, the species has been found in alluvial fan sage scrub habitat, grasslands, and lower montane conifer forests below 5,500 feet (S. Eliason, San Bernardino NF, in litt.). The species is vulnerable to development projects, trail construction and

maintenance, fire suppression, habitat conversion, grazing, trampling, and sand and gravel mining.

***Calochortus weedi* var. *vestus*
(late-flowered mariposa lily)**

Calochortus weedi var. *vestus* is a Forest Service Sensitive Species. It is distributed in the Santa Lucia Ranges and southern Los Padres region. Occurrences are scattered across four counties: Monterey, San Luis Obispo, Santa Barbara, and Ventura. The plant is abundant at some locations and uncommon at others. Like many species of mariposa lily, its abundance varies from year to year due to climatic conditions. In addition, some *Calochortus* species appear to be disturbance oriented, showing up in openings in the vegetation created by low-level ground disturbances. This plant has been noted on road banks and fuel breaks. In relatively undisturbed areas it occurs on rocky substrates, which effectively reduce competition from other plants. The taxon has been found on sandstone, siltstone, shale, and serpentine. Surrounding vegetation is described as chaparral and open woodlands. Occurrences are protected on the Los Padres National Forest in the Lion Den Botanical Area (Matthews 1998), in the Santa Ynez Mountains, and at Wheeler Springs near Ojai. Occurrences on private lands are known from the Hollister Ranch area south to Hearst Ranch.

***Ceanothus cyaneus*
(Lakeside ceanothus)**

Ceanothus cyaneus is a Forest Service Sensitive Species. It occurs in San Diego County and Baja California, Mexico. The shrub is found in San Diego County from Crest to the foothills of Lakeside, including significant populations on El Cajon Mountain (Reiser 1994). The species can be common within this narrow range. A good portion of its known habitat is protected on Cleveland National Forest and BLM lands. It appears to cross with other *Ceanothus* species (*C. leucodermis* and *C. tomentosus*), and plants outside of the Crest

or El Cajon Mountain areas may be hybrids (Reiser 1994). Fire-return intervals that are too frequent may type convert its habitat to grassland. The species is included in a conservation strategy for coastal sage scrub (USDA Forest Service et al. 1997).

Ceanothus ophiochilus
(Vail Lake ceanothus)

Ceanothus ophiochilus is a federally threatened and state endangered shrub species first discovered at Oak/Vail Mountain in 1989. Occurrences are known from near Vail Lake in southern Riverside County and just south of Vail Lake in the Agua Tibia Wilderness Area of the Cleveland National Forest (fig. 5.7). These occurrences are estimated to contain between ten thousand and twenty thousand plants in all. The species can hybridize with *C. crassifolius* and at least two occurrences may be hybrid swarms (USFWS 1995a). Occurrences are reported in drier areas on ridgetops and north- to northeast-facing slopes within chamise chaparral, and also along the edges of creeks and in dry canyons. Plants are restricted to nutrient-poor (phosphorus deficient) soils such as gabbro or metavolcanics, which may allow them to maintain reproductive isolation (USFWS 1998g).

Alteration of the natural fire regime is a threat to this species; it requires fire for seed germination and does not resprout vegetatively after fire. Short fire-return intervals can prevent plants from reaching maturity and producing seed, leading to a gradual depletion of the seed pool (USFWS 1995a). While some occurrences are protected by their location in rugged, relatively inaccessible terrain, others are threatened by habitat destruction, alteration, fragmentation, and degradation from urban development. One occurrence located near Vail Lake is threatened by the development of a planned community and was partly graded to create fuel breaks. A portion of the Agua Tibia Wilderness occurrences have also been graded for fuel breaks. A conservation strategy for coastal sage scrub includes this species (USFS/USFWS/CDFG 1997).

Chaenactis parishii
(Parish's chaenactis)

Chaenactis parishii is a perennial species found in Riverside and San Diego counties, and Baja California, Mexico. Occurrences are known on the Cleveland and San Bernardino national forests. Some of the best-protected sites occur within the Santa Rosa Wilderness Area in the Santa Rosa Mountains. Other occurrences are known in the San Jacinto Mountains and in the Garnet Peak area of the Laguna Mountains. There are historic occurrences in the Cuyamaca Mountains at Stonewall and Cuyamaca peaks (Reiser 1994). The plant is known to respond positively to disturbance and has appeared along the sides of roads.

Chorizanthe blakleyi
(Blakley's spineflower)

Chorizanthe blakleyi is a Forest Service Sensitive Species. It is an annual species endemic to the Sierra Madre Mountains of Santa Barbara and San Luis Obispo counties. Occurrences are found between Bates Canyon and Lion Canyon in openings within chaparral or pinyon-juniper woodland (USFS/USFWS 1996). The U.S. Fish and Wildlife Service reports six to ten known populations of this plant. The Santa Barbara Botanic Garden has specimens that document at least nine different sites for the species, with more than half located on the Los Padres National Forest (D. Wilken, Santa Barbara Botanic Garden, in litt. 1998).

Chorizanthe polygonoides* var. *longispina
(long-spined spineflower)

Chorizanthe polygonoides var. *longispina* is a Forest Service Sensitive Species. It is an annual plant found within Riverside, San Diego, and Santa Barbara counties, and Baja California, Mexico (Reiser 1994). The CNDDDB contains records for twenty-nine occurrences, most at Lake Matthews in Riverside County. Reiser (1994) describes eleven locations in San Diego and Riverside counties. One known occurrence on the San Bernardino National

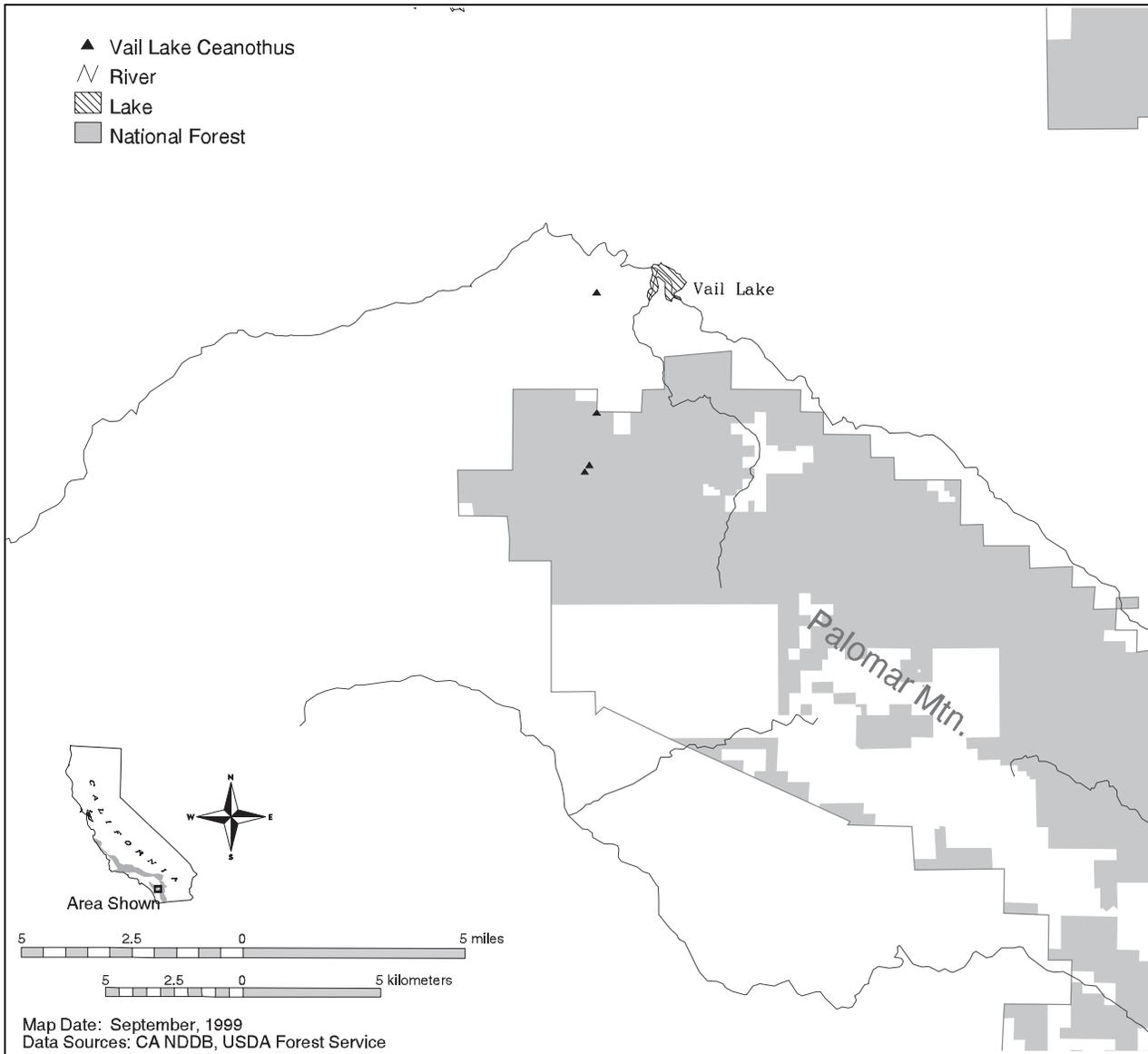


Figure 5.7. Distribution of *Ceanothus ophiochilus* (Vail Lake ceanothus).

Forest is located within an active grazing allotment and was estimated to contain over two thousand plants in 1995. The Cleveland National Forest contains some occurrences, primarily at Black Mountain. Other occurrences are protected in reserves in Riverside County: the Mott Reserve at UC Riverside, Harford Springs County Park, and Lake Matthews Biological Preserve. Occurrences in Santa Barbara County need to be confirmed. The species grows on gabbro-derived clay soil or “clay lenses” and, in addition to scrub and chaparral habitats, has been found at the edges of vernal pools in grasslands and meadows (Reiser 1994). Non-native grasses may be a threat to this species.

***Dudleya cymosa* ssp. *crebrifolia*
(San Gabriel River dudleya)**

Dudleya cymosa ssp. *crebrifolia* is endemic to the San Gabriel Mountains where it is known from one location in Fish Canyon along the San Gabriel River. It occurs on a granitic substrate.

***Erigeron breweri* var. *bisanctus*
(pious daisy)**

Erigeron breweri var. *bisanctus* is a watch-list plant on the San Bernardino and Angeles national forests. It occurs in the San Bernardino and San Gabriel mountains, and four occurrences are recorded in the CNDDDB. Plants grow in chaparral and lower montane coniferous forest, on dry open slopes, and in

washes. One occurrence is protected within the Glendora Wilderness Park. Habitat for this plant on national forest system lands may be affected by trampling, fuel wood harvesting, and prospecting. This variety is difficult to identify and may be confused with other more common taxa; therefore, we may not have an accurate picture of its rarity.

***Eriogonum butterworthianum*
(Butterworth's buckwheat)**

Eriogonum butterworthianum is a Forest Service Sensitive Species. It is a shrub known from four occurrences near Arroyo Seco in the northern Santa Lucia Range of Monterey County. These occurrences are located on the Los Padres National Forest. Abundance estimates for each occurrence range from fifty to fewer than one thousand individual plants. The species grows on sandstone soils within chaparral vegetation. *Castilleja foliosa* and *Mimulus aurantiacus* are common associates.

***Heuchera rubescens* var. *versicolor*
(San Diego County alumroot)**

Heuchera rubescens var. *versicolor* is a rare perennial plant known from a small number of occurrences in the foothills and mountains of San Diego County (i.e., Cuyamaca Peak, Hot Springs Mountain, along San Luis Rey River east of Barker Valley, and the east end of Harper Valley) (Reiser 1994). The taxon is also reported from northern Baja and Texas. San Diego County occurrences appear to be stable, although Reiser (1994) reports plants at the Hot Springs Mountain locale are declining and need protection from foot traffic. Other occurrences are found on state and Indian reservation lands. Plants occupy rocky cliffs in montane chaparral vegetation above 4,900 feet. These areas receive relatively low levels of disturbance.

***Lepechinia cardiophylla*
(heart-leaved pitcher sage)**

Lepechinia cardiophylla is a Forest Service Sensitive Species. This shrub is found in the Santa Ana Mountains, the Peninsular Ranges of San Diego County (disjunct Iron Moun-

tain population), and southward into Baja California, Mexico (White 1990; Reiser 1994). It has potential to occur in the Laguna Mountains. Some populations occur in the Santa Ana Mountains on the upper slopes of Coal and Gypsum canyons among groves of Tecate cypress. The species is reportedly a fire follower; burned areas on the slopes of Sierra Peak contained a significantly higher number of *L. cardiophylla* plants than unburned areas (White 1990). There are about twenty-five recorded occurrences, mostly on the Cleveland National Forest. The species is included in a conservation strategy for coastal sage scrub (USFS/USFWS/CDFG 1997).

***Lepechinia fragrans*
(fragrant pitcher sage)**

Lepechinia fragrans is an uncommon shrub species distributed within the San Gabriel and Santa Monica (near Triunfo Pass) mountains and on the islands of Santa Cruz, Santa Rosa, and Santa Catalina. Scattered occurrences in the San Gabriel Mountains are found on both the Angeles and San Bernardino national forests. They are vulnerable to fire and habitat alteration (type conversion).

***Lepechinia ganderi*
(Gander's pitcher sage)**

Lepechinia ganderi is a shrub species known from fewer than ten occurrences in the Otay Mountains of San Diego County, in the Santa Ana Mountains, and in Baja California, Mexico. The plant grows in various foothill habitats—closed-cone conifer forest, chaparral, coastal sage scrub, and valley-foothill grasslands.

***Malacothamnus aboriginum*
(Indian Valley bush mallow)**

Malacothamnus aboriginum occurs in San Diego, Fresno, Monterey, and San Benito counties. Reiser (1994) lists about five extant occurrences in San Diego County, where the species is thought to be declining and close to extinction. The Garnet Peak population has experienced significant site disturbance and is

being shaded out by planted pines (Reiser 1994). It needs to be determined if populations in the San Diego ranges are disjuncts or a separate species or subspecies. The *CNPS Inventory* (which only reports the northern populations) notes that this shrub appears in abundance after fires (Skinner and Pavlik 1994).

***Malacothamnus palmeri* var. *lucianus*
(Arroyo Seco bush mallow)**

Malacothamnus palmeri var. *lucianus* is endemic to Monterey and San Luis Obispo counties. Three occurrences are documented from Monterey County—two occurrences near Big Sur and a third on the Los Padres National Forest near Hanging Valley in the upper Arroyo Seco watershed (D. Wilken, Santa Barbara Botanic Garden, in litt. 1998). Plants grow in chaparral and low-elevation meadow habitat. Occurrences on national forest system lands appear to be stable and in areas of low impact.

***Monardella viridis* ssp. *saxicola*
(rock monardella)**

Monardella viridis ssp. *saxicola* is a Forest Service Sensitive Species distributed on the southern slopes of the San Gabriel Mountains between 1,700 and 6,000 feet. The perennial grows on dry rocky soils, in sunny exposed places, on partially shaded gravelly benches within chaparral, and in open areas of yellow pine forest. Plants also occupy burned areas in chaparral (Bennett 1979a). Two or three occurrences are known on the San Bernardino National Forest (eastern San Gabriel Mountains), all near one road. Occurrences are also documented in the San Dimas Experimental Forest on the Angeles National Forest. The plant is vulnerable to road-maintenance activities and disturbances that lead to type conversion of its habitat. At least one occurrence is located on private lands and may be vulnerable to development projects.

***Orobanche valida* ssp. *valida*
(Rock Creek broomrape)**

Orobanche valida ssp. *valida* is a Forest Service Sensitive Species. It is known from at least

one locality in the Topatopa Mountains and eight localities in the central and eastern San Gabriel Mountains. An estimated sixteen hundred plants occur at these localities, with the majority (94 percent) occurring in the San Gabriel Mountains on both coastal and desert-side slopes (Mistretta and Boyd 1997b). Plants occur in the San Gabriels at Lookout Mountain and along the South Fork of Big Rock Creek. Abundance data collected in the past two decades indicate that these occurrences are stable. Estimated population size along the South Fork of Big Rock Creek has increased from fifty plants in 1979, to one hundred plants in 1982, and three hundred plants in 1995. Estimated population size at Lookout Mountain for the same three years was thirty-five, greater than forty, and two hundred plants, respectively (Mistretta 1996). In addition, surveys in 1994 and 1995 found six new localities in the eastern San Gabriel Mountains. The taxon is known from a historic collection in the Topatopa Mountains and a more recent collection from the head of Santa Paula Canyon in the same mountains. Only a portion of the potential habitat for this taxon has been surveyed and it seems likely that additional occurrences will be found in the western San Gabriel Mountains and at other locations in the Castaic and southern Los Padres regions (Mistretta 1996).

The perennial is found on granitic soils in fairly open chaparral and pinyon-juniper woodlands between 4,100 and 6,600 feet elevation. It parasitizes various chaparral species such as silk tassel, yerba santa, California buckwheat, desert needlegrass, scrub oak, canyon live oak, and mountain mahogany; however, it is most frequent on silk tassel and has never been observed without this shrub nearby (Mistretta 1996). For the most part, *O. valida* ssp. *valida* inhabits remote terrain that receives few impacts; however, management activities that affect the persistence or stability of the chaparral vegetation could adversely affect the taxon. One occurrence near the Horse Canyon Shooting Area is vulnerable to habitat degradation. Another occurrence along the lower South Fork of Big Rock Creek is affected

by erosion, and the population at Glendora Ridge (in the San Dimas Experimental Forest) could be adversely affected by desert crested wheatgrass, an introduced perennial grass.

***Oxytheca emarginata*
(white-margined oxytheca)**

Oxytheca emarginata is a Forest Service Sensitive Species endemic to the San Jacinto and Santa Rosa mountains of Riverside County. Occurrences are located between 3,900 and 8,200 feet elevation on gravelly soils in openings within chaparral, lower montane coniferous forest, and pinyon-juniper woodlands. In at least one occurrence, *O. emarginata* is found with *Penstemon californicus*, another focal species. Most occurrences are found within chaparral in and around the Garner Valley, an area with two active grazing allotments. The species is vulnerable to overgrazing, trampling, development projects, and recreational activities.

***Oxytheca parishii* var. *abramsii*
(Abram's oxytheca)**

Oxytheca parishii var. *abramsii* is an annual taxon found within the San Rafael Mountains and southern Los Padres region (Topatopa Mountains and Mount Pinos). Some occurrences are located on the Los Padres National Forest. The CNDDDB contains records for five occurrences, mostly historic .

***Penstemon californicus*
(California beardtongue)**

Penstemon californicus is a Forest Service Sensitive Species distributed in the San Jacinto and Santa Rosa mountains of Riverside County and in the Sierra Juarez and Sierra San Pedro Martir of Baja California, Mexico. Plants generally grow on sandy soils in chaparral, lower montane conifer forest, yellow pine forest, and pinyon-juniper woodlands. The CNDDDB contains records on twelve occurrences, many on the San Bernardino National Forest. One historic occurrence is recorded in the Aguanga area near the border of Riverside and San Diego counties. Another historic

record describes an occurrence within the Santa Rosa Wilderness Area. Other occurrences are located on private lands.

Occurrences on the forest grow in rocky or clay soils (specifically granitic soil with pleistocene nonmarine deposits of eroded clay), in openings within chaparral adjacent to meadow habitat in Garner Valley. Plants also grow in openings within chaparral on ridgetops and in the ecotone between chaparral and lower montane conifer forest. At some locales the perennial occurs with *Arabis johnstonii*, another focal species. Some of the occurrences on the forest are located in an active grazing allotment, including portions of two occurrences protected within exclosures. However, the main distribution of this species is in areas above those used by cattle (M. Lardner, San Bernardino NF, in litt. 1999).

***Phacelia suaveolens* ssp. *keckii*
(Santiago Peak phacelia)**

Phacelia suaveolens ssp. *keckii* is a Forest Service Sensitive Species. An annual, it is endemic to the Santa Ana Mountains and San Diego region (Dennis 1995). The *CNPS Inventory* cites occurrences near Santiago Peak and Pleasants Peak in the Santa Ana Mountains (Skinner and Pavlik 1994). The plant is also reported from a drainage near Wild Horse Peak in the Agua Tibia Wilderness Area of the Cleveland National Forest (Reiser 1994). All of these occurrences are located on federal lands where they are somewhat protected. The taxon grows on volcanic soils in chaparral and with knobcone pine and is seen in greatest abundance following fires (White 1990).

***Plagiobothrys uncinatus*
(hooked popcorn-flower)**

Plagiobothrys uncinatus is a Forest Service Sensitive Species. It is known from the Santa Lucia and Gabilan ranges in Monterey, San Benito, Santa Clara, and San Luis Obispo counties. Most of the documented occurrences are historic, including those at Pinnacles National Park and the Hastings Reserve. At least one occurrence is protected within the Cuesta

Ridge Botanical Area of the Los Padres National Forest. Two occurrences are located on Fort Hunter Liggett. This annual plant has been found in chaparral, woodlands, and grasslands.

***Ribes canthariforme* (Moreno currant)**

Ribes canthariforme is a Forest Service Sensitive Species. This shrub is endemic to the foothills of San Diego County near Moreno Dam. There are about twelve recorded occurrences, many consisting of only a few plants and protected on state or federal lands. The species is included in a conservation strategy for coastal sage scrub (USFS/USFWS/CDFG 1997). In chaparral, it occurs in mesic areas with gabbro soils and large granite boulders.

***Sidalcea hickmanii* ssp. *hickmanii*
(Hickman's checkerbloom)**

Sidalcea hickmanii ssp. *hickmanii* is a Forest Service Sensitive Species. It is known from the northern Santa Lucia Range. The CNDDDB contains records for ten occurrences (some of them historic). Six of the known occurrences are found on the Los Padres National Forest.

***Thermopsis macrophylla*
(Santa Ynez false lupine)**

Thermopsis macrophylla is a Forest Service Sensitive Species. It is known from fewer than fifteen occurrences in Santa Barbara County. All of the occurrences are located on the Santa Barbara Ranger District of the Los Padres National Forest, where they range from Santa Ynez Peak east to Camino Cielo Road and La Cumbre Peak. The species grows on sandstone, granitic, and adobe soils within chaparral. Some occurrences are found in disturbed areas such as fuel breaks. The plant is locally abundant after wildfires, gradually decreasing in abundance until the next fire, and is therefore sensitive to fire suppression. The *Jepson Manual* refers to this taxon as *T. macrophylla* var. *agnina* (Hickman 1993).

Plants Associated with Gabbro Soils

Gabbro is a localized soil type that supports a number of rare plant species in the chaparral belt. Thirteen rare plants are found or have potential to occur on gabbro-derived substrates within the assessment area. Summary information is shown in table 5.8. Two federally threatened species and one federally endangered species are included in this group.

***Acanthomintha ilicifolia*
(San Diego thorn-mint)**

Acanthomintha ilicifolia is state endangered and federally threatened. An annual plant, it is endemic to mesa and foothill areas of San Diego County and northern Baja California, Mexico. At least a third of the known historic occurrences have been extirpated by urban and rural development. About thirty small occurrences are presently known. The two largest are found on the Cleveland National Forest near Viejas and Poser mountains (fig. 5.8). These occurrences are located adjacent to an Indian reservation and could be affected by unauthorized cattle grazing and off-highway vehicle activity. Other smaller occurrences are protected in open space reserves throughout San Diego County, including a California Department of Fish and Game reserve at McGinty Mountain. Because much of its original habitat has been removed in San Diego County, *A. ilicifolia* is expected to remain rare. The Cleveland National Forest has developed a species management guide for occurrences on the forest (Winter, 1991c). See the final listing rule (USFWS 1998j) for more information on this species.

***Arctostaphylos otayensis*
(Otay manzanita)**

Arctostaphylos otayensis is an evergreen shrub endemic to San Diego County. Populations are recorded on six 7.5-minute quad maps centered in the Otay Mountain area. The habitat is described as chaparral and woodlands with gabbro or volcanic substrates in the foothill, lower montane, and montane conifer zones. Potential habitat exists on the Cleveland National Forest; however, most of

Table 5.8. Plants found in association with gabbro soils. y = the taxon is known to occur on the forest; p = has potential to occur). Trend, knowledge of distribution, and vulnerability information was determined by forest botanists/biologists and generally refers to occurrences on national forest system lands (decl. = declining; incr. = increasing; unkn. = unknown).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Acanthomintha ilicifolia</i> (San Diego thorn-mint) <i>federally threatened</i>	157				decl.	mod.	San Diego Co. & adjacent areas of Baja; (high)
<i>Arctostaphylos otayensis</i> (Otay manzanita)	p				unkn.		San Diego Co. (Otay Mtn.); (high)
<i>Brodiaea filifolia</i> (thread-leaved brodiaea) <i>federally threatened</i>	y	p	p		unkn.	low	LA, Orange, SW Riverside (Santa Rosa Plateau), San Bernardino, & NW San Diego cos.; (moderate)
<i>Brodiaea orcuttii</i> (Orcutt's brodiaea) <i>FS sensitive</i>	719				decl.	low	Orange, San Bernardino, S Riverside, & SD cos., Baja (Santa Ana Mtns., Santa Rosa Plateau, Santa Margarita Mtns., S to Peninsular Ranges of SD Co.); (moderate)
<i>Calochortus dunnii</i> (Dunn's mariposa lily) <i>FS sensitive</i>	163				decl.	low	Peninsular Ranges of SD Co. & Baja; (moderate)
<i>Chorizanthe procumbens</i> (prostrate spineflower)	y	p	p		stable ¹	low	SD, Riverside, Orange, LA, San Bernardino, & Ventura cos., Baja; (low)
<i>Clarkia delicata</i> (delicate clarkia) <i>FS sensitive</i>	y				decl.	low	Peninsular Ranges of SD Co. & N Baja; (low)
<i>Fremontodendron mexicanum</i> (Mexican flannelbush) <i>federally endangered</i>	p				decl ¹ .		Peninsular Ranges of SD Co. (San Ysidro Mtns., Otay Mtn.) and Baja; (low)
<i>Horkelia truncata</i> (Ramona horkelia) <i>FS sensitive</i>	338				stable	low–mod.	Peninsular Ranges of SD Co. & Baja; (high)
<i>Monardella hypoleuca</i> ssp. <i>Lanata</i> (felt-leaved monardella) <i>FS sensitive</i>	159				stable	low–mod.	Peninsular Ranges of SD Co. (Palomar & Laguna mtns.) & N Baja; (moderate)
<i>Nolina interrata</i> (Dehesa nolina) <i>state endangered</i>	p				stable ¹		Peninsular Ranges of SD Co. & Baja; (low)
<i>Senecio ganderi</i> (Gander's ragwort) <i>FS sensitive</i>	67				stable	mod.	Peninsular Ranges of SD Co. (Black, Laguna, & Palomar mtns.); (high)
<i>Tetracoccus dioicus</i> (Parry's tetracoccus) <i>FS sensitive</i>	97				decl.	low	foothills of Orange, Riverside, & SD cos., Baja; (moderate)

¹ Reiser 1994 (refers to all known occurrences)



Figure 5.8. Distribution of *Acanthomintha ilicifolia* (San Diego thorn-mint).

the known populations are located on BLM lands being considered for inclusion in a national wildlife refuge. In recent years populations at Otay Mountain have been impacted by repeated fires linked to illegal immigration through the area. Frequent fires may lead to conversion of the habitat to non-native grassland and eliminate native woody species. Despite this threat, the species was removed from the Forest Service Sensitive list because no occurrences are known on national forest system lands.

***Brodiaea filifolia*
(thread-leaved brodiaea)**

Brodiaea filifolia is a federally threatened and state endangered species distributed in Los

Angeles, Orange, Riverside, San Bernardino, and San Diego counties. The CNDDDB (1997) lists forty-five extant occurrences in all. Most are located on the Santa Rosa Plateau in southwestern Riverside County and in the Vista-San Marcos-Carlsbad region of northwestern San Diego County (fig. 5.9). Other occurrences are found along the San Jacinto River and a tributary of Old Salt Creek, west of the city of Hemet. Some occurrences are protected in the San Jacinto Wildlife Area managed by the California Department of Fish and Game, and one occurrence is known from Camp Pendleton. In all, this species occupies less than 600 acres of habitat (USFWS 1994b). The largest known occurrence, on the Santa Rosa

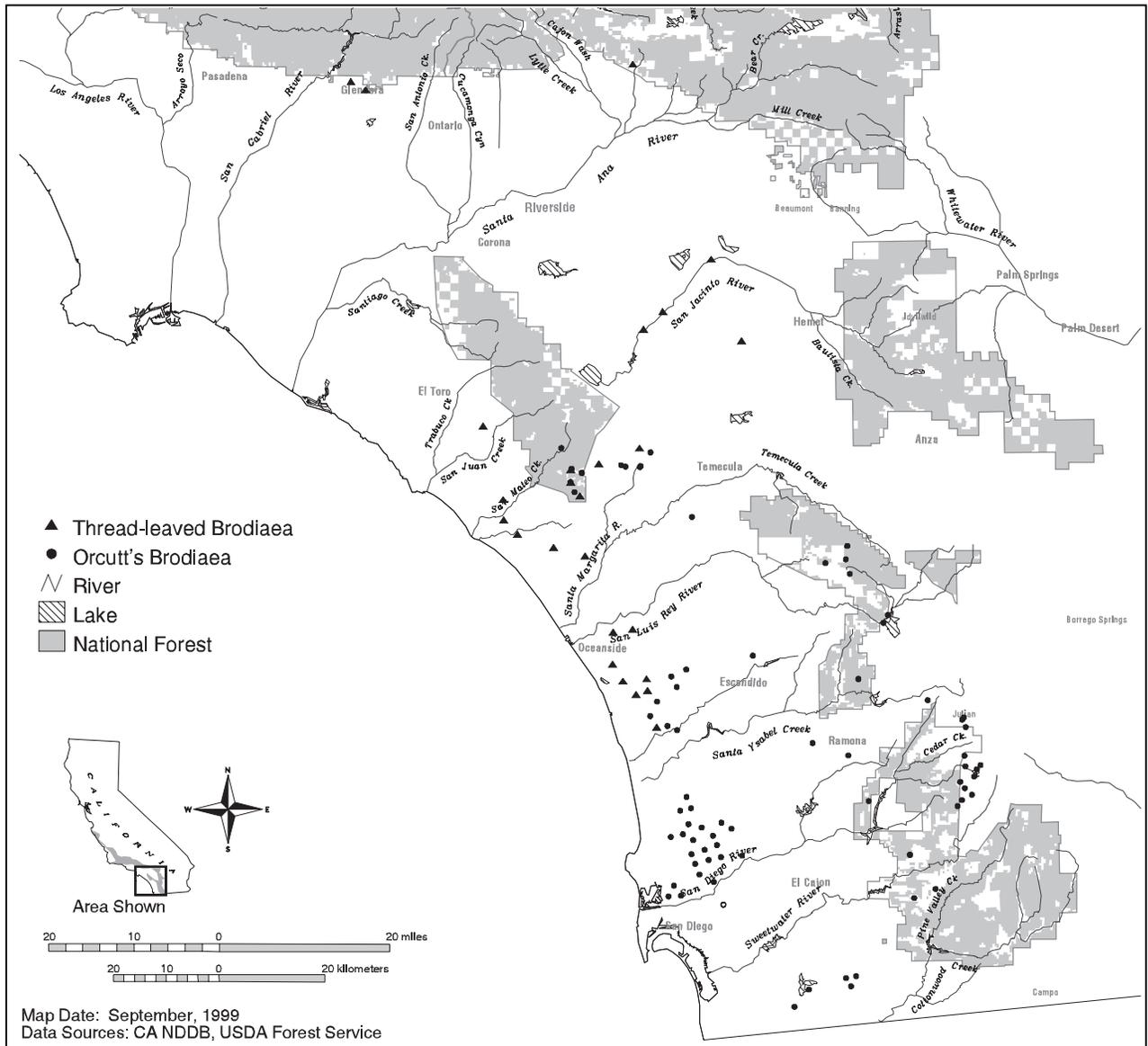


Figure 5.9. Distribution of *Brodiaea filifolia* (thread-leaved brodiaea).

Plateau, is estimated to contain over thirty thousand plants and occupy about 50 acres. The majority of occurrences are located on private lands in San Diego County; however, three populations occur near Miller Mountain on the Cleveland National Forest. These populations contain an estimated twenty thousand plants thought to be the hybrid *B. filifolia* x *B. orcuttii* (K. Winter, Cleveland NF, pers. comm.). One occurrence is reported for the San Bernardino Mountains (adjacent to the San Bernardino National Forest). The species was thought to have been extirpated from Los Angeles County; however, a small occurrence was discovered in 1991 in the city of Glendora at Wildwood and Morgon canyons.

B. filifolia is found in low-elevation inland valley and foothill habitats such as coastal sage scrub, chaparral, cismontane woodlands, and grasslands (e.g., southern needlegrass grassland and alkali grassland). Plants are found on clay soils in mesic places, including vernal pools (USFWS 1998m). In western Riverside County (i.e., Perris, San Jacinto, and Menifee valleys), the plant grows in vernal wetland plains and alkali lake playas (e.g., the Mystic Lake area).

This species is declining throughout its range in southern California (Reiser 1994). Its habitat has been significantly reduced by urban and agricultural development. An estimated 25 percent of *B. filifolia* populations

have been eliminated and over 25 percent of the remaining populations in San Diego and Riverside counties occur in areas of proposed or approved development projects (USFWS 1998m). The species is also vulnerable to trampling, grazing, and invasion of exotic species such as perennial ryegrass in San Diego County and prickly grass in Riverside County. Unless flowering, the species can easily be missed during surveys.

Brodiaea orcuttii
(Orcutt's brodiaea)

Brodiaea orcuttii is a Forest Service Sensitive Species. It occurs in Orange, San Bernardino, southern Riverside, and San Diego counties, and Baja California, Mexico. Occurrences are known from the Santa Ana Mountains, Santa Rosa Plateau, Santa Margarita Mountains, and south to Santa Ysabel and Pine Hills in San Diego County (Reiser 1994). The plant grows from sea level to about 5,300 feet, in vernal moist grasslands (including those with mima mound topography), at the periphery of vernal pools, on streamside embankments, within closed-cone conifer forest, chaparral, cismontane woodland, and meadows. It typically is associated with clay soils (sometimes serpentine) on mesas, and can grow with *Deschampsia danthonioides*. There are an estimated one hundred known populations, most of them west of national forest system lands; however, some plants are found on the Cleveland National Forest. Populations are declining because much of the appropriate habitat has been eliminated by development in coastal areas. The species is included in a conservation strategy for coastal sage scrub (USDA Forest Service et al. 1997). It can form hybrids with *B. filifolia*, another rare species. Plants grow in flat terrain near spring ponds.

Calochortus dunnii
(Dunn's mariposa lily)

Calochortus dunnii is a Forest Service Sensitive Species. A perennial plant, it is found only in San Diego County and Baja Califor-

nia, Mexico. About twelve populations are known, a small number of them protected on the Cleveland National Forest. Unconfirmed reports in Baja are from near Guadalupe Mountain and Laguna Hansen (Reiser 1994). Occurrences on private lands in San Diego County are declining mainly due to urban and rural development. Other factors impacting the species are horticultural collecting and too frequent fire-return intervals that degrade its habitat.

Chorizanthe procumbens
(prostrate spineflower)

Chorizanthe procumbens is distributed in San Diego, Riverside, Orange, Los Angeles, San Bernardino and Ventura counties, as well as Baja California, Mexico. Reiser (1994) cites about twenty-two known current locations and several more historic ones within California. Populations are known to occur on the Cleveland National Forest but are not yet recorded in our GIS database. Habitat conversion due to urban and rural development and competition from non-native grasses are factors negatively impacting the species. It does appear to tolerate some types of ground disturbance—it often grows alongside dirt roads and in lightly disturbed areas of chaparral and coastal sage scrub.

Clarkia delicata (delicate clarkia)

Clarkia delicata is a Forest Service Sensitive Species. An annual plant, it is found within the foothill and lower montane conifer zones of San Diego County and northern Baja California, Mexico. It appears to be associated with gabbro soils where they occur in oak woodlands and chaparral. Some occurrences are protected on federal and state lands; however, those on private lands lack protection and are declining from increased urban and rural development.

Fremontodendron mexicanum
(Mexican flannelbush)

Fremontodendron mexicanum is a federally endangered species. It is an evergreen shrub known from the San Ysidro Mountains (specifically Otay Mountain) in the San Diego

region and Baja California, Mexico. Most of the confirmed populations occur in the Otay Mountain area. Potential habitat occurs on the Cleveland National Forest. At Otay Mountain the species is associated with closed-cone conifer forest and southern mixed chaparral habitats (Reiser 1994). Much of it grows in the Cedar Canyon drainage along with scattered Tecate cypress. Ten confirmed occurrences are recorded in CNDDDB, though some reported on the southern central coast appear to be misidentifications (D. Wilken, Santa Barbara Botanic Garden, pers. comm.) See the proposed and final rules for more information (USFWS 1995a; USFWS 1998g).

***Horkelia truncata* (Ramona horkelia)**

Horkelia truncata is a Forest Service Sensitive Species. A perennial plant, it is known from foothill and lower montane conifer habitats in the San Diego ranges and Baja California, Mexico. It grows exclusively on gabbro soils in open areas of chaparral and cismontane woodland. The species is sometimes observed growing in disturbed areas and is apparently tolerant of fire and some soil disturbances. Approximately forty occurrences are known, most on public lands. These occurrences could potentially be affected by mining activities, heavy road maintenance, chaparral management, and livestock grazing.

***Monardella hypoleuca* ssp. *lanata*
(felt-leaved monardella)**

Monardella hypoleuca ssp. *lanata* is a Forest Service Sensitive Species. A perennial plant, it is endemic to the Palomar and Laguna mountains of San Diego County and northern Baja California, Mexico. Locations recorded for the Santa Ana Mountains are now believed to be erroneous. The taxon grows within foothill and lower montane conifer habitats, mainly on gabbro soils in chaparral and cismontane woodlands. About fifty occurrences are located on federal, state, and private lands. Occurrences on the Cleveland National Forest appear stable and are relatively well protected.

***Nolina interrata* (Dehesa beargrass)**

Nolina interrata is a state-listed endangered species found in San Diego County and Baja California, Mexico. It was proposed for federal listing as threatened but the proposal was subsequently withdrawn (USFWS 1995a; USFWS 1998i). The species is usually found in chaparral below 2,100 feet elevation. Nine sites are known in California (Reiser 1994). There is potential for the species to occur on the Cleveland National Forest but all recorded populations are located west of the forest. The *CNPS Inventory* lists residential development and horticultural collecting as threats to the species (Skinner and Pavlik 1994).

***Senecio ganderi* (Gander's ragwort)**

Senecio ganderi is a Forest Service Sensitive Species. A perennial plant, it is found on Black, Laguna, and Palomar mountains in San Diego County. The plant grows on gabbro soil within chaparral vegetation (including recently burned areas). The *CNPS Inventory* cites fewer than fifteen known occurrences on both public and private lands. Most of the known occurrences are located on federal or state lands. Those occurrences on private lands have potential to be affected by residential or commercial development projects. The species is state-listed rare and included in a conservation strategy for coastal sage scrub (USFS/USFWS/CDFG 1997).

***Tetracoccus dioicus*
(Parry's tetracoccus)**

Tetracoccus dioicus is a Forest Service Sensitive Species. It is a deciduous shrub known from the foothills of Orange, Riverside and San Diego counties, and Baja California, Mexico. It grows specifically on gabbro soils within chaparral and coastal sage scrub communities. Habitat conversion for agriculture and development projects is adversely affecting the species on private lands.

Montane Conifer Forest Plants

Thirty rare plants are primarily associated with montane conifer forest habitat within the assessment area. Summary information is shown in table 5.9.

***Antennaria marginata* (white-margined everlasting)**

Disjunct occurrences of *Antennaria marginata* are located in the upper Santa Ana River watershed of the San Bernardino Mountains. The species also occurs in Colorado and New Mexico. Two occurrences are recorded in the CNDDDB (1997). In the San Bernardino Mountains, the plant grows in dry areas within lower and upper montane conifer forest habitats. One occurrence is located in the San Gorgonio Wilderness Area. This species can be affected by recreation activities such as camping, hiking, horseback riding and off-road vehicle use.

***Astragalus bicristatus* (crested milk-vetch)**

Astragalus bicristatus is a Forest Service Sensitive Species. It is a perennial species found in sandy or rocky places within lower and upper montane conifer forests, between 5,800 and 9,000 feet elevation. Occurrences are known in the eastern San Gabriel, San Bernardino, and Santa Rosa mountains. In the San Bernardino Mountains, plants occur on carbonate soils and rocky/pebbly slopes. At least seven occurrences are found in Big Bear and Holcomb valleys and in the upper Santa Ana River watershed. At least one occurrence is documented in the Santa Rosa Mountains. This species is vulnerable to mining activities, high recreation use, and construction/development projects.

***Astragalus lentiginosus* var. *antoni* (San Antonio milk-vetch)**

Astragalus lentiginosus var. *antoni* is a Forest Service Sensitive taxon endemic to the San Gabriel Mountains (fig. 5.10). The CNDDDB contains records for four historic occurrences. Plants are found on dry, open slopes within

montane conifer/yellow pine forests (Angeles NF 1995; Hickman 1993).

***Castilleja gleasonii* (Mount Gleason Indian paintbrush)**

Castilleja gleasonii is a Forest Service Sensitive Species. Endemic to the western San Gabriel Mountains of Los Angeles County, the perennial grows on granitic soils in conifer forest habitat above 5,000 feet. Fewer than ten occurrences are known, all located on the Angeles National Forest—at Messenger Peak/Flat, Mount Gleason, Lightning Ridge, and east to Chilao, Horse Flats, and the Little Rock Creek area (fig. 5.10) (Mistretta and Brown 1987a).

Like all *Castilleja* species, *C. gleasonii* is hemiparasitic on other plants. Associations are formed with *Artemisia tridentata*, wild buckwheats, and other native species. The plant is usually found in areas of open yellow pine woodland (e.g., ponderosa pine and Coulter pine), with a well-developed shrub or sub-shrub understory. It can also be found growing with bigcone Douglas-fir, white fir, *Arctostaphylos parryana*, and chaparral whitethorn. Occurrences at Mount Gleason grow with one of the narrow-leaved bedstraws (*Galium angustifolium* ssp. *angustifolium*) and prickly phlox. The Messenger Flat occurrence is found primarily in a mixed live oak/yellow pine habitat that grades into chaparral. Plants at Lightning Ridge grow at the interface of conifers and chaparral.

The primary threat to this species is its preference for habitat that is also popular for human recreation activities (i.e., gentle slopes and an open understory). Occurrences are reportedly threatened by their proximity to campgrounds (Horse Flats, Bandido, Chilao Flats, Messenger Flats, and Lightning Ridge). Designated trails (e.g., the Pacific Crest Trail) also occur in the vicinity of occurrences. Fuel wood gathering at Mount Gleason is cited as a threat and off-highway vehicle activity is a potential threat at Mount Gleason and Messenger Flat.

It is unclear how this species responds to disturbance; discing adjacent to occurrences

at Messenger Flat in 1983 did not appear to increase recruitment into the disturbed area (Mistretta and Brown 1987a). A prescribed burn at Horse Flats in October of the same year did not appear to negatively affect the species. Transect data gathered from 1982 to 1987 showed a steady decline in species abundance (attributed to deer browsing) at the Horse Flats area.

The Angeles National Forest has developed a species management guide for occurrences on the forest (Mistretta and Brown 1987a). The *Jepson Manual* lists this species as *C. pruinosa* and considers related species part of a highly variable complex that needs further study (including *C. affinis* and *C. foliolosa*).

***Castilleja montigena*
(Heckard's Indian paintbrush)**

Castilleja montigena is a watch-list species on the San Bernardino National Forest. The perennial is locally common and endemic to the eastern San Bernardino Mountains, where it grows in pinyon-juniper woodlands and montane coniferous forests. The species is presumed to be a stable hybrid of *C. applegatei* ssp. *martinii* and *C. angustifolia*. Habitat where it occurs may be vulnerable to ski area development and high-level recreation use.

***Eriophyllum lanatum* var. *obovatum*
(southern Sierra woolly sunflower)**

Eriophyllum lanatum var. *obovatum* is a perennial taxon distributed in the San Bernardino Mountains and southern Sierra Nevada. Numerous occurrences were documented in the 1980s by herbarium specimens from the San Bernardino National Forest. These occurrences have not been mapped and we were unable to include them in our GIS species coverage. In more recent years, sightings have been less frequent and there is concern that the plant is declining in abundance (A. Sanders, UC Riverside, pers. comm.). It typically occupies open habitat in montane conifer forests. Occurrences are vulnerable to high levels of recreation and development projects.

***Galium angustifolium* ssp. *jacinticum*
(San Jacinto Mountains bedstraw)**

Galium angustifolium ssp. *jacinticum* is a Forest Service Sensitive Species. It occurs in the Black Mountain area of the San Jacinto Mountains. It grows in the understory of coniferous forests. Three occurrences are recorded in the CNDDDB. Some are found near campgrounds on the San Bernardino National Forest and possibly in the Hall Canyon RNA (Keeler-Wolf 1986a). This plant is vulnerable to trampling, tree harvesting, road maintenance, and high levels of recreation use, particularly from off-road vehicles.

***Galium californicum* ssp. *primum*
(California bedstraw)**

Galium californicum ssp. *primum* is a Forest Service Sensitive Species. It is a perennial species known from one occurrence and nine general locations (CNDDDB 1997). One reported occurrence, located on private lands northwest of the San Jacinto Mountains, appears to be declining from "genetic swamping" by the more common *G. nuttallii*. Most occurrences, however, are known from a small area of the San Jacinto Mountains. Several of these occurrences burned in the 1996 Bee Fire and were observed resprouting fifteen months later. New plants from seed have not yet been detected (D. Volgarino, San Bernardino NF, pers. comm.). Plants typically grow on granitic and sandy soil in chaparral and in the understory of conifer forests between 4,400 and 5,600 feet.

***Galium jepsonii* (Jepson's bedstraw)**

Galium jepsonii is an uncommon perennial species found in the upper montane conifer zones of the San Gabriel Mountains and potentially in the San Bernardino Mountains. It occupies dry, granitic, rocky, and gravelly places in open woodlands. A small amount of occupied habitat is recorded on the Angeles National Forest.

Table 5.9. Rare plants found in montane conifer forests. Numerical values indicate acres of occupied habitat within congressional forest boundaries (y = the taxon occurs on the forest; p = has potential to occur). Assessments of trend, knowledge of distribution, and vulnerability were made by forest botanists/biologists and generally refer to occurrences on national forest system lands (unkn. = unknown; decl. = declining; incr. = increasing).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Antennaria marginata</i> (white-margined everlasting)		y			unkn.	unkn.	San Bernardino Mtns., CO, NM; (low)
<i>Astragalus bicristatus</i> (crested milk-vetch) <i>FS sensitive</i>		y	p		unkn.	unkn.	San Gabriel, San Bernardino, & Santa Rosa mtns.; (low)
<i>Astragalus lentiginosus</i> var. <i>antonius</i> (San Antonio milk-vetch) <i>FS sensitive</i>		p	y		unkn.	unkn.	San Gabriel Mtns.; (low)
<i>Castilleja gleasonii</i> (Mt. Gleason Ind. paintbrush) <i>FS sensitive</i>			13			mod.– high	W San Gabriel Mtns.
<i>Castilleja montigena</i> (Heckard's Indian paintbrush)		y				unkn.	E San Bernardino Mtns.
<i>Eriophyllum lanatum</i> var. <i>obovatum</i> (S. Sierra woolly sunflower)		y			unkn.	unkn.	San Bernardino Mtns. & S Sierra Nevada; (low)
<i>Galium angustifolium</i> ssp. <i>jacinticum</i> (San Jacinto Mtns. bedstraw) <i>FS sensitive</i>		y				mod.– high	San Jacinto Mtns.
<i>Galium californicum</i> ssp. <i>primum</i> (California bedstraw) <i>FS sensitive</i>		29			decl.	mod.	San Jacinto Mtns.; (moderate)
<i>Galium jepsonii</i> (Jepson's bedstraw)		p	1		unkn.	unkn.	San Gabriel Mtns.; (low)
<i>Galium johnstonii</i> (Johnston's bedstraw)	p	y	8		unkn.	unkn.	San Gabriel, San Bernardino, & Santa Rosa mtns.; (low)
<i>Heuchera elegans</i> (urn-flowered alumroot)		p	7			unkn.	San Gabriel Mtns.; (high)
<i>Heuchera parishii</i> (Parish's alumroot) <i>FS sensitive</i>		y			unkn.	mod.	San Bernardino & San Jacinto mtns.; (low)
<i>Horkelia wilderae</i> (Barton Flats horkelia) <i>FS sensitive</i>		174			unkn.	mod.	San Bernardino Mtns.; (high)
<i>Hulsea californica</i> (San Diego sunflower)	100				stable	low	Laguna & Cuyamaca mtns. (San Diego Co.); (high)
<i>Hulsea vestita</i> ssp. <i>callicarpa</i> (beautiful hulsea)	y	y					San Jacinto & Santa Rosa mtns. (Riverside Co.) & Palomar Mtns. (SD Co.) .

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Ivesia callida</i> (Tahquitz ivesia) <i>FS sensitive</i>		12			unkn.	low	San Jacinto Mtns.; (moderate)
<i>Linanthus concinnus</i> (San Gabriel linanthus) <i>FS sensitive</i>		p	y		unkn.	mod.– high	San Gabriel Mtns.; (high)
<i>Lupinus excubitus</i> var. <i>johnstonii</i> (interior bush lupine)			1				San Gabriel Mtns.; (low)
<i>Machaeranthera canescens</i> var. <i>ziegleri</i> (Ziegler's aster) <i>FS sensitive</i>		y			unkn.	low	Santa Rosa Mtns.; (high)
<i>Mimulus clevelandii</i> (Cleveland's bush monkeyflower)	3					low	(low)
<i>Monardella linoides</i> ssp. <i>oblonga</i> (flax-like monardella) <i>FS sensitive</i>				473	stable to incr.	low	Ventura, Kern, & Tulare cos., Sierra Nevada, Tehachapi Mtns.; (low)
<i>Monardella nana</i> ssp. <i>leptosiphon</i> (San Felipe monardella) <i>FS sensitive</i>	117	26			stable/ decl.	low ¹ / mod. ²	San Jacinto Mtns., Peninsular Ranges of SD Co.; (high)
<i>Oxytheca caryophylloides</i> (chickweed oxytheca)		y	p	p?	unkn.	unkn.	LA, Riverside, San Bernardino, Tulare, & Ventura cos.; (unknown)
<i>Oxytheca parishii</i> var. <i>cienegensis</i> (Cienega Seca oxytheca) <i>FS sensitive</i>		y			unkn.	mod.	E San Bernardino Mtns.; (moderate)
<i>Phlox dolichantha</i> (Big Bear Valley phlox) <i>FS sensitive</i>		12,774			unkn.	low- mod.	NE San Bernardino Mtns.; (high)
<i>Piperia leptopetala</i>		y			unkn.	low	Transverse & Peninsular ranges, Sierra Nevada, North Coast, Cascade Ranges; (low)
<i>Sedum niveum</i> (Davidson's stonecrop) <i>FS sensitive</i>		24			unkn.	low	San Bernardino, Santa Rosa, & New York mtns., Baja; (moderate)
<i>Senecio ionophyllus</i> (Tehachapi ragwort)		y	2		unkn.	low	LA, San Bernardino, & Kern cos. (San Gabriel & San Bernardino mtns., Piute & Tehachapi mtns.); (low)
<i>Sidalcea hickmanii</i> var. <i>parishii</i> (Parish's checkerbloom) <i>FS sensitive</i>		y	p	397	unkn.	high ² / mod. ³	Santa Lucia, San Rafael, & Sierra Madre mtns., southern Los Padres region, San Bernardino Mtns.; (moderate)
<i>Streptanthus bernardinus</i> (Laguna Mtns. jewel-flower)	1	y	p		incr.	low	S. Gabriel, S. Bernardino, S. Jacinto, Laguna & Cuyamaca mtns.; (high)

¹ on the Cleveland National Forest

² on the San Bernardino National Forest

³ on the Los Padres National Forest

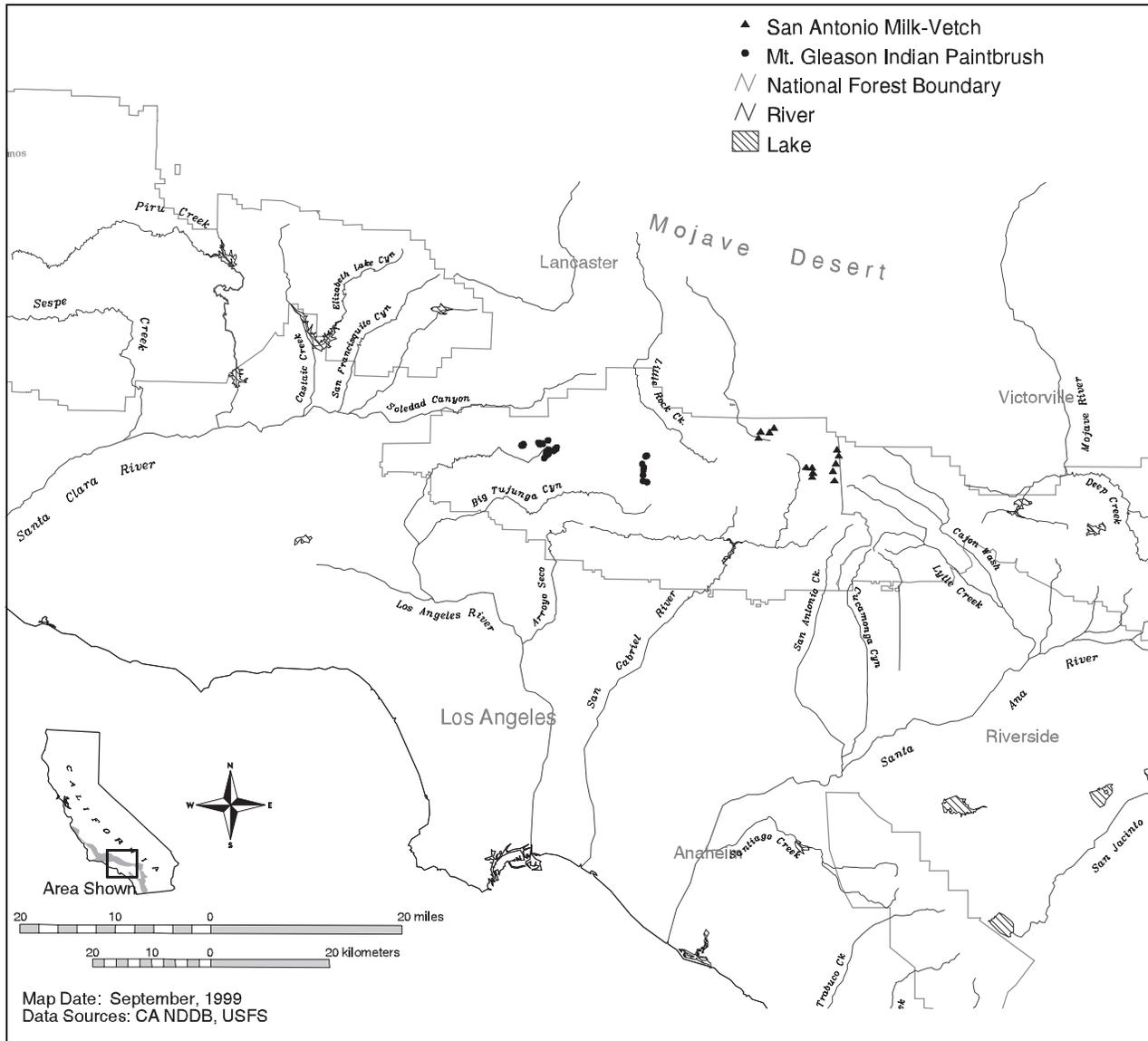


Figure 5.10. Documented locations of *Astragalus lentiginosus* var. *antoni* (San Antonio milk-vetch) and *Castilleja gleasonii* (Mount Gleason Indian paintbrush).

Galium johnstonii
(Johnston's bedstraw)

Galium johnstonii is another perennial bedstraw found in the montane conifer zones of the San Gabriel, San Bernardino, and Santa Rosa mountains. The species is locally common at Santa Rosa Peak (Reiser 1994). It has been found on dry slopes in open mixed hardwood and conifer forest, and in yellow pine forest. Potential habitat exists in the San Diego ranges but the taxon has not been documented on the Cleveland National Forest. Occurrences are known on the San Bernardino and Angeles national forests.

Heuchera elegans
(urn-flowered alumroot)

Heuchera elegans is a watch-list species found in Los Angeles and San Bernardino counties. Occurrences are not uncommon in the central San Gabriel Mountains (S. Boyd, Rancho Santa Ana Botanic Garden, pers. comm.). Occupied habitat is recorded on the Angeles National Forest and potential habitat exists on the San Bernardino National Forest. The perennial grows at rocky sites in lower and upper montane conifer forests, between 4,000 and 8,500 feet (Angeles NF 1995).

***Heuchera parishii* (Parish's alumroot)**

Heuchera parishii is a Forest Service Sensitive Species. It is a perennial species known from occurrences in the San Bernardino and San Jacinto mountains. RAREFIND contains records for five occurrences (CNDDDB 1997), but additional occurrences have been observed by resource personnel on the San Bernardino National Forest. The plant occupies rocky places within montane and subalpine conifer forests, as well as alpine boulder and rock fields. Some occurrences are protected in the San Gorgonio and San Jacinto wilderness areas. One occurrence is threatened by ski area development.

***Horkelia wilderae*
(Barton Flats horkelia)**

Horkelia wilderae is a Forest Service Sensitive Species. It is endemic to the Barton Flats area of the San Bernardino Mountains, where it is locally abundant in a 12-square-mile area. The CNDDDB contains records for five occurrences. Plants are found in montane and subalpine habitats. They grow in yellow pine/oak forest in the understory and in openings and are not found where the canopy and other vegetation become dense. A few occurrences identified almost ten years ago have not been relocated and the vegetation in these areas has become noticeably denser (M. Lardner, San Bernardino NF, in litt. 1998). Habitat in the Barton Flats area is vulnerable to high levels of recreation use; however, the occurrences appear stable. The perennial appears to tolerate some disturbance and light trampling.

***Hulsea californica*
(San Diego sunflower)**

Hulsea californica is a rare, annual or biennial sunflower known from the Peninsular Ranges of San Diego County. Occurrences are documented at Hot Springs Mountain and in the Laguna and Cuyamaca mountains (Wilken 1975). Appearing in open areas after fires and mild ground disturbances, the species grows in chaparral and pine-oak woodlands between 3,200 and 6,600 feet. Many of the known occurrences are located

on the Cleveland National Forest. Other occurrences are located on state and private lands. Increased recreation use in the Laguna Mountains may affect habitat for this species. Fire suppression may also have adverse effects, as the species appears to rely on natural fire cycles for regeneration (Reiser 1994). Occurrences at Hot Springs Mountain appear to intergrade with *H. vestita* ssp. *callicarpa*.

***Hulsea vestita* ssp. *callicarpa*
(beautiful hulsea)**

Hulsea vestita ssp. *callicarpa* is known from at least fifteen different occurrences in the San Jacinto, Santa Rosa, and Palomar mountains (Wilken 1975). Plants are known to occur on the San Bernardino and Cleveland national forests. The perennial grows on granitic soils, in chaparral and in open areas of montane conifer forest between 4,200 and 8,200 feet. Some occurrences are found on roadcuts. Hybrids of this taxon and *H. heterochroma* have been collected in the San Jacinto Mountains.

***Ivesia callida* (Tahquitz ivesia)**

Ivesia callida is a Forest Service Sensitive Species. It is a perennial species endemic to the San Jacinto Mountains. The CNDDDB contains records for two occurrences, both located in the San Jacinto Wilderness Area of the San Bernardino National Forest. A botanical investigation was completed for this species in 1982 (Berg 1982). The investigation found that one occurrence occupied five acres and contained between 1,001 and 10,000 plants. The second occurrence covered twenty acres and was estimated to contain greater than 10,000 plants. This second occurrence was revisited in 1994 and just over 150 plants were found, although the entire site was not surveyed due to the ruggedness of the terrain. Both occurrences are located in relatively inaccessible rocky habitat within upper montane conifer forest. Plants grow from crevices in granitic rocks and are vulnerable to the activities of rock climbers who use the crevices for hand and toe holds.

Linanthus concinnus
(San Gabriel linanthus)

Linanthus concinnus is a Forest Service Sensitive Species. It is an annual species distributed in Los Angeles and San Bernardino counties. Occurrences are found in the San Gabriel Mountains on dry, rocky soils in montane conifer forests (Skinner and Pavlik 1994; Munz 1974). The CNDDDB lists fifteen occurrences, most on the Angeles National Forest growing with Jeffrey and ponderosa pine. Potential habitat exists on the San Bernardino National Forest. The species is vulnerable to high levels of recreation use (i.e., trampling and ski area development). Surveys to locate this species in 1991 were unsuccessful.

Machaeranthera canescens* var. *ziegleri
(Ziegler's aster)

Machaeranthera canescens var. *ziegleri* is a Forest Service Sensitive Species. It is found only in the Santa Rosa Mountains of Riverside County. The CNDDDB contains records for two occurrences, both within the congressional boundaries of the San Bernardino National Forest. These occurrences may be located partly on private lands and partly in the Santa Rosa Wilderness Area. Very little potential habitat exists outside of this area as the Santa Rosa Mountains are surrounded by desert and desert-influenced vegetation. The Forest Service is actively trying to acquire more land with potential habitat for this taxon. Plants are widely scattered in the understory of small conifer stands between 4,500 and 8,200 feet elevation. Some plants are located along roads and adjacent to campsites, possibly indicating a positive response to ground disturbance. However, high levels of trampling, road grading, and livestock grazing may put occurrences at risk. The perennial may also be vulnerable to repeated wildfire events due to its very limited distribution.

Monardella linoides* ssp. *oblonga
(flax-like monardella)

Monardella linoides ssp. *oblonga* is a Forest Service Sensitive Species. It is a perennial

taxon distributed in Ventura, Kern, and Tulare counties. Occurrences are known from the southern Sierra Nevada and Tehachapi mountains and the southern Los Padres region. Plants grow among rock outcrops and on decomposed granite in mixed conifer forests, yellow pine forests, pinyon-juniper woodlands, and desert scrub habitat. The CNDDDB contains records for ten occurrences, all on national forest system lands. Nine of the occurrences are found on the Los Padres National Forest and more potential habitat exists that has yet to be surveyed. The known occurrences appear to be stable or increasing in size. This taxon is known to respond positively to wildfire events; however, some occurrences are vulnerable to road/trail maintenance and off-road vehicle activity.

Monardella nana* ssp. *leptosiphon
(San Felipe monardella).

Monardella nana ssp. *leptosiphon* is a Forest Service Sensitive Species. It is found in chaparral, mixed conifer forest, and yellow pine forest in the San Jacinto Mountains and Peninsular Ranges of San Diego County (Skinner and Pavlik 1994; Munz 1974). The CNDDDB contains records on eleven occurrences in the mountains of San Diego County and additional occurrences are known from the San Jacinto Mountains. Altogether, an estimated twenty-five occurrences are reported by forest botanists/biologists.

Studies on plants in the San Jacinto Mountains indicate they are intermediate to *M. nana* ssp. *tenuiflora* to the north and *M. nana* ssp. *leptosiphon* to the south. Occurrences are located in an area of high recreation use (i.e., adjacent to campsites and campgrounds) but do not appear heavily affected. The plant has shown some resilience to woodcutting, fire, and low-level ground disturbance. About ten populations are recorded for the Palomar Ranger District of the Cleveland National Forest. Occurrences reported from Palomar Mountain may be another taxon or intermediate. Plants from Hot Springs Mountain, Volcan Mountain, and Banner Grade seem to

better represent *M. nana* ssp. *leptosiphon*, rather than those from Palomar Mountain (Allen 1994).

***Oxytheca caryophylloides*
(chickweed oxytheca)**

Oxytheca caryophylloides is an annual species distributed in Los Angeles, Riverside, San Bernardino, Tulare, and Ventura counties (Skinner and Pavlik 1994). Plants grow on sandy soils in montane conifer forests between elevations of 3,900 and 8,500 feet. Occurrences are known on the San Bernardino National Forest and potential habitat occurs on the Angeles and Los Padres national forests.

***Oxytheca parishii* var. *cienegensis*
(Cienega Seca oxytheca)**

Oxytheca parishii var. *cienegensis* is a Forest Service Sensitive plant that occurs in the eastern San Bernardino Mountains. Nineteen occurrences have been inventoried on the San Bernardino National Forest. One occurrence near Coon Creek contained more than one thousand plants in 1990. Another located on the south side of Cienega Seca Creek contained approximately twenty plants in the same year. A third occurrence found along Highway 38 near Cienega Seca Creek had no plants visible in 1990; however, basal rosettes were observed at the site ten years earlier (Ertter 1990). One occurrence is known from the Tip Top Mountain area. The annual grows in sandy soils (carbonate or granitic) and on dry gravelly banks in upper montane coniferous forest and pinyon-juniper woodlands. Some occurrences are found in relatively open or disturbed places, either from past human disturbance or seasonal natural disturbances. Plants have been found along roadsides, along trails, and adjacent to campsites. Plants found in association with carbonate soils are vulnerable to mining activities. The taxon blooms relatively late in the year and is probably not well inventoried (M. Lardner, San Bernardino NF, pers. comm.).

***Phlox dolichantha*
(Big Bear Valley phlox)**

Phlox dolichantha is a Forest Service Sensitive Species. It is a perennial species endemic to Big Bear and Holcomb valleys in the north-eastern San Bernardino Mountains. It grows on clay soils in open areas of montane conifer forest (particularly on north-facing slopes and in shaded canyons). The CNDDDB documents at least eighteen occurrences, some located on private lands but the majority found on the San Bernardino National Forest. One occurrence near Aspen Glen picnic area showed a 278 percent increase in abundance from 1979 to 1995. Another occurrence at Sugarloaf is protected by fencing but vandalism is a regular threat. The species is adversely affected by fuelwood harvesting, unauthorized off-road vehicle activity, and high levels of recreation use. The large number of acres reported for this species is due to areas between discrete occurrences being included in the GIS coverage.

Piperia leptopetala

Piperia leptopetala is a watch-list plant on the San Bernardino National Forest, where two occurrences are known. Occurrences are also known on the Eldorado National Forest. The species is widespread in California, with populations found in the Transverse and Peninsular ranges, the Sierra Nevada, and the North Coast and Cascade ranges. Its distribution may continue northward to Washington. Most occurrences are small, usually fewer than ten plants, with the largest containing thirty plants (Coleman 1995). The species grows at dry sites in open mixed conifer and montane conifer forests. One occurrence on the San Bernardino National Forest is threatened by construction of a water tank. Occurrences in other areas are potentially threatened by timber harvesting.

***Sedum niveum* (Davidson's stonecrop)**

In the assessment area, *Sedum niveum* is known from occurrences in the San Bernardino and Santa Rosa mountains. Other occurrences are reported in the New York

Mountains within the Mojave Desert. Plants reported to be this species are documented at Observatory Peak, in the Sierra San Pedro Martir (Baja California, Mexico); however, they differ in morphology, petal spot color, and chromosome number (Bennett 1979b). In the Santa Rosa Mountains, plants are found on Toro Peak and Santa Rosa Mountain. In the San Bernardino Mountains, occurrences are found at Sugarloaf and Charleston peaks, on the south side of Van Dusen Canyon, above Dry Canyon, at Snow Canyon, and above Dollar Lake (Krantz, Thorne, and Sanders 1995). Some occurrences on the San Bernardino National Forest are located in wilderness areas or are otherwise protected from vehicles and trampling by their habitat preferences; plants grow on rocky ledges and in crevices composed of granitic or carbonate substrates, on steep, north-facing slopes between 7,200 and 9,900 feet elevation. Some occurrences are reported from northeast- or northwest-facing slopes, but in these cases are shaded by rocks. Surrounding habitat consists of upper montane conifer forest with lodgepole pine, pinyon pine, or white fir. *S. niveum* appears to thrive on the leaf mold provided by fallen pine needles (Bennett 1979b). Some occurrences on the forest have potential to be affected by mining claims and ski area expansion. Further surveys are needed to determine a more complete distribution for this species and any potential threats on national forest system lands (D. Volgarino, San Bernardino NF, in litt. 1999).

***Senecio ionophyllus*
(Tehachapi ragwort)**

Senecio ionophyllus is a watch-list species on the San Bernardino National Forest. Occurrences are known from Los Angeles, San Bernardino, and Kern counties. In the assessment area, the species occurs in the San Gabriel and San Bernardino mountains, including populations on the Angeles and San Bernardino national forests. Other occurrences are known in the Piute and Tehachapi mountains. Plants are found growing on dry, granitic soils

within montane conifer and subalpine forests between 4,900 and 8,900 feet elevation. Occurrences in the San Bernardino Mountains can be confused with *Senecio bernardinus*, another focal species. Potential threats to this plant are developed recreation sites and ski area expansions.

***Sidalcea hickmanii* var. *parishii*
(Parish's checkerbloom)**

Sidalcea hickmanii var. *parishii* is a Forest Service Sensitive Species. It occurs on the Los Padres and San Bernardino national forests. Occurrences are known from the Santa Lucia, San Rafael, and Sierra Madre mountains, the southern Los Padres ranges region, and the San Bernardino Mountains (Santa Ana River watershed). The CNDDDB contains records for thirteen occurrences, and at least two other occurrences are known. A range extension for this taxon was discovered during post-burn surveys in San Luis Obispo in 1997. A perennial plant, it grows in chaparral and montane conifer habitat between 4,000 and 7,500 feet (Munz 1974; Skinner and Pavlik 1994). It appears to be disturbance oriented; plants are found after fire and reportedly on grazed and maintained fuel breaks on the Los Padres National Forest. An occurrence on the San Bernardino National Forest is located in an area of recent trail construction. In general, the plant is rarely found and seldom in the same locations. On private lands the taxon is vulnerable to development projects which destroy its habitat. On the San Bernardino National Forest there is potential for erosion and encroachment of brush to affect occurrences. Management of this plant on the Los Padres National Forest is guided by an existing species-specific conservation strategy (USFS/USFWS 1996).

***Streptanthus bernardinus*
(Laguna Mountains jewel-flower)**

Streptanthus bernardinus is a perennial species distributed mainly within the San Gabriel, San Bernardino, San Jacinto, and Santa Rosa mountains, and to a lesser extent on Laguna Mountain. The CNDDDB contains records for

nine occurrences and twenty-seven general locations. Additional occurrences are known on the San Bernardino National Forest but not yet recorded in the GIS database. Occurrences on the San Bernardino National Forest are relatively large and appear to be increasing in size (e.g., at Running Springs and Green Valley). A few occurrences are protected within research natural areas on the San Bernardino National Forest and at the UC James Reserve. Two small occurrences and several larger ones are found in Cuyamaca Rancho State Park (at Cuyamaca Peak) adjacent to the Cleveland National Forest. The species is rare on the Cleveland National Forest; it grows with cedar and Jeffrey pine on the Descanso Ranger District (about one acre of occupied habitat). A botanical investigation was unable to locate any plants on the Angeles National Forest. Potential habitat exists for the species in areas of Baja California, Mexico.

The species is found on granitic substrates in openings of chaparral, closed-cone conifer forests, mixed conifer forests, yellow pine forests, and at previously disturbed sites. It can also occupy mesic and shady streamsides (CNDDDB 1996). The species is often associated with white fir, sugar pine, incense-cedar, and black oak. At the Cuyamaca Peak locale, the plant occurs in areas of partial shade near seeps or springs (Reiser 1994). Prolonged ground disturbance can adversely affect the species; however, it appears to be disturbance oriented in general, having been found in picnic areas, campgrounds, abandoned organizational camps, and along roadsides and trails. The species is relatively abundant and tolerant of disturbance.

Pebble Plains Plants

Six rare plants are associated with highly localized pebble plain habitats which occur within montane conifer forests in the northeastern San Bernardino Mountains. Some of these taxa also occur in the surrounding conifer forests. Summary information is shown in table 5.10. Three federally threatened species are included in this group. All of these species

are managed by provisions in the *Pebble Plain Habitat Management Guide and Action Plan* (Neel and Barrows 1990).

***Arabis parishii* (Parish's rock cress)**

Arabis parishii is a Forest Service Sensitive Species known from the San Bernardino Mountains. Occurrences are found on the San Bernardino National Forest at Onyx Peak, Sugarloaf Ridge, Big Bear Valley, Holcomb Valley, and Coxey Meadows. The CNDDDB contains records for at least forty-five occurrences. The species is a predictable occupant of pebble plains but also grows in other habitats that are dry, sunny, and have rocky soils (carbonate, pinyon-juniper woodlands) (Munz 1974; CNDDDB 1996; S. Boyd, Rancho Santa Ana Botanic Garden, pers. comm.). The species is found with other rare plants such as *Linanthus killipii* and *Echinocereus engelmannii munzii*. Some of the pebble plain occurrences are protected by fencing. The species is not protected where it occurs in the forest understory or on carbonate and, at some locations, is adversely affected by habitat conversion, trampling, non-native species, mining operations, off-road vehicles, woodcutting, dumping, and shooting activities.

***Arenaria ursina* (Big Bear Valley sandwort)**

Arenaria ursina is a federally threatened species known from occurrences in Big Bear and Holcomb valleys (fig. 5.11). The CNDDDB contains records for at least twenty-five occurrences; however, the reported range (from Onyx Peak to Cactus Flat) was recently reduced after surveys identified some of those occurrences as *Arenaria macradenia* var. *macradenia*. Some occurrences on the San Bernardino National Forest are fenced, although vandalism is a recurring problem. Other occurrences continue to be affected by off-road driving—mainly to access unauthorized woodcutting areas—and by legal forest system roads that bisect known sites. Several additional locations will be fenced in 1999, and all occurrences are being surveyed and monitored

Table 5.10. Rare plants found in association with pebble plains. Assessments of trend, knowledge of distribution, and vulnerability were made by forest botanists/biologists and generally refer to occurrences on national forest system lands (decl. = declining; unkn. = unknown).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Arabis parishii</i> (Parish's rock cress) <i>FS sensitive</i>		y			unkn.	mod.	NE San Bernardino Mtns.; (high)
<i>Arenaria ursina</i> (Big Bear Valley sandwort) <i>federally threatened</i>		780			decl.	high	NE San Bernardino Mtns.; (high)
<i>Castilleja cinerea</i> (Ash-gray Indian paintbrush) <i>federally threatened</i>		1,122			decl.	high	NE San Bernardino Mtns.; (high)
<i>Eriogonum kennedyi</i> var. <i>austromontanum</i> (S. mountain buckwheat) <i>federally threatened</i>		910			decl.	high	NE San Bernardino Mtns.; (moderate)
<i>Ivesia argyrocoma</i> (silver-haired ivesia) <i>FS sensitive</i>		1,158			decl.	mod.- high	NE San Bernardino Mtns. & Baja; (high)
<i>Linanthus killipii</i> (Baldwin Lake linanthus) <i>FS sensitive</i>		316+			decl./ stable	mod.	NE San Bernardino Mtns.; (moderate)

to determine whether further recovery actions are needed. Finally, some occurrences are located on private lands where they may be unprotected.

***Castilleja cinerea*
(ash-gray Indian paintbrush)**

Castilleja cinerea is a federally listed threatened species known to occur on clay soils, pebble plains, in dry meadows, and in openings within conifer forest, pinyon-juniper woodlands, and Mojavean desert scrub. The plant is a green-root parasite on *Eriogonum kennedyi* var. *austromontanum*, *Artemisia tridentata*, and other *Artemisias*. Occurrences range between Snow Valley and Fish Camp, east to Onyx Peak, and from South Fork Meadows in the south to Holcomb Valley in the north (fig. 5.11). Locally common within this area, occurrences are located on both public and private lands. At least thirty-three

occurrences are recorded in the CNDDDB (1997). Some are protected on the San Bernardino National Forest by fencing and by their presence within the San Gorgonio Wilderness Area. Other occurrences on the forest may be adversely affected by erosion control practices, a ski and mountain bike area, a hiking trailhead, and recreational residences. These effects are being reviewed and actions to enhance the habitat will be initiated in 1999 (D. Volgarino, San Bernardino NF, pers. comm.).

***Eriogonum kennedyi* var. *austromontanum*
(southern mountain buckwheat)**

Eriogonum kennedyi var. *austromontanum* is a federally threatened taxon known from Big Bear and Holcomb valleys in the San Bernardino Mountains (fig. 5.11). The CNDDDB contains records for at least twenty-two occurrences in this area. On the San Bernardino

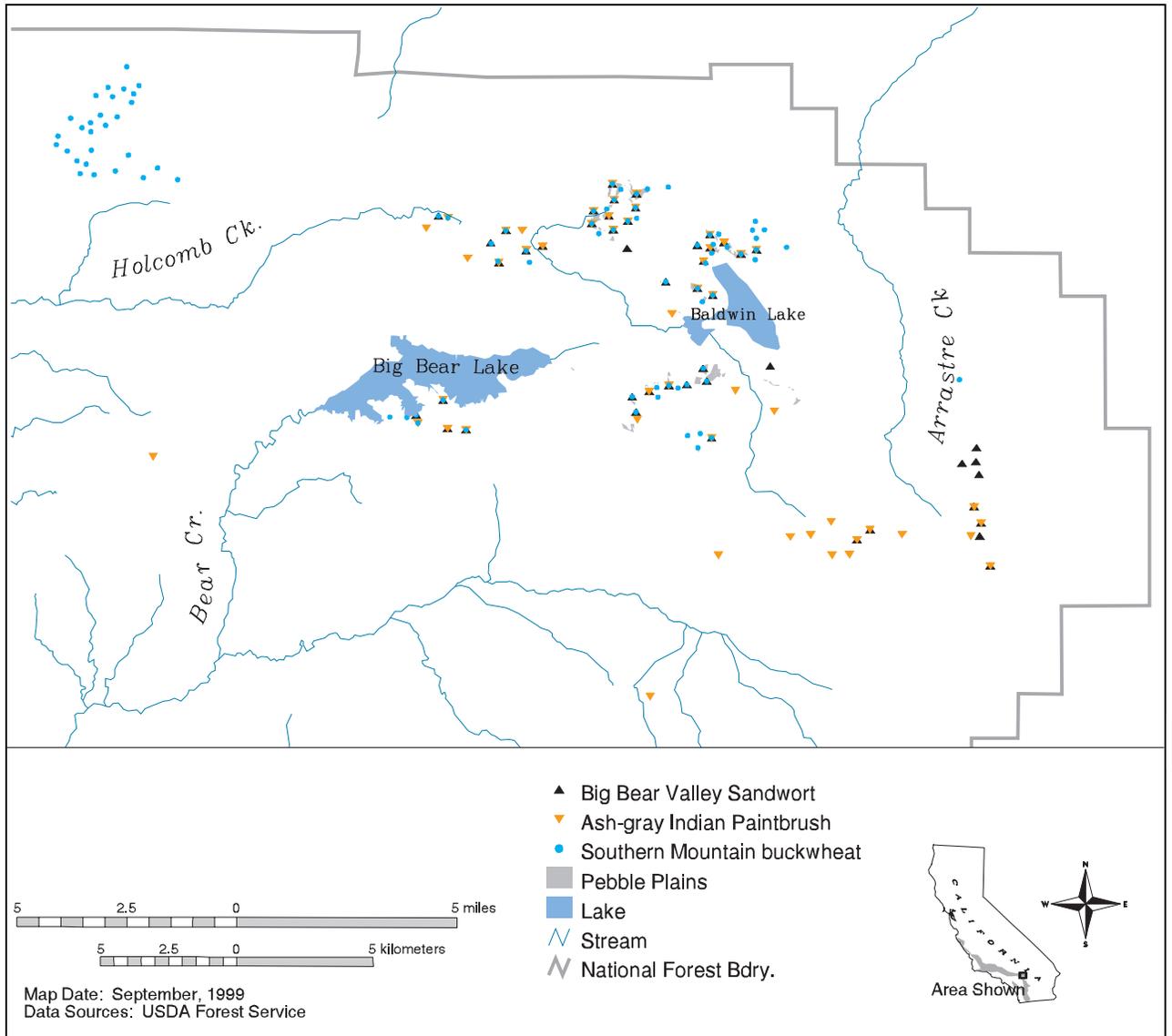


Figure 5.11. Documented locations of *Arenaria ursina* (Big Bear Valley sandwort), *Castilleja cinerea* (ash-gray Indian paintbrush), and *Eriogonum kennedyi* var. *austromontanum* (southern mountain buckwheat).

National Forest, the variety is one of the two most restricted pebble plain taxa and one that is strongly affected by activities on the forest. A few occurrences are protected by fencing, but roads bisect most of them and unauthorized off-road driving is degrading the habitat and adversely affecting individual plants. Patrols have been initiated to protect habitat, additional fencing is planned for 1999, and occurrences are being surveyed to determine additional requirements for recovery. This taxon serves as the host plant for the hemiparasitic *Castilleja cinerea* and one of the newly described San Bernardino blue butterflies (two of our focal species).

***Ivesia argyrocoma* (silver-haired ivesia)**

Ivesia argyrocoma is a Forest Service Sensitive Species known from Big Bear and Holcomb valleys in the San Bernardino Mountains, where it appears to be declining from habitat loss. A disjunct occurrence, which may be taxonomically distinct, is located near Laguna Hansen, Sierra Jaurez, in Baja California, Mexico. The species occurs in pebble plains and alkaline meadows. The CNDDDB contains records for at least twenty-four occurrences on both public and private lands. One occurrence is protected within a CDFG reserve north of Baldwin Lake. On the San Bernardino National Forest some occurrences on pebble

plains are protected by fencing and several more will be fenced in 1999. One historic occurrence on the forest is recorded for the Rouse Meadows area. The species is noted as an early pioneer in disturbed pebble plain habitat; plants have recently been observed recolonizing water bars and old road beds within pebble plain habitat.

Linanthus killipii
(Baldwin Lake linanthus)

Linanthus killipii is a Forest Service Sensitive Species found in pebble plains, alkaline meadows, and on dry slopes within pinyon-juniper woodlands, Joshua tree woodlands, and upper montane conifer forests. The CNDDDB documents at least fifteen occurrences, the highest density of plants being found around Baldwin Lake. An additional 100 acres of occupied habitat were mapped in 1998, an El Nino wet year. These occurrences are located on granitic and clay soils east of Baldwin Lake on the San Bernardino National Forest. At several locations, large areas were completely covered with this species. Previously it appeared to be declining from habitat degradation, mainly from dispersed camping and unauthorized vehicle activity, and several occurrences are fenced for protection.

Montane Meadow Plants

Plants Associated with Wet and Dry Meadows

Twelve rare plants are associated with both wet and dry meadow habitats within the assessment area. Summary information is shown in table 5.11. One federally endangered species is included in this group.

Calochortus palmeri* var. *munzii
(Munz's mariposa lily)

Calochortus palmeri var. *munzii* is a Forest Service Sensitive taxon known from seven occurrences in the San Jacinto Mountains of Riverside County. At least four of those occurrences are located on the San Bernardino National Forest. The perennial grows in mead-

ows, seeps, and vernal moist places within chaparral and conifer forest. Occurrences are vulnerable to overgrazing, trampling, fire suppression activities, road maintenance, development projects, and invasion of exotic species.

Calochortus palmeri* var. *palmeri
(Palmer's mariposa lily)

Calochortus palmeri var. *palmeri* is a Forest Service Sensitive Species. It is sparsely distributed across four national forests (Angeles, San Bernardino, Los Padres, and Sequoia) and on BLM and private lands. At least twenty-two occurrences are known. Within the assessment area, the taxon occurs in the San Bernardino, Santa Rosa, San Jacinto, San Gabriel, and San Rafael mountains, the Sespe Creek area, and the La Panza Range. Plants in the San Jacinto and Santa Rosa mountains, however, may prove to be *C. palmeri* var. *munzii* (another focal species). Occurrences are also known in the Piute Mountains and at Breckenridge Mountain in Kern County. Historic occurrences are known from the Tehachapi Mountains. The plant appears to be declining in abundance due to overgrazing, trampling, flooding, erosion, off-highway vehicles, and development projects. Most of the impact from grazing occurs between April and August when the plant is flowering and setting seed. Two occurrences are located in protected areas—one on the San Bernardino National Forest near Big Bear Lake, where it occurs within a fenced meadow area, and the other in an area free of human disturbance on the Los Padres National Forest. In addition to meadows, the plant occurs in seeps and vernal moist areas within chaparral, mixed conifer forest, and yellow pine forest.

Calochortus striatus
(alkali mariposa lily)

Calochortus striatus is a Forest Service Sensitive Species. It grows in alkaline soils in meadows, seeps, springs, and other mesic places within chaparral, creosote-bush scrub, chenopod scrub (saltbush/carex scrub), and riparian forest habitats between 2,600 and

Table 5.11. Rare plants found in wet and dry montane meadows. y = the taxon occurs on the forest; p = has potential to occur. Assessments of trend, knowledge of distribution, and vulnerability were made by forest botanists/biologists and generally refer to occurrences on national forest system lands (decl. = declining; unkn. = unknown; incr. = increasing).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Calochortus palmeri</i> var. <i>munzii</i> (Munz's mariposa lily) <i>FS sensitive</i>		y			unkn.	mod.– high	San Jacinto Mtns.; (low)
<i>Calochortus palmeri</i> var. <i>palmeri</i> (Palmer's mariposa lily) <i>FS sensitive</i>		y	y	1	unkn./ decl. ¹	mod.– high	San Bernardino, Santa Rosa, San Jacinto, San Gabriel, & San Rafael mtns., La Panza Range, Piute Mtns. & Breckenridge Mtn (Kern Co.), h in Tehachapi Mtns.; (low)
<i>Calochortus striatus</i> (alkali mariposa lily) <i>FS sensitive</i>		p	p		unkn.		desert-side of San Bernardino Mtns., W Mojave Desert, NV; (low)
<i>Castilleja lasiorhyncha</i> (San Bernardino Mtns. owl's-clover) <i>FS sensitive</i>	h/p	103			stable	mod.– high	San Bernardino Mtns., h in San Cuyamaca mtns.; (low)
<i>Downingia concolor</i> var. <i>brevior</i> (Cuyamaca Lk. downingia) <i>state endangered</i>	p				incr. ²		Peninsular Ranges of SD Co. (Cuyamaca Mtns.); (low)
<i>Horkelia yadonii</i> (Santa Lucia horkelia)				y			Santa Lucia Ranges & southern Los Padres region (Big Pine & Mission Pine mtns.)
<i>Layia ziegleri</i> (Ziegler's tidy-tips)		175			unkn.	low	San Jacinto (Garner Valley) & Santa Rosa mtns.; (high)
<i>Machaeranthera asteroides</i> var. <i>lagunensis</i> (Laguna Mtns. aster) <i>FS sensitive</i>	261				stable	mod.	Peninsular Ranges of San Diego Co. (Laguna Mtns.), Baja (Rancho Las Filipinas & Sierra San Pedro Martir); (moderate)
<i>Mimulus exiguus</i> (San Bernardino Mtns. Monkeyflower) <i>FS sensitive</i>		y			decl.	mod.	San Bernardino Mtns., N Baja (Sierra Juarez); (moderate)
<i>Mimulus purpureus</i> (purple monkeyflower) <i>FS sensitive</i>		y			decl.	mod.	San Bernardino Mtns., Baja (Sierra San Pedro Martir); (high)
<i>Thelypodium stenopetalum</i> (sindr.-petaled thelypodium) <i>federally endangered</i>		42			stable	high	San Bernardino Mtns.; (high)
<i>Thermopsis californica</i> var. <i>semota</i> (velvety false lupine) <i>FS sensitive</i>	216				stable	low	Palomar, Laguna, & Cuyamaca mtns., Baja; (moderate)

¹ Skinner and Pavlik 1994 (refers to all known occurrences)

² Reiser 1994 (refers to all known occurrences)

4,600 feet. Occurrences are known from the northern slopes of the San Bernardino Mountains (Krantz, Thorne, and Sanders 1995). These occurrences are vulnerable to overgrazing, invasion of exotic species, altered hydrology (water extraction and pond development), road construction, and urbanization. Development of a mining plant in these mountains reduced habitat on private lands, and construction of Highway 18 reduced habitat on the San Bernardino National Forest. One new occurrence was found in 1998 on national forest system land along the proposed Cleghorn off-highway vehicle route. Occurrences are also reported for the desert side of the San Gabriel Mountains (Hickman 1993), although none are documented in the CNDDDB. The CNDDDB lists thirty-eight occurrences and nine general locations in all for this species, including the Kern River Preserve in Kern County and Edward's Air Force Base in Los Angeles County.

Castilleja lasiorhyncha
(San Bernardino Mountains owl's-clover)

Castilleja lasiorhyncha is a Forest Service Sensitive Species. It is a hemiparasitic plant known from at least thirty-six occurrences, primarily in the San Bernardino Mountains. The host of this plant is unknown. Two historic locations are recorded—in the San Jacinto Mountains and in Cuyamaca Rancho State Park in San Diego County. This annual plant typically grows at the edges of meadows and along vernal streams in chaparral and montane conifer forests, sometimes only in the drying edges of the wet areas. Occurrences appear stable, but the species is dependent on annual rainfall so fluctuations are normal. Habitat for this plant is affected by ground disturbance that affects the hydrologic regime. The habitat is especially fragile when soils are wet in spring and early summer but less so when soils are dry in late summer and early fall. Some occurrences are located in a cattle grazing allotment on the San Bernardino National Forest. Other occurrences on the forest are protected by fences. The species is vulner-

able to trampling, unauthorized off-road vehicles, development projects, road maintenance, erosion, and flooding.

Downingia concolor* var. *brevior
(Cuyamaca Lake downingia)

Downingia concolor var. *brevior* is state listed as endangered. It is known from seven occurrences in the Cuyamaca Lake area of San Diego County. The annual is found in meadow habitat now on the periphery of Cuyamaca Lake, a man-made reservoir. Described as a montane variation of coastal vernal pools, the habitat has very moist soils in spring that dry out by late summer (Reiser 1994). The plant was in decline mainly due to overgrazing; however, after cattle were removed from meadows north of the lake, an estimated several thousand plants flowered in 1988 (a drought year). In 1991 the same area was submerged under water that collected from spring rainfall. Subsequent populations could be impacted if lake waters are allowed to remain high for consecutive years (Reiser 1994).

The plant is included in a conservation agreement between the U.S. Fish and Wildlife Service, California Department of Fish and Game, state parks, the U.S. Forest Service, the Lake Cuyamaca Recreation and Park District, and the Helix Water District (Helix Water District et al. 1996). An estimated 80 percent of the known remaining populations are found on land owned or managed by the Helix Water District and the Lake Cuyamaca Recreation and Park District. All known populations combined occupy less than two hundred acres; however, populations fluctuate based on annual rainfall, winter flooding, and temperatures.

***Horkelia yadonii* (Santa Lucia horkelia)**

Horkelia yadonii is known from several locations in the northern and southern Santa Lucia Ranges, and in the vicinity of Big Pine and Mission Pine mountains in the southern Los Padres region (D. Wilken, Santa Barbara Botanic Garden, in litt. 1998). Its presence on the Los Padres National Forest is documented

from herbarium specimens at Santa Barbara Botanic Garden.

***Layia ziegleri* (Ziegler's tidy-tips)**

Layia ziegleri is an annual plant known from approximately fourteen occurrences in the Garner Valley area of the San Jacinto Mountains. The *CNPS Inventory* and the *Jepson Manual* treat it as a synonym of *L. platyglossa*, a common and highly variable species, and a study comparing the two taxa was inconclusive (Baldwin 1993). *L. ziegleri* may prove to be a subspecies but further research is needed. The plant is managed under the provisions of the National Forest Management Act. It occurs within active grazing allotments and also on private lands, some of which the Forest Service is attempting to purchase. Potential threats at these sites include overgrazing and unauthorized off-road vehicle use, particularly during wet months.

***Machaeranthera asteroides* var. *lagunensis* (Laguna Mountains aster)**

Machaeranthera asteroides var. *lagunensis* is a Forest Service Sensitive Species. A perennial plant, it is known primarily from the Laguna Mountains of San Diego County, where it occurs adjacent to meadows with black oak and Jeffrey pine. Its distribution extends southward into Baja California where the plant grows in "chaparral and associated desert regions" and on "sandy or gravelly soils" (Turner 1987). The plant has been collected at Rancho Las Filipinas and in the Sierra San Pedro Martir. Five occurrences consisting of an estimated nine thousand to ten thousand plants are documented on national forest system and private lands in the Wooded Hill/Laguna Meadow area of Laguna Mountain. These occurrences occupy approximately 5½ square miles, centered near the junction of Sunrise Highway and Morris Ranch Road.

A species management guide including management actions and guidelines was adopted by the Cleveland National Forest in 1992 because of the plant's limited population size and threats occurring at that time to portions of its habitat (Winter and Volgarino

1992). Management activities on national forest system lands within the range of this species include both dispersed and developed recreation, timber stand improvement and regeneration, grazing, and road maintenance. Based on field observations between 1980 and 1996, the taxon appears stable throughout its range (K. Winter, Cleveland NF, pers. comm.). Livestock grazing is continuing in at least a portion of its known habitat and the long-term effects are unclear. Monitoring to determine the effects of grazing was proposed for the Wooded Hill area and a grazing enclosure was placed at the site but so far results have been inconclusive. Grazing during fall months appears to be the most detrimental to regeneration of this taxon. Observations in other areas indicate the plant is somewhat disturbance oriented; it appears in the openings created by road and utility line maintenance and the clearing of pines and diseased trees. It also appears to respond favorably to broadcast burning, although changes in plant density after fire have not been fully determined. The use of salt on the Sunrise Highway puts this taxon and other native plants at risk from salt accumulation in the soil. Unauthorized vehicle use has occurred in habitat known to harbor this taxon and one small area along Morris Ranch Road was fenced in 1986 to prevent disturbance from recreation activities. A botanical report was completed for *M. lagunensis* populations on the Descanso Ranger District, Cleveland National Forest (Sproul and Beachamp 1979).

***Mimulus exiguus* (San Bernardino Mountains monkeyflower)**

Mimulus exiguus is a Forest Service Sensitive Species. A tiny annual plant, it is known from approximately thirteen occurrences in Big Bear and Holcomb valleys in the San Bernardino Mountains. Eight of the occurrences are located on the San Bernardino National Forest. One occurrence is reported from northern Baja California (Sierra de Juarez) but needs confirmation. The plant grows primarily in mesic places within yellow pine forests

(i.e., meadows, vernal seeps, and springs) but sometimes occurs on pebble plains (Neel and Barrows 1990). Some occurrences on the San Bernardino National Forest are protected by fencing, but occurrences in unprotected areas appear to be declining. Little is known about the ecological requirements of this species; however, observations indicate that it may tolerate limited disturbance (Neel and Barrows 1990). Natural disturbances brought on by streamflows and frost heave may be an important component of the habitat for this species. Occurrences are vulnerable to trampling, unauthorized off-road vehicle activity, development projects, and mining.

***Mimulus purpureus*
(purple monkeyflower)**

Mimulus purpureus is a Forest Service Sensitive Species. It is known from eleven occurrences in the Big Bear and Holcomb valleys of the San Bernardino Mountains. There is also one known location in the Sierra San Pedro Martir of Baja California, Mexico. In addition to meadows, the species occurs in moist, sandy openings in yellow pine forest and pinyon-juniper woodland, and on the edges of pebble plains. The ecological requirements of this species are poorly understood but it appears to tolerate some disturbance and consistently occupies open areas of forest habitat that have low accumulations of leaf litter (Neel and Barrows 1990). One occurrence in Belleville Meadow of Holcomb Valley is protected by fencing. In some areas, this species appears to be declining due to habitat degradation from development projects, unauthorized off-road vehicles, overgrazing, trampling, mining activities, and parking that occurs along roadways and turnouts.

***Thelypodium stenopetalum*
(slender-petaled thelypodium)**

Thelypodium stenopetalum is a federally and state-listed endangered species endemic to the San Bernardino Mountains. Occurrences are found in wet meadows and swales in Big Bear and Holcomb valleys, and near

the shore of Baldwin Lake (fig. 5.12). Habitat for the species has been reduced by an estimated 85 percent following construction of the Big Bear Lake reservoir and subsequent lakeshore development (USFWS 1984). Six extant occurrences are known, one on the San Bernardino National Forest at Belleville Meadow in Holcomb Valley. This occurrence has been monitored for the last nine years and appears to be increasing in size, covering an estimated twelve acres in 1998. Prospecting, digging, dry washing, and an unauthorized trail through the meadow are factors affecting plants at this site; however, additional signing has been installed and patrols have been increased to protect the area. A recovery plan was completed for this species by the U.S. Fish and Wildlife Service (USFWS 1998b). A population on the north side of Baldwin Lake is protected by the California Department of Fish and Game. This species is a larval food plant for another focal species, the Andrew's marble butterfly (*Euchloe hyantis andrewsi*), and monitoring of their relationship has occurred at Baldwin Lake (Krantz 1990).

***Thermopsis californica* var. *semota*
(velvety false lupine)**

Thermopsis californica var. *semota* is a Forest Service Sensitive Species. It is known from the Palomar and Laguna mountains and Baja California, Mexico. About fifty occurrences are known, some relatively well protected on state and federal lands. Occurrences are recorded primarily in meadows within montane conifer forests and other areas with vernal moist soils (e.g., at Cuyamaca Lake and Laguna Meadow). The taxon has been found in lesser abundance in grasslands and sandy scrub habitats. Livestock reportedly find the perennial unpalatable and it appears tolerant of mild disturbances.

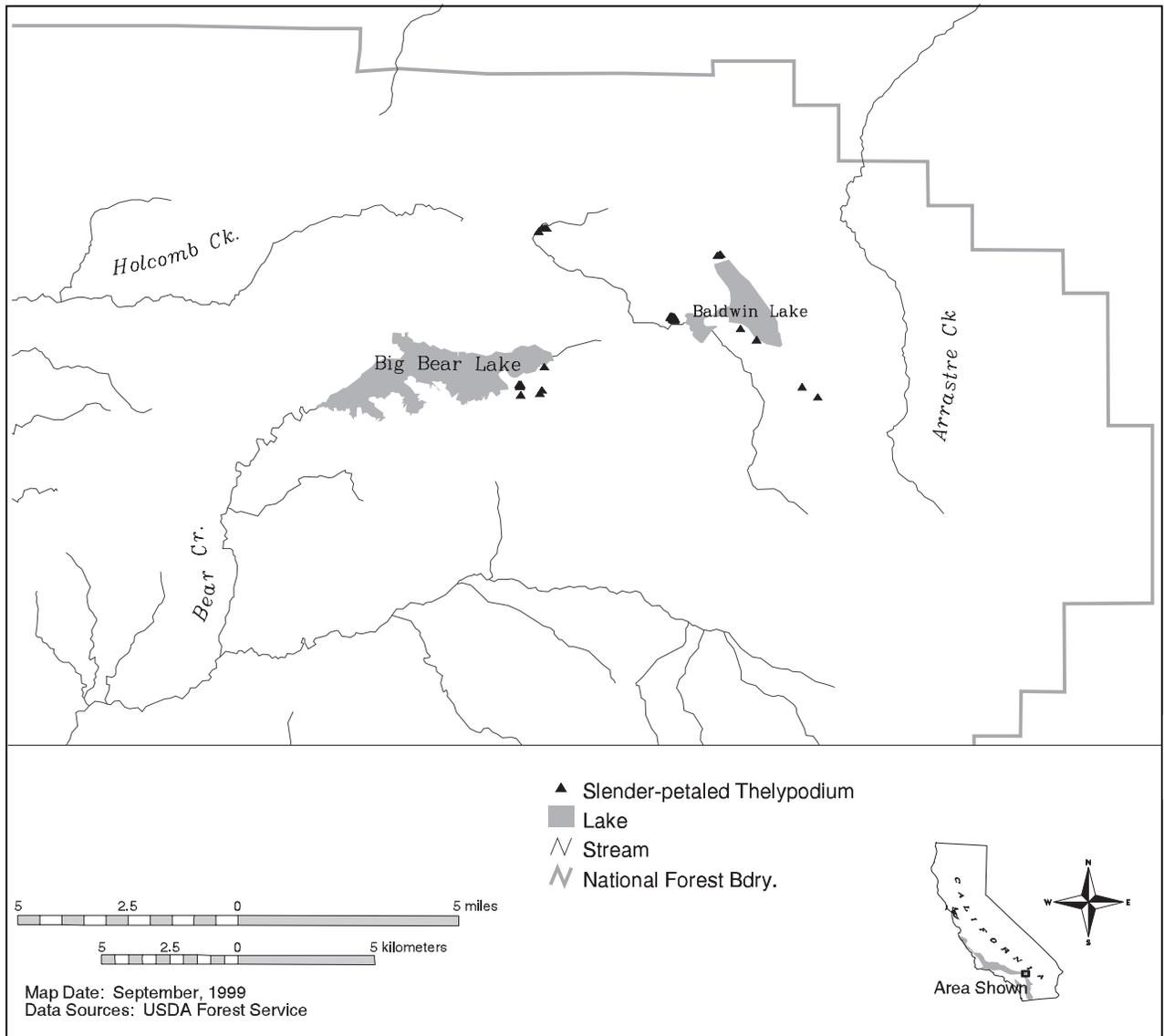


Figure 5.12. Documented locations of *Thelypodium stenopetalum* (slender-petaled thelypodium).

Plants of Wet Meadows

Fifteen rare plants are associated with wet meadows and other vernal moist habitats within the assessment area. Summary information is shown in table 5.12. Four federally endangered species are included in this group.

***Arenaria paludicola* (marsh sandwort)**

Arenaria paludicola is a federally and state-listed endangered species. The perennial is thought to be nearly extinct, known from just one extant occurrence on private land in the Nipomo Mesa area of San Luis Obispo County. This occurrence consisted of ten plants in 1988, three plants in 1992 (USFWS 1993c), and fewer than twenty plants in 1993.

Appropriate habitat occurs in marshes, swamps, and possibly wet meadows, where the species grows up through dense cover of other mesic plants such as cattails, rushes, and sedges. Historically it was known from scattered collections in low-elevation habitat from San Bernardino County north to Washington. One historic occurrence is reported from private land adjacent to the San Bernardino National Forest; however, there are no confirmed occurrences on any of the four southern California forests. The species is threatened by loss of its wetland habitat, alteration of the hydrology, urban development, competition with alien plant species, and stochastic (random)

Table 5.12. Rare plants found in wet montane meadows. y = the taxon occurs on the forest; p = has potential to occur. Assessments of trend, knowledge of distribution, and vulnerability were made by forest botanists/biologists and generally refer to occurrences on national forest system lands (decl. = declining; unkn. = unknown; incr. = increasing).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Arenaria paludicola</i> (marsh sandwort) <i>federally endangered</i>		p			decl.		h in San Bernardino Mtns. & north to WA, extant in SLO Co.
<i>Botrychium crenulatum</i> (scalloped moonwort) <i>FS sensitive</i>		y	p		unkn.	unkn.	CA (San Bernardino & LA cos.), OR, ID, Montana, and UT; (low)
<i>Delphinium hesperium</i> ssp. <i>cuyamaca</i> (Cuyamaca larkspur) <i>FS sensitive</i>	43	y			stable	mod.	Peninsular Ranges of SD Co. (Laguna & Cuyamaca mtns.) & San Jacinto Mtns.; (low)
<i>Grindelia hirsutula</i> var. <i>hallii</i> (San Diego gumplant) <i>FS sensitive</i>	61				stable	low	Peninsular Ranges of SD Co. (Laguna & Cuyamaca mtns.); (moderate)
<i>Helianthus nuttallii</i> ssp. <i>parishii</i> (Los Angeles sunflower)		h/p			extinct?		possibly extinct, h in San Bernardino, LA, & Orange cos.; (low)
<i>Juncus duranii</i> (Duran's rush)		y			unkn.		San Gabriel, San Bernardino, & San Jacinto mtns.; (unkn.)
<i>Lewisia brachycalyx</i> (short-sepaled lewisia)	p	y					San Bernardino Mtns., Peninsular Ranges of SD Co., Baja, UT, AZ, NM; (moderate)
<i>Lilium parryi</i> (lemon lily) <i>FS sensitive</i>	11	429	12		unkn. ₂ / decl. ⁷	mod. ₅ ⁴ / high	San Gabriel, San Bernardino, San Jacinto, Volcan, & Palomar mtns., AZ (Santa Rita & Huachaca mtns.), Sonora, Mexico; (high)
<i>Limnanthes gracilis</i> ssp. <i>parishii</i> (Parish's meadowfoam) <i>state endang./FS sensitive</i>	159				decl./ stable	mod.	Palomar & Laguna mtns. (Peninsular Ranges of SD Co.), Santa Rosa Plateau (sw Riverside Co.); (high)
<i>Malaxis monophyllos</i> ssp. <i>brachypoda</i> (adder's-mouth) <i>FS sensitive</i>		1	p		unkn.	mod.	San Bernardino Mtns. & CO (Rocky Mtns.), h in San Jacinto Mtns.; (low)
<i>Navarretia peninsularis</i> (Baja navarretia) <i>FS sensitive</i>	p	y	y?	p	stable ¹	high	from Tehachapi Mtns. S to Baja (SD, San Bern., Sta. Barbara, & Kern cos.) San Bern. Mtns., Peninsular Ranges of SD Co (Cuyamaca Mtns.); (low)
<i>Perideridia parishii</i> ssp. <i>parishii</i> (Parish's yampah)		29			decl.	low	San Bernardino Mtns., AZ, NM, & NV; (moderate)
<i>Poa atropurpurea</i> (San Bernardino blue grass) <i>federally endangered</i>	y	63			stable/ decl. ³	mod. ₅ ⁹ / high ⁴	San Bernardino Mtns., Palomar & Laguna mtns. (Peninsular Ranges of SD Co.); (high)
<i>Sidalcea pedata</i> (bird-footed checkerbloom) <i>federally endangered</i>		1			incr./ decl. ⁶	mod.	San Bernardino Mtns.; (high)
<i>Taraxacum californicum</i> (California dandelion) <i>federally endangered</i>		51			decl.	high	NE San Bernardino Mtns.; (moderate)

¹ Reiser 1994 (refers to all known occurrences)

² unknown in general, however declining significantly at Big Cienega Springs in the San Gabriel Mountains

³ stable in southern part of range, possibly declining in northern part of range

⁴ on the San Bernardino National Forest

⁵ on the Cleveland National Forest

⁶ increasing on the San Bernardino National Forest, declining on private lands

extinction by virtue of the limited number of individuals that remain (USFWS 1993c).

***Botrychium crenulatum*
(scallop moonwort)**

Botrychium crenulatum is a Forest Service Sensitive Species found at a number of scattered locations throughout California and also in Oregon, Montana, Idaho, and Utah. The CNDDDB lists eight occurrences in California. In the assessment area, occurrences are known from San Bernardino and Los Angeles counties. Plants are documented on the San Bernardino National Forest and suitable habitat exists on the Angeles National Forest. The species is uncommon despite occupying a wide range of habitats including in grassy fields, meadows and other mesic places, along streams or in shaded areas of montane coniferous forest, and on slopes among shrubs. The factors which limit its abundance and distribution are largely unknown; however, all species of *Botrychium* are known to have mycorrhizal requirements. In addition, plants are highly variable and difficult to identify because species of *Botrychium* may occur in mixed populations. *B. crenulatum* is vulnerable to trampling, overgrazing, timber harvesting, and changes in hydrologic regimes.

***Delphinium hesperium* ssp. *cuyamacae*
(Cuyamaca larkspur)**

Delphinium hesperium ssp. *cuyamacae* is a Forest Service Sensitive Species. Approximately fifty large populations occur within the Laguna and Cuyamaca mountains of San Diego County. Historic occurrences, as well as one more recent occurrence, are known from the San Jacinto Mountains of Riverside County. The recent occurrence was noted during an ecological survey for the Cahuilla Mountain RNA (Keeler-Wolf 1986b). This occurrence is located near an area that burned in the 1996 Diego Fire and its current status is unknown. Most of the occurrences in San Diego County are managed under a conservation agreement between the U.S. Fish and Wildlife Service, California Department of Fish and Game, state parks, the U.S. Forest

Service, the Lake Cuyamaca Recreation and Park District, and the Helix Water District (Helix Water District et al. 1996). However, this agreement formally expired in August 1999. In addition to meadow habitat, the perennial grows in open shrub lands and appears to be associated with gabbro-derived soils.

***Grindelia hirsutula* var. *hallii*
(San Diego gumplant)**

Grindelia hirsutula var. *hallii* is a Forest Service Sensitive Species. It is known from occurrences in wet meadow and vernal spring habitat in the Laguna and Cuyamaca mountains of San Diego County. Plants grow on sandy or clay soils in mesic places within chaparral, valley-foothill grassland, and open pine/oak woodland (Skinner and Pavlik 1994). Occurrences are known on the Cleveland National Forest, at Cuyamaca Rancho State Park, and on private lands. They are found with coast live oak on Guatay Mountain, and with Jeffrey pine and black oak in the Lagnas (CNDDDB 1996). Changes to the surface hydrology of meadow habitat is a potential threat due to road projects and off-highway vehicles. The species appears to be tolerant of some ground disturbance (e.g., fire and low levels of grazing and grading).

***Helianthus nuttallii* ssp. *parishii*
(Los Angeles sunflower)**

Helianthus nuttallii ssp. *parishii* is a perennial taxon presumed to be extinct. The CNDDDB contains historical records for seven occurrences in Los Angeles, Orange, and San Bernardino counties. Plants were known to occupy freshwater and coastal salt marshes, wet meadows, and other continuously wet places, from sea level to 5,500 feet (Niehaus 1977). One historic occurrence is known from marshy, riparian habitat near Seven Oaks along the Santa Ana River on the San Bernardino National Forest. Despite the lack of recently known occurrences, the San Bernardino and Angeles national forests maintain this plant on their watch lists.

***Juncus duranii* (Duran's rush)**

Juncus duranii is an uncommon perennial rush known from the Big Bear Valley and San Gorgonio Wilderness Area in the San Bernardino Mountains. Other occurrences are found in the San Gabriel and San Jacinto mountains. There are no records for this species in the CNDDDB and little is known about its distribution. Occurrences on the San Bernardino National Forest are found in wet meadows within the montane conifer and subalpine zones.

***Lewisia brachycalyx*
(short-sepaled lewisia)**

Lewisia brachycalyx occurs in the San Bernardino Mountains, the San Diego ranges, Baja California, Utah, Arizona, and New Mexico. Occurrences are found in wet meadows within montane coniferous forests. On the San Bernardino National Forest, the species occurs in Big Bear and Holcomb valleys and the Snow Valley area and may be affected by high levels of recreation use. Potential habitat exists on the Cleveland National Forest.

***Lilium parryi* (lemon lily)**

Lilium parryi is a Forest Service Sensitive Species. It is distributed in the San Gabriel, San Bernardino, San Jacinto, Volcan, and Palomar mountains. It occurs in lesser abundance within the Santa Rita and Huachaca mountains of Arizona and in adjacent ranges in Sonora, Mexico. Occurrences are recorded on the Cleveland, San Bernardino, and Angeles national forests and at Palomar Mountain State Park. The CNDDDB lists fifty-five occurrences in all, and generally those at higher elevations are larger (some greater than one thousand plants) than those at lower elevations.

Some occurrences are located within the San Gorgonio Wilderness Area. One location at Big Cienega Springs in the San Gabriel Mountains has shown substantial decline since 1990 when 350 individual plants were counted. In 1995 only 11 individuals were seen. The plant has very showy and fragrant flowers that make it vulnerable to collection.

The Angeles National Forest has developed a species management guide for this plant (Mistretta and Parra-Szjij 1991a) and the Cleveland National Forest includes it in their habitat management guide for riparian montane meadows (Winter 1991b).

Limnanthes gracilis* ssp. *parishii

Limnanthes gracilis ssp. *parishii* is a Forest Service Sensitive Species and is state listed as endangered. An annual plant, it is endemic to the Palomar and Laguna mountains of San Diego County. About fifteen populations are recorded, the largest occurring in Cuyamaca Valley near Cuyamaca Lake and Little Stonewall Creek. At least five smaller populations are mapped on adjacent land within the Cleveland National Forest. Another population, covering about five acres, is located in vernal pools on the Santa Rosa Plateau in southwestern Riverside County.

An estimated 70 percent of the known occurrences are found on land owned or managed by the Helix Water District, Lake Cuyamaca Recreation and Park District, California Department of Fish and Game, and the U.S. Forest Service. These parties entered into a habitat conservation agreement to protect the species (Helix Water District et al. 1996); however, the agreement formally expired in August 1999. The Cleveland National Forest has written a habitat management guide for riparian montane meadows that includes this taxon (Winter 1991b).

***Malaxis monophyllos* ssp. *brachypoda*
(adder's-mouth)**

Malaxis monophyllos ssp. *brachypoda* is a Forest Service Sensitive Species. It is extremely rare in California but more common in the Rocky Mountains. Two small occurrences are located in meadow habitat within the San Gorgonio Wilderness Area of the San Bernardino Mountains. The taxon was presumed to be extinct in California until twenty-six plants were discovered at this location in 1989. One historic occurrence was noted in the San Jacinto Wilderness Area (Tahquitz Valley) in

1922. The plant is generally thought to be declining in California; however, it can be difficult to find in the lush meadows where it would be expected to occur. The taxon is vulnerable to trampling.

***Navarretia peninsularis*
(Baja navarretia)**

Navarretia peninsularis is a Forest Service Sensitive Species. It is distributed from the Tehachapi Mountains south to Baja California, Mexico. The CNDDDB documents six occurrences: in San Diego, San Bernardino, Santa Barbara and Kern counties. However, they are all from 1965 or earlier. Two of the historic locations, one on the north slope of Mount Pinos and one on Big Pine Mountain, occur within designated wilderness areas on the Los Padres National Forest. A more recent discovery was made at Holcomb Valley in the San Bernardino Mountains, though gold prospecting activities and vehicle traffic may be negatively affecting the site. Two other occurrences are located within Cuyamaca Rancho State Park in San Diego County. Plants at this location grow in mesic openings within chaparral (Reiser 1994). In other areas plants are found along vernal creeks, in meadows, and in snowmelt seeps within pinyon-juniper woodland and yellow pine forest.

***Perideridia parishii* ssp. *parishii*
(Parish's yampah)**

Occurrences of *Perideridia parishii* ssp. *parishii* are distributed in the San Bernardino Mountains of California, and also in Arizona, New Mexico, and Nevada. In the San Gabriel, San Jacinto, and Cuyamaca mountains the taxon is replaced by *P.p.* ssp. *latifolia* (Constance 1980). On the San Bernardino National Forest, occurrences are found on the Mountaintop Ranger District. This taxon grows in moist or wet meadows, usually around lakes or streams within upper montane conifer forests (Krantz 1990).

***Poa atropurpurea*
(San Bernardino blue grass)**

Poa atropurpurea is a federally endangered species found in the San Bernardino Mountains and in the Palomar and Laguna mountains of San Diego County (fig. 5.13). Between twelve and eighteen occurrences are known. This grass occupies the edges of wet meadows where there is less competition from more mesic species. However, the non-native *P. pratensis* can grow at the same locations and there is potential for genetic absorption to occur (USFWS 1995b).

Occurrences at the southern end of the species' range appear relatively stable. Four occurrences were located in Laguna Meadow in 1979. Two occurrences (each containing an estimated fifty plants) were found in 1993 and more plants were found in 1994. The species has also been located in Bear Valley southwest of the Lagunas, and at Mendenhall Valley in the Palomar Mountains (D. Volgarino, San Bernardino NF, unpubl. notes 1998). The majority of occurrences in San Diego County are protected on federal and state lands; however, grazing is still occurring at three locations. The species is included in a habitat management guide for riparian montane meadows (Winter 1991b).

At the northern end of its range, *P. atropurpurea* appears to be declining. At least 70 percent of the occupied habitat is privately owned with potential for development (USFWS 1995b). Two areas with confirmed occurrences (Wildhorse Meadow and Holcomb Valley) are located partly on the San Bernardino National Forest. In Holcomb Valley, some of these occurrences are affected by gold prospecting activities (i.e., digging and dry washing), mountain biking, and unauthorized vehicle use. Additional fencing, signing, and patrols have been implemented to increase protection in the area. Surveys in 1999 located more occurrences on national forest system land in Holcomb Valley. One occurrence at North Baldwin is managed by CDFG. For more detailed information on this species see the final listing rule (USFWS 1998k).

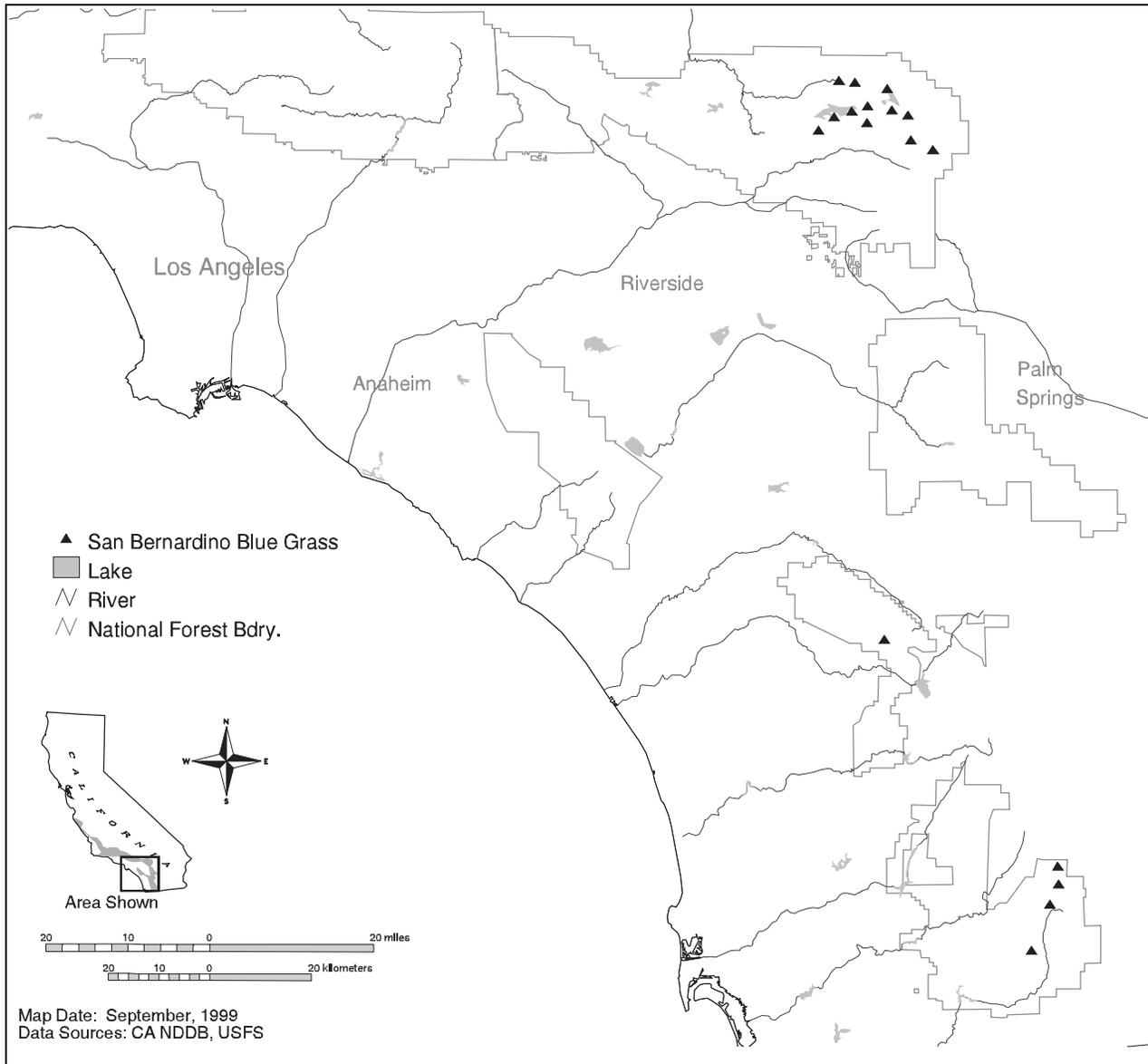


Figure 5.13. Documented locations of *Poa atropurpurea*, the San Bernardino blue grass.

***Sidalcea pedata*
(bird-footed checkerbloom)**

Sidalcea pedata is a federally and state-listed endangered species endemic to montane wet meadows in the Big Bear Valley of the San Bernardino Mountains (fig. 5.14). The plant is known from seventeen locations totaling fewer than 20 acres of occupied habitat (USFWSb 1998). The north Baldwin Lake site, managed by CDFG, is the only occurrence currently receiving full protection. Five other sites receive partial protection and the remaining eleven occurrences are unprotected, degraded, or threatened. One occurrence is located on federal lands (San Bernardino National Forest) on the shore of Big Bear Lake. This oc-

currence is one acre in size and appears to be increasing. Measures to protect the site are being implemented with a completion date of summer 1999. A recovery plan for this species has been completed (USFWS 1998b). See also the final listing rule for more detailed information (USFWS 1984).

***Taraxacum californicum*
(California dandelion)**

Taraxacum californicum is a federally endangered species endemic to the northeastern San Bernardino Mountains. Occurrences range from Big Bear and Holcomb valleys to South Fork Meadows in the Santa Ana River

watershed (fig. 5.14). The CNDDDB lists twenty-five extant occurrences. Plants occupy the edges of meadows, and occurrences are declining primarily from damage to this habitat type. Though some occurrences are found on private lands, most are located on the San Bernardino National Forest where high levels of recreation use are believed to be a cause of this species' decline. Trampling by humans or livestock favors the establishment of the non-native dandelion, *T. officinale* (USFWS 1995b). This species is invading montane meadow habitats and hybridizing with *T. californicum*, creating concern about the future integrity of the species. *T. californicum* is

the only native dandelion in the state and is of considerable interest to plant taxonomists.

Plants of Dry Meadows

Two rare plants are restricted to dry meadow habitat within the assessment area. Summary information is shown in table 5.13. Both of these taxa are endemic to the north-eastern San Bernardino Mountains.

Pyrrocoma uniflora var. *gossypina* (Bear Valley pyrrocoma)

Pyrrocoma uniflora var. *gossypina* is a Forest Service Sensitive Species. It is known from twelve occurrences in Big Bear and Holcomb

Figure 5.14. Documented locations of *Sidalcea pedata*, the bird-footed checkerbloom, and *Taraxacum californicum*, the California dandelion.

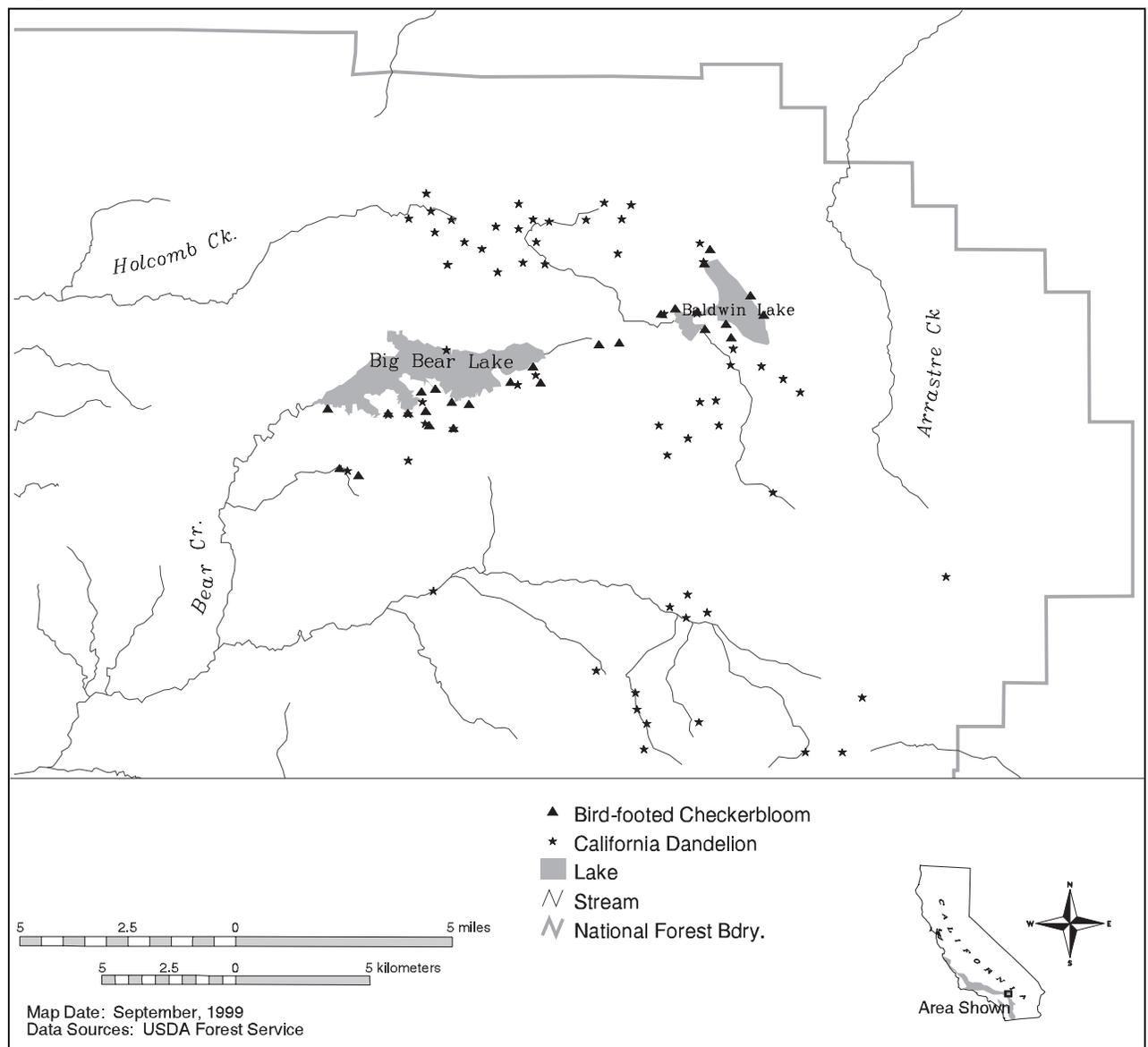


Table 5.13. Rare plants found in dry montane meadows. y = the taxon occurs on the forest; p = has potential to occur. Assessments of trend, knowledge of distribution, and vulnerability were made by forest botanists/biologists and generally refer to occurrences on national forest system lands (decl. = declining; unkn. = unknown; incr. = increasing).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Pyrocoma uniflora</i> var. <i>gossypina</i> (Bear Valley pyrocoma) <i>FS sensitive</i>		27			decl.	high	San Bernardino Mtns.; (moderate)
<i>Senecio bernardinus</i> (San Bernardino ragwort) <i>FS sensitive</i>		188			unkn./ decl. ¹	high	San Bernardino Mtns.; (moderate)

¹two occurrences are reportedly declining, trend for other occurrences is unknown

valleys within the San Bernardino Mountains. Occurrences are documented at Baldwin Lake, Arrastre Flat, and Metcalf Meadow, as well as other locations. The taxon is thought to be declining due to loss of habitat. Factors affecting this plant include grazing, alteration of meadow hydrology, trampling by vehicles and horses, soil compaction, high levels of recreation use, competition from exotic species, brush clearing, and development projects. Some occurrences on the San Bernardino National Forest are protected by fencing and one is located within a CDFG reserve. However, the majority of occurrences are located on private lands. A botanical investigation was completed for this taxon and included surveys of all meadow areas in Big Bear and Holcomb valleys, in the San Bernardino National Forest (Krantz 1979).

***Senecio bernardinus*
(San Bernardino ragwort)**

Senecio bernardinus is a Forest Service Sensitive Species. It is a perennial species known from about fifteen occurrences in Big Bear and Holcomb valleys of the San Bernardino Mountains. Occurrences range from upper Holcomb Valley in the northwest to Arrastre Flat in the northeast to Aspen Glen in the southwest and Erwin Lake in the southeast (Barrows 1989). A significant occurrence is located near Cari-

bou Creek, with an estimated one thousand to fifteen hundred plants found during surveys in 1989. The plant typically grows in drier meadows with alkaline clay soils; however, it can also be found in openings within basin sagebrush scrub, at the edges of pebble plains, and on dry, rocky slopes in the understory of Jeffrey pine woodlands. It has been found with *Castilleja cinerea*, singleleaf pinyon pine, and western juniper.

Common habitat parameters at all locations include alkaline, loosely compacted soils; open areas with low accumulations of organic material; an elevational range between 6,600 and 7,400 feet; and shallow slopes of no greater than 30 percent (Barrows 1989). The species does not require soil disturbance but appears tolerant of it. In historic mining areas, plants have been observed growing on overburden piles. Other occurrences have been found in areas disturbed by seasonal flooding, in mudflows at the edges of roads and the base of boulders, and along the margins of ski slopes (e.g., at Snow Forest). This species is affected by recreation activities (foot, horse, and off-highway vehicle trampling and prospecting), cattle grazing, and residential/commercial development. Occurrences on the San Bernardino National Forest experience lower levels of recreation activity than surrounding areas, but additional protective fencing,

signing, and monitoring by patrols have been implemented to enhance habitat for this species.

Subalpine/Alpine Plants

Fifteen rare plants are found or have potential to occur in subalpine or alpine habitat within the assessment area. Summary information is shown in table 5.14.

***Arabis breweri* var. *pecuniaria* (San Bernardino rock cress)**

Arabis breweri var. *pecuniaria* is a Forest Service Sensitive Species. A perennial plant, it is endemic to the San Bernardino Mountains. It grows in subalpine coniferous forest on rocky substrates (e.g., cliffs, ledges, and talus). Just two occurrences are known in the San Gorgonio Wilderness Area of the San Bernardino National Forest. One of these occurrences is located near a hiking trail and contained about twenty-five individuals in 1980. In 1994 just six plants were located at this site and the occurrence is now thought to be declining, though the exact cause is unknown. The second occurrence is known from a cliff area near Dollar Lake and has not been relocated since 1980.

***Claytonia lanceolata* var. *peirsonii* (Peirson's spring beauty)**

Claytonia lanceolata var. *peirsonii* is a Forest Service Sensitive Species. It is a perennial taxon endemic to the eastern San Gabriel Mountains. Occurrences are scattered along the boundary between the Angeles and San Bernardino national forests, from the eastern side of Mount San Antonio east to the Kelly's Camp area (Mistretta and Brown 1987b). The taxon appears briefly each year after the spring thaw, growing on rocky substrates within upper montane conifer and subalpine forest habitat. It usually grows on north-facing slopes in protected bowls or depressions where snows persist later in the year. Tree canopy cover is a requirement of the species; however, shrub cover or deep litter is not well tolerated. *C. lanceolata* var. *peirsonii* has been found in the understory of lodgepole pines, sugar pine, and white fir. Associated understory elements in-

clude *Allium burlewii*, *A. monticola*, *Fritillaria pinetorum*, *Oreonana vestita* (another focal species), *Lithophragma tenellum*, *Pedicularis semibarbata*, and *Collinsia torreyi*. The substrate is described as granitic talus or granitic cobbles with a sandy or fine soil component.

A species management guide was adopted by the Angeles National Forest in 1987, and surveys during the same year located an estimated 1,675 plants at Ontario Ridge, Timber Mountain, Telegraph Peak, Thunder Mountain, and Devil's Backbone Ridge (Mistretta and Brown 1987b). Monitoring continued at three of these sites until 1993 and showed fluctuations in population sizes, though the changes appear to have been within a normal range of variation. The Telegraph Peak population is within the Cucamonga Wilderness Area. Construction of ski runs within the Mount Baldy Ski Area (at Thunder Mountain) significantly reduced the amount of conifer overstory (a key habitat component) and partially eliminated the species at this locale. Populations at Timber Mountain and Kelly's Camp have been adversely affected by trampling from hiking and camping activities. Potential habitat for this plant occurs on the northern slopes of Cucamonga, Ontario, and Etiwanda peaks, and surveys are needed to determine its presence or absence.

***Erigeron breweri* var. *jacinteus* (San Jacinto Mountains daisy)**

Erigeron breweri var. *jacinteus* is a watch-list plant on the San Bernardino and Angeles national forests. Occurrences are known from the San Jacinto, San Bernardino, and San Gabriel mountains. Four occurrences are recorded in the CNDDDB. The perennial grows in upper montane and subalpine coniferous forests, in rocky areas above approximately 8,800 feet. Little is known regarding occurrences or threats to this taxon. The variety is difficult to identify and easily confused with other more common taxa.

Table 5.14. Rare plants found in subalpine/alpine habitats. y = the taxon occurs on the forest; p = has potential to occur. Assessments of trend, knowledge of distribution, and vulnerability were made by forest botanists/biologists and generally refer to occurrences on national forest system lands (decl. = declining; unkn. = unknown).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Arabis breweri</i> var. <i>pecuniaria</i> (San Bernardino rock cress) <i>FS sensitive</i>		3			decl.	high	San Bernardino Mtns. (San Gorgonio Wilderness Area); (moderate)
<i>Claytonia lanceolata</i> var. <i>peirsonii</i> (Peirson's spring beauty) <i>FS sensitive</i>		8	11		stable	high	E San Gabriel Mtns.; (high)
<i>Erigeron breweri</i> var. <i>jacinteus</i> (San Jacinto Mtns. daisy)		y	y			unkn.	San Gabriel, San Bernardino, & San Jacinto mtns.; (unknown)
<i>Eriogonum kennedyi</i> var. <i>alpigenum</i> (southern alpine buckwheat) <i>FS sensitive</i>		y		y	unkn.	low	San Bernardino Mtns.; (low)
<i>Eriogonum microthecum</i> var. <i>johnstonii</i> (Johnston's buckwheat) <i>FS sensitive</i>		2	2		unkn.	mod.	San Gabriel & E San Bernardino mtns.; (low)
<i>Eriogonum umbellatum</i> var. <i>minus</i> (alp. sulfur-flowrd. buckwht.)		y	y		unkn./stable ¹	mod.	San Gabriel & San Bernardino mtns.; (low)
<i>Heuchera abramsii</i> (Abram's alumroot)		p	y		unkn.	low	San Gabriel Mtns.; (unknown)
<i>Heuchera hirsutissima</i> (shaggy-haired alumroot) <i>FS sensitive</i>		p			unkn.		San Jacinto & Santa Rosa mtns.; (low)
<i>Hulsea vestita</i> ssp. <i>pygmaea</i> (pygmy hulsea)		y			unkn.	low	San Bernardino Mtns., Kern Plateau (Tulare Co.); (high)
<i>Leptodactylon jaegeri</i> (San Jacinto prickly phlox) <i>FS sensitive</i>		36			unkn.	mod.	San Jacinto Mtns.; (moderate)
<i>Monardella cinerea</i> (gray monardella)		p	1		unkn.		San Gabriel Mtns.; (low)
<i>Oreonana vestita</i> (woolly mountain-parsley)		1+	y		unkn.	low	San Bernardino & San Gabriel mtns.; (low)
<i>Podistera nevadensis</i> (Sierra podistera)		h/p				unkn.	San Bernardino Mtns., Sierra Nevada, WA, ID
<i>Potentilla rimicola</i> (cliff cinquefoil) <i>FS sensitive</i>		y			unkn.	low	San Jacinto Mtns., Sierra San Pedro Martir (Baja); (low)
<i>Viola pinetorum</i> ssp. <i>Grisea</i> (grey-leaved violet) <i>FS sensitive</i>		h/p			unkn.		San Bernardino Mtns., Fresno, Tulare, & Kern cos.; (low)

¹Reveal 1979

Eriogonum microthecum* var. *johnstonii
(Johnston's buckwheat)

Eriogonum microthecum var. *johnstonii* is a Forest Service Sensitive Species. It is endemic to the San Gabriel and eastern San Bernardino mountains where it occurs generally above 6,000 feet (Mistretta and Brown 1997a). The shrub is associated with dry sites in upper montane and subalpine coniferous forests, typically on steep slopes with loose rocky soils. It has been found on limestone soils (as well as granitic) but an obligate relationship between the taxon and a specific substrate is not apparent (Mistretta and Brown 1997a). Associated species include white fir, California juniper, Jeffrey pine, curl-leaf mountain-mahogany, sugar pine, and lodgepole pine.

There are six confirmed occurrences: one in a remote area of the San Bernardino Mountains and five in the San Gabriel Mountains. The six occurrences together are estimated to contain between 3,280 and 3,950 plants. Another two occurrences are suspected in the San Gabriel Mountains but need confirmation and are not yet recorded in the CNDDDB. Three of the populations within the San Gabriels—one on the western slope of Mount San Antonio, and two in the upper Little Rock Creek drainage—together contain between 2,100 and 2,600 plants and cover an estimated 150 acres. These three populations constitute about 64 percent of the known extant individuals (Mistretta and Brown 1997a). Some occurrences are protected by their remoteness or inaccessibility—the Burkhart Trail population in the upper Little Rock Creek drainage, the Mount San Antonio population located within the Sheep Mountain Wilderness Area, and two populations at Cucamonga Peak within the Cucamonga Wilderness Area. Other occurrences are experiencing disturbance; one population in the upper Little Rock Creek drainage is bisected by the Angeles Crest Highway (State Highway 2) and granitic outcrops make the area popular with rock climbers. Other populations are located adjacent to camping areas and hiking trails. The Angeles National Forest has completed a species management guide for this plant (Mistretta and Brown 1997a).

Eriogonum umbellatum* var. *minus
(alpine sulfur-flowered buckwheat)

Eriogonum umbellatum var. *minus* is distributed in the San Gabriel and San Bernardino mountains where it grows on dry, sandy or stony soils within upper montane and subalpine conifer forest habitats. One occurrence is reported for the San Jacinto Mountains but is considered to be a misidentification (Reveal 1981). Several large occurrences are known on the Angeles and San Bernardino national forests (e.g., in the Cucamonga Wilderness Area); however, they are unrecorded in both the CNDDDB and our GIS species coverage. A *CNPS Rare Plant Status Report* from 1979 indicated that populations are stable (Reveal 1979). However, one apparently disjunct occurrence on the north slope of the San Bernardino Mountains could be affected if a proposed mine expansion occurs, and occurrences in the Mount Baldy area of the Angeles National Forest could be affected by ski area expansion. The plant appears to be disturbance oriented however, with occurrences found near trails and along roads.

***Heuchera abramsii* (Abram's alumroot)**

Heuchera abramsii is an uncommon perennial species found at elevations above 9,000 feet in dry, rocky areas of the San Gabriel Mountains. Potential habitat occurs in both the Cucamonga and Sheep Mountain wilderness areas on the Angeles and San Bernardino national forests, but the presence or absence of the species has not been confirmed.

Heuchera hirsutissima
(shaggy-haired alumroot)

Heuchera hirsutissima is a Forest Service Sensitive Species. It occurs in the San Jacinto and Santa Rosa mountains (fig. 5.15), at elevations above 3,500 feet in montane conifer and subalpine forest habitats. Seven occurrences are recorded in the CNDDDB. Some occurrences are located in the San Jacinto Mountain Wilderness Area and in Mount San Jacinto State Park. The plant grows among

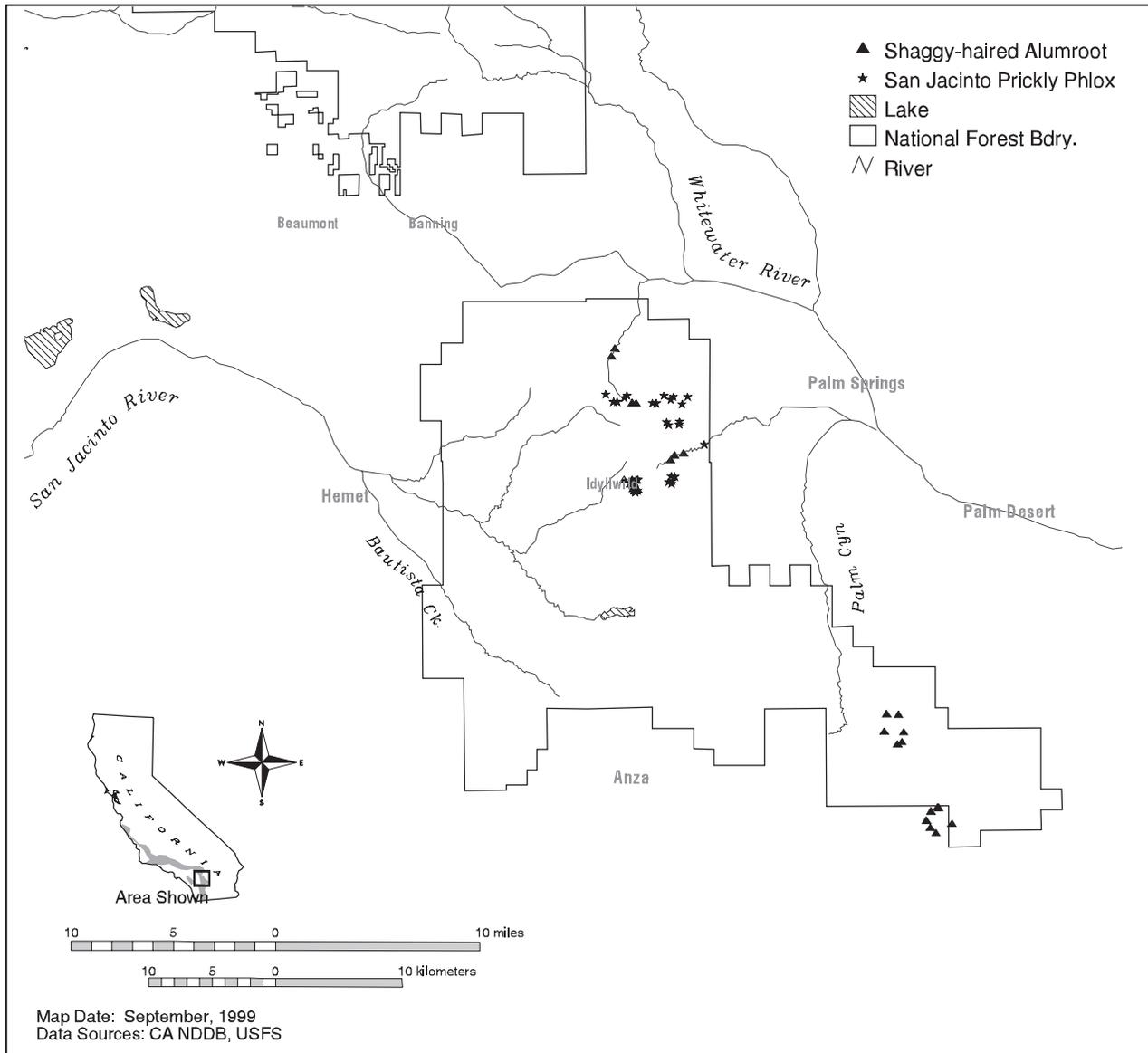


Figure 5.15. Documented locations of *Heuchera hirsutissima*, the shaggy-haired alumroot, and *Leptodactylon jaegeri*, the San Jacinto prickly phlox.

rocks and in crevices of granite boulders. Rock climbing and trampling may be affecting the species.

***Hulsea vestita* ssp. *pygmaea*
(pygmy hulsea)**

Hulsea vestita ssp. *pygmaea* is a perennial taxon known from collections made at San Gorgonio Peak and Sugarloaf Peak in the San Bernardino Mountains (S. White, Scott White Biological Consulting, in litt. 1998). Habitat at these locations is described as subalpine forest and alpine barrens. The taxon also occurs on subalpine volcanic barrens at the Kern Plateau in Tulare County, outside

of our assessment area (Wilken 1975). At least one of the collections made at San Gorgonio Peak appears to intergrade with *H. vestita* ssp. *parryi*, another of our focal subspecies.

***Leptodactylon jaegeri*
(San Jacinto prickly phlox)**

Leptodactylon jaegeri is a Forest Service Sensitive Species. It occurs in the San Jacinto Mountains of Riverside County (fig. 5.15). The CNDDDB contains records for fifteen occurrences, most of them relatively small. For example, the largest occurrence sampled in 1983 contained fewer than thirty plants. Some of the same locations were visited again in

1994 and the largest contained more than two hundred twenty plants. A perennial plant, it grows on dry, granitic soils (specifically from rock crevices in granitic outcrops) in upper montane and subalpine conifer forests. Occurrences are generally well protected in the San Jacinto Wilderness Area of the San Bernardino National Forest; however, the level of impact from rock climbing and hiking activity is unknown.

***Monardella cinerea* (gray monardella)**

Monardella cinerea is known from three occurrences, all above 5,900 feet, in the San Gabriel Mountains (Horse Flats, Crystal Lake, and Mount Harwood). The species is locally common in these areas, growing on loose, granitic talus within upper montane and subalpine conifer forest habitat. Potential habitat exists in the San Jacinto Mountains.

***Oreonana vestita*
(woolly mountain-parsley)**

Oreonana vestita is distributed in the San Bernardino and San Gabriel mountains. Plants are found at high elevations on ridgetops and on rocky soils in montane conifer and subalpine habitat. At least four extant occurrences and one historic occurrence are documented on the San Bernardino National Forest, including two occurrences in the San Gorgonio Wilderness Area. Plants occur on the Angeles National Forest at San Antonio Summit, Mount Lewis, and in the Mount Baldy area. Occurrences may be vulnerable to trampling.

***Podistera nevadensis* (Sierra podistera)**

Podistera nevadensis is a watch-list species on the San Bernardino National Forest. Occurrences are known from northern and central California, in the Sierra Nevada Mountains (in Alpine, Eldorado, Mono, Placer, and Tuolumne counties), and into Washington and Idaho, with one disjunct and historic occurrence noted in the San Bernardino Mountains. The perennial grows in alpine boulder and rock fields, and on granitic scree. Plants are fairly common along the Sierran Crest, usu-

ally occurring above timberline. Threats to this species are unknown.

***Potentilla rimicola* (cliff cinquefoil)**

Potentilla rimicola is a Forest Service Sensitive Species known from occurrences in the San Jacinto Mountains and Sierra San Pedro Martir in Baja California, Mexico. The CNDDDB contains records for five occurrences, some historical, and one recent collection made in 1987. A perennial plant, it grows in granitic crevices within upper montane and subalpine coniferous forest. Some occurrences are located in the San Jacinto Wilderness Area and may be affected by rock climbing activities.

***Viola pinetorum* ssp. *grisea*
(grey-leaved violet)**

Viola pinetorum ssp. *grisea* is a Forest Service Sensitive Species. It is known from extant occurrences in Fresno, Tulare, and Kern counties, and historic occurrences in San Bernardino County. The taxon grows in upper montane conifer and subalpine conifer forests, on dry slopes and peaks from 4,900 to over 11,000 feet in elevation (Hickman 1993). On the Kern Plateau, plants are “scattered and locally common” at Olancha Peak and “occasional on slopes and sand flats.” *The Preliminary Check List of the Flowering Plants of the Kern Plateau* notes occurrences bordering meadows in the higher elevation red fir forests, through the foxtail pine forests, to above timberline. *V. pinetorum* is a variable species in need of further study. Historic occurrences are documented in the San Jacinto and San Bernardino mountains, and at Mount Pinos in the southern Los Padres region. Plants at these locations were previously referred to as *V. purpurea* ssp. *xerophyta* (Munz 1974).

Desert Montane Plants

Twenty-six rare plants are primarily associated with desert montane habitats in the assessment area. Summary information is shown in table 5.15. One federally endangered species is included in this group.

***Arabis dispar* (pinyon rock cress)**

Arabis dispar is a relatively wide-ranging perennial species occurring in four California counties (Inyo, Mono, Tulare, and San Bernardino) and southwestern Nevada. Occurrences are known from the White Mountains, the Dome Land Wilderness, the Panamint Mountains, the Argus Range, and other mountains bordering the Mojave Desert. Within the assessment area it occurs in the northern San Bernardino Mountains and is associated with desert montane plant communities (i.e., pinyon-juniper woodlands, Joshua tree woodlands, and Mojavean desert scrub). It grows in granitic soils, on gravelly substrates (including pebble plains), and on compact talus. The CNDDDB contains records for fifteen occurrences in California, presumed to be extant but not revisited since the 1920s, 1930s, and 1960s. The species is rarer in the San Bernardino Mountains than in any other area, and occurrences found on the San Bernardino National Forest grow in habitat affected by mining, shooting, off-highway vehicles, and other recreation activities. This plant is also found in Joshua Tree National Park.

***Astragalus douglasii* var. *perstrictus* (Jacumba milk-vetch)**

Astragalus douglasii var. *perstrictus* is a Forest Service Sensitive Species. It occurs in San Diego and Imperial counties, as well as Baja California, Mexico (Skinner and Pavlik 1994; Reiser 1994). A northern disjunct occurrence may be located in Riverside County near Temecula Creek. There are about twenty-five known locations in all, found on rocky soils in open chamise chaparral, cismontane woodlands, valley-foothill grasslands, and pinyon-juniper woodlands. However, Reiser

(1994) describes the habitat as primarily transmontane, high desert chaparral. Plants seem to favor areas with mild soil disturbance; scattered individuals have been seen on road shoulders where there is little competition from other species. Another focal species, *Geraea viscida*, may grow sympatrically with this taxon. Occurrences in desert-side habitats appear to be stable, probably owing to the limited development in this region (Reiser 1994). This species appears to be declining on private lands due to habitat loss from urbanization. Occurrences on the Cleveland National Forest (approximately ten) are considered stable or increasing.

***Astragalus lentiginosus* var. *sierrae* (Big Bear Valley milk-vetch)**

Astragalus lentiginosus var. *sierrae* is a Forest Service Sensitive Species known from the eastern San Bernardino Mountains, specifically in Big Bear and Holcomb valleys, the Baldwin Lake area, and in the upper Santa Ana River watershed. The CNDDDB contains records for seven occurrences in all, and other occurrences are known but not yet recorded in the database. Plants grow in arid areas, on gravelly or sandy soils in meadows, in the understory of montane conifer forest, in pinyon-juniper woodlands, sagebrush flats, and Mojavean desert scrub. In the Santa Ana River watershed the taxon occurs with rabbitbrush, sagebrush, and Jeffrey pine (M. Lardner, San Bernardino NF, in litt. 1998). This plant responds positively to disturbance and is now believed to be more common than previously mapped.

***Astragalus leucolobus* (Big Bear Valley woollypod)**

Astragalus leucolobus is a Forest Service Sensitive Species known from twenty-four documented occurrences and seventeen general locations in the mountain regions of San Bernardino, Riverside (San Jacinto Mountains), Los Angeles (San Gabriel Mountains), and San Benito counties (CNDDDB 1997). Potential habitat exists in San Diego County as well. Other occurrences are known but not

yet recorded in the CNDDDB. The species is locally common in the Big Bear Valley of the San Bernardino Mountains. Plants are found on pebble plains, in openings of yellow pine forest and pinyon-juniper woodland, and in dry, rocky areas with sagebrush. The species also occurs in areas with disturbed soils—on fuel breaks, within residential tracts, and adjacent to roads.

***Canbya candida* (pygmy poppy)**

Canbya candida is a Forest Service Sensitive Species. It is distributed in Los Angeles, San Bernardino, Kern, and Inyo counties. The CNDDDB contains records for twenty-nine occurrences in all, most located on private lands. In the assessment area, occurrences are known from the Cajon Pass area of the San Bernardino Mountains. No occurrences are documented on national forest system lands; however, there is potential habitat on the San Bernardino National Forest based on the nearness of the Cajon Pass occurrences. Other occurrences are known from the western Mojave Desert and adjacent areas of the Sierra Nevada. Occurrences are documented in Kern County near Lake Isabella, Walker Pass, and Kelso Peak/Valley. The annual is found on sandy soils in Joshua tree woodlands and Mojavean desert scrub habitat.

***Castilleja plagiotoma*
(Mojave Indian paintbrush)**

Castilleja plagiotoma is a watch-list species on the San Bernardino National Forest. Occurrences are also known on the Angeles National Forest. Plants have not been found on the Los Padres National Forest, although a fair amount of potential habitat may exist (M. Foster, Los Padres NF, pers. comm.). In all, occurrences are documented in Los Angeles, San Bernardino, San Luis Obispo, and Kern counties. The plant grows in Great Basin alluvial scrub and pinyon-juniper woodlands, where it is a green root parasite on other plants (Hickman 1993). Munz (1974) also notes occurrences in Joshua tree woodlands. The plant is “usually among shrubs . . . at Caliente Mountain, Chalk Mountains to Temblor

Range” (Smith 1976). These locations are just north of the Los Padres National Forest. Plants are also known from the Hamilton Preserve. In the San Bernardino Mountains, plants are found on the ridge above Coxey Meadow, at Little Pine Flats, Las Flores Ranch, and Round Mountain (Krantz, Thorne, and Sanders 1995). When dry, the yellow-green inflorescence of this species resembles the federally threatened *Castilleja cinerea*, and microscopic observation may be needed to differentiate the two. Threats on national forest system lands include facilities development and recreational activities.

***Caulanthus californicus*
(California jewelflower)**

Caulanthus californicus is a federally endangered species known from extant occurrences in the Santa Barbara Canyon area of Santa Barbara County, the Carrizo Plain in San Luis Obispo County, and the Kreyenhagen Hills of Fresno County (fig. 5.16). Occurrences have declined from fifty-five to about twenty known today. An annual plant, it grows on gravelly or sandy soils in grasslands, chenopod scrub, and pinyon-juniper woodlands between elevations of 200 and 3,300 feet. The Santa Barbara Canyon occurrences consist of nineteen different sites along a 6-mile stretch of terrace habitat on the western side of the Cuyama River (M. Foster, Los Padres NF, pers. comm.). The total area of occupied habitat is estimated at 30 acres, on both private and BLM-administered lands.

This species has not been found on national forest system lands; however, the Santa Barbara Canyon occurrences are located within 3 miles of the Los Padres National Forest. Despite suitable habitat on the forest, repeated field surveys over a period of years have been unsuccessful in locating the species. Magney (1988) and Danielsen et al. (1994) have conducted the most comprehensive surveys of national forest system lands. Results of these surveys and maps showing the areas visited are on file at the Los Padres National

Table 5.15. Rare plants found in desert montane habitats. y = the taxon occurs on the forest; p = has potential to occur. Assessments of trend, knowledge of distribution, and vulnerability were made by forest botanists/biologists and generally refer to occurrences on national forest system lands (unkn. = unknown; decl. = declining).

Scientific Name (common name) listing status	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Arabis dispar</i> (pinyon rock cress)		99			unkn.	high	San Bernardino, Inyo, Mono, & Tulare cos., SW Nevada; San Bernardino Mtns. & mtns. bordering the Mojave Desert; (moderate)
<i>Astragalus douglasii</i> var. <i>perstrictus</i> (Jacumba milk-vetch) <i>FS sensitive</i>	y				stable ¹	low	San Diego & Imperial cos., Baja; (moderate)
<i>Astragalus lentiginosus</i> var. <i>sierrae</i> (Big Bear Valley milk-vetch) <i>FS sensitive</i>		185			unkn.	low	E San Bernardino Mtns.; (moderate)
<i>Astragalus leucolobus</i> (Big Bear Valley woollypod) <i>FS sensitive</i>	p	y	y	p	unkn.	low	San Gabriel, San Bernardino, & San Jacinto mtns., mtns. in San Benito Co.; (high)
<i>Canbya candida</i> (pygmy poppy) <i>FS sensitive</i>		p	y		unkn.		LA, San Bernardino (San Bernardino Mtns.), Kern, & Inyo cos., W Mojave Desert, Sierra Nevada; (low)
<i>Castilleja plagiotoma</i> (Mojave Indian paintbrush)		y	1	p	unkn.	mod.	Los Angeles, San Bernardino, Kern, & SLO cos.; (low)
<i>Caulanthus californicus</i> (California jewelflower) <i>federally endangered</i>				p	decl.		Santa Barbara, SLO, & Fresno cos., (high)
<i>Caulanthus simulans</i> (Payson's jewelflower) <i>FS sensitive</i>	22	1			unkn.	low	Riverside & SD cos.; (low)
<i>Chorizanthe xanti</i> var. <i>leucotheca</i> (white-bracted spineflower)		y			unkn.	unkn.	E San Gabriel, San Bernardino, San Jacinto, & Santa Rosa mtns., also Inyo & Kern cos.; (low)
<i>Cordylanthus eremicus</i> ssp. <i>eremicus</i> (desert bird's-beak)		p			unkn.		N San Bernardino Mtns. & mtn. ranges of the Mojave Desert
<i>Delphinium inopinum</i> (unexpected larkspur) <i>FS sensitive</i>				41	unkn.	low	Mt. Pinos; (low)
<i>Dudleya abramsii</i> ssp. <i>affinis</i> (San Bern. Mtns. dudleya) <i>FS sensitive</i>		y			unkn.	mod.	San Bernardino Mtns.; (moderate)
<i>Ericameria cuneata</i> var. <i>macrocephala</i> (Laguna Mtns. goldenbush)	y				stable	low	Laguna Mtns. (SD Co.); (moderate)

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Eriogonum foliosum</i> (leafy buckwheat)	p	h/p			decl.		San Bernardino Mtns., Garner Valley, San Jacinto Mtns., Sierra San Pedro Martir (Baja), SD Co.; (low)
<i>Geraea viscida</i> (sticky geraea)	y				stable ¹	low	desert areas of San Diego & Imperial cos., Sierra Juarez & Sierra San Borja (Baja); (moderate)
<i>Heuchera brevistaminea</i> (shaggy-haired alumroot)	45				stable	low	Laguna & Cuyamaca mtns. (SD Co.), also w Riverside Co.; (high)
<i>Lepidium flavum</i> var. <i>felipense</i> (Borrego Vly. pepper-grass)	p						(low)
<i>Linanthus floribundus</i> ssp. <i>hallii</i> (Snta. Rosa Mtns. linanthus) <i>FS sensitive</i>		y					Santa Rosa Mtns.; (low)
<i>Marina orcuttii</i> var. <i>orcuttii</i> (California marina) <i>FS sensitive</i>		y			unkn.	mod.	Santa Rosa Mtns., Sierra Juarez & Sierra de las Palmas (Baja); (low)
<i>Muilla coronata</i> (crowned muilla)		y					base of San Bernardino Mtns., Mojave Desert, also LA, Inyo, Kern, Tulare cos., NV
<i>Opuntia basilaris</i> var. <i>brachyclada</i> (short-joint beavertail) <i>FS sensitive</i>	p	219	29		unkn.	mod.	desert-side of San Gabriel & W San Bernardino mtns., Volcan Mtn. (SD Co.), Providence Mtns. (San Bernardino Co.); (high)
<i>Streptanthus campestris</i> (southern jewel-flower) <i>FS sensitive</i>	y	y		2	stable ¹	mod.	Riverside, San Bernardino, SD, & Santa Barbara cos., N Baja, San Bernardino, Little San Bernardino, San Jacinto, & In- Koh-Pah mtns.; (moderate)
<i>Stylocline masonii</i> (Mason neststraw)			y	y	unkn.	unkn.	LA, Kern, Monterey, & SLO cos., NW Tehachapi Mtns.; (low)
<i>Swertia neglecta</i> (pine green-gentian) <i>FS sensitive</i>		y	6	y	unkn.	mod.	Transverse Ranges; (low)
<i>Syntrichopappus lemmonii</i> (Lemmon's syntrichopappus)		y	y	p	unkn.	low	LA, San Bernardino, Riverside, Kern, & Monterey cos.; (low)
<i>Viola aurea</i> (golden violet)	p	y	p	p			SD, San Bernardino, Kern, & Mono cos.; San Gabriel, San Bernardino, & Tehachapi mtns. SW to Mt. Pinos; NV

¹ Reiser 1994 (refers to all known occurrences)

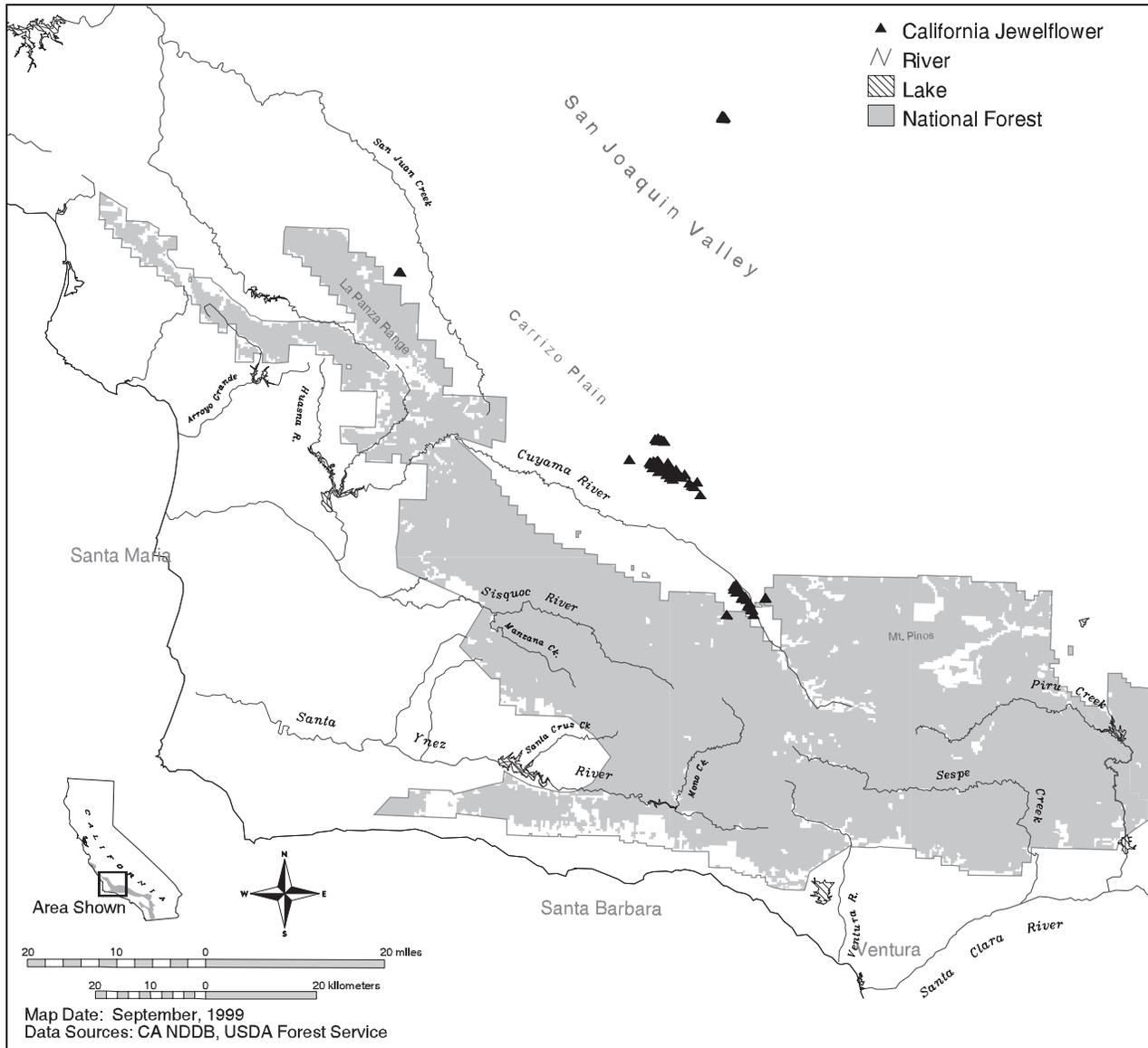


Figure 5.16. Documented locations of *Caulanthus californicus*, the California jewelflower.

Forest. Essentially all areas mapped as suitable habitat have been visited by botanists during the appropriate time of year. Two attempts were made to grow the plant from seed at suitable locations on the forest (Santa Barbara and Deer Park canyons). Germination and subsequent production of seed was successful in 1989; however, the number of individuals produced each year after that gradually declined until 1995 when no plants were found at either site. Monitoring in 1997 and 1998 found no plants evident at either site, despite favorable weather conditions. The range, distribution, abundance, and habitat requirements of this species are described in detail in

the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998). Occurrences are vulnerable to agricultural practices, urbanization, energy development, and overgrazing. See the final listing rule for additional information (USFWS 1990).

***Caulanthus simulans*
(Payson's jewelflower)**

Caulanthus simulans is a Forest Service Sensitive Species that occurs in Riverside and San Diego counties. The CNDDDB contains records for at least thirty-six occurrences and thirty-six general locations. Some of these locations, however, may contain the species *C. heterophyllus* and are in need of further

study. *C. simulans* is easily confused with *C. heterophyllus* var. *pseudosimulans*, a more coastal taxon that, unlike *C. simulans*, appears after fires. Many historic locations in the Santa Ana Mountains have proved to be misidentifications of this variety. *C. simulans* is an annual species that grows in openings within chaparral and coastal sage scrub, including burned areas and disturbed sites. It also is found in streambeds and on steep, rocky slopes. In San Diego County, plants are typically found on the desert side of the mountains. The species is vulnerable to overgrazing, trampling, and development projects. Many of the known occurrences are located on private lands. In addition, fires that are too frequent may lead to type conversion of habitat for this species. Other potential disturbances include flooding, erosion, and road maintenance. Other populations are found on lands managed by the BLM, Anza Borrego Desert State Park, and the Forest Service.

***Chorizanthe xanti* var. *leucotheca*
(white-bracted spineflower)**

Chorizanthe xanti var. *leucotheca* is known from approximately four to five locations on the San Bernardino National Forest. The occurrences are scattered in the eastern San Gabriel, San Bernardino, San Jacinto, and Santa Rosa mountains. No occurrences are recorded in the CNDDDB; however, the draft *Flora of the San Bernardino Mountains* notes occurrences in Inyo and Kern counties (Krantz et al. 1995). The species is found in Mojavean desert scrub and pinyon-juniper woodland communities.

***Cordylanthus eremicus* ssp. *eremicus*
(desert bird's-beak)**

Cordylanthus eremicus ssp. *eremicus* is an annual taxon known mainly from occurrences in mountain ranges of the Mojave Desert (e.g., the Nelson Range in Inyo County) and in Death Valley National Park. One occurrence is located at a spring near Cushenbury in the northern San Bernardino Mountains. This occurrence is close to but not actually on the

San Bernardino National Forest. Due to its potential to occur on the forest, the species has been placed on a watch list. The plant is a root parasite and grows in rocky soils within Joshua tree woodland and Mojavean desert scrub communities.

***Delphinium inopinum*
(unexpected larkspur)**

Delphinium inopinum is a Forest Service Sensitive Species. There are thirty-two reported occurrences of this perennial species. The smaller occurrences each contain from ten to one hundred plants and the larger occurrences (which are more frequent) contain hundreds and thousands of individual plants. In the assessment area, a historic occurrence is reported at Mount Pinos on the Los Padres National Forest. The occurrence is protected within the Mount Pinos Summit Botanical Area but needs to be confirmed. Plants typically grow in dry areas among rock outcrops and on open, rocky ridges in pine and red fir forest habitat.

***Dudleya abramsii* ssp. *affinis*
(San Bernardino Mountains dudleya)**

Dudleya abramsii ssp. *affinis* is a Forest Service Sensitive Species found in the San Bernardino Mountains. It occurs in desert-side montane, upper montane conifer, and subalpine habitats (including pebble plains and pinyon-juniper woodlands). Plants grow on soil outcrops and talus slopes composed of granite, quartzite, or rarely limestone/carbonate. The CNDDDB contains records on nine occurrences, and additional populations in the Big Bear Valley have not yet been reported to the database. Some occurrences are adversely affected by limestone mining. Many of the occurrences associated with pebble plains are protected by fencing on the San Bernardino National Forest.

***Ericameria cuneata* var. *macrocephala*
(Laguna Mountains goldenbush)**

Ericameria cuneata var. *macrocephala* is a shrub species endemic to the Laguna Mountains of San Diego County. Although its range is limited, occurrences are fairly common along the crest and desert-side slopes of these mountains. Reiser (1994) cites occurrences at Garnet Peak and Desert View Point. Most of the occurrences are located on public lands which are relatively well protected, including BLM and state park lands. The only known potential threat to the plant is development of electronic sites in its habitat on the tops of steep, rocky slopes. Occurrences on the Cleveland National Forest currently appear stable.

***Eriogonum foliosum* (leafy buckwheat)**

Eriogonum foliosum is an annual species known historically from Big Bear Valley in the San Bernardino Mountains and more recently from Garner Valley in the San Jacinto Mountains. The species is also known to occur in the Sierra San Pedro Martir in Baja California, Mexico. The *CNPS Inventory* cites two occurrences in the San Diego ranges (Pine Valley and Warner Springs) (Skinner and Pavlik 1994), and potential habitat exists on the Cleveland National Forest, but the plant has not been confirmed there. The CNDDDB contains records for at least three occurrences but the *CNPS Inventory* cites occurrences on seven USGS 7.5-minute quad maps. The plant inhabits sandy areas of chaparral, meadows, yellow pine forest, closed-cone conifer forest, and pinyon-juniper woodlands. It is easily confused with other annual buckwheats (e.g., *E. davidsonii*) and difficult to key.

***Geraea viscida* (sticky geraea)**

Geraea viscida is a rare, short-lived perennial species known from a number of locations in the border region and desert areas of San Diego and Imperial counties, as well as areas of Baja California, Mexico (e.g., the Sierra Juarez Mountains and Sierra San Borja) (Reiser 1994). Occurrences range from approximately 1,500 feet to over 5,500 feet in elevation. A

large occurrence is found in the Smuggler's Cave region east of Jacumba. Approximately half of the known occurrences are protected on federal and state lands. Occurrences are presumed to be stable based on limited development of the plant's habitat. It occupies sandy soils in chamise chaparral and appears to be disturbance oriented, appearing in sparsely vegetated areas, along roads, and after burns.

***Heuchera brevistaminea*
(Mount Laguna alumroot)**

Heuchera brevistaminea is a perennial species found primarily on the desert side of the Laguna Mountains in San Diego County. Occurrences are known from Garnet and Monument peaks, Oasis Spring, and Mount Laguna. It has also been located below the summit of Cuyamaca Peak in the Cuyamaca Mountains. One occurrence growing near Santa Rosa and Toro peaks in western Riverside County may represent a northern disjunct or range extension (Reiser 1994). The plant grows in dry areas on rocky soils in desert montane communities (e.g., montane chaparral). About twelve occurrences are known, some of them relatively large. Most of these occurrences are located on the Cleveland National Forest. Other occurrences are protected on state lands. The species is also naturally protected by its preference for relatively inaccessible terrain—it grows on steep, rock faces and crevices or on exposed rock slabs (Reiser 1994).

***Linanthus floribundus* ssp. *hallii*
(Santa Rosa Mountains linanthus)**

Linanthus floribundus ssp. *hallii* is a Forest Service Sensitive Species. It is a perennial taxon known from occurrences in the Santa Rosa Mountains. Plants grow in desert montane habitats (e.g., canyons with Sonoran desert scrub). The CNDDDB contains records for at least four occurrences. One occurrence on the San Bernardino National Forest is located in the Santa Rosa Wilderness Area. Plants grow in open areas along a wash within pinyon-juniper woodland habitat. High

levels of recreation, trail maintenance, and trail construction are potential impacts to this taxon.

***Marina orcuttii* var. *orcuttii*
(California marina)**

Marina orcuttii var. *orcuttii* is a Forest Service Sensitive Species. It is a perennial plant found in the Santa Rosa Mountains and in the Sierra Juarez and Sierra de las Palmas of Baja California, Mexico (Barneby 1977). Two occurrences are known in the Santa Rosa Wilderness Area, both along the Cactus Springs Trail. This species occupies desert montane habitat—gravelly hillsides in pinyon-juniper woodland and Sonoran desert scrub. Potential impacts to the plant include high levels of recreation use, trail maintenance, and trail construction.

***Muilla coronata* (crowned muilla)**

Muilla coronata is a perennial species known from at least two occurrences along the northern base of the San Bernardino Mountains. Occurrences are also documented in Inyo, Kern, Tulare, and Los Angeles counties, and in Nevada. The plant grows on heavy soils in openings within pinyon-juniper woodland, Mojavean desert scrub, and Joshua tree woodland. Potential threats on the forest include off-road vehicle activities, high levels of recreation use, and mining.

***Opuntia basilaris* var. *brachyclada*
(short-joint beavertail)**

Opuntia basilaris var. *brachyclada* is a Forest Service Sensitive Species found on desert-side slopes of the San Gabriel and western San Bernardino mountains, and at Cajon Pass between the two mountain ranges where desert vegetation occurs. Plants are found between 3,000 and 6,000 feet elevation in loose, sandy to gravelly mineral soils. They grow within chaparral communities (i.e., chamise chaparral, semi-desert chaparral, northern mixed chaparral, and southern mixed chaparral), chaparral transition zones, Joshua tree woodlands, Mojavean desert scrub, Mojavean pinyon woodlands, pinyon-juniper wood-

lands, and southern sycamore-alder riparian woodland (Mistretta and Parra-Szjij 1991b).

Approximately thirty occurrences are known, twelve recorded in the CNDDDB. Surveys in 1990 identified fifteen localities and approximately nine hundred individual plants. Most of these occurrences are located on national forest system lands, and a species management guide was developed in 1991 for the Angeles National Forest (Mistretta and Parra-Szjij 1991b). Known populations appear to be stable and represent a variety of age classes. Vegetation management (e.g., chemical and mechanical removal of biomass, establishment of conifer plantations, and prescribed burning) has had the greatest effect on occurrences on the Angeles National Forest; however, the effects of fire on its distribution and abundance are unknown (Mistretta and Parra-Szjij 1991b).

***Streptanthus campestris*
(southern jewel-flower)**

Streptanthus campestris is a Forest Service Sensitive Species found in Riverside, San Bernardino, San Diego, and Santa Barbara counties as well as in northern Baja California, Mexico. Occurrences are known from the San Bernardino, Little San Bernardino, San Jacinto, and In-Koh-Pah mountains. The species is a short-lived perennial that grows on rocky soils in chaparral (including high desert transitional chaparral), conifer forest, and pinyon-juniper woodlands. One occurrence is located among large boulders in the partial shade of western junipers. At another locale, the plant grows in open chamise chaparral (Reiser 1994). The CNDDDB contains records for fifteen occurrences, and additional locations are known but not yet entered into the database. There are two historic and one confirmed extant occurrence on the Los Padres National Forest.

***Stylocline masonii* (Mason neststraw)**

Stylocline masonii is an annual species known from occurrences in Los Angeles, Monterey, San Luis Obispo, and Kern counties.

The plant is found in the northwestern Tehachapi Mountains, the southern San Joaquin Valley, and the Santa Lucia Ranges. It grows on sandy soils and in washes within chenopod scrub habitat and pinyon-juniper woodlands. Most occurrences are reported between 300 and 1,400 feet elevation (Hickman 1993). Just one collection has been documented since 1971.

***Swertia neglecta* (pine green-gentian)**

Swertia neglecta is a Forest Service Sensitive Species known from the desert slopes of the San Bernardino and San Gabriel mountains, and the western Transverse Ranges. Small, scattered occurrences are found within yellow pine forests, dry open woodlands, and pinyon-juniper woodlands. Five occurrences are known on the San Bernardino National Forest, including two discovered in 1998 on carbonate soils growing with the federally endangered, *Oxytheca parishii* var. *goodmaniana*. Four occurrences are documented on the Los Padres National Forest, and the Angeles National Forest contains almost twenty locations. One occurrence on the San Bernardino National Forest is located in an area proposed for a limestone mine overburden site. In other areas, the species is vulnerable to mining activities, road maintenance, and recreation impacts from hiking, camping, horseback riding, and off-highway vehicle use. A review of all pre-1998 vegetation plot data sheets and maps created for the carbonate plant conservation study (USDA 1996) may yield other locations of this taxon on the San Bernardino National Forest.

***Syntrichopappus lemmonii*
(Lemmon's syntrichopappus)**

Syntrichopappus lemmonii is a watch-list species on the San Bernardino and Angeles national forests. At least five occurrences are documented on the San Bernardino National Forest. Occurrences are known from Los Angeles, San Bernardino, Riverside, Kern, and Monterey counties. An annual plant, it grows on sandy or gravelly soils within chaparral and

Joshua tree woodlands between 2,900 and 4,900 feet elevation. It appears abundantly after fires.

***Viola aurea* (golden violet)**

Viola aurea is a perennial species known from occurrences in San Diego, San Bernardino, Kern, and Mono counties as well as Nevada, where it may be more common. Plants grow in sandy places within Great Basin scrub and pinyon-juniper woodlands between 3,200 and 5,900 feet. Five locations are documented in California, including one at Cajon Pass between the San Gabriel and San Bernardino mountains and another in Doane Valley at Palomar Mountain State Park (CNDDDB 1998). The occurrence at Cajon Pass is located on the San Bernardino National Forest, where the species is placed on a watch list. Potential habitat occurs on the Cleveland National Forest. Other occurrences are reported from the eastern slopes of the Tehachapi Mountains southwest to Mount Pinos (Moe and Twisselmann 1995), and possibly at Pine Mountain Ridge in the southern Los Padres region (Smith 1976). Occurrences are vulnerable to overgrazing, off-road vehicle activity, and development projects.

Carbonate Plants

Ten rare plants are specifically associated with carbonate (e.g., limestone, dolomite) substrates that occur in localized areas on the desert side of the San Bernardino Mountains (table 5.16). Four federally endangered species and one federally threatened species are included in this group.

***Abronia nana* ssp. *covillei*
(Coville's dwarf abronia)**

Abronia nana ssp. *covillei* is a Forest Service Sensitive Species that occurs on dry slopes with carbonate soil and in sandy places within the San Bernardino, Inyo, New York, and White mountains. Occurrences are also found in the Sheep Range in southwestern Nevada. The plant is typically found growing in pinyon-juniper and Joshua tree woodlands,

Table 5.16. Rare plants found in association with carbonate soils. y = the taxon occurs on the forest; p = has potential to occur). Assessments of trend, knowledge of distribution, and vulnerability were made by forest botanists/biologists and generally refer to occurrences on national forest system lands (unkn. = unknown; decl. = declining).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Abronia nana</i> ssp. <i>covillei</i> (Coville's dwarf abronia) <i>FS sensitive</i>		y			decl.	high	San Bernardino, Inyo, White, & New York mtns., SW NV (Sheep Range); (moderate)
<i>Allium parishii</i> (Parish's onion)		y			unkn.	high	San Bernardino, Riverside, & Inyo cos., W AZ, San Bernardino & Little San Bernardino mtns., Mojave Desert; (low)
<i>Arabis shockleyi</i> (Shockley's rock cress) <i>FS sensitive</i>			141		unkn.	high	San Bernardino (NE San Bernardino Mtns.) & Inyo cos., NV, Great Basin; (moderate)
<i>Astragalus albens</i> (Cushenbury milk-vetch) <i>federally endangered</i>			552		decl.	high	San Bernardino Mtns.; (high)
<i>Erigeron parishii</i> (Parish's daisy) <i>federally threatened</i>			489		decl.	high	Riverside & San Bernardino cos., San Bernardino Mtns.; (high)
<i>Erigeron uncialis</i> var. <i>uncialis</i> (limestone daisy) <i>FS sensitive</i>			p		unkn.		San Bernardino & Inyo cos., central NV, San Bernardino Mtns., Mojave Desert (Clark Mtn.), White & Inyo mtns., Grapevine Mtns., Tin Mtn.; (low)
<i>Eriogonum microthecum</i> var. <i>corymbosoides</i> (San Bern. buckwheat)			4	p	unkn.	high	San Bernardino Mtns.; (high)
<i>Eriogonum ovalifolium</i> var. <i>vineum</i> (Cushenbury buckwheat) <i>federally endangered</i>			839		decl.	high	San Bernardino Mtns.; (high)
<i>Lesquerella kingi</i> ssp. <i>bernardina</i> (San Bern. Mtns. bladderpod) <i>federally endangered</i>			128		decl.	high	San Bernardino Mtns.; (high)
<i>Oxytheca parishii</i> var. <i>goodmaniana</i> (Cushenbury oxytheca) <i>federally endangered</i>			312		decl.	high	San Bernardino Mtns.; (high)

dry conifer forests, and Great Basin scrub. Five occurrences are known on the San Bernardino National Forest. Plants are affected by limestone mining operations and high levels of recreation use, particularly from unauthorized off-road vehicles.

***Allium parishii* (Parish's onion)**

Allium parishii occurs in San Bernardino, Riverside, and Inyo counties, as well as western Arizona. Occurrences are generally located above 4,000 feet elevation, on the desert-side slopes of the San Bernardino Mountains and Little San Bernardino Mountains, and in the Mojave Desert. The habitat is described as open and rocky slopes in Joshua tree woodlands. There appears to be an association with carbonate soils but the species may grow in other soil types. Two occurrences are located in an active limestone mining area. One new occurrence was found in 1998 in Furnace Canyon, growing on carbonate soil with *Eriogon parishii* and *Astragalus albens*. Mining activities and high levels of recreation use, particularly from off-road vehicles, may be affecting populations in the assessment area.

***Arabis shockleyi*
(Shockley's rock cress)**

Arabis shockleyi is a Forest Service Sensitive Species found in Inyo and San Bernardino counties, and also Nevada. In California the plant grows on carbonate or quartzite soil in pinyon-juniper woodlands. In 1998, this plant was found within fifty-one 0.1-acre plots randomly placed in an area known to support one of the five listed carbonate species on the San Bernardino National Forest. These occurrences are not included in the acres of occupied habitat reported for this species in table 5.16. Disjunct occurrences are found in the mountains east and north of the Mojave Desert and in portions of the Great Basin. The CNDDB contains records on twenty-two occurrences.

***Astragalus albens*
(Cushenbury milk-vetch)**

Astragalus albens is a federally endangered species endemic to the San Bernardino Mountains. A draft recovery plan (USFWS 1997b) cites thirty-three known occurrences, distributed from the east side of Dry Canyon, north to approximately 1/2 mile north of Cushenbury Springs and southeast to 1/2 mile east of Arrastre Creek. Henderson and Volgarino (1997) estimated 559 acres of *A. albens* on national forest system lands and 11 acres on BLM lands. More occurrences were mapped during 1998 surveys. Occurrences are known to expand in years of good rainfall; during a drought year in the 1980s, the total number of plants at all known locations was estimated at two thousand. Favorable rainfall in 1992, combined with a more thorough survey effort, increased the estimate to between five thousand and ten thousand plants at all known sites. The largest occurrence was located in the Top Spring-Smarts Ranch Road area and contained several thousand individuals (USFWS 1997b; B. Henderson, San Bernardino NF, pers. comm.).

Astragalus albens is usually found on carbonate or granitic soils between 3,600 and 6,200 feet (USFWS 1997b). It occupies pinyon and juniper woodlands, sandy or stony flats, rocky hillsides, and canyon washes and fans. Significant differences between occupied and unoccupied habitat are described by Gonella (1994). This species is also addressed in the *Conservation Study for Five Carbonate Plant Species: a study of land use conflict in the San Bernardino National Forest* (USDA Forest Service 1996). The species is vulnerable to mining operations and mineral exploration. At least 97 percent of the known occurrences are located on public land claimed for mining or on private land (USFWS 1997b). Road and powerline construction, utility corridors, unauthorized vehicle use, and unauthorized grazing from trespass cattle are other actions that affect this species.

***Erigeron parishii* (Parish's daisy)**

Erigeron parishii is a federally threatened species known from at least twenty-six occurrences in Riverside and San Bernardino counties (CNDDDB 1996). The plant is distributed within a 35-mile stretch of carbonate habitat and is the most wide-ranging of the five listed species in this group. Occurrences are found between 3,600 and 6,400 feet in pinyon woodlands, pinyon-juniper woodlands, black bush scrub, Mojavean desert scrub, and Joshua tree woodlands. Plants usually occupy shallow drainages, rocky slopes, and outwash plains on limestone or dolomite soils (USFWS 1997b). Some populations occur on a granite/limestone interface—usually granitics overlain with limestone—and on limestone alluvium above quartz monzonite substrates. Approximately fifty populations are now known, consisting of an undefined number of plants. Prior to listing, the plant was known from fewer than twenty-five occurrences totaling about sixteen thousand individual plants (USFWS 1997b). Henderson and Volgarino (1997) estimated 396 acres of occupied habitat on national forest system lands and 186 acres on BLM lands. The species is addressed in the draft recovery plan (USFWS 1997b) and the *Conservation Study for Five Carbonate Plant Species: a study of land use conflict in the San Bernardino National Forest* (USDA Forest Service 1996). The species is vulnerable to the same activities affecting *Astragalus albens*: mining, mineral exploration, road and powerline construction, utility corridors, unauthorized vehicle use, and unauthorized grazing.

***Erigeron uncialis* var. *uncialis* (limestone daisy)**

Erigeron uncialis var. *uncialis* is a Forest Service Sensitive Species. It is found within San Bernardino and Inyo counties as well as central Nevada. Occurrences are known from the San Bernardino Mountains, the Mojave Desert, and the White and Inyo mountains east of the Sierra Nevada. Disjunct occurrences are located in the Schell Creek and White Pine

ranges of Nevada. Records from botanist Mary Decker indicate occurrences near Death Valley in the Grapevine Mountains and at Tin Mountain, and in the Mojave Desert at Clark Mountain. The Nevada Natural Heritage Program (NNHP) records three to five occurrences of *E. cavernensis* which is now lumped with *E. uncialis* var. *uncialis* (Cronquist 1994). The plant occurs within the assessment area in desert montane and subalpine/alpine habitats. It grows from limestone crevices within Great Basin scrub and subalpine coniferous forest. Limestone mining and off-road vehicle use are threats to its habitat in the San Bernardino Mountains. Habitat in Nevada (carbonate rock and crevices) is relatively widespread and not considered vulnerable at this time (J. Morefield, NNHP, pers. comm.).

***Eriogonum microthecum* var. *corymbosoides* (San Bernardino buckwheat)**

Eriogonum microthecum var. *corymbosoides* is a deciduous shrub known from the northern slopes of the San Bernardino Mountains. Occurrences are found in pinyon-juniper woodlands and associated with carbonate and granitic soils. In 1998, this taxon was found within forty-nine 0.1-acre plots, randomly located in an area known to support one of the five listed carbonate plant species on the San Bernardino National Forest. These occurrences are not included in the acres of occupied habitat reported for this species in table 5.16.

***Eriogonum ovalifolium* var. *vineum* (Cushenbury buckwheat)**

Eriogonum ovalifolium var. *vineum* is a federally endangered taxon distributed from west of the White Mountain Management Unit east to Rattlesnake Canyon (fig. 5.17). The total number of individual plants is estimated at thirteen thousand, with about one-quarter of the known occurrences containing more than one thousand plants (USFWS 1997b). The CNDDDB contains records for twenty-seven occurrences. Known locations on limestone

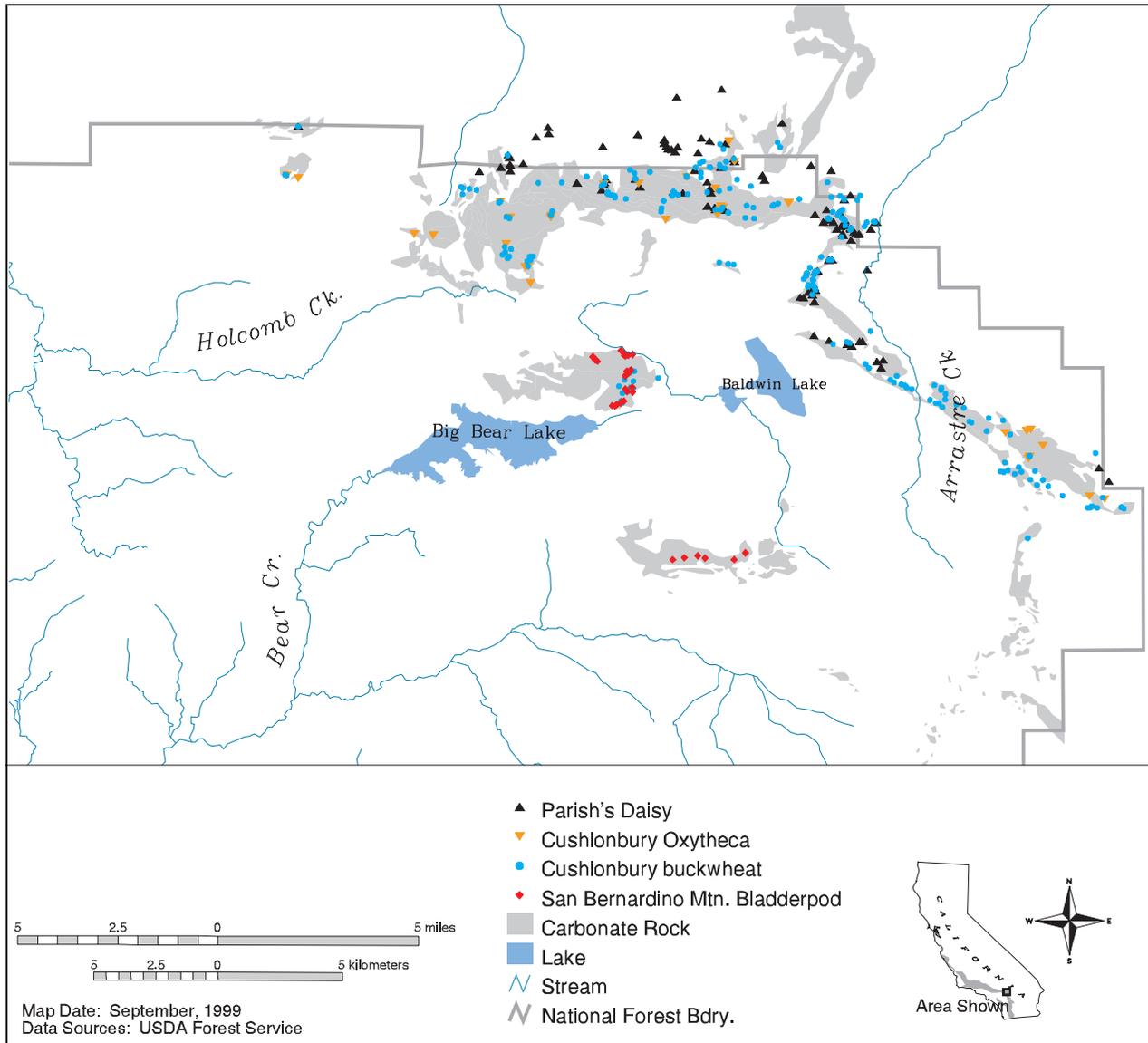


Figure 5.17. Documented locations of *Eriogonum ovalifolium* var. *vineum* (Cushenbury buckwheat), *Lesquerella kingii* ssp. *bernardina* (San Bernardino Mountains bladderpod), and *Oxytheca parishii* var. *goodmaniana* (Cushenbury oxytheca).

include the White Knob area, Arctic/Bousic Canyon west to Terrace Springs, south to Top Spring, and along the north side of Lone Valley to Tip Top Mountain. The plant also occurs on dolomite in the Bertha Ridge area, in northern Holcomb Valley, in Jacoby Canyon, and along Nelson Ridge (USFWS 1997b). A population at Furnace Canyon grows on a mix of granite, limestone, and dolomite. Recent surveys done by the San Bernardino National Forest located two new populations, one near Jacoby Springs and one just north of Mineral Mountain.

This plant is found between 4,800 and 7,800 feet in openings of pinyon woodland, pinyon-juniper woodland, Joshua tree woodland, black bush scrub, Mojavean desert scrub, and dry coniferous forest. Site conditions include a low accumulation of organic material, usually less than 15 percent canopy cover, moderate slopes, and rock cover that exceeds 50 percent in fine soils. Some occurrences on north-facing slopes are found with *Astragalus albens* (USFWS 1997c). The taxon is addressed in a draft recovery plan (USFWS 1997b) and the *Conservation Study for Five*

Carbonate Plant Species: a study of land use conflict in the San Bernardino National Forest (USDA Forest Service 1996). Occurrences are affected by mining, mineral exploration, road and powerline construction, utility corridors, unauthorized vehicle use, and unauthorized grazing.

Lesquerella kingii* ssp. *bernardina
(San Bernardino Mountains bladderpod)

Lesquerella kingii ssp. *bernardina* is a federally endangered plant found in the Big Bear Valley area. It occupies the smallest area of the five listed carbonate taxa (USFWS 1997b). Occurrences are known from two areas that encompass an estimated 149 acres on the San Bernardino National Forest (Henderson and Volgarino 1997). All but 21 acres are mapped in our GIS database. One site is located on the northern side of the valley near the eastern end of Bertha Ridge and next to the community of Big Bear City (fig. 5.17). The total number of individuals at this location was estimated to be twenty-five thousand in 1980, and less than ten thousand in 1988. The decline may reflect real change brought on by prolonged drought conditions and/or apparent change due to differences in sampling technique (USFWS 1997b). The other area is centered on the north-facing slope of Sugarlump Ridge, south of Big Bear Valley and about 6 miles south of the Bertha Ridge populations. This area contained approximately ten thousand plants in 1991. Resource personnel from the San Bernardino National Forest and CDFG observed increased abundance in the years following the drought (USFWS 1997b).

This plant is found between 6,500 and 8,200 feet in elevation, on dolomite soils within Jeffrey pine-western juniper woodlands and white fir forests. Plants grow in open areas with little accumulation of organic material. The northern-most occurrence grows with *Eriogonum ovalifolium* var. *vineum*. Although plants have been observed growing in old road beds, established populations can be easily extirpated by unauthorized off-road vehicle use and mountain biking. Fence construction, signing, and closure of non-

system roads in occupied habitat near the Big Bear rifle range enhanced habitat for one occurrence near the north shore of Big Bear Lake in 1998. Potential disturbances to the Lakeview cabin tract population are being assessed in 1999. Generally, the plant is vulnerable to unauthorized off-road vehicle use, woodcutting, and mining. The taxon is addressed in a draft recovery plan (USFWS 1997b) and the *Conservation Study for Five Carbonate Plant Species: a study of land use conflict in the San Bernardino National Forest* (USDA Forest Service 1996).

Oxytheca parishii* var. *goodmaniana
(Cushenbury oxytheca)

Oxytheca parishii var. *goodmaniana* is a federally endangered taxon. It occupies the second smallest area of the listed carbonate plants. In 1990 the estimated number of plants was fewer than three thousand in four known populations (USFWS 1997b); however, abundance varies with rainfall. Surveys conducted by the San Bernardino National Forest from 1992 to 1995 located eleven new populations. More populations were located following the El Niño event in 1998. Occurrences range from South Peak east to 1/2 mile south and east of Terrace Springs (some plants in the Terrace Springs area have now been identified as *O. parishii* var. *cienegensis*). Other known sites include Cushenbury Spring; Cushenbury, Marble, Arctic, Wild Rose and Furnace canyons; near the abandoned Green Lead gold mine; north of Holcomb Valley; and in the White Mountain Management Unit (fig. 5.17). In addition, three other morphologically distinct populations were found at the eastern end of the known range of this plant—along the Helendale Fault near Tip Top Mountain, at Mineral Mountain, and at Rose Mine. Occurrences are generally found between 4,200 and 7,800 feet, on limestone and dolomite soils within pinyon and juniper woodland. The taxon is addressed in a draft Recovery Plan (USFWS 1997b) and in the *Conservation Study for Five Carbonate Plant Species: a study of land use conflict in the San*

Bernardino National Forest (USDA Forest Service 1996). The primary disturbances to this taxon come from limestone mining operations and exploration.

Desert Floor Plants

Two rare plants are primarily found in desert floor habitat at the eastern edge of the assessment area. Summary information is shown in table 5.17. Both of these taxa are federally endangered.

Astragalus lentiginosus var. *cochellae* (Coachella Valley milk-vetch)

Astragalus lentiginosus var. *cochellae* is a federally endangered species known from the Coachella Valley area of Riverside County. Habitat for this annual plant is found at low elevations (below 1,200 feet) in sandy flats, outwash fans, and on dunes in Sonoran desert scrub, creosote bush scrub, or sagebrush dominated communities. The CNDDDB contains records for seventeen occurrences, five located within the Coachella Valley Preserve (jointly managed by the BLM, CDFG, USFWS, and TNC). Occurrences in the preserve are monitored annually. One occurrence showed a decline in abundance from 1979 (209 plants) to 1982 (2 plants). Surveys during 1987 (a drought year) located fewer than 300 plants at all locations (USFWS 1992a). Two other

occurrences are found on the Agua Caliente Indian Reservation, one occurrence is located on land owned by Southern California Edison, and the remaining occurrences are located on private lands. There are no known occurrences on the San Bernardino National Forest; however, one area at Snow Creek Canyon (1,400 feet) may be low enough in elevation to provide some potential habitat. The main threat to this taxon is habitat loss due to urban development (USFWS 1992a).

Astragalus tricarinatus (triple-ribbed milk-vetch)

Astragalus tricarinatus is a federally endangered, short-lived perennial known from areas bordering the Sonoran Desert in Riverside and San Bernardino counties. The CNDDDB contains records for seven occurrences and seven general locations; however, the U.S. Fish and Wildlife Service confirms only four sites in the Coachella Valley (USFWS 1992a). Occurrences are reported near Whitewater Canyon and Morongo Valley (northwestern end of the Coachella Valley), and Agua Alta Canyon (southern end of the Coachella Valley). Two of these occurrences are protected in an Area of Critical Environmental Concern (ACEC) by the BLM, and also managed as a preserve by the BLM and TNC. Since 1987, plants have not been found at either site or at Whitewater and Agua Alta canyons. When the proposed listing rule was published in 1992,

Table 5.17. Rare plants found in desert floor habitats. p = the taxon has potential to occur on the forest. Assessments of trend, knowledge of distribution, and vulnerability were made by forest botanists/biologists and generally refer to occurrences on national forest system lands.

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Astragalus lentiginosus</i> var. <i>cochellae</i> (Coachella Valley milk-vetch) <i>federally endangered</i>		p					Coachella Valley, potential habitat at low elevation on desert side of San Jacinto Mtns.; (low)
<i>Astragalus tricarinatus</i> (triple-ribbed milk-vetch) <i>federally endangered</i>		p					Coachella Valley, potential habitat at low elevation on desert side of San Jacinto Mtns.; (low)

no live plants were known, but a viable seed pool was presumed to exist in the soil and the species is expected to reappear when climatic conditions are favorable (USFWS 1992a). Plants typically occupy habitat below 2,600 feet, reportedly growing on canyon walls or on decomposed granite or gravelly soils at the base of canyon slopes. Plants have also been found on sandy or gravelly soils along the edges of boulder-strewn washes in Joshua tree woodland or Sonoran desert scrub (USFWS 1992a). Occurrences have not been found on the San Bernardino National Forest; however, potential habitat occurs in the San Jacinto Mountains.

Monterey and San Luis Obispo Coast Plants

Five rare plants are primarily associated with habitats along the coast of Monterey and San Luis Obispo counties. Summary information is shown in table 5.18.

Arctostaphylos cruzensis (La Cruz manzanita)

Arctostaphylos cruzensis is a Forest Service Sensitive Species. It is an evergreen shrub known from occurrences in southern Monterey and northwestern San Luis Obispo counties, where the species is found on sandy soils along the coast. Skinner and Pavlik (1994) report occurrences within several distinct vegetation types: broadleaved upland forest, coastal bluff scrub, closed-cone conifer forest, chaparral, coastal scrub, and valley-foothill grassland. Hickman (1993) describes habitat for this species as sandy bluffs below 500 feet elevation. Fewer than twenty occurrences are known, ranging in size from one plant to an estimated one thousand individual plants. Half of the known occurrences are located on private lands owned by the Hearst Corporation and may be subject to development. In Monterey County, one occurrence is found at Pacific Valley on the Los Padres National Forest (Matthews 1997).

Table 5.18. Rare plants found in Monterey Coast habitats. p = the taxon has potential to occur on the forest. Assessments of trend, knowledge of distribution, and vulnerability were made by forest botanists/biologists and generally refer to occurrences on national forest system lands (decl. = declining; unkn. = unknown).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Arctostaphylos cruzensis</i> (La Cruz manzanita) <i>FS sensitive</i>				1	decl.	low	S Monterey & NW SLO cos., Monterey Coast; (moderate)
<i>Delphinium hutchinsoniae</i> (Hutchinson's larkspur) <i>FS sensitive</i>				2	decl.	low	Monterey Coast; (low)
<i>Galium californicum</i> <i>ssp. luciense</i> (Cone Peak bedstraw) <i>FS sensitive</i>				569	unkn.	low	Monterey Co., (N. Santa Lucia Rng.); (low)
<i>Perideridia gairdneri</i> <i>ssp. gairdneri</i> (Gairdner's yampah)	p		p	4		low	Monterey Co. north to Del Norte Co. (scarce south of Monterey Co.); (low)
<i>Raillardiopsis muirii</i> (Muir's raillardella) <i>FS sensitive</i>				8	stable	low	Monterey Coast, N Santa Lucia Rng., S Sierra Nevada; (moderate)

Delphinium hutchinsonae
(Hutchinson's larkspur)

Delphinium hutchinsonae is a Forest Service Sensitive Species that is endemic to Monterey County. Occurrences are found from sea level to 1,300 feet elevation, on moist soils within broad-leaved upland forest, chaparral, coastal prairie, and coastal scrub habitats. Fewer than ten occurrences are known, the largest containing an estimated one hundred plants. Most of the known occurrences are located on private lands; however, one occurrence is located on the Los Padres National Forest and another occurs on land managed by the U.S. Coast Guard.

Galium californicum* ssp. *luciense
(Cone Peak bedstraw)

Galium californicum ssp. *luciense* is a perennial taxon endemic to the northern Santa Lucia Range in Monterey County. Occurrences are found growing on talus or duff within broad-leaved upland forest, cismontane woodland, and conifer forest habitats. Between five and ten occurrences are known, four of them located in designated wilderness areas on the Los Padres National Forest.

Perideridia gairdneri* ssp. *gairdneri
(Gairdner's yampah)

Perideridia gairdneri ssp. *gairdneri* was once widely distributed in California but is now thought to be extirpated in the southern portion of its range (i.e., Los Angeles, Orange, and San Diego counties) (Skinner and Pavlik 1994). Extant occurrences are found from Monterey County north to Del Norte County, California. The subspecies grows at sea level to about 1,200 feet in elevation, in mesic places (including vernal pools) within coastal flats, valley-foothill grasslands, chaparral, broad-leaved upland forests, and pine stands. Occurrences are mapped on the Monterey Ranger District of the Los Padres National Forest; however, this taxon is no longer identified as a sensitive species.

Raillardiopsis muirii
(Muir's raillardella)

Raillardiopsis muirii is a Forest Service Sensitive Species known from nineteen occurrences that range across an estimated 200-mile section of the southern Sierra Nevada, from Fresno to Kern counties. One disjunct occurrence is found 160 miles to the west near the coast of Monterey County. This occurrence is located in the Ventana Wilderness Area (at Ventana Double Cone) on the Los Padres National Forest. The species grows from granite ledges and crevices and on gravelly or sandy flats in openings of montane chaparral, ponderosa pine forest, and mixed conifer forest.

Serpentine Plants

Ten rare plants are found primarily in association with serpentine soils. Within the assessment area, serpentine soils occur mainly in Monterey and San Luis Obispo counties. Summary information for these species is shown in table 5.19.

Calochortus obispoensis
(San Luis mariposa lily)

Calochortus obispoensis is a Forest Service Sensitive Species. It is endemic to San Luis Obispo County and concentrated around the city of San Luis Obispo. Occurrences are known from Cuesta Ridge, Reservoir Canyon, and Brizzolari Canyon (fig. 5.18). The plants at Indian Knob grow on tar sands that may be a type of carbonate soil (McLeod 1984). There are eighteen recorded occurrences ranging in abundance from fewer than fifty plants to an estimated one thousand plants. One occurrence is protected in the Cuesta Ridge Botanical Area of the Los Padres National Forest, another occurrence is located in a county and city biosphere reserve, and several others are found on land owned by California Polytechnic San Luis Obispo (Cal Poly). Records kept by Forest Service resource personnel indicate that the species responds positively to wildfire.

Table 5.19. Rare plants found in association with serpentine soils. y = the taxon occurs on the forest. Assessments of trend, knowledge of distribution, and vulnerability were made by forest botanists/biologists and generally refer to occurrences on national forest system lands (unkn. = unknown; decl. = declining; incr. = increasing).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Calochortus obispoensis</i> (San Luis mariposa lily) <i>FS sensitive</i>				520	unkn.	mod.	SLO Co., Santa Lucia Rngs.; (moderate)
<i>Carex obispoensis</i> (San Luis Obispo sedge) <i>FS sensitive</i>				218	stable	mod.	SLO Co., Santa Lucia Rngs.; (low)
<i>Caulanthus amplexicaulis</i> var. <i>barbarae</i> (Santa Barbara jewelflower) <i>FS sensitive</i>				136	unkn.	low	San Rafael Mtns. (Santa Barbara Co.); (moderate)
<i>Chlorogalum pomeridianum</i> var. <i>minus</i> (dwarf soaproot)				290		low	SLO, Colusa, Lake, Sonoma, & Tehama cos.
<i>Chorizanthe breweri</i> (Brewer's spineflower) <i>FS sensitive</i>				1,081	stable	low	SLO Co., Santa Lucia Rngs.; (moderate)
<i>Fritillaria falcata</i> (talus fritillary) <i>FS sensitive</i>				y	unkn.	low	Monterey, San Benito, Santa Clara, Stanislaus, & Alameda cos.; (moderate)
<i>Fritillaria viridea</i> (San Benito fritillary) <i>FS sensitive</i>				36	unkn.	low	SLO, Monterey, & San Benito cos.; (low)
<i>Galium hardhamiae</i> (Hardham's bedstraw) <i>FS sensitive</i>				221	stable	low	Monterey & SLO cos., Santa Lucia Rngs.; (moderate)
<i>Sanicula maritima</i> (adobe sanicle) <i>FS sensitive</i>				3	decl.	high	coastal prairies in Monterey & SLO cos.; (moderate)
<i>Sidalcea hickmanii</i> ssp. <i>anomala</i> (Cuesta Pass checkerbloom) <i>FS sensitive</i>				522	stable/ incr.	low	SLO Co., Santa Lucia Rngs.; (high)

***Carex obispoensis*
(San Luis Obispo sedge)**

Carex obispoensis is a Forest Service Sensitive Species known from San Luis Obispo County. Potential habitat also exists in southern Monterey County (fig. 5.18). The sedge is found in ephemeral seeps with Sargent cypress at Cuesta Ridge, Reservoir Canyon, and as far north as Arroyo de la Cruz (McLeod

1984). It also grows under drier conditions in serpentine chaparral. About seventeen occurrences are documented. One is located on Department of Defense (DOD) land, three are within the Los Padres National Forest (one located in the Cuesta Ridge Botanical Area), and the rest occur on private lands owned for the most part by the Hearst Corporation.

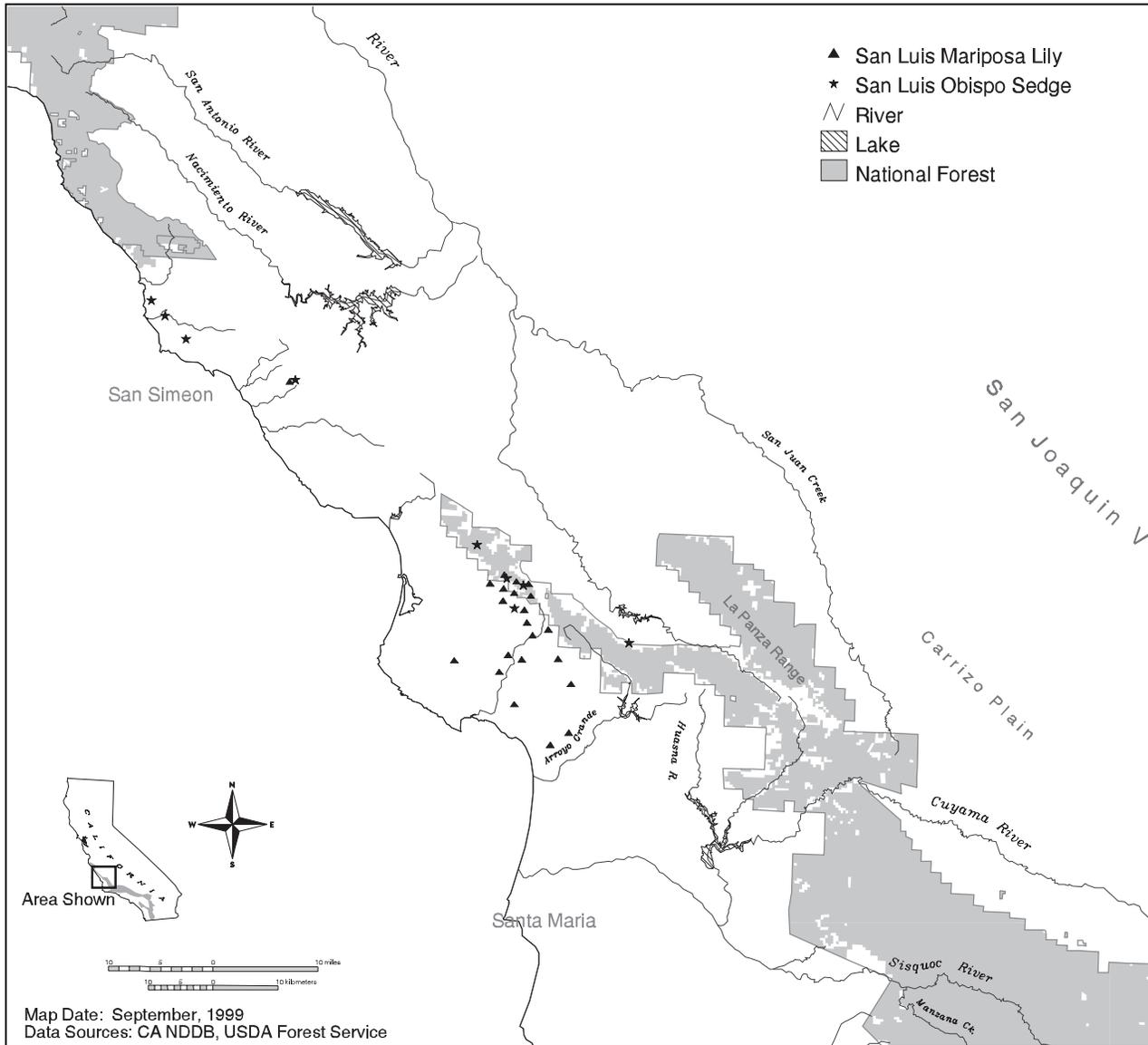


Figure 5.18. Documented locations of *Calochortus obispoensis*, the San Luis mariposa lily, and *Carex obispoensis*, the San Luis Obispo sedge.

***Caulanthus amplexicaulis* var. *barbarae*
 (Santa Barbara jewelflower)**

Caulanthus amplexicaulis var. *barbarae* is a Forest Service Sensitive Species. An annual plant, it is found within the San Rafael Mountains of Santa Barbara County. About six occurrences are documented, five located within the Los Padres National Forest. The plant appears to respond positively to fall fires.

***Chlorogalum pomeridianum* var. *minus*
 (dwarf soaproot)**

Chlorogalum pomeridianum var. *minus* is known from Colusa, Lake, Sonoma, Tehama, and San Luis Obispo counties. The species is

no longer considered a Forest Service Sensitive Species.

***Chorizanthe breweri*
 (Brewer's spineflower)**

Chorizanthe breweri is a Forest Service Sensitive Species. An annual plant, it is found on the Santa Lucia Ranger District of the Los Padres National Forest, from Cerro Alto to Lopez Mountain and at various other sites in San Luis Obispo County. Occurrences are known from Cuesta Ridge, Reservoir Canyon and Brizzolari Canyon. The *CNPS Inventory* cites about twenty occurrences. Four out of the thirteen occurrences recorded in the

CNDDDB are located on national forest system lands. One known site on private land is threatened by development.

***Fritillaria falcata* (talus fritillary)**

Fritillaria falcata is a Forest Service Sensitive Species. It occurs in Stanislaus, San Benito, Alameda, Santa Clara and Monterey counties. The CNDDDB lists eleven occurrences. The number of plants recorded at each site is low, with only two having more than one hundred individuals. The taxon appears to grow almost exclusively on talus slopes derived of serpentine. Two occurrences within the Los Padres National Forest are protected in designated wilderness areas; however, they are not mapped (M Foster, unpubl. notes, 1998). Another two occurrences are found within the Hollister Resource Area on BLM land.

***Fritillaria viridea* (San Benito fritillary)**

Fritillaria viridea is a Forest Service Sensitive Species known from West Cuesta Ridge in San Luis Obispo County and Mount San Carlos in San Benito County (Jenkins 1981). There are also reports from Monterey County; however, plants at this location may be another taxon. The CNDDDB contains records for just six occurrences, yet the *CNPS Inventory* mentions that the species is more common than previously thought in San Benito County. One occurrence is protected within the Cuesta Ridge Botanical Area of the Los Padres National Forest and two occurrences are found in the Hollister Resource Area managed by the BLM. The species occurs on slopes within serpentine chaparral in the foothill and lower montane conifer zones. Most sources cite an adaptation to serpentine soils, but it has also been linked to calcareous shale on the Monterey Ranger District of the Los Padres National Forest (K. Danielsen, pers. comm). Habitat for the species has been negatively impacted by unauthorized OHV use and mining activities.

***Galium hardhamiae*
(Hardham's bedstraw)**

Galium hardhamiae is a Forest Service Sensitive Species that is endemic to Monterey and San Luis Obispo counties. This perennial plant occurs primarily with Sargent cypress in the Santa Lucia Ranges as far south as Cypress Mountain. The species occurs to a lesser degree in openings within serpentine chaparral where there are no cypress (Hardham 1962). The CNDDDB lists seventeen occurrences. Nine occurrences, covering about 221 acres, are mapped within the Los Padres National Forest.

***Sanicula maritima* (adobe sanicle)**

Sanicula maritima is a Forest Service Sensitive Species known from Monterey and San Luis Obispo counties, where it grows in coastal prairie habitat. Historic occurrences are documented for Alameda and San Francisco counties but are now believed to be extirpated. There are fewer than ten recorded occurrences of this perennial plant. The largest occurrence contained an estimated one thousand plants in 1983 and is located on land owned by the Hearst Corporation. One occurrence located on the Monterey Ranger District of the Los Padres National Forest consisted of three hundred plants in 1985. Two year later this estimate dropped to fewer than one hundred plants. Another occurrence is found on state park land and was reported in 1987 and 1990 to contain fewer than one hundred plants. The non-native grass, *Pennisetum clandestinum* (kikuyu grass) appears to be outcompeting *Sanicula maritima* in some areas.

***Sidalcea hickmanii* ssp. *anomala*
(Cuesta Pass checkerbloom)**

Sidalcea hickmanii ssp. *anomala* is a Forest Service Sensitive Species that is endemic to Cuesta Ridge in San Luis Obispo County. A perennial plant, it is known from three locations, mapped over 558 acres, in clearings among Sargent cypress. Most of these acres fall within the Los Padres National Forest and

some populations are protected further within the Cuesta Ridge Botanical Area.

Habitat Generalist Plants

Seventeen rare plants either lack a strong association with a broad habitat type or their habitat associations are poorly understood. Summary information for these species is shown in table 5.20.

***Androsace elongata* ssp. *acuta* (California androsace)**

Androsace elongata ssp. *acuta* is known from occurrences in Garner Valley (San Jacinto Mountains) and along the northern slope of the San Bernardino Mountains. In San Diego County, it reportedly occurs in the Cuyamaca Mountains, Montezuma Valley, and Warner Springs (Beauchamp 1986). These last two locations are inland desert valley grasslands which are privately owned. Potential habitat also occurs on BLM land in the San Felipe Hills and at Anza-Borrego Desert State Park. Its presence on the Los Padres National Forest is documented from herbarium specimens stored at the Santa Barbara Botanic Garden (D. Wilken, Santa Barbara Botanic Garden, in litt. 1998). More occurrences are reported in Kern County and south to Baja California, Mexico. In addition to grasslands, the species is found in chaparral, coastal sage scrub, and cismontane woodlands, but occurrences are highly localized.

***Astragalus oocarpus* (San Diego milk-vetch)**

Astragalus oocarpus is a Forest Service Sensitive Species that is endemic to the mountains of San Diego County. Populations are located in the Palomar and Cuyamaca mountains, and near Volcan Mountain (Reiser 1994). About twenty occurrences are recorded in all, most on private lands, and about six on national forest system lands. Reiser writes that populations of this taxon are stable; however, Forest Service resource personnel consider it to be declining due to limited available habitat (Reiser 1994). The plant occurs at elevations

from roughly 2,000 to 5,000 feet, in openings within chaparral, in oak woodland, and at the periphery of meadows. Known associates include manzanita and chamise. Like other *Astragalus*, *A. oocarpus* appears to be disturbance oriented; mild (but not prolonged) soil disturbance may be necessary to establish new individuals (Reiser 1994). The species is included in a conservation strategy for coastal sage scrub (USFS/USFWS/CDFG 1997).

***Astragalus pachypus* var. *jaegeri* (Jaeger's milk-vetch)**

Astragalus pachypus var. *jaegeri* is a Forest Service Sensitive Species that is endemic to northern San Diego and southern Riverside counties. About seven occurrences are known, including in the Vail Lake area, south and east of Vail Lake towards Aguanga, at the northwestern edge of the Sonoran Desert, in the San Jacinto Mountains, and in the Agua Tibia Wilderness Area. One historical record is from near Warner Springs in San Diego County. The shrub has been located between roughly 1,600 and 3,000 feet elevation in sandy or rocky soil within coastal sage scrub, chaparral, cismontane woodland, and valley-foothill grasslands. California buckwheat and the federally endangered species, *Berberis nevadensis*, are associates at the Vail Lake location (Reiser 1994). In San Diego County the taxon is presumed to be stable; however, those occurrences in Riverside County are at risk of removal due to proposed development projects near Potrero Creek and Vail Lake (Reiser 1994).

***Atriplex parishii* (Parish's brittle scale)**

Atriplex parishii is a Forest Service Sensitive Species that is typically found on drying soils in alkali meadows, vernal pools, playas, and in chenopod scrub at low elevations within desert habitats (though some locations are reported up to 4,700 feet). The CNDDDB contains records for eleven occurrences. Most of the recent collections are from the San Jacinto Valley in Riverside County. Historic occurrences are noted for Los Angeles, San Bernardino, and Orange counties. One of these occurrences may be from Vandeventer

Table 5.20. Rare plants with general or unknown habitat parameters. y = the taxon occurs on the forest; p = has potential to occur. Assessments of trend, knowledge of distribution, and vulnerability were made by forest botanists/biologists and generally refer to occurrences on national forest system lands (decl. = declining; unkn. = unknown).

Scientific Name (common name) <i>listing status</i>	Acres of Known Habitat				Trends	Vulnerability on NFS lands	Overall Distribution (Knowledge of distribution on NFS lands)
	CNF	SBNF	ANF	LPNF			
<i>Androsace elongata</i> ssp. <i>acuta</i> (California androsace)	y	y		y	unkn.	unkn.	Garner Villy. (San Jacinto Mtns.), San Bern. Mtns., Peninsular Ranges & desert of SD Co., San Felipe Hills, S Los Padres area, Kern Co., S to Baja; (low)
<i>Astragalus oocarpus</i> (San Diego milk-vetch) <i>FS sensitive</i>	123				decl.	low	Palomar, Cuyamaca, & Volcan mtns. (SD Co.); (moderate)
<i>Astragalus pachypus</i> var. <i>jaegeri</i> (Jaeger's milk-vetch) <i>FS sensitive</i>	y	p			unkn./ stable ¹	unkn.	N San Diego & S Riverside cos. (Vail Lake area, nw edge of Sonoran Desert, San Jacinto Mtns., desert areas of SD Co.); (low)
<i>Atriplex parishii</i> (Parish's brittle scale)		p					San Jacinto Valley & Palm Springs (Riverside Co.), h in LA, San Bern. & Orange cos., p in Sta. Rosa Mtns., Baja
<i>Calystegia peirsonii</i> (Peirson's morning-glory)			1				Los Angeles Co. (n San Gabriel Mtns. & adjacent areas of Mojave Desert (Antelope Valley)); (low)
<i>Fritillaria ojaiensis</i> (Ojai fritillary) <i>FS sensitive</i>				40	unkn.	low	Ventura, Sta. Brbra, & SLO cos. (outer South Coast Ranges & W Transverse Ranges or S Los Padres region); (mod.)
<i>Galium angustifolium</i> ssp. <i>gabrielense</i> (San Antonio Cyn. bedstraw)		p	1		unkn.		E San Gabriel Mtns. (low)
<i>Galium grande</i> (San Gabriel bedstraw) <i>FS sensitive</i>			1				San Gabriel Mtns.
<i>Hulsea vestita</i> ssp. <i>gabrielensis</i> (San Gabriel Mtns. sunflower)		p	y	y			San Gabriel Mtns. & southern Los Padres region (Frazier & Alamo mtns.)
<i>Hulsea vestita</i> ssp. <i>parryi</i> (Parry's sunflower)		y					San Bernardino & Little San Bernardino mtns.
<i>Layia heterotricha</i> (pale-yellow layia) <i>FS sensitive</i>				41	decl.	mod.	southern Los Padres region (Santa Barbara & Ventura cos.), Fresno Co.; (moderate)
<i>Linanthus orcuttii</i> (Orcutt's linanthus) <i>FS sensitive</i>	197		p		stable	mod.	Palomar and Laguna mtns. (SD Co.), Riverside & LA cos., Baja; (moderate)
<i>Monardella macrantha</i> ssp. <i>hallii</i> (Hall's monardella) <i>FS sensitive</i>	115	133	y		unkn./ decl.	low ² / mod. ³	San Gabriel, San Bernardino, San Jacinto, Santa Ana, Palomar, & Cuyamaca mtns.; (high)
<i>Phacelia exilis</i> (Transverse Range phacelia)		y					San Bernardino Mtns., also LA, Ventura, Kern, & Tulare cos.
<i>Phacelia mohavensis</i> (Mojave phacelia)		y					San Gabriel & San Bernardino mtns.
<i>Rupertia rigida</i> (Parish's rupertia)	y	y			stable ² / unkn. ³	low	San Bernardino & San Jacinto mtns., Peninsular Ranges of SD Co., Baja
<i>Satureja chandleri</i> (San Miguel savory) <i>FS sensitive</i>	273				stable	low	Santa Ana, San Miguel, Palomar & Laguna mtns., also foothills of SD Co., McGinty & Otay mtns., Jamul Mtns., Santa Rosa Plateau, Baja; (mod.)

¹ Reiser 1994 (refers to all known occurrences)

² on Cleveland National Forest

³ on San Bernardino National Forest

Flats on the Santa Rosa Indian Reservation in the Santa Rosa Mountains (near the San Bernardino National Forest). Other historic occurrences close to the forest are reported for Palm Springs and Cushenbury Springs. The species is also known to occur in Baja California, Mexico.

***Calystegia peirsonii*
(Peirson's morning-glory)**

Calystegia peirsonii is a perennial species known from occurrences in Los Angeles County, in the northern San Gabriel Mountains and adjacent areas of the Mojave Desert (Antelope Valley). It grows on rocky slopes in coastal scrub, chaparral, chenopod scrub, cismontane woodland, and lower montane conifer forest habitats.

***Fritillaria ojaiensis* (Ojai fritillary)**

Fritillaria ojaiensis is a Forest Service Sensitive Species that is known from about five occurrences in Ventura and Santa Barbara counties. The occurrences are distributed within the southern Los Padres region on the Los Padres National Forest. Potential habitat exists in San Luis Obispo County as well. Plants are found between 900 and 1,700 feet in elevation, growing on rocky soils in moist areas of chaparral, in mesic broad-leaved upland woodlands (often near drainages), and in lower montane conifer forests (Hickman 1993).

***Galium angustifolium* ssp. *gabrielense*
(San Antonio Canyon bedstraw)**

Galium angustifolium ssp. *gabrielense* is an uncommon perennial species distributed within the eastern San Gabriel Mountains near San Antonio Canyon. The CNDDDB has no records for this taxon. It grows on drier slopes and ridges in chaparral and open forest and is associated with granitic, sandy, or rocky soil types. Occurrences range from lower montane conifer to subalpine habitats. The species is found on the Angeles National Forest and po-

tential habitat also occurs on the San Bernardino National Forest.

***Galium grande* (San Gabriel bedstraw)**

Galium grande is a Forest Service Sensitive Species. A deciduous shrub, it is known from occurrences in the San Gabriel Mountains. The species occupies chaparral, open broad-leaved upland forests, cismontane woodlands, and lower montane conifer forests, between 1,400 and 5,000 feet in elevation.

***Hulsea vestita* ssp. *gabrielensis*
(San Gabriel Mountains sunflower)**

Hulsea vestita ssp. *gabrielensis* is known from at least ten locations on national forest system lands in the San Gabriel Mountains and southern Los Padres region (at Frazier and Alamo mountains) (Wilken 1975, 1977). There is potential for this plant to occur in the western portion of the San Bernardino National Forest as well. This perennial plant grows on rocky soils in open areas of montane coniferous forest. Some collections appear intermediate to *H. vestita* ssp. *vestita* in the Sierra Nevada and *H. vestita* ssp. *parryi* in the San Bernardino Mountains; however, a numerical analysis and review of morphological variation have indicated that populations in the western Transverse Ranges represent a discrete taxon (S. White, Scott White Biological Consulting, in litt. 1998; Wilken 1977).

***Hulsea vestita* ssp. *parryi*
(Parry's sunflower)**

Hulsea vestita ssp. *parryi* is endemic to the eastern San Gabriel, San Bernardino, and Little San Bernardino mountains (S. White, Scott White Biological Consulting, in litt. 1998; Wilken 1975). At least ten occurrences are known in the San Bernardino Mountains, including one in the San Gorgonio Wilderness Area. Another occurrence is known at Joshua Tree National Monument. The San Bernardino National Forest maintains this subspecies on its watch list. A perennial plant, it typically grows on rocky soils or talus slopes

in open areas of conifer forest between 6,500 and 8,900 feet. Recent collections on limestone soils in both conifer forest and pinyon-juniper woodland have tentatively been identified as this taxon; however, the species is highly variable.

***Layia heterotricha* (pale-yellow layia)**

Layia heterotricha is a Forest Service Sensitive Species. It is known from extant populations in the southern Los Padres region of Santa Barbara and Ventura counties, and areas of Fresno County. It appears to be declining; historically the species was distributed in eight counties (Fresno, Kings, Kern, Monterey, Santa Barbara, San Benito, San Luis Obispo, and Ventura). The CNDDDB contains records for twenty-nine occurrences, the majority based on herbarium specimens from the 1930s, 1940s, and 1950s. One occurrence, located in the Hollister Resource Area and managed by the BLM, contained an estimated five hundred plants in 1993. An occurrence on the Mount Pinos Ranger District of the Los Padres National Forest contained twelve plants in 1994. Many occurrences are believed to be extirpated. Four occurrences have been documented in the last fifteen years and the species is included in a conservation strategy (USFS/USFWS 1996). Construction of the San Antonio Reservoir, conversion of habitat for agricultural use, livestock grazing, invasion of non-native annuals, and possibly altered fire regimes are factors believed to have negatively affected this annual species. Occurrences range across foothill, lower montane, and montane conifer forest habitat. Plants are found in grasslands and open areas in foothill and pinyon-juniper woodlands. They grow on fragile soils variously described as sandy, calcareous, or an alkaline clay. On the Los Padres National Forest the species is associated with calcareous potreros (J. O'Hare, Angeles NF, pers. comm.).

***Linanthus orcuttii* (Orcutt's linanthus)**

Linanthus orcuttii is a Forest Service Sensitive Species found in the Palomar and Laguna mountains of San Diego County, in Riverside

and Los Angeles counties, and in Baja California, Mexico. There are approximately twenty-five known occurrences, most on public lands where they are fairly well protected. The species occurs in lower montane and montane conifer habitats, usually growing in vernal moist, open sites of chaparral or pine forest (D. Wilken, Santa Barbara Botanic Garden, in litt. 1998).

***Monardella macrantha* ssp. *hallii*
(Hall's monardella)**

Monardella macrantha ssp. *hallii* is a Forest Service Sensitive Species. It is an increasingly rare perennial taxon that occurs in the San Gabriel, San Bernardino, San Jacinto, Santa Ana, Palomar and Cuyamaca mountains. The plant occupies valley-foothill grasslands, chaparral, cismontane woodlands, broad-leaved upland forests, and lower montane conifer forests. It grows in rocky places and in openings in the vegetation. The CNDDDB contains records for thirty-one occurrences and fourteen general locations. Graduate work done by Linda Allen at Cal Poly San Luis Obispo has shown that some of these occurrences are really an intermediate with *M. macrantha* ssp. *macrantha* (Allen 1994). Three occurrences on the San Bernardino National Forest are believed to be the subspecies *hallii*. One of these occurrences is located within the Cahuilla Mountain RNA where a portion of the population burned in the 1996 Diego Fire. Plants appeared to be thriving following this fire. Photographs of the area taken in 1998 show higher densities of the plant than before the fire (M. Lardner, San Bernardino NF, in litt. 1998). Another population grows partly along a flume line and an access road, indicating the plant may be somewhat disturbance oriented.

***Phacelia exilis*
(Transverse Range phacelia)**

Phacelia exilis is a watch-list plant on the San Bernardino National Forest. Occurrences are also known in Los Angeles, Ventura, Kern, and Tulare counties. The species is found in

montane conifer forests, subalpine forests, meadows, and pebble plains. It can be locally common but is known from fewer than ten occurrences.

***Phacelia mohavensis* (Mojave phacelia)**

Phacelia mohavensis is known from occurrences in the San Gabriel and San Bernardino mountains and is a watch-list plant on the San Bernardino National Forest. The species grows on sandy or gravelly soils, including dry streambeds, within pinyon-juniper woodlands and dry meadows. It also is found in cismontane woodlands and lower montane conifer forests.

***Rupertia rigida* (Parish's rupertia)**

Rupertia rigida is a watch-list species on the San Bernardino and Cleveland national forests. Occurrences are known in Riverside, San Bernardino, and San Diego counties, and Baja California, Mexico. The perennial is uncommon but widely scattered in the San Bernardino and San Jacinto mountains and known from at least a dozen locations in the San Diego ranges (Beauchamp 1986). It grows within chaparral, cismontane woodlands, and montane conifer forests below 8,200 feet elevation. Cattle apparently avoid it, but the species is vulnerable to development projects which remove habitat on private lands. It has shown tolerance to stand thinning and prescribed burning at Palomar Mountain on the Cleveland National Forest.

***Satureja chandleri* (San Miguel savory)**

Satureja chandleri is a Forest Service Sensitive Species found in the Santa Ana Mountains, several San Diego County mountains (San Miguel, McGinty, Otay, Jamul, Palomar and Laguna mountains), also near San Vicente Reservoir, at Sandia Creek near where it meets the Santa Margarita River, and on the Santa Rosa Plateau. It also occurs in Baja California, Mexico. There are an estimated twenty-five known occurrences, on federal, state, and private lands. The shrub grows on gabbro or volcanic soils in shaded areas of

chamise chaparral, coastal scrub, oak woodlands, riparian woodlands, and valley-foothill grasslands. Disjunct occurrences in the Santa Ana Mountains occupy habitat that is more mesic than habitat in San Diego County and Baja (Reiser 1994). One large occurrence in the Santa Anas is located near a proposed development project; however, other occurrences in those mountains appear stable. Occurrences in San Diego County also appear to be stable. The species may be vulnerable to horticultural collecting.