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THE VASCULAR FLORA OF THE OWENS PEAK EASTERN WATERSHED, SOUTHERN SIERRA NEVADA, CALIFORNIA

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ABSTRACT

Owens Peak lies at the southern end of the Sierra Nevada within the Bureau of Land Management's Owens Peak Wilderness Area in Kern County, California. The study site, ca. 50 square miles, encompasses Owens Peak's eastern watershed, and ranges in elevation from 800–2600 m (2600–8400 ft). Granite rocks of the Sierra Nevada batholith underlie the study area. The eastern watershed of Owens Peak is botanically diverse, with 64 families, 230 genera, and 440 taxa currently documented. Floristic elements within the study area include the southern Sierra Nevada, Great Basin, and Mojave Desert. The flora previously was poorly documented, as discovered through a search of California's largest herbaria (CAS/DS, RSA-POM, UC/JEPS). A total of 56 collecting days was spent in the field between 2002 and 2005. Approximately 1300 vascular plant collections were made within the study area. Several rare taxa are found in the study area, including seven endemic to the southern Sierra Nevada, and two species described in 1988. One species, *Lomatium shevockii*, is endemic to the study area. *Saltugilia latimeri* was previously known from several mountain ranges in San Bernardino and Riverside counties, and one disjunct population in Inyo County. The discovery of this species within the study area not only extends its range, but also is a new record for Kern County. The primary objectives of this study were to catalogue, voucher, and create an annotated checklist of the watershed's vascular flora, describe the vegetation patterns, and assess the status of the rare species in the area.

Key words: California, eastern Sierra Nevada, flora, floristics, Great Basin, Mojave Desert, Owens Peak, rare plants, southern Sierra Nevada.

INTRODUCTION

There are several factors bearing on the discovery and loss of biodiversity. These include the inaccessibility of areas for botanical collection, the encroachment of urbanization on wild lands, the deleterious impacts of exotic plants, and the existence of areas that have been overlooked by botanists (Shevock 1988; Wohlgemuth 1998; Prather et al. 2004). Given that there are regions in California that have not been well documented botanically, it is evident that floristic research will continue to be of great importance (Soza et al. 2000). It is estimated that 5% of the vascular plant species in North America remain undescribed (Prather et al. 2004). Through systematic floristic inventories of discrete physiographic regions we can gain a better understanding of the most fundamental aspect of studying plant diversity (Wohlgemuth 1998).

California is a hotspot of plant diversity and endemism, with more than 6200 native species, of which 24% are endemic (Hickman 1993). This level of diversity exceeds that of areas of equivalent size in North America and most of continental Eurasia, and can be attributed to the diversity California exhibits in geology, climate, and topography (Hickman 1993). Although California's flora is relatively well documented, our knowledge of its complexity is continually growing—62 taxa have been described since *The Jepson Manual* (Hickman 1993) was published, and 306 taxa, either newly naturalized exotics or range extensions from outside California, have been documented (Jepson Online Interchange 2005).

Since 1982, the southern Sierra Nevada has been a source of many of these discoveries (Shevock 1996; York 2001). Prior to 1982 only sporadic collecting had occurred along the Sierran Crest south of Olancha Peak (Shevock 1988). Discoveries in the region include *Allium shevockii* D.W.McNeal, *Astragalus ertterae* Barneby & Shevock, and *Mimulus shevockii* L.R.Heckard & R.Bacigalupi, all described since 1986 (Heckard & Bacigalupi 1986; Barneby and Shevock 1987; McNeal 1987; Shevock 1988). These recent discoveries, combined with a lack of systematic botanical collections, make this region ideal for a floristic study.

Owens Peak lies at the southern end of the Sierra Nevada in Kern County, California (Fig. 1). Its eastern watershed contains considerable topographic and botanical diversity. Elevations range from 800 m (2600 ft) on the creosote bush dominated bajadas to 2600 m (8400 ft) where lie its forested peaks. This section of the Sierra Nevada forms the most southerly high-rising portion of the range. The study area is situated on the interface between the Mojave Desert, the Great Basin, and the Sierra Nevada floristic regions.

Prior to my research, there had been little botanical collecting documented in the study area. Despite the lack of documentation, the area has yielded several interesting botanical discoveries in recent years, including new species and significant range extensions (Shevock 1988). The exiguous documentation is a paradox, as the easily accessed Short Canyon is well known to wildflower enthusiasts for its beautiful and often abundant displays of winter annuals. Furthermore, the diverse array of habitats and landscapes, known to hold several rare endemics and disjunct species, are reason enough to document the flora of this region.

The primary objectives of this study were to catalogue, voucher, and create an annotated checklist of the vascular flora of the Owens Peak eastern watershed, describe the

Fig. 1. A map of the Owens Peak eastern watershed and its location in California. The study area is outlined in red.

Fig. 2. The east face of Owens Peak as seen from Indian Wells Canyon.

vegetation patterns, and assess the status of the rare species. Floristic documentation of this area will aid our understanding of the floristic province boundaries of California and will be of value in managing the region's botanical diversity.

PHYSICAL SETTING

Location

The Sierra Nevada, one of the major mountain ranges in North America, is a northwest-trending mountain range in California that is 50–80 miles wide and nearly 400 miles long (Hill 1975). The range extends from as far north as Plumas County near Mount Lassen (40°N) to its southern limit at Tehachapi Pass (35°N) in Kern County (Hill 1975; Wernicke et al. 1996; Smith 2000). Owens Peak is located on the Sierra Nevada crest in Kern County and rises to 2576 m (8453 ft) (Fig. 2). The study area encompasses the eastern watershed of Owens Peak, which rises sharply above Indian Wells Valley northwest of Ridgecrest (Fig. 1)

The study area falls between 35°45′26″ and 35°36′8″N latitude and between 118°0′8″ and 117°51′57″W longitude, encompassing an area of 12,950 hectares (50 sq miles). The majority of the site is located within the Owens Peak 7.5′ USGS topographic quadrangle, with portions of the site contained on the Inyokern, Lamont Peak, Ninemile Canyon, and Walker Pass 7.5′ USGS topographic quadrangles.

Geographic features were primarily used as natural boundaries. The northern and southern boundaries were defined, respectively, by ridgelines above Grapevine Canyon and Indian Wells Canyon, which subsume the watershed (Fig. 1). The western boundary is the Sierra Nevada crest, which includes three peaks—Owens Peak, Mount Jenkins, and Morris Peak (north to south, respectively). California State Route 14 (SR 14) and US Highway 395 (Hwy 395) were used to define the eastern boundary; the intersection of these two highways is identified by the landmark of Brady's Gas Station (Fig. 1). The major physiographic features of the watershed are outlined below.

Physiography

Sierra Nevadan crest.—There are three prominent peaks that delineate the western boundary of the study site. These include Owens Peak (2576 m [8453 ft]), Mount Jenkins (2414 m [7921 ft]) and Morris Peak (2199 m [7215 ft]). Owens Peak is the highest point in the southern Sierra Nevada, and Kern County; the crest of the range rarely reaches above 1800 m (6000 ft) south of the study area. The gray, east face of Owens Peak and the precipitous escarpment is a characteristic and prominent feature of the landscape above the Indian Wells Valley. Five Fingers, also known as Aquilla Peak, rising to 1577 m (5174 ft) is a series of large finger-like spires extending from the east ridgeline of Owens Peak (Fig. 1).

The ridgeline that extends east of Morris Peak just north of Walker Pass includes two peaks around 2100 m (7000 ft) in elevation. While these peaks are not named on the Owens Peak USGS 7.5′ topographic quadrangle, the Sierra Club registers located on the summits show the names of Russell Peak (2041 m [6696 ft]) and Backus Peak (2027 m [6651 ft]), west to east, respectively (Fig. 1).

Canyons.—There are three major canyons that form the eastern watershed of Owens Peak and drain into Indian Wells Valley. North to south, these canyons are Grapevine Canyon, Short Canyon, and Indian Wells Canyon. Several smaller canyons are found west and southwest of Indian Wells

Canyon; these are Morris Canyon, Manuel Canyon, an unnamed canyon, and Buena Vista Canyon, north to south, respectively. These smaller canyons drain into Indian Wells Canyon and make up the eastern watershed of Morris Peak.

Each of the main canyons is unique in its physiography. Grapevine Canyon is significantly more mesic than Indian Wells and Short canyons as is evidenced by the difference in riparian vegetation (Fig. 1). Short Canyon is indeed a short canyon by comparison with the other two. It is characterized by large granite boulders, tall spires, and is interlaced with several springs. Indian Wells Canyon is wide and expansive when compared to the other two, and serves as the watershed for two additional peaks (Morris Peak and Mount Jenkins).

Geology

Formation of the Sierra Nevada.—Geologically the Sierra Nevada is considered a single range unlike the Rocky Mountains to the east, which are a mountain system (Hill 1975). Beginning with a violent volcanic episode about 20 million years ago, the Sierra rose to great heights to form the mountains we currently know (Smith 2000). The major fault lines, which parallel the mountains along the east side, are known as the Sierran Frontal Faults; these are responsible for the continued uplift of the range (Diggles et al. 1987; Smith 2000). The eastern slope is precipitous compared to the more gentle western slope—the result of the westward thrust of the faults (Smith 2000).

Geologic structure.—The study area is underlain by granitic rocks of the Sierra Nevada batholith. A series of enechelon faults that cut west-northwest have controlled the formation of the major canyons (Fig. 3); these canyons form at right angles to the range (Hill 1975; Diggles et al. 1987; Smith 2000). The rocks have undergone at least two periods of uplift followed by major intrusive events. This is evident by foliations in Indian Wells Canyon that trend northwest to southeast (Diggles et al. 1987).

Rock types.—Within the study area, the Sierra Nevada crest is primarily composed of granite formed during the Cretaceous and metamorphic rocks from the Paleozoic (Jennings and Strand 1969; Diggles et al. 1987; Fig. 3). Specifically, Owens Peak is composed of largely leucocratic, coarse-grained, equigranular, biotite granite. The ridgeline extending east of Owens Peak, and leading to Five Fingers, is composed of the same granite type. The summit and portions of the east face of Owens Peak are composed of metamorphic rocks. The east side of Mount Jenkins is predominantly composed of metamorphic rocks interfacing with the same type of granite as on Owens Peak and the diorite of Indian Wells Canyon. The granite of Morris Peak is characterized as medium-grained, biotite-porphyritic granodiorite (Fig. 3).

The westward trending ridgeline forming the southern boundary of the study area is composed of metamorphic rocks along the top. Below, on the south side of Indian Wells Canyon, is mesocratic, medium-grained, serrate, foliated to gneissic diorite (Diggles et al. 1987). At the easternmost end of Grapevine Canyon at Indian Wells Valley lies Quaternary alluvium (Jennings and Strand 1969; Diggles et al. 1987). The canyons are filled with younger alluvium of Quaternary origin, which are dissected stream channel deposits (Diggles et al. 1987; Fig. 3).

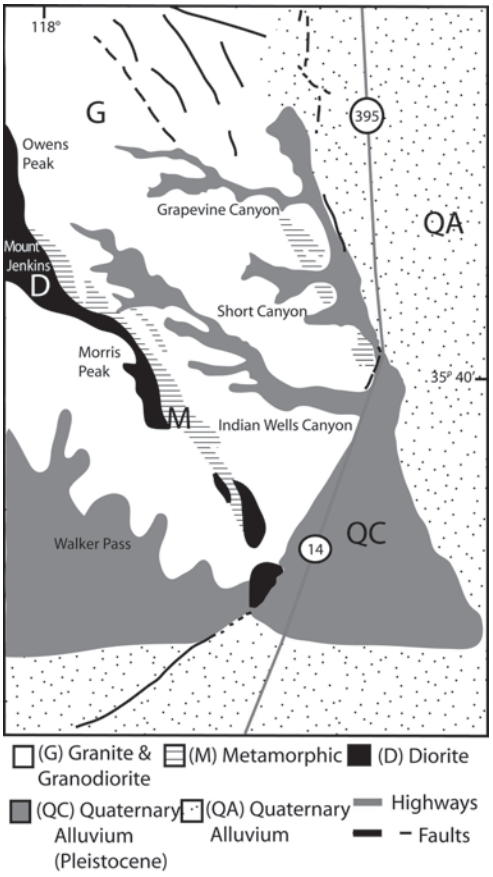

Fig. 3. A geological map of the Owens Peak eastern watershed, adapted from Diggles et al. (1987) and Jennings et al. (1969).

CLIMATE

The eastern face of the Sierra Nevada lies in a rain shadow, characterized by low annual precipitation, seasonally strong winds, and large seasonal fluctuations in temperature (Smith 2000). The temperature and precipitation vary widely with elevation (Smith 2000). The canyon floors are hot and arid, and any standing water residual from snowmelt is ephemeral. In contrast to the lowlands, the higher elevations remain cooler throughout the year. As a consequence, moisture is retained longer. Snow occurs at the higher elevations, generally at or above 1500 m (5000 ft). The north-facing slopes of the highest peaks are coolest and snow persists there the longest.

Long-term climate records do not exist for the study area proper. There is one weather station located in Indian Wells Canyon at 35°41′06″ N and 117°53′22″ W and 1220 m (4000 ft) in elevation (Western Regional Climate Center 2005), however, the data are not presented here. Precipitation and temperature data from nearby Inyokern (ca. 6 km [4 miles] east of the site; elevation 820 m [2700 ft]) were used (United States Geological Survey [USGS] 2005*a*).

Precipitation tends to follow a unimodal, winter rainfall pattern characteristic of the western Mojave Desert (Fig. 4, 5), in contrast to the eastern Mojave Desert that has a bimodal distribution of precipitation (USGS 2005*a*). The majority of the rainfall occurs November through March (Fig. 4). The average annual precipitation at Inyokern is 104 mm (4 in.); total annual

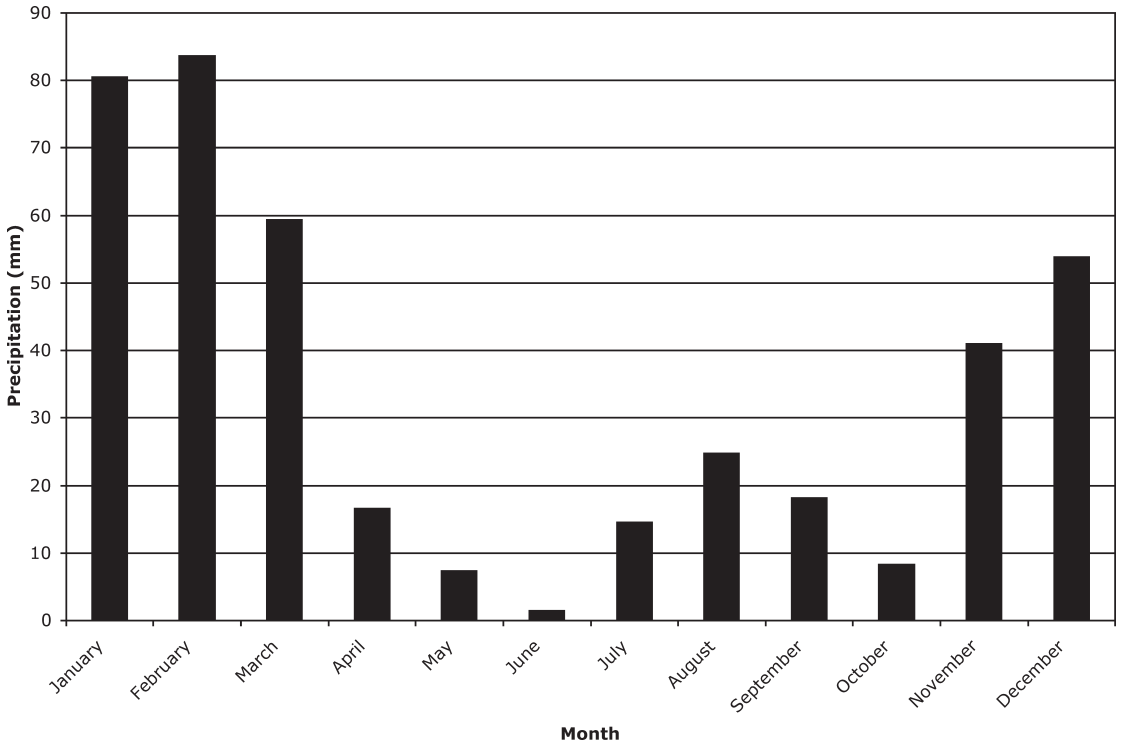

Fig. 4. Average monthly precipitation at Inyokern, 1948–1996 (Western Regional Climate Center 2005).

rainfall varies widely from year to year (Fig. 5). Precipitation is expected to be greater with increasing elevation.

The winter month of January is the coldest and during the summer, July is the hottest month. The maximum temperatures in January and July, respectively, are 15°C (59°F), and 39°C (103°F). The minimum temperatures for January and July, respectively, are −1°C (30°F), and 19°C (66°F). Overall temperatures are expected to decrease with increasing elevation.

HUMAN IMPACTS

Pre-European Inhabitants

The first human inhabitants of Indian Wells Valley and surrounding areas are known from 11,000 to 9000 yr ago (Babcock 2002). During this time, the region was cool and wet (Axelrod and Raven 1985). Indian Wells Valley and neighboring China Lake were filled with water and coniferous forests covered the land (Axelrod and Raven 1985; Babcock 2002). Inhabitants were adapted to hunting the now-extinct American horse, camel, mammoth, and Pleistocene bison (Younkin 1998). Fluted hunting points characteristic of these ''Paleoindians'' have been found in the region (Younkin 1998; Babcock 2002). About 4000 yr ago the climate of the Indian Wells Valley became similar to present-day conditions (Babcock 2002). By this time, camps had developed in pinyon groves with the local inhabitants primarily subsisting on pine nuts (Younkin 1998; Babcock 2002).

It wasn't until 1000 yr ago that the people known as the Shoshone and Paiute appeared who spoke the language known as Numic. These people lived in the areas of the southern Sierra Nevada, Mojave Desert, and Great Basin (Younkin 1998). The inhabitants who possibly occupied the study area were the southern Paiute (the Tubatulabals or ''pine-nut eaters''). These people remained in the area until the early twentieth century, when mining and homesteading by European immigrants became prevalent (Younkin 1998; Babcock 2002). Evidence of these native people inhabiting the study area includes petroglyph sites and several rock outcrops containing mortar indentations, a result of grinding foodstuffs (Fig. 6).

Early European Explorers

Padre Pedro Font is credited with placing the Sierra Nevada on a map for the first time in 1776, referring to the mountains as ''una gran sierra'' (Farquhar 1925). However, many historians believe that J. R. Walker was the first European to enter Indian Wells Valley (Babcock 2002). Walker discovered the pass, which now bears his name, and led several parties through, including the famous Jayhawker party in 1834. Walker later accompanied J. C. Fremont on his third expedition to the West in 1845 (Weiss 1999; Babcock 2002).

Fremont led several expeditions for the United States Government in its effort to expand and settle the West (Weiss 1999). In the 1845 expedition, Fremont explored and mapped Indian Wells and Owens valleys, along with his companions J. R. Walker and G. Kern (his cartographer). Traveling through Owens Valley, Fremont encountered a lake and named it for Richard Owens, who he had traveled with and admired (Fremont 1887). The valley and nearby peak were subsequently named after Owens. In his report to the government Fremont (1887) wrote:

> That Owens was a good man it is enough to say that he and Carson were friends. Cool, brave, and of good judgment; a good

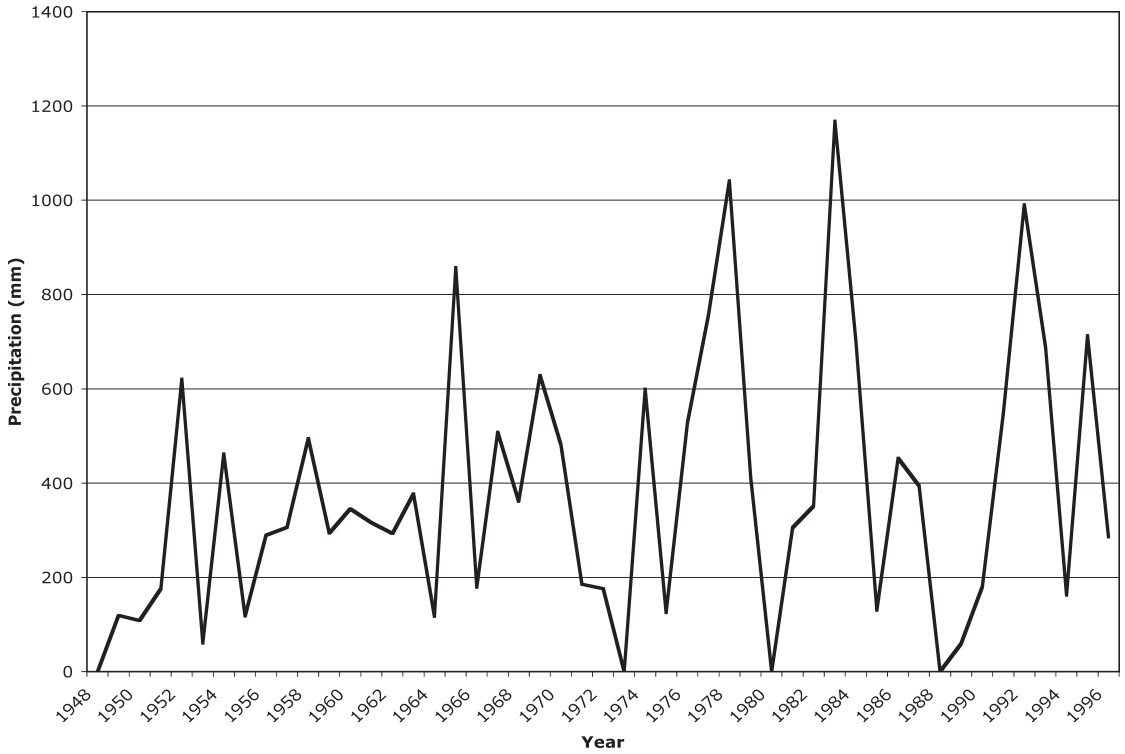

Fig. 5. Average yearly precipitation at Inyokern, 1948–1996 (Western Regional Climate Center 2005).

hunter and good shot; experienced in mountain life; he was an acquisition, and proved valuable throughout the campaign.

The most important product from the Fremont expeditions was an accurate map that included the Sierra Nevada and Great Basin (Weiss 1999).

Many "49ers" and other European settlers made their way down the east side of the Sierra Nevada to Indian Wells Valley. Indian Wells (Fig. 1), a spring at the mouth of Indian Wells Canyon, was most likely an important watering hole for early settlers of the west who were traveling through the desert on their way to Walker Pass (Babcock 2002). William Brewer, a botanist with the Geological Survey of California (1860–1864), traveled through Indian Wells Valley and said, "A more god-forsaken, cheerless place I have seldom seen—a spring of water—nothing else" (Brewer 1863), referring to the once-frequented spring.

Miners and Homesteaders

Mining boomed in the area in the late nineteenth century. However, mining efforts within the study area did not prove as profitable as in surrounding areas (e.g., the Cerro Gordo Mine to the north; Babcock 2002). Several mining sites are indicated on the Owens Peak 7.5′ USGS topographic quadrangle. However, little evidence of activity remains except for an old mining cabin, complete with mineshaft, testing laboratories, and miscellaneous equipment, located at the head of Indian Wells Canyon (Fig. 7). This is the site of the Nadeau-Magnolia Mine. The cabin is maintained by the Bureau of Land Management (BLM) and serves as historical evidence of mining activity in the area. Tungsten and gold ore were the primary products mined at this site; operations were discontinued in 1945 (BLM Volunteer Service 2002).

Profitable mines such as Cerro Gordo to the north brought high volumes of freight running through Indian Wells Valley. After Cerro Gordo shut down in 1879, freight service declined and ceased operation (Babcock 2002). The valley remained quiet until 1908, when construction of the Los Angeles Aqueduct began. Work on the aqueduct attracted many families to the area. During the late nineteenth and early twentieth centuries many homesteaders flocked to the region. Freeman Raymond became the Valley's first recorded homesteader in 1894 (Babcock 2002). A portion of his former land, now called Freeman Junction, sits in the southeast corner of the study area. Construction of the Los Angeles Aqueduct ran from 1908 to 1913. The old black-pipe siphon is still visible in Short Canyon. A replacement aqueduct was completed in 1970 (Babcock 2002).

Current Uses

The majority of the study area is land managed by the BLM, with private parcels interspersed near the highways and in Grapevine Canyon. Much of the area is now used for recreational activities. Short Canyon was designated an Area of Critical Environmental Concern (ACEC) in 1987 thanks to the efforts of Mary Ann Henry and her botanical work (BLM 1996). Much of the study area also falls within the Owens Peak Wilderness Area (Fig. 10) designated in 1994 (Sierra Nevada Wild 2005). This area includes the Sierra Nevada crest and the upper reaches of the main canyons. The main trail running through the site is the Pacific Crest Trail (PCT), the majority of which runs along the east side of Mount Jenkins (Fig. 10). The mountain is named for Jim Jenkins who was instrumental in the construction of this section of the PCT (Jenkins and Jenkins 1992). There are spur trails to the summits of each peak from the PCT and there is also a shorter trail to Owens

Fig. 6–9. Human impacts.—6. A pictograph panel at the head of Indian Wells Canyon.—7. Cabin at the Nadeau-Magnolia mining claim at the head of Indian Wells Canyon.—8. A cow grazing in Indian Wells Canyon.—9. A Bureau of Land Management sign designating the Owens Peak Wilderness boundary.

Peak from the head of Indian Wells Canyon. The many old mining roads also provide a means to easily explore the wilderness area.

A wider recreational audience uses the non-Wilderness areas, including off-highway vehicle (OHV) users and gun enthusiasts (Fig. 9). Indian Wells Canyon is a popular destination for these recreational activities. Several forms of agriculture also exist within the study area. Cattle graze in the Owens Peak Wilderness and non-Wilderness lands (Fig. 8). In 2004, many cows were seen in Indian Wells Canyon with fewer in Short Canyon. Bee husbandry (apiculture) was also observed in Indian Wells Canyon.

There are several parcels of private property throughout the study area (Fig. 7). Access to Grapevine Canyon is blocked by a private parcel, which serves as a ranch and family home. There are two additional parcels located west of the first property. Commercial properties are prevalent along the eastern boundary of the site along SR 14 and Hwy 395. The old 49ers' watering hole at Indian Wells now serves as a modern-day watering hole—the Indian Wells Steak House and Brewery. The Homestead Café and Brady's Gas Station are other commercial properties within the study area.

EARLY BOTANICAL EXPLORATION

Two early botanical expeditions just grazed the study area. These were expeditions to Death Valley (75 miles to the east), headed by botanist Fredrick V. Coville (1891–1893), and to the Argus Mountains in 1897 (35 miles to the northeast), led by Carl Purpus. On the two expeditions, no plant collections were made in the study area, but the lead botanists made note of having passed through the area. Coville (1893) collected the type specimen of *Eriogonum brachyanthum* just a few miles north of the study area and Purpus (1897) made notes of plants he observed in the area, including *Fremontia* [= *Fremontodendron californicum*], *Opuntia basilaris*, *O. echinocarpa* [= *Cylindropuntia echinocarpa*], *Salvia dorrii*, and *Yucca brevifolia*.

FLORISTIC PROVINCES

On 5 January 1891, Coville entered the western Mojave Desert and made the following observation, "…the characteristic flora of the San Bernardino Valley abruptly gives way to the weird and equally characteristic flora of the Mohave Desert." Characteristic indeed, although weird is subjective. Communities dominated by *Larrea tridentata* and *Yucca brevifolia*, characteristic of the Mojave Desert, are prevalent within the study area. However, these species approach their northern limits here (Beatley 1975; USGS 2005*b*) as this region of the southern Sierra Nevada approaches "the edge of the Great Basin" (Smith 2000).

A transition between floristic provinces is characterized by the range limits of a high proportion of indigenous species (Meyer 1978). The transition from *Larrea tridentata* (characteristic of the Mojave Desert) to *Artemisia tridentata* (characteristic of the Great Basin Desert) is marked primarily by climatic factors such as rainfall and temperature (Beatley 1975). Topographic gradients introduce a third floristic province into the site, as plants indigenous to the Sierra Nevada enter the study area at the higher elevations (Axelrod and Raven 1985). This mix of floristic influences makes for a diverse and unique flora where species on the edge of their northern, southern, and eastern distributions are sympatric.

METHODOLOGY

Searches of herbaria at CAS/DS, RSA-POM, and UC/JEPS were conducted in order to include historical collections as a part of the study. Most collections were made from March to September; however, collections were made in all months of the year. An effort was made to collect at all possible locations, from all major physiographic features, geologic and edaphic substrates, and plant communities. All specimens examined were verified and annotated. Vouchers were deposited at RSA with duplicates to be sent to CAS/DS, UC/JEPS, UCR, and elsewhere.

Notes were taken at each collection site indicating the locality, latitude and longitude (via global positioning system receiver), elevation, substrate, aspect, habitat, associated species, and plant attributes (flower color, life form, etc.). The information was entered into the RSA-POM database from which labels were generated. Plant determinations were made using several references, including *The Jepson Desert Manual* (Baldwin et al. 2002), *The Jepson Manual: Higher Plants of California* (Hickman 1993), *A Flora of Southern California* (Munz 1974), *A Flora of Kern County, California* (Twisselman 1967), *Intermountain Flora* (Cronquist et al. 1984), and the RSA-POM herbarium. All nomenclature conforms to Hickman (1993) with the exception of new treatments for Cactaceae (Griffith 2004), Polemoniaceae (Porter and Johnson 2000), and Madiinae (Baldwin 1999). Classification of families follow the Flora of North America [FNA] (2005).

RESULTS AND DISCUSSION

Previous Collections

All persons who made collections within the study site are listed in Table 1. A total of 379 herbarium specimens from 52 collectors was collected prior to this study. The RSA-POM search yielded 170 specimens. A search at CAS/DS produced 156 specimens and a search of the herbaria at UC/JEPS produced 54 specimens. The first plant collection (*Mentzelia eremophila*) was made in the area in 1927 by M. Peirson on the east slope of Walker Pass, perhaps just outside the study area. Major collectors from the study area include J. Keefe (43 collections), a botanist at Glendale Community College, whose personal herbarium was acquired by RSA-POM following his death; he had done the most general collecting prior to this study. Ernest Twisselman (37 collections), who wrote *A Flora of Kern County*, visited the three major canyons in the study area and the east slope of Morris Peak. Javier Peñalosa (33 collections) collected primarily in Indian Wells Canyon from 1960–1962. Frank J. Kirby (22 collections) made several collections from 1954–1960. Verne Grant (15 collections), a noted authority on Polemoniaceae, collected *Gilia* Ruiz & Pav. specimens in Short Canyon.

Mary Ann Henry and Jim Shevock deserve special mention. These botanists have brought attention to the area and the rarities that occur here. Henry (1992) produced the first checklist of Short Canyon. A plaque commemorating her work sits at the canyon trailhead. Shevock made several important

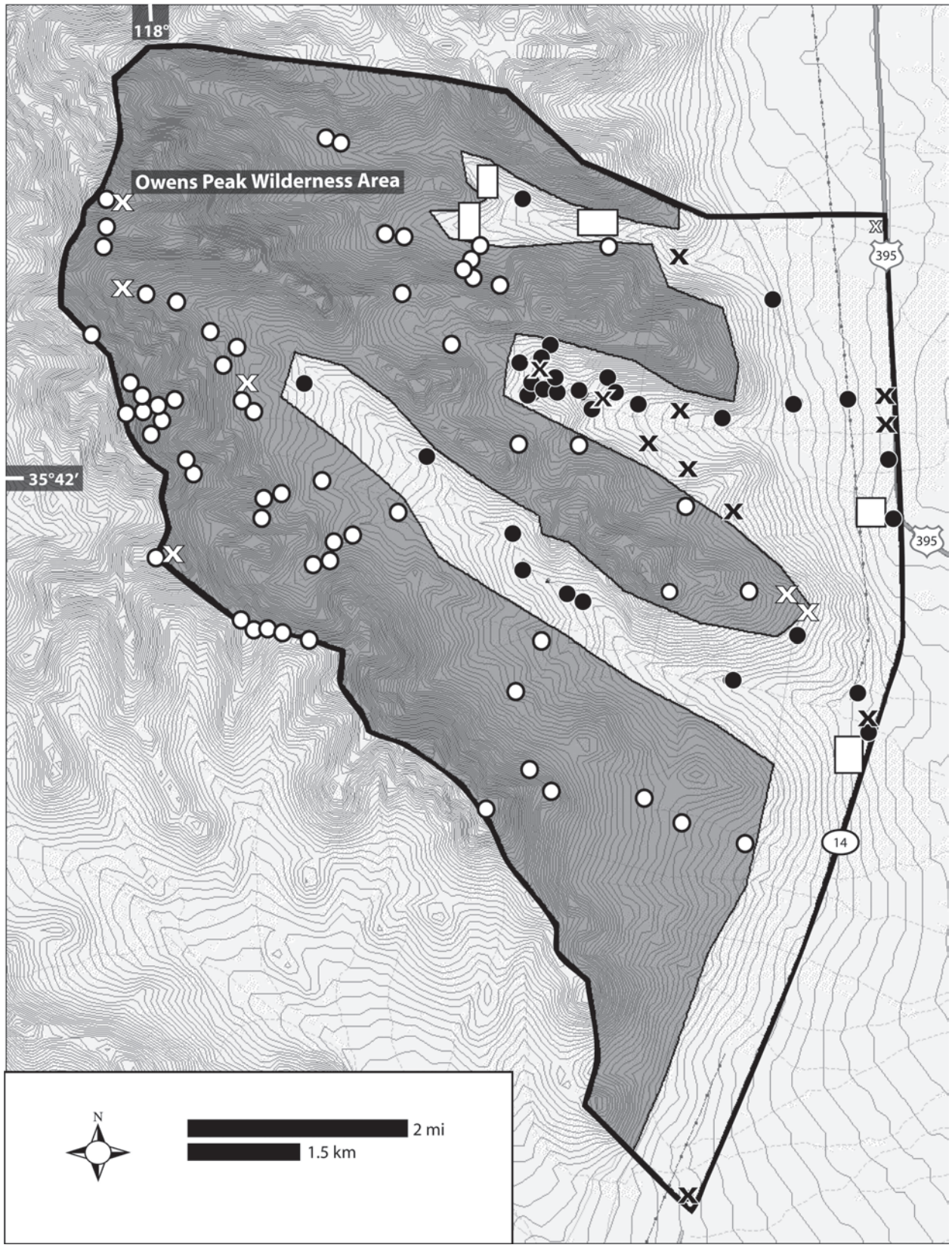

Fig. 10. A map of all documented collecting localities. The Owens Peak Wilderness boundary is shaded in dark gray; white rectangles = private parcels; circles = collections made by Naomi Fraga; X = historical collection sites. Map © 2004 Delorme reproduced with permission of TopoUSA® 5.0.

collections in the area including two species described in 1988, *Lomatium shevockii* and *Monardella beneolens* (Hartman and Constance 1988; Shevock 1988). In addition, he documented several rare species in the area, *Carlquistia muirii*, *Ericameria gilmanii*, *Erigeron aequifolius*, and *Eriogonum breedlovei* var. *shevockii* (Shevock 1988). *Lomatium shevockii* is of special note because it is the only species endemic to the study site.

Other important collections include *Deinandra mohavensis* and *Quercus palmeri*, both collected by A. C. Sanders, S. Boyd, and V. Soza (1998). *Deinandra mohavensis* was once thought extinct, but was rediscovered in Riverside and San Diego counties (Sanders et al. 1997). It subsequently was found within the Owens Peak eastern watershed, and farther south near Cross Mountain (California Natural Diversity Database 2006). The discoveries of *D. mohavensis* and *Q. palmeri* are significant range extensions and also new records for Kern County.

Collections In This Study

A total of 56 collecting days was spent in the field between 2002 and 2005. Approximately 1300 vascular plant collections were made within the study area. Plants were collected at all major physiographic features, substrates, and plant communities. Prior to this study, botanists had collected in only a few locations. Through the course of my study I collected at significantly more sites (Fig. 10).

Vegetation

Several classification schemes for California plant communities have been proposed (e.g., Munz and Keck 1949; Thorne 1982; Holland and Keil 1995; Sawyer and Keeler-Wolf 1995). These classifications aim to describe broad vegetation patterns, but are often inconsistent and give varying levels of detail. From a Gleasonian perspective, these inconsistencies can serve to support the idea that plant communities are merely random assemblages of species with shared ecological tolerances (Gleason 1926).

A plant community can be defined as a characteristic assemblage of plants. Following this definition, those communities in which repeated patterns of dominant plants and common associated species can be recognized are described here. The names of the plant communities presented in the study are based on the classification of Holland and Keil (1995).

Plant communities within the site include salt bush scrub, desert dunes, creosote bush scrub (Fig. 11), black bush scrub, Joshua tree woodland (Fig. 12), sagebrush scrub, pinyon–oak woodland, mixed coniferous forest (Fig. 14), riparian scrub (Fig. 13), and riparian forest. A schematic diagram of transitions in vegetation within the site is illustrated in Fig. 15.

Salt bush scrub.—Occurring on bajadas and alluvial slopes at 900–1100 m (3000–3500 ft) in elevation, this community is dominated by four-winged salt bush, *Atriplex canescens*. Common shrubs include *Ambrosia dumosa*, *Atriplex polycarpa*, *Chrysothamnus nauseosus*, *Ephedra nevadensis*, *Lepidium fremontii*, and *Petalonyx thurberi*. Common herbaceous plants include *Cryptantha barbigera*, *C. pterocarya*, *Eriogonum inflatum*, *E. heermannii*, *Erodium cicutarium*, and *Pectocarya penicillata*.

Desert dunes.—A few sand dunes are found at the mouth of Short Canyon at 850–920 m (2800–3000 ft) in elevation. The dunes are composed of fine sand of granite origin, sparsely covered with vegetation, and dominated primarily by herbaceous plants, including *Abronia pogonantha*, *A. villosa*, *Achnatherum hymenoides*, *Camissonia claviformis*, *Dytherea californica*, *Eriogonum pusillum*, *Lupinus concinnus*, *Nemacladus gracilis*, and *Oenothera californica*.

Creosote bush scrub.—Dominated by the creosote bush, *Larrea tridentata*, this community occurs on the bajadas at 790–1000 m (2600–3400 ft) in elevation and is particularly favored by annuals. Common shrubs include *Ambrosia dumosa*, *Chrysothamnus nauseosus*, *Cylindropuntia echinocarpa*, *Hymenoclea salsola*, *Isomeris arborea*, *Opuntia basilaris*, *Petalonyx thurberi*, and *Psorothamnus arborescens*. Common herbaceous plants include *Camissonia campestris*, *C. claviformis*, *C. pallida*, *C. palmeri*, *Chaenactis xantiana*, *Cryptantha* spp., *Eriogonum pusillum*, *Eriophyllum pringlei*, *E. wallacei*, *Gilia aliquanta*, *G. sinuata*, *Linanthus aureus*, *L. dichotomus*, *L. parryae*, *Malacothrix glabrata*, *Nama demissum*, *Phacelia distans*, *P. fremontii*, *Rafinesquia neomexicana*, and *Schismus barbatus*.

Black bush scrub.—This community is intermediate in elevation between creosote bush scrub and Joshua tree woodland (1100–1200 m [3700–4000 ft]), and commonly occurs on alluvial slopes. It is dominated by black bush, *Coleogyne ramosissima*. Common shrubs include *Ephedra viridis*, *Ericameria linearifolia*, *Eriogonum fasciculatum* var. *polifolium*, *Grayia spinosa*, *Hymenoclea salsola*, *Krascheninnikovia lanata*, *Lycium andersonii*, *L. cooperi*, *Opuntia basilaris*, and *Salazaria mexicana*. Common herbaceous plants include *Bromus tectorum*, *Camissonia campestris*, *C. kernensis*, *Castilleja angustifolia*, *Chaenactis fremontii*, *C. xantiana*, *Eriogonum fasciculatum* var. *polifolium*, *Eriophyllum confertifolium*, *E. pringlei*, *Gilia brecciarum* subsp. *neglecta*, *G. ochroleuca*, *Linanthus aureus*, and *L. dichotomus*.

Joshua tree woodland.—Open woodlands dominated by the Joshua tree, *Yucca brevifolia*, are found at the heads of the major canyons and along the north slopes of Five Fingers at 1200–1600 m (3800–5300 ft) in elevation. Common shrubs include *Artemisia tridentata*, *Ephedra viridis*, *Ericameria cooperi*, *E. linearifolia*, *Eriogonum fasciculatum* var. *polifolium*, *Grayia spinosa*, *Lupinus excubitus*, *Lycium cooperi*, *Prunus andersonii*, *Tetradymia axillaris*, and *T. stenolepis*. Common herbaceous plants include *Bromus tectorum*, *Camissonia kernensis*, *Chaenactis stevioides*, *C. xantiana*, *Eriogonum fasciculatum* var. *polifolium*, *E. nudum* var. *westonii*, *Eriophyllum pringlei*, *Gilia brecciarum* subsp. *neglecta*, *G. ochroleuca*, *Layia glandulosa*, and *Linanthus dichotomus*.

Sagebrush scrub.—This community is dominated by Great Basin sagebrush, *Artemisia tridentata*, and commonly occurs at the heads of canyons near Joshua tree woodland at 1200–1600 m (3800–5300 ft) in elevation. It is most similar to the Joshua tree woodland, but *Yucca brevifolia* is not present. Common shrubs include *Chrysothamnus nauseosus*, *Ephedra viridis*, *Ericameria cooperi*, *E. linearifolia*, *Eriogonum fascicu-*

Table 1. Botanical collectors in the Owens Peak eastern watershed, based on herbarium specimens at CAS/DS, RSA-POM, and UC/JEPS.

Collector	Date	Location
M. Peirson	1927	East slope of Walker Pass
R. S. Ferris	1930	Indian Wells
R. Hoffmann	1931	Indian Wells
L. N. Benson	1933	Indian Wells Valley
H. L. Mason	1935	Desert near Inyokern
A. M. Alexander	1940	Inyokern
C. N. Smith	1940	Freeman Junction
A. A. Beetle	1941	Indian Wells Valley
R. Moran	1946	Grapevine Canyon
V. Grant	1950, 1954, 1958	Short Canyon
L. Constance	1952	Indian Wells Valley
A. M. Vollmer	1953	Short Canyon
J. Janish	1954	Short Canyon
F. J. Kirby	1954, 1956, 1957, 1958, 1960	Grapevine Canyon, Indian Wells Canyon, Short Canyon
H. D. Ripley	1954	E base of Walker Pass
R. Smith	1954	Short Canyon
E. C. Twisselman	1956, 1958, 1961, 1962	Grapevine Canyon, Indian Wells Canyon, Morris Peak, Short Canyon
M. DeDecker	1958, 1978, 1982	Indian Wells Valley
P. C. Everett	1958	Short Canyon
A. Grant	1958	Short Canyon
C. T. Powers	1959	Short Canyon
J. R. Powers	1959	Short Canyon
P. Raven	1959	Short Canyon
R. W. Thorn	1959	Short Canyon
C. Budgett	1960	Indian Wells Canyon
D. Chivers	1960	Indian Wells Canyon
E. G. Linsley	1960	Short Canyon
J. Peñalosa	1960	Indian Wells Canyon
J. Turner	1962	Short Canyon
C. Davidson	1967	Junction of Hwy 395 with SR 14
J. T. Howell	1967	Hwy 395, Indian Wells Valley
L. S. Rose	1967	Freeman Junction
L. C. Wheeler	1969	Indian Wells Canyon
J. M. Keefe	1973	Morris Peak Saddle, Indian Wells Canyon, Owens Peak, Short Canyon
R. Luthey	1973, 1978, 1986, 1990, 1991, 1992	Beside SR 14 west of Inyokern Indian Wells Short Canyon
J. L. Strother	1973	Junction of Hwy 395 with SR 14
H. M. Hall	1975	Indian Wells
M. E. Larson	1975	Grapevine Canyon
T. R. Ericson	1977	Junction of Hwy 395 with SR 14
M. A. Henry	1977, 1978, 1986, 1990, 1991, 1992	Indian Wells Canyon, Short Canyon
J. R. Shevock	1981, 1984, 1985, 1986	Owens Peak, Short Canyon
D. W. McNeal	1985	SR 14, N of Hwy 178
B. Ertter	1986	Owens Peak
D. Charlton	1992	Short Canyon
D. M. Thompson	1992	Indian Wells Canyon
I. Anderson	1998	Grapevine Canyon
A. C. Sanders	1998	Short Canyon; Indian Wells Canyon
D. H. Wilken	1998	Short Canyon
S. Boyd	2001	Short Canyon
B. O'Brien	2003	Five Fingers
T. Thibault	2003	Five Fingers, Short Canyon

latum var. *polifolium*, *Lupinus excubitus*, *Lycium cooperi*, *Purshia tridentata* subsp. *glandulosa*, *Prunus andersonii*, *Tetradymia axillaris*, and *T. stenolepis*. Common herbaceous plants include *Arabis pulchra*, *Bromus tectorum*, *Camissonia kernensis*, *Castilleja angustifolia*, *Eriogonum fasciculatum* var. *polifolium*, *E. wrightii* var. *subscaposum*, *Eriophyllum confertifolium*, *Gilia brecciarum* subsp. *neglecta*, *G. ochroleuca*, *Layia glandulosa*, and *Linanthus dichotomus*.

Pinyon–oak woodland.—The transition from pinyon–oak woodland to sagebrush scrub is the most striking in the study area. The co-dominated single-leaf pinyon, *Pinus monophylla*, stops abruptly at ca. 2200 m (7200 ft). The community occurs at 1700–2200 m (5500–7200 ft) in elevation and occurs primarily on north slopes. It is dominated by *P. monophylla* and *Quercus chrysolepis*. Other woody associates include *Artemisia tridentata*, *Ceanothus greggii*, *Ephedra viridis*,

Eriogonum umbellatum, *Garrya flavescens*, *Holodiscus microphyllus*, *Nolina parryi*, and *Pinus sabiniana*. Common herbaceous plants include *Cordylanthus* spp., *Erigeron foliosus*, *Eriogonum* spp., *Eriophyllum ambiguum*, *Leptodactylon pungens*, *Machaeranthera canescens*, and *Madia elegans*.

Mixed coniferous forest.—This community is limited to the northeastern slope of Mount Jenkins and the upper slopes of Owens Peak at 2200–2600 m (7200–8400 ft) in elevation. Dominants are *Abies concolor*, *Juniperus occidentalis* var. *australis*, *Pinus jeffreyi*, and *P. lambertiana*. Woody associates include *Cercocarpus ledifolius*, *Eriogonum umbellatum* var. *subaridum*, *Holodiscus microphyllus*, *Penstemon newberryi*, *Pinus flexilis*, *Quercus chrysolepis*, and *Salvia pachyphylla*. Common herbaceous plants include *Delphinium hansenii* subsp. *kernense*, *Dudleya abramsii*, *Erigeron breweri*, *Lupinus elatus*, *Orochaenactus thysanocarpa*, *Phacelia austromontana*, and *Selaginella watsonii*.

Riparian scrub.—Dominated primarily by phreatophytic shrubs with a few scattered trees, riparian scrub is restricted to stream channels with ephemeral water between the elevations of 900–1200 m (3000–3800 ft). It is dominated by *Salix lasiolepis* with scattered *Populus fremontii* and *S. laevigata*. Common shrubs include *Baccharis salicifolia*, *B. sergiloides*, and *Pluchea sericea*. Common herbaceous plants include *Artemisia dracunculus*, *A. ludoviciana*, *Asclepias fascicularis*, *Berula erecta*, *Eleocharis parishii*, *Epilobium ciliatum*, *Juncus* spp., *Lotus oblongiflorus*, *Lythrum californicum*, *Polypogon monspeliensis*, and *Rorippa nasturtium-aquaticum*. Annual aquatics include *Azolla filiculoides* and *Lemna gibba*. Clumps of *Muhlenbergia rigens* commonly grow along the edges of the stream channel.

Riparian forest.—This community is dominated primarily by phreatophytic trees with a few scattered shrubs, and is restricted to stream channels with permanent water from springs at 1200–1800 m (3800–5800 ft) in elevation. It is limited to the north and south forks of Grapevine Canyon (Fig. 1). The dominant trees are *Alnus rhombifolia*, *Fraxinus velutina*, and *Salix laevigata*. Other woody associates include *Baccharis salicifolia*, *B. sergiloides*, *Populus fremontii*, *Salix lasiolepis*, and *Vitis giardana*. Common herbaceous plants include *Epilobium ciliatum*, *Polypogon monspeliensis*, *Rorippa nasturtium-aquaticum*, *Stachys albens*, and *Urtica dioica*.

Paleo-Vegetation

The rise of the Sierra Nevada over the last 20 million yr altered not only the landscape, but also the patterns of vegetation. Changes in vegetation can be attributed to changes in climate associated with the rise of the mountains (Smith 2000). Several local studies have documented these changes in vegetation. Pliocene sediments containing fossil pollen from the Owens and Panamint valleys have been analyzed (Axelrod and Ting 1960). Additionally, several studies of packrat (*Neotoma*) middens of Pleistocene age near the study area have been conducted, including in the Alabama Hills (Koehler and Anderson 1995), the southern Sierra Nevada (Davis et al. 1985), and Robber's Roost in the Western Mojave (McCarten and Van Devender 1988). No studies of middens from within the study area have been published. From these studies, one can describe general patterns of paleo-vegetation transitions, as changes in vegetation are believed to be quite similar in this broader region of interest (e.g., the interface between the Mojave and Great Basin deserts).

The Sierra Nevada imposes a significant rain shadow on the modern landscape, contributing to the vast Great Basin and Mojave deserts. Before the rise of this significant mountain range, these vast areas were not as arid as they are today. Instead, they are thought to have been dominated by coniferous forest and pinyon–juniper woodland (Axelrod and Ting 1960; McCarten and Van Devender 1988; Koehler and Anderson 1995). It is also thought that at one time pinyon–juniper woodland was restricted to the Mojave Desert region, south of latitude 37° (Axelrod et al. 1960). During warming in the early Holocene (ca. 8000 yr ago), subalpine and coniferous forest taxa shifted to higher altitudes in the mountains (Axelrod and Raven 1985).

Packrat midden data from the late Wisconsin (13,000–12,000 yr ago) was obtained from Robber's Roost (1190–1230 m [3904–4035 ft]) (McCarten and Van Devender 1988), just 4.3 km (2.7 miles) southwest of the most southeastern portion of the study area. These data show that the Robber's Roost area during the late Wisconsin was dominated by *Juniperus californica* and *Pinus monophylla*, in association with *Artemisia tridentata*, *Ceanothus greggii*, *Ericameria cuneata*, *Eriogonum fasciculatum*, *Purshia tridentata* var. *glandulosa*, and *Yucca brevifolia* (Table 2). With the exception of *Juniperus californica*, all of these species now occur in the pinyon zone within the Owens Peak study area, which occurs above 1524 m (5000 ft). While *J. californica* does occur within the study area, it is scarce and scattered, and seldom found above 1524 m.

The vegetation in the pinyon zone within the study area appears to have a high degree of similarity with the vegetation that was once more prevalent in the valleys and basins that are now the Mojave and Great Basin deserts. These enormous expanses now dominated by *Atriplex confertiflora* and *Larrea tridentata* were once forested areas of *Pinus monophylla*, interspersed with *Artemisia tridentata* and *Ceanothus greggii*.

Table 2. Fossil plants from the late Wisconsin at Robber's Roost (McCarten et al. 1988). ka = thousands of years ago; (+) = present in the area, (−) = absent in the area.

Species	Owens Peak Study Area	Robber's Roost		
		12.9 ka	13.0 ka	13.3 ka
Amsinckia tesselata	+	−	+	+
Artemisia tridentata	+	−	−	+
Ceanothus greggii	+	+	+	+
Ericameria arborescens	−	+	+	+
E. cuneata	+	−	+	−
Eriogonum fasciculatum	+	−	+	+
Juniperus californica	+	+	+	+
Lepidium fremontii	+	−	+	+
Lupinus excubitus	+	+	+	+
Opuntia basilaris	+	−	+	−
O. echinocarpa	+	+	+	+
Penstemon incertus	+	−	−	+
Pinus monophylla	+	+	+	+
Purshia glandulosa	+	+	+	+
Quercus turbinella	−	−	+	−
Yucca brevifolia	+	+	+	−

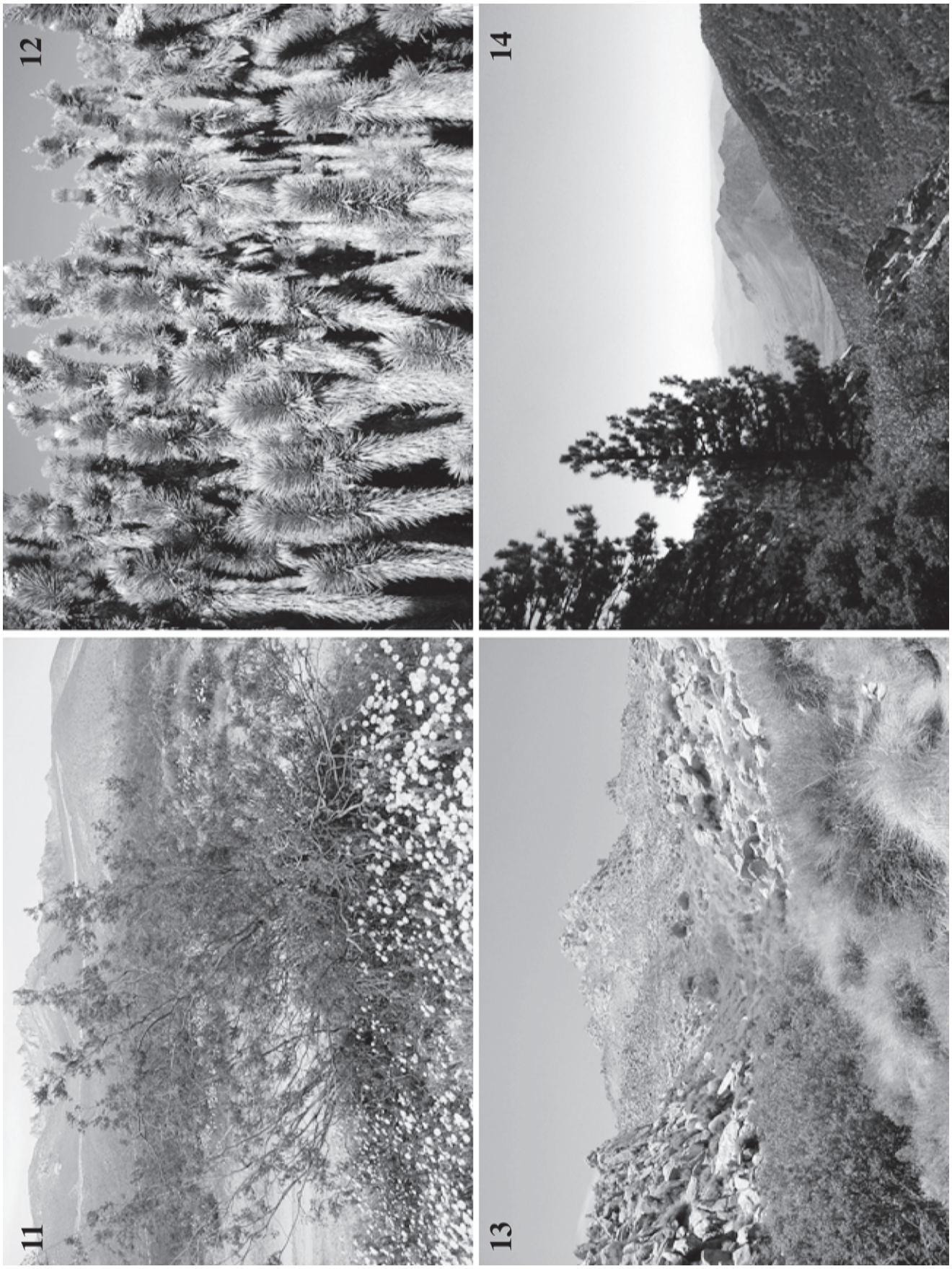

Fig. 11–14. Plant communities in the study area.—11. Creosote bush scrub.—12. Joshua tree woodland.—13. Riparian scrub.—14. Mixed coniferous forest.

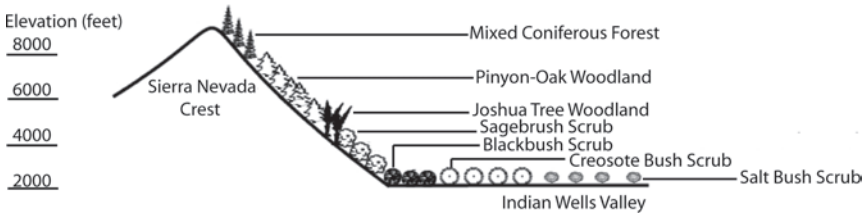

Fig. 15. A schematic diagram illustrating the vegetation transitions in the study area. (Adapted from Smith 2000).

Along the eastern slopes of the Sierra Nevada, one can observe sharp bands of vegetation contouring the slopes, each upwardly successive band changing with increasing moisture and decreasing temperature. Climate change in eastern California has significantly impacted the vegetation patterns, with many species migrating together based on shared ecological tolerances (i.e., temperature and the moisture availability: Beatley 1975; Axelrod and Raven 1985).

Flora

Numerical summary.—This study documents 440 vascular plant taxa (including species, subspecies, varieties, and hybrids) as occurring in the study area (Appendix 1). These include 64 families and 230 genera (sensu Hickman 1993; Table 3). Asteraceae are by far the largest family, accounting for 17.5% of the total flora. The five largest genera in the study area are *Eriogonum* (25), *Mimulus* (12), *Phacelia* (12), *Cryptantha* (10), and *Camissonia* (8). A summary of life forms is also provided in Table 3 and shows that annuals dominate the landscape of the study area.

Table 3. Numerical summary of taxa.

	Total taxa	% of the total flora
Flora		
Families	64	
Genera	233	
Taxa (species, subsp., vars., hybrids)	441	
Nativity		
Native	420	95.23
Non-native	21	4.77
Lifeforms		
Annual	188	42.7
Perennial herb	107	24.3
Small shrub	54	12.3
Suffruticose perennial	24	5.5
Geophyte	16	3.6
Large shrub	16	3.6
Tree	15	3.4
Parasitic perennial	6	1.4
Succulent perennial herb	4	0.9
Biennial herb	3	0.7
Succulent shrub	3	0.7
Aquatic annual	2	0.5
Liana	2	0.5
Five Largest Families		
Asteraceae	77	17.5
Poaceae	29	6.6
Polygonaceae	29	6.6
Polemoniaceae	25	5.7
Scrophulariaceae	23	5.2

Non-Native Taxa

Non-native taxa account for 5% of the total flora. A list of non-native taxa is given in Table 4. The area has a relatively intact native flora compared with the State of California in which 17.4% of the total flora is non-native (Hickman 1993). *Encelia farinosa*, while native to California, is not native to this portion of the Mojave Desert. Plants have been planted near the roadside at the intersection of SR 14 and Hwy 395. Seedlings of *E. farinosa* were collected adjacent to the SR 14; neither mature plants nor evidence of hybridization (between *E. farinosa* and the native *E. actoni*) were observed over the course of this study.

Non-native taxa within the study area occur primarily in mesic areas near riparian areas, and disturbed areas from along roadsides. Several species were documented adjacent to SR 14 near the Indian Wells Steak House and Brewery. Non-native species that are widespread throughout the area are *Bromus tectorum*, *B. rubens*, *Erodium cicutarium*, and *Schismus barbatus*. *Bromus tectorum* is the most widespread of these, occurring on the low elevation desert slopes, and near the summit of Owens Peak. *Bromus rubens* is common on low elevation desert slopes, while *E. cicutarium* and *S. barbatus* are most abundant on the bajadas.

Table 4. Non-native taxa documented in the study area.

Taxon
Agrostis viridis
Bromus arenarius
B. diandrus
B. rubens
B. tectorum
Erodium cicutarium
Gnaphalium luteo-album
Hordeum murinum subsp. *glaucum*
Malva neglecta
Melilotus albus
Poa annua
Polypogon monspeliensis
Salsola paulsenii
Schismus arabicus
S. barbatus
Sisymbrium orientale
S. oleraceus
Tamarix ramosissima
Taraxacum officinale
Tribulus terrestris
Veronica anagallis-aquatica

Distribution.—Several taxa characteristic of the Mojave Desert reach their northern limits near the study area. *Larrea tridentata* and *Yucca brevifolia* are seldom seen north of Owens Valley (Thorne 1982; USGS 2005*b*). Within the study site the areas that are most characteristic of the Mojave Desert are at the lower elevations (790–1524 m [2600–5000 ft]) on alluvial slopes, bajadas, and canyon bottoms. However, there are several Mojavean species that are broadly distributed throughout the study site. *Opuntia basilaris* is probably the most widespread of these, occurring commonly on bajadas and canyon slopes, but also near the summit of Owens Peak in the shade of Mixed Coniferous Forest. Other Mojavean species occurring at higher altitudes include *Eriophyllum ambiguum* var. *paleaceum* and *Mimulus fremontii*.

Species characteristic of the Great Basin are most common at mid-elevations (1130–1524 m [3700–5000 ft]) and on northern slopes where temperatures are cooler and thus moisture availability is greater. These include *Artemisia tridentata*, *Coleogyne ramosissima*, and *Pinus monophylla* (Turner 1982). *Artemisia tridentata* and *P. monophylla* characteristically occur in high density on northern aspects throughout the study area.

With increasing elevation, species associated with the Sierra Nevada floristic province are encountered. Most of these species appear to have ecological requirements that require colder and wetter conditions. The Sierra Nevada taxa are typically restricted to the cold moist drainages and occur at higher elevations throughout the site (1980–2560 m [6500–8400 ft]). One exception is *Pinus sabiniana*. This species is most abundant in the shaded upper reaches of Indian Wells Canyon at the base of Owens Peak, however, this Sierra Nevada species is distributed sparingly along the canyon floors of Short and Grapevine canyons as it reaches its eastern limit.

Rare species.—Rarity in vascular plants is a statement about the geographic distribution and population sizes of a species (Brown 1984). The *Inventory of Rare and Endangered Plants in California* published by the California Native Plant Society (CNPS 2001) is a widely cited document containing information about California's rare plants. This volume contains information on the CNPS listing system, which aims to categorize degrees of rarity (CNPS 2001). Additionally, the CNPS hosts an online inventory of rare and endangered plants (CNPS 2005). Eight CNPS (2001) List 1B taxa (plants rare, threatened, or endangered in California) and nine List 4 taxa (plants of limited distribution—a watch list) have been documented within the study area (Table 5). *Deinandra mohavensis* is the only government-listed species in the study area (listed as endangered by the State of California).

Carlquistia muirii, *Erigeron aequifolius*, *Eriogonum breedlovei* var. *shevockii*, *Lomatium shevockii*, *Monardella beneolens*, and *Phacelia nashiana* are endemic to the southern Sierra Nevada and populations are within the study area. *Lomatium shevockii* is a highly restricted species known from only two locations, on the east slopes of Owens Peak and Mount Jenkins, and is endemic to the study area. The occurrence of *Ericameria gilmanii* on Owens Peak extends the range of this highly restricted species by 100 km to the south from Telescope Peak (Shevock and Jokerst 1990). *Saltugilia latimeri* was previously known from the foothills of the Little San Bernardino, San Bernardino, Santa Rosa, and Granite (of central San Bernardino County) mountains and one disjunct collection from the Panamint Mountains of Inyo County (Weese and Johnson 2001). Two new localities documented over the course of this study (Five Fingers and Grapevine Canyon) extend the range of this species and are the first collection of any member of the genus *Saltugilia* in Kern County (Fraga and Porter 2003).

Table 5. Sensitive plants from the Owens Peak eastern watershed (CNPS Online Inventory 2005).

Taxon	CNPS List[a]	CA State List
Allium atrorubens var. *cristatum*	4	
Camissonia kernensis subsp. *kernensis*	4	
Canbya candida	4	
Chamaesyce vallis-mortae	4	
Cordylanthus eremicus subsp. *eremicus*	4	
Cordylanthus rigidus subsp. *brevibracteatus*	4	
Eriogonum breedlovei var. *shevockii*	4	
Fritillaria pinetorum	4	
Muilla coronata	4	
Carlquistia muirii	1B	
Deinandra mohavensis	1B	Endangered
Ericameria gilmanii	1B	
Erigeron aequifolius	1B	
Lomatium shevockii	1B	
Monardella beneolens	1B	
Phacelia nashiana	1B	
Saltugilia latimeri	1B	

[a] 1B: Rare, threatened, or endangered in California; 4: Limited distribution (watch list).

Phacelia novenmillensis was previously thought to occur within the study area (California Natural Diversity Database 2006). Upon careful examination of historical collections and voucher specimens made as a result of this study, those occurrences that were cited as *P. novenmillensis* have been identified as two other species of *Phacelia*. These are *P. curvipes*, and *P. humilus* var. *dudleyi*.

ANNOTATED CATALOG OF THE VASCULAR FLORA

The following is a list of all vascular plant taxa documented from the eastern watershed of Owens Peak. This catalog is a result of field work and herbarium searches conducted as of March 2005. Family classification follows FNA (2005), while classification of genera and species conforms to Hickman (1993), with the exception of Cactaceae (Griffith 2004), Polemoniaceae (Porter and Johnson 2000), and Madiinae (Baldwin 1999). Specimens that are cited are housed at RSA unless designated by CAS, DS, JEPS, POM, or UC. Common, locally common, occasional, uncommon, and rare are used as an indication of the distribution of taxa across the study area. Non-native taxa are denoted by an asterisk (*). Rare taxa are denoted by a dagger (†).

FERNS AND FERN ALLIES

Selaginellaceae

Selaginella watsonii L.Underw. Perennial herb. Uncommon from rock crevices and between large boulders. 2300–2400 m (7500–7800 ft) *Fraga & Griffith 1225*.

Equisetaceae

Equisetum laevigatum A.Braun. Perennial herb. Uncommon along sandy banks near streams. 1000–1200 m (3400–3800 ft) *Fraga & Fraga 105*.

Azollaceae

Azolla filiculoides Lam. Aquatic annual. Uncommon in standing water in stream channels. 1000–1200 m (3400–3800 ft) *Fraga & Brock 1136*.

Pteridaceae

Cheilanthes covillei Maxon. Perennial herb. Common from rock crevices and between large boulders. 1100–2400 m (3500–7800 ft) *Fraga & Soza 876*.

Pellaea mucronata (D.C.Eaton) D.C.Eaton var. californica (Lemmon) Munz & I.M.Johnst. Perennial herb. Uncommon from rock crevices and between large boulders. 1000–1200 m (3400–3800 ft) *Fraga, Anderson & Stolzenburg 1032*.

Pentagramma triangularis (Kaulf.) Yatsk., Windam & Wollenw. subsp. triangularis. Perennial herb. Uncommon from rock crevices and between large boulders. 700–1200 m (2400–3800 ft) *Fraga & Anderson 1004*.

coniferae

Cupressaceae

Juniperus californica Carrière. Large shrub. Uncommon on desert and mountain slopes. 1200–1500 m (4000–5000 ft) *Fraga & Fraga 101*.

Juniperus occidentalis Hook. var. australis (Vasek) A.Holmgren & N.Holmgren. Tree. Occasional on the east slopes of Owens Peak. Generally on rocky slopes. 2300–2500 m (7500–8200 ft) *Fraga & Griffith 859*.

Ephedraceae

Ephedra nevadensis S.Watson. Small shrub. Occasional on gravelly desert slopes. 800–1500 m (2600–5000 ft) *Fraga, De Groot & Porter 671*.

Ephedra viridis Coville. Small shrub. Common on gravelly desert slopes, and rocky mountain slopes. 1200–2400 m (3800–7900 ft) *Fraga & Soza 773*.

Pinaceae

Abies concolor (Gordon & Glend.) Lindl. Tree. Uncommon on the north slope of Mount Jenkins and the eastern slope of Owens Peak. 2200–2500 m (7200–8300 ft) *Fraga & De Groot 937*.

Pinus flexilis E.James. Tree. Rare on the upper east slopes and the summit of Owens Peak. 2600 m (8400 ft) *Fraga & Gross 978*.

Pinus jeffreyi Grev. & Balf. Tree. Common on the north slope of Mount Jenkins and on the east slope of Owens Peak. 2200–2600 m (7200–8400 ft) *Fraga & De Groot 938*.

Pinus lambertiana Douglas Tree. Common on the north slope of Mount Jenkins and on the east slope of Owens Peak. 2200–2600 m (7200–8400 ft) *Fraga & De Groot 936*.

Pinus monophylla Torr. & Frém. Tree. Common on lower mountain slopes. 1200–2500 m (3800–7900 ft) *Fraga & Boyd 389*.

Pinus sabiniana Douglas. Tree. Occasional on upper reaches of canyon and lower mountain slopes. 1000–1800 m (3400–6000 ft) *Fraga & Fraga 130*.

angiospermae – dicotyledones

Aceraceae

Acer glabrum Torrey var. diffusum (Greene) F.J.Smiley. Large shrub. Rare on the north slope of Mount Jenkins. 2200 m (7200 ft) *Fraga & Anderson 1002*.

Apiaceae

Angelica lineariloba A.Gray. Perennial herb. Occasional on exposed rocky mountain slopes. 2000–2500 m (6700–8100 ft) *Fraga & Anderson 1119*.

Berula erecta (Huds.) Coville. Perennial herb. Occasional in stream channels of canyons. 1000–1200 m (3300–3900 ft) *Fraga & Tessel 151*.

Lomatium mohavense (J.M.Coult. & Rose) J.M.Coult. & Rose. Geophyte. Common on alluvial slopes and canyon floors. 850–1900 m (2800–6100 ft) *Fraga, Boyd, Denslow & Gross 327*.

Lomatium nevadense (S.Watson) J.M.Coult. & Rose var. parishii (J.M.Coult. & Rose) Jeps. Geophyte. Occasional on rocky mountain slopes. 2100–2300 m (6800–7600 ft) *Fraga & Anderson 1128*.

†Lomatium shevockii R.L.Hartm. & Constance. Geophyte. On the steep east slopes of Mount Jenkins and Owens Peak, generally on talus and scree. 2200–2500 m (7000–8200 ft) (*Holotype* UC; *isotypes* CAS, MO, NY, RM, RSA, US) *Shevock 11681*.

Tauschia parishii (J.M.Coult. & Rose) J.F.Macbr. Geophyte. Common on alluvial slopes, and rocky slopes. 1200–2200 m (3900–7200 ft) *Fraga & Soza 885*.

Asclepiadaceae

Asclepias californica Greene. Perennial herb. Occasional on shaded slopes in pinyon–oak woodland. 1200–2000 m (4000–6500 ft) *Fraga, Soza & Honer 753*.

Asclepias fascicularis Decne. Perennial herb. Occasional near banks of stream channels. 1000–1200 m (3400–4000 ft) *Fraga, Maurice, Scovell & Virgen 896*.

Asteraceae

Acamptopappus sphaerocephalus (A.Gray) A.Gray. Small shrub. Occasional on bajadas and on alluvial slopes in open desert scrub. 800–1100 m (2600–3500 ft) *Fraga & Denslow 472*.

Agoseris retrorsa (Benth.) Greene. Perennial herb. Uncommon on rocky mountain slopes, often in shade of pines. 2100–2400 m (7000–7800 ft) *Fraga & Anderson 1131*.

Ambrosia acanthicarpa Hook. Annual. Occasional on roadways and disturbed sites. 800–1000 m (2600–3400 ft) *Fraga, Bigelow & Denslow 1009*.

Ambrosia dumosa (A.Gray) Payne. Small shrub. Common on desert slopes and bajadas. 800–1200 m (2600–3800 ft) *Fraga & Fraga 551*.

Anisocoma acaulis Torr. & A.Gray. Annual. Common on desert slopes and bajadas. 1000–2000 m (3300–6500 ft) *Fraga & Soza 771*.

Artemisia dracunculus L. Suffruticose perennial. Occasional along banks above stream channels. 980–1200 m (3200–4000 ft) *Fraga, Boyd, Denslow & Gross 371*.

Artemisia ludoviciana Nutt. subsp. ludoviciana. Perennial herb. Common along banks above stream channels. 1000–1500 m (3200–5000 ft) *Fraga, De Groot & Hobbs 991*.

Artemisia tridentata Nutt. subsp. tridentata. Small shrub. Common on upper slopes of canyons and rocky mountain slopes. 1000–2100 m (3400–6800 ft) *Fraga & Brock 1344*.

Baccharis salicifolia (Ruiz & Pav.) Pers. Large shrub. Occasional in stream channels. 1000–1400 m (3300–4500 ft) *Fraga & Maurice 169*.

Baccharis sergiloides A.Gray. Small shrub. Common on banks above stream channels and desert slopes. 1000–1200 m (3300–4000 ft) *Fraga, Soza & Honer 700*.

Brickellia californica (Torr. & A.Gray) A.Gray. Small shrub. Uncommon on shaded north slopes near stream channels. 1200–1800 m (4000–6000 ft) *Fraga & Gross 971*.

Brickellia desertorum Coville. Small shrub. Occasional from in between large granite boulders and desert slopes. 900–1400 m (3000–4500 ft) *Sanders, Boyd & Soza 22340*.

Brickellia watsonii Robinson. Small shrub. Occasional from in between large granite boulders and desert slopes. 900–1400 m (3000–4500 ft) *Fraga, De Groot & Hobbs 996*.

†Carlquistia muirii (A.Gray) B.G.Baldwin. Suffruticose perennial. Rare from large granite ourcrops on Owens Peak. 2400–2500 m (8000–8200 ft) *Ertter, Bagley, Bramlet & Daniel 6442* (UC).

Chaenactis fremontii A.Gray. Annual. Occasional in sandy bajadas and desert slopes. 800–1100 m (2600–3500 ft) *Fraga & Fraga 1110*.

Chaenactis santolinoides Greene. Perennial herb. Uncommon on steep talus mountain slopes, on the east slope of Mount Jenkins. 2000–2400 m (6500–7800 ft) *Fraga & Anderson 1118*.

Chaenactis stevioides Hook. & Arn. Annual. Uncommon in sandy bajadas and desert slopes. 900–1400 m (3000–4500 ft) *Fraga, De Groot & Porter 578*.

Chaenactis xantiana A.Gray. Annual. Common in sandy bajadas, desert and exposed mountain slopes. 800–2300 m (2600–7400 ft) *Fraga & Soza 764*.

Chrysothamnus nauseosus (Pall.) Britton subsp. consimilis (Greene) H.M.Hall & Clem. Small shrub. Common on desert slopes and canyon floors. 1100–1500 m (3500–5000 ft) *Fraga & Maurice 168*.

Chrysothamnus nauseosus (Pall.) Britton subsp. hololeucus (A.Gray) H.M.Hall & Clem. Small shrub. Common on sandy bajadas. 800–1000 m (2600–3400 ft) *Fraga & Brock 1347*.

Chrysothamnus nauseosus (Pall.) Britton subsp. mohavensis (Greene) H.M.Hall & Clem. Small shrub. Common on desert slopes of canyons. 1200–1220 m (3500–4000 ft) *Fraga & De Groot 998*.

Chrysothamnus parryi (A.Gray) Greene subsp. vulcanicus (Greene) H.M.Hall & Clem. Small shrub. Rare on the summit of Owens Peak. 2600 m (8400 ft) *Fraga & Gross 979*.

Chrysothamnus teretifolius (Durand & Hilg.) H.M.Hall. Small shrub. Occasional on desert slopes of canyons and on north slope of Five Fingers. 900–1200 m (3000–4000 ft) *Fraga, De Groot & Hobbs 985*.

Chrysothamnus viscidiflorus (Hook.) Nutt. subsp. viscidiflorus. Small shrub. Uncommon along the trail from Indian Wells Canyon to Owens Peak. 1800 m (6000 ft) *Fraga & Gross 969*.

Cirsium occidentale (Nutt.) Jeps. var. venustum (Greene) Jeps. Biennial herb. Occasional on desert slopes of canyons, and rocky montains slopes. 900–2400 m (3000–7800 ft) *Fraga, Honer & Soza 707*.

Conyza canadensis (L.) Cronquist. Annual (sometimes treated as introduced). Uncommon in moist drainages. 1710 m (5600 ft) *Fraga, Anderson, Gross & Kempton 1642*.

Coreopsis bigelovii (A.Gray) H.M.Hall. Annual. Common on alluvial slopes and sandy bajadas. 900–2100 m (3000–7000 ft) *Fraga & Denslow 494*.

†Deinandra mohavensis (D.D.Keck) B.G.Baldwin. Annual. Occasional from springs and seeps in Short Canyon. 1150–1200 m (3800–4000 ft) *Fraga, Buck, McAllister, Morgan & Virgen 954*.

Encelia actoni (Elmer) D.D.Keck. Small shrub. Common on desert slopes and sandy bajadas. 900–1500 m (3000–5000 ft) *Fraga & Denslow 518*.

*Encelia farinosa Torr. & A.Gray. Small shrub. Rare; from one collection along SR 14 near the Indian Wells Steakhouse. Only seedlings collected, the source population is located along the highway. No plants seen naturalizing further into the study area. 800 m (2600 ft) *Fraga, Bigelow & Denslow 1017*.

Ericameria cooperi (A.Gray) H.M.Hall subsp. cooperi. Small shrub. Common on desert slopes. 850–1200 m (2800–4000 ft) *Twisselman & Urbatsch 7142* (UC).

Ericameria cuneata (A.Gray) McClatchie. Small shrub. Locally common from underneath boulders and in granite outcrops. 1000–2400 m (3300–7600 ft) *Fraga & De Groot 995*.

†Ericameria gilmanii (S.F.Blake) G.Nesom. Small shrub. Rare at the base of granite boulders and gravelly areas on Owens Peak. 2500 m (8200 ft) *Fraga, Anderson, Gross & Kempton 1653*.

Ericameria linearifolia (DC.) Urbatsch & Wussow. Small shrub. Common on sandy canyon floors, desert slopes, and rocky mountain slopes. 1000–2100 m (3500–6800 ft) *Fraga, De Groot & Porter 645*.

†Erigeron aequifolius H.M.Hall. Perennial herb. Rare from granite outcrops on Owens Peak 2500–2600 m (8000–8400 ft) *Fraga 1700*.

Erigeron breweri A.Gray var. covillei (Greene) G.Nesom. Perennial herb. Occasional on shaded steep slopes in mixed coniferous forest. 2440 m (8000 ft) *Fraga, Anderson, Gross & Kempton 1655*.

Erigeron foliosus Nutt. var. foliosus. Perennial herb. Occasional on rocky mountain slopes. 1200–2200 m (3800–7000 ft) *Fraga & Soza 893*.

Eriophyllum ambiguum (A.Gray) A.Gray var. paleaceum (Brandegee) Ferris. Annual. Common on desert slope, exposed ridgelines and canyon floors. 900–7600 m (3000–7600 ft) *Fraga & Soza 770*.

Eriophyllum confertiflorum (DC.) A.Gray var. confertiflorum. Suffruticose perennial. Common from granite rock ourcrops and desert slopes. 900–2400 m (3000–7800 ft) *Twisselman 4519* (JEPS).

Eriophyllum pringlei A.Gray. Annual. Common on alluvial slopes and sandy canyon bottoms. 900–1500 m (3000–5000 ft) *Fraga, Gross & Navidara 1075*.

Eriophyllum wallacei (A.Gray) A.Gray. Annual. Common on alluvial slopes and sandy canyon bottoms. 900–1500 m (3000–5000 ft) *Fraga & Boyd 406*.

Filago depressa A.Gray. Annual. Uncommon on sandy canyon bottoms. 800–1200 m (2600–4000 ft) *Fraga & Boyd 435*.

Gnaphalium canescens DC. Suffruticose perennial. Occasional in moist drainages. 1710 m (5600 ft) *Fraga, Anderson, Gross & Kempton 1644*.

*Gnaphalium luteo-album L. Annual. Occasional on moist banks above stream channels. 1000–1400 m (3400–4600 ft) *Fraga & Brock 1330*.

Gnaphalium stramineum Kunth. Annual or biennial herb. Uncommon in moist drainages. 1710 m (5600 ft) *Fraga, Anderson, Gross & Kempton 1640*.

Gutierrezia microcephala (DC.) A.Gray. Suffruticose perennial. Common on sandy canyon bottoms and desert slopes. 900–1300 m (3000–4200 ft) *Fraga & Maurice 160*.

*Helianthus annuus L. Annual. Rare; documented from one locality along the aqueduct road between Short Canyon and Five Fingers. 975 m (3200 ft) *Fraga & De Groot 843*.

Hieracium horridum Fries. Perennial herb. Rare; from the rocky slopes of Owens Peak, at the base of granitic outcrops. 2500 m (8100 ft) *Ertter, Bagley, Bramlet & Daniel 6439* (UC).

Hymenoclea salsola Torr. & A.Gray var. salsola. Small shrub. Common on desert slopes and sandy canyon bottoms. 850–1500 m (2800–5000 ft) *Fraga & Fraga 553*.

Lasthenia californica DC. ex Lindl. Annual. Occasional on sandy bajadas and desert slopes. 850–1000 m (2800–3300 ft) *Fraga & Boyd 439*.

Layia glandulosa (Hook.) Hook. & Arn. Annual. Locally abundant on open desert slopes and canyon bottoms. 1100–1900 m (3500–6300 ft) *Fraga & Griffith 1087*.

Lepidospartum squamatum (A.Gray) A.Gray. Small shrub. Occasional on sandy bajadas and dry washes. 800–1100 m (2600–3600 ft) *Fraga & Brock 1325*.

Lessingia filaginifolia (Hook. & Arn.) M.A.Lane var. filaginifolia. Suffruticose perennial. Occasional in the shade of pinyon–oak woodland, and shaded areas and rock outcrops along canyon floors. 975–2000 m (3200–6400 ft) *Fraga & Gross 976*.

Lessingia lemmonii A.Gray var. ramulosissima (A.Nelson) Ferris. Annual. Uncommon in open areas, and dry canyon bottoms. 1450–1500 m (4800–5000 ft) *Fraga & Brock 1333*.

Machaeranthera canescens (Pursh) A.Gray var. canescens. Perennial herb. Uncommon on rocky mountain slopes. 2100–2600 m (7000–8400 ft) *Fraga & Soza 886*.

Madia elegans Lindl. subsp. elegans. Annual. Occasional on rocky slopes in open pinyon forest, and steep talus slopes. 1800–2400 m (6000–8000 ft) *Fraga & Griffith 810*.

Malacothrix glabrata (D.C.Eaton) A.Gray. Annual. Common on bajadas, generally growing underneath shrubs. 800–1500 m (2600–5000 ft) *Fraga & Boyd 442*.

Monoptilon bellidiforme A.Gray. Annual. Uncommon; from one collection in Short Canyon in a dry alluvial wash with fine sandy soil. 1000 m (3400 ft) *Fraga & Denslow 527*.

Nicolletia occidentalis A.Gray. Perennial herb. Common on canyons bottoms in sandy soil and sand dunes. 800–1100 m (2600–3600 ft) *Twisselman 4540* (CAS).

Orochaenactis thysanocarpha (A.Gray) Coville. Annual. Occasional on rocky talus and scree slopes. 2000–2600 m (6600–8400 ft) *Fraga & Anderson 1115*.

Pluchea sericea (Nutt.) Coville. Large shrub. Uncommon in stream channels. 900–1100 m (3000–3500 ft) *Twisselman 6528* (CAS).

Rafinesquia neomexicana A.Gray. Annual. Occasional from underneath shrubs serving as nurse plants in bajadas, and desert slopes. 800–900 m (2600–3000 ft) *Fraga & Boyd 438*.

Senecio flaccidus Less. var. monoensis (Greene) B.L.Turner & T.M.Barkley. Small shrub. Occasional from desert slopes and near dry stream channels. 1100–1400 m (3500–4600 ft) *Fraga, Maurice, Scovell & Virgen 899*.

Solidago californica Nutt. Perennial herb. Locally abundant along moist stream channels. 1100–1220 m (3500–4000 ft) *Fraga, Buck, McAllister, Morgan & Virgen 949*.

Solidago confinis A.Gray. Perennial herb. Locally abundant on moist banks of stream channels. 1100–1220 m (3500–4000 ft) *Fraga, Buck, McAllister, Morgan & Virgen 958*.

*Sonchus oleraceus L. Annual. Rare in canyon drainages. 1100–1700 m (3600–5600 ft) *Fraga & Tessell 833*.

Stephanomeria exigua Nutt. subsp. coronaria (Greene) Gottlieb. Annual. Occasional on desert slopes. 1220–2100 m (4000–7000 ft) *Fraga & Soza 891*.

Stephanomeria pauciflora (Nutt.) A.Nelson. Suffruticose perennial. Common on desert slopes and rocky mountain slopes. 800–2100 m (2600–7000 ft) *Fraga & Soza 794*.

Syntrichopappus fremontii A.Gray. Annual. Uncommon on desert slopes. 1220–1525 m (4000–5000 ft) *Fraga et al. (Field trip attendees) 1544*.

*Taraxacum officinale Weber ex G.H.Wiggers. Perennial herb. Rare; from one collection in Short Canyon on wet soil from seeps and springs. 1200 m (3900 ft) *Fraga & Griffith 1083*.

Tetradymia axillaris A.Nelson var. longispina (M.E.Jones) Strother. Small shrub. Occasional on canyons bottoms and desert slopes. 1100–1300 m (3600–4400 ft) *Fraga, Griffith & Walker 568*.

Tetradymia stenolepis Greene. Small shrub. Occasional on canyons bottoms and desert slopes. 1100–1500 m (3600–5000 ft) *Fraga, Maurice, Scovell & Virgen 897*.

Uropappus lindleyi Nutt. Annual. Occasional on bajadas, generally growing underneath shrubs. 900–1500 m (3000–5000 ft) *Fraga, De Groot & Porter 636*.

Wyethia mollis A.Gray. Perennial herb. Occasional in shade pinyon woodland, and on rocky mountains slopes. 1700–2100 m (5500–7000 ft) *Fraga & Griffith 1093*.

Xanthium strumarium L. Annual. Rare; from one collection near moist canyon drainage in Indian Wells Canyon. 1100 m (3600 ft) *Fraga & Brock 1339*.

Xylorhiza tortifolia (Torr. & A.Gray) Greene var. tortifolia. Suffruticose perennial. Occasional on canyon bajadas and exposed ridgetops. 800–2050 m (2600–6700 ft) *Fraga & Fraga 1100*.

Betulaceae

Alnus rhombifolia Nutt. Tree. Locally common in Grapevine Canyon at upper reaches of the north and south forks in canyon drainage. 1200–1500 m (4000–5000 ft) *Fraga & Mills 1216*.

Boraginaceae

Amsinckia tesselata A.Gray var. tesselata. Annual. Common on bajadas and desert slopes. 800–1700 m (2600–5600 ft) *Fraga, De Groot & Porter 583*.

Cryptantha barbigera (A.Gray) Greene. Annual. Occasional in bajadas and desert slopes. 800–1700 m (2600–5500 ft) *Fraga, De Groot & Porter 608*.

Cryptantha circumscissa (Hook. & Arn.) I.M.Johnst. Annual. Common in sandy openings of bajadas and gentle mountain slopes. 800–1700 m (2600–5600 ft) *Fraga, Boyd, Denslow & Gross 348*.

Cryptantha decipiens (M.E.Jones) A.Heller. Annual. Occasional in open sandy areas. 800–1000 m (2600–3300 ft) *Fraga & Boyd 437*.

Cryptantha intermedia (A.Gray) Greene. Annual. Occasional in open sandy areas. 1100–1220 m (3500–4000 ft) *Fraga, Anderson & Stolzenburg 1034*.

Cryptantha micrantha (Torr.) I.M.Johnst. Annual. Occasional in sandy open places. 800–1200 m (2600–4000 ft) *Fraga & Boyd 441*.

Cryptantha mohavensis (Greene) Greene. Annual. Common in open habitats on desert slopes and exposed ridgetops. 1100–1900 m (3500–6200 ft) *Fraga & Soza 759*.

Cryptantha nevadensis A.Nelson & Kennedy. Annual. Common in sandy open places. 800–1220 m (2600–4000 ft) *Fraga & Boyd 447*.

Cryptantha pterocarya (Torr.) Greene var. pterocarya. Annual. Common in open habitats on desert slopes, canyon bottoms and exposed ridgetops. 800–2100 m (2600–6800 ft) *Fraga & Soza 760*.

Cryptantha pterocarya (Torr.) Greene var. purpusii Jeps. Annual. Uncommon in open habitats on desert slopes, canyon bottoms and exposed ridgetops. 800–2100 m (2600–6800 ft). Two collections of this specimen made from Grapevine Canyon and Indian Wells Canyon. The vegetative morphology is variable, however nutlets appear consistent. Further study warranted. *Fraga, Honer & Soza 751*.

Cryptantha utahensis (A.Gray) Greene. Annual. Rare; from one collection on Five Fingers. 1220 m (4000 ft) *Fraga, De Groot & Porter 605*.

Heliotropium curassavicum L. subsp. oculatum (A.Heller) Thorne. Perennial herb. Occasional, from disturbed sites, and open sandy places. 800–1600 m (2600–5200 ft) *Fraga, Maurice, Scovell & Virgen 898*.

Pectocarya penicillata (Hook. & Arn.) A.DC. Annual. Occasional from sandy open places. 800–1700 m (2600–5600 ft) *Fraga & Boyd 450*.

Pectocarya recurvata I.M.Johnst. Annual. Uncommon from sandy open places. 800–1500 m (2600–5000 ft) *Fraga, Gross & Navidara 1079*.

Pectocarya setosa A.Gray. Annual. Occasional from sandy open places. 800–1220 m (2600–4000 ft) *Fraga, Boyd, Denslow & Gross 309*.

Plagiobothrys arizonicus (A.Gray) Greene ex A.Gray. Annual. Common in open sandy habitats. 800–1500 m (2600–5000 ft) *Fraga & Denslow 456*.

Plagiobothrys canescens Benth. Annual. Locally common in sandy openings of bajadas. 792–915 m (2600–3000 ft) *Fraga & Fraga 1523*.

Tiquilia nuttallii (Hook.) A.T.Richardson. Annual. Uncommon on bajadas and desert slopes. 900–1200 m (2800–4000 ft) *Keefe 13740*.

Brassicaceae

Arabis inyoensis Rollins. Perennial herb. Occasional on rocky mountain slopes of Mount Jenkins and Owens Peak and from

granite outcrops in Short Canyon. 1160–2600 m (3800–8400 ft) *Fraga & Soza 873*.

Arabis pulchra M.E.Jones var. pulchra. Perennial herb. Common in the shade of pinyons, and canyon bottoms, exposed ridges and rocky mountain slopes. 1200–2600 m (3800–8400 ft) *Fraga, Honer & Soza 728*.

Athysanus pusillus (Hook.) Greene. Annual. Uncommon on wet seeps and moist sandy hummocks. 1200–1400 m (3800–4500 ft) *Fraga, Boyd, Denslow & Gross 321*.

Caulanthus cooperi (S.Watson) Payson. Annual. Common from bajadas and desert slopes. 800–1220 m (2600–4000 ft) *Fraga, De Groot & Porter 597*.

Descurainia pinnata (Walter) Britton subsp. glabra (Wooton & Standl.) Detling. Annual. Occasional on desert and rocky mountain slopes. 850–2400 m (2800–7800 ft) *Fraga & Anderson 1274*.

Dithyrea californica Harvey. Annual. Occasional in slopes with fine sandy soil and dunes near Short Canyon. 850–900 m (2800–3000 ft) *Fraga & Fraga 210*.

Draba cuneifolia Torr. & A.Gray. Annual. Rare on moist sandy banks near springs in Short Canyon. 1100–1200 m (3500–3800 ft) *Fraga, Boyd, Denslow & Gross 344*.

Erysimum capitatum (Douglas) Greene. Biennial herb. Occasional in shade of pinyons and and on exposed talus slopes. 1220–2200 m (4000–7200 ft) *Fraga & Griffith 1149*.

Guillenia lasiophylla (Hook. & Arn.) Greene. Annual. Occasional in canyon bajadas and desert slopes. 900–1220 m (2800–4000 ft) *Fraga & Boyd 436*.

Hutchinsia procumbens (L.) Desv. Annual. Locally common on moist sandy hummocks. 1200–1300 m (3800–4200 ft) *Fraga & Boyd 412*.

Lepidium fremontii S.Watson var. fremontii. Small shrub. Occasional on desert slopes and bajadas. 850–1500 m (2800–5000 ft) *Fraga & Maurice 226*.

Lepidium lasiocarpum Torr. & A.Gray. Annual. Occasional on sandy bajadas and desert slopes. 800–1220 m (2600–4000 ft) *Fraga & Boyd 414*.

Rorippa nasturtium-aquaticum (L.) Schinz & Thell. Perennial herb. Locally abundant in stream channels with running water. 1300–1100 m (3500–4200 ft) *Fraga & Fraga 104*.

*Sisymbrium orientale L. Annual. Uncommon; from one location near the Indian Wells Steak House and Brewery. 800 m (2600 ft) *Fraga, Bigelow & Denslow 1019*.

Thysanocarpus curvipes Hook. Annual. Occasional on sandy slopes and canyon bottoms. 1200–1500 m (3800–5000 ft) *Fraga & Boyd 410*.

Thysanocarpus laciniatus Nutt. ex Torr. & A.Gray. Annual. Occasional on sandy slopes and canyon bottoms. 1100–1400 m (3600–4500 ft) *Fraga, Honer & Soza 739*.

Tropidocarpum gracile Hook. Annual. Occasional on desert slopes and canyon bottoms. 850–1550 m (2800–5100 ft) *Fraga & Maurice 227*.

Cactaceae

Cylindropuntia echinocarpa (Engelm. & J.M.Bigelow) F.M.Knuth. Succulent shrub. Common on sandy bajadas and desert slopes. 800–1220 m (2600–4000 ft) *Fraga & Tessel 136*.

Opuntia basilaris Engelm. & J.M.Bigelow. Succulent shrub. Common on bajadas, desert slopes and rocky mountain slopes. 800–2500 m (2600–8200 ft) *Fraga & Denslow 511*.

Opuntia erinacea Engelm. & J.M.Bigelow. Succulent shrub. Rare; from one collection of a seedling in mixed coniferous understory growing in dense pine duff. Further surveys warranted. 2380 m (7800 ft) *Fraga, Anderson, Gross & Kempton 1645*.

Campanulaceae

Nemacladus sigmoideus G.T.Robbins. Annual. Uncommon from the bajada of Short Canyon on sand dunes. 900–1000 m (2800–3400 ft) *Fraga et al. (field trip attendees) 1099*.

Capparaceae

Isomeris arborea Nutt. Small shrub. Common on desert slopes and bajadas. 800–1280 m (2600–4200 ft) *Fraga & Denslow 507*.

Caprifoliaceae

Lonicera interrupta Benth. Liana, sometimes a scandent shrub. Uncommon in shade of pinyon forest. 1600–2100 m (5300–6800 ft) *Fraga & Griffith 798*.

Sambucus mexicana C. Presl ex DC. Large shrub. Uncommon in shade of pinyon–oak woodland on rocky mountain slopes. 1900–2300 m (6100–7400 ft) *Fraga & Griffith 805*.

Caryophyllaceae

Arenaria macradenia S.Watson var. arcuifolia Maguire. Suffruticose perennial. Occasional on shaded and rocky talus slopes. 1220–2300 m (4000–7300 ft) *Fraga, Honer & Soza 749*.

Minuartia douglasii (Torr. & A.Gray) Mattf. Annual. Uncommon from one collection on the north slope near Coyote Springs, Grapevine Canyon. 1220 m (4000 ft) *Fraga, Soza, Honer 738*.

Minuartia pusilla (S.Watson) Mattf. Annual. Locally common in moist areas fed by springs on coarse sand in Short Canyon. 1100 m (3600 ft) *Fraga & Brock 1517*.

Silene verecunda S.Watson subsp. platyota (S.Watson) C.L.Hitchc. & Maguire. Perennial herb. Occasional on desert and rocky mountain slopes. 1220–2230 m (4000–7300 ft) *Fraga & Anderson 1265*.

Chenopodiaceae

Atriplex canescens (Pursh) Nutt. Small shrub. Common on desert slopes, especially in Short Canyon. 1010–1220 m (3300–4000 ft) *Fraga & Brock 1326*.

Atriplex polycarpa (Torr.) S.Watson Small shrub. Occasional on desert slopes. 800–1220 m (2600–4000 ft) *Fraga & Brock 1340*.

Chenopodium californicum (S.Watson) S.Watson. Perennial herb. Rare, from one location in Short Canyon in moist shaded areas. 1200 m (3900 ft) *Fraga, Griffith & Walker 573*.

Chenopodium fremontii S.Watson. Annual. Occasional on exposed ridgetops, in shade of pinyons and rocky mountain slopes. 1220–2600 m (4000–8400 ft) *Fraga & Mills 1212*.

Grayia spinosa (Hook.) Moq. Small shrub. Occasional on canyon bajadas and rocky desert slopes. Common on the exposed ridgeline of Backus Peak. 850–2010 m (2800–6600 ft) *Fraga, Gross & Navidara 1073*.

Krascheninnikovia lanata (Pursh) Gueldenstaedt. Small shrub. Occasional on desert slopes. 910–1220 m (3000–4000 ft) *Fraga & Fraga 557*.

*Salsola paulsenii Litv. Annual. Rare; from one collection at the Indian Wells Steak House and Brewery. 800 m (2600 ft) *Fraga, Bigelow & Denslow 1013*.

Convolvulaceae

Calystegia longipes (S.Watson) Brummitt. Perennial herb. Occasional on desert slopes and sandy canyon bottoms. 1100–1220 m (3600–4000 ft) *Fraga & Fraga 1108*.

Crassulaceae

Crassula connata (Ruiz & Pav.) A.Berger. Annual. Uncommon on moist sandy hummocks in Short Canyon. 1100–1300 m (3500–4100 ft) *Fraga & Maurice 236*.

Dudleya abramsii Rose subsp. abramsii. Succulent perennial herb. Uncommon on the rocky talus slopes of Owens Peak and Mount Jenkins 2300–2400 m (7500–7800 ft) *Fraga & Soza 877*.

Dudleya lanceolata (Nutt.) Britton & Rose. Succulent perennial herb. Uncommon from the mouth of Grapevine Canyon. 800 m (2600 ft) *Moran & Nakai 3272*.

Dudleya saxosa (M.E.Jones) Britton & Rose subsp. aloides (Rose) Moran. Succulent perennial herb. Occasional from near crevices of large granite boulders and desert slopes. 1100–1500 m (3500–5000 ft) *Fraga, Griffith & Walker 565*.

Cucurbitaceae

Cucurbita foetidissima Kunth. Geophyte. Locally common in Indian Wells Canyon on dry flats above stream channels. 1100–1220 m (3700–4000 ft) *Fraga, Maurice, Scovell & Virgen 908*.

Cuscutaceae

Cuscuta californica Hook. & Arn. var. californica. Parasitic annual. Common on desert slopes, most commonly growing on *Baccharis sergiloides* and *Eriogonum fasciculatum*. 1200–2100 m (3800–7000 ft) *Fraga, Maurice, Scovell & Virgen 910*.

Cuscuta denticulata Engelm. Parasitic annual. Rare from one collection in Indian Wells Canyon on desert slopes, generally growing on *Atriplex polycarpa*. 975 m (3200 ft) *Fraga & Soza 793*.

Cuscuta subinclusa Durand & Hilg. Parasitic annual. Rare; from one collection in Short Canyon from large granite boulders on *Artemisia ludoviciana*. 1200 m (3800 ft) *Fraga & Anderson 1003*.

Euphorbiaceae

Chamaesyce albomarginata (Torr. & A.Gray) Small. Perennial herb. Occasional from head of Indian Wells Canyon in open or disturbed places. 800–2100 m (2600–7000 ft) *Fraga, Gross & Navidara 1057*.

†Chamaesyce vallis-mortae Millsp. Perennial herb. Locally common from sandy open places. 800–1500 m (2600–5000 ft) *Fraga & Brock 1321*.

Fabaceae

Astragalus didymocarpus Hook. & Arn. var. didymocarpus. Annual. Occasional from one location at Short Canyon growing on moist sand from seeps. 1100–1200 m (3500–3800 ft) *Fraga, Griffith & Walker 560*.

Astragalus layneae Greene. Perennial herb. Rare; from the southeast end of the study area at Freeman Junction. 800–1000 m (2600–3300 ft) *Rose s.n.* 3 Apr 1967 *67011*.

Astragalus lentiginosus Hook. var. variabilis Barneby. Perennial herb. Occasional on desert slopes, and bajadas. 900–2200 m (3000–7000 ft) *Fraga & Soza 776*.

Astragalus pachypus Greene var. pachypus. Suffruticose perennial. Uncommon from the desert slopes of Short Canyon. 850–1200 m (2800–4000 ft) *Berry 269* (UCR).

Astragalus purshii Douglas var. tinctus M.E.Jones. Perennial herb. Uncommon from the head of Indian Wells Canyon. 1520–1600 m (5000–5500 ft) *Fraga, Anderson & Stolzenburg 1055*.

Glycyrrhiza lepidota Pursh. Perennial herb. Locally common in Grapevine Canyon in moist areas near drainages. 915–1040 m (3000–3400 ft) *Fraga & Mills 1220*.

Lotus argophyllus (A.Gray) Greene var. argophyllus. Perennial herb. Uncommon from from crevices and in between granite boulders. 1100–1520 m (3600–5000 ft) *Fraga & Tessel 145*.

Lotus humistratus Greene. Annual. Occasional from sandy bajadas and desert slopes. 800–1220 m (2600–4000 ft) *Fraga & Boyd 428*.

Lotus oblongifolius (Benth.) Greene var. oblongifolius. Perennial herb. Locally common from moist stream channels. 1100–1590 m (3500–5200 ft) *Fraga, Maurice, Scovell & Virgen 915*.

Lotus procumbens (Greene) Greene var. procumbens. Perennial herb. Occasional in shade of pinyon woodland and on open rocky mountain slopes. 1830–2200 m (6000–7000 ft) *Fraga & Anderson 1273*.

Lotus purshianus Clem. & E.G.Clem. Perennial herb. Occasional from banks above stream channels. 1100–1220 m (3500–4000 ft) *Fraga & Fraga 1105*.

Lotus strigosus (Nutt.) Greene. Annual. Common from sandy canyons, dry slopes, and rocky mountain slopes. 800–2200 m (2600–2700 ft) *Fraga & Soza 777*.

Lupinus bicolor Lindl. Annual. Occasional from bajadas and desert slopes. 915–1700 m (3000–5600 ft) *Fraga & Maurice 262*.

Lupinus concinnus J.G.Agardh. Annual. Common on bajadas, sand dunes and desert slopes. 915–2000 m (3000–6500 ft) *Fraga, Boyd, Denslow & Gross 320*.

Lupinus elatus I.M.Johnst. Perennial herb. Uncommon in the shady understory of mixed coniferous forest on the rocky slopes of Owens Peak. 2400–2600 m (8000–8400 ft) *Fraga & Griffith 1230*.

Lupinus excubitus M.E.Jones var. excubitus. Suffruticose perennial. Common on the desert canyon slopes and rocky mountain slopes. 1100–2300 m (3600–7400 ft) *Fraga, Gross & Navidara 1062*.

*Melilotus albus Medikus. Annual to perennial herb. Uncommon along the moist stream channel, from one collection at Indian Wells Canyon. 1100 m (3500 ft) *Fraga & Brock 1328*.

Psorothamnus arborescens (A.Gray) Barneby var. minutiflora (Parish) Barneby. Small shrub. Occasional on bajadas and desert slopes. 800–1100 m (2600–3600 ft) *Thibault & Thibault 41*.

Trifolium microcephalum Pursh. Annual. Rare; from one collection in Short Canyon on moist bank above stream edge. 1100 m (3600 ft) *Fraga & Fraga 1104*.

Trifolium willdenovii Spreng. Annual. Uncommon from moist areas on banks above stream, or vernally wet from nearby springs in Short Canyon. 1100 m (3600 ft) *Fraga, Griffith & Walker 559*.

Trifolium wormskjoldii Lehm. Perennial herb. Rare; from one collection near vernally moist depression fed by spring in Short Canyon. 1200 m (3800 ft) *Fraga & Anderson 1102*.

Fagaceae

Chrysolepis sempervirens (Kellogg) Hjelmq. Large shrub. Occasional on steep slopes in understory of mixed coniferous forest on the east slope of Owens Peak. 2440 m (8000 ft) *Fraga, Anderson, Gross & Kempton 1649*.

Quercus chrysolepis Lieb. Tree or large shrub. Common on north slopes of canyons and rocky mountain slopes. 1100–2400 m (3500–8000 ft) *Fraga & Boyd 387*.

Quercus palmeri Engelm. Large shrub. Uncommon; from Short Canyon growing above streams and vernally moist places. 1000–1200 m (3400–3800 ft) *Sanders & Boyd 22350*.

Quercus wislizenii A.DC. Tree. Occasional on north slopes of canyons and on rocky mountain slopes. 1000–1800 m (3400–6000 ft) *Fraga, Honer & Soza 705*.

Quercus ×morehus Kellogg. Tree. Rare; from one collection near the trail to Owens Peak; upper reaches of Indian Wells Canyon. 1800 m (6000 ft) *Fraga & Gross 967*.

Garryaceae

Garrya flavescens S.Watson. Large shrub. Occasional on talus slopes and in the shade of pinyon–oak woodland. 1800–2300 m (6000–7400 ft) *Fraga & Gross 974*.

Gentianaceae

Centaurium exaltatum (Griseb.) Piper. Annual. Rare; near moist places associated with springs in Short Canyon. 1100 m (3600 ft) *Fraga & Fraga 132*.

Centaurium venustum (A.Gray) B.L.Rob. Annual. Rare; from moist places in Short Canyon. 1200 m (4000 ft) *Luthey s.n.* 14 Sep 1978 (CAS).

Geraniaceae

*Erodium cicutarium (L.) L'Hér. Annual. Common especially on bajadas, desert slopes, and disturbed roadsides. 800–1600 m (2600–5200 ft) *Fraga, Bigelow & Denslow 1014*.

Grossulariaceae

Ribes roezlii Regel var. roezlii. Small shrub. Occasional on north slopes at the upper reaches of Indian Wells Canyon and in the shade of pinyon woodland. 1700–2000 m (5600–6600 ft) *Fraga & Griffith 1096*.

Hydrophyllaceae

Emmenanthe penduliflora Benth. var. penduliflora. Annual. Occasional on desert slopes. 980–1500 m (3200–5000 ft) *Fraga, Soza & Honer 727*.

Eucrypta chrysanthemifolia (Benth.) Greene var. bipinnatifida (Torr.) Constance. Annual. Occasional on desert slopes from underneath shrubs and granite rock crevices. 980–1400 m (3200–4500 ft) *Fraga, Boyd, Denslow & Gross 287*.

Nama demissum A.Gray var. demissum. Annual. Occasional on bajadas and desert slopes. 800–1500 m (2600–5000 ft) *Fraga & Denslow 477*.

Nemophila menziesii Hook. & Arn. var. integrifolia Parish. Annual. Occasional on desert slopes and bajadas. Usually growing from underneath shrubs. 800–1600 m (2600–5300 ft) *Fraga & Maurice 253*.

Phacelia austromontana J.T.Howell. Annual. Occasional from talus slopes. 2100–2600 m (7000–8400 ft) *Fraga & Griffith 811*.

Phacelia bicolor S.Watson var. bicolor. Annual. Occasional on bajadas and desert slopes. 800–1220 m (2600–4000 ft) *Kirby 1279* (CAS).

Phacelia cicutaria Greene var. hispida (A.Gray) J.T.Howell. Annual. Uncommon on desert slopes and from between rock crevices or in between shrubs. 1200–2100 m (3800–7000 ft) *Fraga, Honer & Soza 733*.

Phacelia curvipes S.Watson Annual. Uncommon in openings between trees and shrubs in pine–oak woodland, from one collection in Grapevine Canyon. 1816 m (5960 ft) *I. Anderson 870a*.

Phacelia distans Benth. Annual. Common on bajadas and desert slopes. 800–1900 m (2600–6200 ft) *Fraga, Boyd, Denslow & Gross 326*.

Phacelia egena (Greene ex Brand) J.T.Howell. Suffruticose perennial. Occasional on rocky mountain and desert slopes. 1800–2400 m (6000–7800 ft) *Fraga & Griffith 809*.

Phacelia eisenii Brandegee. Annual. Uncommon on the talus slopes of Owens Peak. 2100–2600 m (7000–8400 ft) *Ertter, Bagley, Bramlet & Daniel 6441*.

Phacelia fremontii Torr. Annual. Occasional on bajadas and desert slopes. 800–2000 m (2600–6500 ft) *Fraga & Boyd 395*.

Phacelia lemmonii A.Gray. Annual. Locally common on vernally moist areas on banks above stream in Short Canyon, moisture often associated with springs. 1200 m (3800 ft) *Fraga, Boyd, Denslow & Gross 343*.

Phacelia humilus Torr. ex Gray var. dudleyi J.T.Howell. Annual. Occasional in shaded areas of pinyon forest and from exposed ridgelines and mountain slopes. Most abundant on steep talus slopes. 1100–2000 m (3600–6500 ft) *Fraga & Soza 762*.

†Phacelia nashiana Jeps. Annual. Occasional on sandy slopes and exposed ridgelines. 915–2000 m (3000–6500 ft) *Fraga & Soza 768*.

Phacelia ramosissima Douglas ex Lehm. var. ramosissima. Perennial herb. Uncommon growing from rock crevices or between shrubs. 1000–1500 m (3400–5000 ft) *Fraga, Honer & Soza 724*.

Pholistoma membranaceum (Benth.) Constance. Annual. Occasional from underneath shrubs on desert slopes. 8000–1500 m (2600–5000 ft) *Fraga & Maurice 268*.

Tricardia watsonii S.Watson. Perennial herb. Uncommon on sandy desert slopes. 800–1220 m (2600–4000 ft) *Fraga, Boyd, Denlow & Gross 292*.

Lamiaceae

†Monardella beneolens Shevock, Ertter & Jokerst. Perennial herb. Rare; on Owens Peak on granitic and metamorphic scree and bedrock in open mixed coniferous forest. 2500–2600 m (8200–8400 ft) (Holotype CAS; isotypes FSC, MO, NY, RSA, UC) *Shevock, Bartel & York 11727*.

Monardella odoratissima Benth. subsp. pallida Epling. Perennial herb. Occasional on shaded slopes in open pinyon forest and exposed rocky mountain slopes. 1220–2300 m (4000–7500 ft) *Fraga & De Groot 925*.

Salazaria mexicana Torr. Small shrub. Common on bajadas and desert slopes. 1100–1500 m (3600–5000 ft) *Fraga & Fraga 550*.

Salvia columbariae Benth. Annual. Common on canyon floors and desert slopes. 800–1900 m (2600–6000 ft) *Fraga, De Groot & Porter 575*.

Salvia dorrii (Kellogg) Abrams var. pilosa (A.Gray) Strachan & Reveal. Small shrub. Occasional on desert slopes and sandy canyon bottoms. 1200–1400 m (3800–4500 ft) *Fraga, Boyd, Denslow & Gross 369*.

Salvia pachyphylla Epling ex Munz. Small shrub. Occasional on exposed ridgelines and mountain slopes in open coniferous forest. 1900–2400 m (6000–8000 ft) *Fraga & De Groot 924*.

Stachys ajugoides Benth. var. rigida Jeps. & Hoov. Perennial herb. Locally common in moist drainages. 1710 m (5600 ft) *Fraga, Anderson, Gross & Kempton 1638*.

Stachys albens A.Gray. Perennial herb. Uncommon in moist soil in stream channels. 1100–1400 m (3600–4500 ft) *Fraga & Mills 1121*.

Lennoaceae

Pholisma arenarium Hook. Parasitic perennial herb. Rare; in open places in sandy soil and along road cuts. 1100–1400 m (3500–4500 ft) *Fraga & De Groot 841*.

Loasaceae

Mentzelia affinis Greene. Annual. Occasional in bajadas and desert slopes. 800–1700 m (2600–5600 ft) *Fraga & Denslow 478*.

Mentzelia albicaulis Hook. Annual. Common on bajadas and desert slopes. 800–1500 m (2600–5000 ft) *Fraga & Fraga 554*.

Mentzelia congesta Torr. & A.Gray. Annual. Occasional on rocky mountains slopes in pinyon woodland. 1800–2400 m (6000–8000 ft) *Fraga & Soza 758*.

Mentzelia eremophila (Jeps.) H.J.Thompson & J.E.Roberts. Annual. Rare on desert slopes, only known from one early collection. 800–1400 m (2600–4500 ft) *Peirson 7341*.

Mentzelia obscura H.J.Thompson & J.E.Roberts. Annual. Occasional on bajadas and desert slopes. 800–1220 m (2600–4000 ft) *Fraga & Boyd 429*.

Mentzelia veatchiana Kellogg. Annual. Occasional on bajadas ad desert slopes. 8000–1220 m (2600–4000 ft) *Fraga, Boyd, Denslow & Gross 288*.

Petalonyx thurberi A.Gray subsp. thurberi. Small shrub. Occasional in bajadas and sandy slopes. 8000–1100 m (2600–3500 ft) *Fraga & De Groot 846*.

Lythraceae

Lythrum californicum Torr. & A.Gray. Perennial herb. Uncommon on banks above stream channels in moist soil. 1000–1200 m (3300–3800 ft) *Fraga & Tessel 146*.

Malvaceae

Eremalche exilis (A.Gray) Greene. Annual. Rare; from one collection in Short Canyon on fine sandy soil on the canyon bajadas. 915 m (3000 ft) *Fraga & Denslow 490*.

Malacothamnus fremontii A.Gray. Small shrub. Uncommon on open canyon floors near the head of Indian Wells Canyon in sagebrush scrub. 1500–1700 m (5000–5600 ft) *Fraga & De Groot 837*.

*Malva neglecta Wallr. Annual. Rare; from one collection at the Indian Wells Steak House and Brewery, on open disturbed roadside. 800 m (2600 ft) *Fraga, Bigelow & Denslow 1011*.

Sphaeralcea ambigua A.Gray var. ambigua. Suffruticose perennial. Common on bajadas and desert slopes. 1200–1500 m (3600–5000 ft) *Fraga, De Groot & Porter 687*.

Sphaeralcea ambigua A.Gray var. rosacea (Munz & I.M.Johnst.) Kearney. Suffruticose perennial. Rare; from one collection on the summit of Backus Peak (Unnamed Peak 6651 ft on Owens Peak 7.5′ USGS topoquad). 2027 m (6651 ft) *Fraga & McGlaughlin 1167*.

Nyctaginaceae

Abronia pogonantha Heimerl. Annual. Locally common on sand dunes of Short Canyon and sandy slopes. 800–975 m (2800–3200 ft) *Fraga & Denslow 495*.

Abronia villosa S.Watson var. villosa. Annual. Locally common on sand dunes of Short Canyon and sandy slopes. 900–975 m (2800–3200 ft) *Fraga & Denslow 503*.

Mirabilis bigelovii A.Gray var. retrorsa (A.Heller) Munz. Perennial herb. Occasional from sandy canyon bottoms and desert slopes. 900–1500 m (2800–5000 ft) *Fraga, De Groot & Porter 582*.

Mirabilis californica A.Gray. Suffruticose perennial. Occasional from sandy canyon bottoms and desert slopes. 1100–1700 m (3500–5500 ft) *Fraga, Honer & Soza 734*.

Oleaceae

Fraxinus velutina Torr. Tree. Occasional in stream channels, most abundant in Grapevine Canyon. 1100–1500 m (3600–5000 ft) *Fraga & Mills 1208*.

Onagraceae

Camissonia boothii (Douglas) P.H.Raven subsp. desertorum (Munz) P.H.Raven. Annual. Rare; from one collection near SR 14. 800 m (2600 ft) *Luthy 323* (CAS).

Camissonia campestris (Greene) P.H.Raven subsp. campestris. Annual. Common on bajadas and desert slopes. 800–1220 m (2600–4000 ft) *Fraga & Denslow 454*.

Camissonia claviformis (Torr. & Frém.) P.H.Raven subsp. claviformis. Annual. Common on desert slopes and bajadas. 800–1800 m (2600–6000 ft) *Fraga & Fraga 549*.

Camissonia kernensis (Munz) P.H.Raven subsp. gilmanii (Munz) P.H.Raven. Annual. Occasional on desert slopes and bajadas. 800–1500 m (2600–5000 ft) *Fraga & McGlaughlin 1154*.

†Camissonia kernensis (Munz) P.H.Raven subsp. kernensis. Annual. Occasional on desert slopes and bajadas. 850–2100 m (2800–7000 ft) *Fraga, De Groot & Porter 693*.

Camissonia pallida (Abrams) P.H.Raven subsp. pallida. Annual. Common on bajadas and desert slopes. 800–1400 m (2600–4500 ft) *Fraga & Fraga 538*.

Camissonia palmeri (S.Watson) P.H.Raven. Annual. Common on bajadas and desert slopes. 800–1220 m (2600–4000 ft) *Fraga & Boyd 417*.

Camissonia pubens (S.Watson) P.H.Raven. Annual. Rare; from one collection in Buena Vista Canyon. 1500 m (5000 ft) *Fraga, De Groot & Porter 658*.

Clarkia xantiana A.Gray subsp. xantiana. Annual. Occasional from north-facing slopes with course granitic soil. 1200–1600 m (3800–5200 ft) *Fraga & McGlaughlin 1175*.

Epilobium canum (Greene) P.H.Raven subsp. canum. Suffruticose perennial. Occasional from desert slopes, and near edges of stream channels. 1000–1220 m (3400–4000 ft) *Fraga, De Groot & Hobbs 993*.

Epilobium canum (Greene) P.H.Raven subsp. latifolium (Hook.) P.H.Raven. Suffruticose perennial. Occasional from rocky mountain slopes. 1500–2600 m (5000–8400 ft) *Fraga & Gross 980*.

Epilobium ciliatum Raf. subsp. ciliatum. Perennial herb. Locally common in stream channels. 1100–1300 m (3500–4200 ft) *Fraga, Maurice, Scovell & Virgen 917*.

Gayophytum diffusum Torr. & A.Gray subsp. parviflorum F.H.Lewis & M.R.Lewis. Annual. Occasional on exposed talus slopes. 2000–2300 m (6500–7500 ft) *Fraga & Anderson 1259*.

Gayophytum racemosum Torr. & A.Gray. Annual. Occasional in shaded pinyon woodland on rocky mountain slopes and exposed talus slopes. 1700–2100 m (5600–7000 ft) *Fraga & Griffith 800*.

Oenothera californica S.Watson subsp. californica. Perennial herb. Common on sand dunes and on sandy desert slopes. 915–1220 m (3000–4000 ft) *Fraga & Denslow 500*.

Orobanchaceae

Castilleja angustifolia (Nutt.) G.Don. Parasitic perennial herb. Common on desert slopes. 915–1900 m (3000–6000 ft) *Fraga, Boyd, Denslow & Gross 279*.

Castilleja applegatei Fern. subsp. martinii (Abrams) T.I.Chuang & Heckard. Parasitic perennial herb. Occasional on mountain slopes. 1950–2100 m (6400–7000 ft) *Fraga & Anderson 1117*.

Castilleja linariifolia Benth. Parasitic perennial herb. Uncommon on desert slopes, near riparian areas. 1100–1200 m (3500–3800 ft) *Fraga & Tessel 142*.

†Cordylanthus eremicus (Coville & C.Morton) Munz subsp. eremicus. Parasitic annual. Occasional on open mountain slopes, usually along trails. 1900–2300 m (6200–7500 ft) *Fraga & De Groot 933*.

†Cordylanthus rigidus (Benth.) Jeps. subsp. brevibracteatus (A.Gray) J.F.Macbr. Parasitic annual. Locally common in the understory of shaded mixed coniferous forest. 1710 m (5600 ft) *Fraga, Anderson, Gross & Kempton 1643*.

Cordylanthus rigidus (Benth.) Jeps. subsp. rigidus. Parasitic annual. Occasional on open mountain slopes, usually along trails. 2000–2300 m (6200–7500 ft) *Keefe & Florgerzi 14–007*.

Orobanche fasciculata Nutt. Parasitic perennial herb. Uncommon on desert and mountain slopes. 1220–2100 m (4000–7000 ft) *Fraga & Mills 1246*.

Papaveraceae

Argemone munita Durand & Hilg. Annual to perennial herb. Uncommon from open habitats, often along roadsides. 1220–1700 m (4000–5500 ft) *Fraga & Fraga 1253*.

†Canbya candida C.Parry. Annual. Uncommon on north slopes of course granite soils, in open habitats. 1200–1600 m (3800–5200 ft) *Fraga, Honer & Soza 721*.

Eschscholtzia californica Cham. Perennial herb. Common on desert slopes. 915–1700 m (3000–5500 ft) *Fraga & Maurice 221*.

Eschscholtzia glyptosperma Greene. Annual. Occasional on desert slopes. 900–1300 m (2800–4000 ft) *Fraga & Fraga 213*.

Eschscholtzia minutiflora S.Watson subsp. covillei (Greene) C.Clark. Annual. Common on desert slopes and bajadas. 900–1500 m (2800–5000 ft) *Fraga & Denslow 516*.

Platystemon californicus Benth. Annual. Common on desert slopes and canyon bottoms. 1200–1500 m (3800–5000 ft) *Fraga, Boyd, Denslow & Gross 282*.

Polemoniaceae

Aliciella lottiae (A.Day) J.M.Porter. Annual. Occasional on bajadas and desert slopes. 800–1200 m (2600–4000 ft) *Twisselman 7163* (CAS).

Aliciella sp. nov. Annual. Occasional on bajadas and desert slopes. 800–1100 m (2600–3500 ft) *Fraga & Denslow 526*.

Eriastrum densifolium (Benth.) H.Mason subsp. austromontanum (T.T.Craig) H.Mason. Suffruticose perennial. Occasional on mountain slopes. 1800–2300 m (6000–7500 ft) *Fraga & Soza 890*.

Eriastrum densifolium (Benth.) H.Mason subsp. elongatum (Benth.) H.Mason. Suffruticose perennial. Rare; from one collection in Short Canyon. *Vollmer s.n.* 1 Jul 1953 (DS).

Eriastrum densifolium (Benth.) H.Mason subsp. mohavense (Craig) H.Mason. Suffruticose perennial. Occasional on bajadas and desert slopes. 1200–1700 m (3800–5500 ft) *Fraga & Tessel 155*.

Eriastrum diffusum (A.Gray) H.Mason × eremicum (Jeps.) H.Mason. Annual. Rare; from one collection along the Los Angeles Aqueduct road east of Indian Wells Canyon, growing along roadside. 975 m (3200 ft) *Fraga & De Groot 845*.

Eriastrum eremicum (Jeps.) H.Mason. Annual. Occasional in open habitats, on desert slopes. 9000–1500 m (2800–5000 ft) *Twisselman 4541* (CAS).

Eriastrum pluriflorum (A.Heller) H.Mason. Annual. Occasional in open habitats, especially along roadsides. 800–1220 m (2600–4000 ft) *Fraga & Soza 697*.

Eriastrum sparsiflorum (Eastw.) H.Mason. Annual. Occasional in open habitats, especially along roadsides. 915–1700 m (3000–5600 ft) *Fraga & De Groot 834*.

Gilia aliquanta A.D.Grant & V.E.Grant subsp. aliquanta. Annual. Occasional on canyon slopes and bajadas. 850–1400 m (2800–4500 ft) *Fraga & Boyd 423*.

Gilia brecciarum M.E.Jones subsp. neglecta A.D.Grant & V.E.Grant. Annual. Common on canyon bottoms and desert slopes. 850–2000 m (2800–6500 ft) *Fraga & Maurice 254*.

Gilia cana (M.E.Jones) A.Heller subsp. speciosa (Jeps.) A.D.Grant & V.E.Grant. Annual. Occasional on desert slopes. 915–2200 m (3000–7200 ft) *Fraga, Gross & Navidara 1082*.

Gilia leptantha Parish subsp. purpusii (Milliken) A.D.Grant & V.E.Grant. Annual. Occasional on upper desert slopes and mountain slopes. 1500–2100 m (5000–7000 ft) *Fraga & Mills 1249*.

Gilia malior A.G.Day & V.E.Grant. Annual. Occasional on desert slopes and bajadas. 915–1220 m (3000–4000 ft) *Fraga, Gross & Navidara 1056*.

Gilia ochroleuca M.E.Jones subsp. ochroleuca. Annual. Common on desert slopes and bajadas. 800–1700 m (2600–5500 ft) *Fraga, De Groot & Porter 613*.

Gilia sinuata Benth. Annual. Common on desert slopes and bajadas. 800–1700 m (2600–5500 ft) *Fraga & Denslow 522*.

Langloisia setosissima (Torr. & A.Gray) Greene subsp. punctata (Coville) Timbrook. Annual. Rare; documented from one collection in the desert, near Inyokern. 800 m (2600 ft) *Mason 8296* (UC).

Leptodactylon pungens (Torr.) Rydb. Perennial herb. Occasional on rocky mountain slopes. 2000–2500 m (6600–8200 ft) *Fraga & Mills 1245*.

Linanthus aureus (Nutt.) Greene. Annual. Occasional on desert slopes and bajadas. 800–1500 m (2600–5000 ft) *Fraga, De Groot & Porter 656*.

Linanthus bigelovii (A.Gray) Greene. Annual. Occasional on desert slopes and bajadas. 800–2100 m (2600–6800 ft) *Fraga & Boyd 418*.

Linanthus dichotomus Benth. Annual. Common on desert slopes and bajadas. 800–2100 m (2600–6800 ft) *Fraga, Boyd, Denslow & Gross 307*.

Linanthus parryae (A.Gray) Greene. Annual. Common on desert slopes and bajadas. 800–1220 m (2600–4000 ft) *Fraga & Denslow 471*.

Loeseliastrum matthewsii (A.Gray) Timbrook. Annual. Common on desert slopes and bajadas. 850–1220 m (2800–4000 ft) *Fraga, Griffith & Walker 570*.

Phlox gracilis (Hook.) Greene. Annual. Occasional on canyon bottoms and desert slopes. 1500–1700 m (4800–5500 ft) *Fraga, Anderson & Stolzenburg 1053*.

†Saltugilia latimeri T.L.Weese & L.A.Johnson. Annual. Uncommon on desert slopes. 1200–1400 m (3800–4500 ft) *Fraga, De Groot & Porter 638*.

Polygonaceae

Centrostegia thurberi A.Gray ex Benth. Annual. Occasional on desert slopes and canyon bottoms. 915–1500 m (3000–5000 ft) *Fraga, De Groot & Porter 679*.

Chorizanthe brevicornu Torr. var. brevicornu. Annual. Occasional on bajadas and canyon slopes. 800–1220 m (2600–4000 ft) *Fraga & Denslow 457*.

Chorizanthe watsonii Torr. & A.Gray. Annual. Uncommon on bajadas and canyon slopes. 800–1500 m (2600–5000 ft) *Fraga & McGlaughlin 1178*.

Eriogonum ampullaceum J.T.Howell. Annual. Uncommon on desert slopes. 915–1500 m (3000–5000 ft) *Fraga & Brock 1334*.

Eriogonum baileyi S.Watson. Annual. Occasional on mountain slopes and bajadas. 915–1800 m (3000–6000 ft) *Fraga & Gross 966*.

Eriogonum brachyanthum Coville. Annual. Occasional on find sandy soil of canyons in open habitats. 900–1400 m (2800–4500 ft) *Fraga & McGlaughlin 1153*.

†Eriogonum breedlovei (J.T.Howell) Reveal var. shevockii J.T.Howell. Perennial herb. Occasional from granite outcrops near the summit of Owens Peak. 2400–2600 m (8000–8400 ft) *Shevock 11196* (CAS).

Eriogonum davidsonii Greene. Annual. Common on mountain slopes in open habitats. 1700–2400 m (5500–7800 ft) *Fraga & Soza 887*.

Eriogonum deflexum Torr. var. baratum (Elmer) Reveal. Annual. Common on exposed mountain slopes, often growing along trails. 915–2300 m (3000–7600 ft) *Fraga & De Groot 940*.

Eriogonum deflexum Torr. var. deflexum. Annual. Common on exposed mountain slopes, often growing along trails. 850–1700 m (2800–5600 ft) *Fraga & De Groot 823*.

Eriogonum fasciculatum Benth. var. polifolium (Benth.) Torr. & A.Gray. Small shrub. Common on canyon bottoms, and slopes. 915–2100 m (3000–7000 ft) *Fraga & Fraga 1254*.

Eriogonum gracillimum S.Watson. Annual. Occasional on fine sandy soil on canyon slopes bajadas. 800–1220 m (2600–4000 ft) *Fraga & Denslow 488*.

Eriogonum heermannii Durand & Hilg. var. heermannii. Small shrub. Occasional on desert slopes. 1000–1400 m (3300–4500 ft) *Fraga, Boyd, Denslow & Gross 379*.

Eriogonum inflatum Torr. & Frém. Perennial herb. Common on desert slopes and bajadas. 915–1500 m (3000–5000 ft) *Fraga & De Groot 838*.

Eriogonum kennedyi S.Watson var. purpusii (Brandegee) Reveal. Perennial herb. Rare; from one location on a gravelly flat in Indian Wells Canyon. 1600 m (5400 ft) *Fraga & Brock 1338*.

Eriogonum maculatum A.Heller. Annual. Occasional in open habitats on fine granite sand. 915–1500 m (3000–5000 ft) *Fraga, De Groot & Porter 629*.

Eriogonum nidularium Coville. Annual. Occasional in open habitats on fine granite sand. 915–1400 m (3000–4500 ft) *Fraga & McGlaughlin 1151*.

Eriogonum nudum Douglas ex Benth. var. pauciflorum S.Watson. Perennial herb. Occasional in shade of pinyon–oak woodland on rocky mountain slopes. 1500–2300 m (5000–7500 ft) *Fraga & Soza 878*.

Eriogonum nudum Douglas ex Benth. var. westonii (S.Stokes) J.T.Howell. Perennial herb. Common on desert slopes. 1000–1500 m (3500–5000 ft) *Fraga, Honer & Soza 731*.

Eriogonum plumatella Durand & Hilg. Small shrub. Occasional on bajadas and desert slopes. 915–1220 m (3000–4000 ft) *Fraga & Brock 1324*.

Eriogonum pusillum Torr. & A.Gray. Annual. Common on find sandy soil in open habitats. 915–2000 m (3000–6500 ft) *Fraga, Gross & Navidara 1066*.

Eriogonum reniforme Torr. & Frém. Annual. Rare on canyon bajadas and desert slopes. 8000–1000 m (2600–3300 ft) *Luthey 324* (CAS).

Eriogonum roseum Durand & Hilg. Annual. Occasional on mountain slopes. 1600–2100 m (5500–7000 ft) *Fraga & De Groot 920*.

Eriogonum saxatile S.Watson. Perennial herb. Occasional on rock outcroppings on mountain slopes. 1220–2300 m (4000–7500 ft) *Fraga & McGlaughlin 1161*.

Eriogonum trichopes Torr. Annual. Uncommon on bajadas and desert slopes. 915–1524 m (3000–5000 ft) *Fraga & Denslow 520*.

Eriogonum umbellatum Torr. var. subaridum S.Stokes. Small shrub. Common on exposed rocky mountains slopes. 1900–2400 m (6000–8000 ft) *Fraga & De Groot 923*.

Eriogonum vimineum Douglas ex Benth. Annual. Locally common in sagebrush scrub and pinyon woodland. 1525–1700 m (5000–5500 ft) *Fraga & McGlaughlin 1181*.

Eriogonum wrightii Benth. var. subscaposum S.Watson. Small shrub. Common on open pinyon woodland and sagebrush scrub on mountain slopes. 1100–2100 m (3600–6800 ft) *Fraga & Gross 962*.

Rumex salicifolius Weinm. Perennial herb. Rare, in shaded upper reaches of Indian Wells Canyon near the base of Owens Peak. 1900–2000 m (6100–6400 ft) *Fraga & Griffith 806*.

Portulacaceae

Calandrinia ciliata (Ruiz & Pav.) DC. Annual. Uncommon on canyon bottoms and shaded north slopes. 1400–1700 m (4500–5550 ft) *Fraga & Boyd 401*.

Calyptridium monandrum Nutt. & A.Gray. Annual. Occasional on desert slopes and bajadas. 915–1500 m (3000–5000 ft) *Fraga & Denslow 491*.

Claytonia parviflora Douglas ex Hook. subsp. parviflora. Annual. Occasional from north slopes in moist areas under rock crevices. 915–1900 m (3000–6000 ft) *Fraga & Griffith 1092*.

Claytonia parviflora Douglas ex Hook. subsp. viridis (Davidson) J.M.Mill. & Chambers. Annual. Uncommon from north slopes in moist areas under rock crevices. 915–1220 m (3000–4000 ft) *Fraga, Boyd, Denslow & Gross 333*.

Claytonia perfoliata Donn ex Willd. subsp. perfoliata. Annual. Occasional from north slopes in moist areas under rock crevices. 1220–2000 m (4000–6500 ft) *Fraga & Griffith 1142*.

Lewisia rediviva Pursh subsp. minor (Rydb.) Munz. Geophyte. Locally common; from one location on a gravelly flat in Indian Wells Canyon. 1600 m (5400 ft) *Fraga et al. (Field Trip Attendees) 1538*.

Ranunculaceae

Delphinium hansenii (Greene) Greene subsp. kernense (Davidson) Ewan. Geophyte. Uncommon in shade of mixed coniferous forest on steep mountain slopes. 2200–2400 m (7000–7800 ft) *Fraga & Grffith 1226*.

Delphinium parishii A.Gray subsp. parishii. Geophyte. Common in canyons and desert slopes. 915–1700 m (3000–5600 ft) *Fraga & Denslow 504*.

Rhamnaceae

Ceanothus greggii A.Gray var. vestitus (Greene) McMinn. Large shrub. Occasional in open pinyon woodland in the upper reaches of canyons and mountain slopes. 1000–2200 m (3400–7200 ft) *Fraga & Mills 1244*.

Rhamnus tomentella Benth. subsp. cuspidata (Greene) J.O.Sawyer. Large shrub. Occasional at the upper reaches of canyons and mountain slopes. 1220–2200 m (4000–7200 ft) *Fraga & Maurice 174*.

Rosaceae

Cercocarpus ledifolius Nutt. var. ledifolius. Large shrub. Occasional on open mountain slopes. 1500–2400 m (5000–8000 ft) *Fraga & Soza 870*.

Coleogyne ramosissima Torr. Small shrub. Common on desert slopes. 1100–1400 m (3500–4500 ft) *Fraga, Boyd, Denslow & Gross 331*.

Holodiscus microphyllus Rydb. var. microphyllus. Small shrub. Occasional on open mountain slopes. 2100–2500 m (7000–8200 ft) *Fraga & Soza 871*.

Ivesia santolinoides A.Gray. Perennial herb. Occasional on steep granite slopes on the east side of Owens Peak. 2440 m (8000 ft) *Fraga, Anderson, Gross & Kempton 1651*.

Ivesia saxosa (Greene) B.Ertter. Perennial herb. Occasional in the cracks of large granite ourcrops on the east side of Owens Peak. 2440 m (8000 ft) *Fraga, Anderson, Gross & Kempton 1652*.

Potentilla glandulosa Lindl. subsp. nevadensis (S.Watson) D.D.Keck. Perennial herb. Uncommon in shaded narrow drainage at the base of Owens Peak. 1700–1800 m (5600–6000 ft) *Fraga & Griffith 804*.

Prunus andersonii A.Gray. Large shrub. Occasional on desert slopes and in the shade of pinyon woodland. 1100–1800 m (3500–5800 ft) *Fraga, Griffith & Walker 572*.

Purshia tridentata (Pursh) DC. var. glandulosa (Curran) M.E.Jones. Large shrub. Occasional at the upper reaches of canyons and on mountain slopes in pinyon–oak woodland. 1200–2100 m (3800–7000 ft) *Fraga & De Groot 929*.

Rosa woodsii Lindl. var. ultramontana (S.Watson) Jeps. Small shrub. Rare; from one collection in Buena Vista Canyon in Joshua tree woodland. 1400 m (4700 ft) *Fraga, Maurice, Scovell & Virgen 906*.

Rubiaceae

Galium hallii Munz & I.M.Johnst. Small shrub. Occasional on mountain slopes in pinyon–oak woodland and mixed coniferous forest. 1700–2300 m (5600–7500 ft) *Fraga & Anderson 1261*.

Galium hilendiae Dempster & Ehrend. subsp. hilendiae. Perennial herb. Rare; from one collection at the upper reaches of Grapevine Canyon 1190–1220 m (3800–4000 ft) *Fraga, Honer & Soza 736*.

Galium matthewsii A.Gray. Perennial herb. Occasional on desert slopes. 915–2100 m (3000–7000 ft) *Fraga & Fraga 1106*.

Salicaceae

Populus fremontii S.Watson subsp. fremontii. Tree. Occasional in riparian areas. 915–1500 m (3000–5000 ft) *Fraga & Mills 1210*.

Salix laevigata Bebb. Tree. Occasional in riparian areas. 1220–1520 m (4000–5000 ft) *Fraga, Gross & Navidara 1065*.

Salix lasiolepis Benth. Large shrub. Common in riparian scrub. 980–1500 m (3200–5000 ft) *Fraga & Mills 1204*.

Saururaceae

Anemopsis californica (Nutt.) Hook. & Arn. Perennial herb. Uncommon; on moist banks above riparian area. 1000–1220 m (3300–4000 ft) *Fraga & Fraga 121*.

Saxifragaceae

Heuchera rubescens Torr. var. alpicola Jeps. Perennial herb. Uncommon growing from in between rock crevices on rocky mountain slopes. 2400–2600 m (7800–8400 ft) *Fraga & Soza 869*.

Scrophulariaceae

Antirrhinum kingii S.Watson. Annual. Uncommon from one collection on Five Fingers near the base of large granitic outcrop. 915–1220 m (3000–4000 ft) *O'Brien & Thibault s.n.* 18 Apr 2003.

Collinsia callosa Parish. Annual. Occasional on desert and mountain slopes or exposed ridgelines. 1500–2100 m (5000–6800 ft) *Fraga, De Groot & Porter 655*.

Collinsia childii A.Gray. Annual. Rare; from one collection in the shade of oaks on the trail to Owens Peak. 1700 m (5600 ft) *Fraga & Griffith 801*.

Keckiella breviflora (Lindl.) Straw var. breviflora. Small shrub. Occasional on open mountain slopes and upper reaches of canyons. 1220–2300 m (4000–7500 ft) *Fraga, Honer & Soza 747*.

Keckiella rothrockii (A.Gray) Straw var. rothrockii. Small shrub. Uncommon on open mountain slopes. 2100–2300 m (6800–7500 ft) *Fraga & Anderson 1268*.

Mimulus androsaceus Greene. Annual. Uncommon, in Short Canyon on gravelly flats that obtain moisture from springs. 1160–1220 m (3800–4000 ft) *Fraga, Boyd, Denslow & Gross 339*.

Mimulus aurantiacus Curtis var. pubescens (Torr.) D.M.Thompson. Small shrub. Common, growing from crevices in large granite boulders. 975–1500 m (3200–5000 ft) *Fraga, De Groot & Porter 576*.

Mimulus bigelovii (A.Gray) A.Gray var. bigelovii. Annual. Rare; from one collection on the trail to Owens Peak in pinyon woodland. 2300–2400 m (7500–7800 ft) *Fraga & Griffith 814*.

Mimulus brewerI (Greene) Coville. Annual. Rare; from one collection near the summit of Owens Peak. 2500 m (8100 ft) *Ertter, Baglet, Bramlet & Daniel 5447a* (UC).

Mimulus cardinalis Benth. Perennial herb. Uncommon in riparian areas. 975–1220 m (3200–4000 ft) *Fraga & Maurice 162*.

Mimulus floribundus Douglas ex Lindl. Annual. Uncommon in moist drainages. 1710 m (5600 ft) *Fraga, Anderson, Gross & Kempton 1637*.

Mimulus fremontii (Benth.) A.Gray. Annual. Uncommon on bajadas and open mountain slopes. 915–2100 m (3000–6800 ft) *Fraga & Denslow 484*.

Mimulus guttatus DC. Annual or perennial herb. Occasional in moist soil of riparian areas. 1100–1600 m (3500–5200 ft) *Fraga & De Groot 817*.

Mimulus montioides A.Gray. Annual. Rare; near ridgeline east of the summit of Owens Peak 2500 m (8100 ft) *Ertter, Bagley, Bramlet & Daniel 6447* (UC).

Mimulus parishii Greene. Annual. Locally common in moist drainages. 1710 m (5600 ft) *Fraga, Anderson, Gross & Kempton 1641*.

Mimulus pilosus (Benth.) S.Watson. Annual. Locally common in moist drainages. 1710 m (5600 ft) *Fraga, Anderson, Gross & Kempton 1636*.

Mimulus whitneyi Congdon. Annual. Uncommon, on the summit of Owens Peak. 2600 m (8400 ft) *Fraga & Griffith 865*.

Penstemon grinnellii Eastw. subsp. grinnellii. Suffruticose perennial. Uncommon, on steep scree slopes. 2000–2300 m (6500–7500 ft) *Fraga & Griffith 854*.

Penstemon grinnellii Eastw. var. scrophularioides (M.E.Jones) N.H.Holmgren. Suffruticose perennial. Uncommon from open mountain slopes. 2000–2300 m (6500–7500 ft) *Fraga & Anderson 1260*.

Penstemon incertus Brandegee. Small shrub. Occasional on desert slopes and canyon bottoms. 1000–1500 m (3400–5000 ft) *Fraga 1202*.

Penstemon labrosus (A.Gray) Hook.f. Perennial herb. Occasional in shade of pinyon woodland on mountain slopes. 1900–2300 m (6000–7500 ft) *Fraga & De Groot 930*.

Penstemon newberryi A.Gray. Suffruticose perennial. Uncommon near the summit of Owens Peak. 2400–2600 m (8000–8400 ft) *Fraga & Griffith 868*.

Scrophularia californica Cham. & Schlecht. Perennial herb. Rare; from one collection on Five Fingers growing out of large granite outcrop. 1500 m (5000 ft) *Fraga, De Groot & Hobbs s.n.* 20 Oct 2003.

*Veronica anagallis-aquatica L. Perennial herb. Uncommon in riparian areas in Indian Wells Canyon. 915–1100 m (3000–3500 ft) *Fraga & Brock 1331*.

Solanaceae

Datura wrightii Regel. Perennial herb. Uncommon in disturbed areas, especially roadside. 800–1220 m (2600–4000 ft) *Fraga & Maurice 157*.

Lycium andersonii A.Gray. Small shrub. Common on desert slopes and canyon bottoms. 850–1220 m (2800–4000 ft) *Fraga & Fraga 547*.

Lycium cooperi A.Gray. Small shrub. Occasional on desert slopes and canyon bottoms. 1100–1500 m (3600–5000 ft) *Fraga & Boyd 396*.

Nicotiana attenuata Torr. Annual. Uncommon on desert slopes and canyon bottoms. 1400–1500 m (4500–5000 ft) *Fraga & De Groot 636*.

Solanum xanti A.Gray var. xanti. Suffruticose perennial. Uncommon on open mountain slopes. 2000–2100 m (6500–7000 ft) *Fraga & Anderson 1122*.

Sterculiaceae

Fremontodendron californicum (Torr.) Coville. Large shrub. Common in upper reaches of canyons and on mountain slopes. 1220–1800 m (4000–6000 ft) *Fraga & Soza 792*.

Tamaricaceae

*Tamarix ramosissima Ledeb. Large shrub. Uncommon in stream channel of Indian Wells Canyon. 800 m (2600 ft) *Fraga & Brock 1348*.

Urticaceae

Urtica dioica L. subsp. holosericea (Nutt.) Thorne. Perennial herb. Uncommon at the edge of riparian areas. 1100–1220 m (3500–4000 ft) *Fraga & Mills 1217*.

Verbenaceae

Verbena lasiostachys Link subsp. lasiostachys. Perennial herb. Rare; from one documented collection in Short Canyon. *Henry s.n.* 4 Jul 1991.

Viscaceae

Arceuthobium occidentale Engelm. Parasitic perennial herb. Occasional at the upper reaches of canyons commonly growing on *Pinus sabiniana*. 1000–1700 m (3400–5500 ft) *Fraga, Honer & Soza 702*.

Phoradendron juniperinum A.Gray. Parasitic perennial herb. Occasional on *Juniperus occidentalis* subsp. *australis* near the summit of Owens Peak. 2440–2530 m (8000–8300 ft) *Fraga, Anderson, Gross & Kempton 1647*.

Phoradendron pauciflorum Torr. Parasitic perennial herb. Occasional, growing on *Abies concolor* on the northeast slopes of Mount Jenkins. 2100–2300 m (7000–7500 ft) *Fraga & De Groot 935*.

Phoradendron villosum (Nutt.) Nutt. Parasitic perennial herb. Occasional on *Quercus chrysolepis* at the upper reaches of canyons and mountain slopes. 1220–1830 m (4000–6000 ft) *Fraga & Boyd 388*.

Vitaceae

Vitis girdiana Munson. Liana. Common, in riparian areas commonly growing on other shrubs. 1100–1800 m (3500–5800 ft) *Fraga, Maurice, Virgen & Scovell 902*.

Zygophyllaceae

Larrea tridentata (Sessé & Moç. ex DC.) Coville. Large shrub. Common on bajadas in sandy soil. 800–1200 m (2600–3800 ft) *Fraga & Fraga 552*.

*Tribulus terrestris L. Annual. Locally common along disturbed roadsides near highways. 792 m (2600 ft) *Fraga, Brock, Fisher & Oberlin 1659*.

angiospermae—monocotyledones

Agavaceae

Nolina parryi S.Watson. Succulent shrub. Occasional on mountain slopes and the upper reaches of canyons. 1100–2100 m (3600–6800 ft) *Fraga & Anderson 1125*.

Yucca brevifolia Engelm. Tree. Common on canyon bottoms, northern desert slopes and upper reaches of canyons. 1100–1600 m (3500–5300 ft) *Fraga, De Groot & Porter 619*.

Cyperaceae

Carex alma L.H.Bailey. Perennial herb. Uncommon in riparian areas, more commonly at the upper reaches of canyons. 975–2100 m (3200–6800 ft) *Fraga & Gross 970*.

Eleocharis parishii Britton. Perennial herb. Occasional on moist edges of riparian areas. 1100–1500 m (3600–5000 ft) *Fraga & Soza 788*.

Scirpus nevadensis S.Watson. Perennial herb. Uncommon in moist soil of riparian areas. 1030 m (3400 ft) *Fraga & Brock 1332*.

Juncaceae

Juncus balticus Willd. Perennial herb. Occasional on edges of riparian areas, often on banks above stream channels. 1100–1700 m (3500–5600 ft) *Fraga & Soza 786*.

Juncus macrophyllus Coville. Perennial herb. Locally common in moist drainages in pine–oak woodland. 1710 m (5600 ft) *Fraga, Anderson, Gross & Kempton 1639*.

Juncus rugulosus Engelm. Perennial herb. Uncommon on edges of riparian areas, in moist soil. 1100–1700 m (3500–5600 ft) *Fraga, Maurice, Scovell & Virgen 912*.

Juncus xiphioides E.Meyer. Perennial herb. Occasional in moist soil of riparian areas. 1100–1400 m (3500–4500 ft) *Fraga & Maurice 173*.

Lemnaceae

Lemna gibba L. Aquatic annual. Uncommon in standing water of stream channels. 1100–1400 m (3500–4500 ft) *Fraga & Anderson 1024*.

Liliaceae

†Allium atrorubens S.Watson var. cristatum (S.Watson) McNeal. Geophyte. Occasional on open mountain slopes. 2000–2600 m (6500–8400 ft) *Fraga & Griffith 867*.

Allium burlewii Davidson Geophyte. Common on exposed ridgelines and mountain slopes in pinyon woodland. 1800–2300 m (6000–7500 ft) *Fraga & Soza 757*.

Allium fimbriatum S.Watson var. mohavense Jeps. Geophyte. From bajadas on sandy soil documented near SR 14. 800 m (2600 ft) *McNeal 3048*.

Allium lacunosum S.Watson var. davisiae (M.E.Jones) McNeal & Ownbey. Geophyte. Occasional on bottoms of canyons in gravelly soil. 1100–1220 m (3600–4000 ft) *Fraga, Griffith & Walker 562*.

Allium lacunosum S.Watson var. kernensis McNeal & Ownbey. Geophyte. Rare; from one collection in Grapevine Canyon in an open flat of the canyon. 1030 m (3400 ft) *Fraga, Honer & Soza 706*.

Calochortus invenustus Greene. Geophyte. Uncommon on exposed ridgelines and mountain slopes. 1700–2600 m (5500–8400 ft) *Fraga & Griffith 886*.

Dichelostemma capitatum (Benth.) Keator var. pauciflorum (Torr.) Keator. Geophyte. Occasional on mountain and desert slopes and canyon bottoms. 1200–1900 m (3800–6200 ft) *Fraga & Denslow 462*.

†Fritillaria pinetorum Davidson. Geophyte. Rare; from one collection on steep talus slope just west of Russel Peak. 1920 m (6300 ft) *Fraga & Soza 775*.

†Muilla coronata Greene. Geophyte. Uncommon on sandy bajadas and sandy desert slopes. 800–1220 m (2600–4000 ft) *Fraga & Boyd 415*.

Poaceae

Achnatherum hymenoides (Roem. & J.A.Schultes) Barkworth. Perennial herb. Common on sandy bajadas, and occasional on exposed ridges and the upper reaches of canyons. 850–2500 m (2800–7900 ft) *Fraga & Denslow 497*.

Achnatherum speciosum (Trin. & Rupr.) M.E.Barkworth. Perennial herb. Common on canyon bottoms, desert and mountain slopes. 1100–2300 m (3500–7500 ft) *Fraga & Fraga 542*.

*Agrostis viridis Gouan. Annual. Uncommon in moist soil of riparian areas. 1100–1400 m (3500–4500 ft) *Fraga & Mills 1218*.

*Bromus arenarius Labill. Annual. Uncommon, from one collection in Grapevine Canyon in the shade of *Pinus sabiniana*. 1020–2000 m (3400–3600 ft) *Fraga, Honer & Soza 698*.

*Bromus diandrus Roth. Annual. Occasional in disturbed moist sites, often adjacent to roads. 800–1400 m (2600–4500 ft) *Fraga & Soza 787*.

*Bromus rubens L. Annual. Common on desert slopes and canyon bottoms. 800–1500 m (2600–5000 ft) *Fraga & Fraga 113*.

*Bromus tectorum L. Annual. Common on canyon bottoms, desert and mountain slopes. Most abundant in open habitats on mountain slopes. 1100–2400 m (3600–8000 ft) *Fraga, De Groot & Porter 678*.

Bromus trinii Desv. Annual. Uncommon on desert slopes, often growing from between rock crevices. 1100–1400 m (3500–4500 ft) *Fraga, Griffith & Walker 564*.

Distichlis spicata (L.) Greene. Perennial herb. Occasional on alkaline flats near stream channels. 1100–1700 m (3500–5600 ft) *Fraga & De Groot 832*.

Elymus elymoides (Raf.) Swezey subsp. californicus (J.G.Smith) Barkworth. Perennial herb. Common throughout the study area in open habitats on desert and mountain slopes. 918–2400 m (3000–7800 ft) *Fraga, Honer & Soza 711*.

Elymus elymoides (Raf.) Swezey subsp. elymoides. Perennial herb. Common in open habitats on desert and mountain slopes, most common at higher elevations. 915–2400 m (3000–7800 ft) *Fraga & De Groot 926*.

Elymus glaucus Buckley subsp. glaucus. Perennial herb. Occasional in the shade of trees in moist sites, in Grapevine Canyon. 1100–1400 m (3500–4500 ft) *Fraga, Honer & Soza 708*.

*Hordeum murinum L. subsp. glaucum (Steud.) Tzvelev. Annual. Uncommon, near stream channels with moist soil. 1220–1400 m (4000–4500 ft) *Fraga & Mills 1213*.

Leptochloa filiformis (Lam.) Beauv. Perennial herb. Rare; from one collection in a cement crack at Brady's Gas Station. 792 m (2600 ft) *Fraga, Brock, Fisher & Oberlin 1659*.

Leymus triticoides (Buckl.) Pilg. Perennial herb. Occasional in moist sites near springs and stream channels in Grapevine Canyon. 1100–1300 m (3500–4200 ft) *Fraga, Honer & Soza 710*.

Melica imperfecta Trin. Perennial herb. Occasional on mountain and desert slopes, often in shaded areas. 1100–2400 m (3500–7800 ft) *Fraga & Griffith 1114*.

Melica stricta Bol. Perennial herb. Uncommon on mountain and desert slopes, often in shaded areas. 1200–2400 m (4000–7800 ft) *Fraga, Honer & Soza 745*.

MUHLENBERGIA ASPERIFOLIA (Nees & Meyen) Parodi. Perennial herb. Occasional on alkaline flats near stream channels. 1100–1220 m (3500–4000 ft) *Fraga & Tessel 153*.

MUHLENBERGIA RIGENS (Benth.) Hitchc. Perennial herb. Common on edges of stream channels and moist areas fed by springs. 1000–1400 m (3200–4500 ft) *Fraga & Maurice 163*.

PHRAGMITES AUSTRALIS (Cav.) Steud. Perennial herb. Uncommon, from one locality near the stream edge in Short Canyon. 1100–1200 m (3500–3800 ft) *Fraga, Buck, McAllister, Morgan & Virgen 950*.

*POA ANNUA L. Annual. Uncommon in moist soil near riparian areas in Indian Wells Canyon. 1400 m (4600 ft) *Fraga & Soza 790*.

POA SECUNDA J.Presl subsp. SECUNDA. Perennial herb. Common throughout the site, on desert and mountain slopes, and canyon bottoms. 1100–2400 m (3500–7900 ft) *Fraga, De Groot & Porter 652*.

*POLYPOGON MONSPELIENSIS (L.) Desf. Annual. Common, in moist soil of riparian areas. 975–1700 m (3200–5500 ft) *Fraga, Honer & Soza 704*.

*SCHISMUS ARABICUS Nees. Annual. Uncommon on bajadas and desert slopes in sandy areas. 850–1220 m (2800–4000 ft) *Fraga, De Groot & Porter 641*.

*SCHISMUS BARBATUS (L.) Thell. Annual. Common on desert slopes and bajadas, most abundant in creosote bush scrub. 800–1220 m (2600–4200 ft) *Fraga & Fraga 205*.

SPOROBOLUS FLEXUOSUS (Vasey) Rydb. Perennial herb. Uncommon on desert slopes and sandy flats above stream channels. 1100–1160 m (3500–3800 ft) *Fraga & Maurice 167*.

VULPIA MICROSTACHYS (Nutt.) Munro var. MICROSTACHYS. Annual. Uncommon in open habitats on desert slopes and canyon bottoms. 915–1520 m (3000–5000 ft) *Fraga, Gross & Navidara 1069*.

VULPIA MICROSTACHYS (Nutt.) Munro var. PAUCIFLORA (Beal) Lonard & Gould. Annual. Uncommon, from one collection on the north end of Five Fingers. 1190 m (3900 ft) *Fraga, Boyd, Denslow & Gross 285b*.

VULPIA OCTOFLORA (Walter) Rydb. Annual. Occasional in open habitats on canyon bottoms, desert slopes and bajadas. 915–1380 m (3000–4500 ft) *Fraga, Anderson & Stolzenburg 1025*.

TYPHACEAE

TYPHA DOMINGENSIS Pers. Perennial herb. Uncommon, near stream channels and spring fed areas in Short Canyon. 1100–1220 m (3500–4000 ft) *Fraga & Brock 1342*.

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