Conserving Rare and Disjunct Orchids in a Changing American West

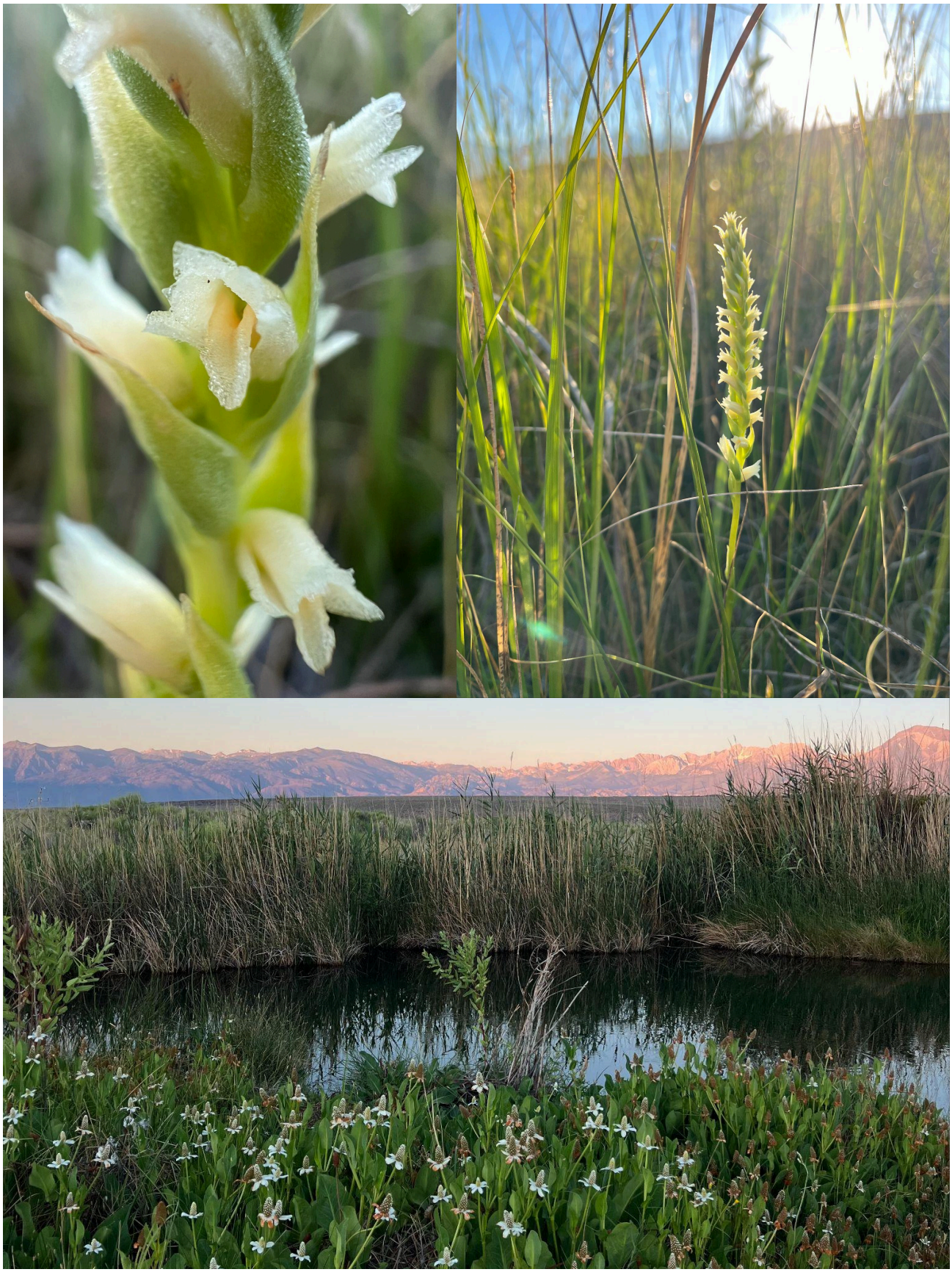
2024 Mary DeDecker Botanical Grant Progress Report
Allison Autry – PhD Student in Botany
California Botanic Garden/Claremont Graduate University

Thanks to the Bristlecone Chapter's generosity in awarding me the Mary DeDecker Botanical Grant, I was able to make significant progress in my research on the population genetics and conservation of *Spiranthes* orchids in California and Nevada in 2024. My research aims to gather information on, and ensure the continued survival of, the rare and under-researched *Spiranthes infernalis*. This project will provide valuable population-level information for disjunct and isolated *Spiranthes* occurrences via a study that integrates population genetic and taxonomic research, demographic monitoring and surveys, life history studies, seed banking, propagation trials, and restoration planning.

Over the course of the field season, I visited both known *Spiranthes infernalis* populations in Nevada, the Fish Slough *Spiranthes* population near Bishop, CA, and a variety of other *Spiranthes* populations in the Sierra Nevada for outgroup sampling. The 2024 DeDecker grant made it possible for me to travel to Fish Slough, McGee Creek, and Sequoia National Forest to conduct surveys and gather samples for my research. The Fish Slough *Spiranthes* population had last been surveyed in 2023 by a team of botanists from California Botanic Garden surveyed this population in 2023, and that year they managed to re-locate only a single individual. I was able to find a total of three plants at the site in July 2024. Tissue samples for genetic analysis were collected from two of the three plants.

In total, I collected tissue samples from 197 individual plants during the course of my field work. I was able to successfully extract DNA from all of these samples using standard CTAB protocol, and have since prepared and sent out two 96-sample libraries for ddRadseq sequencing at UC Riverside's lab. This data will provide me with information on the genetic diversity and population structure of *Spiranthes infernalis* across its range. I will also be able to make phylogenetic assessments that will provide some clarity on the identity of the Fish Slough *Spiranthes*. These assessments will use Nevada *S. infernalis* samples and identifiable California *Spiranthes porrifolia* and *Spiranthes romanzoffiana* samples to gain information on the placement of the taxonomically challenging Fish Slough plants.

Currently, I am analyzing the data from my first ddRadseq library and awaiting the sequences from the second. I am also planning fieldwork for the upcoming season. I plan to revisit Fish Slough in hopes of locating more plants. My colleagues have recently begun using soil moisture maps produced by the Sentinel 2 imaging satellite to identify appropriate habitat and survey for rare alkali plants, and I hope that by using this resource I can locate unknown *Spiranthes* plants in the Fish Slough area. I will also supplement the outgroup samples collected last season with more *Spiranthes porrifolia* collections, as this is the closest related species to *S. infernalis* and the other possible identification for the Fish Slough plants.



Images from Fish Slough. 1-2) *Spiranthes* blooming in Fish Slough. 3) Fish Slough just before sunrise.