

Agency/Organization: US Geological Survey

Project Name: Development of Resilient Plant Materials for Desert Restoration

Project Number: 2023-USGS-2382A

Reporting Period: July 1, 2025 – September 30, 2025

Project Contact Name and Information: Lesley DeFalco, Ph.D.; USGS, Western Ecological Research Center; 500 Date St., Boulder City, NV; 89005. (702) 294-6591. ldefalco@usgs.gov

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 received seeds of both FORB and SHRUB species that we requested from BLM and the Germplasm Resources Information Network for collection locations that are geographically and climatically similar to the USGS Searchlight, Nevada common garden (seed transfer zone 25, "STZ25"). This common garden is where we will be evaluating seed and nursery stock during the field trials that will follow our greenhouse pre-conditioning trials to develop drought- and herbivore-resistant plant materials.

After beginning pre-conditioning and stress treatments on FORB species in our greenhouse, we began monitoring vigor of pre-conditioned seedlings (M14). After completing viability testing on SHRUB seeds, we implemented dormancy break treatments (M13) and have been transplanting germinated seeds into the USGS greenhouse for growth prior to treatment. In late September, we started pre-conditioning and stress treatments on SHRUB seedlings in the greenhouse (M15).

These Milestones are instrumental in our greenhouse pre-conditioning trials and in our garden evaluations of plant materials so we can develop 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.

After implementing dormancy break treatments on shrub seeds in mid-July, we did not see a level of germination consistent with our high viability testing of the seed. Germination was spotty for *Ambrosia*, and *Larrea* in particular. We requested and received an amendment to extend the dates for implementation of pre-conditioning and stress treatments in the greenhouse to allow for the slightly longer process of germinating seeds on petri plates first and transferring viable germinants to plant bands instead of direct seeding into bands.

After implementing dormancy break treatments on forb seeds, we saw emergence and survival of a sufficient number of seedlings for one species, Arizona lupine (*Lupinus arizonicus*) and partial emergence and survival for two others, fringed amaranth (*Amaranthus fimbriatus*) and desert chia (*Salvia columbariae*). We applied pre-conditioning and three levels of stress treatments to individuals of Arizona lupine and have monitored their vigor; we were able to apply only one level of stress to individuals of fringed amaranth and desert chia (late flowering) due to low numbers of surviving plants for those species. Mojave Desert forbs have different temperature requirements for germination, which allows for their co-existence in habitat. Although our greenhouse has capacity for temperature control, warmer nighttime temperatures during summer

months may not be optimal for some native forb species. Now that temperatures in the greenhouse are representing a fall transition, particularly those at night, we are re-planting seeds of our candidate forb species. We have requested and received an amendment to extend the dates for completing pre-conditioning and stress treatments on these additional species.

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 10% 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?

None anticipated.

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 (D08).