

2015 Funded Section 6 Plant Proposals - AZ

The following proposals were funded in 2015 (Segment 19). Federal shares include Arizona Department of Agriculture administration costs. Abstracts from final reports will be posted once the segment is complete.

- 1) The role of pollinator abundance and diversity in reproductive output of *Pediocactus peeblesianus* var. *fickeiseniae*, the Fickeisen Plains Cactus**
Principal Investigator(s): **Dr. Clare Aslan, Northern Arizona University**
Federal Share: \$21,892
Objective(s): 1) identify relative frequencies and efficacies of pollinators visiting focal cactus individuals across the study area, with relevance to site-level grazing history and fire history, 2) identify relative densities and diversity of pollinators across the study area, with relevance to site-level grazing history and fire history, 3) identify the relative potential of native vs. non-native pollinators to effect pollination of focal plants, and 4) assess early reproductive metrics from a limited number of flowers from focal plants (seed production, seed viability).
- 2) Development of genetic resources for the study of acuña cactus (*Echinomastus erectocentrus* var. *acunensis*) and its close relatives**
Principal Investigator(s): **Dr. Shannon Fehlberg, Desert Botanical Gardens**
Federal Share: \$20,036
Objective(s): To develop the genetic markers necessary for the documentation and quantification of genetic diversity within and among individuals, populations, and taxa in the genus *Echinomastus*.
- 3) Detection of *Lilaeopsis schaffneriana* var. *recurva* using PCR in water samples**
Principal Investigator(s): **Dr. Nadja Anderson, University of Arizona**
Federal Share: \$20,968
Objective(s): To develop a protocol with high school research students from four Advanced Biotechnology classes, for measuring the presence of endangered aquatic herbaceous perennial species, *L. schaffneriana* ssp. *recurva*, DNA in water samples. This will be accomplished through: a) develop PCR protocol(s) for a DNA loci specific to *L. schaffneriana* ssp. *recurva*, b) confirm amplified DNA sequence to *L. schaffneriana* ssp. *recurva* DNA, c) test PCR protocol on water containing *L. schaffneriana* ssp. *recurva*, and d) determine ideal PCR conditions to amplify *L. schaffneriana* ssp. *recurva* in water samples.
- 4) Application of Distance Sampling for Pima Pineapple Cactus (*Coryphantha scheeri* var. *robustispina*) Population Enumeration and Monitoring**
Principal Investigator(s): **Aaron Flesch and Brian Powell, private, Pima County**
Federal Share: \$10,060

Objective(s): 1) investigate the efficacy of distance sampling for estimating abundance and monitoring of Pima pineapple cactus across multiple environmental gradients with the outcome of: a) a statistical comparison of abundance estimates based on distance sampling vs. the Roller (1996) method based on sampling in the same areas, b) estimates of the effects of key environmental variables on abundance and detection probability of Pima pineapple cactus, and c) guidance on the use of distance sampling for monitoring and research programs including survey effort and sample size requirements for distance sampling.

5) Genetic diversity of the Arizona endemic, *Actaea arizonica* (Arizona bugbane): implications for conservation and management

Principal Investigator(s): **Dr. Tina Ayers, Wendy McBride, and Kimberly Hansen, Northern Arizona University**

Federal Share: \$8,808

Objective(s): 1) analyze AFLP data from individuals representing four populations and representative subpopulations to answer the following questions: a) how is genetic diversity distributed within and among populations and subpopulations of *A. arizonica*?, b) is there evidence for gene flow among the four disjunct populations of *A. arizonica*? Among subpopulations?, c) has a genetic bottleneck occurred in any or all of the populations and or subpopulations?, and d) in which populations and or subpopulations, if any, are levels of inbreeding depression significant? And 2) identify candidate populations or subpopulations that contain sufficient diversity for future vegetation or reintroduction efforts.

6) Multi-year study monitoring two *Graptopetalum bartramii* (Bartram Stonecrop, Crassulaceae) populations in Pima and Santa Cruz Counties, Arizona

Principal Investigator(s): **George Ferguson, private**

Federal Share: \$4,098

Objective(s): 1) evaluate two known populations in Arizona of *G. bartramii* over time for abundance, population structure (by size-class), habitat characteristics and threats to each population, and 2) monitor two existing study plots from the above objective for population dynamics in growth, mortality, reproduction, germination and survival of individuals.

7) Survey for *Carex specuicola* (Navajo sedge) in support of the Draft Recovery Plan

Principal Investigator(s): **Glenn Rink, private**

Federal Share: \$7,179

Objective(s): 1) make thorough and focused searches for Navajo sedge to determine if populations are extant or extirpated, 2) to survey areas previously surveyed with negative results to document possible dispersal, and 3) relocate the southwestern-most location of Navajo sedge on Hopi land to determine status and collect a voucher specimen.

8) *Allium gooddingii* (Goodding Onion, Amaryllidaceae) and *Salix arizonica* (Arizona willow, Salicaceae) response to the Wallow Fire on the Apache-Sitgreaves National Forest

Principal Investigator(s): **Kirsten Phillips, Museum of Northern Arizona**

Federal Share: \$10,608

Objective(s): 1) inventory known populations of *Allium gooddingii* and *Salix arizonica* within the Wallow Fire burn area to determine population health, 2) evaluate structural stability and effectiveness of fences and exclosures surrounding *Salix gooddingii* on the Apache-Sitgreaves National Forest, 3) resurvey permanent plots of *Allium gooddingii* and *Salix arizonica* populations and compare monitoring data to data collected pre-fire, 4) survey for new populations of *Allium gooddingii* and *Salix arizonica* in previously unoccupied habitat, identifying high density populations that could be designated as special management areas, and 5) update both the SEINet records, image library, and AGFD Heritage Data Management System records for both species.

9) Survey for *Cryptantha semiglabra* (*Fredonia catseye*, Boraginaceae) in northern Coconino and Mohave counties, Arizona

Principal Investigator(s): **Glenn Rink, private**

Federal Share: \$4,758

Objective(s): To survey within the known range as well as promising habitats outside of the presently known range of *Cryptantha semiglabra* with the aim of discovering new populations. Negative results will also be reported to help direct future survey effort and inform managers of expanding or contracting ranges and dispersal events.

10) Conservation of a Rare Cactus (*Pediocactus bradyi*) Through Surveying and Seed Collection

Principal Investigator(s): **Dr. Kristin Haskins and Sheila Murray, The Arboretum at Flagstaff**

Federal Share: \$11,301

Objective(s): 1) complete a survey / census of *Pediocactus bradyi* within and beyond the known distribution boundaries, 2) collect seeds from geographically dispersed areas and store them by maternal line at the National Center for Genetic Resources Preservation in Ft. Collins, Colorado, and 3) promote public awareness, appreciation, and support for the preservation of *Pediocactus bradyi* through writing an article on the species for the Cactus and Succulent Society of America's international publication.