

**ARIZONA GAME AND FISH DEPARTMENT  
HERITAGE DATA MANAGEMENT SYSTEM**

**Plant Abstract**

**Element Code:** PDAP0030M0

**Data Sensitivity:** Yes

**CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE**

**NAME:** *Amsonia kearneyana*

**COMMON NAME:** Kearney's Blue Star, Kearney's blue-star, Kearney's Bluestar, Kearney's Amsonia

**SYNONYMS:**

**FAMILY:** Apocynaceae

**AUTHOR, PLACE OF PUBLICATION:** R.E. Woodson, Ann. Missouri Bot. Gard. 15(4): 415. 1928.

**TYPE LOCALITY:** USA, Arizona, Pima County, south canyon (Baboquivari Mts.), 9 April 1928, F. Thackery #55, MBG.

**TYPE SPECIMEN:** Type: MO, F.A. Thackery, 9 April 1928, Arizona. Paratype: US 01367358, F.A. Thackery 2018, 24 Mar 1926, USA. Arizona. Baboquivari Mts., south canyon.

**TAXONOMIC UNIQUENESS:** The species *kearneyana* is 1 of 16 in the genus *Amsonia*, and 1 of 5 in the subgenus *Sphinctosiphon*, which also includes: *A. tharpii*, *A. jonesii*, *A. palmeri*, and *A. peeblesii*. *A. kearneyana* was considered as synonymous with *A. palmeri* (North American Flora 29:129), but Kearney et al. (1951) maintains *A. kearneyana* based on distinct characteristics of mature follicles. McLaughlin (1982) retains species based on geographic separation between species, larger corolla lobes, and stem pubescence. Not a synonym of *A. palmeri* as suggested by Woodson (1928). Should be retained as distinct species. McLaughlin (1982): A specimen of *A. palmeri* from the Rio Bavispe, northeastern Sonora, has some characteristics of *A. kearneyana*.

**DESCRIPTION:** Perennial, milky sap multi-stemmed herb up to 90 cm (35.4 in) tall, with a thickened woody root. Up to 50 pilose stems are usually clustered from the base, giving plant hemispherical shape; sparingly branched and densely pubescent. Alternate to subverticillate, oblong-lanceolate to lanceolate leaves (lower: 6-10 cm [2.4-4.0 in.] long and 11-17 mm broad, upper: 4-6 cm [1.6-2.4 in] long and 3-8 mm broad), with soft spreading hairs along the margins. The inflorescence is not too conspicuous. White flowers (with pale pinkish/bluish bottom) are borne in clusters at the ends of the inflorescence. The pubescent calyx is 3.0-5.0 mm long, while the salverform **corolla** (long tube **with short lobes** [2-4 mm long] on the end) is 12-15 mm (range 10-22 mm) long, broadest below the apex and constricted at the orifice. The fruit is a pair of follicles, 3.0-10.0 cm (1.2-4.0 in.) long, slightly constricted between seeds. Seeds are cylindrical, corky, 8-11 mm long and 3-4 mm broad. *A. kearneyana* has largest seed size for its sub-group within *Amsonia*.

**AIDS TO IDENTIFICATION:** *A. kearneyana* has pubescent foliage and calyx; large seed 3-4 mm wide and 8-11 mm long; short corolla lobes, 2-4 mm long. Not sympatric with any other *Amsonias*. Closest *Amsonia* is *A. palmeri* with very showy flowers, narrower leaves, and different pubescence. *A. grandiflora* typically occurs at slightly higher elevations in oak woodlands and is glabrous, its leaves are longer and narrower, its corolla is longer, and its fruits are terete and not constricted between seeds (Falk, Jenkins et al. 2001).

**ILLUSTRATIONS:** Line drawing. USFWS.

Line drawing (*In* Falk, Jenkins et al. 2001)

Color photo of plant (F. Reichenbacher, *in* Falk, Jenkins et al. 2001).

Color photo of plant in habitat (J. Rorabaugh, *in* Falk, Jenkins et al. 2001).

**TOTAL RANGE:** Western slopes of the Baboquivari Mountains, Pima County, Arizona.

**RANGE WITHIN ARIZONA:** South and Sycamore canyons, Baboquivari Mountains, Pima County. Introduced into Brown Canyon, east side of the Baboquivari Mountains. Recent (2017) surveys found additional plants in Thomas and Jaguar canyons (USFWS 2021).

## **SPECIES BIOLOGY AND POPULATION TRENDS**

**GROWTH FORM:** Herbaceous perennial.

**PHENOLOGY:** Flowers late April and May, fruiting June through August. Seeds sterile (Woodson 1928). However, McLaughlin (1982) states that sterility is due to insect predation on embryo--this insect has been identified as a species of stink bug (*Chlorochroa ligata*). Seed production by plants has been seen by many researchers; seed production does not appear to be the limiting factor of seedlings in wild populations (USFWS 2021).

**BIOLOGY:** Insect predators attack embryo giving sterile appearing seeds. Responds to winter precipitation. Reichenbacher has found variability in flower shapes and sizes in plants from the introduction site, implying that the population has some genetic variability. Hawk moths may pollinate at night. As plants mature, become five to six feet across.

**HABITAT:** Dry, open, slopes (20-30 degrees) at 4,000-6,000 ft (1220-1830 m) elevation in Madrean evergreen woodlands/interior chaparral transition zone and on stable, partially-shaded, coarse alluvium along dry washes at 3,600-3,800 ft (1095-1160 m) elevation under deciduous riparian trees and shrubs in Sonoran desertscrub or desertscrub-grassland ecotone (Falk, Jenkins et al. 2001).

**ELEVATION:** 3,600 - 6,400 ft. (1097 - 1950 m).

**EXPOSURE:** Open woodland in full sun or partial shade. North and east-facing slopes just above the flood zone has been recommended for future transplantation efforts (USFWS 2021).

**SUBSTRATE:** Granitic alluvium.

**PLANT COMMUNITY:** “Mexican Blue Oak association, Sonoran Desertscrub, Semidesert Grassland plant communities, or a transition zone between the two” (Reichenbacher, 1993). Madrean evergreen woodland/interior chaparral transition zone to Sonoran desertscrub or desertscrub-grassland ecotone (Falk, Jenkins et al. 2001). Associated plants (Van Devender 1981b) include: *Prosopis velutina*, *Brumelia lanuginosa*, *Coursetia glandulosa*, *Baccharis sarothroides*, *Quercus oblongifolia*, *Dasyllirion wheeleri*, *Celtis reticulata*, *Juglans major*, *Forestiera*, *Cocculus diversifolius*, *Acacia greggii*, *Anisacanthus thurberi*, *Phacelia*, *Cryptantha*, *Crossosoma biglovii*, *Gossypium thurberi*, *Dodonaea viscosa*, *Vauquelinia pauciflora*, *Ptelea trifoliolata*, *Vitis arizonica*, and *Nicotiana trigonophylla*.

**POPULATION TRENDS:** Location of this plant forgotten between 1928 and mid-1970's. McLaughlin found plant in South Canyon (8 individuals in entire population). In 1987, Howell surveyed for additional locations but none were found. From 1987 to 1989, U.S. Fish and Wildlife Service contracted with Southwestern Field Biologists to transplant Arizona Sonoran Desert Museum seeds from South Canyon to establish a new population. In spring of 1988, about 90 plants were planted in Brown Canyon, which is now part of the Buenos Aires National Wildlife Refuge. In 1989, 110 plants were also planted in Brown Canyon. The introduced population in Brown Canyon (east side of Baboquivari Mountains) declined from approximately 130 to 35 plants (2/3 of the population) following a flood in 1990. (At the Bureau of Land Management, Safford District, Rare Plants Workshop, Frank Reichenbacher stated that the flood occurred in July, 1991. However, his report of 1991 gives the year as 1990).

The one native population consists of approximately 10-15 individuals (late 1980's). Native population in 1986 and 1987 was 8-12 individuals in field. Flooding occurred in 1988, 1989 and 1992. By November 1993, had 65 plants surviving. Low recruitment due partially to seed pods being collected for two years because insects were boring into pods and eating seeds. No young in South Canyon at all. The status of the Sycamore Canyon population is unknown.

The total number of *A. kearneyana* individuals across all sites that have been resurveyed has declined by about 48 percent (USFWS 2021). However, this number (332) is probably an underestimate, as some sites (e.g. sites owned/administered by Tohono O'odham and ASLD) have not been resurveyed due to access issues.

The minimum number of *A. kearneyana* needed to achieve resiliency based on Pavlik's concept of minimum viability population is estimated to be 1,225 individual plants, while redundancy could be achieved, through augmentation at existing sites or discovery of additional localities, a minimum of 5 subpopulations with 100 plants each (USFWS 2021). To date, neither exists.

## **SPECIES PROTECTION AND CONSERVATION**

**ENDANGERED SPECIES ACT STATUS:** LE (USDI, FWS 1989)

**STATE STATUS:** [C1 USDI, FWS 1985]  
 [C1 USDI, FWS 1980]  
 [PTN-E USDI, FWS 1975]  
 Highly Safeguarded (ARS, ANPL 1993, 1999, 2016)

**OTHER STATUS:** Not Forest Service Sensitive (USDA, FS Region 3 1999, 2013)  
 Bureau of Land Management Sensitive (USDI, BLM AZ 2017)  
 [Forest Service Sensitive (USDA, FS Region 3 1990)]

**MANAGEMENT FACTORS:** Extreme rarity, vulnerable canyon bottom habitat (due to catastrophic flood events). Protection of populations from disturbance; these disturbances include physical damage from livestock, border activities, and invasion of habitat from nonnative plants. An altered fire regime (both severity and size) is seen as a threat to plants/sites. Drought and climate change are also recognized as threats (USFWS 2021).

**CONSERVATION MEASURES TAKEN:** Artificial population established by transplants in Brown Canyon; Baboquivari protected area on Tohono O'odham Reservation. Surveys to expand known range.

**SUGGESTED PROJECTS:** Surveys should be done in the Coyote Mountains (S. Rutman 1994). Surveys should be conducted in Sonora, Mexico to verify the existence of this species there (USFWS 2021). USFWS identified many recovery action items, ranked here from highest priority: census known *A. kearneyana* sites (every 3 - 5 years); monitor known *A. kearneyana* sites and habitat (every 3 - 5 years); survey for new *A. kearneyana* locales (every 3 - 5 years); transplanting efforts to increase individual numbers at known sites (every 10 years); establish new sites via transplanting efforts (every 10 years); conduct research relating to *A. kearneyana* biology (USFWS 2021).

**LAND MANAGEMENT/OWNERSHIP:** BIA - Tohono O'odham Nation; BLM - Phoenix and Tucson Field Offices; Private. Introduction site on FWS - Buenos Aires National Wildlife Refuge.

## **SOURCES OF FURTHER INFORMATION**

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#### ADDITIONAL INFORMATION:

<b>Revised:</b>	1991-11-10 (PLW)
	1991-12-04 (SR)
	1994-12-07 (DBI)
	1997-11-05 (SMS)
	2003-06-27 (SMS)
	2021-08-27 (TME)

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