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Cover: Double rainbow over Joshua trees during a summer monsoonal storm in the upper reaches of Ivanpah Valley on the eastern slopes of the Mescal Range. Photograph by Duncan Bell.

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A Flora of the Mescal Range and the Northern Section of the Ivanpah Mountains, San Bernardino County, California

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ABSTRACT: Presented here is an annotated catalogue of the vascular flora of the Mescal Range and the northern section of the Ivanpah Mountains, that lie within the eastern Mojave Desert in San Bernardino County. The catalogue and following discussion are based on field surveys performed between 2011 and 2023 while exploring this botanically diverse area. The aim of the study was to collect information on rare plant species, as well as common species, to better understand the flora and the distribution of plant species of this under-documented area, and to report conservation concerns for this area due to potential threats such as large-scale mining, or other forms of development that could be proposed in the future.

KEYWORDS: Floristics, Mescal Range, Ivanpah Mountains, east Mojave Desert, rare plants, mining, rare earth minerals, conservation.

INTRODUCTION

Rising up and out of Shadow Valley to its west and Ivanpah Valley to its east, the Mescal Range is one of several mountain ranges making up the backbone of the east Mojave Desert sky islands, providing a home for a diversity of flora and fauna. While there has been botanical documentation in this range in the form of herbarium specimens for close to a century, a great part of this diverse mountain range has remained botanically unexplored or under-documented in places, until the recent surveys reported here. During my surveys, many rare plant species were added to the flora of the Mescal Range, and many new occurrences of previously known sensitive plant taxa were found, mapped and reported.

PHYSICAL SETTING

Site Location

The Mescal Range is located in the northeastern section of San Bernardino County in the east Mojave Desert of southern California, approximately 290 km (180 miles) northeast of Los Angeles and approximately 80 km (50 miles) southwest of Las Vegas, just to the south of Mountain Pass along Interstate 15 (Figure 1). Bordering mountain ranges include the Clark Mountains to the north and the southern Ivanpah Mountains and Cima Dome to the south. The Mescal Range is often considered to be contiguous with, or a subset, of the Ivanpah Mountains, making up the northern section of the Ivanpah Mountains. Other significant mountain ranges nearby include the New York Mountains, 10 miles to the southeast, and the Spring Mountains, approximately 20 miles to the northeast.

For this study, the primary focus was on the Bureau of Land Management (BLM) lands making up the central and eastern section of the Mescal Range, as well as all BLM lands making up the northern section of the Ivanpah Mountains, which includes the upper section of Piute Valley on the east side of the Mescal Range, including Mineral Hill and Kokoweef Peak, to the terminus of the BLM lands at the eastern base of Mineral Hill, running north approximately from Mineral Spring in the southeastern corner, to Interstate 15 at the northeastern corner. Interstate 15 marks the northern extent of the project area, and Cima Road marks the western boundary (Figure 1). The total project area is approximately 130km^2 (50 mi^2). From here on, all mentions of the Mescal Range will also include the lands of the northern Ivanpah Mountains, as shown in Figure 1.

Management

The primary focus was on BLM lands on the central and eastern side of the Mescal Range, the upper section of Piute Valley, and Kokoweef and Mineral Hill. The western side of the Mescal Range including its alluvial fan draining westward to Cima Road, is managed by the National Park Service (NPS) as part of the Mojave National Preserve. No collections from National Park Service lands were made as part of this project, as the focus was on BLM lands. However, there are some collections included in this flora from NPS lands, largely from James M. André and Barbara G. Pitzer, to make this a more complete flora for the Mescal Range. Few botanists have collected in the canyons on the west side of the Mescal Range, and a great deal of botanical work should be focused here in the future to better understand the distribution of species for this range, as well as to add additional species to the diverse flora that makes up this range.

Topography and geology

The Mescal Range is largely made up of steep, rugged, rocky ridges rising out of Shadow Valley to the west and Ivanpah Valley to the east. At its highest point, the Mescal Range rises to 1980 m (6499 ft.), and the lowest elevation in the study area is 1136 m

(3730 ft.) at the northwestern corner, for an elevation difference of 844 m (2769 ft.).

The Mescal Range is geologically diverse, consisting of a mix of Cambrian dolomite, early Cretaceous volcanics, Cambrian siliciclastic rocks, and a band of Permian limestone in its main central area that makes up its main canyons and ridges (Miller 2007). To the east of the main range, Piute Valley and Mineral Hill are made up of a mix of alluvial bajadas consisting of limestone gravels, gneiss, and granitoid rocks.

On the east side of the Mescal Range, there is a small, geologically unique area called the Dinosaur Track Area of Critical Environmental Concern (ACEC), which is made up of a large sandstone block, consisting of Jurassic Aztec sandstone, being lifted out of the desert floor (Miller 2007). The Dinosaur Track ACEC gets its name from the fossilized dinosaur tracks that were found here by paleontologists. This is the only known location in California where fossilized dinosaur tracks, or Mesozoic reptile tracks of any kind, can be found (FWS 2013).

There are a number of springs in the Mescal Range and the northern section of the Ivanpah Mountains, including China Spring, Groaner Spring, Hardrock Queen Spring, and Wheaton Spring, all located on the north side of the range, and Mineral Spring on the southeastern slopes of Mineral Hill, all with varying levels of moisture. Unfortunately, all springs have been damaged to some extent by heavy burro activity, as well as historic livestock

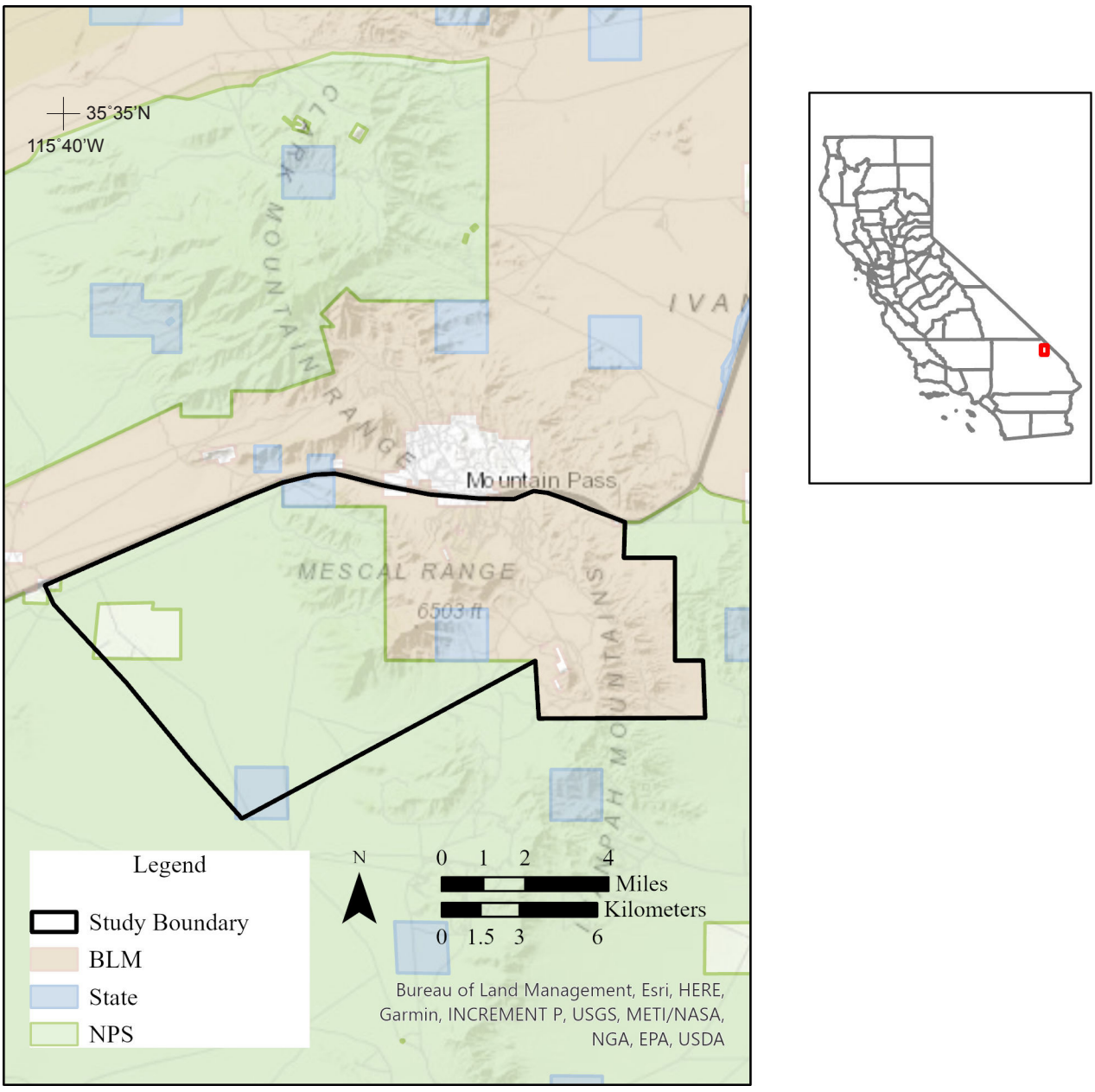

Figure 1. The Mescal Range and northern Ivanpah Mountains study area, its relationship to the state, and land ownership in the general vicinity.

management, and have been inundated with non-native species. However, some native species can still be found in and around these springs.

Botanical explorations

The first collections from the study area appear to have been made in the 1930s when, within a decade, Carl Wolf, Philip Munz, F. & H. Reed, and Annie Alexander visited the area, bringing back with them the first botanical information from the Mescal Range. Over the next 80 years an occasional collector would visit the area with most collections being made at or near Mountain Pass at the northern foot of the range. While there are hundreds of historical collections from the study area, they are all primarily from the easily accessible areas along Interstate 15 on the margins of the range, with no apparent collections being made in the central part of the range until 1986 when B. Pitzer and D. Charlton made a botanical foray in the inner southwestern section of the range. In the 1970s intensive collecting was done across the east Mojave Desert by James Henrickson, Barry Prigge and Robert Thorne, and while the Ivanpah Mountains were noted as a collection area within their published flora, collections were not made in the Mescal Range, except for a handful of collections along Interstate 15 (Thorne, et al 1981). However, their intensive surveys were performed in the mountain ranges immediately to the north and south of the Mescal Range and were foundational work for the understanding of the biodiversity of the region that surrounds the Mescal Range.

My curiosity for the area began in spring of 2011, when, one morning after having camped in the northern part of the range, I climbed up and along one of the main ridges of the Mescal Range, finding a unique, pristine, and botanically diverse region that I would later find out was largely unexplored. Between 2011 and 2023, I would make dozens of return trips to the area, specifically targeting sensitive species of the area and targeting surveys in the inner central part of the range and upper Piute Valley, where rare plant surveys were most needed. Surveys were also focused here after reports were made that the large, rare earth mine of Mountain Pass was reopening, with a possibility of mine expansion that could potentially bring a large-scale threat to the Mescal Range (Juetten 2011).

Human History & Impact

Early human history. The earliest known human use of this area was by the Ancestral Pueblo people who would have hunted, gathered, and farmed nearby and used this area as a trade route. Following them, the Shoshonean and Paiute tribes would have used the area (NPS 2021), followed by the more recent Mohave and Chemehuevi tribes, whose artwork and artifacts can be found across the east Mojave Desert.

Mining. European entry to the area was largely for the extraction of minerals and other resources. Mining has been a frequent occurrence in the Mescal Range area for well over a hundred years, starting in the mid 1800s when European settlers began mining the area for gold and silver (Vredenburgh 1996). Some of these smaller mining claims grew to be large scale mines, including the Mountain Pass Rare Earth Mine. This mine started as a small claim in 1949 and grew significantly in the 1960s after being purchased and explored by The Molybdenum Corporation of America, which would become Molycorp, and eventually part of the Chevron Corporation. Rare earth minerals were mined here for decades until 2002, when the mine was closed by environmental restrictions due to an investigation that reported there being at least 60 spills, over several decades, of radioactive and hazardous waste across the desert floor to the east of the mine, totaling around 600,000 gallons (Juetten 2011). Discussion of reopening the mine began in 2008, with potential of reopening and expanding starting in 2011 or 2012. It was noted again in 2020 that there was interest in expanding rare earth exploration and mining to the south, into the Mescal Range, when SciNews published an article on the recent mapping of rare earth minerals in the Mescal Range (SciNews 2020; Geosphere 2019)

Another noteworthy mine in the Mescal Range is the Kokoweef Mountain mine on the east side of the range in upper Piute Valley, believed by some to hold secret caverns and flowing underground rivers holding billions of dollars of gold (Stringfellow 2016). While this mine is active and slightly larger than many others in the area, it does not currently appear to be a threat to the biodiversity of the area in the form of large-scale expansion. Most of the mining there is done by hobbyists and performed gradually and within the interior of Kokoweef Mountain.

Tree harvesting. While performing surveys in the central interior of the range, we observed a number of individuals with chainsaws harvesting pinyon pines (*Pinus monophylla*) in a canyon. This tree removal was not significant in itself, but could be a concern if such harvesting occurred frequently or on a larger scale.

Recreation. Off highway vehicle (OHV) use and general recreation in the area have some impacts on vegetation and rare plant occurrences, but when observed during surveys, these impacts were largely noted near roads and historic mining areas.

Burros. Burros were released by humans into the wild centuries ago and have since greatly multiplied and have become a problematic non-native species, as they trample pristine native habitats, especially at and in the vicinity of springs, which are highly vulnerable to these activities. As a result of this recent burro invasion, many non-native species have been introduced to these springs, and due to this invasion, many native species occurring at these springs have been greatly reduced, with some potentially being extirpated. Similarly, many native mammals, invertebrates and birds rely on these springs for their continued existence. Every desert spring is unique to itself and irreplaceable (Love 2022) and the eradication of burros from these natural areas is paramount to their existence and continuation into the future.

METHODS

Field surveys were conducted in all seasons except for winter, and trips were planned following good winter precipitation and summer monsoons.

I performed field work in the study area from May of 2011 to October of 2023. While the majority of collections for botanical documentation were made during the spring seasons, a good number of trips were made in summer and fall to collect late-blooming species as well as annuals appearing after monsoonal storms. I made approximately 250 vouchers during this study. To provide a more complete flora, additional vouchers are represented in the annotated checklist that were made by other collectors who visited the area, specifically those collections made by James André, who also has a strong interest in documenting rare species and the general floristics in this under-collected area. These additional collections were found in the herbarium at California Botanic Garden and on the Consortium of California Herbaria (CCH).

Specimens were deposited in the herbarium at California Botanic Garden (RSA) with duplicates sent to University of California Riverside (UCR). Specimens were determined and identified using taxonomic keys and descriptions from several references including the Jepson Manual (Hickman 1993, Baldwin et al. 2012) and the Flora of North America (2014). Identifications were also verified through comparison with annotated specimens in the herbarium at California Botanic Garden (RSA).

RESULTS

Flora

The Mescal Range is currently known to have 352 vascular plant species in 56 families. Only twelve non-native taxa are known from the area, with most of these being small, localized populations, showing that this area is quite pristine compared to other areas of southern California, where the non-native species can make up more than 25 percent of the total flora (Soza 2013). A total of 49 sensitive plant species, ranked by the California Native Plant Society (CNPS) as rare, threatened, or endangered (CNPS 2023), are currently known from the Mescal Range, making up 15% percent of the total flora. This is an exceptionally high percentage compared to other floras that have been conducted in southern California, showing the uniqueness and diversity of this area.

During surveys, approximately 100 taxa (approx. 30% of the flora) were vouchered in the area that had not been previously found in the Mescal Range, with 20 of these being rare species that had previously not been documented from the range.

Vegetation

The Mescal Range lies within the Mojave Desert and consists of a number of different vegetation types including blackbrush scrub, a mix of Joshua tree and pinyon-juniper woodlands, and grasslands that are most noticeable after adequate summer monsoonal storms. Some examples of these vegetation types are found within this study area are included on figure 2.

Joshua tree woodlands (Figure 2c), or the "Joshua tree series" (Sawyer, Wolf & Evens 2009) can be found across the majority of this floristic area, ranging from the alluvial bajadas of upper Piute Valley up to the rocky limestone slopes and ridges in the central section of the Mescal Range. Common species associated with these Joshua tree woodlands are *Coleogyne ramosissima* Torr., *Ephedra* species, *Eriogonum fasciculatum* Benth., *Larrea tridentata* (DC.) Coville, *Lycium* species, *Yucca baccata* Torr., and *Y. schidigera* Roezl ex Ortgies.

Juniper woodlands (Figure 2d), or "Utah juniper series" (Sawyer, Wolf & Evens 2009) are most commonly found on the eastern margins of upper Piute Valley up onto and across Mineral Hill on the alluvial bajadas of limestone and granitic ridge, and are also found on the limestone slopes, ridges and canyons in the central section of the Mescal Range. The most common associates in Juniper woodlands are *Coleogyne ramosissima*, *Ephedra* species, *Eriogonum fasciculatum, Ericameria nauseosus* (Pursh) G.L. Nesom & G.I. Baird, *Pinus monophylla* Torr. & Frem., *Scutellaria mexicana* (Torr.) A.J. Paton, *Yucca baccata, Y. jaegeriana* (McKelvey) L.W. Lenz, and *Y. schidigera*.

Blackbrush scrub (Figure 2e), or "Black bush series" (Sawyer, Wolf & Evens 2009) can be found in large, dense stands on some alluvial slopes and bajadas, most frequently on the north side of the range, but also in upper Piute Valley and Mineral Hill. This vegetation series is most commonly associated with *Ericameria nauseosa, Eriogonum fasciculatum, Gutierrezia sarothrae* (Pursh) Britton & Rusby, *Yucca baccata, Y. jaegeriana*, and *Y. schidigera*.

One of the more unique vegetation series for the area is the grasslands (Figure 2f), which can appear savannah-like after adequate summer monsoonal storms. This vegetation series is most abundant on the alluvial bajadas of upper Piute Valley but can also be found in smaller canyons and drainages. The grasses that make up these unique communities are *Aristida purpurea* Nutt., *Bouteloua eriopoda* (Torr.) Torr., *Bouteloua gracilis* (Kunth.) Lag. ex Griffiths, *Elymus elymoides* (Raf.) Swezey, *Hilaria jamesii* (Torr.) Benth., *Muhlenbergia porteri* Scribn. ex Beal, *Sporobolus contractus* Hitchc., *S. cryptandrus* (Torr.) A. Gray, and *Stipa hymenoides* Roem. & Schult., and the most commonly associated non-grass species include *Coleogyne ramosissima, Ephedra* species, *Ericameria nauseosa, Eriogonum fasciculatum, Yucca jaegeriana*, and *Y. schidigera*.

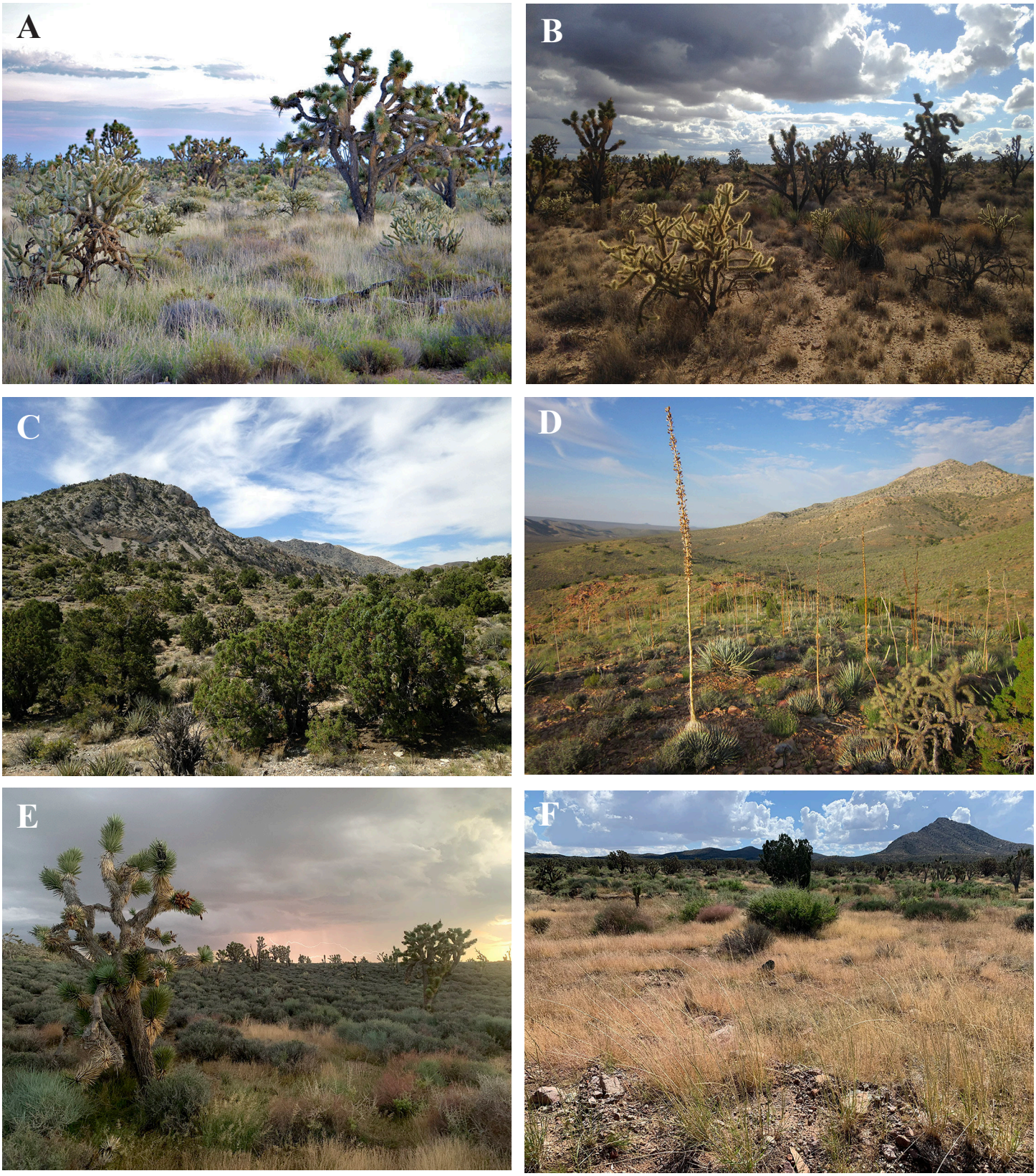

Figure 2. Examples of plant communities of the Mescal Range and the northern section of the Ivanpah Mountains: A) Post-monsoon grasslands in Joshua-tree woodlands; B) Joshua tree woodlands; C) Juniper woodlands; D) Dense stands of *Agave utahensis* var. *nevadensis* in black brush scrub and sparse juniper woodlands; E) Black brush scrub in Joshua tree woodlands;& F) Summer annuals and grasslands in openings of juniper-Joshua tree woodlands.

There are a few washes, with associated species being *Chilopsis linearis* (Cav.) Sweet, *Neltuma odorata* (Torr. & Frem.) C.E. Hughes & G.P. Lewis [= *Prosopis glandulosa* Torr.], *Prunus* species, and *Lycium* species. These washes are relatively small and localized in areas on the north side of the range.

Floristic seasons

Floristically, there are two distinct blooming periods in the Mescal Range: the season following winter rains and snow that bring spring annuals, and the season following summer rains bringing summer annuals. The amount of germination in a season can vary greatly from year to year, but during the years I performed surveys in the Mescal Range there was good winter precipitation during several winters, as well as multiple years of exceptional summer monsoons.

Following winter rains, many spring annuals can be present. Some of the more abundant species in the project area include *Amsinckia tessellata* A. Gray, *Cryptantha* species, *Diplacus bigelovii* (A.Gray) G.L. Nesom, *Eriophyllum wallacei* (A.Gray) A.Gray, *Eschscholzia minutiflora* S. Watson, *Layia glandulosa* (Hook.) Hook. & Arn., *Phacelia fremontii* Torr., *Phacelia distans* Benth., and *Salvia columbariae* Benth. as well as a number of rare annuals that can usually only be found in the spring, such as *Linum puberulum* (Engelm.) A. Heller, *Galium proliferum* A. Gray, *Phacelia anelsonii* J.F. Macbr., *P. barnebyana* J.T. Howell, and *P. coerulea* Greene.

In the summer following the monsoonal rains, the flora of the Mescal Range changes dramatically from the spring flora, with a plethora of rare plant species whose seeds lay dormant until the correct conditions occur following these monsoonal storms. The open areas between the Joshua trees become savannah-like, with more than 20 species of grass flowering at this time, including sensitive species such as *Bouteloua eriopoda, Enneapogon desvauxii* P. Beauv., and *Munroa squarrosa* (Nutt.) Torr. An ensemble of other rare annuals make their appearance at this time, scattered amongst the grasslands and shrubbery in the understory of Joshua tree woodlands, such as *Euphorbia exstipulata* Engelm., *Euphorbia revoluta* Engelm., *Portulaca halimoides L.,* and *Sanvitalia abertii* Torr. Other more common summer annuals include *Pectis papposa* Harv., which after good summer rains will form showy yellow blankets on the mountain sides and across the valley floors.

Special Status Species

The Mescal Range is home to 49 special status plant taxa, ranked by the California Native Plant Society (CNPS) as rare, threatened, or endangered (CNPS 2023). That this many CNPS listed taxa are found in an area of approximately 50 square miles is impressive and further illustrates the importance of conserving these habitats. While many of these rare species are found more commonly in adjacent states (i.e. Nevada, Arizona, Utah), many of these species have their westernmost occurrences here in the Mescal Range. Many of these species are found in just a few locations within California, in the Mescal Range and nearby mountain ranges including the Clark, Castle, and New York Mountains.

These recent collections also help tie together the distributions of some of these rare species, connecting them to other known occurrences in the Clark Mountains and the New York Mountains.

Table 1: Rare plant taxa of the Mescal Range

Taxa	Common Name	California Rare Plant Rank
Abronia nana var. *covillei*	Coville's dwarf sand verbena	4.2
Abutilon parvulum	Dwarf mallow	2B.3
Acmispon argyraeus var. *multicaulis*	Canyon bird's-foot trefoil	1B.3
Agave utahensis var. *nevadensis*	Nevada agave	4.2
Allium nevadense	Nevada onion	2B.3
Aloysia wrightii	Oreganillo	4.3
Asclepias asperula subsp. *asperula*	Antelope horns	4.3
Asclepias nyctaginifolia	Mojave milkweed	2B.1
Astragalus bernardinus	San Bernardino milkvetch	1B.2
Astragalus nutans	Providence Mountains milkvetch	4.3
Astragalus tidestromii	Tidestrom's milkvetch	2B.2
Astrolepis cochisensis subsp. *cochisensis*	Scaly cloak fern	2B.3
Bouteloua eriopoda	Black grama	4.2
Bouteloua trifida	Red grama	2B.3
Coryphantha chlorantha	Desert pincushion	2B.1

Table 1 (continued): Rare plant taxa of the Mescal Range

Taxa	Common Name	California Rare Plant Rank
Enneapogon desvauxii	Nine awned pappus grass	2B.2
Eriogonum heermannii var. *floccosum*	Clark Mountain buckwheat	4.3
Eriogonum umbellatum var. *juniporinum*	Juniper buckwheat	2B.3
Erioneuron pilosum	Hairy woollygrass	2B.3
Euphorbia exstipulata var. *exstipulata*	Clark Mountain spurge	2B.1
Euphorbia revoluta	Revolute spurge	4.3
Fendlerella utahensis	Utah fendlerbush	4.3
Galium proliferum	Limestone bedstraw	2B.2
Grusonia parishiorum	Matted cholla	2B.2
Hedeoma nana subsp. *californica*	California false pennyroyal	4.3
Kallstroemia parviflora	Warty caltrop	4.2
Linum puberulum	Hairy flax	2B.3
Mirabilis coccinea	Scarlet four o'clock	2B.3
Muhlenbergia arsenei	Navajo muhly	2B.3
Munroa squarrosa	False buffalo grass	2B.2
Myriopteris wootonii	Wooton's lace fern	2B.3
Oenothera cespitosa subsp. *crinata*	Cespitose evening-primrose	4.2
Opuntia ×charlestonensis		
Oreocarya tumulosa	New York Mountains oreocarya	4.3
Pellaea truncata	Cliff brake	2B.3
Penstemon utahensis	Utah penstemon	2B.3
Petradoria pumila subsp. *pumila*	Rock goldenrod	4.3
Phacelia anelsonii	Aven Nelson's phacelia	2B.3
Phacelia barnebyana	Barneby's phacelia	2B.3
Phacelia coerulea	Sky blue phacelia	2B.3
Physaria chambersii	Chambers' twinpod	2B.3
Portulaca halimoides	Desert portulaca	4.2
Rhinotropis acanthoclada	Thorny milkwort	2B.3
Sanvitalia abertii	Abert's sanvitalia	2B.3
Sphaeralcea rusbyi var. *eremicola*	Rusby's desert mallow	1B.2
Stipa arida	Mormon needle grass	2B.3
Tetradymia argyraea	Striped cottonthorn	4.3
Tragia ramosa	Desert noseburn	4.3
Xanthisma gracile	Annual bristleweed	4.3

California Rare Plant Rankings (CRPR):

1B: plants rare, threatened, or endangered in California and elsewhere

2B: plants rare, threatened, or endangered in California but more common elsewhere.

4: plants of limited distribution, a watchlist

CRPR Threat Rankings

0.1 seriously Endangered in California

0.2 fairly endangered in California

0.3 not very threatened in California (CNPS 2023)

Some examples of rare plants found within this study area are included in Figures 4 and 5.

Conservation seed collections. A number of conservation seed collections of rare and sensitive species were made while working in the Mescal Range by myself, Cheryl Birker and Evan Meyer. Conservation seed collections were made for *Asclepias nyctaginifolia* A. Gray, *Eriogonum heermannii* Durand & Hilg. var. *floccosum* Munz, *Enneapogon desvauxii, Erioneuron pilosum* (Buckley) Nash*, Euphorbia revoluta*, *Kallstroemia parviflora, Linum puberulum*, *Petradoria pumila* (Nutt.) Greene subsp. *pumila*, *Physaria chambersii* Rollins, *Sanvitalia abertii, Tetradymia argyraea* Munz & J.C. Roos and *Tragia ramosa* Torr. These are housed in the conservation seed bank at California Botanic Garden in Claremont. We hope to continue visiting the area to make additional seed collections of other rare species from this area, as well as of other unique species such as the graminoids of the Mescal Range that make up these unique California grasslands.

Missing taxa. During these surveys, a number of rare species with potential to occur in the area, based on habitat and known populations in adjacent mountain ranges, were not found. This does not mean that these species do not occur in the Mescal Range, but that I did not encounter them during my surveys. This could be for a number of reasons, including weather patterns, phenology, the large survey area, etc. Those species with potential to occur in the Mescal Range that were not found during surveys include but are not limited to: *Abies concolor* (Gordon & Glend.) Lindley, *Erigeron uncialis* S. F. Blake var. *uncialis, Frasera albomarginata* S. Watson, *Galium munzii* Hilend & J.T. Howell, *Galium wrightii* A. Gray, *Glossopetalon pungens* Brandegee, *Hymenopappus filifolius* Hook. var. *eriopodus* (A. Nelson) B.L. Turner, *Menodora scabra* A. Gray var. *scabra, Mentzelia polita* A. Nelson, *Monardella eremicola* A.C. Sanders & Elvin, *Mortonia utahensis* (Trel.) A. Nelson, *Muhlenbergia fragilis* Swallen, *Oenothera cavernae* Munz, *Penstemon stephensii* Brandegee, *Penstemon thompsoniae* (A. Gray) Rydb., and *Phacelia geraniifolia* Brand. All of these taxa are known from just a few air miles to the north in the Clark Mountains, with some also being known from the New York Mountains to the south. So, there is a strong possibility that these species are somewhere in the Mescal Range, and future surveys in this range should target these missing species.

Non-native species

During these surveys, twelve non-native species were documented across the area, some of which were only known from one or a few isolated occurrences. The low levels of non-native taxa (3% of the total flora) and their relatively low abundance is a good indicator of how pristine this area is relative to other recent floristic studies in southern California, such as the flora of the Verdugo Mountains, where non-native species made up 28% of the flora (Soza, 2013), and the flora of California as a whole having 17% non-natives (Hickman 1993).

Conservation concerns and recommendations

Currently, large-scale mining may be the largest threat to the Mescal Range as rare earth minerals have become such a demand in our modern world, and as mentioned above, explorations for these rare earth minerals have already begun in the Mescal Range (SciNews 2020; Geosphere 2019). Rare earth mining is highly destructive, usually having to move 20 to 160 tons of materials for every single ton of rare earth materials (Manhattan Institute, 2020). It is also environmentally hazardous and unsustainable, as for every single ton of rare earth that is extracted, 2000 tons of toxic waste are produced (Harvard International Review, 2021). Other forms of large-scale development have also been proposed for the area in the form of large-scale wind energy projects, as noted in the Desert Renewable Energy Conservation Plan (DRECP, 2023). The Ivanpah Solar Power Facility, the largest concentrating solar power facility on the planet, was constructed in 2010 on 3500 acres (1420 ha) on the northeastern flanks of the Ivanpah Mountains.

In recent news there is also the upcoming installation of the Brightline bullet-train, a high-speed rail car running from Los Angeles to Las Vegas, that would travel across the northern slopes of the Mescal Range, and the northern Ivanpah Mountains, while transporting people between these urban areas (International Railway Journal, 2023).

It is my hope that the information provided here will be added to additional data on the natural and cultural history, and diversity, of this area to support protection of the Mescal Range from the threat of large scale development, or at least help to provide information and guidance for land managers in avoiding specific areas where there are unique vegetation assemblages, rare plant occurrences, and areas of high diversity.

Lastly, the majority of the surveys for this flora were done on BLM managed lands of the Mescal Range, with little focus on the western side of the range, which is managed by the Mojave National Preserve. Little focus was aimed at the Preserve lands, as these lands currently have no major threats, such as large-scale development. However, future surveys should be focused here, as this section of the Mescal Range is still greatly under-explored botanically and will no doubt hold many additions to the flora including new rare species that were not found during my surveys.

Figure 3. A selection of rare taxa from the Mescal Range and the northern section of the Ivanpah Mountains: **A)** *Abronia nana* var. *covillei*; **B)** *Allium nevadense*; **C)** *Argyrochosma jonesii*; **D)** *Sanvitalia abertii*; **E)** *Asclepias asperula* ssp. *asperula*; **F)** *Asclepias nyctaginifolia*; & **G)** *Bouteloa eripoda*. Photos by author.

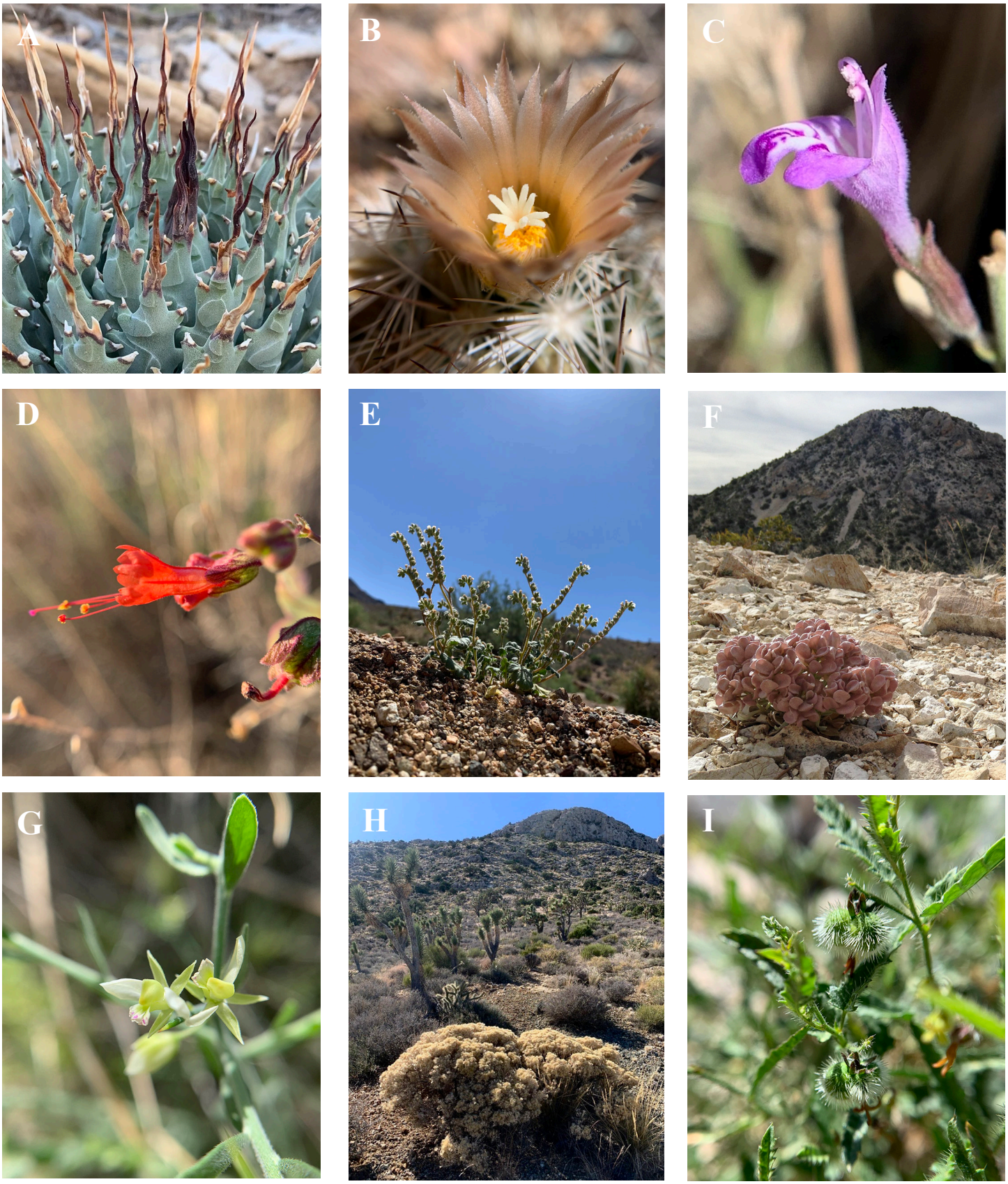

Figure 4. Another selection of rare taxa from the Mescal Range and the northern section of the Ivanpah Mountains: **A)** *Agave utahensis*; **B)** *Coryphantha chlorantha*; **C)** *Hedeoma nana* ssp. *californica*; **D)** *Mirabilis coccinea*; **E)** *Phacelia coerulea;* **F)** *Physaria chambersii*; **G)** *Rhinotropis acanthoclada*; **H)** *Tetradymia argyraea*; & **I)** *Tragia ramosa*. Photos by author.

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Annotated catalog of the vascular plants of the Mescal Range and the northern section of the Ivanpah Mountains

The following is a list of the vascular plant taxa documented from the Mescal Range and the northern section of the Ivanpah Mountains during floristic surveys done from spring of 2011 to fall of 2023. Family classification follows APG (2015). Nomenclature and classification of genera and species conforms to Jepson Flora Project (eds) Jepson eFlora (2023). All voucher specimens cited in this catalog are housed at the herbarium at California Botanic Garden (RSA), except for those noted otherwise.

Sensitive species are denoted with a dagger (†)
Non-native species are denoted with an asterisk (*)

FERN AND FERN ALLIES

Pteridaceae

Argyrochosma jonesii (Maxon) M.D. Windham JONES' FALSE CLOAK FERN. Fern. Uncommon. A single localized population found on limestone cliff faces in the central section of the range. (*Bell 5858*)

†Astrolepis cochisensis (Goodd.) Benham & Windham subsp. ***cochisensis*** SCALY CLOAK FERN. Fern. Uncommon/localized. A few collections from the central section of the range, growing at base of steep limestone outcrops. (*Bell 8139*)

Myriopteris covillei (Maxon) A. Love & D. Love COVILLE'S LIP FERN. Fern. Locally common in places growing in cracks of limestone outcrops and cliff faces in the central section of the range. (*Bell 5870*)

Myriopteris gracilis Fee SLENDER LIP FERN. Fern. Occasional to uncommon or localized on limestone outcrops and cliff faces in the central section of the range and in the vicinity of Iron Horse Mine and Hardrock Queen Spring. (*Bell 2450*)

†Myriopteris wootonii (Maxon) Grusz & Windham WOOTON'S LACE FERN. Fern. Occasional to uncommon. Found in a few localized locations on the north side of the range, between Hardrock Queen Spring and China Spring, growing on gabbro outcrops. (*André 32422*)

Pellaea mucronata (D. Eaton) D. Eaton BIRDFOOT CLIFFBRAKE. Fern. Occasional/scattered in rocky canyon bottoms and rocky slopes in the central part of the range and in the vicinity of the Dinosaur Trackway area. (*Bell 5878*)

†Pellaea truncata Goodd. SPINY CLIFFBRAKE. Fern. Uncommon to localized in limestone cracks and on steep limestone slopes and cliff faces in the central section of the range. (*Bell 8141*)

CONIFERAE

Cupressaceae

Juniperus osteosperma (Torrey) Little UTAH JUNIPER. Tree/shrub. Occasional/scattered/locally common on limestone slopes, in canyons and in open bajadas. (*Bell 2469*)

Ephedraceae

Ephedra nevadensis S. Watson NEVADA EPHEDRA. Shrub. Occasional to common in open shrubby areas of alluvial flats of Joshua tree woodlands. (*André 25881*)

Ephedra viridis Cov. MOUNTAIN EPHEDRA. Shrub. Occasional to frequent on limestone slopes and ridges and in canyons. (*Bell 8133*)

Pinaceae

Pinus monophylla Torrey & Fremont SINGLE LEAF PINYON PINE. Tree. Uncommon to locally common in narrow limestone canyons and along ridges. (*Bell 2468*)

EUDICOTS

Amaranthaceae

****Amaranthus albus*** L. PIGWEED AMARANTH. Annual herb. Uncommon to locally common in canyon bottoms and in openings of Joshua tree woodlands in the vicinity of the Dinosaur Trackway area. Only seen after abundant summer monsoonal storms. (*Bell 4089*)

Amaranthus fimbriatus (Torrey) Benth. FRINGED AMARANTH. Annual herb. Locally common to scattered in rocky canyon bottoms, on slopes, and in opening of Joshua tree woodlands after abundant summer monsoonal storms. (*Bell 4066*)

Amaranthus torreyi (A. Gray) Benth. SANDHILL AMARANTH. Annual herb. Uncommon to locally common on limestone slopes and in canyon bottoms after abundant summer monsoonal storms. A few collections from the center of the range and from the vicinity of Kokoweef. (*Bell 5848*)

Anacardiaceae

Rhus aromatica Aiton FRAGRANT SUMAC. Shrub. Locally common/scattered at a few locations in the central section of the range in narrow brushy canyons. (*Bell 8153*)

Apiaceae

Cymopterus purpurascens (A. Gray) M.E. Jones PURPLE CYMOPTERUS. Perennial herb. Rare. A single localized population on open rocky ridge to the southwest of Hardrock Queen Spring in the northeastern section of the range. (*Bell 2443*)

Lomatium nevadense (S. Watson) J. Coulter & Rose var. ***nevadense*** NEVADA LOMATIUM. Perennial herb. Occasional/scattered on limestone ridges and open rocky flats in the central and eastern section of the range. (*Bell 2454*)

Lomatium nevadense (S. Watson) J. Coulter & Rose var. ***parishii*** (J. Coulter & Rose) Jepson PARISH'S BISCUITROOT. Perennial herb. Occasional/scattered on limestone ridges in the central section of the range and on the sandstone outcrop of the Dinosaur Trackway. (*Bell 8127*)

Lomatium parryi (S. Watson) J.F. Macbr. PARRY'S LOMATIUM. Perennial herb. Infrequent/uncommon in the central section of the range in rocky limestone canyon bottom. (*Bell 8145*)

Apocynaceae

Amsonia tomentosa Torr. & Frem. WOOLLY AMSONIA. Perennial herb. A few collections from Wheaton Springs and Wheaton Wash. (*Cooper 3513*)

†Asclepias asperula (Dcne.) Woodson subsp. ***asperula*** SPIDER MILKWEED. Perennial herb. Rare. Known from a few narrow rocky limestone canyons on the east side of the range and central section of the range. (Bell 5850)

Asclepias erosa Torrey DESERT MILKWEED. Annual herb. A few historic collections from the Mountain Pass/Mexican Spring area on the north side of the range. (*Peirson 7354*)

†Asclepias nyctaginifolia A. Gray MOJAVE MILKWEED. Perennial herb. Rare. A single scattered colony in a rocky limestone canyon bottom in the vicinity of the Dinosaur Trackway on the east side of the range. (*Bell 4097*)

Asteraceae

Acamptopappus shockleyi A. Gray SHOCKLEY'S GOLDENHEAD. Shrub. A few scattered collections from northwestern section of the Mescal Range in mixed subsaline/calcareous gravels. (*André 20509* [UCR])

Acamptopappus sphaerocephalus (Harv. & A. Gray) A. Gray var. ***hirtellus*** S. F. Blake HAIRY GOLDENHEAD. Shrub. Common on margin of wash. (*André 29055* [UCR])

Adenophyllum cooperi (A. Gray) Strother COPPER'S DYSSODIA. Perennial herb. Occasional/scattered in rocky canyon bottoms and in openings of Joshua tree woodlands. (*Bell 8161*)

Ambrosia confertiflora DC. WEAK LEAVED BURSAGE. Perennial herb. A single scattered population in rocky canyon bottom in the vicinity of the Dinosaur Trackway area. (*Bell 4086*)

Ambrosia dumosa (A. Gray) Payne BURROBUSH. Shub. Occasional to locally common in places. (*Boyd, Vanderplank & Arvizu 11595*)

Ambrosia eriocentra (A. Gray) Payne WOOLY BURSAGE. Shrub. Occasional to common in rocky canyon bottoms. (*André 25891*)

Ambrosia salsola (Torr. & A. Gray) Strother & B.G. Baldw. CHEESEBUSH. Shrub. Occasional/scattered in shrubby alluvial bajadas in Joshua tree woodlands. (*Reed s.n., 11 May 1935* [UC])

Artemisia bigelovii A. Gray BIGELOW SAGEBRUSH. Shrub. Scarce. A single collection from limestone slopes on the north side of Kokoweef Peak. (*Boyd 11582*)

Artemisia dracunculus L. WILD TARRAGON. Shrub. A few localized colonies in narrow rocky drainages. (*André 22241* [UCR])

Artemisia ludoviciana Nutt. subsp. ***albula*** (Wooton) Keck WHITE SAGEBRUSH. Perennial herb. Occasional to infrequent on limestone slopes and canyon bottoms. (*Bell 7589*)

Artemisia nova A. Nelson BLACK SAGEBRUSH. Shrub. A single collection from the Groaner Spring area, where it was occasional in the Joshua tree/juniper woodlands. (*André 36950* [UCR])

Artemisia spinescens D.C. Eat. BUDSAGE. Shrub. A single historic collection from Mountain Pass. (*Cooper 3517*)

Artemisia tridentata Nutt. subsp. ***tridentata*** BIG SAGEBRUSH. Shrub. Occasional/scattered on limestone slopes in the central and eastern sections of the range. (*Bell 5888*)

Baccharis salicifolia (Ruiz Lopez & Pavon) Pers. MULE FAT. Shrub. A single historic collection from the north side of the range. (*Alexander 512* [UC])

Baccharis sergiloides A. Gray DESERT BACCHARIS. Shrub. A single collection from the Groaner Spring area on the north side of the range. (*André 36953*)

Bahiopsis parishii (Greene) E. E. Schilling & Panero PARISH'S VIGUIERA. Perennial herb, shrub. Occasional on limestone slopes and along canyon margins. (*André 22208*)

Baileya multiradiata Harv. & A. Gray ex A. Gray DESERT MARIGOLD. Perennial herb. Occasional to locally common in open rocky places of Joshua tree woodlands. (*Bell 8168*)

Brickellia californica (Torrey & A. Gray) A. Gray CALIFORNIA BRICKELLBUSH. Shrub. Occasional/scattered on limestone slopes and canyon bottoms in the central and east side of the range. (*Bell 5885*)

Brickellia desertorum Cov. DESERT BRICKELLBUSH. Shrub. A single historic collection from the central section of the range. (*Charlton s.n., 16-20 Apr 1986* [OBI])

Brickellia microphylla (Nutt.) A. Gray LITTLE LEAVED BRICKELLBUSH. Shrub. Occasional/scattered on limestone slopes and along canyon bottoms in central and east side of the range. (*Bell 5892*)

Brickellia oblongifolia Nutt. var. ***linifolia*** (D. Eaton) Robinson NARROWLEAF BRICKELLBUSH. Perennial herb. (*Bell 2466*)

Calycoseris parryi A. Gray YELLOW TACKSTEM. Annual herb. A single collection from alluvial bajada on west side of the range. (*Pitzer 0095* [UCR])

Chaenactis fremontii A. Gray FREMONT PINCUSHION. Annual herb. A single collection from the central section of the range on open gravelly limestone slope. (*Bell 8169C*)

Chaenactis macrantha D. Eaton MOHAVE PINCUSHION. Annual herb. Occasional on gravely slopes in the vicinity of Mineral Spring to the southeast of Kokoweef Peak. (*André 12814*)

Chaenactis stevioides Hook. & Arn. DESERT PINCUSHION. Annual herb. A few collections from Mountain Pass and from Cima Road. (*Alexander 522* [UC])

Chaetopappa ericoides (Torrey) G. Neson HEATH LEAVED CHAETOPAPPA. Perennial herb. Uncommon to locally common in open rocky places along ridge, saddles, and in openings of Joshua tree woodlands. (*Bell 2458*)

Cirsium neomexicanum A. Gray DESERT THISTLE. Perennial herb. Uncommon in rocky canyons. (*Sanders 5816* [UCR])

Dieteria canescens (Pursh) Nutt. var. ***leucanthemifolia*** (Greene) D. R. Morgan & R. L. Hartm. HOARY ASTER. Perennial herb. Occasional to uncommon in openings of Joshua tree woodlands and on benches and margins of canyons. (*André 22234*)

Encelia actoni Elmer ACTON ENCELIA. Shrub. On sandy alluvium in Joshua tree woodlands. (*André 25992* [SD])

Encelia virginensis Nelson VIRGIN RIVER BRITTLEBUSH. Shrub. Uncommon. A few collections from the north side of the range. (*André 13441* [GMDRC])

Ericameria cooperi (A. Gray) H.M. Hall var. ***cooperi*** COOPER'S GOLDENBUSH. Shrub. Uncommon on slopes and in areas of low scrub. (*Boyd 11588* [UC])

Ericameria laricifolia (A. Gray) Shinn. TURPENTINE BRUSH. Shrub. Occasional to uncommon in rocky canyon bottoms and on slopes. (*Bell 4099*)

Ericameria linearifolia (DC.) Urb. & J. Wassow LINEAR LEAVED GOLDENBUSH. Shrub. Occasional to common in rocky canyon bottoms and on slopes. (*Bell 8182*)

Ericameria nauseosa (Pall.) G.L. Nesom & G.I. Baird var. ***leiosperma*** (A. Gray) G.L. Nesom & G.I. Baird RABBITBRUSH. Shrub. Uncommon/scattered on limestone slopes and in rocky canyon bottoms. (*Bell 5864*)

Ericameria paniculata (A. Gray) Rydb. MOJAVE RABBITBRUSH. Shrub. Locally common in washes. (*André 4008* [GMDRC])

Erigeron breweri A. Gray var. ***covillei*** (Greene) G.L. Nesom COVILLE'S FLEABANE. Perennial herb. Dense clumps on sandy slope on north side of Kokoweef. (*Roos 4414*)

Erigeron concinnus (Hook. & Arn.) Torrey & A. Gray var. ***concinnus*** NAVAJO FLEABANE. Perennial herb. Uncommon in open rocky places on both limestone and granitic soils in the central section of the range and on the ridgeline of Mineral Hill. (*Bell 2457*)

Erigeron divergens Torrey & A. Gray SPREADING FLEABANE. Biennial or perennial herb. Rare. A few scattered individuals in rocky drainage bottom in the vicinity of the Dinosaur Trackway. (*Bell 5895*)

Eriophyllum pringlei A. Gray PRINGLE'S WOOLY SUNFLOWER. Annual herb. Uncommon. A single collection on alluvial fan at the eastern base of Mineral Hill. (*Prigge 755*)

Eriophyllum wallacei (A. Gray) A. Gray WALLACE'S WOOLY DAISY. Annual herb. Open sandy/gravelly flats. A few older collections from Mountain Pass. (*Wolf 3329*)

Gutierrezia microcephala (DC.) A. Gray MATCHWEED. Shrub. Occasional to common on slopes, canyon bottoms and in open places of Joshua tree woodland. (*André 22216*)

Gutierrezia sarothrae (Pursh) Britton & Rusby COMMON SNAKEWEED. Shrub. Occasional to frequent along rocky canyon bottoms, slopes and open areas of Joshua tree woodlands. (*Bell 4077*)

Heliomeris multiflora Nutt. var. ***nevadensis*** (A. Nelson) W.F. Yates NEVADA GOLDENEYE. Perennial herb. Occasional to locally common in open rocky places, along ridges, and on slopes. (*Bell 4093*)

Hymenoxys cooperi (A. Gray) Cockerell COPPER'S GOLDFLOWER. Biennial or perennial herb. Infrequent/scattered on rocky limestone slopes in the central section of the range, often under pinyon pines. (*Bell 5855*)

Layia glandulosa (Hook.) Hook. & Arn. WHITE TIDY TIPS. Annual herb. Occasional to locally common along washes and in openings of Joshua tree woodlands. (*André 12810* [UCR])

Lessingia glandulifera A. Gray var. ***glandulifera*** STICKY LESSINGIA. Annual herb. A single collection from the northwest corner of the range. (*Helmkamp s.n., 29 Apr 1988* [CLARK])

Logfia filaginoides (Hook. & Arn.) Morefield CALIFORNIA COTTONROSE. Annual herb. A single collection from the vicinity of the Dinosaur Trackway. (*André 35436*)

Malacothrix glabrata A. Gray DESERT DANDELION. Annual herb. Rare. On open gravelly slopes in the central section of the range. (*Bell 8169B*)

Packera multilobata (Torr. & A. Gray ex A. Gray) W.A. Weber & A. Love LOBELEAF GROUNDSEL. Perennial herb. Infrequent/scattered on limestone slopes. (*André 14679*)

Pectis papposa Harvey & A. Gray var. ***papposa*** CHINCH WEED. Annual herb. Occasional/scattered on rocky slopes and canyon bottoms and in gravelly openings of alluvial bajadas in Joshua tree woodlands after abundant summer monsoonal storms. (*Green s.n., 30 Sep 2011* [UCR])

†Petradoria pumila (Nutt.) Greene subsp. ***pumila*** GRASSY ROCK GOLDENROD. Perennial herb. A few colonies in the central section of the range where it is locally common in places. (*Bell 5865*)

Porophyllum gracile Benth. ODORA. Perennial herb. A single collection from the vicinity of Mineral Spring to the southeast of Kokoweef Peak. (*André 12829* [UCR])

Prenanthella exigua (A. Gray) Rydb. THORNY SKELETON PLANT. Annual herb. Rare on open gravelly/rocky slopes in the central section of the range. (*Bell 8169D*)

Psilostrophe cooperi (A. Gray) Greene COOPER'S PAPER DAISY. Shrub. Occasional to locally common in open rocky places and along rocky canyon bottoms. (*Bell 7593*)

†Sanvitalia abertii A. Gray ABERT'S SANVITALIA. Annual herb. Rare to locally common in gravelly openings in Joshua tree woodlands and on slopes following good summer monsoonal storms. (*Bell 4084*)

Senecio flaccidus Less. var. ***monoensis*** (Greene) B. L. Turner & T. Barkley MONO RAGWORT. Shrub. Uncommon to rare in drainages. (*Green s.n. 30 Sep 2011* [UCR])

Stephanomeria exigua Nutt. subsp. ***exigua*** SMALL WIRELETTUCE. Annual herb. Infrequent. A few collections from Mountain Pass and Cima Road. (*André 25991*)

Stephanomeria parryi A. Gray PARRY'S WIRELETTUCE. Perennial herb. A single collection from the Mountain Pass area where it was occasional in gravelly soils. (*André 38295*)

Stephanomeria pauciflora (Torrey) Nelson WIRE LETTUCE. Perennial herb. Uncommon in rocky canyons. (*Pitzer s.n., 13 Sep 1985* [DES])

Syntrichopappus fremontii A. Gray FREMONT'S GOLD. Annual herb. A single historic collection from Mountain Pass. (*Alexander 520* [UC])

†Tetradymia argyraea Munz & Roos STRIPED COTTONTHORN. Shrub. Rare to locally common on rocky shrubby slopes. (*Bell 2467*)

Tetradymia stenolepis Greene MOJAVE COTTONTHORN. Shrub. A single collection from the Blue Buzzard Mine area where it was locally common. (*André 25908*)

Tetraneuris acaulis (Pursh) Greene var. ***arizonica*** (Greene) K.F. Parker ARIZONA FOUR NERVE DAISY. Perennial herb. Uncommon to locally common on limestone slopes. (*Bell 2459*)

Thymophylla pentachaeta (DC.) Small var. ***belenidium*** (DC.) Strother FIVENEEDLE PRICKLYLEAF. Perennial herb. Occasional to locally common on limestone slopes and ridges. (*Bell 4081*)

†Xanthisma gracile (Nuttall) D.R. Morgan & R.L. Hartman ANNUAL BRISTLEWEED. Annual herb. A few historical collections from the Mountain Pass area and a recent collection from the eastern slopes of the range where it was localized in a silty and stony flat in Joshua tree woodland. (*André 39714*)

Bignoniaceae

Chilopsis linearis (Cav.) Sweet subsp. ***arcuata*** (Fosb.) Henrickson DESERT WILLOW. Tree. Uncommon. A few localized collections from the Mountain Pass area. (*André 14454* [UCR])

Boraginaceae

Amsinckia tessellata A. Gray CHECKER FIDDLENECK. Annual herb. Occasional to common on slopes and in openings of Joshua tree woodland. (*André 25897*)

Cryptantha barbigera (A. Gray) Greene BEARDED FORGET ME NOT. Annual herb. Occasional on rocky slopes and ridgelines. (*Bell 2472*)

Cryptantha decipiens (M.E. Jones) A.A. Heller GRAVEL FORGET ME NOT. Annual herb. A single collection from the Mountain Pass area. (*André 19877* [UCR])

Cryptantha gracilis Osterhout SLENDER FORGET ME NOT. Annual herb. Occasional on ridges and slopes. (*Bell 2453*)

Cryptantha nevadensis Nelson & Kenn. NEVADA FORGET ME NOT. Annual herb. Occasional on gravelly slopes. (*André 12802*)

Cryptantha pterocarya (Torrey) Greene var. ***cycloptera*** (Greene) J.F. Macbr. WINGNUT CRYPTANTHA. Annual herb. Local on rocky slopes. (*André 35427*)

Cryptantha pterocarya (Torr.) Greene var. ***pterocarya*** WINGNUT CRYPTANTHA. Annual herb. Occasional in gravelly openings of Joshua tree woodland and on slopes. (*Green s.n., 11 Apr 2011* [UCR])

Cryptantha recurvata Coville CURVE NUT CRYPTANTHA. Annual herb. Occasional on rocky slopes. (*André 14725*)

Cryptantha utahensis (A. Gray) Greene SCENTED FORGET ME NOT. Annual herb. A single collection from the vicinity of Mineral Spring to the southeast of Kokoweef Peak where it was occasional on gravelly slopes. (*André 12824*)

Eremocarya micrantha (Torrey) I.M. Johnston var. ***micrantha*** PURPLE ROOTED FORGET ME NOT. Annual herb. A single collection from the west side of the range, where it was locally common in sandy places. (*Pitzer 108* [UCR])

Greeneocharis circumscissa (Hook. & Arn.) Rydb. var. ***circumscissa*** WESTERN FORGET ME NOT. Annual herb. A few historic collections from the Mountain Pass area. (*Wolf 3326*)

Lappula redowskii (Hornem.) Greene REDOWSKI'S STICKSEED. Annual herb. Scattered on limestone ridge in the central section of the range. (*Bell 9542*)

†Oreocarya tumulosa (Payson) Payson NEW YORK MOUNTAIN CRYPTANTHA. Perennial herb. Uncommon to locally common/scattered on steep limestone slopes and ridges. (*Bell 8160*)

Oreocarya virginensis (M.E. Jones) J.F. Macbr. VIRGIN RIVER CRYPTANTHA. Perennial herb. Occasional on limestone slopes. (*André 29068*)

Pectocarya heterocarpa (I.M. Johston) I.M. Johnston HAIRY LEAVED COMB BUR. Annual herb. A single historic collection from bajada on west side of the range where it was common in a wash. (*Pitzer 98* [UCR])

Pectocarya setosa A. Gray STIFF STEMMED COMB BUR. Annual herb. Occasional in gravelly openings of Joshua tree woodland and on slopes. (*André 10228* [UCR])

Plagiobothrys arizonicus (A. Gray) A. Gray ARIZONA POPCORN FLOWER. Annual herb. Occasional to locally common in a few places in sandy/gravelly places. (*André 32407*)

Simpsonanthus jonesii A. Gray SIMPSON'S POPCORN FLOWER. Annual herb. Occasional. A few recent collections from the north side of the range. (*André 35454* [GMDRC])

Brassicaceae

Boechera perennans (S. Watson) W.A. Weber PERENNIAL ROCKCRESS. Perennial herb. Occasional/localized on rocky slopes and outcrops. (*André 32411*)

Boechera pulchra (S. Watson) W.A. Weber BEAUTIFUL ROCKCRESS. Perennial herb. Occasional to uncommon on rocky slopes and outcrops. (*Bell 2462*)

Boechera xylopoda Windham & Al-Shehbaz BIGFOOT HYBRID ROCKCRESS. Perennial herb. Occasional in Joshua tree woodland. (*André & LaDoux 39556*)

Caulanthus cooperi (S. Watson) Payson COOPER'S JEWEL FLOWER. Annual herb. A single collection from the vicinity of Mineral Spring to the southeast of Kokoweek Peak, where it was occasional on gravelly slopes. (*André 12808*)

Caulanthus lasiophyllus (Hook. & Arn.) Payson CALIFORNIA MUSTARD. Annual herb. Occasional in sandy soils in Joshua tree woodlands. (*André 12856*)

Descurainia pinnata (Walter) Britton subsp. ***intermedia*** (Rydb.) Detl. INTERMEDIATE WESTERN TANSY MUSTARD. Annual herb. Uncommon to occasional on slopes. (*Bell 6150*)

****Descurainia sophia*** (L.) Webb FLIXWEED. Annual herb. A few localized populations around mines and along roads. (*André 19866* [UCR])

Draba cuneifolia Torrey & A. Gray WEDGE LEAVED DRABA. Annual herb. Uncommon to occasional on rocky limestone ridges. (*Bell 2445*)

Lepidium fremontii S. Watson DESERT PEPPERWEED. Perennial herb. Uncommon on limestone ridges and slopes. (*Blakley 3274* [DES])

Lepidium lasiocarpum Nutt. subsp. ***lasiocarpum*** SHAGGYFRUIT PEPPERWEED. Annual herb. Uncommon to occasional/ scattered on rocky slopes and ridges. (*Bell 8118*)

Lepidium montanum Nutt. MOUNTAIN PEPPERGRASS. Perennial herb. Occasional/scattered on limestone ridge and outcrops in central section of range. (*Bell 9545*)

†Physaria chambersii Rollins CHAMBER'S TWINPOD. Perennial herb. Rare to locally common on rocky limestone ridges and slopes in the central section of the range. (*Bell 9532*)

****Sisymbrium irio*** L. LONDON ROCKET. Annual herb. A few recent collections from the vicinity of Mineral Spring and from Cima Road. (*André 12820* [UCR])

Stanleya pinnata (Pursh) Britton var. ***pinnata*** PRINCE'S PLUME. Perennial herb. Uncommon to occasional on limestone slopes. (*Bell 4071*)

Streptanthella longirostris (S. Watson) Rydb. LONG BEAKED TWIST FLOWER. Annual herb. A few historic collections from the Mountain Pass area and from along Cima Road. (*Wolf 3351*)

Thysanocarpus curvipes Hook. FRINGE POD. Annual herb. Scattered on limestone slopes and ridges. (*Bell 8117*)

Cactaceae

†Coryphantha chlorantha (Engelm.) Britt. & Rose DESERT PINCUSHION. Perennial herb. Uncommon to occasional on open limestone slopes and ridges. (*Bell 8159*)

Cylindropuntia acanthocarpa var. ***acanthocarpa*** (Engelm. & Bigelow) F.M. Knuth BUCKHORN CHOLLA. Shrub. Occasional to common in alluvial bajada area of Joshua tree woodland. (*Dawson 4932*)

Echinocereus engelmannii (Engelm.) Lem. var. ***engelmannii*** ENGELMANN'S HEDGEHOG CACTUS. Shrub. Occasional in open rocky places of alluvial bajada in Joshua tree woodland. (*Pitzer 99* [UCR])

Echinocereus mojavensis (Engelm. & J.M. Bigelow) Rumpler MOJAVE KINGCUP CACTUS. Shrub. Uncommon on steep rocky slopes and in narrow rocky canyons. (*Pitzer 28* [UCR])

†Grusonia parishiorum (Orcutt ex Britton & Rose) Pinkava MATTED CHOLLA. Shrub. Rare to locally common in open rocky/gravelly flats on alluvial bajadas in Joshua tree woodland. (*André 20471* [UCR])

Opuntia basilaris Engelm. & J. Bigelow var. ***basilaris*** BEAVERTAIL. Shrub. Occasional in open rocky/gravelly flats of alluvial bajada of Joshua tree woodland and on benches and margins of canyon bottoms. (*Pitzer 85* [UCR])

†Opuntia ×charlestonensis Clokey Shrub. Localized population on rocky alluvium on the east side of the range in the vicinity of Blue Buzzard Mine. (*Baker 16749*)

Opuntia chlorotica Engelm. & J. Bigelow PANCAKE CACTUS. Shrub. Occasional on steep rocky slopes, ridges and outcrops. (*Jones s.n., March 3, 1934*)

Opuntia phaeacantha Engelm. MOJAVE PRICKLY PEAR. Shrub. Occasional to locally common in rocky alluvium and along rocky ridges. (*Baker 16750*)

Opuntia polycantha Haw. var. ***erinacea*** (Engelm. & Bigelow ex Engelm.) Parfitt GRIZZLYBEAR PRICKLYPEAR. Shrub. Mountain Pass. (*Rush 198*)

Campanulaceae

Nemacladus orientalis (McVaugh) Morin EASTERN GLANDULAR NEMACLADUS. Annual herb. Scattered on steep rocky limestone slopes and in sandy/gravelly places in drainages. (*Bell 8112*)

Nemacladus sigmoideus G. Robb. SMALL FLOWERED NEMACLADUS. Annual herb. Sandy wash on the north side of Mineral Hill. (*Fraga 6466*)

Caprifoliaceae

Symphoricarpos longiflorus A. Gray DESERT SNOWBERRY. Sprawling shrub. Infrequent/scattered on rocky limestone slopes in narrow brushy canyons. (*Bell 8157*)

Caryophyllaceae

Eremogone macradenia (S. Watson) Ikonn. var. ***macradenia*** MOJAVE SANDWORT. Perennial herb. Occasional/scattered on steep rocky limestone slopes and ridges. (*Bell 8166*)

Silene antirrhina L. SLEEPY CATCHFLY. Annual herb. A few localized populations scattered in semi-shady rocky places of limestone canyons. (*Bell 8137*)

Silene verecunda S. Watson DOLORES CAMPION. Annual herb. A single collection from just below the summit of the range, where it was uncommon on loose north-facing talus slopes. (*Bell 8130*)

Chenopodiaceae

Atriplex canescens (Pursh) Nutt. var. ***canescens*** FOURWING SALTBUSH. Shrub. Uncommon to occasional on slopes and on alluvial bajadas of Joshua tree woodland. (*Bell 8152*)

Atriplex confertiflora (Torr. & Frem.) S. Watson SHADSCALE. Shrub. Alkali hills west of Mountain Pass. (*Munz 12893*)

Chenopodium fremontii S. Watson FREMONT'S GOOSEFOOT. Annual herb. Uncommon to occasional in Joshua tree woodlands. (*André 22215*)

Chenopodium incanum (S. Watson) A. A. Heller var. ***occidentale*** D.J. Crawford MEALY PIGWEED. Perennial herb. Uncommon to occasional in open places of Joshua tree woodlands and along drainages. (*André 25888* [SD])

Grayia spinosa (Hook.) Moq. HOPSAGE. Shrub. Occasional on rocky slopes, in shrubby areas of Joshua tree woodlands and along drainages. (*André 20478*)

Krascheninnikovia lanata (Pursh) A.D.J. Meeuse & Smit WINTER FAT. Shrub. Occasional on rocky slopes, in shrubby areas of Joshua tree woodlands and along drainages. (*Bell 8173*)

Crassulaceae

Dudleya saxosa (M.E. Jones) Britton & Rose subsp. ***aloides*** (Rose) Moran DESERT DUDLEYA. Perennial herb. A single collection from the east side of the range in the vicinity of the Dinosaur Trackway area where it was uncommon on slope of metamorphic soils. (*André 9520* [UCR])

Crossosomataceae

Glossopetalon spinescens A. Gray var. ***aridum*** M.E. Jones SPINY GREASEWOOD. Shrub. Uncommon to occasional/scattered on rocky limestone slopes and ridges in the central section of the range. (*Bell 8156*)

Cucurbitaceae

Cucurbita palmata S. Watson COYOTE GOURD. Perennial herb. A single collection from the north side of the range. (*Green s.n., 30 Sep 2011* [UCR])

Euphorbiaceae

Euphorbia albomarginata Torr. & A. Gray RATTLESNAKE SPURGE. Perennial herb. Occasional in sandy/gravelly soils in open places of sparse Joshua tree woodlands. (*André 25909*)

†Euphorbia exstipulata Engelm. var. ***exstipulata*** CLARK MOUNTAIN SPURGE. Annual herb. Rare to locally frequent in open gravelly places of sparse Joshua tree woodlands and on limestone slopes. Only seen after good/sufficient summer monsoonal storms. (*Bell 4279*)

Euphorbia fendleri Torr. & A. Gray FENDLER'S SPURGE. Perennial herb. Occasional/scattered on limestone slopes and ridges. (*Bell 2444*)

Euphorbia micromera (Engelm.) Wooton & Standley SONORAN SPURGE. Annual herb. Occasional in gravelly soils. (*André 36943*)

†Euphorbia revoluta Engelm. REVOLUTE SPURGE. Annual herb. Occasional/scattered on limestone slopes and ridges after adequate summer monsoonal storms. (*Bell 4090*)

Euphorbia serpyllifolia Pers. THYME-LEAFED SPURGE. Annual herb. Occasional/scattered, sometimes locally common, on limestone slopes. (*Bell 4056*)

Euphorbia setiloba Engelm. YUMA SPURGE. Annual herb. A single collection from the north side of the range, bur locally common in places after monsoonal storms. (*Green s.n., 30 Sep 2011* [UCR])

†Tragia ramosa Torrey DESERT NOSEBURN. Perennial herb. Occasional to locally common in rocky canyon bottoms and drainages. (*Bell 5856*)

Fabaceae

†Acmispon argyraeus (Greene) Brouillet var. ***multicaulis*** (Ottley) Brouillet SCRUB LOTUS. Perennial herb. A single location on the east side of the range in the vicinity of the Dinosaur Trackway where it was found to be uncommon (80 plants) in limestone gravels at the base of cliff. (*André 9525*)

Acmispon brachycarpus (Benth.) D.D. Sokoloff SHORT PODDED LOTUS. Annual herb. A single collection from the vicinity of the Dinosaur Trackway. (*André 35437*)

†Astragalus bernardinus M.E. Jones SAN BERNARDINO MILKVETCH. Perennial herb. A single historic collection from 1937 from the north side of the range. (*Reed 742* [UCR])

Astragalus layneae Greene LAYNE'S MILKVETCH. Perennial herb. A few scattered collection from the north side of the range. (*Cooper 3519*)

Astragalus lentiginosus Hook. var. ***fremontii*** (A. Gray) Watson FREMONT'S MILKVETCH. Annual or perennial herb. Occasional to locally common in open sandy/gravelly places. (*Bell 5877*)

Astragalus lentiginosus Hook. var. ***variabilis*** Barneby FRECKLED MILKVETCH. Annual or perennial herb. A single collection from the north side of the range. (*Wolf 3334*)

Astragalus minthorniae (Rydb.) Jepson var. ***villosus*** Barneby MINTHORN'S MILKVETCH. Perennial herb. Uncommon to occasional/scattered on rocky limestone slopes. (*Bell 8167*)

Astragalus mohavensis S. Watson var. ***mohavensis*** MOJAVE MILKVETCH. Annual or perennial herb. Infrequent/scattered on limestone slopes and ridges and on gravelly benches in canyon bottoms. (*Bell 8165*)

Astragalus newberryi A. Gray NEWBERRY'S MILKVETCH. Perennial herb. Occasional on rocky limestone ridges and slopes in the central section of the range. (*Bell 8126*)

†Astragalus nutans M.E. Jones PROVIDENCE MOUNTAINS MILKVETCH. Annual herb. Uncommon on limestone gravels on east side of the range. (*André 29085*)

Astragalus nuttallianus A. DC. var. ***imperfectus*** (Rydb.) Barneby TURKEY PEAS. Annual herb. Uncommon to occasional/scattered on rocky limestone slopes and ridges. (*Bell 8124*)

Astragalus purshii Douglas var. ***tinctus*** M.E. Jones PURSH'S MILKVETCH. Perennial herb. Uncommon in rocky limestone canyons. (*Meyer & Hird 100*)

†Astragalus tidestromii (Rydb.) Clokey TIDESTROM'S MILKVETCH. Perennial herb. Uncommon/scattered on rocky limestone ridges and open sunny flats. (*Bell 8171*)

Lupinus brevicaulis S. Watson SHORT STEMMED BLUE LUPINE. Annual herb. Uncommon. A few collections from the east side of the range and from Wheaton Spring. (*André 9524* [UCR])

Lupinus concinnus J. Agardh. var. ***concinnus*** ELEGANT LUPINE. Annual herb. A single collection from the east side of the range in limestone gravels in Joshua tree woodlands. (*André 25902*)

Lupinus flavoculatus A.A. Heller. YELLOW EYED LUPINE. Annual herb. Occasional on limestone slopes and in gravelly opening of Joshua tree woodland. (*Bell 8180*)

Neltuma odorata (Torr. & Frem.) C.E. Hughes & G.P. Lewis [*Prosopis glandulosa* Torr. var. ***torreyana*** (L.D. Benson) M.C. Johnst.] HONEY MESQUITE. Shrub. Locally common at a few springs. (*André 14453* [UCR])

Senegalia greggii (A. Gray) Britton & Rose CATCLAW. Shrub. Occasional to common along drainages and in narrow canyon bottoms. (*Peirson 7355*)

Hydrangeaceae

†Fendlerella utahensis (S. Watson) A.A. Heller YERBA DESIERTO. Shrub. Uncommon in central section of the range in narrow brushy canyons. (*Bell 8158*)

Hydrophyllaceae

Emmenanthe penduliflora Benth. WHISPERINGBELLS. Annual herb. A single collection from the vicinity of Mineral Spring to the southeast of Kokoweef where it was found to be occasional on gravelly slopes. (*André 12813* [UCR])

Eucrypta micrantha (Torr.) A. Heller SMALL FLOWERED EUCRYPTA. Annual herb. Occasional in rocky outcrops and slopes. (*André 32418*)

Phacelia affinis A. Gray PURPLE BELL PHACELIA. Annual herb. Uncommon on limestone slopes and ridges in the central section of the range. (*Bell 8114B*)

†Phacelia anelsonii J.F. Macbr. AVEN NELSON'S PHACELIA. Annual herb. Uncommon on limestone slopes and ridges. (*Bell 8122*)

†Phacelia barnebyana J. Howell BARNEBY'S PHACELIA. Annual herb. Rare, but locally common in a few places in heavy limestone scree on north facing slopes. (*Bell 2447*)

†Phacelia coerulea Greene SKY BLUE PHACELIA. Annual herb. Rare. A few localized populations on rocky limestone slopes and ridges. (*Bell 8121*)

Phacelia cryptantha Greene SMALL FLOWERED PHACELIA. Annual herb. Localized/uncommon on rocky slopes and outcrops. (*André 10230* [GMDRC])

Phacelia distans Benth. COMMON PHACELIA. Annual herb. Occasional to locally common on rocky/gravelly slopes and in shrubby flats of Joshua tree woodland. (*Bell 2455*)

Phacelia fremontii Torrey FREMONT'S PHACELIA. Annual herb. Occasional to locally common in open gravelly places of Joshua tree woodlands and on slopes. (*Bell 8120*)

Phacelia lemmonii A. Gray LEMMON'S PHACELIA. Annual herb. A single collection from the vicinity of Mineral Spring to the southeast of Kokoweef Peak. (*André 12819* [UCR])

Phacelia rotundifolia A. Gray ROUND LEAFED PHACELIA. Annual herb. Uncommon to locally common on steep rocky limestone slopes and cliff faces. (*Bell 8113*)

Phacelia tanacetifolia Benth. TANSY LEAFED PHACELIA. Annual herb. Scattered on limestone slopes below the summit area of the range. (*Bell 8119*)

Tricardia watsonii S. Watson THREEHEARTS. Perennial herb. A single historic collection from the Mountain Pass area. (*Alexander 516* [UC])

Krameriaceae

Krameria erecta Schult. LITTLE LEAVED RATANY. Shrub. Occasional to uncommon on limestone slopes and ridges and in shrubby Joshua tree woodlands. (*André 20514* [UCR])

Lamiaceae

†Hedeoma nana (Torr.) Briq. subsp. ***californica*** W.S. Stewart CALIFORNIA FALSE PENNYROYAL. Perennial herb. Uncommon/scattered on rocky limestone slopes and in canyon bottom in central section of the range. (*Bell 8135*)

Marrubium vulgare L. HOREHOUND. Perennial herb. A few localized populations around mining areas and along roads. (*André 14458*)

Salvia columbariae Benth. CHIA SAGE. Annual herb. Occasional/scattered on slopes, on sandy/gravelly benches along drainages and in openings of Joshua tree woodlands. (*André 25899*)

Salvia dorrii (Kellogg) Abrams var. ***dorrii*** DESERT SAGE. Shrub. Occasional/scattered in shrubby areas of Joshua tree woodlands. (*Bell 8148*)

Salvia mohavensis Greene MOJAVE SAGE. Shrub. Scattered on rocky slopes and in canyons. (*Jaeger s.n., June 10, 1939* [RSA])

Scutellaria mexicana (Torr.) A.J. Paton MEXICAN BLADDER SAGE. Shrub. Occasiona/scattered on slopes and in canyon bottoms, and in shrubby Joshua tree woodlands on alluvial bajadas. (*Bell 8146*)

Linaceae

Linum lewisii Pursh var. ***lewisii*** LEWIS' FLAX. Perennial herb. Uncommon to occasional along limestone ridgelines and on slopes. (*Bell 2449*)

†Linum puberulum (Engelm.) A.A. Heller HAIRY FLAX. Annual herb. Uncommon to frequent, scattered along limestone ridges in the central part of the range. (*Bell 8134*)

Loaceaceae

Mentzelia albicaulis Hook. WHITE STEMMED BLAZING STAR. Annual herb. Occasional to uncommon on loose gravelly slopes and in open places in Joshua Tree woodlands. (*Bell 8136*)

Mentzelia obscura H.J. Thompson & Joyce Roberts PACIFIC BLAZING STAR. Annual herb. A few collections from the west side of the range in washes. (*Pitzer 101* [UCR])

Mentzelia oreophila J. Darl. ARGUS BLAZINGSTAR. Perennial herb. Steep calcareous north facing bank on the northern slopes of the Mescal Range. (*André 45701* [GMDRC])

Malvaceae

†Abutilon parvulum A. Gray DWARF MALLOW. Perennial herb. A single collection from the Dinosaur Trackway area. A highly localized population growing in sandstone cracks at the bottom of rocky drainage. (*Bell 5894*)

Sphaeralcea ambigua A. Gray var. ***ambigua*** APRICOT MALLOW. Perennial herb. Occasional/scattered on limestone slopes and along drainage margins. (*Bell 7591*)

Sphaeralcea ambigua A. Gray var. ***rugosa*** (Kearney) Kearney DESERT GLOBEMALLOW. Perennial herb. Occasional on rocky/gravelly slopes and drainages. (*André 29091* [UCR])

Sphaeralcea angustifolia (Cav.) G. Don NARROW LEAVED DESERT MALLOW. Shrub. Occasional in dark granitic boulders on the north side of the Mescal Range. (*André 9517* [GMDRC])

†Sphaeralcea rusbyi A. Gray var. ***eremicola*** (Jepson) Kearney RUSBY'S DESERT MALLOW. Perennial herb. On both limestone and granitic soils on the east side of the range, to Mineral Hill in upper Piute Valley. Uncommon to occasional, locally common to scattered, in open sandy/gravelly areas of Joshua tree/juniper woodlands. (*Bell 5843*)

Molluginaceae

Mollugo cerviana (L.) Ser. THREADSTEM CARPETWEED. Annual herb. Occasional to locally common in places following summer monsoonal storms. (*Boyd, Vanderplank & Arvizu 11612*)

Montiaceae

Claytonia parviflora Hook. MINER'S LETTUCE. Annual herb. A few historic collections from the north side of the range. (*Wade 91-11* [UCR])

Nyctaginaceae

†Abronia nana S. Watson var. ***covillei*** (Heimerl) Munz COVILLE'S DWARF SAND VERBENA. Perennial herb. A single collection from the central section of the range where it was scattered or rocky limestone ridges. (*Bell 9534*)

Allionia incarnata L. WINDMILLS. Perennial herb. Occasional on slopes and in open gravelly areas of Joshua tree woodlands. (*Bell 8175*)

Boerhavia coulteri (Hook) S. Watson var. ***palmeri*** (S. Watson) Spellenb. COULTER'S SPIDERLING. Annual herb. Infrequent/scattered in rocky canyon bottom in the vicinity of Dinosaur Trackway. (*Bell 4092*)

Boerhavia triquetra S. Watson var. ***intermedia*** (M.E. Jones) Spellenb. FIVEWING SPIDERLING. Annual herb. Occasional in limestone gravels in Joshua tree woodlands on the east side of the range. (*André 39727*)

Boerhavia wrightii A. Gray WRIGHT'S SPIDERLING. Annual herb. Locally common in places after summer monsoonal storms. (*Boyd, Vanderplank & Arvizu 11615*)

Mirabilis albida (Walter) Heimeri WHITE FOUR O'CLOCK. Perennial herb. Occasional in limestone gravels in blackbush scrub and Joshua tree woodlands. (*Bell 7592*)

†Mirabilis coccinea (Torrey) Benth. & Hook. SCARLET FOUR O'CLOCK. Perennial herb. Uncommon/scattered in small drainages in Piute Valley, usually growing out of thick shrubbery. Only seen after abundant summer monsoonal storms. (*Bell 10177*)

Mirabilis laevis (Benth.) Curran var. ***villosa*** (Kellogg) Spellenb. WISHBONE BUSH. Perennial herb. Occasional in limestone gravels in blackbush scrub and Joshua tree woodlands. (*André 38288*)

Mirabilis multiflora (Torrey) A. Gray GIANT FOUR O'CLOCK. Perennial herb. Occasional/scattered on limestone slopes, in rocky drainages and in gravelly places in Joshua tree woodlands. (*Bell 5854*)

Oleaceae

Forestiera pubescens Nutt. DESERT OLIVE. Shrub. Rare. Localized population at Groaner Spring. (*André 32414*)

Fraxinus anomala S. Watson SINGLE LEAVED ASH. Tree/shrub. Uncommon/scattered in canyon bottom in central section of the range. (*Bell 8155*)

Menodora scabra A. Gray var. ***glabrescens*** A. Gray DESERT OLIVE. Perennial herb. Occasional on limestone slopes and in shrubby areas of Joshua tree woodlands. (*Bell 5869*)

Menadora spinescens A. Gray var. ***spinescens*** SPINY DESERT OLIVE. Shrub. Uncommon to occasional on limestone slopes and ridges, and in shrubby alluvial bajadas in Joshua tree woodlands. (*Bell 5898*)

Onagraceae

Camissonia campestris (Greene) Raven MOJAVE SUNCUP. Annual herb. A few historic collections from Mountain Pass. (*Cooper 3526*)

Chylismia brevipes (A. Gray) Small subsp. ***brevipes*** YELLOW CUPS. Annual herb. A single collection from the northwestern section of the range. (*André 20507* [UCR])

Chylismia walkeri A. Nelson subsp. ***tortilis*** (Jeps.) W.L. Wagner & Hoch WALKER'S SUNCUP. Annual or perennial herb. Scattered on limestone ridges and slopes in the central section of the range. (*Bell 8111*)

Chylismiella pterosperma (S. Watson) W.L. Wagner & Hoch WING FRUIT SUNCUP. Annual herb. Localized and uncommon on rocky limestone slopes to the southwest of Hardrock Queen Spring. (*Bell 2446*)

Eremothera boothii (Douglas) W.L. Wagner & Hoch subsp. ***condensata*** (Munz) W.L. Wagner & Hoch CLUSTERED BOOTH'S DESERT PRIMROSE. Annual herb. Sandy granitic soils in Joshua tree woodland. (*André 25989* [SD])

Eremothera chamaenerioides (A. Gray) W.L. Wagner & Hoch LONG FRUIT SUNCUP. Annual herb. Scattered on limestone slopes and ridges. (*Bell 8116*)

Oenothera californica (S. Watson) S. Watson subsp. ***avita*** Klein CALIFORNIA EVENING PRIMROSE. Perennial herb. A single historic collection from the western alluvial slopes of the range where it was found to be common. (*Pitzer 112* [UCR])

†Oenothera cespitosa Nutt. subsp. ***crinita*** (Rydb.) Munz CAESPITOSE EVENING PRIMROSE. Perennial herb. Uncommon to occasional on rocky limestone slopes and cliff faces. (*Bell 8163*)

Oenothera cespitosa Nutt. subsp. ***marginata*** (Hook. & Arn.) Munz FRAGRANT EVENING PRIMROSE. Perennial herb. Occasional on gabbro outcrops. (*André 32421*)

Oenothera suffrutescens (Ser.) W.L. Wagner & Hoch WILD HONEYSUCKLE. Perennial herb. Occasional/scattered on limestone ridges and in rocky canyon bottoms. (*Bell 5881*)

Orobanchaceae

Aphyllon cooperi (A. Gray) A. Heller DESERT BROOMRAPE. Parasitic perennial herb. A single collection from the central section of the range where there were a few isolated colonies in sandy soils in canyon bottom. (*Bell 9691*)

Aphyllon fasciculatum Nutt. CLUSTERED BROOMRAPE. Parasitic perennial herb. A few scattered colonies in sandy soils of canyon bottom in the central section of the range, appearing to be parasitic on *Artemisia tridentata*. (*Bell 9523*)

Castilleja applegatei Fernald subsp. ***martinii*** (Abrams) T.I. Chuang & Heckard WAVYLEAF PAINTBRUSH. Perennial herb. A single collection from the Blue Buzzard Mine area where it was occasional in limestone gravels in Joshua tree woodlands. (*André 25882*)

Castilleja chromosa A. Nelson DESERT PAINTBRUSH. Parasitic perennial herb. Occasional/scattered on rocky/gravelly slopes. (*Bell 5849*)

Papaveraceae

Eschscholzia glyptosperma Greene DESERT GOLDEN POPPY. Annual herb. Scattered collections from west, east, and north sides of the range. Uncommon to occasional on gravelly slopes. (*André 12828* [UCR])

Eschscholzia minutiflora S. Watson COVILLE'S POPPY. Annual herb. Occasional on gravelly slopes and in washes and drainages. (*André 25900*)

Phrymaceae

Diplacus bigelovii (A. Gray) A. Gray var. ***bigelovii*** BIGELOW'S MONKEYFLOWER. Annual herb. Occasional to locally common on rocky/gravelly limestone slopes and in open gravelly places on alluvial bajadas in Joshua tree woodlands. (*Bell 8162*)

Erythranthe rubella A. Gray LITTLE REDSTEM MONKEYFLOWER. Annual herb. A few populations found, where they were noted as locally common on rocky/gravelly limestone slopes. (*Bell 2448*)

Plantaginaceae

Antirrhinum filipes A. Gray. TWINING SNAPDRAGON. Annual herb. A single collection from the vicinity of Mineral Spring to the southeast of Kokoweef Peak. (*André 12816* [UCR])

Penstemon eatonii A. Gray var. ***eatonii*** EATON'S PENSTEMON. Perennial herb. A single collection from the central section of the range where it was localized in a rocky chute below the summit. (*Bell 8129*)

Penstemon palmeri A. Gray var. ***palmeri*** PALMER'S PENSTEMON. Perennial herb. Occasional to common on rocky limestone slopes and along rocky canyon bottoms. (*Bell 8174*)

†Penstemon utahensis Eastw. UTAH PENSTEMON. Perennial herb. A single localized population where it was uncommon on limestone slopes on the east side of the range. (*André 9518* [UCR])

****Plantago major*** L. COMMON PLANTAIN. Perennial herb. A single localized population from Murdoch Spring in the northern section of the Range. (*André 14459*)

Plantago patagonica Jacq. PATAGONIA PLANTAIN. Annual herb. Occasional/scattered in loose limestone soils. (*Bell 2451*)

Polemoniaceae

Eriastrum diffusum (A. Gray) H. Mason MINIATURE WOOLLYSTAR. Annual herb. Scattered/occasional in gravelly places. (*Bell 8181*)

Eriastrum eremicum (Jeps.) H. Mason subsp. ***eremicum*** DESERT WOOLYSTAR. Annual herb. Locally common in dark boulders on the north side of the range. (*André 9494*)

Gilia brecciarum M.E. Jones subsp. ***brecciarum*** NEVADA GILIA. Annual herb. Occasional to uncommon on rocky limestone ridges and in rocky drainages. (*Bell 8184*)

Gilia cana (M.E. Jones) A.A. Heller subsp. ***triceps*** (Brand) A.D. Grant & V. Grant SHOWY GILIA. Annual herb. Sandy wash areas along Cima Road and Mountain Pass. (*Porter 11470*)

Gilia clokeyi H. Mason CLOKEY'S GILIA. Annual herb. Occasional in rocky canyon on the north side of the range. (*André 32410*)

Gilia ophthalmoides Brand EYED GILIA. Annual herb. Occasional on breccia outcrops on the north side of the range. (*André 33204* [GMDRC])

Gilia sinuata Benth. CINDER GILIA. Annual herb. Wash areas along Cima Road and Mountain Pass. (*Wolf 3325*)

Gilia stellata A. Heller STAR GILIA. Annual herb. Occasional on gravelly slopes and in rocky canyon bottoms. (*André 12799*)

Gilia transmontana (H. Mason & A.D. Grant) A.D. Grant & V. Grant TRANSMONTANE GILIA. Annual herb. Occasional on steep rocky limestone slopes. (*Bell 8143*)

Ipomopsis polycladon (Torrey) V. Grant MANYBRANCHED IPOMOPSIS. Annual herb. Scattered collections from across the range from open rocky places. Annual herb. (*Bell 9541*)

Langloisia setosissima (Torrey & A. Gray) Greene subsp. ***punctata*** (Cov.) BRISTLY LANGLOISIA. Annual herb. Infrequent/scattered on slopes and open rocky places. (*Bell 8169A*)

Leptosiphon chrysanthus J.M. Porter & R. Patt. subsp. ***chrysanthus*** GOLDEN LINANTHUS. Annual herb. Wash area of Mountain Pass. (*Wolf 3332*)

Linanthus bigelovii (A. Gray) Greene subsp. ***johnstonii*** J.M. Porter & R. Patt. BIGELOW'S LINANTHUS. Annual herb. Locally common in places on the north side of the range. (*André 10229* [UCR])

Linanthus demissus (A. Gray) Greene DESERT LINANTHUS. Annual herb. Occasional on gravelly slopes and rocky ridges. (*André 12811* [GMDRC])

Linanthus filiformis (Parry ex A. Gray) J. M. Porter & L. A. Johnson YELLOW GILIA. Annual herb. A single collection from the central section of the range, where it was scattered along a rocky limestone ridge. (*Bell 9537*)

Loeseliastrum matthewsii (A. Gray) S. Timbrook DESERT CALICO. Annual herb. A single collection from Mountain Pass. (*Mason 14247* [UC])

Loeseliastrum schottii (Torrey) S. Timbrook SCHOTT'S CALICO. Annual herb. Occasional/scattered in sandy/gravelly soils in alluvial bajada on the west side of the range. (*André 25988*)

Phlox stansburyi (Torrey) A.A. Heller COLD DESERT PHLOX. Perennial herb. Infrequent on gravelly limestone slopes in the central section of the range. (*Bell 2456*)

Polygalaceae

†Rhinotropis acanthoclada (A. Gray) J.R. Abbott THORNY MILKWORT. Shrub. A single collection from Mountain Pass. (*Wear s.n., 6 Jul 1990* [UCR])

Polygonaceae

Centrostegia thurberi Benth. THURBER'S SPINEFLOWER. Annual herb. Fairly common on alluvial bajada on the west side of the range. (*Pitzer 92* [UCR])

Eriogonum brachypodum Torr. & A. Gray PARRY'S BUCKWHEAT. Annual herb. Locally common in a few places in drainages and on road cuts. (*André 36915* [UCR])

Eriogonum deflexum Torrey var. ***deflexum*** SKELETON WEED. Annual herb. Scattered in rocky canyons and on slopes. (*Bell 10198*)

Eriogonum fasciculatum Benth. CALIFORNIA BUCKWHEAT. Shrub. Scattered on rocky slopes and canyon bottoms and in shrubby areas of Joshua tree woodlands on alluvial bajadas. (*André 29082*)

†Eriogonum heermannii Durand & Hilg. var. ***floccosum*** Munz CLARK MOUNTAIN BUCKWHEAT. Shrub. Uncommon to locally common in places on steep rocky limestone slopes, cliff faces and outcrops. (*Bell 2461*)

Eriogonum inflatum Torr. & Frem DESERT TRUMPET. Perennial herb. Occasional on rocky limestone slopes and ridges and in gravelly places on alluvial bajadas in Joshua tree woodlands. (*André 29079*)

Eriogonum maculatum A.A. Heller SPOTTED BUCKWHEAT. Annual herb. A few collections from the vicinity of Mineral Spring and from Mountain Pass. (*André 12809* [GMDRC])

Eriogonum microtheca Nutt. var. ***simpsonii*** (Benth.) Reveal SIMPSON'S BUCKWHEAT. Shrub. Scattered on rocky limestone slopes. (*Bell 5866*)

Eriogonum nidularium Cov. BIRDNEST BUCKWHEAT. Annual herb. Scattered on rocky/gravelly slopes. (*Bell 7597*)

Eriogonum palmerianum Rev. PALMER'S BUCKWHEAT. Annual. Scattered on rocky/gravelly slopes and in canyon bottoms. (*Bell 9527*)

Eriogonum pusillum Torrey & A. Gray YELLOW TURBANS. Annual herb. Fairly common on alluvial bajadas on the west side of the range. (*Pitzer 90* [UCR])

Eriogonum trichopes Torrey LITTLE DESERT TRUMPET. Annual herb. Occasional in rocky wash bottoms and in open rocky places on alluvial bajadas in Joshua tree woodlands. (*Bell 4282*)

†Eriogonum umbellatum Torr. var. ***juniporinum*** Reveal JUNIPER BUCKWHEAT. Perennial herb. A localized population on rhyolite outcroppings on the north side of the range. (*André 36949* [UCR])

Eriogonum wrightii Benth. var. ***wrightii*** WRIGHT'S BUCKWHEAT. Perennial herb, sub-shrub. Occasional to localized in rocky places in Joshua tree woodlands. (*André 22225*)

****Rumex crispus*** L. CURLY LEAVED DOCK. Perennial herb. A single localized population on gravelly alluvium at Murdoch Spring on the north side of the range. (*André 14457* [UCR])

Portulacaceae

†Portulaca halimoides L. SILKCOTTON PURSLANE. Annual herb. Uncommon/scattered in canyon and drainage bottoms. Only seen after abundant summer monsoonal storms. (*Bell 4085*)

Ranunculaceae

Anemone tuberosa Rydb. TUBER ANEMONE. Perennial herb. Uncommon in limestone cracks of cliff faces and outcrops. (*Bell 2452*)

Delphinium parishii A. Gray PARISH'S LARKSPUR. Perennial herb. Occasional/scattered on limestone slopes and ridges. (*Bell 8132*)

Myosurus cupulatus S. Watson DESERT MOUSE TAIL. Annual herb. A single localized population found on gabbro rocks on the north side of the range. (*André 35450* [GMDRC])

Rosaceae

Amelanchier utahensis Koehne UTAH SERVICE BERRY. Shrub. Uncommon in rocky canyon bottoms in the central section of the range. (*Bell 9529*)

Cercocarpus intricatus S. Watson LITTLE LEAVED MOUNTAIN MAHOGANY. Shrub. Scattered in brushy canyon bottoms and on slopes in central section of the range. (*Bell 8151*)

Coleogyne ramosissima Torrey BLACKBRUSH. Perennial shrub. Occasional to common on slopes and ridges and on alluvial bajadas in Joshua tree woodlands. (*Bell 2465*)

Fallugia paradoxa (D. Don) Endl. APACHE PLUME. Shrub. Scattered in rocky canyons and on alluvial bajadas in Joshua tree woodland. (*André 19872* [UCR])

Petrophytum caespitosum (Nutt.) Rydb. subsp. ***caespitosum*** ROCK SPIRAEA. Shrub. Occasional to locally common on steep limestone slopes, cliff faces and outcrops. (*Bell 2464*)

Prunus fasciculata (Torrey) A. Gray DESERT ALMOND. Shrub. Scattered colonies in brushy canyon in the central section of the range. (*Bell 8149*)

Purshia stansburyana (Torr.) Henr. STANSBURY'S ANTELOPE BUSH. Shrub. Occasional/scattered on rocky slopes and canyon bottoms. (*Bell 2460*)

Purshia tridentata (Pursh) DC. var. ***glandulosa*** (Curran) M.E. Jones DESERT BITTERBRUSH. Shrub. (*Helmkamp s.n., May 29, 1977* [CLARK])

Rubiaceae

Galium parishii Hilend & J. Howell PARISH'S BEDSTRAW. Perennial herb. Scattered colonies in rock cracks and in narrow rocky limestone canyon bottoms. (*Bell 5860*)

†Galium proliferum A. Gray DESERT BEDSTRAW. Annual herb. Uncommon. Scattered colonies in rocky limestone canyon bottoms and along ridges in the central section of range. (*Bell 9540*)

Rutaceae

Thamnosma montana Torrey & Fremont TURPENTINE BROOM. Shrub. Occasional/scattered on rocky limestone slopes and on alluvial bajadas in Joshua tree woodland. (*Bell 8147*)

Saururaceae

Anemopsis californica (Nutt.) Hook. & Arn. YERBA MANSA. Perennial herb. At isolated spring at Mineral Hill. (*Fraga, Perez & Wing 6463*)

Scrophulariaceae

Buddleja utahensis Cov. UTAH BUTTERFLYBUSH. Shrub. Occasional/scattered on steep limestone slopes and cliff faces in the central section of the mountain range. (*Bell 8164*)

Solanaceae

Lycium andersonii A. Gray ANDERSON'S DESERT THORN. Shrub. A few historic collections from Mountain Pass and Wheaton Wash in the northern section of the range. (*Cooper 3535*)

Lycium cooperi A. Gray COOPER'S BOX THORN. Shrub. Occasional to locally common on rocky slopes and on alluvial bajadas in Joshua tree woodlands. (*André 14698* [GMDRC])

Physalis hederifolia A. Gray var. ***fendleri*** (A. Gray) Cronquist FENDLER'S GROUND CHERRY. Perennial herb. Occasional on limestone alluvium in pinyon-juniper woodlands. (*André 39731* [GMDRC])

Physalis hederifolia A. Gray var. ***palmeri*** (A. Gray) Cronq. PALMERS GROUND CHERRY. Perennial herb. Occasional/scattered on limestone slopes and along drainage margins. (*Bell 4091*)

Verbenaceae

†Aloysia wrightii Abrams VERA DULCE. Shrub. Uncommon/scattered on limestone slopes of Kokoweef Mountain. (*Bell 4283*)

Verbena bracteata Lagasca & J.D. Rodriguez BRACTED VERBENA. Annual or perennial herb. A single collection from a spring on the north side of the range. (*Sanders 00992* [UCR])

Verbena gooddingii Briq. SOUTHWESTERN MOCK VERVAIN. Perennial herb. Occasional to common along drainage margins and in open rocky places on alluvial bajadas in Joshua tree woodlands. (*Bell 4100*)

Viscaceae

Phoradendron juniperinum A. Gray JUNIPER MISTLETOE. Parasitic on *Juniperus osteosperma*. A single collection from the vicinity of the Iron Horse Mine site. (*André 14722* [UCR])

Zygophyllaceae

Kallstroemia californica (S. Watson) Vail CALIFORNIA CALTROP. Annual herb. Occasional to locally common in places following summer monsoonal storms. (*André 22331* [UCR])

†Kallstroemia parviflora Norton WARTY CALTROP. Annual herb. Uncommon/scattered to locally common on limestone slopes and flats. (*Bell 4070*)

Larrea tridentata (DC.) Cov. CREOSOTE BUSH. Shrub. Frequent/scattered on slopes and on alluvial bajadas in Joshua tree woodlands. (*Boyd 11613*)

MONOCOTS

Agavaceae

†Agave utahensis (Engelm.) Gentry var. ***nevadensis*** Engelm. NEVADA AGAVE. Perennial herb/shrub. Occasional to locally common on limestone slopes and ridges. (*Bell 5862*)

Yucca baccata Torrey SPANISH BAYONET. Shrub. Occasional/scattered to common on alluvial bajadas in Joshua tree woodlands. (*André 29074*)

Yucca brevifolia Engelm. var. ***jaegeriana*** (McKelvey) L.W. Lenz EASTERN JOSHUA TREE. Tree. Occasional to common on ridges and on alluvial bajadas. (*Munz 13751*)

Yucca schidigera K.E. Ortgies MOHAVE YUCCA. Shrub. Occasional/scattered on rocky slopes and ridges and on alluvial bajadas in Joshua tree woodlands. (*Cooper 35125*)

Alliaceae

†Allium nevadense S. Watson NEVADA ONION. Perennial herb from bulb. Uncommon. A few populations seen on rocky ridges with heavy soils. (*Bell 9518*)

Liliaceae

Calochortus kennedyi Porter var. ***kennedyi*** DESERT MARIPOSA LILY. Perennial herb from bulb. Occasional/scattered on rocky slopes and ridges. (*André 29078*)

Calochortus kennedyi Porter var. ***munzii*** Jepson MUNZ'S MARIPOSA. Perennial herb from bulb. Uncommon/scattered on rocky ridges and slopes. (*Bell 8177*)

Poaceae

Aristida adscensionis L. SIX WEEK THREE AWN. Annual herb. Occasional to locally common in patches in rocky canyon bottoms and on alluvial bajadas in Joshua tree woodlands. (*Bell 5847*)

Aristida purpurea Nutt. var. ***fendleriana*** (Steud.) Vasey FENDLER THREE AWN GRASS. Perennial grass. Occasional on rocky limestone slopes. (*André 29062* [UCR])

Aristida purpurea Nutt. var. ***longiseta*** (Steud.) Vasey RED THREE AWN GRASS. Perennial grass. Occasional in mixed limestone gravels in Joshua tree woodlands. (*André 25843*)

Aristida purpurea Nutt. var. ***nealleyi*** (Vasey) Allred NEALLEY THREE AWN GRASS. Perennial grass. Occasional to locally common on rocky/gravelly slopes and open flats. (*Bell 8176*)

Bouteloua aristidoides (Kunth) Griseb. var. ***aristidoides*** NEEDLE GRAMA. Annual herb. Occasional to common following summer monsoonal rains. (*Estrada 9*)

Bouteloua barbata Lagasca var. ***barbata*** SIXWEEK GRAMA. Annual herb. Occasional/scattered on rocky limestone slopes and ridges. (*Bell 4078*)

Bouteloua curtipendula (Michaux) Torrey SIDEOATS GRAMA. Perennial grass. Occasional/scattered on rocky limestone slopes and ridges and in rocky canyon bottoms. (*Bell 5880*)

†Bouteloua eriopoda (Torrey) Torrey BLACK GRAMA. Perennial grass. Occasional to common on alluvial bajadas in Joshua tree woodlands in upper Piute Valley and scattered along canyon bottoms in the central section of the range. (*Bell 4087*)

Bouteloua gracilis (Kunth) Griffiths BLUE GRAMA. Perennial grass. Occasional/scattered on rocky slopes and in rocky/gravelly openings on alluvial bajadas in Joshua tree woodlands. (*Bell 4096*)

†Bouteloua trifida Thurber RED GRAMA. Perennial grass. Uncommon. A single collection from the central section of the range where it was scattered on loose rocky slopes. (*Bell 8138*)

****Bromus rubens*** L. FOXTAIL BROME. Annual grass. Occasional to locally common. (*Fraga, Perez & Wing 6459*)

****Bromus tectorum*** L. CHEATGRASS. Annual grass. Occasional to locally common in places. (*Green s.n., April 11, 2011* [UCR])

Dasyochloa pulchella (Kunth) Rydb. LOW WOOLLYGRASS. Perennial grass. Occasional to common, scattered on limestone slopes and in open rocky/gravelly places on alluvial bajadas in Joshua tree woodlands. (*Bell 4082*)

****Echinochloa crus-galli*** (L.) P. Beauv. BARNYARD GRASS. Annual grass. A single localized population from the vicinity of the Dinosaur Trackway. (*André 22230*)

Elymus elymoides (Raf.) Swezey var. ***elymoides*** BOTTLEBRUSH. Perennial herb. Occasional/scattered on rocky slopes and in open gravelly places on alluvial bajadas in Joshua tree woodlands. (*Bell 8172*)

†Enneapogon desvauxii Beauv. NINE AWNED PAPPUS GRASS. Annual grass. Uncommon to locally common on limestone slopes and along rocky ridges. Only seen after abundant summer monsoonal storms. (*Bell 4079*)

****Eragrostis cilianensis*** (All.) Janchen STINKGRASS. Annual herb. A single collection from upper Piute Valley where it was occasional following heavy summer monsoonal storms. (*André 22226* [UCR])

†Erioneuron pilosum (Buckley) Nash HAIRY WOOLLYGRASS. Occasional to locally common on rocky limestone ridges and rocky outcrops. (*Bell 8125*)

Festuca octoflora Walter SIXWEEK GRASS. Annual grass. Uncommon to locally common on rocky/gravelly slopes and rocky canyon bottoms. (*Bell 9526*)

Hilaria jamesii (Torr.) Benth. GALLETA GRASS. Perennial grass. Occasional on rocky limestone slopes and ridges and in open rocky/gravelly places on alluvial bajadas in Joshua tree woodlands. (*Bell 5883*)

Hilaria rigida (Thurb.) Scribn.) BIG GALLETA GRASS. Perennial grass. Occasional to common on limestone alluvium in Joshua tree woodlands. (*Boyd, Vanderplank & Arvizu 11607*)

†Muhlenbergia arsenei A. Hitchc. NAVAJO MUHLY. Perennial grass. Rare. A localized population growing in limestone cracks and on outcrops and cliff faces in the central section of the range. (*Bell 5886*)

Muhlenbergia microsperma (DC.) Trin. ANNUAL MUHLY. Annual grass. A single population found in the central section of the range where it was uncommon in rocky canyon bottom. (*Bell 5874*)

Muhlenbergia porteri Beal PORTER'S MUHLY. Perennial grass. Occasional to locally common on rocky slopes and in shrubby areas on alluvial bajadas in Joshua tree woodlands. (*Bell 4063*)

†Munroa squarrosa (Nutt.) Torrey FALSE BUFFALO GRASS. Annual grass. Occasional in sandy soils in Piute Valley in Joshua tree woodlands. (*André 23164*)

Poa bigelovii Vasey & Scribner BIGELOW'S BLUEGRASS. Annual grass. Uncommon. A few collections from the range, growing in amongst shrubbery in rocky canyon bottom in the central section of the range. (*Bell 9525*)

Poa fendleriana (Steud.) Vasey MUTTONGRASS. Perennial grass. Infrequent on rocky slopes and in rocky canyon bottoms. (*Bell 8131*)

Poa secunda J.S. Presl PINE BLUEGRASS. Perennial grass. A single historic collection from the north side of the range. (*Reed 9945* [UCR])

****Schismus barbatus*** (L.) Thell. COMMON MEDITERRANEAN GRASS. Annual grass. Occasional to locally common in places. (*Green s.n., April 11, 2011* [UCR])

****Sorghum bicolor*** (L.) Moench SORGHUM. Annual grass. A single collection from upper Piute Valley where it was uncommon/scattered in small washes near road. (*Bell 4074*)

Sporobolus airoides (Torrey) Torrey ALKALI SACATON. Perennial grass. Localized populations in the northwestern section of the mountain range. (*André 45695* [GMDRC])

Sporobolus contractus A. Hitchc. SPIKE DROPSEED. Perennial grass. Occasional/scattered in small drainages and open shrubby areas in upper Piute Valley and in rocky canyon bottoms. (*Bell 5871*)

Sporobolus cryptandrus (Torrey) A. Gray SAND DROPSEED. Perennial grass. Occasional to common after abundant summer monsoonal storms on rocky slopes and in rocky canyon bottoms and in grassy/shrubby alluvial bajadas of upper Piute Valley. (*Bell 5875*)

Sporobolus flexuosus (Vasey) Rydb. MESA DROPSEED. Perennial grass. A single collection from the vicinity of Kokoweef Mountain where it was uncommon/scattered across limestone slopes and in small washes at the base of slopes. (*Bell 4064*)

†Stipa arida M.E. Jones MORMON NEEDLE GRASS. Perennial grass. A single localized population on slopes above Iron Horse Mine. (*André 29063*)

Stipa comata Trin. & Rupr. NEDDLE-AND-THREAD GRASS. Perennial grass. A single collection from the central section of the range where there were scattered colonies in the rocky canyon bottom. (*Bell 9692*)

Stipa hymenoides Roem. & Schult RICE GRASS. Perennial grass. Occasional in rocky canyon bottoms and in grassy/shrubby alluvial bajadas in upper Piute Valley. (*Bell 5879*)

Stipa hymenoides × ***Stipa speciosa*** [*Stiporyzopsis* x *bloomeri* (Bol.) B.L. Johns.]. Striking rare hybrid, rocky slopes in pinyon-juniper woodland, 1600-2000 m. [syn: *Eriocoma* × *bloomeri* (Bol.) Romasch.] (*André 29084*)

Stipa parishii Vasey var. ***parishii*** PARISH'S NEEDLEGRASS. Perennial grass. Occasional to uncommon on rocky slopes. (*André 29090*)

Stipa speciosa Trin. & Rupr. DESERT NEEDLE GRASS. Perennial grass. Occasional on rocky slopes and ridges and along rocky wash margins. (*Bell 8128*)

Tridens muticus (Torrey) Nash SLIM TRIDENS. Perennial grass. Occasional to uncommon on rocky slopes and ridges and in rocky canyon bottoms. (*Bell 4080*)

Themidaceae

Dipterostemon capitatus (Benth.) Rydb. subsp. ***pauciflorus*** (Torrey) R.E. Preston BLUEDICKS. Perennial herb. Occasional/scattered in rocky canyon bottoms. (*Bell 8179*)

Crossosoma 49 (2), Fall-Winter 2023

NOTEWORTHY COLLECTIONS

Riverside County, California

CARLOWRIGHTIA ARIZONICA A. Gray. (ACANTHACEAE). — Santa Rosa Mountains/Sonoran (Colorado) Desert: Bear Creek, 2.57 air km SW of La Quinta Cove, 33°37'40.3", -116°19'31.5"W, ±100m [WGS84], Alt. 203 m/666 ft.Wash on canyon bottom and on sides with *Justicia californica* (Benth.) D.N. Gibson, *Senegalia greggii* (A. Gray) Britton & Rose, *Ditaxis lanceolata* (Benth.) Pax & K. Hoffm., *Pennisetum setaceum* (Forssk.) Chiov., *Condea emoryi* (Torr.) Harley & J.F.B. Pastore, *Horsfordia newberryi* (S. Watson) A. Gray, and *Encelia farinosa* A. Gray ex Torr. Plants sparse but continuous up Bear Creek Canyon, restricted to the south side of canyon bottom and on north facing slopes and ledges. At least 50 plants on mesozoic age granite bedrock in the canyon bottom. Deciduous sub-shrub; flowers white with pink veins. *Melanie J. Davis with Lynn C. Sweet 0014, 8 May 2024* (UCR308666).

Previous knowledge. *Carlowrightia arizonica*, commonly known as Arizona carlowrightia, is a subshrub generally reaching less than a meter in height and arising from a woody caudex with drought deciduous leaves. The corolla is pseudo-papilionaceous (pea-like), white to cream, with the upper lobe maroon-streaked with a yellow center and has been recorded as flowering throughout all months of the year. However, in environments without monsoons or a prolonged wet season, like California's Colorado Desert region, flowering phenology has been reported as March through May. The capsule is about 1 cm long, glabrous, and flattened with a terminal beak. Seeds are usually 4 per capsule (Daniel 1983, Daniel et al. 2012).

Carlowrightia arizonica is widely distributed from southern Arizona in the United States, to Guanacaste in Costa Rica, where it primarily occupies rocky or sandy washes, ledges, and hillsides from sea level to 1400 meters (Daniel 1983). It is somewhat cryptic in appearance when it lacks leaves, resembling several common subshrubs in dormancy, which may have led to under-detection in the past.

Carlowrightia arizonica has a California Rare Plant Rank of 2B.2, indicating it as rare, threatened, or endangered in California but common elsewhere (CNPSb 2024); in California it is known only from Anza-Borrego Desert State Park in San Diego Co. and has been collected four times from two general localities from 2006-2011 (CCH2 2024). However, since 2016, to the time of this publication, there have been 30 records from this region reported to Calflora and 338 verified iNaturalist observations of *C. arizonica* throughout San Diego Co. (Calflora 2025, iNaturalist 2025).

Carlowrightia arizonica was first detected in Riverside County in 2021 by Colin Barrows and Elizabeth Ogren Erickson in Guadalupe Creek and Devil Canyon (*https://www.inaturalist.org/observations/72497856*). Colin Barrows then documented the extent of the species within Devil Canyon in 2023 and 2024 and has since recorded over 30 individuals (personal communications, C. Barrows 2025).

Significance. This collection is significant for this taxon as it is the first vouchered specimen for Riverside County, it represents a northern range extension, and it lies 40 air km from the nearest collection. Although *Carlowrightia arizonica* had been recently observed in Riverside County, the locality of this collection is novel and is now the northwesternmost observation of the species, by 2.4 air km. This collection contributes to herbarium representation for an under-collected, regionally and locally rare species in California.

This occurrence was initially detected by Lynn Sweet and Jennifer Prado on 5 May 2024 while hiking in the area (Figure 1). Approximately 50 plants were documented growing on mesozoic age granite bedrock in the canyon bottom of *Senegalia greggii* - *Hyptis emoryi* - *Justicia californica* Desert Wash Shrubland (Dibble and Minich 2008, CNPSa 2024). Plants were in flower and fruit with flexible green, ascending to erect stems and sparse leaves.

—Melanie J. Davis, University of California, Riverside, Center for Conservation Biology, 75-080 Frank Sinatra Drive, Palm Desert, CA 92211. melanie.davis@ucr.edu; Lynn C. Sweet, University of California, Riverside, Center for Conservation Biology, 75-080 Frank Sinatra Drive, Palm Desert, CA 92211.

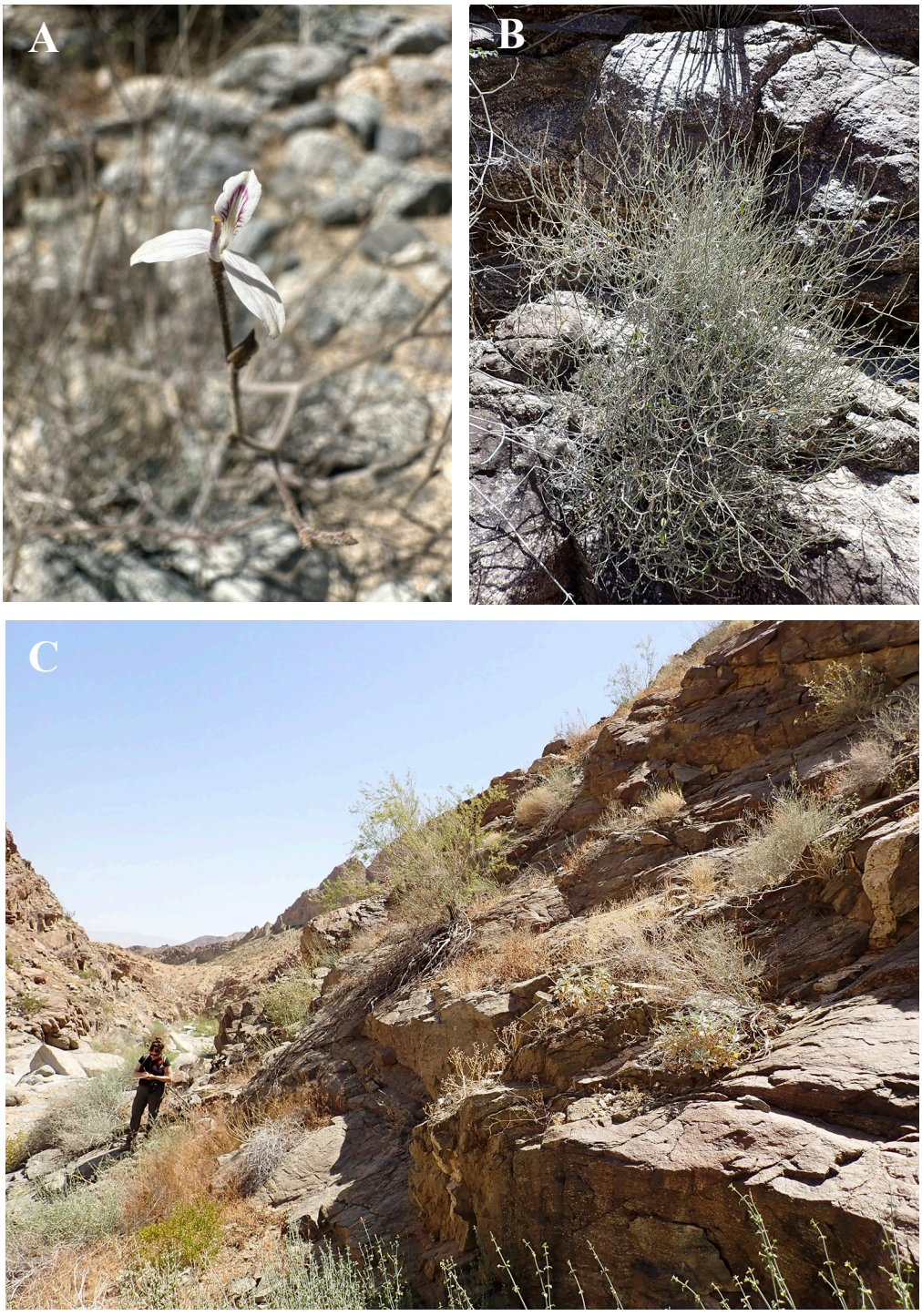

Figure 1: A. Flower of *Carlowrightia arizonica*, photo by M.J. Davis; **B**. *C. arizonica* plant. Photo by L.C. Sweet; & **C.** Canyon sides of Bear Creek, habitat for *C. arizonica*. Photo by L.C. Sweet

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REVIEWERS OF CROSSOSOMA MANUSCRIPTS volumes 45-49 (2019-2023)

Reviewers are critical element of any peer reviewed publication. We are presenting the names of the peer reviewers who contributed to volumes 45-49 as a small thanks for their service.

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