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A Vascular Flora of the Nopah Range, Inyo County, California

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A VASCULAR FLORA OF THE NOPAH RANGE, INYO COUNTY, CALIFORNIA

By
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Presented to the Graduate Faculty of Claremont Graduate University in partial fulfillment of the requirements for the degree of Master of Science in Botany.

We certify that we have read this document and approve it as adequate in scope and quality for the degree of Master of Science.

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Table of Contents

List of Figures

List of Tables

Introduction

Specimen-based floristic inventories are fundamental to understanding plant biodiversity. The voucher specimens and checklists generated from floristic inventories provide a record of botanical diversity through time and bring greater resolution to our understanding of the distribution and abundance of plant species (Ertter 2000, Heberling et al. 2019). Voucher specimens enable researchers to re-examine primary data and evaluate the validity of previous work in a replicable and rigorous scientific way, underpinning the entire enterprise of botanical research (Schilthuizen et al. 2015). In addition to addressing hypotheses in the traditional areas of floristics, taxonomy, and phytogeography, these specimens can have far-reaching applications, answering questions in the fields of global change biology, ecophysiology, environmental chemistry, molecular systematics, and population genetics (Heberling 2017, Holmes 2016, Lendemer et al. 2020, Prather et al. 2004). The checklists generated by floristic inventories and supporting herbarium specimens provide essential data that enable land managers and conservation practitioners to effectively protect and conserve plant diversity.

In the past several decades, there has been a significant decline in local plant collecting in the United States, accompanied by an increase in the negative anthropogenic impacts to biodiversity such as the rapidly compounding effects of climate change, development, and the spread of invasive species at the global scale (Prather et al. 2014). This decline in specimen collection may be due in part to the misconception that our flora has been thoroughly explored and catalogued. In the face of these threats, there is an urgent need for botanists to increase efforts to collect voucher specimens at the local level, especially in places where a high degree of threat exists and documentation is lacking.

California has long been renowned for its high levels of biodiversity and as a center of plant endemism (Baldwin et al. 2017, Kraft et al. 2010, Raven and Axelrod 1973). However, large swathes of California's deserts have been overlooked by botanists and lack rigorous documentation, including

sensitive habitats like desert springs (André 2014, Consortium of California Herbaria [CCH] 2023b, Fraga et al. 2023), even as California's largely intact deserts are increasingly threatened by extreme weather events, habitat loss and fragmentation, renewable energy development, unsustainable groundwater pumping, grazing, mining, off-road vehicle damage, and the rapid expansion of urban areas (Hunter et al. 2003, Parker et al. 2018, Parker et al. 2020).

These deserts of southeastern California are a land of extremes–home to the hottest ambient temperatures recorded on earth, an elevational gradient spanning over 14,000 feet, and some of the oldest vascular plants (*Pinus longaeva*, *Larrea tridentata*) known to exist. This arid region of the state supports over 3,000 minimum-rank plant taxa, of which roughly 750 are endemic (Jepson Flora Project 2023, Walker and Landau 2018). Experts estimate that 5% of the flora in North American north of Mexico remains undescribed (Ertter 2000), and that up to 10% of the flora of California's deserts may be undescribed (André 2014).

This study aims to document the flora of the Nopah Range, a mid-elevation mountain range situated in California's Mojave Desert that has largely been ignored by botanists. This is likely due to the challenge of access, as most of the range is closed off to motorized travel and requires long hikes and the transport of large amounts of water, and the lack of relict white firs (*Abies concolor*) at the summit to indicate the presence of Mojavean sky island flora. However, the Nopah Range has been identified as an area of significantly high endemism, likely due to the abundance of carbonate substrates which support a rich suite of edaphic endemic plant taxa (Baldwin et al. 2017). The study area's nearness to the transition zone between the Mojave and Great Basin deserts also presents an opportunity to find taxa at the limits of their ranges. The high endemism, along with the study area's nearness to the transition zone between the Mojave and Great Basin deserts and dearth of previous inventory work, make the Nopah Range and surrounding valleys an ideal setting for a floristic inventory.

Physical Setting

Study Area Location and Boundaries – The Nopah Range is located in the southeastern corner of Inyo County, California, just west of the Nevada state line (Fig. 1). The study area encompasses the entire mountain range and portions of the surrounding valleys, including California Valley, Chicago Valley, and Pahrump Valley, for a total area of 490 km^2 (189 mi^2).

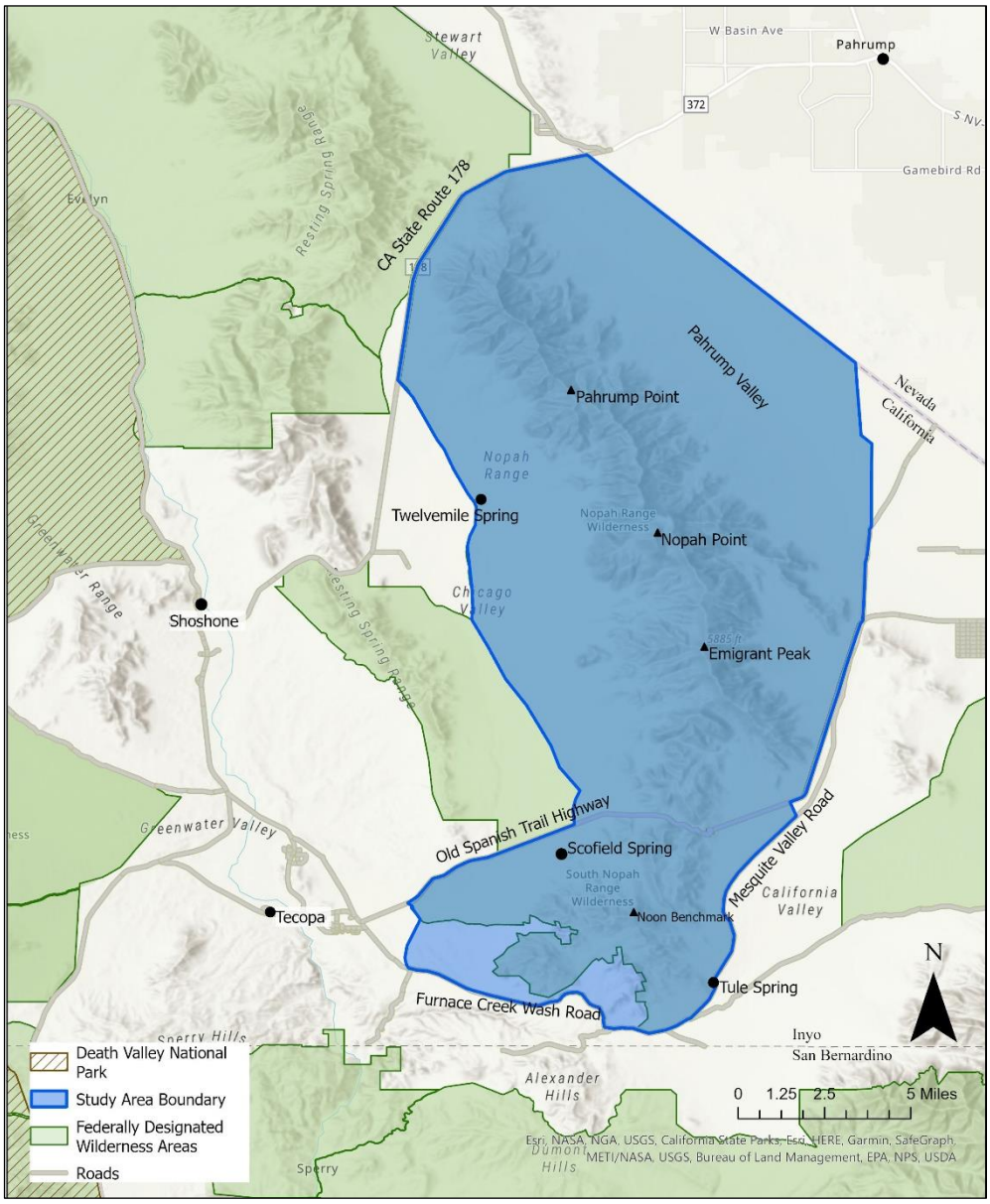


Fig. 1. Map of the study area

The northern boundary of the study area is marked by the intersection of California State Route 178 (CA-178) and the California-Nevada state line. The boundary extends southwest along CA-178, departing from the highway and tracing the boundary of the Nopah Range Wilderness area along a decommissioned jeep trail. From there, it diverges from the wilderness boundary, cutting south through the wilderness and following the 630-meter contour line through Chicago Valley to the Old Spanish Trail Highway. The boundary then follows the highway to the southwest, leaving it to trace an unnamed dirt road southeast to Furnace Creek Road. From there, the boundary continues east along Furnace Creek Road to the intersection with Mesquite Valley Road, winding north through California Valley and returning to the Old Spanish Trail Highway. The boundary follows the Old Spanish Trail Highway north before departing the highway to trace the wilderness boundary north across Pahrump Valley and along the California-Nevada state line back to the intersection with CA-178.

Land Management – The majority of the study area is administered by the Bureau of Land Management (BLM) Barstow Field Office and is managed as federally designated wilderness, including two grazing allotments. Both the Nopah Range Wilderness Area (with the exception of the southern portion of the Resting Spring Range) and the South Nopah Range Wilderness Area are included in the study area. The Chicago Valley Herd Management Area (CA0681) overlaps with the study area in Chicago Valley, where occasional signs of wild horses and burros may be observed. There are also several small private inholdings located near the southern boundary of the study area.

Access – Since much of the Nopah Range is federally designated as wilderness, the Old Spanish Trail Highway is the only road that crosses the range (Fig. 6). This highway forms the dividing line between the Nopah Range and South Nopah Range wilderness areas. Road access is limited to the highways that form the wilderness area boundaries and a few jeep trails leading to abandoned mines along the southern edge

of the study area. A few old roads provide rough trails into the wilderness, though they are not maintained and were decommissioned nearly 30 years ago, with the passage of the California Desert Protection Act in 1994.

Topography – Elevations in the study area range from 234 m (767 ft) to 1,949 m (6,394 ft) and span landforms from playa and bajadas in the valleys to the peaks and canyons of the mountains (Fig. 2-7). The Nopah Range includes several named peaks, including Nopah Point (1,949 m; 6,394 ft), Nopah Peak (1,946 m; 6,384 ft), Emigrant Peak (1,790 m; 5,874 ft), Pahrump Point (1,752 m; 5,745 ft; Fig. 2), Pahrump Peak (1,750 m; 5,740 ft), and Noon Benchmark (1,292 m; 4,238 ft; Fig. 1). Nopah Point and Pahrump Point are included in the Sierra Club Desert Peaks Section list, so hikers occasionally summit these peaks; otherwise, little recreation occurs on these lands apart from the occasional visit by a canyoneer, mining enthusiast, or obsessive botanist. Prominent mountain ranges in close proximity include the neighboring Resting Springs Range rising to 1,604 m (5,264 ft) to the west, the Kingston Range rising to 2,232 m (7,323 ft) to the southeast, and the towering Spring Mountains rising to 3,632 m (11,916 ft) to the northeast.

Three small springs express small quantities of water on the low bajadas surrounding the Nopah Range, including Scofield Spring (620 m; 2,034 ft), Tule Spring (711 m; 2,334 ft; Fig. 4), and Twelvemile Spring (671 m; 2,201 ft; Fig. 3).

Figs. 2-7. Selected features of the Nopah Range. 2. Pahrump Point.–3. Twelvemile Spring with Nopah Peak and Nopah Point in the background.–4. Tule Spring.–5. Looking down at the playa in Pahrump Valley.–6.The Old Spanish Trail Highway down in Emigrant Pass.–7. The playa following a winter storm.

Climate

Modern Climate – Mary Hunter Austin's (1903) portrayal of the Mojave Desert as the "land of little rain" is an apt description of the modern climatic conditions of the Nopah Range. The climate is characterized by its aridity, highly variable temperatures, strong winds, and broad diurnal temperature swings (Iacobellis et al. 2016). The close proximity of Death Valley National Park, where the hottest ambient air temperatures on Earth have been recorded, means the study area is subject to extreme heat in the summer, particularly at the low elevations of the bajadas and playa.

Long Term Averages – There are no weather stations located within the study area. The closest weather stations are at Horse Thief Springs, San Bernardino County, California (35.77056, -115.90917) and Ash Meadows, Nye County, Nevada (36.40889, -116.33833; WRCC 2023a, 2023b). These stations provide reasonable proxies for the weather of upper and lower elevations in the study area, respectively. The Horse Thief Springs station is in the Kingston Range, ca. 13 km (8.5 mi) east-southeast of the study area at an elevation of 1,524 m (5,000 ft). This station has been in service from September 1991 to the present, with <1% missing data. The Ash Meadows station is located at Ash Meadows National Wildlife Refuge, ca. 32 km (20 mi) northwest of the study area at an elevation of 637 m (2,091 ft). This weather station has been in service from August 2016 to the present, with <1% missing data. Long-term averages for average daily maximum and minimum air temperatures were calculated using the "Monthly Summary Time Series" function (Table 1). Average yearly precipitation was calculated based on yearly rainfall totals during 1992-2022 at Horse Thief Springs and 2017-2022 at Ash Meadows. Climate data was also estimated using modelled data from the PRISM Climate Group (PRISM 2023; Table 2). Standard 30-year normals were calculated for a high-elevation site (Nopah Point; 36.0155, -116.0657) and a low-elevation site (Upper Noonday Camp; 35.81108, -116.10397).

Table 1. Average seasonal temperatures for the coldest and warmest months and annual precipitation totals based on weather station data collected by the WRCC (2023a, b).

Station	Elevation	Jan min	Jan max	Jul min	Jul max	Precipitation
Horse Thief Springs	1,524 m (5,000 ft)	2.8°C (37°F)	11.1°C (52°F)	22.8°C (73°F)	33.3°C (92°F)	26.9 cm (10.6 in)
Ash Meadows	637 m (2,091 ft)	0.5°C (33°F)	16.1°C (61°F)	24.4°C (76°F)	41.1°C (106°F)	7.4 cm (2.9 in)

Table 2. Average seasonal temperatures for the coldest and warmest months and annual precipitation totals based on climate modelling data (PRISM 2023).

Station	Elevation	Jan min	Jan max	Jul min	Jul max	Precipitation
Nopah Point	1,949 m (6,394 ft)	1.7°C (35°F)	11.7°C (53°F)	20°C (68°F)	33.3°C (92°F)	20.9 cm (8.22 in)
Upper Noonday Camp	700 m (2,297 ft)	1.7°C (35°F)	15°C (59°F)	24.4°C (76°F)	40°C (104°F)	11.4 cm (4.47 in)

Precipitation – Precipitation primarily falls as rain, except at the high elevations of the range where snow was observed at least once per year during the duration of this study. The study area is subject to a double rain shadow effect, with the towering Sierra Nevada (Mount Whitney, 14,505 ft.) and Panamint Range (Telescope Peak, 11,048 ft.) to the west and Spring Mountains (Mount Charleston, 11,916 ft.) to the east (Belnap 2016, Walker and Landau 2018). The high crests of these north-south trending mountain ranges act as physical barriers that intercept and wring moisture from the atmosphere before it can reach the Nopah Range.

Precipitation in the study area is highly variable, both on an annual basis and along the elevational gradient of the mountain range. Fifty-five to 95% percent of the Mojave Desert's annual precipitation falls in the cool season, generally between November and March (Walker and Landau 2018). The remaining 5-45% of the annual precipitation falls in the hot summer months, generally between July and September, when the North American monsoonal system brings occasional thunderstorms to the region (Minnich

2007, Walker and Landau 2018). *Agave*, *Yucca*, and Cactaceae are known to be more abundant in areas with warm-season rainfall, and the diverse succulent flora of the Nopah Range attests to the influence of the monsoon (Walker and Landau 2018). Many of the succulent plants present in the study area are at or very near their westernmost limits, including *Agave utahensis* var. *eborispina*, *Dudleya arizonica*, *Ferocactus cylindraceus*, and *Yucca schidigera*, only one of which is indigenous to Death Valley National Park, less than 10 km to the west (Consortium of California Herbaria 2023b; Figs. 16 & 18-19).

Paleoclimate – Changes in climatic conditions across geologic time are reflected by changes in vegetation. Woodrat (*Neotoma* spp.) middens can be studied to infer the paleo-vegetation composition of a site, providing insight into past climatic conditions. Macrofossils including leaves, twigs, and seeds can be recovered from middens, and their approximate age calculated using radiocarbon dating techniques (Wells and Woodcock 1985). No middens from within the study area have been examined, though they are present in the Nopah Range. Middens recovered from sites in the Panamint Range, Funeral Mountains, and Pahrump Valley provide a local proxy for the vegetation and climate of the Nopah Range and surrounding valleys over the past 20,000 years.

Past climatic conditions of the Mojave Desert were both wetter and cooler (Walker and Landau 2018). Ten thousand years ago, summer and fall precipitation just to the north of the study area at the Nevada National Security Site is estimated to have exceeded present amounts by up to 50% (Spaulding 1985). The isolated stands of relict bristlecone pine, limber pine, and white fir spread thinly across the highest peaks of the Mojave Desert mountain ranges are remnants of populations that were once more widespread downslope during the wetter, cooler conditions of the Pleistocene (Millar and Woolfenden 2016).

Juniper woodlands dominated by *Juniperus osteosperma* were likely abundant in the late Pleistocene, with an extent estimated to follow the 610 m (2,000 ft) contour line (Spaulding 1985).

Middens at all four sites yielded juniper macrofossils in quantities indicating it was a principal constituent of the vegetation assemblage, dated to ca. 30,000-13,000 BP at Owl Canyon (790 m; 2,592 ft; Spaulding 1985), ca. 13,000 BP in the Panamint Range (775 m; 2,542 ft; Wells and Woodcock 1985), ca. 12,000-9,300 BP in the Last Chance Range (960 m; 3,150 ft), and ca. 10,000 BP at Pyramid Peak in the Funeral Mountains (1,130-1,280 m; 3,700-4,200 ft; Wells and Berger 1967). In the study area, *J. osteosperma* woodlands are likely to have been dominant on the low slopes and upper bajadas during this period, retreating upslope to their current range (above 1,200 m; 4,000 ft) as the early Holocene brought increasing aridity.

Agave utahensis (var. unknown) is also inferred to have been more widespread at lower elevations during the late Pleistocene. *Agave utahensis* macrofossils were only detected at middens from Owl Canyon, dated to ca. 30,000-13,000 BP at 790 m (2,592 ft) and ca. 10,000 BP at 820 m (2700 ft; Spaulding 1981, 1985). At ca. 30,000-13,000 BP, macrofossils indicate *A. utahensis* occurred intermixed with a juniper woodland, but by ca. 10,000 BP, juniper is no longer a component of the vegetation community. Spaulding reports this is consistent with increased warm-season precipitation during the transition from the Pleistocene to Holocene (Spalding 1985). In the Nopah Range, *Agave utahensis* var. *eborispina* likely began to retreat upslope to its current range above 975 m (3,200 ft) during this time.

Xerophytic, non-succulent shrubs presently make up the principal component at these elevations (775-1,280 m; 2,542-4,200 ft), which are typically dominated by *Larrea tridentata* and *Ambrosia dumosa*. These two species first appear in the macrofossil record in middens recovered from the Panamint Range. *Ambrosia dumosa* shows up as a dominant constituent ca. 10,000 BP at 425 m (1,395 ft), and by ca. 2000-900 BP at 260-414 m (850-1,360 ft), *L. tridentata* is the dominant constituent with intermediate levels of *A. dumosa* also present (Wells and Woodcock 1985). *Larrea tridentata* and *A. dumosa* are inferred to have begun appearing in the study area at this time as well.

Geology

The Nopah Range falls within the Basin and Range geomorphic province (Nolan 1943). The backbone of the range has a generally north-south trending orientation, a common character of many mountain ranges in this province. The range has a rich geologic history, spanning nearly a billion years and is predominantly composed of carbonate rocks dating from the Cambrian through the Pennsylvanian (ca. 570 to 290 Ma), though exposures of Precambrian sedimentary formations from the Pahrump Group (ca. 1250 to 787 Ma) may be seen along the fault traced by the Old Spanish Trail Highway (Armstrong et al. 1987, Mahon et al. 2014). While the geology of the Nopah Range has been extensively studied, the scope of most studies has been limited to particular geologic formations within the range. A geologic map for the northern half of the range was published in 1983; however, no published geologic maps of the southern portion of the range exist (Burchfiel et al. 1983).

The range itself is a tilted fault-block, with numerous faults crossing the study area. These rocks were subject to episodic folding, normal faulting, and thrust faulting during the Mesozoic, as well as basin-and-range style faulting and tilting during the Cenozoic (Burchfiel et al. 1983). At the edges of the range, coalescing rocky alluvial fans merge with lacustrine deposits in the surrounding valleys (Burchfiel et al. 1983). The most significant of these is the playa in Pahrump Valley, a topographically closed basin from which there is no surface water outflow (Malmberg 1967). Following significant precipitation events, this dry lakebed will be temporarily inundated with standing water as runoff and fine sediments collect (Rundel and Gibson 1996). As the water evaporates, high concentrations of salts are left behind in the silt- and clay-rich soils of the playa. In the Pleistocene, Pahrump Lake was one of the largest lakes in the Amargosa River system, along with Lake Tecopa, an arm of which once extended up Chicago Valley for several miles (Armstrong et al. 1987, Rundel and Gibson 1996).

Dolomite or dolomitic limestone occur most abundantly within the study area (Armstrong et al. 1987). These ancient sedimentary rocks were formed in an ancient sea, as evidenced by the diverse marine fossils found throughout the range, including trilobites, cloudinids, conodonts, and thrombolites (Hagadorn and Waggoner 2000, Miller and Paden 1976, Shapiro and Awramik 2006). The Nopah Range is also notable as one of the few localities in California where stromatolite fossils occur (Druschke et al. 2009). Other sedimentary rocks including limestone, marble, sandstone, and shale are present within the study site, as are metamorphic rocks (e.g., quartzite) and minor amounts of igneous rocks (e.g., volcanics; Armstrong et al. 1987, Hazzard 1937).

Hazzard (1937) provides an overview of some of the formations that comprise the backbone of the Nopah Range. The oldest strata, dating to the Precambrian, are found in the southern portion of the range. The Noonday Formation of pale gray dolomite underlies the southernmost portion of the range, where the Gunsight and Noonday mines are located. Overlaying the Noonday Formation is the Johnnie Formation, composed primarily of interbedded quartzite and sandy dolomite that trends in a northwest direction, terminating north of Emigrant Pass. This is overlain by Stirling Quartzite, a pinkish-reddish-brown quartzite which follows a similar path to the Johnnie Formation. Above the Stirling Quartzite lies the Wood Canyon Formation, composed of sandstone, dolomite, and shale, which includes the area around Tule Springs. Above the Wood Canyon Formation is a layer of Zabriskie Quartzite, a salmon pink to rusty brown quartzite that underlies the low foothills north and south of Emigrant Pass on the east side of the range. Overlaying that is the eponymous Nopah Formation, which forms the distinctive light and dark gray dolomite bands visible on the northwestern face of the range (Fig. 8). Above the Nopah Formation is the Pogonip Group, composed of yellowish-buff dolomite, which is in turn overlain by the white to pale pink quartzite of the Eureka Quartzite. Several formations of limestone and dolomite are interspersed here, including the Bird Spring Formation, Monte Cristo Limestone, Devils Gate Limestone, Nevada Formation, Hidden Valley Dolomite, and Ely Springs Dolomite (Burchfiel et al. 1982).

Fig. 8. View of the striations on the west face of the Nopah Range.

History

History of Indigenous People – The Nopah Range and surrounding valleys are part of the ancestral homelands of the Nuwuvi (Southern Paiute), specifically the Pahrump Band of Southern Paiute (Chmara-Huff 2006, Inter-Tribal Council of Nevada 1976). The Nuwuvi maintain that they have lived in their homelands since the beginning of time, which is the source of their deep ecological knowledge and adaptability (Stoffle et al. 2004). According to non-Indigenous scholars, human habitation in the region dates to at least the early Holocene (Coombs 1979). Projectile points associated with the Lake Mojave Complex (8,000-6,000 BCE) have been recorded within the boundaries of the BLM California Desert District's Barstow Field Office, where the study area is located (Coombs 1979, Jones and Klar 2007).

The Nuwuvi visited the Nopah Range seasonally to hunt desert bighorn sheep and harvest *Agave utahensis* var. *eborospina* (Stoffle et al. 2004, Hebner 2010). No archaeological excavations to document cultural sites have been carried out in the Nopah Range, but visitors will note the projectile points, lithic scatter, and agave roasting pits that attest to their presence. However, archaeological sites have been documented in the surrounding valleys. A rock shelter with Paiute brown pottery, flake tools, debitage, and hearth debris was documented in California Valley, dating to the period between 1100 and 1900 CE

(Coombs 1979). Sites have also been recorded in Chicago Valley and Pahrump Valley, often in association with honey mesquite bosques (*Prosopis glandulosa* var. *torreyana*), a major food source of the Nuwuvi.

History of European-American Settlement – The first known European-American settlers came to the Nopah Range with the establishment of the Spanish Trail in 1830, which connected Spanish settlements in New Mexico and California (Inter-Tribal Council of Nevada 1976). The Spanish Trail crossed the range via Emigrant Pass, where the contemporary Old Spanish Trail Highway divides the Nopah Range Wilderness from the South Nopah Range Wilderness. These early visitors did not linger; however, the trail they blazed forever altered the lives of the Nuwuvi, bringing disease, slave traders who stole women and children, and caravans of horses and mules that damaged plant life along the trail (Stoffle et al. 2004, Inter-Tribal Council of Nevada 1976). This route also detrimentally impacted important springs and agricultural areas used by the Nuwuvi and disrupted their traditional lifeways.

John C. Fremont travelled along the Spanish Trail on the return journey of his second expedition in 1844, and subsequently published a map of the region in 1845 which increased traffic along the trail (Coombs 1979).

When the California Gold Rush began in 1849, prospectors began using the trail to travel to California's gold fields. Eventually, prospectors became interested in the mineral potential of the Nopah Range. The Tecopa Mining District was established and included a number of sites in the far southern extent of the range. Here, the Columbia, Donna Loy, Gunsight, Noonday, and War Eagle mines were intermittently active from the 1860s through the 1950s, producing lead, zinc, silver, gold, copper, and talc (Lengner and Ross 2004; Fig. 9). In 1910, the Tecopa Railroad was completed so that ore could be transported directly from the Gunsight and Noonday mines to Tecopa and carried onward to smelters via the Tonopah and Tidewater Railroad (Lingenfelter 1986). In the northern Nopah Range, the Shaw Mine (also known as the Nancy Ann Mine) was established in 1925 and produced lead, zinc, and silver

(Armstrong et al. 1987). Impacts from these mines including roads, structures, adits, shafts, and tailings are still visible today, as are the railroad berms.

European-American settlers also brought cattle grazing to the region. The BLM continues to maintain two grazing allotments that overlap portions of the study area. The Horsethief Springs grazing allotment (CA09007) extends into California Valley and the South Nopah Range Wilderness, including the sensitive riparian habitat at Tule Spring. The Pahrump Valley grazing allotment (CA08000) includes the dry lake in Pahrump Valley and extends into the Nopah Range Wilderness.

Fig. 9. An abandoned ore bin at the War Eagle Mine.

Botanical History – Prior to this study, there had been no formal, focused specimen-based floristic surveys to produce a vascular checklist of the vascular flora of the Nopah Range. Neighboring mountain ranges have been inventoried as part of efforts to document the flora of Death Valley National Monument (now Death Valley National Park), including the Black Mountains (Schramm 1982), Cottonwood Mountains (Peterson 1984), Funeral Mountains (Annable 1985), and Grapevine Mountains (Kurzius 1981), and to document the flora of the sky islands of the Mojave Desert in the Kingston Range (Stone and Sumida 1983), Clark Mountains (Prigge 1975), and Spring Mountains (Clokey 1951). However, neither the Nopah

Range nor its nearest neighbor, the geologically similar Resting Spring Range, received much study, as neither are within the national park boundary nor are they considered sky islands, due to a lack of conifer diversity at their upper elevations.

The first botanical collections from within the study area were made in 1941 by Carl B. Wolf of the Rancho Santa Ana Botanic Garden (now California Botanic Garden) and LeRoy R. Abrams of Stanford University (Consortium of California Herbaria 2023b). They spent two days making collections in California Valley near Tule Spring, at the eastern edge of the present-day South Nopah Range Wilderness. Wolf described the Nopah Range as "rocky and funereal," and reported coming across the largest population of *Buddleja utahensis* he had ever seen – so dense were the shrubs on the rocks that from a distance he mistook them for sheep (Lenz 1977)!

Collection efforts in the study area have been sporadic over the years (Table 3). Celebrated Inyo County botanist Mary DeDecker visited the Nopah Range twice, spending time on the east side of the range and documenting the flora for inclusion in her *Flora of the Northern Mojave Desert* (1984). In 1978, John Emmel was the first to collect *Agave utahensis* var. *eborispina* in the range for preservation in an herbarium, which was believed to be the only occurrence of this taxon in California until Sarah DeGroot documented it from the Resting Spring Range in 2017 (Consortium of California Herbaria 2023b). In 2010, Andrew Sanders of the University of California Riverside Herbarium documented the rare flora of the dry lake in Pahrump Valley, including *Atriplex argentea* var. *longitrichoma*, *Cymopterus multinervatus*, *Eriogonum bifurcatum*, *Mentzelia pterosperma*, *Phacelia parishii*, and the first record of *Ephedra torreyana* known from California.

Most collections are from the lower elevations in the range and concentrated along roadsides, and the specimen record does not shed much light on what plants occur in the upper elevations of the range.

The bryoflora of the Nopah Range has also been the subject of study. Twenty-two bryophyte taxa have been documented from the range. Notably, a collection made by Eve Laeger from below Pahrump Peak in 2006 was described as a new species in 2016, *Campylostelium laegerae* (Brinda et al. 2016). Subsequent fieldwork in the Nopah Range by bryologist John. C. Brinda yielded the first known population of *C. pitardii* in California, and only the second known population in the USA.

Table 3. Collectors of vascular plants in the study area, listed in chronological order.

Name	Year	Number	Location
Carl B. Wolf	1941	43	California Valley
LeRoy R. Abrams	1941	17	Tule Spring
Robert H. Gill	1954 or 1959	2	War Eagle Mine
Peter Raven	1958	1	Highway CA-178
Darley Howe	1960	11	Old Spanish Trail Highway (Emigrant Pass)
N.N. Williams	1964	1	Shaw Mine
Mary DeDecker	1977	18	California Valley drainage
John F. Emmel	1978-1979	3	Shaw Mine
Mary DeDecker	1978	45	California Valley drainage, amphitheater-like canyon
Susan Cochrane & J.S. Holland	1978	5	Canyon below Pahrump Peak
David J. Keil & Lawrence M. Kelly	1988	21	Chicago Valley
G.F. Pratt	1996-1997	15	Nopah Peak
John F. Emmel	1996-1997	6	Nopah Peak
Jim Andre	2008	11	Old Spanish Trail Highway
Shannon M. Still	2010	1	Canyon below Pahrump Peak
Onkar Singh	2010	1	Old Spanish Trail Highway (Emigrant Pass)
J.M. Andre	2010	7	Mesquite Valley Road
A.C. Sanders	2010	8	Old Spanish Trail Highway (Emigrant Pass)
A.C. Sanders	2011	53	Old Spanish Trail Highway; Dry Lake, Pahrump Valley
Ann Howald	2011	2	Old Spanish Trail Highway (Emigrant Pass)
Onkar Singh	2011	2	Mesquite Valley Road; Old Spanish Trail Highway (Emigrant Pass)
J.M. Andre	2011	4	Mesquite Valley Road
Stephanie Rockwood	2011	3	Mesquite Valley Road; Pahrump Valley playa
A.C. Sanders	2012	8	Old Spanish Trail Highway; Highway CA-178
J.M. Andre	2014	91	Old Spanish Trail Highway; California Valley; Noonday Mine; Highway CA-178
Sarah DeGroot	2014	7	Old Spanish Trail Highway; California Valley
Duncan Bell	2014	6	Canyon below Pahrump Peak
J.M. Andre	2016	12	Old Spanish Trail Highway

Rachel Darney-Lane	2017	5	Old Spanish Trail Highway; California Valley
Sarah DeGroot	2017	289	Pahrump Valley; Furnace Creek Wash Road; Highway CA-178; Twelvemile Spring
Janeth Rivera-Fonseca	2017	1	Twelvemile Spring
Haley Deal	2017	2	California Valley; Twelvemile Spring
Naomi Fraga	2018	5	Scofield Spring

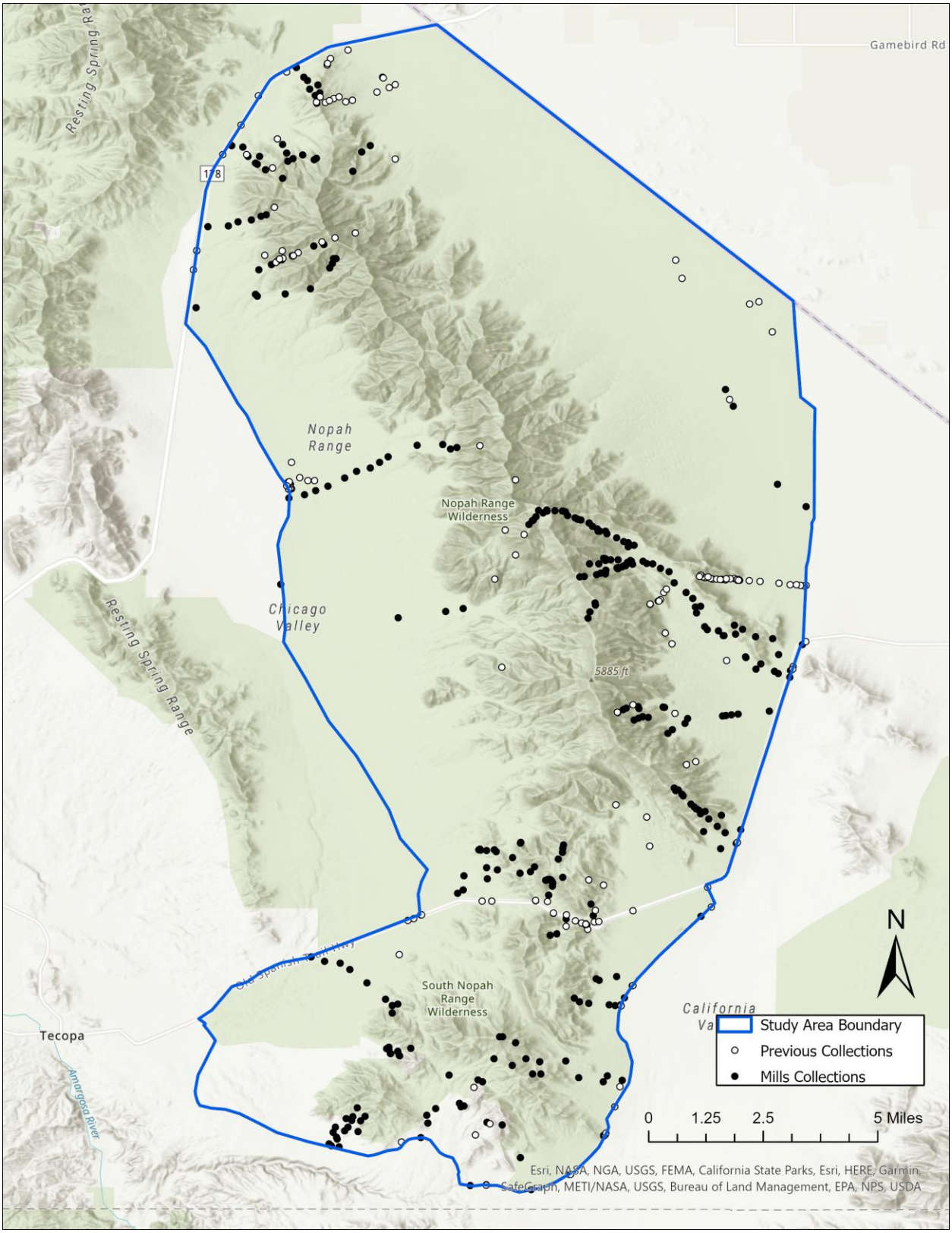
Methods

Prior to conducting fieldwork, a preliminary checklist was assembled by querying databases for specimens and observations, including the Consortium of California Herbaria (CCH1 & CCH2 2018), SEINet Portal Network (SEINet 2018), California Natural Diversity Database (CNDDB 2018), and iNaturalist (2018). USGS 7.5' quadrangles and aerial imagery were examined to assess vegetation communities and unique habitat types to ensure surveys included coverage of each community or type. USGS 7.5' quadrangles examined included Calvada Springs, Mound Spring, Nopah Peak, North of Tecopa Pass, Resting Spring, Sixmile Spring, Stewart Valley, Tecopa, Tecopa Pass, and Twelvemile Spring. California Botanic Garden obtained a collection permit from the Bureau of Land Management (BLM) during each year of this study, granting permission to legally collect specimens from within the study area.

An effort was made to conduct surveys in every month of the year, with the greatest efforts made between February and June, the primary growing season. Between October 2018 and February 2022, 73 days were spent in the field and a total of 1,201 collections were made (Fig. 10). The bulk of collections were made in 2019, following a winter of exceptional precipitation. In March 2020, travel restrictions associated with the COVID-19 pandemic went into effect, and field work was curtailed until May 2020. Voucher specimens were collected in triplicate whenever possible, with a full set to be deposited at RSA and duplicates likely to be deposited at UCR and RENO.

Specimens were identified using the Jepson Flora Project (2023) and the Flora of North America Editorial Committee (1993+), along with updated treatments for groups including Amsinckiinae (Amsinckiinae Working Group 2020-2023) and *Nemacladus* (Morin and Ayers 2020). Family classification follows APG IV (2016), except for families in Boraginales (Boraginaceae, Heliotropiaceae, Hydrophyllaceae, and Namaceae; Luebert et al. 2016). The classification at the rank of genus, species, subspecies, and variety follows the Jepson Flora Project (2023), except for Ephedraceae (Flora of North America Editorial Committee 1993+) and *Nemacladus* (Morin and Ayers 2020). Vegetation alliances were identified using *A Manual of California Vegetation* (California Native Plant Society 2023) and wetland indicator plants were identified using the indicator status rankings on the National Wetland Plant List (USACE 2020).

Fig. 10. Map of collection localities



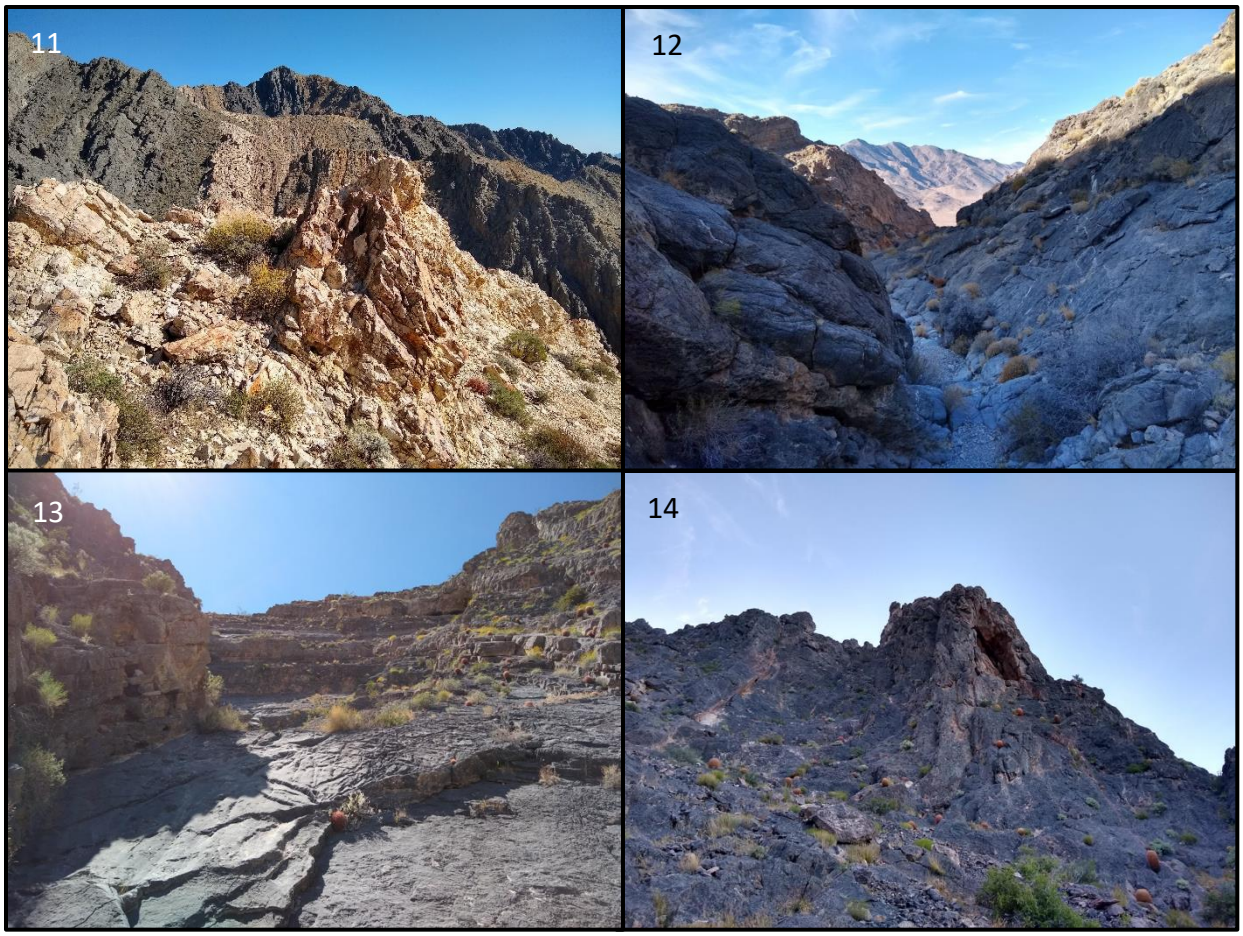
Results and Discussion

Vegetation – Existing vegetation maps are very coarse and do not always accurately represent the assemblages present on the ground. This study follows plant assemblages outlined in the Manual of California Vegetation (Sawyer et al. 2009). With respect to the study area, descriptions of vegetation alliances are arranged in three broad groups: shrublands, woodland, and special habitats. Many are ranked as sensitive natural communities by the California Department of Fish and Wildlife (2023).

Classifying vegetation in rocky, sparsely vegetated areas like the Nopah Range can be difficult, as vegetation patterns can be inconsistent in small, proximal areas, such as between neighboring canyons. In the mountains of the nearby Nevada National Security Site, Janice Beatley (1976) described the vegetation as having "little organization of plants to suggest communities, beyond small aggregations on microsites – most plants appear to be living largely independently of others." The Nopah Range includes many rocky canyons, slopes, and ridges where a mosaic of shrublands without an obviously dominant element occur (Figs. 11-14). These areas are referred to in Appendix A as "mixed Mojave shrublands" and are small patchwork areas of shrubland where commonly encountered species include *Ambrosia salsola*, *Ephedra funerea*, *Gutierrezia* spp., *Mortonia utahensis*, *Prunus fasciculata*, *Purshia stansburyana*, and *Yucca schidigera*.

More work is needed to classify and map vegetation alliances in the study area, particularly at mid-elevations where alliances with rare plants as a dominant element are patchily present, including *Amphipappus fremontii – Salvia funerea* (Fremont's chaffbush – wooly sage scrub), *Coleogyne ramosissima* (black brush scrub), and *Mortonia utahensis* (Utah mortonia scrub) shrublands.

Figs. 11-14. Diffficult-to-classify mixed Mojave shrublands in rocky habitats.



Shrublands

***Juniperus osteosperma* (Utah juniper) wooded shrubland.–** *Juniperus osteosperma* wooded shrubland occurs on the north-facing slopes of Nopah Point and in the basin between Nopah Point and Nopah Peak at 1,750 m (5,740 ft). This is the only place in the mountains of the study area where tree canopy cover exceeds 10%. This vegetation type typically has a sparse, open canopy with a diverse shrubby understory and is adjacent to black sagebrush shrubland and black brush scrub. Shrubs: *Artemisia nova*, *Cercocarpus ledifolius* var. *intricatus*, *Coleogyne ramosissima*, *Ephedra viridis*, *Eriogonum microtheca* var. *simpsonii*, *Gutierrezia* spp., *Juniperus osteosperma*, *Purshia stansburyana*, *Yucca schidigera*. Herbaceous: *Bromus rubens*, *B. tectorum*, *Calochortus flexuosus*, *Castilleja chromosa*, *Erythranthe rubella*, *Toxicoscordion venenosum* var. *venenosum*.

***Artemisia nova* (black sagebrush) shrubland.–** Black sagebrush shrublands occur above 1,500 m (4,900 ft) along the ridges and upper slopes of the Nopah Range. This vegetation type is comprised of a low, open canopy with a sparse herbaceous understory, though emergent *Juniperus osteosperma* are sometimes present. It is often adjacent to black brush shrubland, mixed Mojave shrublands, and Utah juniper wooded shrubland. These stands are often associated with carbonate substrates. Shrubs: *Agave utahensis* var. *eborispina*, *Artemisia nova*, *Ephedra funerea*, *E. viridis*, *Eriogonum heermannii*, *Grayia spinosa*, *Krascheninnikovia lanta*, *Menodora spinescens* var. *spinescens*, *Purshia stansburyana.* Herbs: *Bromus rubens*, *B. tectorum*, *Boechera* spp., *Castilleja chromosa*, *Eremogone macradenia* var. *macradenia*, *Erigeron concinnus* var. *concinnus*, *Tridens muticus* var. *muticus*.

***Coleogyne ramosissima* (black brush) shrubland.–** Black brush shrublands occur most frequently between 850 m (2,800 ft) and 1,700 m (5,600 ft) on slopes, ridges, and in canyons. This vegetation type is

comprised of a dense, low canopy with a sparse herbaceous understory, with the occasional emergent *Yucca schidigera*. It is often adjacent to black sagebrush shrubland and mixed Mojave shrublands. Shrubs: *Agave utahensis* var. *eborispina*, *Amphipappus fremontii*, *Buddleja utahensis*, *Coleogyne ramosissima*, *Ephedra funerea, Ericameria teretifolia, Galium stellatum, Grayia spinosa*, *Menodora spinescens* var. *spinescens*, *Yucca schidigera.* Herbs: *Anemone tuberosa*, *Bromus rubens*, *Castilleja chromosa*, *Eremogone macradenia* var. *macradenia*, *Oreocarya* spp.

***Atriplex confertifolia* (shadscale) shrubland.–** Shadscale shrubland spans across all elevations in the study area. It is most abundant at lower elevations, particularly near the margins of the Pahrump Valley playa, but can be found on bajadas and mid-elevation slopes. This vegetation type has an open to intermittent canopy with a sparse understory, and often occurs adjacent to creosote bush shrubland, playas, and saltbush shrubland. Shrubs: *Ambrosia dumosa*, *Atriplex canescens*, *Atriplex confertifolia*, *Grayia spinosa*, *Krascheninnikovia lanata, Larrea tridentata*, *Lycium andersonii*. Herbs: *Bromus rubens*, *Chaenactis stevioides*, *Eremalche exilis*, *Helianthus annuus*, *Hoffmannseggia glauca*, *Monolepis nuttalliana*, *Schismus* spp., *Sphaeralcea ambigua*, *Stanleya pinnata* var. *pinnata*, *Stipa hymenoides*, and *Suaeda nigra*.

***Larrea tridentata* (creosote bush) shrubland.–** Creosote bush shrubland is the dominant vegetation alliance of the Nopah Range. This vegetation type is often found on bajadas, low slopes, and in washes and has an intermittent canopy with a diverse understory of annual herbaceous vegetation, particularly in years with above-average winter precipitation. *Larrea tridentata* can be the sole dominant shrub, or co-dominant with *Ambrosia dumosa* and/or *Encelia farinosa*. This alliance occurs adjacent to mixed Mojave shrublands, saltbush and shadscale shrublands, and at the margins of playas and springs. Shrubs: *Acamptopappus shockleyi*, *Ambrosia dumosa*, *A. salsola*, *Atriplex confertifolia*, *A. hymenelytra*, *Bebbia juncea* var. *aspera*, *Encelia farinosa, Krameria erecta*, *Larrea tridentata*, *Lycium andersonii*, *Psorothamnus*

arborescens, Yucca schidigera. Herbs: *Chylismia brevipes*, *Eriogonum inflatum*, *Gilia cana*, *Mentzelia* spp., *Schismus* spp.

***Atriplex canescens* (saltbush) shrubland.–** Saltbush shrublands occur in alkaline soils along the playa margins in Pahrump Valley and in alkaline soils in Chicago Valley from an elevation of 235 m (770 ft). This vegetation type has an open canopy with a sparse herbaceous understory and is often adjacent to the playa and/or shadscale shrubland. *Atriplex canescens* is included as a Facultative Upland (FACU) species on the National Wetland Plant List (USACE 2020). Trees and shrubs: *Ambrosia dumosa*, *A. salsola*, *Atriplex canescens, A. confertifolia*, *A. torreyi, Larrea tridentata, Prosopis glandulosa* var. *torreyana* Herbs: *Schismus* spp., *Suaeda nigra.*

Woodland

***Prosopis glandulosa* (honey mesquite) woodland.–** Honey mesquite woodlands occur at low elevations below 750 m (2,460 ft), with mesquite bosques present in alkaline soils in California Valley, Chicago Valley, and Pahrump Valley. This vegetation type can have either a continuous or an open canopy, with a sparse understory. It is often adjacent to creosote bush shrubland or shadscale shrubland. *Prosopis glandulosa* is a phreatophyte that requires access to the water table, and it is included as a Facultative Upland species on the National Wetland Plant List (USACE 2020). Trees and shrubs: *Atriplex canescens*, *A. polycarpa*, *Isocoma acradenia*, *Prosopis glandulosa* var. *torreyana*, *Tamarix ramosissima*. Herbs: *Hoffmannseggia glauca*, *Phoradendron californicum*, *Schismus* spp.

Special Habitats

Springs and seeps.– There are three small springs which harbor wetland taxa that are not found elsewhere within the study area. Wetland taxa refers to those included in the United States Army Corps of Engineers' Indicator Status Rankings (2020). The unique plants supported by these springs include Obligate (OBL) wetland plants such as *Anemopsis californica*, *Leucosyris carnosa*, *Schoenoplectus americanus*, *Solidago confinis*, and *Suaeda nigra*; Facultative Wetland (FACW) plants such as *Baccharis salicina*, *Juncus balticus* subsp. *ater*, *Juncus cooperi*, *Salix gooddingii*, and *Thelypodium integrifolium* subsp. *affine;* Facultative (FAC) plants such as *Distichlis spicata*, *Populus fremontii* subsp. *fremontii, Prosopis pubescens*, *Sporobolis airoides*, and *Tamarix aphylla*; and numerous Facultative Upland (FACU) plants (USACE 2020). Hydrological research has documented widespread spring depletion in the region due to groundwater extraction (Parker et al. 2021). A monitoring well installed at Twelvemile Spring in 2013 documented a drop of 1.8 feet in elevation of free surface water over a six-year period, indicating regional groundwater decline, since there are no significant pumping wells located in Chicago Valley (Partner 2020).

Playa.– A large, sparsely vegetated playa occupies a significant portion of Pahrump Valley (Figs. 5 & 7). The playa occupies the lowest elevation of the study area at 234 m (767 ft). It will flood following significant local precipitation events. Several CNPS-ranked rare plants are restricted to this alkaline habitat, including *Atriplex argentea* var. *longitrichoma, Ephedra torreyana*, *Eriogonum bifurcatum*, *Mentzelia pterosperma*, and *Phacelia parishii*. While not ranked as rare, *Prosopis pubescens* also occurs in small, scattered stands on the western playa margins. Despite its wilderness designation, the playa is highly disturbed by off-highway vehicle use and invasive plants including *Polygonum argyrocoleon, Salsola paulsenii*, and *Tamarix ramosissima* have gained a foothold here.

Numerical Summary – A total of 365 minimum-rank vascular plant taxa were documented during this study, distributed across 60 families, 198 genera, and 351 species (Table 4). The six largest plant families

are Asteraceae, Poaceae, Boraginaceae, Polygonaceae, Brassicaceae, and Fabaceae. The five largest genera are *Eriogonum*, *Phacelia*, *Astragalus*, *Cryptantha*, and *Gilia*. A majority of the flora is herbaceous, with annual and perennial herbs accounting for 46% and 26%, respectively.

Table 4. Numerical summary of the flora of the study area.

	Taxa
Flora	
Families	60
Genera	198
Species	351
Minimum-Rank Taxa	365
Native/Non-Native	
Native	350 (96%)
Non-Native	15 (4%)
Largest Families	
Asteraceae	71
Poaceae	29
Boraginaceae	22
Polygonaceae	22
Brassicaceae	20
Fabaceae	20
Largest Genera	
Eriogonum	17
Phacelia	13
Astragalus	10
Cryptantha	8
Gilia	8
Life Forms	
Annual herb	168 (46%)
Biennial herb	1 (0.003%)
Perennial herb	96 (26%)
Subshrub	15 (4%)
Shrub	78 (22%)
Tree	7 (2%)

Noteworthy Collections – This study yielded collections of 94 minimum-rank taxa that were not previously documented within the study area. Range extensions include *Toxicoscordion venenosum* var. *venenosum* (Fig. 17), the nearest occurrence of which lies 45 miles to the northeast in the Spotted Range of Nevada (SEINet 2023). This taxon is only known in Inyo County from the Sierra Nevada, approximately 110 miles to the northwest. *Muilla coronata* has its nearest occurrence 50 miles to the southeast at Clark Mountain (Consortium of California Herbaria 2023b). Additionally, this study yielded two new records for Inyo County: *Astrolepis cochisensis* and *Galium proliferum*, which both reach their northernmost known extents in the Nopah Range. The nearest occurrences of these taxa are in San Bernardino County, where *Astrolepis cochisensis* is known from Clark Mountain in the Mojave National Preserve and *Galium proliferum* is known from the Kingston Range. In addition to these new records, several desert taxa appear to reach the northernmost edge of their ranges in the study area. New occurrences of *Asclepias subulata*, *Ferocactus cylindraceus*, *Tetradymia argyraea*, *Thymophylla pentachaeta* var. *belenidium*, and *Yucca schidigera* were all documented at their northernmost limit in California from within the study area.

Endemism – The flora of the Inyo region has been referred to as "the richest and most interesting in transmontane California" (Raven and Axelrod 1978). The Nopah Range is no exception, with a unique regional endemic flora influenced by the notable geology and proximity of the range to the intersection of many borders, both political and ecological.

California endemism – Most of the taxa found within the study area are broadly distributed across the Mojave Desert ecoregion. Only two California endemics are known from the study area (Jepson Flora Project 2023; Table 5). This low degree of California endemism is an artifact of political boundaries, as the study area's northeastern border straddles the California-Nevada state line. The climatic and geologic conditions found within the Mojave ecoregion extend far beyond the political boundary of California,

extending from eastern California, across Nevada, and into western Arizona and Utah (Kraft 2010). Mountain ranges underlain by carbonate substrates are much more common across the border in Nevada.

Table 5. Taxa endemic to California.

Family	Taxon
Plantaginaceae	*Penstemon fruticiformis* var. *fruticiformis*
Plantaginaceae	*Penstemon stephensii*

Edaphic endemism – Edaphic endemism refers to the restriction of plant taxa or populations to certain substrates or soil types. The dominant substrates of the Nopah Range are all derived from carbonate rocks, which is unusual in California. Dolomite (calcium magnesium carbonate) and limestone (calcium carbonate) are both rich in calcium, and taxa that are restricted to or have a high degree of specificity for these substrates are often called "calciphiles" or "calcicoles" (Jepson Flora Project 2023, Marchand 1973, Rundel and Gibson 1996). Quartzite (silica with carbonates) also occurs frequently in the range, so for the purposes of this thesis the plants endemic to these substrates are referred to as "carbonate endemics." A list of 32 potential edaphic endemics encountered within the study area can be found in Table 6.

The Nopah Range is situated within the Inyo-Nye region, identified as a center of endemism by Raven and Axelrod (1978), who wrote that "endemism on limestone in the deep canyons flanking Death Valley is a notable feature of the region." It is a transitional region between the Desert Floristic Province, which includes the Mojave Desert ecoregion as defined by the Jepson Flora Project, and the Great Basin Floristic Province (Jepson Flora Project 2023, Stebbins and Major 1965). The Inyo-Nye region is named for the counties where it is centered, near the border of Inyo County in California and Nye County in Nevada, though the region extends to include parts of Clark County in Nevada and San Bernardino County in California. Edaphic endemics of this region are indicated below (Table 6).

In the Nopah Range, it can be a challenge to distinguish between carbonate endemics and non-endemics. Carbonate substrates are so ubiquitous within the study area that nearly every taxon occurs on carbonates, from the sheer carbonate bedrock of the high cliffs and canyons to the low cobbled bajadas derived from carbonate parent material. However, the occurrence of plants in the Nopah Range can be helpful to verify the affinity of many taxa for carbonate substrates.

In addition to carbonate endemics, the Nopah Range also harbors taxa endemic to alkali soils. Within the study area, these substrates are found in the valleys and are particularly prevalent at the Pahrump Valley dry lakebed. While a number of taxa occur only on the alkaline soils of the playa and nowhere else in the range, relatively few are restricted to alkaline soils outside of the Nopah Range (Flora of North America Editorial Committee 1993+, Jepson Flora Project 2023).

Table 6. Potential edaphic endemics within the study area, based on personal field observations and descriptions in the Jepson Flora Project (2023), Stone and Sumida (1983), and Raven and Axelrod (1978). A = alkaline, Ca = carbonate, Cl = clay, Gr = granite, Gy = gypsum, M = miscellaneous, V = volcanics, and "-" = not treated.

Family	Taxon	Nopah Range	Jepson Manual	Kingston Range	Inyo-Nye Regional Endemics
Apiaceae	*Cymopterus gilmanii*	Ca	Ca,Gy	Ca	x
Asparagaceae	*Agave utahensis* var. *eborispina*	Ca	Ca	-	x
Asteraceae	*Chaenactis macrantha*	Ca,A	Ca,A	-	-
Asteraceae	*Ericameria nauseosa* var. *hololeuca*	Ca	Ca,Gr	Gr	-
Asteraceae	*Hazardia brickellioides*	Ca	Ca	Ca	x
Asteraceae	*Stylocline intertexta*	~Ca	~Ca	-	-
Boraginaceae	*Cryptantha cycloptera*	~Ca	~Ca	-	-
Boraginaceae	*Oreocarya virginensis*	Ca	Ca	Ca	-
Cactaceae	*Sclerocactus johnsonii*	Ca	Gr*	-	-
Caryophyllaceae	*Eremogone macradenia* var. *macradenia*	Ca	~Ca	Ca	-
Celastraceae	*Mortonia utahensis*	Ca	Ca	Ca	-
Crossosomataceae	*Glossopetalon spinescens* var. *aridum*	Ca	Ca	Ca	-
Fabaceae	*Astragalus mohavensis* var. *mohavensis*	Ca	~Ca	Ca	x
Fabaceae	*Astragalus panamintensis*	Ca	Ca	-	x
Fabaceae	*Astragalus tidestromii*	Ca	Ca	-	x
Hydrangeaceae	*Fendlerella utahensis*	Ca	Ca	Ca	-
Hydrophyllaceae	*Phacelia parishii*	A	A,Cl	-	-
Hydrophyllaceae	*Phacelia perityloides* var. *perityloides*	Ca	~Ca	Ca	-
Lamiaceae	*Hedeoma nana* subsp. *californica*	Ca	~Ca	Ca	-
Loasaceae	*Mentzelia oreophila*	Ca	Ca	Ca	-
Loasaceae	*Mentzelia pterosperma*	A	Gy	-	-
Onagraceae	*Oenothera cespitosa* subsp. *crinita*	Ca	Ca	-	-
Poaceae	*Bouteloua trifida*	Ca	~Ca	Ca	-
Poaceae	*Tridens muticus* var. *muticus*	Ca	~Ca	Ca	-
Polemoniaceae	*Gilia cana* subsp. *triceps*	Ca	~Ca	-	-
Polemoniaceae	*Gilia clokeyi*	Ca	~Ca	-	-

Polemoniaceae	*Linanthus demissus*	Ca	Ca	-	-
Pteridaceae	*Argyrochosma jonesii*	Ca	~Ca	Ca	-
Pteridaceae	*Astrolepis cochisensis*	Ca	Ca	-	-
Pteridaceae	*Myriopteris parryi*	Ca	Ca,Gr	Ca	-
Rubiaceae	*Galium proliferum*	Ca	Ca	-	-
Scrophulariaceae	*Buddleja utahensis*	Ca	Ca,V	Ca	-

Taxa of Conservation Concern – Taxa of conservation concern within the study area include plants ranked as rare by the California Native Plant Society, listed as sensitive by the BLM, critical to the lifecycle of the monarch butterfly, experiencing significant local decline, and at high risk of illegal poaching.

Twenty-nine taxa present in the study area are ranked as rare by the CNPS Rare Plant Inventory (RPI), including nine taxa newly reported in this paper (CNPS RPI 2023; Table 6; Figs. 15-22). These RPI-ranked taxa account for 8% of the taxa within the study area – a relatively large proportion of the flora. This is likely due to the carbonate endemics that occur within the study area, many of which have a limited distribution in California but are widely distributed across southern Nevada. Seven taxa are ranked as "1B," meaning they are considered rare, threatened, or endangered in California or elsewhere. Fourteen taxa are ranked as "2B," indicating they are rare, threatened, or endangered in California but more common elsewhere. Most of the taxa with the 2B ranking are more widespread across the eastern Mojave Desert, particularly in southern Nevada and northwestern Arizona. Eight taxa are ranked on list "4," plants of limited distribution that should be monitored regularly. There are no list "3" taxa known from the study area.

Nine taxa present within the study area are listed as sensitive by the BLM. This list includes all taxa ranked as 1B by the CNPS RPI and two taxa listed as 2B.

In 2020, the U.S. Fish and Wildlife Service ruled that listing the monarch butterfly (*Danaus plexippus*) under the Endangered Species Act was "warranted but precluded" (U.S. Fish and Wildlife Service 2020). Monarch butterflies have been in sharp decline across the western United States. Care

should be taken to avoid adverse impacts to *Asclepias* spp. (milkweeds) as they provide critical egg-laying habitat for monarch butterflies. Milkweeds present within the study area include *Asclepias erosa* and *A. subulata*.

Prosopis pubescens (screwbean mesquite) is experiencing a range-wide decline throughout the southwestern deserts (Foldi 2014). Within the study area, *P. pubescens* can be found in both Chicago and Pahrump valleys, in areas where the water table is near the surface. Dead trees were observed at both of these localities. The species should be monitored for ongoing die-off as significant local decline has been observed in nearby populations in the Amargosa watershed (Sorrels 2021).

The charismatic perennial succulent taxa in the range are threatened by illegal collection and poaching. The 1B-ranked *Agave utahensis* var. *eborispina* is highly prized by collectors, as are *Dudleya arizonica* and the cacti that grow within the range (Maggio 2020; Figs. 16 & 18). Detailed locality information for these taxa should be obscured from the general public.

Figs. 15-22. Selected taxa of conservation concern of the Nopah Range.–15. *Arctomecon merriamii*.–16. *Agave utahensis* var. *eborispina*.–17. *Toxicoscordion venenosum* var. *venenosum*.–18. *Hedeoma nana* var. *californica*.–19. *Dudleya arizonica*.–20. *Allium nevadense*.–21. *Penstemon stephensii*.–22. *Sclerocactus johnsonii.*

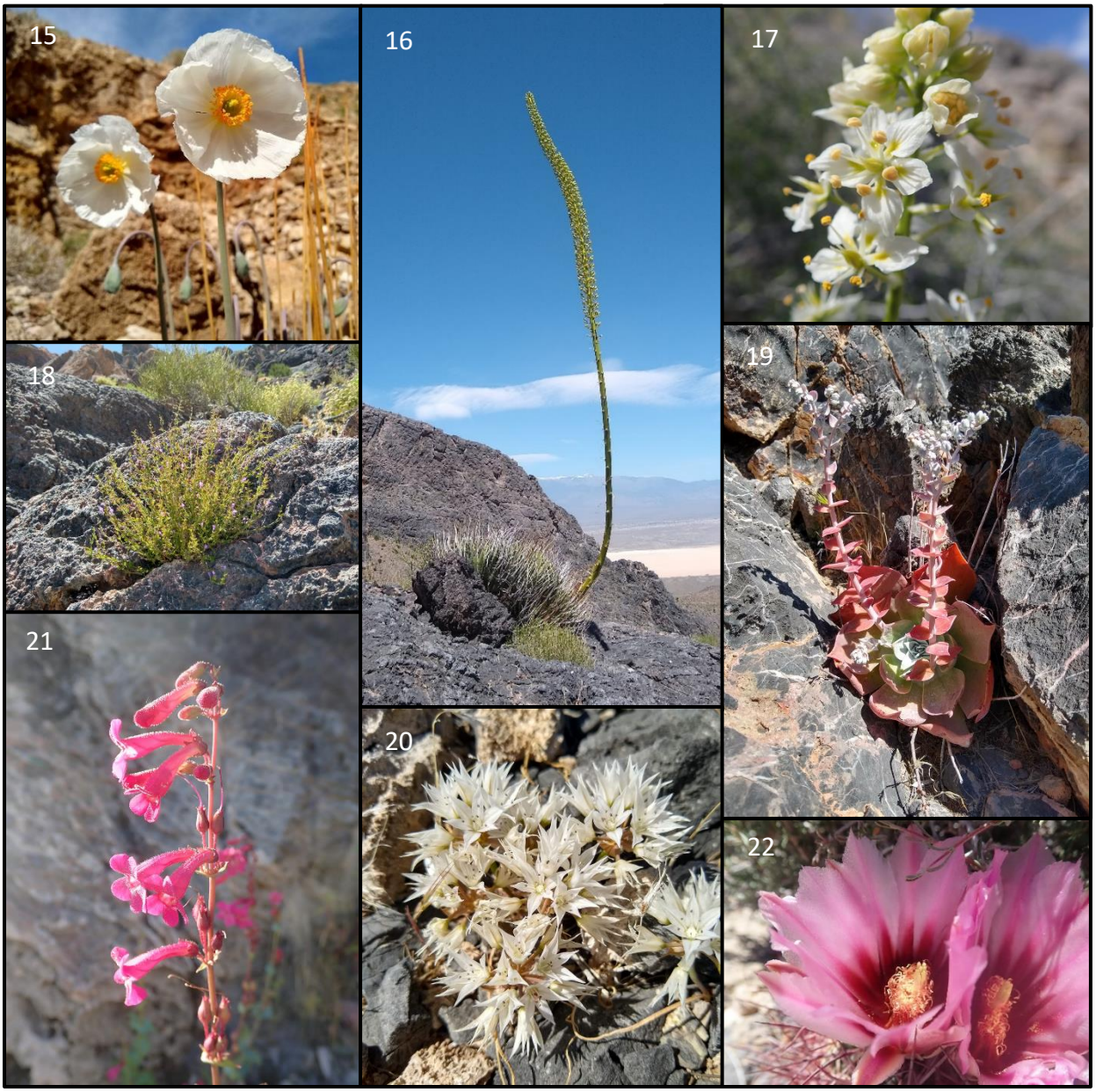


Table 7. CNPS-ranked taxa in the study area. New records are taxa newly reported from the Nopah Range. In addition to climate change, threats to local populations include: G = grazing, N = non-native plants, O = off-road vehicle use, P = poaching, T = trampling (CNPS RPI 2023 & personal observations).

Taxon	CNPS Rank	Heritage State Rank	Global Rank	BLM Sensitive	New Records	Threats
Astrolepis cochisensis	2B.3	S2	G5?T4		NR	N
Ephedra torreyana	2B.1	S1	G5			O
Allium nevadense	2B.3	S3	G4		NR	
Agave utahensis var. *eborispina*	1B.3	S2	G4T3	BLM_S		P
Juncus cooperi	4.3	S3	G4			G?
Bouteloua trifida	2B.3	S3	G4G5			G?
Androstephium breviflorum	2B.2	S2?	G5			N
Muilla coronata	4.2	S3	G3		NR	N
Atriplex argentea var. *longitrichoma*	1B.1	S2	G5T2	BLM_S		O
Cymopterus gilmanii	2B.3	S2	G3			N
Cymopterus multinervatus	2B.2	S2	G4G5			O
Tetradymia argyraea	4.3	S4	G4?		NR	
Boechera lincolnensis	2B.3	S3	G4G5	BLM_S	NR	N
Sclerocactus johnsonii	2B.2	S2	G3		NR	P
Mortonia utahensis	4.3	S3?	G4G5			
Astragalus tidestromii	2B.2	S2	G4			N
Fendlerella utahensis	4.3	S4	G5			
Phacelia parishii	1B.1	S1	G2G3	BLM_S		O
Hedeoma nana var. *californica*	4.3	S4	G5T4			N
Salvia funerea	4.3	S4	G4			
Mentzelia pterosperma	2B.2	S1S2	G4			O
Sphaeralcea rusbyi var. *eremicola*	1B.2	S2	G4T2	BLM_S		N
Oenothera cespitosa subsp. *crinita*	4.2	S4?	G5T4		NR	N
Arctomecon merriamii	2B.2	S3	G3		NR	T
Penstemon fruticiformis var. *amargosae*	1B.3	S2	G4T3	BLM_S	NR	G
Penstemon stephensii	1B.3	S3?	G3?	BLM_S		
Eriogonum bifurcatum	1B.2	S3	G3	BLM_S		O
Eriogonum contiguum	2B.3	S2	G3	BLM_S		O
Galium proliferum	2B.2	S2	G5		NR	N

Introduced Taxa – Fifteen introduced non-native taxa are present within the study area, comprising 4% of the flora (Table 7). Seven of those taxa are herein newly reported from the study area. Additionally, *Salsola gobicola* has been reported from just beyond the border of the study site in Pahrump Valley, Nevada and has a high potential to cross into the study area in the vicinity of the Pahrump dry lakebed (*Sanders 38599*, UCR). Like the overall flora of the study area, the dominant life forms of the introduced flora are annual herbaceous species, including grasses.

Eleven of the introduced taxa have been assessed and ranked by the California Invasive Plant Council (Cal-IPC). Of these, four taxa are ranked as "high," meaning that these non-natives have severe impacts, a high rate of dispersal and establishment, and are generally widely distributed (Cal-IPC 2017).

Bromus rubens is the most widely distributed and abundant non-native species in the study area (Fig. 23). *Erodium cicutarium* is similarly widespread though not as abundant. Other widespread non-natives in the study area include *Schismus* spp. on the low-elevation bajadas and *Bromus tectorum* at mid-to-high elevations.

Brassica tournefortii is only present in the South Nopah Range Wilderness as of 2023. It appears to have been introduced along the Furnace Creek Wash Road. It is important for land managers to take action to prevent this weed from spreading farther north and gaining a larger foothold in the range.

Other introduced taxa are restricted to specific habitats and/or localities including roadsides, disturbed areas, springs, and the Pahrump Valley playa.

Fig. 23. A dense understory of invasive *Bromus rubens*.

Table 8. Introduced non-native species documented in the study area and California Invasive Plant Council (Cal-IPC) ratings.

Family	Species	Cal-IPC rating	Habitat/Locality
Amaranthaceae	*Chenopodium murale*	Not assessed	Shaw Mine
Amaranthaceae	*Halogeton glomeratus*	Moderate	Old Spanish Trail Highway
Amaranthaceae	*Salsola paulsenii*	Limited	Widespread
Brassicaceae	*Brassica tournefortii*	High	South Nopah Range Wilderness
Brassicaceae	*Sisymbrium irio*	Limited	South Nopah Range Wilderness
Brassicaceae	*Sisymbrium orientale*	Not assessed	Pahrump Valley
Brassicaceae	*Strigosella africana*	Not assessed	Roadsides
Geraniaceae	*Erodium cicutarium*	Limited	Widespread
Poaceae	*Bromus rubens*	High	Widespread
Poaceae	*Bromus tectorum*	High	Widespread at mid- to upper elevations
Poaceae	*Schismus arabicus*	Limited	Widespread at low elevations
Poaceae	*Schismus barbatus*	Limited	Widespread at low elevations
Polygonaceae	*Polygonum argyrocoleon*	Not assessed	Pahrump Valley playa
Tamaraceae	*Tamarix aphylla*	Limited	Tule Spring
Tamaraceae	*Tamarix ramosissima*	High	Springs, mesquite bosques, and playa

Excluded taxa – Ten taxa were excluded from the checklist due to lacking a supporting voucher specimen or when the voucher specimen was misidentified. Taxa lacking voucher specimens were either observed but not collected by the author, reported in the literature (Stone and Sumida 1983), or reported from databases including the California Natural Diversity Database (CNDDB 2023) and iNaturalist.org (2023).

Table 9. Excluded taxa reported from within the study area.

Family	Taxon	Justification	Voucher Specimen
Apocynaceae	*Funastrum hirtellum*	Observed by the author in January 2022	None
Asteraceae	*Pectis papposa* var. *papposa*	Observed by the author in September 2021	None
Asteraceae	*Perityle intricata*	Reported from the Nopah Range by Susan Cochrane (Stone and Sumida 1983)	None
Brassicaceae	*Stanleya elata*	Misidentified voucher specimen, verified as *Stanleya pinnata* var. *pinnata*	*Andre 14318,* RSA
Boraginaceae	*Cryptantha clokeyi*	Misidentified voucher specimen, verified as *Cryptantha barbigera* var. *barbigera*	*DeGroot 8309,* RSA
Namaceae	*Nama demissa* var. *covillei*	Reported from CNDDB	None
Phrymaceae	*Diplacus nanus*	Misidentified voucher specimen, verified as *Diplacus bigelovii* var. *bigelovii* via scanned voucher image	*Schneider 960,* UCJEPS
Polemoniaceae	*Aliciella ripleyi*	Reported on iNaturalist.org	None
Polemoniaceae	*Aliciella triodon*	Reported from CNDDB	None
Polemoniaceae	*Loeseliastrum schottii*	Observed by the author in February 2020	None

Literature Cited

Amsinckiinae Working Group [2020-2023]. Systematics of Amsinckiinae (Boraginaceae): The Popcorn Flowers. Website: https://plants.sdsu.edu/amsinckiinae.

André, J.M. 2014. Floristic discovery & diversity in the California desert. *Fremontia* 42: 3-8.

The Angiosperm Phylogeny Group (APG), M.W. Chase, M.J.M. Christenhusz, M.F. Fay, J.W. Byng, W.S. Judd, D.E. Soltis, D.J. Mabberley, A.N. Sennikov, P.S. Soltis, et al. 2016. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. *Bot. J. Linn. Soc.* 181: 1–20.

Annable, C.R. 1985. Vegetation and Flora of the Funeral Mountains, Death Valley National Monument, California. Cooperative National Park Resources Studies Unit, University of Nevada, Las Vegas, NV. 193 p.

Armstrong, A.K., C.L. Smith, G.L. Kennedy, C. Sabine, and R.T. Mayerle. 1987. Mineral resources of the Nopah Range Wilderness Study Area, Inyo County, California. U.S. Geological Survey Bulletin 1709-C. https://www.sciencebase.gov/catalog/item/4f4e4b00e4b07f02db69817a [accessed 24 June 2023].

Austin, M.H. 1903. *The Land of Little Rain*. Houghton, Mifflin, and Company, Boston, MA & New York, NY. 280 p.

Baldwin, B.G., A.H. Thornhill, W.A. Freyman, D.D. Ackerly, M.M. King, N. Morueta-Holme, and B.D. Mishler. 2017. Species richness and endemism in the native flora of California. *American Journal of Botany* 104(3): 487-501.

Beatley, J.C. 1976. Vascular Plants of the Nevada Test Site and Central-Southern Nevada: Ecologic and geographic distributions. TID-26881. Technical Information Center, Office of Technical Information, Energy Research and Development Association.

Belnap, J., R.H. Webb, T.C. Esque, M.L. Brooks, L.A. DeFalco, and J.A. Macmahon. 2016. Deserts, pp 635-668. In Mooney, H., E. Zavaleta, and M. Chapin [eds.], Ecosystems of California. University of California Press, Oakland. 984 p.

Brinda, J.C, D.R. Toren, and J.R. Shevock. 2016. Campylostelium (Ptychomitriaceae) in the Southwestern United States: Campylostelium laegerae sp. nov. and C. pitardii new to the Americas. *Madroño* 63(4): 353-358.

Burchfiel, B.C., G.S. Hamill IV, and D.E. Wilhelms. 1983. Structural geology of the Montgomery Mountains and the northern half of the Nopah and Resting Spring Ranges, Nevada and California. *Geological Society of America Bulletin*, v. 94: 1359-1376.

Bureau of Land Management [BLM]. 2023. BLM Natl Grazing Allotment Polygons. https://gbp-blm-egis.hub.arcgis.com/datasets/blm-natl-grazing-allotment-polygons/explore [accessed 24 June 2023].

California Department of Fish and Wildlife [CDFW]. 2023. California Natural Community List. Website: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153398&inline [accessed 11 October 2023].

California Invasive Plant Council [Cal-IPC]. 2017. California Invasive Plant Inventory. Website: https://www.cal-ipc.org/plants/inventory/ [accessed 21 July 2023].

California Native Plant Society. 2023. A Manual of California Vegetation, Online Edition. http://www.cnps.org/cnps/vegetation/. California Native Plant Society, Sacramento, CA.

California Native Plant Society, Rare Plant Program [CNPS RPP]. 2023. Rare Plant Inventory (online edition, v9.5). Website: https://www.rareplants.cnps.org [accessed 2018-2023].

California Natural Diversity Database [CNDDB]. 2020. Rarefind 5, California Department of Fish and Game, Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cnddb/ [accessed between 2018 and 2023].

Chmara-Huff, F.P. 2006. A Critical Cultural Landscape of the Pahrump Band of Southern Paiute [thesis]. University of Arizona, Tucson, AZ. 129 p.

Clokey, I.W. 1951. Flora of the Charleston Mountains, Clark County, Nevada. University of California Press, Berkeley. 274 p.

Consortium of California Herbaria [CCH]. 2023a. Consortium of California Herbaria portal 1 [CCH1]. https://ucjeps.berkeley.edu/consortium/ [accessed between November 2018 and June 2023].

Consortium of California Herbaria [CCH]. 2023b. Consortium of California Herbaria portal 2 [CCH2]. https://www.cch2.org/portal/index.php [accessed between November 2018 and June 2023].

Coombs, G.B. 1979. The Archaeology of the Northeast Mojave Desert. US Department of the Interior, Bureau of Land Management. https://archive.org/download/archaeologyofnor00coom/archaeologyofnor00coom.pdf [accessed 24 June 2023].

DeDecker, M. 1984. Flora of the Northern Mojave Desert, California. California Native Plant Society, Berkeley. 163 p.

Druschke, P.A., G. Jiang, T.B. Anderson, and A.D. Hanson. 2009. Stromatolites in the Late Ordovician Eureka Quartzite: implications for microbial growth and preservation in siliciclastic settings. *Sedimentology* 56: 1275-1291.

Ertter, B. 2000. Floristic Surprises in North America North of Mexico. *Annals of the Missouri Botanical Garden* 87(1): 81-109.

Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico [Online]. 22+ vols. New York and Oxford. http://beta.floranorthamerica.org [accessed 2020-2023].

Foldi, S.E. 2014. Disappearance of a dominant bosque species: screwbean mesquite (*Prosopis pubescens*). *The Southwestern Naturalist* 59(3): 337-343.

Fraga, N.S., B.S. Cohen, A. Zdon, M.P. Mejia, and S.S. Parker. 2023. Floristic Patterns and Conservation Values of Mojave and Sonoran Desert Springs in California. *Natural Areas Journal* 43(1): 4-21.

Hagadorn, J.W. and B. Waggoner. 2000. Ediacaran Fossils from the Southwestern Great Basin, United States. *Journal of Paleontology* 74(2): 349-359.

Hazzard, J.C. 1937. Paleozoic section in the Nopah and Resting Spring Mountains, Inyo County, California. *California Journal of Mining and Geology*, v.33: 237-339.

Hebner, W.L. 2010. Southern Paiute: A Portrait. University Press of Colorado, Denver, CO. 196 p.

Heberling, J.M. and B.L. Isaac. 2017. Herbarium specimens as exaptations: New uses for old collections. *American Journal of Botany* 104(7): 1-3.

Heberling, J.M., L.A. Prather, and S.J. Tonsor. 2019. The Changing Uses of Herbarium Data in an Era of Global Change: An Overview Using Automated Content Analysis. *BioScience* 69(10): 812-822.

Holmes, M.W., T.T. Hammond, G.O.U. Wogan, R.E. Walsh, K. Labarbera, E.A. Wommack, F.M. Martins, J.C. Crawford, K.L Mack, L.M. Bloch, and M.W. Nachman. 2016. Natural history collections as windows on evolutionary processes. *Molecular Ecology* 25: 864-881.

Hunter, L.M., M. de J. Gonzalez, M. Stevenson, K.S. Karish, R. Toth, T.C. Edwards, R.J. Lilieholm, and M. Cablk. 2003. Population and land use change in the California Mojave: natural habitat implications of alternative futures. *Popul. Res. Policy Rev.* 22: 373-397.

Iacobellis, S.F., D.R. Cayan, J.T. Abatzoglou, and H. Mooney. 2016. Climate, pp 9-25. In Mooney, H., E. Zavaleta, and M. Chapin [eds.], Ecosystems of California. University of California Press, Oakland. 984 p.

iNaturalist. Website: https://www.inaturalist.org/ [accessed 2018-2023].

Inter-Tribal Council of Nevada. 1976. Nuwuvi: A Southern Paiute History. University of Utah, Salt Lake City, UT. 177 p.

Jepson Flora Project [eds.]. 2023. Jepson eFlora, https://ucjeps.berkeley.edu/eflora/ [Accessed multiple times between 2018-2023].

Jones, T.L. and K.A. Klar. 2007. California Prehistory: Colonization, Culture, and Complexity. Altamira Press. Advances in Understanding Mojave Desert Prehistory, pp. 339-366.

Kraft, N.J.B., B.G. Baldwin, and D.D. Ackerly. 2010. Range size, taxon age and hotspots of neoendemism in the California flora: California plant neoendemism. *Diversity and Distributions* 16: 403-413.

Kurzius, M.A. 1981. Vegetation and Flora of the Grapevine Mountains, Death Valley National Monument, California – Nevada. Cooperative National Park Resources Studies Unit, University of Nevada, Las Vegas, NV. 289 p.

Lendemer, J., B. Thiers, A.K. Monfils, J. Zaspel, E.R. Ellwood, A. Bentley, K. Levan, J. Bates, D. Jennings, D. Contreras, L. Lagomarsino, P. Mabee, L.S. Ford, R. Guralnick, R.E. Gropp, M. Revelez, N. Cobb, K. Seltmann, and M.C. Aime. 2020. The Extended Specimen Network: A Strategy to Enhance US Biodiversity Collections, Promote Research and Education. *BioScience* 70(1): 23-30.

Lengner, K.E. and G.A. Ross. 2004. Remembering the Early Shoshone and Tecopa Area: Life in Southeastern Death Valley Region Mining Towns. Deep Enough Press. 99 p.

Lenz, L.W. 1977. An Independent Institution. *Aliso* 9(1): 56-86.

Lingenfelter, R.E. 1986. Death Valley and the Amargosa: A Land of Illusion. University of California Press, Berkeley. 664 p.

Luebert, F., L. Cecchi, M.W. Frohlich, M. Gottschling, C.M. Guilliams, K.E. Hasenstab-Lehman, H.H. Hilger, J.S. Miller, M. Mittelbach, M. Nazaire, et al. 2016. Familial Classification of the Boraginales. *Taxon* 65: 502-522.

Maggio, M.V. 2020. Agaves on the Edge: Range Expansion of *Agave utahensis* var. *eborispina* in California. *Cactus and Succulent Journal* 92(4): 256-270.

Mahon, R.C., C.M. Dehler, P.K. Link, K.E. Karlstrom, and G.E Gehrels. 2014. Geochronologic and stratigraphic constraints on the Mesoproterozoic and Neoproterozoic Pahrump Group, Death Valley, California: A record of the assembly, stability, and breakup of Rodinia. *GSA Bulletin* 126(5/6): 652-664.

Malmberg, G.T. 1967. Hydrology of the Valley-Fill and Carbonate-Rock Reservoirs. Geological Survey Water-Supply Paper 1832. United States Government Printing Office, Washington.

Marchand, D.E. 1973. Edaphic control of plant distribution in the White Mountains, eastern California. *Ecology* 54: 233–250.

Miller, R.H. and E.A. Paden. 1976. Upper Cambrian Stratigraphy and Conodonts from Eastern California. *Journal of Paleontology* 50(4): 590-597.

Minnich, R.A. 2007. Climate, paleoclimate, and paleovegetation, pp 43-70. *In* Barbour, M.G., T. Keeler-Wolf, and A.A. Schoenherr [eds.], Terrestrial Vegetation of California, 3rd ed. University of California Press, Berkeley.

Morin, N.R. and T.J. Ayers. 2020. New species and a new variety of *Nemacladus* (Campanulaceae, Nemacladoideae) and a key to the species. *Madroño* 67: 35-60.

Nolan, T.B. 1943. The Basin and Range Province in Utah, Nevada, and California. U.S. Geological Survey Professional Paper 197-D. United States Government Printing Office, Washington.

Parker, S.S., B.S. Cohen, and J. Moore. 2018. Impact of solar and wind development on conservation values in the Mojave Desert. *PLoS ONE* 13(12): e0207678.

Parker, S.S., A. Zdon, W.T. Christian, B.S. Cohen, M.P. Mejia, N.S. Fraga, E.E. Curd, K. Edalati, and M.A Renshaw. 2021. Conservation of Mojave Desert springs and associated biota: status, threats, and policy opportunities. *Biodiversity and Conservation* 30: 311-327.

Partner Engineering and Science, Inc. 2020. 2020 Amargosa State of the Basin Report, Amargosa River Basin, Inyo and San Bernardino Counties, California.

https://www.amargosaconservancy.org/wp-content/uploads/2022/03/2020-Amargosa-State-of-the-Basin-Report-Zdon-compressed.pdf [accessed 18 November 2023].

Peterson, P.M. 1984. Flora and physiognomy of the Cottonwood Mountains, Death Valley National Monument, California. Cooperative National Park Resources Studies Unit, University of Nevada, Las Vegas, NV. 241 p.

Prather, L.A., O. Alvarez-Fuentes, M.H. Mayfield, and C.J. Ferguson. 2004. The Decline of Plant Collecting in the United States: A Threat to the Infrastructure of Biodiversity Studies. *Systematic Botany* 29(1): 15-28.

Prigge, B.A. 1975. Flora of the Clark Mountain Range, San Bernardino County, California [thesis]. California State University at Los Angeles, California. 64 p.

PRISM Climate Group, Oregon State University, https://www.prism.oregonstate.edu/. [accessed 8 August 2023].

Raven, P.H. and D.I. Axelrod. 1978. Origin and relationships of the California Flora. *Univ. Calif. Publ. Bot.* 72: 1-134.

Rundel, P.W. and Gibson A.C. 1996. Ecological communities and processes in a Mojave Desert ecosystem: Rock Valley, NV. Cambridge University Press, New York.

Sorrels, S. 2021. The Dying Screwbean Mesquite. *Desert Report: News of the desert from Sierra Club California & Nevada Desert Committee*, June 2021: 1, 6-7.

Schilthuizen, M., C.S. Vairappan, E.M. Slade, D.J. Mann, and J.A. Miller. 2015. Specimens as primary data: museums and 'open science'. Trends in Ecology and Evolution.

Schramm, D.R. 1982. Floristics and Vegetation of the Black Mountains, Death Valley National Monument, California. Cooperative National Park Resources Studies Unit, University of Nevada, Las Vegas, NV. 167 p.

SEINet Portal Network. 2023. https://swbiodiversity.org/seinet/index.php [accessed multiple times between 2018-2023].

Shapiro, R.S. and S.M. Awramik. 2006. *Favosamaceria cooperi* new group and form: A widely dispersed, time-restricted thrombolite. *Journal of Paleontology*, 80(3): 411-422.

Spaulding, W.G. 1985. Vegetation and climates of the last 45,000 years in the vicinity of the Nevada Test Site, South-Central Nevada. U.S. Geological Survey Professional Paper 1329. United States Government Printing Office, Washington.

Stebbins, G.L. and J. Major. 1965. Endemism and speciation in the California flora. *Ecological Monographs* 35(1): 1–35.

Stoffle, R.W., F.P. Chmara-Huff, K.A. Van Vlack, and R.S. Toupal. 2004. Puha Flows from It: The Cultural Landscape Study of the Spring Mountains. Bureau of Applied Research in Anthropology, University of Arizona. https://repository.arizona.edu/handle/10150/271073 [accessed 24 June 2023].

Stone, R.D. and V.A. Sumida. 1983. The Kingston Range of California: A Resource Survey. Publication No. 10, Environmental Field Program, University of California, Santa Cruz. 393 p.

U.S. Army Corps of Engineers [USACE]. 2020. National Wetland Plant List, version 3.5 http://wetland-plants.usace.army.mil/. U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH.

U.S. Fish and Wildlife Service. 2020. U.S. Fish and Wildlife Service Finds Endangered Species Act Listing for Monarch Butterfly Warranted but Precluded. https://www.fws.gov/press-release/2020-12/endangered-species-act-listing-monarch-butterfly-warranted-precluded [accessed 11 October 2023].

Walker, L.R. and F.H. Landau. 2018. A Natural History of the Mojave Desert. University of Arizona Press. 400 p.

Wells, P.V. and D. Woodcock. 1985. Full-glacial vegetation of Death Valley, California: Juniper woodland opening to Yucca semidesert. *Madroño* 32(1): 11-23.

Western Regional Climate Center [WRCC]. 2023a. RAWS USA Climate Archive, Horse Thief Springs California. https://wrcc.dri.edu/cgi-bin/rawMAIN.pl?caCHOR [accessed multiple times in 2023].

Western Regional Climate Center [WRCC]. 2023b. RAWS USA Climate Archive, Ash Meadows Nevada. https://wrcc.dri.edu/cgi-bin/rawMAIN.pl?nvNASH [accessed multiple times in 2023].

Appendix I: Annotated Checklist of the Vascular Flora

All vascular plant taxa from the Nopah Range represented by a known voucher specimen are compiled in the checklist below. Specimens were obtained via fieldwork and queries of the Consortium of California Herbaria (CCH1, CCH2) and the SEINet Portal Network. Historical specimens deposited at RSA were examined and annotated.

Life forms are based on descriptions in the Jepson Flora Project (2023), with occasional supplemental descriptors in parentheses. Habitat information and abundance are based on the author's field observations. Abundance was evaluated based on observations made at the time of collection and may vary considerably based on annual precipitation. Five categories were used to describe abundance, according to standards established by Palmer et al. (1995; Table 8). Non-native taxa are symbolized by an asterisk (*) and CNPS-ranked taxa are symbolized by a dagger (†).

Table 8. Abundance scale, adapted from Palmer et al. (1995).

Density	Description
Abundant	Dominant or co-dominant in one or more common habitats
Frequent	Easily seen or found in one or more common habitats but not dominant in any common habitat
Occasional	Widely scattered but not difficult to find
Infrequent	Difficult to find with few individuals or colonies but found in several locations
Rare	Very difficult to find and limited to one or very few locations or uncommon habitats

FERNS & FERN ALLIES

PTERIDACEAE

***Argyrochosma jonesii* (Maxon) Windham.** Perennial herb. Occasional. Shaded rock crevices. *Mills 995.*

†***Astrolepis cochisensis* (Goodd.) D.M. Benham & Windham.** Perennial herb. Rare. Collected only once from a carbonate rock crevice in a canyon east of Nopah Point. *Mills 864.*

***Myriopteris parryi* (D. C. Eaton) Grusz & Windham.** Perennial herb. Frequent. Shaded rock crevices. *Mills 973.*

GYMNOSPERMS

CUPRESSACEAE

***Juniperus osteosperma* (Torr.) Little.** Tree. Frequent. Canyons, ridges, and slopes above 4,000 ft; most dense in the gravelly basin below Nopah Point and Nopah Peak. *Mills 799.*

EPHEDRACEAE

***Ephedra aspera* S. Watson.** Shrub. Occasional. Canyons and rocky slopes in creosote bush shrubland. *Mills, Fraga, & Donnelly 605.*

***Ephedra funerea* Coville & C.V. Morton.** Shrub. Frequent. Bajadas, canyons, rocky slopes, and washes in creosote bush shrubland. *Mills & Zweifler 466.*

***Ephedra nevadensis* S. Watson.** Shrub. Occasional. Bajadas and rocky washes in creosote bush shrubland. *Mills & Figueroa 499.*

†***Ephedra torreyana* S. Watson.** Shrub. Infrequent. Playa in Pahrump Valley. *Sanders, Scott, Clark, Utter, & Laeger 39453.*

***Ephedra viridis* Coville.** Shrub. Occasional. Rocky slopes and along the crest of the Nopah Range. *Mills 685.*

MAGNOLIIDS

SAURURACEAE

***Anemopsis californica* (Nutt.) Hook. & Arn.** Perennial herb. Rare. Tule Spring and Twelvemile Spring. *Mills & Varnava 1172.*

MONOCOTS

AMARYLLIDACEAE

†***Allium nevadense* S. Watson.** Geophytic perennial herb. Infrequent. Gravelly carbonate flats and gentle slopes in mixed desert shrubland. *Mills & Fraga 630.*

ASPARAGACEAE

†***Agave utahensis* Engelm. var. *eborispina* (Hester) Breitung.** Succulent shrub. Locally frequent. Carbonate rock outcrops and gravelly carbonate slopes in mixed desert and sagebrush shrublands above 3,200 ft in the Nopah Range Wilderness. *Mills 863.*

***Yucca schidigera* Roezl ex Ortgies.** Shrub. Abundant. Bajadas, gentle slopes, and low-elevation canyons in creosote bush and mixed desert shrublands. *Mills & Fraga 288.*

CYPERACEAE

***Schoenoplectus americanus* (Pers.) Volkart ex Schinz & R. Keller.** Perennial herb. Infrequent. Twelvemile Spring. *DeGroot, Betz, Holguin, & Steppe 8569.*

JUNCACEAE

***Juncus balticus* Willd. subsp. *ater* (Rydb.) Snogerup.** Perennial herb. Rare. Silty alkaline flats near Twelvemile Spring. *DeGroot, Betz, Holguin, & Steppe 8554.*

†***Juncus cooperi* Engelm.** Perennial herb. Rare. Silty alkaline flats near Twelvemile Spring. *DeGroot, Betz, Holguin, & Steppe 8553.*

LILIACEAE

***Calochortus flexuosus* S. Watson.** Perennial herb (geophytic). Frequent. Bajadas, canyons, and rocky slopes in creosote bush and mixed desert shrublands. *Mills, Zweifler, Palmese, & Bohr 401.*

MELANTHIACEAE

***Toxicoscordion venenosum* (S. Watson) Rydb. var. *venenosum*.** Perennial herb (geophytic). Occasional. Moist soil pockets and rock crevices in mixed desert and sagebrush shrublands. *Mills 925.*

POACEAE

***Aristida adscensionis* L.** Annual herb. Occasional. Bajadas and washes in creosote bush shrubland. *Mills & Fraga 47.*

***Aristida purpurea* Nutt. var. *nealleyi* (Vasey) Allred.** Perennial herb. Rare. Collected only once in an unnamed canyon east of Nopah Point. *Mills 893.*

***Aristida purpurea* Nutt. var. *wrightii* (Nash) Allred.** Perennial herb. Occasional. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills & Fraga 329.*

***Bouteloua barbata* Lag. var. *barbata*.** Annual herb. Rare. Collected once from a rocky slope west of Mesquite Valley Road. *DeGroot & Darney-Lane 9095.*

†***Bouteloua trifida* Thurb. ex S. Watson.** Annual herb. Rare. Carbonate rock outcrops. *Mills, Lencioni, & Stan 152.*

***Bromus berteroanus* Colla.** Annual herb. Occasional. Bajadas, canyons, and carbonate rock outcrops. *Mills, Fraga, & Pipkin 254.*

****Bromus rubens* L.** Annual herb. Frequent. All habitat types, particularly in disturbed areas. *Mills & Fraga 51.*

****Bromus tectorum* L.** Annual herb. Occasional. Mid-elevations in mixed desert and sagebrush shrublands. *Mills 941.*

***Dasyochloa pulchella* (Kunth) Willd. ex Rydb.** Perennial herb. Frequent. Canyons, gravelly slopes, ridges, and washes. *Mills, Fraga, & Boes 72.*

***Distichlis spicata* (L.) Greene.** Perennial herb. Locally frequent. Scofield Spring, Tule Spring, and Twelvemile Spring. *Mills & Varnava 1173.*

***Elymus elymoides* (Raf.) Swezey var. *brevifolius* (J.G. Sm.) Dorn.** Perennial herb. Rare. Collected only once from a carbonate cliff face on the east slope of the Nopah Range. *Mills 789.*

***Elymus elymoides* (Raf.) Swezey var. *elymoides*.** Perennial herb. Occasional. Gravelly slopes and ridges in mixed desert shrubland. *Mills & Fraga 1055.*

***Elymus multisetus* (J.G. Sm.) Burtt Davy.** Perennial herb. Infrequent. Canyons in mixed desert shrubland. *Mills 891.*

***Elymus x gouldii*.** Perennial herb. Rare. Silty alkaline flats near Twelvemile Spring. *DeGroot, Betz, Holguin, & Steppe 8570.*

***Festuca bromoides* L.** Annual herb. Occasional. Bajadas and washes in creosote bush shrubland. *Mills, Fraga, & Pipkin 239.*

***Festuca octoflora* Walter.** Annual herb. Occasional. Bajadas, rockyflats, and gentle slopes in creosote bush shrubland. *Mills & Fraga 297.*

***Hilaria rigida* (Thurb.) Benth. ex Scribn.** Perennial herb. Infrequent. Western slopes of the Nopah Range in creosote bush shrubland. *Mills, Lencioni, & Stan 144.*

***Melica frutescens* Scribn.** Perennial herb. Rare. Collected once in California Valley. *DeDecker 4255.*

***Muhlenbergia asperifolia* (Nees & Meyen ex Trin.) Parodi.** *Fraga, Mills, Washburn, & Zdon 6279.*

***Muhlenbergia microsperma* (DC.) Kunth.** Annual herb. Occasional. Carbonate rock outcrops in mixed desert shrubland. *Mills, Lencioni, & Stan 149.*

***Muhlenbergia porteri* Scribn. ex Beal.** Perennial herb. Occasional. Canyons and washes in mixed desert shrubland. *Mills & Figueroa 479.*

***Poa secunda* J. Presl subsp. *secunda*.** Perennial herb. Frequent. Canyons and rocky slopes in mixed desert shrublands. *Mills, Fraga, & Pipkin 278.*

****Schismus arabicus* Nees.** Annual herb. Occasional. Bajadas, gentle slopes, and washes in creosote bush shrubland. *Mills, Fraga, & Boes 64.*

****Schismus barbatus* (L.) Thell.** Annual herb. Frequent. Bajadas, gentle slopes, and washes in creosote bush shrubland. *Mills, Fraga, Madsen-McQueen, & House 32.*

***Sporobolus airoides* (Torr.) Torr.** Perennial herb. Rare. Scofield Spring, Tule Spring, and Twelvemile Spring. *Wolf 10554.*

***Stipa hymenoides* Roem. & Schult.** Perennial herb. Occasional. Canyons, rock outcrops, slopes, and washes in mixed desert shrubland. *Mills & Figueroa 512.*

***Stipa parishii* Vasey var. *parishii*.** Perennial herb. Occasional. Canyons and washes in mixed desert shrubland. *Mills 800.*

***Stipa speciosa* Trin. & Rupr.** Perennial herb. Frequent. Canyons, rock outcrops, slopes, and washes in creosote bush and mixed desert shrublands. *Mills, Zweifler, Palmese, & Bohr 403.*

***Tridens muticus* (Torr.) Nash var. *muticus*.** Perennial herb. Frequent. Canyons, ridges, and slopes in mixed desert and sagebrush shrublands. *Mills, Fraga, Vanderplank, & Tremor 12.*

THEMIDACEAE

†***Androstephium breviflorum* S. Watson.** Perennial herb (geophytic). Infrequent. Rocky areas on bajadas in creosote bush shrubland. *Mills, Zweifler, Palmese, & Bohr 390.*

***Dipterostemon capitatus* (Benth.) Rydb.** Perennial herb (geophytic). Frequent. Bajadas, gravelly slopes, rocky outcrops, and washes in creosote bush and mixed desert shrublands. *Mills, Fraga, & Pipkin 283.*

†***Muilla coronata* Greene.** Perennial herb (geophytic). Rare. Collected once from a rocky area near the Columbia Mine in the South Nopah Range Wilderness. *Mills & Jesus 191.*

EUDICOTS

AMARANTHACEAE

†***Atriplex argentea* Nutt. var. *longitrichoma* (Stutz, G.L. Chu & S.C. Sand.) S.L. Welsh.** Annual herb. Locally frequent. Margins of playa in Pahrump Valley. *Sanders, Scott, Clark, Utter, & Laeger 39447.*

***Atriplex canescens* (Pursh) Nutt. var. *laciniata* Parish.** Shrub. Occasional. Flats at the edge of mesquite bosques and playas. *Mills 950.*

***Atriplex confertifolia* (Torr. & Frém.) S. Watson.** Shrub. Frequent. Rocky slopes and saddles. *Mills & Fraga 979.*

***Atriplex hymenelytra* (Torr.) S. Watson.** Shrub. Frequent. Bajadas, canyon bottoms, and washes. *Mills 991.*

***Atriplex polycarpa* (Torr.) S. Watson.** Shrub. Infrequent. Alkaline soils near springs. *Mills & Fraga 982.*

***Atriplex torreyi* (S. Watson) S. Watson var. *torreyi*.** Shrub. Rare. Collected only once at the edge of the playa in Pahrump Valley. *Mills & Varnava 1159.*

****Chenopodium murale* L.** Annual herb. Rare. Disturbed areas, collected once in the wash below Shaw Mine. *Mills & Jesus 202.*

***Grayia spinosa* (Hook.) Moq.** Shrub. Occasional. Canyons and ridges in creosote bush and mixed desert shrublands. *Mills, Zweifler, Palmese, & Bohr 422.*

****Halogeton glomeratus* (M. Bieb.) C.A. Mey.** Annual herb. Infrequent. Road shoulder along Old Spanish Trail Highway. *Mills 977.*

***Krascheninnikovia lanata* (Pursh) A. Meeuse & A. Smit.** Subshrub. Frequent. Gravelly flats and slopes in creosote bush, mixed desert, and sagebrush shrublands. *Mills, Fraga, & Boes 79.*

***Monolepis nuttalliana* (Schult.) Greene.** Annual herb. Infrequent. Playa in Pahrump Valley. *DeGroot 8679.*

***Nitrophila occidentalis* (Moq.) S. Watson.** Perennial herb. Locally frequent. Silty alkaline flats near Twelvemile Spring in Chicago Valley. *DeGroot & Rivera 9022.*

****Salsola paulsenii* Litv.** Annual herb. Infrequent. Disturbed areas. *Mills 953.*

***Suaeda nigra* (Raf.) J.F. Macbr.** Subshrub. Infrequent. Edges of playas and springs. *Mills & Varnava 1163.*

***Stutzia covillei* (Standl.) E.H. Zacharias.** Annual herb. Locally frequent. Alkaline soil in California Valley. *Wolf 10566.*

***Tidestromia suffruticosa* (Torr.) Standl. var. *oblongifolia* (S. Watson) Sánch.Pino & Flores Olv.** Perennial herb. Occasional. Bajadas and low-elevation canyons in creosote bush shrubland. *Mills 947.*

ANACARDIACEAE

***Rhus aromatica* Aiton.** Shrub. Infrequent. Mid-elevation canyons in mixed desert shrublands. *Mills 751.*

APIACEAE

***Cymopterus aboriginum* M.E. Jones.** Perennial herb. Rare. Gravelly carbonate slopes in mixed desert shrubland. *Mills & Fraga 1070.*

†***Cymopterus gilmanii* C.V. Morton.** Perennial herb. Infrequent. Carbonate rock outcrops and soil pockets in mixed desert shrubland. *Mills, Fraga, & Donnelly 584.*

†***Cymopterus multinervatus* (J.M. Coult. & Rose) Tidestr.** Perennial herb. Rare. Seasonally wet depressions in Pahrump Valley. *Sanders, Scott, Clark, Utter, & Laeger 39463.*

***Lomatium nevadense* (S. Watson) J.M. Coult. & Rose var. *parishii* (J.M. Coult. & Rose) Jeps.** Perennial herb. Occasional. Mid-elevation canyons and gravelly slopes in mixed desert shrubland. *Mills 912.*

***Lomatium parryi* (S. Watson) J.F. Macbr.** Perennial herb. Occasional. Mid-elevation canyons and gravelly slopes in mixed desert and sagebrush shrublands. *Mills & Fraga 1071.*

***Yabea microcarpa* (Hook. & Arn.) Koso-Pol.** Annual herb. Rare. Carbonate cliffs in a canyon on the east slopes of the Nopah Range. *DeDecker 4560.*

APOCYNACEAE

***Asclepias erosa* Torr.** Perennial herb. Rare. Collected only once from the road shoulder along Mesquite Valley Road. *Mills 820.*

***Asclepias subulata* Decne.** Perennial herb. Infrequent. Low-elevation canyons and flats south of Emigrant Peak in creosote bush shrubland. *Mills 834.*

ASTERACEAE

***Acamptopappus shockleyi* A. Gray.** Shrub. Occasional. Bajadas, canyons, and slopes in creosote bush shrubland. *Mills 839.*

***Acamptopappus sphaerocephalus* (Harv. & A. Gray) A. Gray var. *hirtellus* S.F. Blake.** Subshrub. Infrequent. Silty flats in California Valley. *Wolf 10583.*

***Ambrosia dumosa* (A. Gray) W.W. Payne.** Subshrub. Abundant. Bajadas, canyons, and slopes in creosote bush shrubland. *Mills, Fraga, Madsen-McQueen, & House 28.*

***Ambrosia salsola* (Torr. & A. Gray) Strother & B.G. Baldwin var. *salsola*.** Shrub. Abundant. Bajadas, canyons, and washes in creosote bush and mixed desert shrublands. *Mills, Fraga, Boes, & Cunningham 91.*

***Amphipappus fremontii* Torr. & A. Gray var. *fremontii*.** Subshrub. Occasional. Canyons and gravelly slopes in creosote bush and mixed desert shrublands. *Mills, Fraga, Boes, & Cunningham 96.*

***Artemisia ludoviciana* Nutt. subsp. *albula* (Wooton) D.D. Keck.** Shrub. Occasional. Mid-elevation canyons in mixed desert and sagebrush shrublands. *Mills & Varnava 959.*

***Artemisia nova* A. Nelson.** Shrub. Locally abundant. Gravelly slopes and north-facing rocky exposures in sagebrush shrubland. *Mills & Varnava 969.*

***Atrichoseris platyphylla* (A. Gray) A. Gray.** Annual herb. Occasional. Bajadas and low-elevation canyons in creosote bush shrubland. *Mills & Figueroa 552.*

***Baccharis salicina* Torr. & A. Gray.** Shrub. Rare. Scofield Spring, Tule Spring, and Twelvemile Spring. *Mills 975.*

***Baccharis salicifolia* (Ruiz & Pav.) Pers.** Shrub. Rare. *DeGroot 8590.*

***Bahiopsis reticulata* (S. Watson) E.E. Schill. & Panero.** Shrub. Frequent. Bajadas, canyons, and wash bottoms in creosote bush and mixed desert shrublands. *Mills 845.*

***Baileya multiradiata* Harv. & A. Gray ex Torr.** Perennial herb. Rare. Road shoulder along Old Spanish Trail Highway (possibly seeded). *Mills 817.*

***Bebbia juncea* (Benth.) Greene var. *aspera* Greene.** Shrub. Frequent. Canyons and washes in creosote bush and mixed desert shrublands. *Mills 675.*

***Brickellia atractyloides* A. Gray var. *arguta* (B.L. Rob.) Jeps.** Shrub. Infrequent. Rock crevices and rocky slopes. *Wolf 10588.*

***Brickellia atractyloides* A. Gray var. *atractyloides*.** Shrub. Occasional. Mid-elevation canyons and rock outcrops in mixed desert shrubland. *Mills 881.*

***Brickellia desertorum* Coville.** Shrub. Occasional. Rocky canyons in creosote bush shrubland. *DeGroot & Darney-Lane 9096.*

***Brickellia knappiana* Drew.** Shrub. Infrequent. Rocky canyons in creosote bush shrubland. *DeGroot & Deal 9435.*

***Brickellia longifolia* S. Watson var. *longifolia*.** Shrub. Occasional. Bajadas, canyons, and wash bottoms in creosote bush and mixed desert shrublands. *Mills 701.*

***Brickellia longifolia* S. Watson var. *multiflora* (Kellogg) Cronquist.** Shrub. Occasional. Bajadas, canyons, and wash bottoms in creosote bush and mixed desert shrublands. *Mills & Varnava 956.*

***Brickellia microphylla* (Nutt.) A. Gray.** Shrub. Infrequent. Mid-elevation canyons in mixed desert shrubland. *Mills & Varnava 970.*

***Calycoseris parryi* A. Gray.** Annual herb. Infrequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills & Fraga 623.*

***Calycoseris wrightii* A. Gray.** Annual herb. Occasional. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills & Fraga 1105.*

***Chaenactis carphoclinia* A. Gray var. *carphoclinia*.** Annual herb. Frequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills & Figueroa 526.*

***Chaenactis fremontii* A. Gray.** Annual herb. Frequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills & Jesus 123.*

***Chaenactis macrantha* D.C. Eaton.** Annual herb. Occasional. Bajadas and gravelly flats in creosote bush and mixed desert shrublands. *Mills & Figueroa 519.*

***Chaenactis stevioides* Hook. & Arn.** Annual herb. Infrequent. Playa in Pahrump Valley. *DeGroot 8680.*

***Cirsium neomexicanum* A. Gray.** Perennial herb. Occasional. Rocky canyons in creosote bush and mixed desert shrublands. *Mills & Fraga 1110.*

***Encelia farinosa* A. Gray ex Torr.** Shrub. Abundant. Bajadas, canyons, slopes, and washes in creosote bush shrubland. *Mills, Fraga, & Jesus 107.*

***Encelia farinosa x frutescens*.** Shrub. Rare. Bajada in creosote bush shrubland. *Mills 682.*

***Encelia frutescens* (A. Gray) A. Gray.** Shrub. Occasional. Bajadas, canyons, and washes in creosote bush shrubland. *Mills & Fraga 56.*

***Encelia frutescens x virginensis*.** Shrub. Rare. Rocky slopes in creosote bush shrubland. *DeGroot 8641.*

***Encelia virginensis* A. Nelson.** Shrub. Occasional. Bajadas, canyons, and washes in creosote bush shrubland. *Mills & Zweifler 455.*

***Ericameria linearifolia* (DC.) Urbatsch & Wussow.** Shrub. Occasional. Mid-elevation canyons in mixed desert shrubland. *Mills & Fraga 1082.*

***Ericameria nauseosa* (Pursh) G.L. Nesom & G.I. Baird var. *hololeuca* (A. Gray) G.L. Nesom & G.I. Baird.** Shrub. Frequent. Mid-elevation canyons and slopes in mixed desert and sagebrush shrublands. *Mills & Varnava 962.*

***Ericameria paniculata* (A. Gray) Rydb.** Shrub. Occasional. Canyons and wash bottoms in creosote bush and mixed desert shrublands. *Mills 778.*

***Ericameria teretifolia* (Durand & Hilg.) Jeps.** Shrub. Infrequent. Mid-elevation carbonate ridgelines in mixed desert shrubland. *Mills & Lencioni 4.*

***Erigeron concinnus* (Hook. & Arn.) Torr. & A. Gray var. *concinnus*.** Perennial herb. Infrequent. Mid-elevation slopes in mixed desert and sagebrush shrublands. *Mills 914.*

***Eriophyllum ambiguum* (A. Gray) A. Gray var. *paleaceum* (Brandegee) Ferris.** Annual herb. Occasional. Bajadas and gravelly flats in creosote bush shrubland. *Mills 678.*

***Eriophyllum wallacei* (A. Gray) A. Gray.** Annual herb. Infrequent. Desert pavement in creosote bush shrubland. *Mills, Zweifler, Palmese, & Bohr 392.*

***Geraea canescens* Torr. & A. Gray.** Annual herb. Occasional. Bajadas and gravelly flats in creosote bush shrubland, particularly in the South Nopah Range Wilderness. *Mills & Fraga 42.*

***Glyptopleura setulosa* A. Gray.** Annual herb. Infrequent. Silty flats in California Valley. *Wolf 10558.*

***Gutierrezia microcephala* (DC.) A. Gray.** Subshrub. Frequent. Canyons, slopes, and washes in mixed desert shrubland. *Mills, Fraga, Vanderplank, & Tremor 11.*

***Gutierrezia sarothrae* (Pursh) Britton & Rusby.** Subshrub. Infrequent. Gravelly slopes in mixed desert and sagebrush shrublands. *Mills & Varnava 968.*

***Hazardia brickellioides* (S.F. Blake) W.D. Clark.** Subshrub. Occasional. Carbonate rock crevices in canyons in creosote bush and mixed desert shrublands. *Mills 943.*

***Helianthus annuus* L.** Annual herb. Infrequent. Playa in Pahrump Valley. *Rockwood & Gabriel 46.*

***Isocoma acradenia* (Greene) Greene var. *acradenia*.** Shrub. Infrequent. Tule Spring and Twelvemile Spring. *Mills & Fraga 978.*

***Isocoma acradenia* (Greene) Greene var. *eremophila* (Greene) G.L. Nesom.** Shrub. Infrequent. Bajadas and rocky slopes near Tule Spring. *DeGroot & Sevilla 7335.*

***Layia glandulosa* (Hook.) Hook. & Arn.** Annual herb. Rare. Collected only once on the ridgeline southeast of Emigrant Peak. *Mills, Fraga, & Donnelly 603.*

***Leocosyris carnosa* (A. Gray) Greene.** Perennial herb. Infrequent. Silty flats near Twelvemile Spring in Chicago Valley. *DeGroot & Rivera 9019.*

***Logfia filaginoides* (Hook. & Arn.) Morefield.** Annual herb. Infrequent. Rocky washes. *DeGroot & Darney-Lane 8314.*

***Malacothrix glabrata* (D.C. Eaton) A. Gray.** Annual herb. Frequent. Bajadas, canyon bottoms, gravelly slopes, and washes in creosote bush shrubland. *Mills & Zweifler 445.*

***Monoptilon bellioides* (A. Gray) H.M. Hall.** Annual herb. Frequent. Bajadas, canyon bottoms, gravelly slopes, and washes in creosote bush shrubland. *Mills & Zweifler 447.*

***Perityle emoryi* Torr.** Annual herb. Infrequent. Gravelly wash bottoms in creosote bush shrubland. *Mills 829.*

***Peucephyllum schottii* A. Gray.** Shrub. Occasional. Low-elevation canyons and washes in creosote bush shrubland. *Mills & Stan 155.*

***Pleurocoronis pluriseta* (A. Gray) R.M. King & H. Rob.** Subshrub. Occasional. Rocky canyons in creosote bush and mixed desert shrublands. *Mills & Stan 158.*

***Prenanthella exigua* (A. Gray) Rydb.** Annual herb. Occasional. Bajadas, gravelly flats, and gentle slopes in creosote bush shrubland. *Mills 643.*

***Psathyrotes annua* (Nutt.) A. Gray.** Annual herb. Infrequent. Silty alkaline flats in California Valley. *Wolf 10560.*

***Psathyrotes ramosissima* (Torr.) A. Gray.** Annual herb. Occasional. Alkaline soils near springs. *Mills 645.*

***Rafinesquia californica* Nutt.** Annual herb. Infrequent. Gravelly canyon bottoms in creosote bush shrubland. *Mills 806.*

***Rafinesquia neomexicana* A. Gray.** Annual herb. Occasional. Bajadas, gravelly slopes, and washes in creosote bush shrubland. *Mills & Jesus 174.*

***Senecio flaccidus* Less. var. *monoensis* (Greene) B.L. Turner & T.M. Barkley.** Subshrub. Occasional. Bajadas and gravelly washes in creosote bush and mixed desert shrublands. *Mills & Compo 386.*

***Senecio mohavensis* A. Gray.** Annual herb. Occasional. Bajadas and gravelly washes in creosote bush shrubland. *Mills, Fraga, & Pipkin 232.*

***Solidago confinis* A. Gray.** Shrub. Rare. Twelvemile Spring. *DeGroot & Rivera 9162.*

***Stephanomeria pauciflora* (Torr.) A. Nelson.** Perennial herb. Occasional. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills 830.*

***Stylocline intertexta* Morefield.** Annual herb. Occasional. Bajadas, gravelly slopes, and washes in creosote bush shrubland. *Mills, Fraga, & Pipkin 217.*

***Stylocline micropoides* A. Gray.** Annual herb. Occasional. Bajadas, gravelly slopes, and washes in creosote bush shrubland. *Mills & Figueroa 498.*

†***Tetradymia argyraea* Munz & J.C. Roos.** Shrub. Rare. South of Nopah Point in mixed desert shrubland, along the western crest of the Nopah Range. *Mills & Varnava 1175.*

***Tetradymia axillaris* A. Nelson var. *longispina* (M.E. Jones) Strother.** Shrub. Infrequent. Canyons, ridges, and slopes in mixed desert shrubland. *Mills 754.*

***Thymophylla pentachaeta* (DC.) Small var. *belenidium* (DC.) Strother.** Perennial herb. Infrequent. Scattered along the Nopah Range crest in mixed desert shrublands. *Mills & Fraga 1088.*

***Uropappus lindleyi* (DC.) Nutt.** Annual herb. Infrequent. Gravelly washes in creosote bush shrubland. *Mills, Fraga, & Pipkin 240.*

***Xylorhiza tortifolia* (Torr. & A. Gray) Greene var. *tortifolia*.** Subshrub. Frequent. Bajadas, canyons, slopes, and washes in creosote bush and mixed desert shrublands. *Mills & Jesus 122.*

BORAGINACEAE

***Amsinckia menziesii* (Lehm.) A. Nelson & J.F. Macbr.** Annual herb. Rare. Twelvemile Spring. *DeGroot, Betz, Holguin, & Steppe 8587.*

***Amsinckia tessellata* A. Gray var. *tessellata*.** Annual herb. Frequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills & Compo 377.*

***Cryptantha barbigera* (A. Gray) Greene var. *barbigera*.** Annual herb. Frequent. Bajadas, canyons, ridges, rock outcrops, and washes in creosote bush and mixed desert shrublands. *Mills & Figueroa 505.*

***Cryptantha cycloptera* (Greene) Greene.** Annual herb. Frequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush and mixed desert shrublands. *Mills, Fraga, & Pipkin 231.*

***Cryptantha decipiens* (M.E. Jones) A. Heller.** Annual herb. Occasional. Gravelly canyon and wash bottoms in creosote bush and mixed desert shrublands. *Mills & Figueroa 504.*

***Cryptantha gracilis* Osterh.** Annual herb. Infrequent. Rocky flats and slopes in mixed desert and sagebrush shrublands. *Mills 928.*

***Cryptantha maritima* (Greene) Greene var. *pilosa* I.M.Johnston.** Annual herb. Frequent. Ridges, rock outcrops, and washes in creosote bush shrubland. *Mills, Fraga, & Pipkin 247.*

***Cryptantha nevadensis* A. Nelson & P.B. Kenn.** Annual herb. Frequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills, Fraga, & Pipkin 213.*

***Cryptantha recurvata* Coville.** Annual herb. Infrequent. Silty alkaline flats at Twelvemile Spring. *DeGroot, Betz, Holguin, & Steppe 8561.*

***Cryptantha utahensis* (A. Gray) Greene.** Annual herb. Occasional. Canyons and carbonate rock outcrops in creosote bush and mixed desert shrublands. *Mills 794.*

***Greeneocharis circumscissa* (Hook. & Arn.) Rydb. var. *circumscissa*.** Annual herb. Occasional. Gravelly washes in creosote bush shrubland. *Mills 220.*

***Johnstonella angustifolia* (Torrey) Hasenstab & M.G. Simpson.** Annual herb. Frequent. Bajadas and canyons in creosote bush shrubland. *Mills & Figueroa 544.*

***Johnstonella racemosa* (A. Gray) Brand.** Perennial herb. Frequent. Carbonate canyon bottoms in creosote bush or mixed desert shrublands, often in shaded areas beneath large boulders. *Mills 712.*

***Lappula redowskii* (Hornem.) Greene var. *cupulata* (A. Gray) M.E. Jones.** Annual herb. Infrequent. Rocky slopes in sagebrush shrubland. *Mills 933.*

***Oreocarya confertiflora* Greene.** Perennial herb. Occasional. Canyons, ridges, and slopes in mixed desert shrubland. *Mills, Fraga, & Pipkin 272.*

***Oreocarya virginensis* (M.E. Jones) J.F. Macbr.** Perennial herb. Infrequent. Rocky carbonate ridges and slopes in mixed desert shrubland. *Mills & Varnava 1146.*

***Pectocarya heterocarpa* (I.M. Johnst.) I.M. Johnst.** Annual herb. Infrequent. Bajadas, desert pavement, and washes in creosote bush shrubland. *Mills, Zweifler, Palmese, & Bohr 396.*

***Pectocarya platycarpa* (Munz & I. M. Johnston) Munz & I. M. Johnston.** Annual herb. Frequent. Bajadas and washes in creosote bush shrubland. *Mills & Figueroa 531.*

***Pectocarya recurvata* I.M. Johnston.** Annual herb. Frequent. Bajadas, canyons, and washes in creosote bush shrubland. *Mills & Compo 342.*

***Pectocarya setosa* A. Gray.** Annual herb. Infrequent. Gravelly slopes in mixed desert shrubland. *Mills & Fraga 1078.*

***Plagiobothrys arizonicus* (A. Gray) A. Gray.** Annual herb. Infrequent. Bajadas and washes in mixed desert shrubland. *Mills & Figueroa 515.*

***Simpsonanthus jonesii* (A.Gray) Guilliams, Hasenstab & B.G. Baldwin.** Annual herb. Frequent. Canyons, gravelly slopes, and washes in creosote bush and mixed desert shrublands. *Mills & Zweifler 458.*

BRASSICACEAE

†***Boechera lincolnensis* Windham & Al-Shehbaz.** Perennial herb. Rare. Collected once beneath a *Juniperus osteosperma* along the crest of the Nopah Range. *Mills & Fraga 1092.*

***Boechera perennans* (S. Watson) W.A. Weber.** Perennial herb. Infrequent. Crevices in carbonate rocks and rock outcrops in mixed desert shrubland. *Mills & Lencioni 1006.*

***Boechera xylopoda* Windham & Al-Shehbaz.** Perennial herb. Occasional. Carbonate canyons, ridgelines, and slopes in mixed desert shrubland. *Mills & Lencioni 1022.*

****Brassica tournefortii* Gouan.** Annual herb. Locally frequent. Bajadas and gentle slopes in disturbed areas in creosote bush shrubland, particularly along roadsides. *Mills & Fraga 62.*

***Caulanthus cooperi* (S. Watson) Payson.** Annual herb. Infrequent. Low-elevation canyons and slopes in creosote bush shrubland. *Mills, Fraga, & Pipkin 274.*

***Caulanthus lasiophyllus* (Hook. & Arn.) Payson.** Annual herb. Frequent. Bajadas, canyons, and wash bottoms in creosote bush shrubland, often at the bases of shrubs. *Mills & Fraga 294.*

***Descurainia pinnata* (Walter) Britton subsp. *brachycarpa* (Richardson) Detling.** Annual herb. Infrequent. Disturbed areas in creosote bush shrubland. *Mills & Fraga 614.*

***Descurainia pinnata* (Walter) Britton subsp. *glabra* (Wooton & Standl.) Detling.** Annual herb. Occasional. Disturbed areas and canyons in creosote bush shrubland. *Mills & Fraga 295.*

***Draba cuneifolia* Nutt. ex Torr. & A. Gray.** Annual herb. Frequent. Rock crevices in carbonate canyons and carbonate rock outcrops in mixed shrubland. *Mills & Jesus 179.*

***Lepidium flavum* Torr.** Annual herb. Infrequent. Alkaline soils in Chicago Valley and Pahrump Valley. *DeGroot, Betz, Holguin, & Steppe 8559.*

***Lepidium fremontii* S. Watson.** Subshrub. Occasional. Canyons, gravelly slopes, and washes in creosote bush and mixed desert shrublands. *Mills & Jesus 193.*

***Lepidium lasiocarpum* Nutt. subsp. *lasiocarpum*.** Annual herb. Frequent. Bajadas, canyon bottom, desert pavement, gravelly flats, and slopes in creosote bush shrubland. *Mills, Lencioni, & Stan 147.*

****Sisymbrium irio* L.** Annual herb. Infrequent. Disturbed areas, primarily near mines in the South Nopah Range Wilderness. *Mills, Fraga, & Boes 80.*

****Sisymbrium orientale* L.** Annual herb. Infrequent. Disturbed areas, primarily near roadsides in Pahrump Valley. *Mills 816.*

***Stanleya pinnata* (Pursh) Britton var. *pinnata*.** Perennial herb. Occasional. Fine alkaline soils near springs and gravelly slopes in creosote bush shrubland. *Mills & Fraga 1102.*

****Strigosella africana* (L.) Botsch.** Annual herb. Infrequent. Disturbed areas, primarily along roadsides. *Mills & Figueroa 572.*

***Thelypodium integrifolium* (Nutt.) Endl. ex Walp. Subsp. *affine* (Greene) Al-Shehbaz.** Perennial herb. Infrequent. Silty alkaline flats near Twelvemile Spring. *DeGroot & Rivera 9160.*

***Thysanocarpus curvipes* Hook. subsp. *amplectans* (Greene) P.J. Alexander & Windham.** Annual herb. Occasional. Canyons, carbonate rock outcrops, ridges, slopes, and washes in creosote bush and mixed desert shrublands. *Mills & Lencioni 1010.*

***Thysanocarpus curvipes* Hook. subsp. *eradiatus* (Jeps.) P.J. Alexander & Windham.** Annual herb. Occasional. Canyons, carbonate rock outcrops, ridges, slopes, and washes in creosote bush and mixed desert shrublands. *Mills & Fraga 1049.*

***Thysanocarpus curvipes* Hook. [intermediate between subsp. *amplectans & eradiatus*].** Annual herb. Occasional. Canyons, carbonate rock outcrops, ridges, slopes, and washes in creosote bush and mixed desert shrublands. *Mills & Figueroa 482.*

CACTACEAE

***Cylindropuntia echinocarpa* (Engelm. & J.M. Bigelow) F.M. Knuth.** Shrub (succulent). Occasional. Bajadas and gravelly slopes in creosote bush shrubland. *Mills 644.*

***Cylindropuntia ramosissima* (Engelm.) F.M. Knuth.** Shrub (succulent). Infrequent. Bajadas and slopes in creosote bush shrubland near Emigrant Pass. *Mills & Varnava 1156.*

***Echinocactus polycephalus* Engelm. & J.M. Bigelow var. *polycephalus*.** Shrub (succulent). Frequent. Bajadas, carbonate rock outcrops, and gravelly slopes in creosote bush and mixed desert shrubland. *Mills & Varnava 1134.*

***Echinocereus engelmannii* (Parry ex Engelm.) Lem.** Shrub (succulent). Frequent. Gravelly slopes and rock outcrops in creosote bush and mixed desert shrublands. *Mills & Fraga 1046.*

***Echinocereus mojavensis* (Engelm. & J.M. Bigelow) Rümpler.** Shrub (succulent). Infrequent. Saddles and slopes at mid-elevations in mixed desert and sagebrush shrublands. *Mills & Lencioni 1017.*

***Ferocactus cylindraceus* (Engelm.) Orcutt.** Shrub (succulent). Frequent. Bajadas, carbonate rock outcrops, and gravelly slopes in creosote bush and mixed desert shrublands. *Mills 833.*

***Mammillaria tetrancistra* Engelm.** Shrub (succulent). Infrequent. Bajadas, gravelly slopes, and ridges in mixed desert shrubland. *Mills 861.*

***Opuntia basilaris* Engelm. & J.M. Bigelow var. *basilaris*.** Shrub (succulent). Frequent. Bajadas, canyons, and gravelly slopes in creosote bush, mixed desert, and sagebrush shrublands. *Mills & Fraga 1060.*

†***Sclerocactus johnsonii* (Parry ex Engelm.) N.P. Taylor.** Shrub (succulent). Locally frequent. Carbonate rock outcrops and gravelly slopes in mixed desert shrublands. *Mills & Varnava 1141.*

CAMPANULACEAE

***Nemacladus orientalis* (McVaugh) Morin.** Annual herb. Occasional. Bajadas and wash bottoms in creosote bush shrubland. *Mills & Figueroa 530.*

CAPRIFOLIACEAE

***Symphoricarpos longiflorus* A. Gray.** Shrub. Occasional. Mid-elevation canyons and rock outcrops in mixed desert shrubland. *Mills & Fraga 1062.*

CARYOPHYLLACEAE

***Eremogone macradenia* (S. Watson) Ikonn. var. *macradenia*.** Perennial herb. Frequent. Carbonate canyons, ridges, and gravelly slopes in creosote bush and mixed desert shrubland. *Mills, Fraga, & Pipkin 271.*

CELASTRACEAE

†***Mortonia utahensis* (Trel.) A. Nelson.** Shrub. Locally frequent. Carbonate canyons, outcrops, and rocky slopes in creosote bush and mixed desert shrublands. *Mills & Figueroa 486.*

CONVOLVULACEAE

***Cuscuta californica* Hook. & Arn. var. *californica*.** Perennial herb (parasitic). Occasional. Growing on herbs and shrubs in creosote bush shrubland. *Mills & Varnava 1125.*

CRASSULACEAE

***Dudleya arizonica* Rose.** Perennial herb (succulent). Rare. Carbonate cliff faces. *Mills 856.*

CROSSOMATACEAE

***Glossopetalon spinescens* A. Gray var. *aridum* M.E. Jones.** Shrub. Occasional. Carbonate rock outcrops and ridges in mixed desert and sagebrush shrublands. *Mills & Varnava 1176.*

EUPHORBIACEAE

***Euphorbia albomarginata* Torr. & A. Gray.** Annual herb. Infrequent. Washes in creosote bush shrubland. *Keil & Kelly 20539.*

***Euphorbia micromera* Boiss.** Annual herb. Occasional. Bajadas and washes in creosote bush shrubland. *Mills, Fraga, Boes, & Cunningham 88.*

***Euphorbia parishii* Greene.** Perennial herb. Occasional. Bajadas and sandy washes in creosote bush shrubland. *Mills 949.*

FABACEAE

***Acmispon brachycarpus* (Benth.) D.D. Sokoloff.** Annual herb. Infequent. Rocky slopes in creosote bush shrubland. *DeGroot 8640.*

***Acmispon maritimus* (Nutt.) D.D. Sokoloff var. *brevivexillus* (Ottley) Brouillet.** Annual herb. Infrequent. Bajadas and washes in creosote bush shrubland. *Mills & Zweifler 452.*

***Acmispon strigosus* (Nutt.) Brouillet.** Annual herb. Occasional. Bajadas and gravelly slopes in creosote bush shrubland. *Mills & Zweifler 441.*

***Astragalus acutirostris* S. Watson.** Annual herb. Rare. Collected only once on a rocky ridge near Shaw Mine. *Mills & Zweifler 471.*

***Astragalus coccineus* Brandegee.** Perennial herb. Infrequent. Among carbonate rocks in mixed desert and sagebrush shrubland. *Mills & Fraga 1067.*

***Astragalus didymocarpus* Hook. & Arn. var. *dispermus* (A. Gray) Jeps.** Annual herb. Infrequent. Bajadas in creosote bush shrubland. *DeGroot 8670.*

***Astragalus layneae* Greene.** Perennial herb. Infrequent. Rocky, silty flats in California Valley. *Wolf 10581.*

***Astragalus mohavensis* S. Watson var. *mohavensis*.** Perennial herb. Occasional. Among carbonate rocks in mixed desert shrubland. *Mills & Fraga 1061.*

***Astragalus newberryi* A. Gray var. *newberryi*.** Perennial herb. Rare. Collected only once in a canyon near Nopah Point. *Mills 898.*

***Astragalus nuttallianus* DC. var. *imperfectus* (Rydb.) Barneby.** Annual herb. Infrequent. Bajadas, canyons, and ridges in creosote bush and mixed desert shrublands. *Mills & Figueroa 493.*

***Astragalus panamintensis* E. Sheld.** Perennial herb. Occasional. Carbonate canyons and rocky areas. *Mills, Fraga, & Pipkin 279.*

***Astragalus purshii* Douglas var. *tinctus* M.E. Jones.** Perennial herb. Rare. Mid-elevation carbonate canyons and rocky areas. *Mills 768.*

†***Astragalus tidestromii* (Rydb.) Clokey.** Perennial herb. Rare. Desert pavement and gravelly areas in creosote bush shrubland near Emigrant Pass. *Mills & Figueroa 520.*

***Dalea mollissima* (Rydb.) Munz.** Perennial herb. Ocasional. Gravelly flats, often in disturbed areas below 2,500 ft. *Mills, Fraga, & Pipkin 227.*

***Hoffmannseggia glauca* (Ortega) Eifert.** Perennial herb. Infrequent. Playa in Pahrump Valley. *Mills Varnava 1162.*

***Lupinus concinnus* J. Agardh.** Annual herb. Occasional. Bajadas and gentle slopes in creosote bush shrubland. *Mills & Zweifler 456.*

***Prosopis glandulosa* Torr. var. *torreyana* (L.D. Benson) M.C. Johnst.** Tree. Locally abundant. Mesquite bosques in California Valley and Chicago Valley, and scattered individuals in Pahrump Valley. *Mills 951.*

***Prosopis pubescens* Benth.** Tree. Rare. Margin of playa in Pahrump Valley, and Twelvemile Spring. *DeGroot & Rivera 9014.*

***Psorothamnus arborescens* (A. Gray) Barneby var. *minutifolius* (Parish) Barneby.** Shrub. Occasional. Bajadas, gravelly flats, and washes in creosote bush shrubland. *Mills 662.*

***Senna armata* (S. Watson) H.S. Irwin & Barneby.** Shrub. Infrequent. Low elevations in California Valley. *Mills 818.*

GERANIACEAE

****Erodium cicutarium* (L.) Aiton.** Annual herb. Frequent. Bajadas, canyons, slopes, and washes. *Mills, Fraga, & Boes 67.*

***Erodium texanum* A. Gray.** Annual herb. Infrequent. Bajadas and gentle slopes in creosote bush shrubland, particularly in the South Nopah Range Wilderness. *Mills & Jesus 178.*

HELIOTROPIACEAE

***Heliotropium curassavicum* L. var. *oculatum* (A. Heller) I.M. Johnst. ex Tidestr.** Perennial herb. Rare. Tule Spring & Twelvemile Spring. *Mills & Varnava 1170.*

HYDRANGEACEAE

†***Fendlerella utahensis*** **(S. Watson) A. Heller.** Subshrub. Infrequent. Mid-elevation carbonate canyons and rock outcrops in mixed desert shrubland. *Mills 907.*

HYDROPHYLLACEAE

Emmenanthe penduliflora **Benth.** Annual herb. Occasional. Low-elevation canyons and rock outcrops in creosote bush and mixed desert shrublands. *Mills & Fraga 332.*

Eucrypta chrysanthemifolia **(Benth.) Greene var.** ***bipinnatifida*** **(Torr.) Constance.** Annual herb. Occasional. Sheltered rock crevices in canyons. *Mills & Stan 157.*

Eucrypta micrantha **(Torr.) A. Heller.** Annual herb. Occasional. Sheltered rock crevices in canyons. *Mills & Jesus 196.*

Phacelia affinis **A. Gray.** Annual herb. Occasional. Canyons, gravelly slopes, and washes. *Mills & Fraga 1108.*

Phacelia crenulata **Torr. ex S. Watson var.** ***ambigua*** **(M.E. Jones) J.F. Macbr.** Annual herb. Occasional. Bajadas, canyon bottoms, gravelly slopes, and washes in creosote bush and mixed desert shrublands. *Mills & Jesus 176.*

Phacelia crenulata **Torr. ex S. Watson var.** ***crenulata*****.** Annual herb. Frequent. Bajadas, canyon bottoms, gravelly slopes, and washes in creosote bush and mixed desert shrublands. *Mills & Figueroa 560.*

Phacelia cryptantha **Greene.** Annual herb. Occasional. Cliff faces and rocky slopes in mixed desert shrubland. *Mills 785.*

Phacelia distans **Benth.** Annual herb. Infrequent. Bajadas in creosote bush and mixed desert shrubland. *Mills 145.*

Phacelia fremontii **Torr.** Annual herb. Frequent. Bajadas, gentle slopes, and washes in creosote bush shrubland. *Mills, Fraga, & Pipkin 287.*

***Phacelia ivesiana* Torr.** Annual herb. Rare. Collected only once on a rocky slope in creosote bush shrubland. *Mills, Zweifler, Palmese, & Bohr 409.*

***Phacelia neglecta* M.E. Jones.** Annual herb. Occasional. Bajadas in creosote bush shrubland. *Mills & Figueroa 529.*

†***Phacelia parishii* A. Gray.** Annual herb. Rare. Playa in Pahrump Valley. *Sanders, Scott, Clark, Utter, & Laeger 39449.*

***Phacelia pedicellata* A. Gray.** Annual herb. Occasional. Bajadas and gravelly washes in creosote bush shrubland. *Mills & Fraga 45.*

***Phacelia perityloides* Coville var. *perityloides*.** Perennial herb. Occasional. Carbonate rock faces in canyons in mixed desert shrubland. *Mills 784.*

***Phacelia rotundifolia* Torr. ex S. Watson.** Annual herb. Frequent. Canyons, rocky slopes, and washes in creosote bush and mixed desert shrublands. *Mills 901.*

***Phacelia vallis-mortae* J.W. Voss.** Annual herb. Occasional. Bajadas and rocky washes in creosote bush shrubland. *Mills 666.*

***Pholistoma membranaceum* (Benth.) Constance.** Annual herb. Occasional. Bajadas, canyons, and washes in creosote bush and mixed desert shrublands. *Mills & Jesus 169.*

***Tricardia watsonii* S. Watson.** Perennial herb (geophytic). Occasional. Canyons and rocky slopes, often sheltered at the base of rock outcrops. *Mills, Fraga, & Pipkin 267.*

KRAMERIACEAE

***Krameria erecta* Schult.** Shrub. Occasional. Rocky ridges, slopes, and washes in mixed desert shrubland. *Mills & Varnava 1124.*

LAMIACEAE

†***Hedeoma nana*** **(Torr.) Briq. var.** ***californica*** **W.S. Stewart.** Perennial herb. Occasional. Carbonate canyons and rocky outcrops in mixed desert and sagebrush shrubland. *Mills 938.*

Salvia columbariae **Benth.** Annual herb. Frequent. Bajadas, canyons, and washes in creosote bush and mixed desert shrubland. *Mills & Jesus 186.*

Salvia dorrii **(Kellogg) Abrams var.** ***dorrii*****.** Shrub. Infrequent. Rocky slopes in mixed desert shrubland. *Mills, Zweifler, Palmese, & Bohr 425.*

†***Salvia funerea*** **M.E. Jones.** Shrub. Occasional. Carbonate canyons in mixed desert shrubland. *Mills & Schaffner 983.*

Salvia mohavensis **Greene.** Shrub. Occasional. Mid-elevation canyons and gravelly slopes in mixed desert shrubland. *Mills 882.*

Scutellaria mexicana **(Torr.) A.J. Paton.** Shrub. Occasional. Mid-elevation canyons and gravelly slopes in creosote bush and mixed desert shrublands. *Mills 708.*

LOASACEAE

Eucnide urens **(A. Gray) Parry.** Perennial herb. Occasional. Rock crevices and washes. *Mills & Varnava 1131.*

Mentzelia albicaulis **(Douglas ex Hook.) Douglas ex Torr. & A. Gray.** Annual herb. Occasional. Bajadas and washes in creosote bush shrubland. *Mills & Compo 355.*

Mentzelia involucrata **S. Watson.** Annual herb. Rare. Collected once from a rocky slope in creosote bush shrubland. *DeGroot 8659.*

Mentzelia nitens **Greene.** Annual herb. Occasional. Bajadas, rocky slopes, and washes in creosote bush, mixed desert, and sagebrush shrublands. *Mills & Figueroa 501.*

Mentzelia obscura **H.J. Thomps. & J.E. Roberts.** Annual herb. Infrequent. Bajadas in creosote bush shrubland. *Mills & Figueroa 491.*

***Mentzelia oreophila* J. Darl.** Perennial herb. Occasional. Carbonate canyons, rocky ridgelines, and slopes. *Mills & Varnava 1133.*

†*Mentzelia pterosperma* Eastw. Biennial? Rare. Collected once from the playa in Pahrump Valley. *Sanders, Scott, Clark, Utter, & Laeger 39451.*

MALVACEAE

***Eremalche exilis* (A. Gray) Greene.** Annual herb. Rare. Margin of playa in Pahrump Valley. *DeGroot 8683.*

***Eremalche rotundifolia* (A. Gray) Greene.** Annual herb. Occasional. Bajadas and washes in creosote bush shrubland. *Mills, Fraga, & Pipkin 234.*

***Malvella leprosa* (Ortega) Krapov.** Perennial herb. Rare. Margin of playa in Pahrump Valley. *Sanders, Scott, Clark, Utter, & Laeger 39455.*

***Sphaeralcea ambigua* A. Gray var. *ambigua*.** Perennial herb. Frequent. Canyons, rock outcrops, slopes, and washes in creosote bush and mixed desert shrublands. *Mills, Fraga, & Pipkin 285.*

***Sphaeralcea ambigua* A. Gray var. *rosacea* (Munz & I.M. Johnst.) Kearney.** Perennial herb. Rare. Collected once near Emigrant Pass. *DeDecker 4587.*

***Sphaeralcea angustifolia* (Cav.) G. Don.** Perennial herb. Rare. Collected once from an alkaline wash in Chicago Valley. *Darney-Lane, DeGroot, & England 80.*

***Sphaeralcea emoryi* Torr. ex A. Gray var. *emoryi*.** Perennial herb. Rare. Collected once in California Valley. *DeDecker 4252.*

†*Sphaeralcea rusbyi* A. Gray var. *eremicola* (Jeps.) Kearney. Perennial herb. Infrequent. Gravelly canyons and washes in mixed desert shrubland. *Mills 897.*

MONTIACEAE

***Claytonia parviflora* Hook. subsp. *utahensis* (Rydb.) John M. Mill. & K.L. Chambers.** Annual herb. Infrequent. Moist soil pockets and rock crevices in creosote bush and mixed desert shrublands. *Mills, Fraga, & Pipkin 269.*

NAMACEAE

***Nama demissa* A. Gray var. *demissa*.** Annual herb. Rare. Collected only once from a wash near Tule Spring in creosote bush shrubland. *Mills 1033.*

***Nama pusilla* A. Gray.** Annual herb. Occasional. Bajadas, desert pavement, and washes in creosote bush shrubland. *Mills & Figueroa 540.*

NYCTAGINACEAE

***Allionia incarnata* L. var. *incarnata*.** Annual herb. Rare. Collected only once from a disused dirt road in Chicago Valley. *Mills & Varnava 1127.*

***Boerhavia coulteri* (Hook. f.) S. Watson var. *palmeri* (S. Watson) Spellenb.** Annual herb. Rare. Collected once from a rocky slope west of Mesquite Valley Road. *DeGroot & Darney-Lane 9094.*

***Mirabilis laevis* (Benth.) Curran var. *retrorsa* (A. Heller) Jeps.** Perennial herb. Occasional. Rocky slopes and washes in creosote bush and mixed desert shrublands. *Mills, Fraga, Boes, & Cunningham 93.*

***Mirabilis laevis* (Benth.) Curran var. *villosa* (Kellogg) Spellenb.** Perennial herb. Occasional. Rocky slopes and washes in creosote bush and mixed desert shrublands. *Mills, Fraga, & Donnelly 594.*

OLEACEAE

***Menodora spinescens* A. Gray var. *spinescens*.** Shrub. Occasional. Desert pavement and rocky slopes in creosote bush shrubland. *Mills, Zweifler, Palmese, & Bohr 387.*

ONAGRACEAE

***Chylismia brevipes* (A. Gray) Small subsp. *brevipes*.** Annual herb. Frequent. Bajadas, gentle slopes, and washes in creosote bush and mixed desert shrublands. *Mills 739.*

***Chylismia claviformis* (Torr. & Frém.) A. Heller subsp. *funerea* (P.H. Raven) W.L. Wagner & Hoch.** Annual herb. Occasional. Bajadas and gentle slopes in creosote bush and mixed desert shrublands. *Mills, Fraga, & Pipkin 212.*

***Chylismia munzii* (P.H. Raven) W.L. Wagner & Hoch.** Annual herb. Frequent. Bajadas, canyons, and desert pavement in creosote bush shrublands. *Mills, Zweifler, Palmese, & Bohr 399.*

***Chylismia walkeri* A. Nelson subsp. *tortilis* (Jeps.) W.L. Wagner & Hoch.** Annual herb. Occasional. Rocky areas near cliffs and rock outcrops above 3,800 ft. *Mills & Varnava 1152.*

***Chylismiella pterosperma* (S. Watson) W.L. Wagner & Hoch.** Annual herb. Infrequent. Gravelly slopes in sagebrush shrubland. *Mills 927.*

***Eremothera boothii* (Douglas) W.L. Wagner & Hoch subsp. *desertorum* (Munz) W.L. Wagner & Hoch.** Annual herb. Occasional. Sandy pockets on bajadas and gentle slopes in creosote bush shrubland. *Mills & Figueroa 527.*

***Eremothera chamaenerioides* (A. Gray) W.L. Wagner & Hoch.** Annual herb. Infrequent. Gravelly slopes in creosote bush shrubland. *Mills, Fraga, & Pipkin 281.*

***Eremothera refracta* (S. Watson) W.L. Wagner & Hoch.** Annual herb. Frequent. Bajadas, gentle slopes, and washes in creosote bush shrubland. *Mills, Fraga, Boes, & Cunningham 89.*

†***Oenothera cespitosa* Nutt. subsp. *crinita* (Rydb.) Munz.** Perennial herb. Occasional. Rocky carbonate slopes in the northern Nopah Range Wilderness. *Mills 843.*

OROBANCHACEAE

***Aphyllon cooperi* A. Gray.** Perennial herb (parasitic). Infrequent. Bajadas and washes in creosote bush shrubland. *Mills, Fraga, & Pipkin 248.*

***Castilleja chromosa* A. Nelson.** Perennial herb (parasitic). Frequent. Canyons, rock outcrops, and rocky slopes in mixed desert shrubland. *Mills & Lencioni 1021.*

PAPAVERACEAE

†***Arctomecon merriamii* Coville.** Perennial herb. Occasional. Carbonate gravel and benches with accumulated soil in mixed desert shrubland. *Mills & Figueroa 575.*

***Eschscholzia glyptosperma* Greene.** Annual herb. Frequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills & Figueroa 553.*

***Eschscholzia minutiflora* S. Watson.** Annual herb. Frequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills & Jesus 184.*

PHRYMACEAE

***Diplacus bigelovii* (A. Gray) G.L. Nesom var. *bigelovii*.** Annual herb. Occasional. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills 828.*

***Erythranthe rubella* (A. Gray) N.S. Fraga.** Annual herb. Rare. Collected only once in the gravelly basin below Nopah Point and Nopah Peak in sagebrush shrubland. *Mills 927.*

PLANTAGINACEAE

***Antirrhinum filipes* A. Gray.** Annual herb. Occasional. Canyons and washes. *Mills, Fraga, & Pipkin 235.*

***Antirrhinum mohavea* D.J. Keil.** Annual herb. Frequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills & Fraga 53.*

†***Penstemon fruticiformis*** **Coville var. *amargosae* (D.D. Keck) N.H. Holmgren.** Perennial herb. Rare. Collected only once in a gravelly wash west of Nopah Peak. *Mills 711.*

Penstemon fruticiformis **Coville var. *fruticiformis*.** Perennial herb. Occasional. Gravelly washes in creosote bush and mixed desert shrublands. *Mills & Fraga 1107.*

†***Penstemon stephensii*** **Brandegee.** Perennial herb. Infrequent. Carbonate rock outcrops, gravelly flats, and slopes in mixed desert shrubland. *Mills & Fraga 1058.*

Plantago ovata **Forssk. Var. *fastigiata* (Morris) S.C. Meyers & A. Liston.** Annual herb. Frequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills & Fraga 43.*

POLEMONIACEAE

Aliciella latifolia **(S. Watson) J.M. Porter subsp. *latifolia*.** Annual herb. Occasional. Bajadas, desert pavement, and gravelly flats in creosote bush shrubland. *Mills & Figueroa 523.*

Eriastrum eremicum **(Jeps.) H. Mason subsp. *eremicum*.** Annual herb. Occasional. Bajadas and gravelly flats in creosote bush shrubland. *Mills 812.*

Gilia cana **(M.E. Jones) A. Heller subsp. *speciformis* A.D. Grant & V.E. Grant.** Annual herb. Frequent. Bajadas, gravelly slopes, and washes in creosote bush shrubland. *Mills & Zweifler 439.*

Gilia cana **(M.E. Jones) A. Heller subsp. *triceps* (Brand) A.D. Grant & V.E. Grant.** Annual herb. Frequent. Bajadas, gravelly slopes, and washes in creosote bush shrubland. *Mills, Lencioni, & Stan 126.*

Gilia clokeyi **H. Mason.** Annual herb. Infrequent. Canyons in creosote bush shrubland. *DeDecker 4581.*

Gilia malior **A.G. Day & V.E. Grant.** Annual herb. Infrequent. Gravelly flats and slopes. *Mills & Zweifler 446.*

Gilia minor **A.D. Grant & V.E. Grant.** Annual herb. Occasional. Bajadas, gravelly slopes, and washes in creosote bush and mixed desert shrubland. *Mills & Zweifler 464.*

***Gilia scopulorum* M.E. Jones.** Annual herb. Frequent. Canyons, rocky slopes, and washes in mixed desert shrubland. *Mills, Fraga, & Pipkin 238.*

***Gilia stellata* A. Heller.** Annual herb. Occasional. Bajadas and washes in creosote bush shrubland. *Mills & Zweifler 451.*

***Gilia transmontana* (H. Mason & A.D. Grant) A.D. Grant & V.E. Grant.** Annual herb. Infrequent. Bajadas, gravelly flats, and rocky slopes in creosote bush shrubland. *DeDecker 4570.*

***Ipomopsis polycladon* (Torr.) V.E. Grant.** Annual herb. Occasional. Bajadas and gravelly washes in creosote bush shrubland. *Mills & Figueroa 518.*

***Langloisia setosissima* (Torr. & A. Gray) Greene subsp. *punctata* (Coville) Timbrook.** Annual herb. Occasional. Bajadas and gravelly slopes in creosote bush shrubland. *Mills & Figueroa 525.*

***Linanthus demissus* (A. Gray) Greene.** Annual herb. Frequent. Bajadas, gravelly flats, and rocky slopes in creosote bush and mixed desert shrublands. *Mills & Compo 337.*

***Linanthus filiformis* (A. Gray) J.M. Porter & L.A. Johnson.** Annual herb. Infrequent. Gravelly washes in mixed desert shrubland. *Mills 896.*

***Linanthus jonesii* (A. Gray) Greene.** Annual herb. Frequent. Bajadas, gravelly flats, and washes in creosote bush shrubland. *Mills & Jesus 166.*

***Linanthus pungens* (Torr.) J.M. Porter & L.A. Johnson.** Subshrub. Occasional. Rocky places in mixed desert and sagebrush shrublands. *Mills & Figueroa 507.*

POLYGONACEAE

***Chorizanthe brevicornu* Torr. var. *brevicornu*.** Annual herb. Frequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills, Fraga, & Boes 65.*

***Chorizanthe rigida* (Torr.) Torr. & A. Gray.** Annual herb. Frequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills 722.*

†***Eriogonum bifurcatum*** **Reveal.** Annual herb. Rare. Collected once from the playa in Pahrump Valley. *Sanders, Scott, Clark, Utter, & Laeger 39444.*

Eriogonum brachypodum **Torr. & A. Gray.** Annual herb. Frequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills & Varnava 1150.*

Eriogonum clavatum **Small.** Annual herb. Occasional. Bajadas and desert pavement. *Mills 719.*

†***Eriogonum contiguum*** **(Reveal) Reveal.** Annual herb. Rare. Alkaline flats in Chicago Valley. *Mills 646.*

Eriogonum deflexum **Torr. var.** ***deflexum*****.** Annual herb. Rare. Collected once in California Valley. *DeDecker 4249.*

Eriogonum fasciculatum **Benth. var.** ***polifolium*** **(Benth.) Torr. & A. Gray.** Shrub. Frequent. Bajadas, canyons, and gravelly slopes. *Mills & Zweifler 460.*

Eriogonum glandulosum **(Nutt.) Benth.** Annual herb, white & pink fls. Infrequent. Gravelly slopes in creosote bush shrubland. *Mills & Varnava 1154.*

Eriogonum heermannii **Durand & Hilg. var.** ***argense*** **(M.E. Jones) Munz.** Shrub, white to red fls. Rare. Collected only once on a ridge south of Emigrant Peak. *Mills & Varnava 1151.*

Eriogonum heermannii **Durand & Hilg. var.** ***sulcatum*** **(S. Watson) Munz & Reveal.** Shrub. Frequent. Carbonate canyons, outcrops, ridges, and slopes in mixed desert shrubland. *Mills & Varnava 960.*

Eriogonum inflatum **Torr. & Frém.** Perennial herb, yellow fls. Frequent. Bajadas, canyons, gravelly slopes, and washes in creosote bush shrubland. *Mills, Fraga, & Pipkin 225.*

Eriogonum maculatum **A. Heller.** Annual herb. Occasional. Rocky slopes in mixed desert and sagebrush shrublands. *Mills & Varnava 1191.*

Eriogonum microtheca **Nutt. var.** ***simpsonii*** **(Benth.) Reveal.** Shrub. Infrequent. Gravelly basin below Nopah Point and Nopah Peak. *Mills & Varnava 961.*

Eriogonum nidularium **Coville.** Annual herb. Occasional. Gravelly washes and slopes in creosote bush and mixed desert shrublands. *Mills 827.*

***Eriogonum palmerianum* Reveal.** Annual herb. Occasional. Rocky slopes in mixed desert shrubland. *Mills 918.*

***Eriogonum reniforme* Torr. & Frém.** Annual herb. Infrequent. Silty alkaline flats. *Wolf 10564.*

***Eriogonum thomasii* Torr.** Annual herb. Occasional. Bajadas and canyons in creosote bush and mixed desert shrublands. *Mills, Fraga, & Donnelly 579.*

***Eriogonum trichopes* Torr.** Annual herb. Occasional. Bajadas and desert pavement in creosote bush shrubland. *Mills 727.*

***Oxytheca perfoliata* Torr. & A. Gray.** Annual herb. Occasional. Bajadas and gravelly slopes in creosote bush shrubland. *Mills & Fraga 1121.*

****Polygonum argyrocoleon* Kunze.** Annual herb. Rare. Collected once from the playa in Pahrump Valley. *Sanders, Scott, Clark, Utter, & Laeger 39456.*

***Pterostegia drymarioides* Fisch. & C.A. Mey.** Annual herb. Frequent. Shaded rock crevices. *Mills & Compo 381.*

RANUNCULACEAE

***Anemone tuberosa* Rydb.** Perennial herb (geophytic). Occasional. Canyons and rocky slopes, often sheltered at the base of rock outcrops. *Mills, Fraga, & Pipkin 266.*

***Delphinium parishii* A. Gray subsp. *parishii*.** Perennial herb (geophytic). Frequent. Bajadas and gravelly slopes in creosote bush, mixed desert, and sagebrush shrublands. *Mills & Figueroa 497.*

***Myosurus cupulatus* S. Watson.** Annual herb. Rare. Collected once from an amphitheater-like canyon. *DeDecker 4557.*

RESEDACEAE

***Oligomeris linifolia* (Vahl ex Hornem.) J.F. Macbr.** Annual herb. Frequent. Bajadas and gravelly slopes in creosote bush shrubland. *Mills & Varnava 1165.*

ROSACEAE

***Cercocarpus ledifolius* Nutt. var. *intricatus* (S. Watson) M.E. Jones.** Shrub. Frequent. Canyons and rocky slopes in mixed desert shrubland. *Mills & Lencioni 1013.*

***Coleogyne ramosissima* Torr.** Shrub. Frequent. On rocky slopes and along the crest of the Nopah Range. *Mills & Fraga 1077.*

***Fallugia paradoxa* (D. Don) Endl. ex Torr.** Shrub. Rare. Rocky canyons and washes in mixed desert shrubland. *Mills 886.*

***Prunus fasciculata* (Torr.) A. Gray var. *fasciculata*.** Shrub. Frequent. Rocky canyons and washes in mixed desert shrubland. *Mills & Compo 379.*

***Purshia stansburyana* (Torr.) Henrickson.** Shrub. Frequent. Rocky canyons and slopes in mixed desert and sagebrush shrubland. *Mills 733.*

RUBIACEAE

***Galium parishii* Hilend & J.T. Howell.** Perennial herb. Infrequent. Canyons and cliff faces in mixed desert shrubland. *Mills 791.*

†***Galium proliferum* A. Gray.** Annual herb. Infrequent. Crevices in carbonate rocks. *Mills 757.*

***Galium stellatum* Kellogg.** Shrub. Frequent. Canyons, gravelly slopes, and carbonate rock outcrops. *Mills, Fraga, & Pipkin 237.*

RUTACEAE

***Thamnosma montana* Torr. & Frém.** Subshrub. Frequent. Canyons, rocky outcrops, and slopes in creosote bush and mixed desert shrublands. *Mills, Fraga, & Boes 78.*

SALICACEAE

***Populus fremontii* S. Watson subsp. *fremontii*.** Tree. Rare. Tule Spring and Twelvemile Spring. *Mills & Varnava 1171.*

***Salix exigua* Nutt.** Tree. Rare. Twelvemile Spring. *McCoy 16230.*

***Salix gooddingii* C.R. Ball.** Tree. Rare. Twelvemile Spring. *DeGroot & Rivera 9013.*

SCROPHULARIACEAE

***Buddleja utahensis* Coville.** Shrub. Occasional. Carbonate canyons and ridgelines in mixed desert shrubland. *Mills &Fraga 1056.*

SOLANACEAE

***Lycium andersonii* A. Gray.** Shrub. Frequent. Bajadas and rocky slopes. *Mills 720.*

***Lycium pallidum* Miers var. *oligospermum* C.L. Hitchc.** Shrub. Occasional. Bajadas and rocky slopes. *Mills & Stan 159.*

***Nicotiana obtusifolia* M. Martens & Galeotti.** Perennial herb. Occasional. Carbonate gravel and at the base of carbonate rock outcrops in creosote bush and mixed desert shrublands. *Mills, Fraga, & Pipkin 284.*

***Physalis crassifolia* Benth.** Perennial herb. Occasional. Canyons and washes in creosote bush and mixed desert shrubland. *Mills, Fraga, & Pipkin 282.*

TAMARACEAE

***Tamarix aphylla* (L.) H. Karst.** Tree. Rare. Tule Spring. *Mills & Fraga 980.*

***Tamarix ramosissima* Ledeb.** Shrub. Infrequent. Disturbed areas near roadsides. *Mills & Figueroa 573.*

URTICACEAE

***Parietaria hespera* Hinton var. *hespera*.** Annual herb. Rare. Shaded rock crevices in canyons on the eastern side of the Nopah Range in mixed desert shrubland. *Mills & Fraga 1111.*

VISCACEAE

***Phoradendron californicum* Nutt.** Perennial herb (parasitic). Locally frequent. On honey mesquite in California Valley, Chicago Valley, and Pahrump Valley. *Mills 952.*

ZYGOPHYLLACEAE

***Larrea tridentata* (DC.) Coville.** Shrub. Abundant. Bajadas, canyons, slopes, and washes in creosote bush shrubland. *Mills, Fraga, Boes, & Cunningham 83.*