ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Plant Abstract **Element Code:** PDCRA06010
Data Sensitivity: Yes

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Graptopetalum bartramii* Rose
COMMON NAME: Bartram Stonecrop
SYNONYMS: *Echeveria bartramii*
FAMILY: Crassulaceae

AUTHOR, PLACE OF PUBLICATION: Rose. 1926. Addisonia 11:1-2, pl. 253.

TYPE LOCALITY: Arizona: Santa Cruz County: Patagonia Mountains: Flux Canyon.

TYPE SPECIMEN: E. Bartram. 1920.

TAXONOMIC UNIQUENESS: One of nine species in the genus *Graptopetalum*, one of two in Arizona, which also includes *G. rusbyi*.

DESCRIPTION: Small succulent perennial with a basal rosette of flat to concave leaves. These leaves, numbering 20 or more, are flat or somewhat concave, bluish-green with a reddish margin and tip, up to 6.5 cm (2.6 in.) long, and ovate to broadly spatulate with a pointed tip. Flower stalk up to 0.3 m (1.0 ft.) high with alternate bract-like leaves. Five-parted flowers arranged along multi-branched stalk are 19.0-32.0 mm (0.76-1.28 in) wide. Five petals joined at bottom are broadly campanulate when blooming. Colored pale- or greenish-yellow, 13.0 mm (0.52 in.) petals are transversely banded or blotched with red. Ten red stamens often recurve outside of petals. Valves of 5 carpels abruptly tipped with styles.

AIDS TO IDENTIFICATION: Grows as solitary rosettes or in clumps on ledges or slopes of steep walled canyons. Thick succulent leaves glaucous and gray-green in color. Old flowering stalks give plants reddish-brown appearance from a distance. Flowers reported to have strong disagreeable odor resembling odor of stinkhorn fungus (Phillips 1982). Leaves of distinctive shape.

In its longer, apiculate leaves, acute sepals, paniculate inflorescence, and fall phenology, *G. bartramii* differs from *G. rusbyi* (Anderson 1999).

ILLUSTRATIONS:
Line drawings of flowers (Moran 1949 Fig.1:4).
Line drawings of flowers (Moran 1949 Figs.2 and 3:55).
B&W photo of rosette (Moran 1974 Fig.1:94).

TOTAL RANGE: Southern Arizona, Sonora and Chihuahua, Mexico; currently 50 extant populations across 12 mountain ranges in southern Arizona and northern Mexico (USFWS 2021).

RANGE WITHIN ARIZONA: Santa Cruz County: Patagonia, Santa Rita and Pajarito-Atascosa Mountains; Pima County: Baboquivari, Dragoon, Mule and Rincon Mountains; Cochise County: Chiricahua and Whetstone Mountains.

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Perennial succulent. Individual plants reportedly live up to five years (USFWS 2018).

PHENOLOGY: Flowering occurs September - November, while fruiting occurs in November and December (USFWS 2018). Anderson (1999) reports a flowering/fruiting period from September to February.

BIOLOGY: As this species only reproduces sexually, it is dependent upon pollinators and seed production for reproduction. True flies (*Sarcophaga* spp.) and house flies (*Musca* spp.) are the major pollinators of this species, though the honey bee (*Apis mellifera*) may play a role in pollination (USFWS 2018). Recruitment appears to decline or even cease in drought years with dry falls, while mortality appears to be higher in hot and dry years (Ferguson 2020).

HABITAT: Deep, narrow canyons and cracks in rocky outcrops in shrub live oak-grassland communities along meandering arroyos on sides of rugged canyons. Usually heavy litter cover and shade where moisture drips from rocks, often with Madrean evergreen woodland. USFWS reports that plants typically occur within 10 meters of streambeds, springs, or seeps (2018). The narrow canyons and overstory species provide shade during a portion of the day, creating a cooler temperature and aiding in maintaining a humid microenvironment (USFWS 2018).

ELEVATION: 3,650 - 6,700 ft (1113-2044 m). Based on records in the AGFD Heritage Data Management System (HDMS), elevation in Arizona ranges up to 6,300 ft (1922 m).

EXPOSURE: North.

SUBSTRATE: A wide range of substrates have been reported for this species, including volcanic, granitic, igneous, sedimentary, and metamorphic rocks. Crevices, shade and leaf litter appear to be more important than underlying geology for this species (USFWS 2018).

PLANT COMMUNITY: Madrean evergreen woodland. Dominant associated species include: *Agave schottii, Bouteloua curtipendula, Cercocarpus montanus, Choisya mollis,*

Dasylirion wheeleri, Fouquieria splendens, Juniperus deppeana, Muhlenbergia spp., *Rhus trilobata,* and *Yucca baccata*. Also in rocky outcrops in shrub live oak (*Quercus turbinella*)-grassland communities.

POPULATION TRENDS: In decline. Three populations in Arizona have recently become extirpated due to habitat drying, and another has decreased in size (USFWS 2018). An increased fire regime in the southwest and an ongoing drought (10+ years) have contributed to the loss of individuals as well as populations in Arizona (USFWS 2018).

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: Threatened (USDI, FWS 2021)
[Proposed Threatened (USDI, FWS 2019)]
None (USDI, FWS 1996)
[C2 USDI, FWS 1983]
[C1 USDI, FWS 1980]

STATE STATUS: Salvage Restricted (ARS, ANPL accessed 2011)
[Salvage Restricted (ARS, ANPL 1993)]

OTHER STATUS: Forest Service Sensitive (USDA, FS Region 3, 1990, 1997, 2007, 2013)
Bureau of Land Management Sensitive (USDI, BLM AZ 2000, 2005, 2008, 2010, 2017)

MANAGEMENT FACTORS: Small, isolated populations with little to no connectivity. Loss of water from mining and mineral exploration; habitat alteration due to intensive livestock grazing, water development, and fire suppression; trampling by cattle and recreationists; illegal collection of individual plants, and road construction and maintenance have all been identified as stressors. High severity wildfires caused by recreationists, cross border violators and lightning is also a potential threat. Erosion, sedimentation, and burial threatens populations and individuals. Climate change related effects including altered precipitation, drought, flooding, and freezing regimes, increased evapotranspiration, habitat loss due to erosion, and increased temperatures are all projected to have a negative impact on *G. bartramii* populations in the future (USFWS 2018).

PROTECTIVE MEASURES: Listed as a threatened species under the Endangered Species Act. In 2016, over 50,000 seeds were collected, presumably to be stored in a seed bank (USFWS 2018).

SUGGESTED PROJECTS: Continue monitoring known populations. Conduct research on specific microhabitat requirements and reproductive biology of Bartram's Stonecrop. Creation of a Recovery Plan.

LAND MANAGEMENT/OWNERSHIP: BLM - Tucson Field Office; NPS - Saguaro National Park; USFS - Coronado National Forest; TNC - Thomas Canyon Preserve. Possibly on BIA - Tohono O'odham Nation.

SOURCES OF FURTHER INFORMATION

REFERENCES:

Arizona Revised Statutes, Chapter 7. 1993. Arizona Native Plant Law. Appendix A:8.

Arizona Revised Statutes, Chapter 7. Arizona Native Plant Law. Accessed 2011, AZDA. http://www.azda.gov/ESD/protplants.htm.

Ferguson, George. 2020. Personal communication. Email to J. Crawford, USFS, dated 12/15/2020.

Kearney, T.H., R.H. Peebles with collaborators. 1960. Arizona flora. Second edition with supplement by J.T. Howell, E. McClintock and collaborators. University of California Press. Berkeley. p. 361

Moran. R. 1949. *Graptopetalum bartramii* in Chiricahua. Desert Plant Life. 21:53-56.

Moran. R. 1974. *Graptopetalum bartramii* Rose. Saguaroland Bulletin. 28:94-95.

Phillips, A.M. III, B.G. Phillips, N. Brian, J. Mazzoni, L.T. Green III. 1982. Status report on *Graptopetalum bartramii*. Prepared for U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

Rutman, S. 1994. Bureau of Land Management, Safford District, Rare Plant Workshop. November 14-16. Tucson, Arizona.

USDA, Forest Service Region 3. 1990. Regional Forester's Sensitive Species List.

USDA, Forest Service Region 3. 1999. Regional Forester's Sensitive Species List.

USDA, Forest Service Region 3. 2007. Regional Forester's List of Sensitive Plants.

USDA, Forest Service Region 3. 2013. Regional Forester's List of Sensitive Plants.

USDI, Bureau of Land Management. 2000. Arizona BLM Sensitive Species List. Instruction Memorandum No. AZ-2000-018.

USDI, Bureau of Land Management. 2005. Arizona BLM Sensitive Species List.

USDI, Bureau of Land Management Region 2. 2008. Arizona BLM Sensitive Species List.

USDI, Bureau of Land Management Region 2. 2010. Arizona BLM Sensitive Species List.

USDI, Bureau of Land Management Region 2. 2017. Arizona BLM Sensitive Species List.

USDI, Fish and Wildlife Service. 1980. Endangered and Threatened Wildlife and Plants; Review of Plant Taxa for Listing as Endangered or Threatened Species. Federal Register 45(242):82512.

USDI, Fish and Wildlife Service. 1983. Endangered and Threatened Wildlife and Plants; Supplement to Review of Plant Taxa for Listing; Proposed Rule. Federal Register 48(229):53651.

USDI, Fish and Wildlife Service. 1996. Endangered and Threatened Wildlife and Plants: Review of Plant and Animal Taxa That Are Candidates for Listing as Endangered or Threatened Species; Notice of Review. Proposed Rule. Federal Register 61(40):7595-7613.

UDSI, Fish and Wildlife Service. 2018. Species status assessment report for *Graptopetalum bartramii* (Bartram's stonecrop). United States Fish and Wildlife Service Arizona Ecological Services Office, Tucson, Arizona. 117 pp. + 2 appendices.

USDI, Fish and Wildlife Service. 2019. Endangered and Threatened Wildlife and Plants; Endangered Species Status for Beardless Chinchweed With Designation of Critical Habitat, and Threatened Species Status for Bartram's Stonecrop With Section 4(d) Rule. Proposed Rule. Federal Register 84 (235):67060-67104.

USDI, Fish and Wildlife Service. 2021. Endangered and Threatened Wildlife and Plants; Threatened Species Status for Bartram's Stonecrop With a Section 4(d) Rule. Final Rule. Federal Register 86 (166):48545.

MAJOR KNOWLEDGEABLE INDIVIDUALS:

Dan Beckman – Saguaro National Park, Tucson, Arizona.
Julie Crawford – USFWS, Flagstaff, Arizona.
Charles Drost – USGS Southwest Biological Science Center, Flagstaff, Arizona.
George Ferguson – University of Arizona Herbarium, Tucson, Arizona.

ADDITIONAL INFORMATION:

Species name *Graptopetalum* from Greek "petals marked with writing."
New treatment of *Graptopetalum*: Moran, Reed. 1993. Journal of Arizona-Nevada Academy of Science. Vol. 27:190-193. Newest and best key for Crassidaceae.

Isotypes include: NY 387949, E.B. Bartram, 21 Nov 1924; NY 387950, E.B. Bartram 54708, Sep-Oct 1925.

Revised: 1990-12-20 (SR)
1991-10-20 (BKP)
1997-07-22 (SMS)
2001-12-20 (SMS)
2020-02-04 (TME)
2021-08-31 (KSL)

To the user of this abstract: you may use the entire abstract or any part of it. We do request, however, that if you make use of this abstract in plans, reports, publications, etc. that you credit the Arizona Game and Fish Department. Please use the following citation:

Arizona Game and Fish Department. 20XX **(= year of last revision as indicated at end of abstract)**. X...X **(= taxon of animal or plant)**. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. X pp.
o