

# A VASCULAR PLANT INVENTORY OF THE SPUR CROSS RANCH CONSERVATION AREA, MARICOPA COUNTY, ARIZONA

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## ABSTRACT

A vascular plant inventory of the Spur Cross Ranch Conservation Area was conducted from August 2007 through May 2012. The study site, encompassing 2,154 acres (871 hectares), lies close to the northern edge of the Sonoran Desert, in central Arizona. The elevation ranges from Cave Creek at 2,179 feet (664 meters) to the summit of Elephant Mountain at 3,926 feet (1,197 meters). Sonoran Desert scrub is the dominant vegetation type. An annotated checklist, based on collected plant specimens, comprised 396 taxa, including 390 species, 4 additional infraspecific taxa and 2 interspecific hybrids in 73 plant families. Asteraceae, Poaceae, Fabaceae, Boraginaceae and Brassicaceae accounted for 44% of the species included in the inventory. Non-native taxa accounted for 15% of the flora. One rare species of concern, one new state record, and seven species endemic to Arizona are reported. This inventory documents the current floristic diversity of a regionally significant Conservation Area and provides baseline data for future studies of shifts in diversity and use in land management.

## INTRODUCTION

The Spur Cross Ranch Conservation Area (SCRCA) is situated close to the northern edge of the Sonoran Desert, in central Arizona, on the northeastern margin of the Phoenix metropolitan area. It is part of a complex of 10 regional parks that rings the city of Phoenix, managed by the Maricopa County Parks and Recreation Department. The newest addition to the Parks system, the SCRCA was created in 2001, and is the only part of the complex designated a Conservation Area (Maricopa County Parks 2013, Gunn, pers. comm. 2009).

The rugged terrain is composed of Elephant Mountain, hills, low mesas, drainages and approximately 2 mi (3 km) of Cave Creek. There are 12 mi (19 km) of trails for hiking, some of which are also available for bicycling and horseback riding. The area also has a number of prehistoric and historic archaeological sites.

This land has been set aside, in part, for protection of its natural resources (URS Corp. 2004), so knowledge of species occurrences is important. The main objective of this study is to document the vascular flora of the SCRCA with an annotated checklist and voucher specimens. These baseline data are necessary for future comparisons of floristic diversity and other research relying on plant species of the area. The flora is also intended to be useful for land managers, educational purposes, and anyone interested in the plants of the region. Nearly all of the Maricopa County parks have been floristically inventoried, however few plant collections and no comprehensive inventory of vascular plants have been made in the SCRCA prior to this study.

## STUDY AREA

**Area boundaries**—The SCRCA is located north of the Town of Cave Creek, in northern Maricopa County (Fig. 1). It is approximately 32 mi (51 km) northeast of downtown Phoenix. It is bounded by 33°54.000', 33°52.735' north latitudes and 111°59.641', 111°56.451' west longitudes, and covers an area of 2,154 acres (871 ha). The Tonto National Forest forms the northern boundary. Arizona State Trust Land borders the west and part of the south side and a mix of private, Town of Cave Creek, and unincorporated Maricopa County land borders the east and part of the south side. Desert Foothills Land Trust owns 26.6 acres (10.8 ha) of land (Jewel of the Creek Preserve) along Cave Creek within the reach running through the SCRCA (Desert Foothills Land Trust 2013).

**Topography**—The SCRCA lies in the southwest corner of the USGS New River Mesa 7.5 minute series topographic Quadrangle. The elevation of the SCRCA ranges from the bed of Cave Creek at 2,179 ft (664 m) to the summit of Elephant Mountain at 3,926 ft (1,197 m). Elephant Mountain dominates the west side of the Conservation Area. Its top is a long ridge, resembling an elephant's head and back. The terrain east of Elephant Mountain consists of hills and low mesas dissected by several ephemeral drainages that empty into Cave Creek. The creek originates about 12 mi (19 km) to the north, in the Tonto National Forest, flows southwest through the SCRCA and ends at Cave Buttes Dam, about 12 mi (19 km) southwest of the Conservation Area, in Phoenix. The reach flowing through the SCRCA is mainly intermittent, generally flowing in the winter to spring months and during summer monsoon storms (Fig. 3A). Jewel of the Creek Preserve contains a perennial reach that continues a short distance into the SCRCA. Cottonwood Creek, an ephemeral drainage, is a large tributary of Cave Creek, in the eastern section of the SCRCA.

**Geology**—Arizona is characterized by two major physiographic provinces: the Colorado Plateau to the north, and the Basin and Range to the south. A mountainous Transition Zone (also known as the Central Arizona Highlands) divides the two (Nations & Stump 1996). The Conservation Area is located on the southern edge of the Transition Zone, bordering the Basin and Range province. Ferguson, Gilbert and Leighty (1998) mapped and described the geology of the USGS New River Mesa Quadrangle. Their study indicates that the majority of rocks within the SCRCA are from the Quaternary and Mid-Tertiary periods, with Early Proterozoic rocks making up the remainder. The Early Proterozoic rocks are largely fine-grained quartz monzonite, found along the northern and eastern parts of the conservation area as well as along Cave Creek and Cottonwood Creek. Metamorphosed basalt and felsic intrusive sills are also visible along the creeks. The Mid-Tertiary rocks are mainly volcanic in origin. A sequence of basaltic lavas and tuffs interbedded with sedimentary rocks is exposed in small patches and bands throughout the study area. Overlying this is a series of basalt lava flows, mainly in the western half of the SCRCA, which cover the top of Elephant Mountain and portions of its slopes. Finally, the youngest rocks (Quaternary) consist of talus and colluvial slope deposits, mainly on Elephant Mountain, and alluvial sediments on vegetated terraces and along active channels such as Cave Creek (Ferguson et al. 1998).

**Climate**—The region has a semi-arid climate, experiencing moderate to high temperatures. Most of the precipitation falls in the summer and winter months. Summer monsoons are localized, often intense storms, while winter rains tend to be more widespread and gentle (Dimmitt 2000). Precipitation records cited here were measured by the Flood Control District of Maricopa County at the Cave Creek@Spur Cross #4920 rain gauge. The annual mean precipitation from 2007-2012 was 11.05 in (28.07 cm). The driest and wettest years were 2007 (9.09 in/23.09 cm) and 2010 (13.46 in/34.19 cm). Monthly extremes ranged from no measurable precipitation during many months to 6.26 in (15.90 cm) in January, 2010 (FCDMC 2013). Snowfall is an occasional event rarely producing accumulation.

The nearest temperature gauge is in the adjacent town of Carefree, approximately 8 mi (13 km) east of the SCRCA. Temperatures recorded from 1962-2012 range from an average maximum of 102.0°F (38.9°C) in July to an average minimum of 40.5°F (4.7 °C) in December (WRCC 2013). Extremes during the study were 108°F (42 °C) in July and/or August of 2007, 2011 and 2012, and 19°F (-7 °C) in January 2011 (FCDMC 2013).

**Cultural History**—Archaeological sites on the SCRCA are numerous and the preservation of these was one of the motivations for public acquisition of the property (URS Corp. 2004). Several surveys and limited excavations have been conducted on the SCRCA since the 1970s, with much of the work being initiated by development companies (Holiday 1974, Redman & Minnis 1992, and Crary & Motsinger 1996). The majority of the sites are prehistoric and include rock-walled rooms, pit houses, a fortified hilltop, a wide range of artifacts, and petroglyphs. The earliest human occupants appear to be from the early Formative Period (A.D. 1-700) (Crary & Motsinger 1996, Minnis 1992a). However, most of the prehistoric occupation sites date from the Classic Period (A.D. 1150-1450) of the Hohokam tradition (Crary & Motsinger 1996, Minnis 1992b, Swidler 1992, Wood, pers. comm. 2010).

After a period of abandonment, the next people to use the area were likely Apache, from the late 1600s into the mid-late 1800s, and then the Yavapai, who occupied the area toward the end of the Apache presence (Wood, pers. comm. 2013). The arrival of the Apache and Yavapai into central Arizona is poorly documented in the archaeological record, but there is some evidence that Protohistoric period components exist on the SCRCA (Crary & Motsinger 1996).

With the arrival of Euro-Americans, and the discovery of gold in Arizona, in the 1860s, conflict arose between the newcomers and the Apache. The U.S. army set up military forts and eventually defeated the Apache, which led to an era of mining, ranching and farming (Gregory 1992). Several mines were operated on the SCRCA, including the Maricopa and Phoenix mines (Carlson 1988). Today the remains of both mines include shafts, tunnels, tailings, and traces of mining equipment.

Spur Cross Ranch, established in 1928, was named for its cattle brand, a cross-shaped spur. The first dude ranch in the area, it later operated as an authentic ranch and ownership changed a number of times. Several building foundations and a well are evidence of existence of the ranch (Carlson 1988). The property was mainly owned by development companies from the late 1980s into the 1990s. In 1997 the Town of Cave Creek annexed the land to protect it from development proposals, and in 2000, residents of the town voted to tax themselves to help purchase the property.

In 2001 it was designated a Conservation Area through a partnership of the State of Arizona, the Town of Cave Creek and Maricopa County (Gunn, pers. comm. 2009).

**Vegetation**—The vegetation of the SCRCA is a relatively dense scrubland composed of small trees, shrubs, and cacti, which display myriad shades of green. It is characterized by Turner (1994) as Arizona Upland, a subdivision of Sonoran Desertscrub (Fig. 2A). This plant community receives the most rain of any desertscrub in North America. The most common association in the SCRCA is Paloverde-Cacti-Mixed Scrub, dominated by the green-barked tree, *Parkinsonia microphylla* (foothill paloverde). Also abundant is the columnar cactus, *Carnegiea gigantea* (saguaro). Individuals of this species are the tallest plants in this habitat, punctuating the landscape like exclamation points. Other common plants include *Olneya tesota* (desert ironwood), *Ambrosia deltoidea* (triangle bur ragweed), *Encelia farinosa* (brittlebush) (Fig. 3B), *Simmondsia chinensis* (jojoba), *Opuntia engelmannii* (Engelmann prickly pear), and *Cylindropuntia acanthocarpa* (buckhorn cholla). *Larrea tridentata* (creosote bush), *Fouquieria splendens* (ocotillo), and *Cylindropuntia bigelovii* (teddybear cholla) are often found in localized populations.

Riparian habitats occur along Cave Creek, larger ephemeral drainages such as Cottonwood Creek, and in pockets around a couple of seeps near the base of Elephant Mountain (Fig. 2B). The *Salix gooddingii* (Goodding's willow)-*Populus fremontii* (Fremont cottonwood) association (Stromberg 1993) forms a narrow strip of forest along the perennial reach of Cave Creek. The cottonwoods are the tallest trees here, though few in numbers. *Salix gooddingii* is abundant with *Fraxinus velutina* (velvet ash) being the next most numerous tree. Other streamside trees include *Prosopis velutina* (velvet mesquite), *Platanus wrightii* (Arizona sycamore), and *Juglans major* (Arizona walnut). *Typha domingensis* (southern cattail) and *Schoenoplectus pungens* (common threesquare) are found in the understory, usually in pure stands.

On the floodplains of Cave Creek and Cottonwood Creek, *Prosopis velutina* (velvet mesquite), *Celtis pallida* (desert hackberry), and *Acacia greggii* (catclaw acacia) dominate, *Lycium exsertum* (wolfberry) is common, and *Ambrosia monogyra* (singlewhorl burrobush) and *A. ambrosioides* (canyon ragweed) grow almost exclusively in this habitat. On both creeks, where *Prosopis velutina* is thickest, it forms a mesquite bosque (mesquite woodland) (Fig. 2C; Minckley & Brown 1994). A small pond, within the bosque near the Metate Trail, is fed by a solar-powered well and serves as a refuge for the endangered, native desert pupfish and Gila topminnow (Yarush et al. 2012).

On the north face of Elephant Mountain, the Sonoran Desertscrub Arizona Upland vegetation begins to intergrade with Interior Chaparral, as described by Abel (1980), and elements of Semi-Desert Grassland appear as well (Fig. 2D; Brown 1994). The upper slopes are dominated by shrubs, and saguaros are notably absent. Indicative of Interior Chaparral species are *Ceanothus vestitus* (desert ceanothus), *Cercocarpus montanus* (birchleaf mountain mahogany), *Juniperus arizonica* (redberry juniper), *Quercus turbinella* (Sonoran scrub oak), and *Rhus ovata* (sugar sumac), all of which are infrequent to rare. Common species include *Canotia holacantha* (crucifixion thorn), *Ericameria laricifolia* (turpentine bush), *Eriogonum fasciculatum* (flat-top buckwheat), *Hilaria mutica* (tobosagrass), *Opuntia engelmannii* (Engelmann prickly pear), *Pappostipa speciosa* (desert needle grass),

*Simmondsia chinensis* (jojoba), and *Yucca baccata* (banana yucca), and most of these can be found in at least two of the three habitats mentioned.

Fire and livestock grazing have not impacted the vegetation in at least the last 10 years. The Cave Creek Complex Fire in 2005 came within a few miles of the SCRCA boundary and a 3 acre (1.2 ha) burn occurred in the Jewel of the Creek Preserve in 2009.

## METHODS

Plant collecting trips were made throughout all seasons from August 2007 through May 2012 and specimen vouchers were prepared for every taxon. Sampling was most intensive after winter and monsoon rains and in 2008, when new taxa were found in every month. Collections were made in all vegetation and substrate types, and a representative range of slope aspects and elevations. Data recorded for each collection included coordinates and elevation using a GPS unit, locality and plant description, habitat type, associated species and relative abundance. Photos were taken of nearly all taxa in the field.

Five species (*Amaranthus fimbriatus*, *Arundo donax*, *Cenchrus ciliaris*, *Salix laevigata*, and *Zeltnera nudicaulis*) collected within 1/4 mile (~1/2 km) of the Conservation Area boundary upstream were included in the study due to the fact that they had the potential to be found further downstream, within the SCRCA, in the future. *Cenchrus ciliaris* (buffelgrass) was also found within the SCRCA, but was removed prior to the inventory. Jewel of the Creek Preserve was scouted throughout the study but no species were added to the inventory.

The voucher specimens, which provide verification of the inventory as well as reference material, were deposited at the Desert Botanical Garden herbarium (DES) in Phoenix. Duplicate vouchers, when available, were deposited at the University of Arizona herbarium (ARIZ) in Tucson. One duplicate of *Malacothamnus fasciculatus* was sent to the Illinois Natural History Survey (ILLS) in Champaign, Illinois for verification. Specimens were identified using *Arizona Flora* (Kearney et al. 1960), *Flora of North America* (Flora of North America Editorial Committee 1993+), treatments published in *Journal of the Arizona-Nevada Academy of Science* and *Canotia* (Vascular Plants of Arizona Editorial committee 1992+), and herbarium material at DES, ASU (Arizona State University herbarium), or ARIZ. On a few occasions other sources such as the *Jepson Manual* (Hickman, ed. 1993) and experts in particular plant groups were consulted as well.

## RESULTS AND DISCUSSION

Fieldwork produced 550 collections during 101 collecting trips. A total of 394 distinct taxa were determined, including 388 species, 4 additional infraspecific taxa and 2 interspecific hybrids. A herbarium search, using the databases in SEINet (2013), revealed two additional species, *Rhus lancea* (Makings 3876, ASU), and *Arundo donax* (Makings 3862, ASU), bringing the total species to 390 and the total taxa to 396. These represent 268 genera in 73 families (Table 1). The five largest families by species, Asteraceae (62), Poaceae (46), Fabaceae (26), Boraginaceae (19),

and Brassicaceae (15), make up 44% of the flora (Table 3), while 29 families are represented by a single taxon. *Euphorbia* and *Eriogonum* are the two largest genera with 8 and 6 species, respectively. Nearly half (48%) of the taxa are ephemerals (Fig. 3D) and together with perennial herbs they compose 75% of the total taxa. Trees, shrubs/subshrubs and succulents account for the remaining 25% (Table 2).

Although 2005 (prior to this study) produced one of the more dramatic and diverse displays of ephemerals in recent time, 2008 was also very good, and as a result approximately three quarters of the taxa were documented in that year. Nearly 20% of the flora was found from 2009 through 2012, with the number decreasing each year.

The majority of the taxa (337) are native to North America (USDA 2013), making up 85% of the flora. Of the 15% (59) that are non-native, Poaceae (19) is best represented, followed by Asteraceae (8), Amaranthaceae (5), and Brassicaceae (5). Ephemerals are the most common life form of these non-native taxa. Three non-native species likely to have been planted are *Aloe maculata* (surviving for years near a former squatter's camp but no longer present), *Cannabis sativa* (removed) and *Tamarix aphylla* (a small grove of tall trees).

SCRCA species listed as noxious weeds in Arizona (USDA 2013) are *Cenchrus ciliaris*, *Cuscuta spp.* (the species in this flora is native), *Medicago polymorpha*, *Portulaca oleracea*, and *Tribulus terrestris*. These range from occasional to rare in the study area. Many more species appear on the Arizona Wildlands Invasive Plant Working Group list (AWIPWG 2013). Those considered to be of high concern are *Arundo donax*, *Bromus rubens*, *Eragrostis lehmanniana*, *Cenchrus ciliaris*, *C. setaceus*, and *Tamarix chinensis*. *Bromus rubens*, a major concern for fire, is common and the others are occasional to rare.

Eleven species (*Juncus xiphioides*, *Lythrum californicum*, *Mimulus guttatus*, *Nasturtium officinale*, *Schoenoplectus pungens*, *Stemodia durantifolia*, *Symphytotrichum subulatum* var. *parviflorum*, *Veronica americana*, *V. anagallis-aquatica*, *V. peregrina*, and *Typha domingensis*) are rated as obligate wetland species according to the newly revised National Wetland Plant List (Lichvar 2013).

There are no U. S. Fish & Wildlife Service listed threatened or endangered taxa, however there are some species worthy of note:

*Agave murpheyi* (Hohokam Agave) is listed by the USFWS and Arizona Rare Plant Committee as a Species of Concern due to its rarity and status as an ancient cultivar (ARPC 2001). This succulent reproduces asexually primarily, and is found in central Arizona and northwestern Mexico. It was used by the Hohokam people for food and fiber, and is associated with basaltic pre-Columbian archeological sites and/or features (Hodgson 2001, Hodgson & Salywon 2013). Only one clone was found, at the base of the south side of Elephant Mountain. The clone was dead, but a representative specimen was collected and identified.

*Malacothamnus fasciculatus* (chaparral mallow), a pink-flowered subshrub, is a new record for the flora of Arizona for both the genus and species (Hunkins & Smith 2012). It is disjunct by approximately 250 mi (400 km) from its other known native populations in California and Baja California. It appeared in 2010 in Cottonwood Creek, a second time downstream the following year, and once again further downstream in 2012. It has not been observed since the 2012 sighting.

Possible explanations for its initial appearance are that its seed was carried in by birds, hikers, or horses.

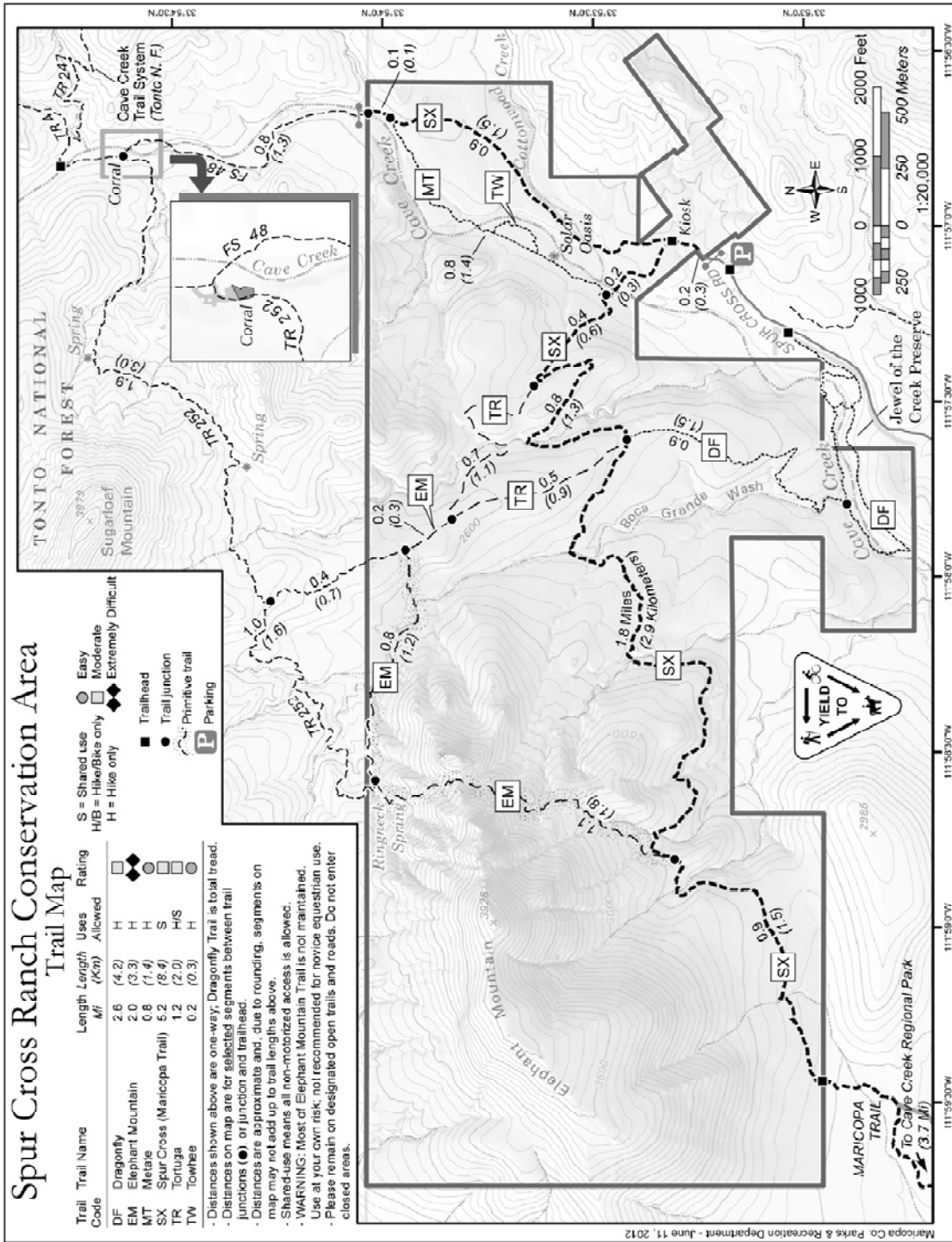
The study area lies at the central, southern edge of the Central Arizona Highlands. This region is a predicted hotspot in the state for endemic plant species according to a recent MaxEnt model in a GIS-based report by Hodgson et al. 2013. Based on the checklist in this report, the SCRCA has seven taxa endemic to Arizona: *Agave chrysantha*, *Cylindropuntia acanthocarpa* var. *thornberi*, *C. ×tetracantha* (a hybrid between *C. acanthocarpa* and *C. leptocaulis*), *Dudleya saxosa* ssp. *collomiae*, *Echinocereus yavapaiensis* (Fig. 3C), *Eriogonum arizonicum*, and *Penstemon subulatus*.

This inventory fills a gap in the floristic knowledge of the region. Among its potential uses will be to help land managers make informed decisions, aid interpretive programs, and benefit future research involving plant species of the area. The Conservation Area's position on a geologic and vegetational transition zone, its rare riparian areas, and higher precipitation than other desert community types contributes to its botanical richness and endemism. Protecting it from development was an important step in preserving some of the remaining biodiversity on the edge of one of the largest metropolitan areas in the United States.

**Table 1.** Taxonomic composition of the Spur Cross Ranch Conservation Area flora.

Taxonomic Group	Families	Genera	Species	Additional Intraspecific taxa	Interspecific Hybrids	Total taxa
Pteridophytes	2	5	7	0	0	7
Gymnosperms	2	2	2	0	0	2
Angiosperms						
Dicots	62	224	323	1	2	326
Monocots	7	37	58	3	0	61
Totals	73	268	390	4	2	396

**Figure 1.** Maricopa County Parks and Recreation map showing area covered by Spur Cross Ranch Conservation Area (SCRCA) and the trails within its borders.





**Table 2.** Number of taxa by life form and percent of total flora, in the SCRCA.

Life Form	Number of Taxa*	Percent of Total Flora
Tree	16	4
Shrub/Subshrub	63	16
Succulent	19	5
Perennial Herb	108	27
Ephemeral	190	48

\* Refers to the number of species plus 4 additional infraspecific taxa and 2 interspecific hybrids

**Table 3.** The best represented plant families of the Spur Cross Ranch Conservation Area.

Family	Genera	Species	Percent of total flora
Asteraceae	50	62	16
Poaceae	30	49*	12
Fabaceae	16	26	7
Boraginaceae	10	19	5
Brassicaceae	11	15	4
Cactaceae	6	15+	4
Plantaginaceae	7	14	4
Polygonaceae	6	12	3
Polemoniaceae	8	11	3
Euphorbiaceae	3	11	3

\* Includes 2 varieties of *Aristida purpurea*, 2 varieties of *Bouteloua barbata* and 2 varieties of *Vulpia microstachya*.

+ Includes 2 varieties of *Opuntia engelmannii* and 2 interspecific hybrids: *Cylindropuntia* × *tetracantha* (a hybrid between *C. acanthocarpa* and *C. leptocaulis*) and *Opuntia engelmannii* × *phaeacantha*.

### ANNOTATED CHECKLIST OF VASCULAR PLANTS OF THE SPUR CROSS RANCH CONSERVATION AREA, MARICOPA COUNTY, ARIZONA

Taxa are divided into the major plant groups, Pteridophytes, Gymnosperms, and Angiosperms: Dicots and Monocots. Within these groups, plants are listed alphabetically by family, genus, species and infraspecific rank. Infraspecific taxa are given only when more than one occurs in Arizona and a distinction could be made at that rank. Family names follow the Angiosperm Phylogeny Group III system of classification (Stevens 2013). Tropicos (2013) is the main database used for names not

covered in Vascular Plants of Arizona Project and Flora of North America treatments, and is the source for author names, abbreviations, and a few nomenclatural updates. Synonymy is derived mainly from Arizona Flora (Kearney et al. 1960). Taxa not native to North America are preceded by an asterisk (\*), taxa endemic to Arizona are preceded by a pound sign (#), and a new record for the state is noted in boldface. Relative abundance classifications are subjective observations by the authors taken over the course of the study and are based on terms from Palmer et al. (1995). All collections were made by the authors except where the collection number is preceded by the collector's last name.

## **PTERIDOPHYTES (ferns and lycophytes)**

### **PTERIDACEAE**

- Astrolepis cochisensis* (Goodd.) D. M. Benham & Windham. [*Notholaena sinuata* (Lag. ex Sw.) Kaulf. var. *cochisensis* (Goodd.) Weath.]. Cochise scaly cloakfern. Perennial herb; occasional. 632.
- Astrolepis sinuata* (Lag. ex Sw.) D. M. Benham & Windham [*Notholaena sinuata* (Lag. ex Sw.) Kaulf.]. Wavy scaly cloakfern. Perennial herb; occasional. 140.
- Cheilanthes covillei* Maxon. Coville's lipfern. Perennial herb; occasional. 144, 368.
- Cheilanthes parryi* Domin. Parry's lipfern. Perennial herb; occasional. 624.
- Notholaena standleyi* Maxon. Star cloakfern. Perennial herb; occasional. 495, 498.
- Pellaea truncata* Goodd. [*P. longimucronata* auct. non Hook.]. Spiny cliffbrake. Perennial herb; occasional. 143, 491.

### **SELAGINELLACEAE**

- Selaginella arizonica* Maxon. Arizona spikemoss. Perennial herb; common on rocky, north-facing slopes. 142.

## **GYMNOSPERMS (cone-bearing plants)**

### **CUPRESSACEAE**

- Juniperus arizonica* R. P. Adams. Redberry juniper. Tree; infrequent, mainly on north face of Elephant Mountain. 483.

### **EPHEDRACEAE**

- Ephedra aspera* Engelm. ex S. Watson. [*E. nevadensis* S. Watson var. *aspera* (Engelm. ex S. Watson) L. D. Benson]. Rough jointfir. Shrub; occasional. 346, 613.

## **ANGIOSPERMS (flowering plants)**

## **DICOTS**

### **ACANTHACEAE**

- Anisacanthus thurberi* (Torr.) A. Gray. Thurber's desert honeysuckle. Shrub; rare. 471.
- Carlowrightia arizonica* A. Gray. Arizona wrightwort. Subshrub; occasional. 428, 671.
- Justicia californica* (Benth.) D. N. Gibson. [*Beloperone californica* Benth.]. Beloperone, Chuparosa. Shrub; locally common to occasional. 258.

### **AMARANTHACEAE (includes CHENOPODIACEAE)**

- \**Alternanthera caracasana* Kunth. Khakiweed. Perennial herb; rare, found once in dry stream bed of Cave Creek. 568A.
- \**Amaranthus albus* L. Prostrate pigweed. Ephemeral; occasional. 431, 517, 596.
- \**Amaranthus blitoides* S. Watson. Mat amaranth. Ephemeral; locally common to occasional. 456, 461.
- Amaranthus fimbriatus* (Torr.) Benth. ex S. Watson. Fringed amaranth. Ephemeral; rare. 561.
- Atriplex canescens* (Pursh) Nutt. var. *canescens*. Fourwing saltbush. Shrub; infrequent. 528, 697.
- Atriplex elegans* (Moq.) D. Dietr. var. *elegans*. Wheelscale saltbush. Ephemeral; rare, in disturbed area. 582.
- Chenopodium fremontii* S. Watson. Fremont's goosefoot. Ephemeral; common. 513, 597.

\**Kochia scoparia* (L.) Schrad. Burningbush. Ephemeral; rare, found once in dry stream bed of Cave Creek. 545.

*Monolepis nuttalliana* (Schult.) Greene. Nuttall's povertyweed. Ephemeral; rare, in disturbed area. 184.

\**Salsola tragus* L. [*S. kali* L. var. *tenuifolia* Tausch]. Prickly Russian thistle, Tumbleweed. Ephemeral; occasional. 439, 516.

#### ANACARDIACEAE

\**Rhus lancea* L. f. African sumac. Tree; rare, only one found along Cave Creek. *Makings* 3876.

*Rhus ovata* S. Watson. Sugar sumac. Shrub; rare. 605.

#### APIACEAE

*Bowlesia incana* Ruiz & Pav. Hoary bowlesia. Ephemeral; occasional. 180.

*Daucus pusillus* Michx. American wild carrot. Ephemeral; occasional. 279.

*Lomatium nevadense* (S. Watson) J. M. Coult. & Rose var. *parishii* (J. M. Coult. & Rose) Jeps. Parish's biscuitroot. Perennial herb; infrequent. 360.

#### APOCYNACEAE (includes ASCLEPIADACEAE)

*Cynanchum arizonicum* (A. Gray) Shinnars. [*Metastelma arizonicum* A. Gray]. Arizona swallow-wort. Perennial Herb (vine); occasional. 502, 557.

*Matelea parvifolia* (Torr.) Woodson. [*Gonolobus parvifolius* Torr.]. Spearleaf. Perennial herb; infrequent. 670.

*Sarcostemma cynanchoides* Decne. ssp. *hartwegii* (Vail) R. W. Holm. [*Funastrum heterophyllum* (Engelm. ex Torr.) Standl.; *F. cynanchoides* Schltr. var. *hartwegii* (Vail) Krings]. Hartweg's twinevine, Rambling milkweed. Perennial herb (vine); occasional. 424, 468.

#### ARISTOLOCHIACEAE

*Aristolochia watsonii* Wooton & Standl. Watson's dutchman's pipe. Perennial herb; infrequent. 556.

ASCLEPIADACEAE, see APOCYNACEAE

#### ASTERACEAE

*Acourtia wrightii* (A. Gray) Reveal & R. M. King. [*Perezia wrightii* A. Gray]. Brownfoot. Perennial herb; occasional. 399.

*Adenophyllum porophylloides* (A. Gray) Strother. [*Dyssodia porophylloides* A. Gray]. San Felipe dogweed. Perennial herb; occasional. 345.

*Ambrosia ambrosioides* (Cav.) W. W. Payne. [*Franseria ambrosioides* Cav.]. Canyon ragweed. Shrub; common in riparian areas. 340.

*Ambrosia confertiflora* DC. [*Franseria confertiflora* Rydb.]. Weakleaf bur ragweed. Perennial herb; locally common in disturbed areas. 576, 604.

*Ambrosia deltoidea* (Torr.) W. W. Payne. [*Franseria deltoidea* Torr.]. Triangle bur ragweed, Triangle bursage. Shrub; abundant. 309.

*Ambrosia monogyra* (Torr. & A. Gray) Strother & B. G. Baldwin. [*Hymenoclea monogyra* Torr. & A. Gray]. Singlewhorl burrobush. Shrub; common in riparian areas. 121, 598.

*Artemisia dracunculul* L. [*A. dracunculoides* Pursh]. Wild tarragon. Subshrub; rare. 746.

*Artemisia ludoviciana* Nutt. ssp. *albula* (Wooton) D. D. Keck. White sagebrush. Perennial herb; occasional. 591.

*Baccharis salicifolia* (Ruiz & Pav.) Pers. [*B. glutinosa* Pers.; *B. viminea* DC.]. Mule-fat. Shrub; common in riparian areas. 133.

*Baccharis sarothroides* A. Gray. Desertbroom. Shrub; common. 141, 601, 602.

*Baccharis sergiloides* A. Gray. Desert baccharis, Seepwillow. Shrub; infrequent in drainages. 570, 572.

*Bahia biternata* A. Gray. Slimlobe bahia. Ephemeral; occasional. 543.

*Bahiopsis parishii* (Greene) E. E. Schill. & Panero. [*Viguiera deltoidea* A. Gray var. *parishii* (Greene) Vasey & Rose; *V. parishii* Greene]. Parish's goldeneye. Shrub; common. 234.

*Baileya multiradiata* Harv. & A. Gray ex Torr. Desert marigold. Perennial herb; common. 378.

- Bebbia juncea* Greene. Chuckwalla's delight, Sweetbush. Shrub; common. 421.
- Brickellia atractyloides* A. Gray. Spearleaf brickellbush. Subshrub; occasional, north face of Elephant Mountain. 374.
- Brickellia californica* (Torr. & A. Gray) A. Gray. California brickellbush. Subshrub; rare, spring on north side of Elephant Mountain. 695.
- Brickellia coulteri* A. Gray var. *brachiata* (A. Gray) B. L. Turner. Coulter's brickellbush. Subshrub; occasional. 418.
- \**Centaurea melitensis* L. Maltese star-thistle. Ephemeral; locally common to occasional, currently being managed for removal. 322, 379A.
- Chaenactis carphoclinia* A. Gray. Pebble pincushion. Ephemeral; rare, in disturbed area. 329.
- Cirsium neomexicanum* A. Gray. New Mexico thistle. Ephemeral; occasional. 339.
- Dieteria asteroides* Torr. var. *glandulosa* (B. L. Turner) D. R. Morgan & R. L. Hartm. [*Machaeranthera asteroides* (Torr.) Greene var. *glandulosa* B. L. Turner]. Fall tansyaster. Ephemeral; occasional. 470.
- \**Dimorphotheca sinuata* DC. Glandular Cape marigold. Ephemeral; rare. 702.
- Encelia farinosa* A. Gray ex Torr. Brittlebush. Shrub; abundant. 351.
- Ericameria laricifolia* (A. Gray) Shinnars. [*Haplopappus laricifolius* A. Gray]. Turpentine bush. Shrub; occasional. 593.
- Ericameria linearifolia* (DC.) Urbatsch & Wussow. [*Haplopappus linearifolius* DC.]. Narrowleaf goldenbush. Shrub; infrequent. 365.
- Erigeron canadensis* L. [*Conyza canadensis* (L.) Cronquist]. Canadian horseweed. Ephemeral; occasional. 544.
- Erigeron divergens* Torr. & A. Gray. Spreading fleabane. Ephemeral; common. 332, 587.
- Eriophyllum lanosum* A. Gray [*Antheropeas lanosum* (A. Gray) Rydb.]. White easterbonnets. Ephemeral; occasional. 196, 243.
- Gutierrezia sarothrae* (Pursh) Britton & Rusby. Broom snakeweed. Shrub; occasional. 594.
- Helianthus annuus* L. Common sunflower. Ephemeral; occasional in dry stream bed. 427.
- Heliomeris longifolia* (B. L. Rob. & Greenm.) Cockerell var. *annua* (M. E. Jones) Yates. [*Viguiera annua* S. F. Blake]. Longleaf false goldeneye. Ephemeral; occasional in dry stream bed. 592, 599.
- Heterotheca subaxillaris* (Lam.) Britton & Rusby ssp. *latifolia* (Buckley) Semple. [*H. psammophila* Wagenkn.]. Camphorweed. Ephemeral; occasional in dry stream bed. 532.
- Hymenothrix loomisii* S. F. Blake. Loomis' thimblehead. Ephemeral; rare. 745.
- Isocoma acradenia* (Greene) Greene var. *acradenia*. Alkali goldenbush. Shrub; locally common to occasional in disturbed area. 588.
- \**Lactuca serriola* L. Prickly lettuce. Ephemeral; occasional. 684.
- Lasthenia gracilis* (DC.) Greene. [*Baeria chrysostoma* Fisch. & C. A. Meyer subsp. *gracilis* (DC.) Ferris]. Needle goldfields. Ephemeral; rare. 269.
- Layia glandulosa* (Hook.) Hook. & Arn. Whitedaisy tidytops. Ephemeral; occasional. 636.
- Logfia filaginoides* (Hook. & Arn.) Morefield. [*L. californica* (Nutt.) Holub; *Filago californica* Nutt.]. California cottonrose. Ephemeral; occasional. 259.
- Machaeranthera tagetina* Greene. [*Aster tagetinus* (Greene) S.F. Blake]. Mesa tansyaster. Ephemeral; rare. 743.
- Melampodium leucanthum* Torr. & A. Gray. Plains blackfoot, Blackfoot daisy. Perennial herb; occasional on north face of Elephant Mountain. 640.
- \**Oncosiphon piluliferum* (L.f.) Källersjö. Stinknet, Globe chamomile. Ephemeral; locally common. 264.
- Packera quercetorum* (Greene) C. Jeffrey. [*Senecio quercetorum* Greene]. Oak Creek ragwort. Perennial herb; rare. 654.
- Pluchea sericea* (Nutt.) Coville. [*Tessaria sericea* (Nutt.) Shinnars]. Arrowweed. Shrub; rare, in riparian areas. 725, 751.
- Porophyllum gracile* Benth. Slender poreleaf, Odora. Perennial herb; occasional. 358.
- \**Pseudognaphalium luteoalbum* (L.) Hilliard & B. L. Burtt. [*Gnaphalium luteoalbum* L.]. Jersey cudweed. Ephemeral; infrequent. 466.
- Psilostrophe cooperi* (A. Gray) Greene. Whitestem paperflower. Subshrub; infrequent. 397.
- Rafinesquia californica* Nutt. California plumeseed. Ephemeral; occasional. 270, 362, 645, 707.

- Rafinesquia neomexicana* A. Gray. New Mexico plumeseed, Desert chicory. Ephemeral; common. 206.
- Senecio flaccidus* Less. var. *monoensis* (Greene) B. L. Turner & T. M. Barkley. [*S. monoensis* Greene; *S. douglasii* DC. var. *monoensis* (Greene) Jeps.]. Smooth threadleaf ragwort. Subshrub; infrequent. 733.
- Senecio lemmonii* A. Gray. Lemmon's ragwort. Perennial herb; occasional. 359, 417, 486.
- \**Senecio vulgaris* L. Old-man-in-the-Spring. Ephemeral; rare. 334.
- \**Sonchus asper* (L.) Hill. Spiny sowthistle. Ephemeral; occasional. 658, 729.
- \**Sonchus oleraceus* L. Common sowthistle. Ephemeral; occasional. 225, 478, 503.
- Stephanomeria pauciflora* (Torr.) A. Nelson. Brownplume wirelettuce. Perennial herb; occasional. 131, 395, 676.
- Stylocline micropoides* A. Gray. Woollyhead neststraw. Ephemeral; occasional. 274, 295.
- Symphotrichum subulatum* (Michx.) G. L. Nesom var. *parviflorum* (Nees) S. D. Sundb. [*S. expansum* (Poepp. ex Spreng.) G.L. Nesom]. Southwestern annual saltmarsh aster. Ephemeral; occasional. 541.
- Trixis californica* Kellogg. American threefold. Shrub; occasional. 312.
- Uropappus lindleyi* (DC.) Nutt. Lindley's Silverpuffs. [*Microseris linearifolia* (Nutt.) Sch. Bip.; *M. lindleyi* (DC.) A. Gray]. Ephemeral; common. 223.
- Verbesina encelioides* (Cav.) A. Gray. Golden crownbeard. Ephemeral; infrequent. 458, 531.
- Xanthisma spinulosum* (Pursh) D. R. Morgan & R. L. Hartm. var. *gooddingii* (A. Nelson) D. R. Morgan & R. L. Hartm. [*Haplopappus spinulosus* (Pursh) DC. var. *gooddingii* (A. Nelson) S. F. Blake; *Machaeranthera pinnatifida* (Hook.) Shinnars var. *gooddingii* (A. Nelson) B. L. Turner & R. L. Hartm.]. Goodding's tansyaster. Subshrub; occasional. 299.
- Xanthium strumarium* L. Rough cocklebur. Ephemeral; common. 135.

#### **BORAGINACEAE** (includes HYDROPHYLLACEAE)

- Amsinckia intermedia* Fisch. & C. A. Mey. Common fiddleneck. Ephemeral; common. 159, 188.
- Amsinckia tessellata* A. Gray. Bristly fiddleneck. Ephemeral; infrequent. 183.
- Cryptantha barbiger* (A. Gray) Greene. Bearded cryptantha. Ephemeral; common. 296.
- Cryptantha decipiens* (M.E. Jones) A. Heller. Gravelbar cryptantha. Ephemeral; occasional. 297.
- Cryptantha pterocarya* (Torr.) Greene var. *cycloptera* (Greene) J.F. Macbr. Wingnut cryptantha. Ephemeral; occasional. 249, 291.
- Emmenanthe penduliflora* Benth. Whisperingbells. Ephemeral; occasional. 199.
- Eriodictyon angustifolium* Nutt. Narrowleaf yerba santa. Shrub; rare, found only in Cottonwood Creek. 691, 757.
- Eucrypta chrysanthemifolia* Greene. Spotted hideseed. Ephemeral; locally common to occasional. 158.
- Harpagonella palmeri* A. Gray var. *arizonica* I.M. Johnst. Arizona grapplinghook. Ephemeral; locally common to occasional. 163.
- Pectocarya heterocarpa* (I. M. Johnst.) I. M. Johnst. Chuckwalla combseed. Ephemeral; occasional. 256.
- Pectocarya platycarpa* (Munz & I. M. Johnst.) Munz & I. M. Johnst. Broadfruit combseed. Ephemeral; occasional. 189, 268.
- Pectocarya recurvata* I. M. Johnst. Curvenut combseed. Ephemeral, common. 145.
- Phacelia affinis* A. Gray. Limestone phacelia. Ephemeral; occasional. 335, 412.
- Phacelia crenulata* Torr. ex S. Watson var. *ambigua* (M. E. Jones) J. F. Macbr. [*P. ambigua* M. E. Jones]. Purplestem phacelia, Scorpionweed. Ephemeral; occasional. 262, 265, 306.
- Phacelia cryptantha* Greene. Hiddenflower phacelia. Ephemeral; occasional. 369.
- Phacelia distans* Benth. Distant phacelia, Wild heliotrope. Ephemeral; locally common to occasional. 202, 233, 320.
- Phacelia pedicellata* A. Gray. Pedicellate phacelia. Ephemeral; rare. 629, 641.
- Pholistoma auritum* (Lindl.) Lilja var. *arizonicum* (M. E. Jones) Constance. Arizona fiestaflower. Ephemeral; occasional. 162, 271.
- Plagiobothrys arizonicus* (A. Gray) Greene ex A. Gray. Arizona Popcornflower. Ephemeral; occasional. 207, 336.

**BRASSICACEAE**

- Boechea perennans* (S. Watson) W. A. Weber. [*Arabis perennans* S. Watson]. Perennial rockcress. Perennial herb; infrequent. 251.
- \**Brassica tournefortii* Gouan. Asian mustard, Sahara mustard. Ephemeral; locally common to occasional. 214, 386.
- \**Capsella bursa-pastoris* (L.) Medik. Shepherd's purse. Ephemeral; occasional. 267.
- Caulanthus lasiophyllus* (Hook. & Arn.) Payson. [*Thelypodium lasiophyllum* (Hook. & Arn.) Greene; *Guillenia lasiophylla* (Hook. & Arn.) Greene]. California mustard. Ephemeral; common. 164, 176, 182, 240.
- Descurainia pinnata* (Walter) Britton. Western tansymustard. Ephemeral; occasional. 338.
- Draba cuneifolia* Nutt. ex Torr. & A. Gray var. *integrifolia* S. Watson. Wedgeleaf draba. Ephemeral; occasional. 187.
- Lepidium densiflorum* Schrad. Common pepperweed. Ephemeral; common. 194, 209.
- Lepidium lasiocarpum* Nutt. Shaggyfruit pepperweed. Ephemeral; common. 211.
- Lepidium virginicum* L. Virginia pepperweed. Ephemeral; occasional. 276.
- \**Nasturtium officinale* W. T. Aiton. [*Rorippa nasturtium-aquaticum* (L.) Hayek]. Watercress. Perennial herb; common. 463.
- Physaria gordonii* (A. Gray) O'Kane & Al-Shehbaz. [*Lesquerella gordonii* (A. Gray) S. Watson]. Gordon's bladderpod. Ephemeral; common. 208.
- Physaria tenella* (A. Nelson) O'Kane & Al-Shehbaz. [*Lesquerella tenella* A. Nelson]. Moapa bladderpod. Ephemeral; occasional. 282.
- \**Sisymbrium irio* L. London rocket. Ephemeral; common. 161, 191.
- \**Sisymbrium orientale* L. Indian hedgemustard. Ephemeral; infrequent. 652.
- Thysanocarpus curvipes* Hook. [*T. amplexans* Greene]. Sand fringe pod. Ephemeral; common. 177, 625.

**CACTACEAE**

- Carnegiea gigantea* (Engelm.) Britton & Rose. [*Cereus giganteus* Engelm.]. Saguaro. Succulent; abundant. 429.
- #*Cylindropuntia acanthocarpa* (Engelm. & J. M. Bigelow) F. M. Knuth var. *thornberi* (Thornber & Bonker) Backeb. [*Opuntia thornberi* Thornber & Bonker; *Opuntia acanthocarpa* Engelm. & J. M. Bigelow var. *thornberi* (Thornber & Bonker) L. D. Benson]. Thornber's buckhorn cholla. Succulent; abundant. 406.
- Cylindropuntia arbuscula* (Engelm.) F. M. Knuth. [*Opuntia arbuscula* Engelm.]. Arizona pencil cholla. Succulent; rare. 606.
- Cylindropuntia bigelovii* (Engelm.) F. M. Knuth. Teddybear cholla. Succulent; locally common to occasional. 404.
- Cylindropuntia fulgida* (Engelm.) F. M. Knuth var. *fulgida*. [*Opuntia fulgida* Engelm.]. Jumping cholla, Chainfruit cholla. Succulent; locally common to occasional. 515.
- Cylindropuntia leptocaulis* (DC.) F. M. Knuth. [*Opuntia leptocaulis* DC.]. Christmas cactus. Succulent; occasional. 435.
- #*Cylindropuntia* × *tetracantha* (Toumey) F. M. Knuth. A hybrid between *C. acanthocarpa* and *C. leptocaulis*. Tucson pricklypear. Succulent; rare. 609, 669.
- Echinocereus engelmannii* (Parry ex Engelm.) Lem. ssp. *fasciculatus*. Engelmann's hedgehog cactus. Succulent; common. 363, 713.
- #*Echinocereus yavapaiensis* M. A. Baker. Yavapai claret-cup cactus. Succulent; occasional on upper slopes of Elephant Mountain. 370, 703.
- Ferocactus cylindraceus* (Engelm.) Orcutt. Desert barrel cactus. Succulent; common. 482.
- Mammillaria grahamii* Engelm. [*M. microcarpa* Engelm.]. Graham's nipple cactus, Pincushion cactus. Succulent; occasional. 667, 668.
- Opuntia chlorotica* Engelm. & J. M. Bigelow. Dollarjoint pricklypear, Pancake pricklypear. Succulent; occasional. 484.
- Opuntia engelmannii* Salm-Dyck ex Engelm. var. *engelmannii*. Cactus apple, Engelmann's prickly pear. Succulent; abundant. 403, 405.
- Opuntia engelmannii* Salm-Dyck var. *linguiformis* (Griffiths) B. D. Parfitt & Pinkava. Cow's tongue pricklypear. Succulent; rare, along roadside. Native to Texas and Mexico. 672.

*Opuntia engelmannii* × *phaeacantha*. Succulent; infrequent. 687.

#### **CAMPANULACEAE**

*Nemacladus glanduliferous* Jeps. var. *orientalis* McVaugh. Glandular threadplant. Ephemeral; infrequent. 674, 719.

#### **CANNABACEAE** (includes Ulmaceae, in part)

\**Cannabis sativa* L. Marijuana. Ephemeral, rare. Found planted near Cave Creek, removed. 730.

*Celtis pallida* Torr. Spiny hackberry. Desert hackberry. Shrub; common in major drainages to occasional elsewhere. 136

*Celtis reticulata* Torr. [*C. laevigata* var. *reticulata* (Torr.) L.D. Benson]. Netleaf hackberry. Tree; infrequent. 361.

#### **CAPPARACEAE**

*Polanisia dodecandra* (L.) DC. var. *trachysperma* (Torr. & A. Gray) Iltis. [*P. trachysperma* Torr. & A. Gray]. Sandysseed Clammyweed. Ephemeral; occasional, in dry stream beds. 476.

#### **CARYOPHYLLACEAE**

\**Herniaria hirsuta* L. var. *cinerea* (DC.) Loret & Barrandon. [*H. cinerea* DC.]. Hairy rupturewort. Ephemeral; common. 195.

*Silene antirrhina* L. Sleepy silene. Ephemeral; occasional. 247, 277.

\**Stellaria media* (L.) Vill. Common chickweed. Ephemeral; rare. 612.

*Stellaria nitens* Nutt. Shiny chickweed. Ephemeral; occasional. 272.

#### **CELASTRACEAE**

*Canotia holacantha* Torr. Crucifixion thorn. Shrub; locally common on north face of Elephant Mountain. 364, 480.

#### CHENOPODIACEAE, see **AMARANTHACEAE**

#### **CONVOLVULACEAE**

*Calystegia longipes* (S. Watson) Brummitt. [*Convolvulus linearilobus* Eastw.]. Paiute false bindweed. Perennial herb; infrequent. 462.

*Convolvulus equitans* Benth. Texas bindweed. Perennial herb; occasional. 685, 686.

*Cuscuta indecora* Choisy. Bigseed alfalfa dodder. Perennial herb; occasional. 473.

*Ipomoea barbatisepala* A. Gray. Canyon morning-glory. Ephemeral; infrequent. 550.

*Ipomoea costellata* Torr. Crestrib morning-glory. Ephemeral; occasional. 589.

*Ipomoea cristulata* Hallier f. Trans-Pecos morning-glory. Ephemeral; occasional. 425, 549.

#### **CRASSULACEAE**

*Crassula connata* (Ruiz & Pav.) A. Berger. [*Tillaea erecta* Hook. & Arn.; *Crassula erecta* (Hook. & Arn.) A. Berger]. Sand pygmyweed. Ephemeral; occasional. 185.

#*Dudleya saxosa* (M.E. Jones) Britton & Rose ssp. *collomiae* (Rose) Moran. [*Echeveria collomiae* (Rose) Kearney & Peebles, *D. collomiae* Rose]. Gila County liveforever, Rock echeveria. Perennial herb; occasional. 356.

#### **CROSSOSOMATAACEAE**

*Crossosoma bigelovii* S. Watson. Ragged rockflower. Shrub; occasional. 229.

#### **CUCURBITACEAE**

*Marah gilensis* (Greene) Greene. Gila manroot, wild cucumber. Perennial herb (vine); locally common to occasional. 263.

#### CUSCUTACEAE, see **CONVOLVULACEAE**

**EUPHORBIACEAE**

- Acalypha neomexicana* Müll. Arg. New Mexico copperleaf. Ephemeral; rare. 553.
- Ditaxis lanceolata* (Benth.) Pax & K. Hoffm. [*Argythamnia lanceolata* (Benth.) Müll. Arg.]. Narrowleaf silverbush. Subshrub; occasional. 236, 496.
- Ditaxis neomexicana* (Müll. Arg.) A. Heller. [*Argythamnia neomexicana* Müll. Arg.]. New Mexico silverbush. Perennial herb; occasional. 116.
- Euphorbia abramsiana* L. C. Wheeler. [*Chamaesyce abramsiana* (L. C. Wheeler) Koutnik]. Abrams' sandmat. Ephemeral, occasional. 129.
- Euphorbia albomarginata* Torr. & A. Gray. [*Chamaesyce albomarginata* (Torr. & A. Gray) Small]. Whitemargin sandmat. Perennial herb; occasional. 574.
- Euphorbia arizonica* Engelm. [*Chamaesyce arizonica* (Engelm.) Arthur]. Arizona spurge. Perennial herb; occasional. 128.
- Euphorbia capitellata* Engelm. [*Chamaesyce capitellata* (Engelm.) Millsp.]. Head sandmat. Perennial herb; occasional. 127, 649.
- Euphorbia eriantha* Benth. Beetle spurge, Desert poinsettia. Ephemeral; infrequent. 115, 657.
- Euphorbia florida* Engelm. [*Chamaesyce florida* (Engelm.) Millsp.]. Chiricahua Mountain sandmat. Ephemeral; occasional. 534.
- Euphorbia melanadenia* Torr. [*Chamaesyce melanadenia* (Torr.) Millsp.]. Red-gland spurge. Perennial herb; common. 122.
- Euphorbia pediculifera* Engelm. var. *pediculifera*. [*Chamaesyce pediculifera* (Engelm.) Rose & Standl]. Carrizo Mountain sandmat, Louse spurge. Perennial herb; common. 255, 354, 575.

**FABACEAE**

- Acacia greggii* A. Gray. [*Senegalia greggii* (A. Gray) Britton & Rose]. Catclaw acacia. Shrub; abundant. 530.
- Astragalus arizonicus* A. Gray. Arizona milkvetch. Perennial herb; occasional. 333, 474, 648.
- Astragalus nuttallianus* DC. Smallflowered milkvetch. Ephemeral; locally common to occasional. 304.
- Astragalus tephrodes* A. Gray var. *brachylobus* (A. Gray) Barneby. Ashen milkvetch. Perennial herb; occasional. 662.
- Calliandra eriophylla* Benth. Fairyduster. Shrub; common. 311.
- Lotus humistratus* Greene. Foothill deervetch. Ephemeral; locally common to occasional. 237, 292.
- Lotus rigidus* (Benth.) Greene. Shrubby deervetch. Subshrub; occasional. 210.
- Lotus salsuginosus* Greene ssp. *brevivexillus* (Ottley) Munz. Coastal bird's-foot trefoil. Ephemeral; locally common to occasional. 238.
- Lotus strigosus* (Nutt.) Greene var. *tomentellus* (Greene) Isely. [*L. tomentellus* Greene]. Strigose bird's-foot trefoil. Ephemeral; locally common to occasional. 303, 305, 631.
- Lupinus concinnus* J. Agardh. Bajada lupine. Ephemeral; occasional. 383.
- Lupinus sparsiflorus* Benth. Coulter's lupine. Ephemeral; common. 201, 231.
- Lupinus succulentus* Douglas ex K. Koch. Hollowleaf annual lupine. Ephemeral; infrequent. 244.
- Marina parryi* (Torr. & A. Gray) Barneby. [*Dalea parryi* Torr. & A. Gray]. Parry's false prairie-clover. Perennial herb; occasional. 337.
- \**Medicago polymorpha* L. [*M. hispida* Gaertn.]. Burclover. Ephemeral; infrequent. 716.
- \**Melilotus indicus* (L.) All. Annual yellow sweetclover. Ephemeral; common. 289, 426, 500.
- Mimosa aculeaticarpa* Ortega var. *biuncifera* (Benth.) Barneby. [*M. biucifera* Benth.]. Catclaw mimosa. Shrub; infrequent. 467.
- Olneya tesota* A. Gray. Desert ironwood. Tree; common. 507.
- Parkinsonia florida* (Benth ex A. Gray) S. Watson. [*Cercidium floridum* Benth. ex A. Gray]. Blue paloverde. Tree; occasional. 434.
- Parkinsonia microphylla* Torr. [*Cercidium microphyllum* (Torr.) Rose & I. M. Johnst.]. Yellow paloverde, Foothill paloverde. Tree; abundant. 436.
- Phaseolus angustissimus* A. Gray. Slimleaf bean. Perennial herb; rare. 728.
- Prosopis velutina* Wooton. [*P. juliflora* (Sw.) DC. var. *velutina* (Wooton) Sarg.]. Velvet mesquite. Tree; abundant.
- Senna covesii* (A. Gray) H. S. Irwin & Barneby. [*Cassia covesii* A. Gray]. Coves' cassia. Subshrub; common. 506.
- Trifolium alborpurpureum* Torr. & A. Gray. Rancheria clover. Ephemeral; occasional. 381.



- Trifolium gracilentum* Torr. & A. Gray. Pinpoint clover. Ephemeral; occasional. 388.  
*Trifolium mucronatum* Willd. ex Spreng. ssp. *lacerum* (Greene) J.M. Gillett. [*T. lacerum* Greene].  
 Spinytooth clover. Perennial herb; occasional. 380.  
*Vicia ludoviciana* Nutt. ex Torr. & A. Gray. [*V. exigua* Nutt.]. Louisiana vetch. Ephemeral; occasional.  
 245, 414.

#### FAGACEAE

- Quercus turbinella* Greene. Sonoran scrub oak. Shrub; infrequent, on upper slopes of north face of  
 Elephant Mountain. 372.

#### FOUQUIERIACEAE

- Fouquieria splendens* Engelm. Ocotillo. Shrub; common. 377.

#### FUMARIACEAE

- Corydalis aurea* Willd. ssp. *aurea*. Scrambled eggs. Ephemeral; rare, on upper slopes of north face of  
 Elephant Mountain. 633.

#### GENTIANACEAE

- Zeltnera calycosa* (Buckley) G. Mans. [*Centaurium calycosum* (Buckley) Fernald]. Arizona centaury.  
 Ephemeral; occasional in riparian areas. 493, 525.  
*Zeltnera nudicaulis* (Engelm.) G. Mans. [*Centaurium nudicaule* (Engelm.) B.L. Rob.] Santa Catalina  
 Mountain centaury. Ephemeral; infrequent, in riparian areas. 520.

#### GERANIACEAE

- \**Erodium cicutarium* (L.) L' Hér. ex Aiton. Filaree. Ephemeral; common. 160.  
*Erodium texanum* A. Gray. Texas filaree. Ephemeral; occasional. 226.  
*Geranium carolinianum* L. Carolina geranium. Ephemeral; infrequent. 332A.

#### HYDROPHYLLACEAE, see BORAGINACEAE

#### JUGLANDACEAE

- Juglans major* (Torr.) A. Heller. Arizona walnut. Tree; rare, along Cave Creek. 651.

#### KRAMERIACEAE

- Krameria erecta* Willd. ex Schult. [*K. parvifolia* Benth.]. Littleleaf ratany. Shrub; infrequent. 490.  
*Krameria bicolor* S. Watson. [*K. grayii* Rose & Painter]. White ratany. Shrub; common. 437, 441.

#### LAMIACEAE

- Hedeoma oblongifolia* (A. Gray) A. Heller. Oblongleaf false pennyroyal. Perennial herb; occasional.  
 637.  
*Hyptis emoryi* Torr. Desert lavender. Shrub; occasional. 350.  
 \**Lamium amplexicaule* L. Henbit deadnettle. Ephemeral; occasional. 190.  
 \**Marrubium vulgare* L. Horehound. Perennial herb; rare. 656.  
*Salazaria mexicana* Torr. [*Scutellaria mexicana* (Torr.) A. J. Paton.]. Mexican bladdersage, Mexican  
 paperbag bush. Shrub; occasional. 352.  
*Salvia columbariae* Benth. Chia. Ephemeral; occasional. 200, 232, 644.

#### LOASACEAE

- Mentzelia affinis* Greene. Yellowcomet. Ephemeral; rare. 287.  
*Mentzelia albicaulis* (Douglas ex Hook.) Douglas ex Torr. & A. Gray. Whitestem blazingstar.  
 Ephemeral; occasional. 628.  
*Mentzelia multiflora* (Nutt.) A. Gray. Adonis blazingstar. Perennial herb; occasional. 518.

#### LYTHRACEAE

- Lythrum californicum* Torr. & A. Gray. California loosestrife. Perennial herb; occasional, in Cave  
 Creek. 521, 527.

**MALPIGHIACEAE**

*Cottisia gracilis* (A. Gray) W. R. Anderson & C. Davis. [*Janusia gracilis* A. Gray]. Slender janusia. Subshrub vine); occasional. 398, 559.

**MALVACEAE** (includes STERCULIACEAE)

*Abutilon incanum* (Link) Sweet. Pelotazo, Indian mallow. Subshrub; occasional. 494, 548.

*Ayenia filiformis* S. Watson. Trans-Pecos ayenia. Perennial herb; occasional. 618.

*Herissantia crispa* (L.) Brizicky. [*Gayoides crispum* (L.) Small]. Bladdermallow. Perennial herb; occasional. 138, 562.

*Hibiscus coulteri* Harv. ex A. Gray. Desert rosemallow. Subshrub; infrequent. 497, 558.

*Malacothamnus fasciculatus* (Nutt. ex Torr. & A. Gray) Greene. Mendocino bushmallow, Chaparral mallow. Subshrub; rare, along Cave Creek. Not seen since 2012. 717, 740, 747. **New record for Arizona.**

\**Malva parviflora* L. Cheeseweed mallow. Ephemeral; locally common. 266.

\**Sida abutifolia* Mill. [*S. procumbens* Sw.]. Spreading fanpetals. Perennial herb; rare. 536.

*Sphaeralcea ambigua* A. Gray ssp. *ambigua*. Apricot globemallow, Desert globemallow. Subshrub; locally common to occasional. 313, 673.

*Sphaeralcea rusbyi* A. Gray. Rusby's globemallow. Perennial herb; infrequent. 455.

**MARTYNIACEAE**

*Proboscidea parviflora* (Wooton) Wooton & Standl. ssp. *parviflora*. [*Martynia parviflora* Wooton]. Devil's claw. Ephemeral; rare. 573.

**MONTIACEAE** (includes PORTULACACEAE, in part)

*Calandrinia ciliata* (Ruiz & Pav.) DC. Fringed redmaids. Ephemeral; occasional. 179.

*Cistanthe monandra* (Nutt.) Hershk. [*Calyptridium monandrum* Nutt.]. Common pussypaws. Ephemeral; occasional. 701.

*Claytonia perfoliata* Donn ex Willd. ssp. *mexicana* (Rydb.) J. M. Miller & K. L. Chambers. [*Limnia mexicana* Rydb.] Miner's Lettuce. Ephemeral; occasional. 213.

**NYCTAGINACEAE**

*Allionia incarnata* L. Trailing windmills. Perennial herb; occasional. 666, 678.

*Boerhavia coccinea* Mill. Scarlet spiderling. Perennial herb; occasional. 499, 539.

*Boerhavia intermedia* M. E. Jones. Fivewing spiderling. Ephemeral; occasional. 533.

*Mirabilis coccinea* (Torr.) Benth. & Hook. f. [*Oxybaphus coccineus* Torr.]. Scarlet four o'clock. Perennial herb; infrequent. 485, 639.

*Mirabilis laevis* (Benth.) Curran var. *villosa* (Kellogg) Spellenb. [*M. bigelovii* A. Gray]. Wishbone-bush. Perennial herb; common. 246.

*Mirabilis multiflora* (Torr.) A. Gray var. *multiflora*. Colorado four o'clock. Perennial herb; rare. 469, 583.

**OLEACEAE**

*Fraxinus velutina* Torr. Velvet ash. Tree; common in riparian areas. 420.

*Menodora scabra* A. Gray. [*M. scoparia* Engelm. ex A. Gray]. Rough menodora. Shrub; occasional. 310.

**ONAGRACEAE**

*Camissonia californica* (Nutt. ex Torr. & A. Gray) P. H. Raven. [*Oenothera leptocarpa* Greene]. California Suncup. Ephemeral; occasional. 230, 416, 433.

*Camissonia cardiophylla* (Torr.) P. H. Raven. Heartleaf suncup. Ephemeral; rare. 630.

*Camissonia chamaenerioides* (A. Gray) P. H. Raven. [*Oenothera chamaenerioides* A. Gray]. Longcapsule suncup. Ephemeral; infrequent. 275, 393.

*Camissonia micrantha* (Hornem. ex Spreng.) P. H. Raven. [*Oenothera micrantha* Hornem. ex Spreng.]. Miniature suncup. Ephemeral; infrequent. 387, 722.

*Clarkia epilobioides* (Nutt. ex Torr. & A. Gray) A. Nelson and J. F. Macbr. [*Godetia epilobioides* (Nutt. ex Torr. & A. Gray) S. Watson]. Canyon clarkia. Ephemeral; rare. 285.

*Oenothera cespitosa* ssp. *marginata* (Nutt. ex Hook. & Arn.) Munz. Tufted evening primrose. Perennial herb; occasional. 683.

*Oenothera elata* Kunth ssp. *hirsutissima* (A. Gray ex S. Watson) W. Dietr. [*O. hookeri* Torr. & A. Gray var. *hirsutissima* (A. Gray ex S. Watson) Munz]. Hooker's evening primrose. Subshrub; infrequent. 742.

*Oenothera primiveris* A. Gray. Desert evening primrose. Ephemeral; infrequent. 224.

#### **OROBANCHACEAE** (includes SCROPHULARIACEAE, in part)

*Castilleja applegatei* Fernald ssp. *martinii* (Abrams) T. I. Chuang & Heckard. [*C. chromosa* A. Nelson; *C. angustifolia* (Nutt.) G. Don var. *dubia* A. Nelson]. Wavyleaf Indian paintbrush. Perennial herb; occasional. 349, 620.

*Castilleja exserta* (A. Heller) T. I. Chuang & Heckard. [*Orthocarpus purpurascens* Benth.]. Exserted Indian paintbrush, Owl clover. Ephemeral; locally common to occasional. 186, 242.

*Castilleja minor* (A. Gray) A. Gray. Lesser Indian paintbrush. Ephemeral; occasional along Cave Creek. 382, 465.

*Orobanche cooperi* (A. Gray) A. Heller. Louisiana broomrape. Ephemeral; rare. 642.

#### **PAPAVERACEAE**

*Argemone pleiacantha* Greene ssp. *ambigua* G. B. Ownbey. Southwestern pricklypoppy. Perennial; rare. 646.

*Eschscholzia californica* Cham. ssp. *mexicana* (Greene) C. Clark. [*E. mexicana* Greene]. California poppy, Mexican gold poppy. Ephemeral; occasional. 197, 357.

#### **PHRYMACEAE**

*Mimulus guttatus* Fisch. ex DC. Seep monkeyflower. [*M. nasutus* Greene]. Ephemeral; common in riparian areas. 384.

*Mimulus rubellus* A. Gray. Little redstem monkeyflower. Ephemeral; occasional. 409, 410.

#### **PLANTAGINACEAE** (includes SCROPHULARIACEAE, in part)

*Keckiella antirrhinoides* (Benth.) Straw. ssp. *microphylla* (A. Gray) Straw. [*Penstemon microphyllus* A. Gray]. Snapdragon penstemon. Shrub; occasional. 353.

*Maurandya antirrhiniflora* Humb. & Bonpl. ex Willd. [*Maurandella antirrhiniflora* (Humb. & Bonpl. ex Willd.) Rothm.] Roving sailor, Twining snapdragon. Perennial herb; occasional. 627.

*Penstemon eatonii* A. Gray ssp. *exsertus* (A. Nelson) D. D. Keck. Firecracker penstemon. Perennial herb; infrequent. 623, 638.

*Penstemon palmeri* A. Gray. Palmer's penstemon. Perennial herb; rare, found once on trailside. 655.

*Penstemon pseudospectabilis* M. E. Jones ssp. *connatifolius* (A. Nelson) D. D. Keck. Desert beardtongue. Perennial herb; infrequent. 367.

#*Penstemon subulatus* M. E. Jones. Hackberry beardtongue. Perennial herb; occasional. 212, 228.

*Plantago ovata* Forssk. [*P. insularis* Eastw.]. Desert indianwheat. Ephemeral; common. 204, 301.

*Plantago patagonica* Jacq. [*P. purshii* Roem. & Schult.]. Woolly plantain. Ephemeral; common. 314.

*Plantago rhodosperma* Decne. Redseed plantain. Ephemeral; occasional. 288.

*Sairocarpus nuttallianus* (Benth.) D. A. Sutton. [*Antirrhinum nuttallianum* Benth.]. Violet snapdragon. Ephemeral; occasional. 413.

*Stemodia durantifolia* (L.) Sw. Whitewoolly twintip. Ephemeral; occasional. 453, 608, 665.

*Veronica americana* Schwein. ex Benth. American speedwell. Perennial herb; rare. 526.

*Veronica anagallis-aquatica* L. Water speedwell. Perennial herb; common in riparian areas. 385.

*Veronica peregrina* L. Hairy purslane speedwell. Ephemeral; infrequent. 319.

#### **PLATANACEAE**

*Platanus wrightii* S. Watson. Arizona sycamore. Tree; occasional in riparian areas. 130.

#### **POLEMONIACEAE**

*Allophyllum gilioides* (Benth.) A. D. Grant & V. E. Grant. [*Gilia gilioides* (Benth.) Greene]. Dense false gilyflower. Ephemeral; infrequent. 321, 430.

*Eriastrum diffusum* (A. Gray) H. Mason. Miniature woollystar. Ephemeral; occasional. 294, 326.

- Eriastrum eremicum* (Jeps.) H. Mason. Desert woollystar. Ephemeral; locally common to occasional. 300.
- Gilia flavocincta* A. Nelson ssp. *flavocincta*. [*G. ophthalmoides* Brand ssp. *flavocincta* (A. Nelson) A. D. Grant & V. E. Grant]. Lesser yellowthroat gilia. Ephemeral; locally common to occasional. 203, 250, 327.
- Gilia stellata* A. Heller. Star gilia. Ephemeral; occasional. 254, 308.
- Ipomopsis multiflora* (Nutt.) V. E. Grant. [*Gilia multiflora* Nutt.]. Manyflowered ipomopsis. Ephemeral; infrequent. 732.
- Leptosiphon aureus* (Nutt.) J. M. Porter & L. A. Johnson ssp. *aureus*. [*Linanthus aureus* (Nutt.) Greene]. Golden linanthus. Ephemeral; rare. 724.
- Linanthus bigelovii* (A. Gray) Greene. Bigelow's linanthus. Ephemeral; occasional. 278.
- Linanthus demissus* (A. Gray) Greene. Desertsnow. Ephemeral; infrequent. 293.
- Microsteris gracilis* (Douglas ex Hook.) Greene. [*Phlox gracilis* (Douglas ex Hook.) Greene]. Slender phlox. Ephemeral; infrequent. 619, 723.
- Phlox tenuifolia* E. E. Nelson. Santa Catalina Mountain phlox, Desert Phlox. Perennial herb; occasional. 347.

### POLYGONACEAE

- Chorizanthe brevicornu* Torr. Brittle spineflower. Ephemeral; occasional. 205, 680.
- Eriogonum abertianum* Torr. Abert's buckwheat. Ephemeral; occasional. 198, 241.
- #*Eriogonum arizonicum* S. Stokes ex M. E. Jones. Arizona buckwheat. Perennial herb; locally common to occasional. 511A, 537.
- Eriogonum deflexum* Torr. Flatcrown Buckwheat. Ephemeral; locally common to occasional. 401, 546.
- Eriogonum fasciculatum* Benth. var. *polifolium* (Benth.) Torr. & A. Gray. Eastern Mojave buckwheat, Flat-top buckwheat. Shrub; common. 310A.
- Eriogonum inflatum* Torr. & Frém. Desert trumpet. Perennial herb; occasional. 400.
- Eriogonum palmerianum* Reveal. Palmer's buckwheat. Ephemeral; infrequent. 675.
- Persicaria lapathifolia* (L.) Gray. [*Polygonum lapathifolium* L.]. Curlytop knotweed. Ephemeral; occasional in dry stream beds. 475, 504.
- \**Polygonum aviculare* L. Prostrate knotweed. Ephemeral; occasional. 415, 540.
- Pterostegia drymarioides* Fisch. & C.A. Mey. Woodland Pterostegia. Ephemeral; occasional. 248.
- \**Rumex crispus* L. Curly dock. Perennial herb; occasional in sandy riparian areas. 464, 523, 736.
- Rumex hymenosepalus* Torr. Canaigle dock, Desert rhubarb. Perennial herb; occasional. 192.

### PORTULACACEAE (see also MONTIACEAE)

- \**Portulaca oleracea* L. Little hogweed, Common purslane. Ephemeral; infrequent. 731.

### PRIMULACEAE

- \**Anagallis arvensis* L. Scarlet pimpernel. Ephemeral; rare on floodplain. 720.
- Androsace occidentalis* Pursh. Western rockjasmine. Ephemeral; occasional. 178.

### RANUNCULACEAE

- Anemone tuberosa* Rydb. Tuber anemone, Desert anemone. Perennial herb; occasional. 227.
- Delphinium parishii* A. Gray. [*D. amabile* Tidestr.]. Parish's larkspur, Paleface delphinium. Perennial herb; occasional. 324.
- Delphinium scaposum* Greene. Tall mountain larkspur. Perennial herb; occasional. 325, 348.
- Myosurus cupulatus* S. Watson. Arizona mousetail. Ephemeral; occasional. 273.

### RHAMNACEAE

- Ceanothus vestitus* Greene [*C. greggii* A. Gray var. *vestitus* (Greene) McMinn]. Desert ceanothus. Shrub; occasional on north face of Elephant Mountain. 621.
- Ziziphus obtusifolia* (Hook. ex. Torr. & A. Gray) A. Gray var. *canescens* (A. Gray) M. C. Johnst. [*Condalia lycioides* (A. Gray) Weberb. var. *canescens* (A. Gray) Trel.]. Lotebush, Gray thorn. Shrub; occasional. 396, 514.

**ROSACEAE**

*Cercocarpus montanus* Raf. var. *glaber* (S. Watson) F. L. Martin. [*C. betuloides* Nutt.]. Birchleaf mountain mahogany. Tree; occasional on upper slopes of north face of Elephant Mountain. 373.

**RUBIACEAE**

*Galium aparine* L. Stickywilly. Ephemeral; infrequent. 252, 257.  
*Galium microphyllum* A. Gray. Bracted bedstraw. Perennial herb; occasional. 551.  
*Galium proliferum* A. Gray. Limestone bedstraw. Ephemeral; infrequent. 253.  
*Galium stellatum* Kellog. Starry bedstraw. Shrub; occasional. 355.

**SALICACEAE**

*Populus fremontii* S. Watson. Fremont cottonwood. Tree; abundant in riparian areas. 614.  
*Salix gooddingii* C. R. Ball. Goodding's Willow. Tree; abundant in riparian areas. 419.  
*Salix laevigata* Bebb. Red willow. Tree; rare. 738.

**SANTALACEAE**

*Phoradendron californicum* Nutt. Mesquite mistletoe, Desert mistletoe. Perennial herb; common on *Acacia greggii*. 489.

**SAPINDACEAE**

*Dodonaea viscosa* Jacq. Florida hopbush. Shrub; infrequent. 492, 749.

**SCROPHULARIACEAE**, see also **OROBANCHACEAE**, **PHRYMACEAE**, and **PLANTAGINACEAE**

\**Verbascum thapsus* L. Common mullein. Ephemeral; infrequent. 739.

**SIMMONDSIACEAE**

*Simmondsia chinensis* (Link) C. K. Schneid. Jojoba. Shrub; common. 146.

**SOLANACEAE**

*Calibrachoa parviflora* (Juss.) D'arcy. [*Petunia parviflora* Juss.]. Seaside petunia. Ephemeral; locally common to occasional in dry stream bed and floodplain. 393A, 408.  
*Datura wrightii* Regel. Sacred thorn-apple, Sacred datura. Ephemeral; occasional. 454.  
*Lycium berlandieri* Dunal. Berlandier's wolfberry. Shrub; occasional. 560, 563.  
*Lycium exsertum* A. Gray. Arizona desert-thorn, Wolfberry. Shrub; common. 165, 307.  
 \**Nicotiana glauca* Graham. Tree tobacco. Tree; rare, found once in dry stream bed. 734.  
*Nicotiana obtusifolia* M. Martens & Galeotti. [*N. trigonophylla* Dunal; *N. palmeri* Gray]. Desert tobacco. Perennial herb; occasional. 457.  
*Solanum americanum* Mill. American black nightshade. Ephemeral; infrequent. 524.

**STERCULIACEAE**, see **MALVACEAE****TAMARICACEAE**

\**Tamarix aphylla* (L.) H. Karst. Athel tamarisk. Tree; rare, small grove of tall trees on Cave Creek floodplain. 595.  
 \**Tamarix chinensis* Lour. [*T. pentandra* Pall.; *T. ramosissima* Ledeb.] Five-stamen tamarisk, Saltcedar, Tamarisk. Shrub; occasional along Cave Creek, currently being managed for removal. 389, 547.

**ULMACEAE**, see **CANNABACEAE****URTICACEAE**

*Parietaria hespera* B. D. Hinton var. *hespera*. Rillita Pellitory. Ephemeral; occasional. 181, 411.

**VERBENACEAE**

*Aloysia wrightii* A. Heller. Wright's beebrush, Oregonillo. Shrub; occasional. 566, 754.

- Glandularia gooddingii* (Briq.) Solbrig. [*Verbena gooddingii* Briq.] Southwestern mock vervain, Goodding's verbena. Perennial herb; occasional. 392.  
*Verbena bracteata* Lag. & Rodr. Bigbract verbena. Ephemeral; rare. 721.  
*Verbena neomexicana* Small var. *xylopoda* L. M. Perry. Hillside vervain. Perennial herb; infrequent. 653.

VISCACEAE, see **SANTALACEAE**

**VITACEAE**

- Vitis arizonica* Engelm. Canyon grape. Perennial herb; rare. 661.

**ZYGOPHYLLACEAE**

- Kallstroemia grandiflora* Torr. ex A. Gray. Arizona poppy. Ephemeral; infrequent. 535, 568.  
*Larrea tridentata* (Sessé & Moc. ex DC.) Coville. Creosote bush. Shrub; common. 394.  
 \**Tribulus terrestris* L. Puncturevine, Goat's head. Ephemeral; rare. 726.

**MONOCOTS**

AGAVACEAE, see **ASPARAGACEAE**

**ASPARAGACEAE** (includes AGAVACEAE and THEMIDACEAE)

- #*Agave chrysantha* Peebles. Goldenflower century plant. Succulent; rare, found once on north-facing hillside. 727.  
*Agave murpheyi* F. Gibson. Murphey's century plant, Hohokam agave. Succulent; rare, found once in 2009, on south face of lower slope of Elephant Mountain, clone was dead. 607.  
*Dichelostemma capitatum* (Benth.) Alph. Wood. [*D. pulchellum* (Salisb.) A. Heller]. Bluedicks, Desert hyacinth. Perennial herb; common. 193, 235.  
*Yucca baccata* Torr. Banana yucca. Succulent; occasional. 376.

**CYPERACEAE**

- \**Cyperus involucratus* Rottb. Umbrella plant. Perennial herb; rare, found once in dry stream bed of Cave Creek. 698.  
*Schoenoplectus pungens* (Vahl) Palla. [*Scirpus americanus* Pers.]. Common threesquare. Perennial herb; common along Cave Creek. 423, 477, 511.

**JUNCACEAE**

- Juncus bufonius* L. Toad rush. Ephemeral; occasional. 318.  
*Juncus torreyi* Coville. Torrey's rush. Perennial herb; occasional. 479, 510.  
*Juncus xiphioides* E. Mey. Irisleaf rush. Perennial herb; rare, in riparian areas. 735.

**LILIACEAE**

- Calochortus kennedyi* Porter var. *kennedyi*. Desert mariposa lily. Perennial herb; occasional. 330.

**POACEAE**

- Aristida adscensionis* L. Sixweeks threeawn. Ephemeral; occasional. 407.  
*Aristida purpurea* Nutt. var. *parishii* (Hitchc.) Allred. Parish's threeawn. Perennial herb; occasional. 422, 438, 647.  
*Aristida purpurea* Nutt. var. *purpurea*. Purple threeawn. Perennial herb; occasional. Purple threeawn. 611.  
 \**Arundo donax* L. Giant reed. Perennial herb; rare along Cave Creek. 752, *Makings* 3862.  
 \**Avena fatua* L. Wild oat. Ephemeral; locally common to occasional. 341.  
*Bothriochloa barbinodis* (Lag.) Herter. [*Andropogon barbinodis* Lag.]. Cane bluestem. Perennial herb; occasional. 677.  
*Bouteloua aristidoides* (Kunth) Griseb. Needle grama. Ephemeral; occasional. 360A, 567.  
*Bouteloua barbata* Lag. var. *barbata*. Sixweeks grama. Ephemeral; occasional. 125.

- Bouteloua barbata* Lag. var. *rothrockii* (Vasey) Gould. [*B. rothrockii* Vasey]. Rothrock's grama. Perennial herb; infrequent. 578.
- Bouteloua curtipendula* (Michx.) Torr. Sideoats grama. Perennial herb; occasional. 580.
- Bromus arizonicus* (Shear) Stebbins. Arizona brome. Ephemeral; infrequent. 290B.
- \**Bromus berteruanus* Colla. [*B. trinii* É. Desv.]. Chilean chess. Ephemeral; infrequent. 290A.
- \**Bromus catharticus* Vahl. Rescuegrass. Ephemeral; occasional. 390.
- \**Bromus diandrus* Roth. [*B. rigidus* Roth]. Ripgut brome. Ephemeral; locally abundant to occasional. 391.
- \**Bromus rubens* L. [*B. madritensis* L. ssp. *rubens* (L.) Husn.]. Red brome. Ephemeral; locally abundant to common. 315, 328.
- \**Cenchrus ciliaris* L. [*Pennisetum ciliare* (L.) Link]. Buffelgrass. Perennial herb; rare. 565.
- \**Cenchrus setaceus* (Forssk.) Morrone. [*Pennisetum setaceum* (Forssk.) Chiov.]. Crimson fountaingrass. Perennial herb; infrequent in drainages. 472, 509.
- \**Cynodon dactylon* (L.) Pers. Bermudagrass. Perennial herb; common. 343.
- Dasyochloa pulchella* (Kunth) Willd. ex Rydb. [*Tridens pulchellus* (Kunth) Hitchc.; *Erioneuron pulchellum* (Kunth) Tateoka]. Low woollygrass. Perennial herb; occasional. 600, 643.
- Digitaria californica* (Benth.) Henrard. [*Trichachne californica* (Benth.) Chase]. Arizona cottontop. Perennial herb; occasional. 132.
- Dinebra panicea* (Retz.) P.M. Peterson & N. Snow ssp. *brachiata* (Steud.) P. M. Peterson & N. Snow. [*Leptochloa panicea* (Retz) Owhi ssp. *brachiata* (Steud.) N. Snow; *L. filiformis* (Pers.) P. Beauv.]. Mucronate sprangletop. Ephemeral; occasional. 120, 581.
- Disakisperma dubium* (Kunth) P. M. Peterson & N. Snow. [*Leptochloa dubia* (Kunth) Nees]. Green sprangletop. Perennial herb; occasional. 579.
- \**Echinochloa colona* (L.) Link. Jungle rice. Ephemeral; occasional. 123.
- \**Echinochloa crus-galli* (L.) P. Beauv. Barnyardgrass. Ephemeral; occasional. 460.
- \**Eragrostis cilianensis* (All.) Vignolo ex Janch. Stinkgrass. Ephemeral; occasional. 554, 586.
- \**Eragrostis lehmanniana* Nees. Lehmann lovegrass. Perennial herb; occasional. 119, 663.
- Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult. Tanglehead. Perennial herb; infrequent. 600A.
- Hilaria belangeri* (Steud.) Nash var. *belangeri*. Curly-mesquite. Perennial herb; occasional. 569.
- Hilaria mutica* (Buckley) Benth. [*Pleuraphis mutica* Buckley]. Tobosagrass. Perennial herb; common. 481.
- Hilaria rigida* (Thurb.) Benth. ex Scribn. [*Pleuraphis rigida* Thurb.]. Big galleta. Perennial herb; common. 440.
- \**Hordeum murinum* L. ssp. *glaucum* (Steud.) Tzvelev. [*H. stebbinsii* Covas; *H. glaucum* Steud.]. Smooth barley. Ephemeral; locally common to occasional. 660.
- Hordeum pusillum* Nutt. Little barley. Ephemeral; locally common to occasional. 323, 659.
- \**Lolium multiflorum* Lam. [*L. perenne* L. ssp. *multiflorum* (Lam.) Husn.]. Italian ryegrass, Annual ryegrass. Ephemeral; infrequent. 459.
- Muhlenbergia porteri* Scribn. ex Beal. Bush muhly. Perennial herb; occasional. 564, 750.
- Muhlenbergia rigens* (Benth.) Hitchc. Deergrass. Perennial herb; common in riparian areas. 139, 590.
- Panicum hirticaule* J. Presl var. *hirticaule*. Mexican panicgrass. Ephemeral; infrequent. 584.
- Pappostipa speciosa* (Trin. & Rupr.) Romasch. [*Stipa speciosa* Trin. & Rupr.; *Achnatherum speciosum* (Trin. & Rupr.) Barkworth; *Jarava speciosa* (Trin. & Rupr.) Peñail.]. Desert needle Grass. Perennial herb; common on upper slopes of north face of Elephant Mountain. 366.
- \**Phalaris minor* Retz. Littleseed canarygrass. Ephemeral; infrequent. 331.
- Poa bigelovii* Vasey & Scribn. Bigelow's bluegrass. Ephemeral; common. 281, 317, 342, 617.
- \**Polypogon monspeliensis* (L.) Desf. Annual rabbitsfoot grass. Ephemeral; locally common to occasional in riparian areas. 432.
- \**Polypogon viridis* (Gouan) Breistr. [*Agrostis semiverticillata* (Forsk.) C. Chr.]. Beardless rabbitsfoot grass. Perennial herb; occasional. 505.
- \**Schismus barbatus* (L.) Thell. Common Mediterranean grass. Ephemeral; common. 280, 615.
- Setaria leucopila* (Scribn. & Merr.) K. Schum. Streambed bristlegrass. Perennial herb; occasional. 577.
- Sporobolus cryptandrus* (Torr.) A. Gray. Sand dropseed. Perennial herb; occasional. 137, 538.
- Tridens muticus* (Torr.) Nash var. *muticus*. Slim tridens. Perennial herb; infrequent. 134.

- Urochloa arizonica* (Scribn. & Merr.) Morrone & Zuloaga. [*Panicum arizonicum* Scribn. & Merr.]. Arizona signalgrass. Ephemeral; rare. 585.
- Vulpia microstachys* (Nutt.) Munro var. *ciliata* (A. Gray ex Beal) Lonard & Gould. [*Festuca eastwoodiae* Piper; *F. microstachys* Nutt. var. *ciliata* A. Gray ex Beal]. Eastwood fescue. Ephemeral; occasional. 316.
- Vulpia microstachys* (Nutt.) Munro var. *pauciflora* (Scribn. ex Beal) Lonard & Gould. [*Festuca pacifica* Piper; *F. microstachys* Nutt. var. *pauciflora* Scribn. ex Beal]. Pacific fescue. Ephemeral; occasional. 298.
- Vulpia octoflora* (Walter) Rydb. var. *hirtella* (Piper) Henrard. [*Festuca octoflora* Walter]. Sixweeks fescue. Ephemeral; common. 239, 616.

#### TYPHACEAE

*Typha domingensis* Pers. Southern cattail. Perennial herb; occasional in riparian areas. 512.

#### XANTHORRHOEACEAE

\**Aloe maculata* All. [*A. saponaria* Haw.]. Soap aloe. Succulent; rare, found once near bank of Cave Creek, but no longer present. 650.

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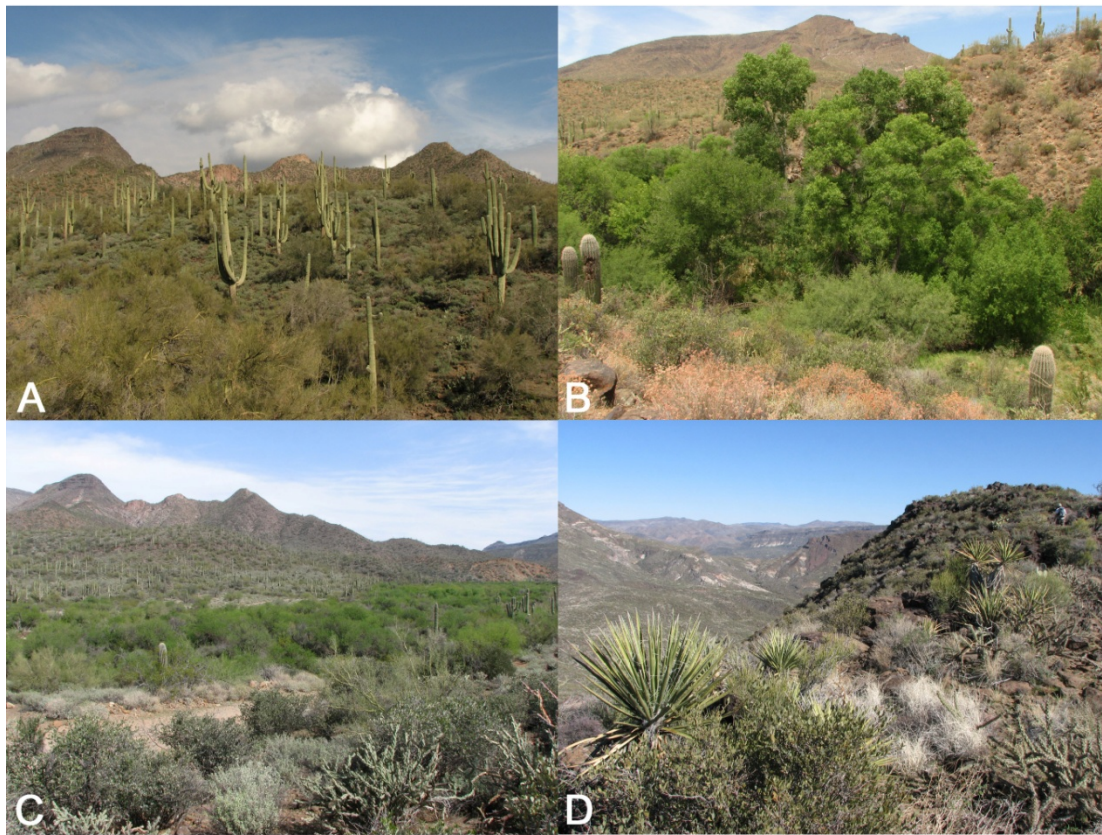
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**Figure 2.** Types of Vegetation.

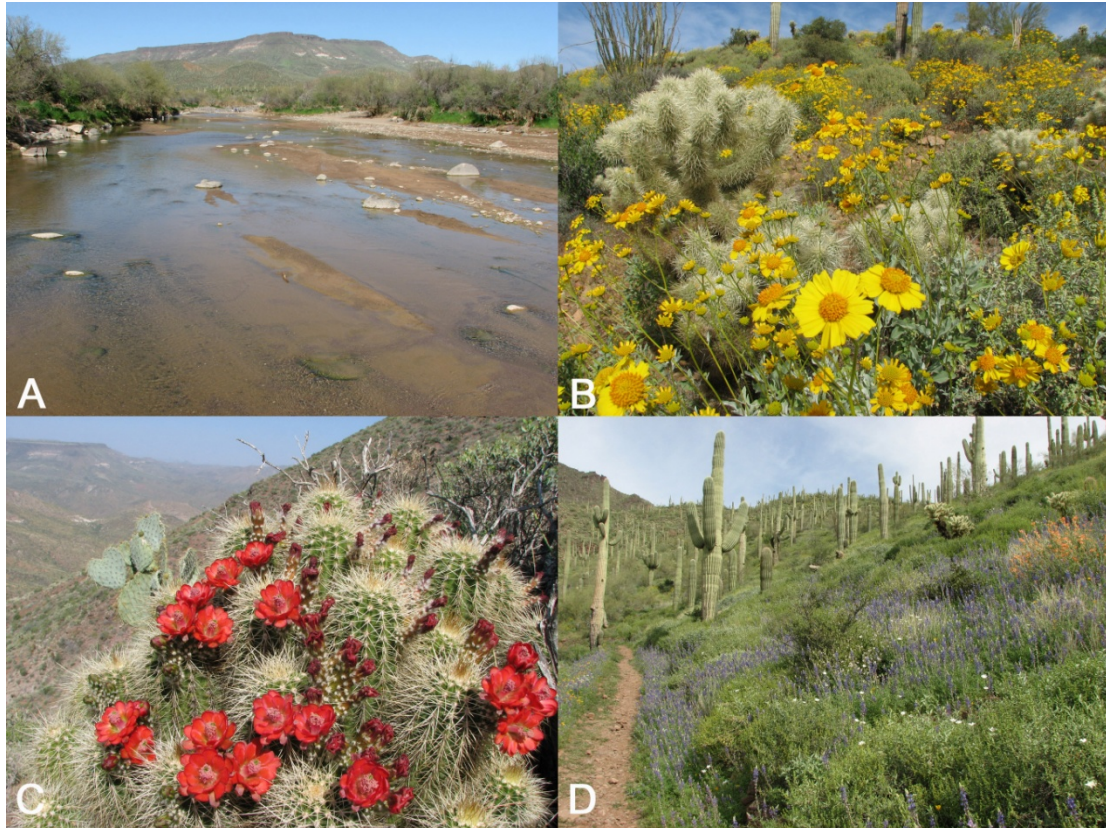
(A) Sonoran Desertscrub-Arizona Upland vegetation includes *Parkinsonia microphylla* (foothill paloverde), *Carnegiea gigantea* (saguaro), *Ambrosia deltoidea* (triangle bur ragweed), *Encelia farinosa* (brittlebush), *Opuntia engelmannii* (Engelmann's pricklypear) and *Cylindropuntia acanthocarpa* (buckhorn cholla). Sugarloaf Mountain on left. 10 Feb 2013.

(B) *Salix gooddingii* (Goodding's willow)-*Populus fremontii* (Fremont cottonwood) riparian habitat along Cave Creek. *Eriogonum fasciculatum* var. *polifolium* (flat-top buckwheat) in foreground, Elephant Mountain in background. 26 May 2013.

(C) A mesquite bosque, dominated by *Prosopis velutina* (velvet mesquite), lines part of Cave Creek. Elephant Mountain in background. 22 Apr 2012.

(D) Elephant Mountain summit, facing northeast. Sonoran Desertscrub Arizona Upland habitat intergrades with Interior Chaparral and Semi-Desert Grassland on the upper slopes of the north face. *Yucca baccata* (banana yucca), *Simmondsia chinensis* (jojoba), *Hilaria mutica* (tobosagrass) and *Cylindropuntia acanthocarpa* (buckhorn cholla) in foreground. 20 Jan 2008.





**Figure 3.** Additional images from Spur Cross Ranch Conservation Area.

(A) Cave Creek supports riparian habitats. Facing northeast, Skull Mesa in background. 20 Mar 2010.

(B) *Encelia farinosa* (brittlebush) displaying a mass of yellow flowers. A member of the Asteraceae, which is the best represented family in the flora, it is an abundant shrub in Arizona Upland Sonoran Desertscrub. *Cylindropuntia bigelovii* (teddybear cholla) in foreground, *Fouquieria splendens* (ocotillo) and *Carnegiea gigantea* (saguaro) in background. 30 Mar 2008.

(C) *Echinocereus yavapaiensis* (Yavapai claret-cup cactus) grows on the upper slopes of Elephant Mountain, and is one of the seven taxa in the study area which are endemic to Arizona. 20 Apr 2008.

(D) Spring ephemerals *Lupinus sparsiflorus* (Coulter's lupine, purple), *Rafinesquia neomexicana* (desert chicory, white), and perennial subshrub *Sphaeralcea ambigua* (desert globemallow, orange) along Spur Cross Trail. Ephemerals accounted for nearly half of the total taxa. 31 Mar 2010.