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 (38.9ºC) in July to an average minimum of 40.5°F (4.7 ºC) in December (WRCC 2013). Extremes during the study were 108°F (42 ºC) in July and/or August of 2007, 2011 and 2012, and 19°F (-7 ºC) 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 burrobrush) 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*, *Symphyotrichum 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.

<table>
<thead>
<tr>
<th>Taxonomic Group</th>
<th>Families</th>
<th>Genera</th>
<th>Species</th>
<th>Additional Infraspecific taxa</th>
<th>Interspecific Hybrids</th>
<th>Total taxa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pteridophytes</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Gymnosperms</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Angiosperms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dicots</td>
<td>62</td>
<td>224</td>
<td>323</td>
<td>1</td>
<td>2</td>
<td>326</td>
</tr>
<tr>
<td>Monocots</td>
<td>7</td>
<td>37</td>
<td>58</td>
<td>3</td>
<td>0</td>
<td>61</td>
</tr>
<tr>
<td>Totals</td>
<td>73</td>
<td>268</td>
<td>390</td>
<td>4</td>
<td>2</td>
<td>396</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Life Form</th>
<th>Number of Taxa*</th>
<th>Percent of Total Flora</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>Shrub/Subshrub</td>
<td>63</td>
<td>16</td>
</tr>
<tr>
<td>Succulent</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>Perennial Herb</td>
<td>108</td>
<td>27</td>
</tr>
<tr>
<td>Ephemeral</td>
<td>190</td>
<td>48</td>
</tr>
</tbody>
</table>

* 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.

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

* 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. Synonomy 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.


*Pellaea truncata* Goodd. [*P. longimucronata* auct. non Hook.]. Spiny cliffbrake. Perennial herb; occasional. 143, 491.

**SELAGINELLACEAE**


**GYMNOSPERMS** (cone-bearing plants)

**CUPRESSACEAE**


**EPHEDRACEAE**


**ANGIOSPERMS** (flowering plants)

**DICOTS**

**ACANTHACEAE**


*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.

*Alternanthera albus* L. Prostrate pigweed. Ephemeral; occasional. 431, 517, 596.

*Amaranthus blitoides* S. Watson. Mat amaranth. Ephemeral; locally common to occasional. 456, 461.

*Atriplex canescens* (Pursh) Nutt. var. *canescens*. Fourwing saltbush. Shrub; infrequent. 528, 671.

*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.


**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**


**APOCYNACEAE**(includes ASCLEPIADACEAE)

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


**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.


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


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

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

*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.

Bebbia juncea Greene. Chuckwalla’s delight, Sweetbush. Shrub; common. 421.
Brickellia coulteri A. Gray var. brachiata (A. Gray) B. L. Turner. Coulter's brickellbush. Subshrub; occasional. 418.
*Centauraea melitensis L. Maltese star-thistle. Ephemeral; locally common to occasional, currently being managed for removal. 322, 379A.
Cirsium neomexicanum A. Gray. New Mexico thistle. Ephemeral; occasional. 339.
[Machaeranthera asteroides (Torr.) Greene var. glandulosa B. L. Turner]. Fall tansyaster. Ephemeral; occasional. 470.
*Dimorphotheca sinuata DC. Glandular Cape marigold. Ephemeral; rare. 702.
Ericameria laricifolia (A. Gray) Shinners. [Haplopappus laricifolius A. Gray]. Turpentine bush. Shrub; occasional. 593.
Ericameria linearifolia (DC.) Urbatsch & Wussow. [Haplopappus linearifolius DC.]. Narrowleaf goldenbush. Shrub; infrequent. 365.
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.
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.
Logia 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.
*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.) Shinners]. Arrowweed. Shrub; rare, in riparian areas. 725, 751.
Porophyllum gracile Benth. Slender poreleaf, Odora. Perennial herb; occasional. 358.
*Psilostrophe cooperi (A. Gray) Greene. Whitestem paperflower. Subshrub; infrequent. 397.
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.


*Sonchus oleraceus L. Common sowthistle. Ephemeral; occasional. 225, 478, 503.


Verbesina encelioides (Cav.) A. Gray. Golden crownbeard. Ephemeral; infrequent. 458, 531.

Xanthium strumarium L. Rough cocklebur. Ephemeral; common. 135.

BORAGINACEAE (includes HYDROPHYLLACEAE)

Amsinckia intermedia Fisch. & C. A. Mey. Common fiddleneck. Ephemeral; common. 159, 188.


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.


Phacelia affinis A. Gray. Limestone phacelia. Ephemeral; occasional. 335, 412.


Phacelia pedicellata A. Gray. Pedicellate phacelia. Ephemeral; rare. 629, 641.


BRASSICACEAE


Descaria pinnata (Walter) Britton. Western tansymustard. Ephemeral; occasional. 338.


Lepidium lasiocarpum Nutt. Shaggyfruit pepperweed. Ephemeral; common. 211.

Lepidium virginicum L. Virginia pepperweed. Ephemeral; occasional. 276.


*Sisymbrium orientale L. Indian hedgemustard. Ephemeral; infrequent. 652.


CACTACEAE

Carnegiea gigantea (Engelm.) Britton & Rose. [Cereus giganteus Engelm.]. Saguaro. Succulent; abundant. 429.


*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, Chainfruits cholla. Succulent; locally common to occasional. 515.


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.


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

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

CAPPARACEAE

CARYOPHYLLACEAE
Silene antirrhina L. Sleepy silene. Ephemeral; occasional. 247, 277.
*Stellaria media* (L.) Vill. Common chickweed. Ephemeral; rare. 612.
*Stellaria nitenis* Nutt. Shiny chickweed. Ephemeral; occasional. 272.

CELASTRACEAE

CHENOPODIACEAE, see AMARANTHACEAE

CONVOLVULACEAE
*Calystegia longipes* (S. Watson) Brummitt. [Convolvulus linearilobus Eastw.]. Paiute false bindweed. Perennial herb; infrequent. 462.
*Cuscuta indecora* Choisy. Bigseed alfalfa dodder. Perennial herb; occasional. 473.
*Ipomoea cristulata* Hallier f. Trans-Pecos morning-glory. Ephemeral; occasional. 425, 549.

CRASSULACEAE

CROSSOSOMATACEAE

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

CUSCUTACEAE, see CONVOLVULACEAE
EUPHORBIACEAE


Ditaxis lanceolata (Benth.) Pax & K. Hoffm. [Argythamnia lanceolata (Benth.) Müll. Arg.]. Narrowleaf silverbush. Ephemeral; occasional. 236, 496.


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 floridensis Engelm. [Chamaesyce floridensis (Engelm.) Millsp.]. Chiricahua Mountain sandmat. Ephemeral; occasional. 534.


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 nittutius A. Gray. 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. Fairy duster. Shrub; common. 311.

Lotus humistratus Greene. Foothill deervetch. Ephemeral; locally common to occasional. 237, 292.


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 sparsiflorus Benth. Coulter’s lupine. Ephemeral; common. 201, 231.

Lupinus succulentus Douglas ex K. Koch. Hollowleaf annual lupine. Ephemeral; infrequent. 244.


Mimosa aculeaticarpa Ortega var. biuncifera (Benth.) Barneby. [M. biuncifera Benth.] Catclaw mimosa. Shrub; infrequent. 467.

Olneya tesota A. Gray. Desert ironwood. Tree; common. 507.

Parkinsonia floridensis (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.

Prospis 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 mucronatum Wild. ex Spreng. ssp. lacerum (Greene) J.M. Gillett. [T. lacerum Greene].
Spinytooth clover. Perennial herb; occasional. 380.
245, 414.

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

FOUQUIERIACEAE

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 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.

LAMIACEAE
Hedeoma oblongifolia (A. Gray) A. Heller. Oblongleaf false pennyroyal. Perennial herb; occasional.
637.
*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.

LOASACEAE
Mentzelia affinis Greene. Yellowcomet. Ephemeral; rare. 287.
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
Cottsia 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.
Hibiscus coulteri Harv. ex A. Gray. Desert rosemallow. Subshrub; infrequent. 497, 558.

*S* 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 sps. ambigua. Apricot globemallow, Desert globemallow. Subshrub; locally common to occasional. 313, 673.
Sphaeralcea rusbyi A. Gray. Rusby's globemallow. Perennial herb; infrequent. 455.

MARTYNIACEAE

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.

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 Engel. ex A. Gray]. Rough menodora. Shrub; occasional. 310.

ONAGRACEAE
Camissonia chamaenerioides (A. Gray) P. H. Raven. [Oenothera chamaenerioides A. Gray]. Longcapsule suncup. Ephemeral; infrequent. 275, 393.
Oenothera cespitosa ssp. marginata (Nutt. ex Hook. & Am.) Munz. Tufted evening primrose. Perennial herb; occasional. 683.


Oenothera primiveris A. Gray. Desert evening primrose. Ephemer; infrequent. 224.

OREBANCHEACEAE (includes SCROPHULARIACEAE, in part)


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

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

PAPAVERACEAE

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

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

PHRYMACEAE

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

Mimulus rubellus A. Gray. Little redstem monkeyflower. Ephemer; 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.


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


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

Plantago ovata Forssk. [P. insularis Eastw.]. Desert Indianwheat. Ephemer; common. 204, 301.

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


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


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


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. Ephemer; infrequent. 321, 430.

Eriastrum eremicum (Jeps.) H. Mason. Desert woollystar. Ephemeral; locally common to occasional.


Ipomopsis multiflora (Nutt.) V. E. Grant. [Gilia multiflora Nutt.]. Manyflowered ipomopsis. Ephemeral; infrequent. 732.


Linanthus bigelovii (A. Gray) Greene. Bigelow’s linanthus. Ephemeral; occasional. 278.

Linanthus demissus (A. Gray) Greene. Desertsnow. Ephemeral; infrequent. 293.


POLYGONACEAE


#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.


PERSICARIA.CHORISANTHE


*Polygonum aviculare L. Prostrate knotweed. Ephemeral; occasional. 415, 540.


*Rumex crispus L. Curly dock. Perennial herb; occasional in sandy riparian areas. 464, 523, 736.


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.


RHAMNACEAE

Ceanothus vestitus Greene [C. greggii A. Gray var. vestitus (Greene) McMinn]. Desert ceanothus. Shrub; occasional on north face of Elephant Mountain. 621.

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

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 OROBLANCHACEAE, PHRYMACEAE, and PLANTAGINACEAE
* _Verbascum thapsus_ L. Common mullein. Ephemeral; infrequent. 739.

SIMMONDSIACEAE

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.
* _Nicotiana glauca_ Graham. Tree tobacco. Tree; rare, found once in dry stream bed. 734.

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

VERBENACEAE
_Aloysia wrightii_ A. Heller. Wright’s beebrush, Oreganillo. Shrub; occasional. 566, 754.
Glandularia gooddingii (Briq.) Solbrig. [Verbena gooddingii Briq.] Southwestern mock vervain, Goodding’s verbena. Perennial herb; occasional. 392.

VISCACEAE, see SANTALACEAE

VITACEAE
Vitis arizonica Engelm. Canyon grape. Perennial herb; rare. 661.

ZYGOPHYLLACEAE
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.

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 xiphioides E. Mey. Irisleaf rush. Perennial herb; rare, in riparian areas. 735.

LILIACEAE

POACEAE
Aristida purpurea Nutt. var. parishii (Hitchc.) Allred. Parish’s threeawn. Perennial herb; occasional. 422, 438, 647.
*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 barbinodus Lag.]. Cane bluestem. Perennial herb; occasional. 677.


*Bromus arizonicus (Shear) Stebbins. Arizona brome. Ephemerid; infrequent. 290B.

*Bromus berteroanus Colla. [B. trinii É. Desv.]. Chilean chess. Ephemerid; infrequent. 290A.

*Bromus catharticus Vahl. Rescuegrass. Ephemerid; occasional. 390.

*Bromus diandrus Roth. [B. rigidus Roth]. Ripgut brome. Ephemerid; locally abundant to occasional. 391.

*Bromus rubens L. [B. madritensis L. ssp. rubens (L.) Husn.]. Red brome. Ephemerid; 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.


Dasyochloa pulchella (Kunth) Willd. ex Rydb. [Tridens pulchellus (Kunth) Tateoka]. Low woollygrass. Perennial herb; occasional. 600, 643.

*Echinochloa colona (L.) Link. Jungle rice. Ephemerid; occasional. 123.


*Eragrostis cilianensis (All.) Vignolo ex Janch. Stinkgrass. Ephemerid; occasional. 554, 586.

*Eragrostis lehmanniana Nes. Lehmann lovegrass. Perennial herb; occasional. 119, 663.

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. Ephemerid; locally common to occasional. 660.

Hordeum pusillum Nutt. Little barley. Ephemerid; locally common to occasional. 323, 659.

*Lolium multiflorum Lam. [L. perenne L. ssp. multiflorum (Lam.) Husn.]. Italian ryegrass. Annual ryegrass. Ephemerid; 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.


*Polypogon monspeliensis (L.) Desf. Annual rabbitsfoot grass. Ephemerid; 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. Ephemerid; common. 280, 615.


Tridens muticus (Torr.) Nash var. muticus. Slim tridens. Perennial herb; infrequent. 134.

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.

**XANTHORHOEACEAE**

*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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**LITERATURE CITED**


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.

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 ambiguа* (desert globemallow, orange) along Spur Cross Trail. Ephemerals accounted for nearly half of the total taxa. 31 Mar 2010.