

Agency/Organization: US Geological Survey

Project Name: Clark County Rare Plant Propagation Research Phase II

Project Number: 2021-USGS-2075A

Reporting Period: October 1, 2024 – December 31, 2024

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QUESTION 1: What did you accomplish during this reporting period? How did these accomplishments help you reach the goal of your project? If relevant, what indicators or benchmarks were used to determine your progress?

We collected soil seedbank samples at the Upper Virgin Valley population of *Eriogonum viscidulum* (ERVI), the Mud Lake (Dry Lake) and Mormon Mesa populations of *Astragalus geyeri* var. *triquetrus* (ASGET), and the Gold Butte and Bitter Springs Valley populations of *Arctomecon californica* (ARCA) in late October and early November 2024 and began watering the samples to propagate these three species (M17). Resulting plants will be grown in the USGS greenhouse and seed collected to create conservation collections for the ERVI and ASGET populations or nursery stock for ARCA.

We established experimental plots within the California Wash and Muddy River populations of ASGET in November 2024 (M18). Our experience watering plots in winter 2023/24 and monitoring ASGET during spring 2024 has allowed us to narrow the environmental window for successful ASGET germination, and we plan to begin watering the plots in January 2025. Fall and winter rainfall has been extremely limited at both locations due to the current La Niña weather pattern, with a resulting lack of germinants of any annual plant species, including ASGET, observed during plot establishment and initial surveys.

In early November, we planted *Cylindropuntia multigeniculata* (CYMU) plants propagated from Gold Butte joint cuttings collected in late October 2023 into habitat (M19). All cuttings were caged to exclude small mammals and randomized in a two-level watering experiment at the time of planting. Prior to planting, we assessed and measured the CYMU cuttings collected in fall and propagated using the soil mixture developed during Phase I of this project. We randomly assigned experimental planting treatments to each joint and verified that cutting size was not statistically different between treatments (M16). During the same field visit, we revisited the re-introduced CYMU plants propagated from spring joint cuttings (planted in April 2024, M11) and watered the plants assigned to the Frequent watering treatment with 1 gal of water each, while plants assigned to the Infrequent watering treatment received no additional water. In January 2025, we will begin differential watering of the fall-planted CYMU assigned to the Frequent and Infrequent watering treatments.

We completed propagation treatments from seed for *Arctomecon californica* (ARCA) received from Kelsey Graham (USDA), with germination associated with ongoing temperature trials and gibberellic acid treatment (M20). We have also prepared additional ARCA seeds collected in 2023 by Kelsey Graham for a second round of germination based on the most successful treatment combinations from our initial trials.

In the USGS greenhouse, the PEAL cuttings collected by our subcontractor (Utah State University graduate student) in late March 2024 at three of the four populations in Clark County (Ivanpah, Hidden Valley, and Jean) were potted in May and June as they developed roots. All cuttings continue to be cared for at the USGS greenhouse and will be outplanted in early 2025.

These Milestones are instrumental in field and greenhouse work and developing our final deliverables for this project.

QUESTION 2: What, if any, problems were encountered? Briefly describe those problems and the manner in which they were dealt.

Because no ERVI seedlings were successfully transplanted and grown out from surface soils we collected during Fall 2023, and we found no remaining viable seeds in these samples, we were unable to harvest seeds from plants emerging from seedbank grown in the greenhouse (D14). To overcome the absence of seed for conservation collection, we proposed delivery of an Excel workbook documenting all species that emerged and their counts from this habitat collection. This aspatial data includes details of the greenhouse emergence trial and the composition of the seed bank at this site (i.e., native, nonnative and ERVI species; seedling counts; timing of emergence associated with watering and chemical treatments), which can be compared against seed bank composition at other sites. We are currently awaiting a decision on this proposed change to the Deliverable.

QUESTION 3: What, if any, proposed activities were not completed? Briefly describe those activities, the reasons they were not completed and your plans for carrying them out.

None.

QUESTION 4: What is the calculated percent of work completed?

We are approximately 23% toward project completion.

QUESTION 5: Do you foresee any upcoming problems with future project activities? If so, how do you propose to overcome those problems?

Based on the La Niña weather pattern forecasted by NOAA, we anticipate probability of rainfall will continue to decline across the Mojave Desert over the winter of 2024/25. As of this reporting, Las Vegas has not received measurable rain in 159 days, the second-longest such streak on record for the region. As prolonged soil drying continues and soil water storage declines, our planned supplemental irrigation will become less effective at offsetting drought effects. As a winter annual species, ASGET relies on winter and/or early spring precipitation for germination, and we may not see emergence and survival of seedlings, despite our planned supplemental watering of habitat plots. Lack of seedlings would preclude eventual seed collections at the California Wash and Muddy River populations (D25). If dry conditions persisting into January fail to promote establishment of native annuals in general, we would propose shifting field work on this species to winter/spring of 2025/26 so that our supplemental watering is more effective when La Niña conditions dissipate.

QUESTION 6: Is there anything else you want to tell the DCP about this project?

We have nothing additional to note concerning this project.

QUESTION 7: What was produced during the reporting period?

During the reporting period, we produced this Quarterly Progress Report (D16).