Final Project Report for Seed collection for Rare and Native Seeds on the Spring Mountains National Recreation Area

PROJECT REVIEW:

What measurable goals did you set for this project and what indicators did you use to measure your performance?

The goal of this project was to develop a rare seed bank, a native seed bank for restoration, and germination protocols for rare species. We proposed to begin seed banking for 7 species and determining germination requirements for 5 species of rare plants.

To what extent has your project achieved these goals and levels of performance?

Beginning in May 2004, Red Butte Gardens and the Forest Service began collection of rare plant seeds. Seeds from 6 priority taxa were collected in the Spring Mountain National Recreation Area and sent to Red Butte Garden for developing germination methods and seed banking.

Table 1. Summary of seeds received from Spring Mountain NRA in 2004 and the accession number assigned by Red Butte Garden.

Date received	Taxon	Seed accession #	Seed count	Collection site
8/18/04	*Astragalus aequalis*	S-31 S-32 S-38	13 460 352	Willow Creek Buck Springs Road Fletcher Trailhead
8/18/04	*Astragalus oophorus* var. *clokeyanus*	S-29 S-30	196 89	Bristlecone Ridge Foxtail Ridge
8/18/04	*Penstemon thompsoniae* ssp. *jaegeri*	S-27 S-28	236 101	Wallace Canyon Lovell Summit
8/18/04	*Townsendia jonesii* var. *tumulosa*	S-24 S-25 S-26	45 38 14	Bristlecone Trail Blue Tree Trail Mud Springs Trail
8/18/04	*Viola purpurea* var. *charlestonensis*	S-23	3	Harris Springs Wash/Griffith Peak
10/1/04	*Cirsium clokeyi*	S-45 S-46	817 278	Three Springs Mary Jane Falls

In 2005, Seeds from seven taxa were collected from the Spring Mountain National Recreation Area (SMNRA) with Red Butte Garden assistance and later sent Red Butte Garden (RBG) seed bank facility. The seeds collected in early August were transported by RBG staff upon return on 8/5/2005. A second batch of collected seeds was received at RBG on 11/9/2005 in a shipment from SMNRA.

Table 2. Summary of seeds received from Spring Mountain NRA in 2005 and the accession number assigned by Red Butte Garden.

Date received	Taxon	Seed accession #	Collection site	Date collected
11/9/2005	*Angelica scabrida*	S-212 S-213	Fletcher Canyon Rainbow Canyon	9/19/2005 10/4/2005
8/5/2005 11/9/2005	*Arenaria kingii* ssp. *rosea*	S-202 S-207	Bristlecone Trail Dolomite campground	8/4/2005 8/22/2005
8/5/2005	*Astragalus aequalis*	S-195 S-196	Mud Springs Buck Springs canyon	8/2/2005 8/3/2005
8/5/2005	*Astragalus oophorus* var. *clokeyanus*	S-197 S-198	Bonanza Peak Foxtail Ridge	8/2/2005 8/4/2005
11/9/2005	*Penstemon leiophyllus* var. *keckii*	S-205 S-206 S-210 S-211	Bristlecone trail Griffith Peak trail Three spring complex Ski area West bowl	8/9/2005 8/22/2005 8/29/2005 9/12/2005
8/5/2005	*Townsendia jonesii* var. *tumulosa*	S-199 S-200 S-201	Bonanza Peak Mud Springs Bristlecone trail	8/2/2005 8/2/2005 8/4/2005
11/9/2005	*Viola purpurea* var. *charlestonensis*	S-203 S-204 S-208 S-209	Griffith Peak trail Harris Mountain Griffith Peak slope Griffith Peak trail	7/27/2005 8/8/2005 9/22/2005 8/24/2005

Germination testing was performed on 5 of the collected taxa and propagation protocols were submitted by Red Butte Garden and Arboretum for *Astragalus aequalis, Astragalus oophorus* var. *clokeyanus, Cirsium clokeyi, Penstemon thompsoniae* ssp. *jaegeri* and *Townsendia jonesii* var. *tumulosa.*

It was proposed in the 2005 Annual Report that germination protocol testing would be initiated for *Angelica scabrida, Arenaria kingii* ssp. *rosea, Penstemon leiophyllus* var. *keckii,* and *Viola purpurea* var. *charlestonensis,* with a repeat of testing for *Townsendia jonesii* var. *tumulosa,* using seeds collected in 2005. However, the species used changed because the time constraints in place for a project conclusion date of May 2006 did not provide a sufficient span of time in which to conduct and complete the various phases of germination testing for those taxa. The Challenge Cost-Share Agreement requires the reporting of germination protocols for 5 taxa, and these were delivered for the species listed in the above paragraph.

In addition, collections of native common plant seeds, including endemic butterfly host plants, have been collected for seed that is, and will be, used for restoration projects. These collections were conducted by Forest Service employees and a contract with Nevada Conservation Corp contractors. Species identified for restoration which were collected can be found in Table 3.

Table 3. List of Plant Species Collected for the Spring Mountains National NRA Restoration Projects

Species Collected	
Anemopsis californica	Lupinus argenteus
Angelica scabrida	Machaeranthera canes
Arenaria kingii	Mentzelia oreophila
Astragalus calycosus	Mimulus guttatus
Atriplex canescens	Monardella odoratus
Baccharis sergiloides	Oryzopsis hymenoides
Baileya multiradiata	Penstemon eatonii
Bouteloua gracilis	Penstemon leiophyllus
Carex aurea	Penstemon rostriflorus
Carex straminiformis	Pinus monophylla
Cercocarpus ledifolia	Purshia mexicana
Chrysothamnus nausea	Purshia mexicana
Dodecatheon redolens	Quercus gambelii
Elymus elymoides	Rhus trilobata
Ephedra viridis	Ribes aureum
Eriogonum umbellatum	Rosa woodsii
Erysimum capitatum	Sisyrinchium halophila
Fallugia paradoxa	Sphaeralcea ambigua
Hymenoxys cooperi	Sporobolus airoides
Juncus balticus	Stanleya pinnata
Juncus ensifolius	Stipa comata
Leymus cinereus	Tetradymia canescens
Linum lewisii	Viola purpurea var. charlestonensis
	Zigadenus paniculata

Seed collection for restoration efforts continues to date. Species collected from varies depending on specific restoration needs.

Did the project encounter internal or external challenges? How were they addressed? Was there something Clark County could have done to assist you?

No extraordinary internal or external challenges were encountered.

What lessons did you learn from undertaking this project?

The germination protocols are very helpful in building a native seed collection and germination program for restoration in the future.

What impact do you think the project has had to date?

This agreement helped in initiating a Seed Program on the SMNRA. The Seed Program will be a continually developing program that will adapt and change through depending on SMNRA needs for restoration and rare plant knowledge. We now have established a system for developing germination protocols for rare and native species. We also have begun building a native seed bank to aid in restoration efforts on the SMNRA. Some of the projects these seeds have already been used for include: deterring weed establishment at spring

sites, rehabilitating user created roads that have officially been closed, and for post-fire restoration.

Is there additional research or efforts that would complement or add to your project that could be conducted?

Germination protocols for additional rare and native plant species would be helpful for our program. Further understanding the needs of rare plant species helps us in managing habitats so plant populations can be sustained.

FORMAL REPORT:

Executive Summary

Featured Project and Type
Seed Collection of Rare and Native Species for the SMNRA.

Rare Species Addressed

- *Angelica scabrida* – Rough angelica (Charleston angelica)
- *Arenaria kingii* ssp. *rosea* – Rosy King sandwort
- *Astragalus aequalis* – Clokey milkvetch
- *Astragalus oophorus* var. *clokeyanus* – Clokey eggvetch
- *Cirsium clokeyi* – Clokey thistle (Charleston Mountain thistle)
- *Penstemon leiophyllus* var. *keckii* – Charleston beardtongue
- *Penstemon thompsoniae* ssp. *jaegeri* – Jaeger beardtongue
- *Townsendia jonesii* var. *tumulosa* – Charleston grounddaisy
- *Viola purpurea* var. *charlestonensis* – Charleston violet

Summary Project Description
Seeds from nine taxa were collected by Spring Mountain National Recreation Area (SMNRA) during 2004 and 2005, with assistance from Red Butte Garden and Arboretum (RBGA) staff in August 2005.

Project Status/Accomplishments
The agreement with Red Butte Gardens is completed and seed collection for restoration efforts continues by Forest Service Staff and a contract with Nevada Conservation Corp.

Red Butte Gardens has provided germination protocols on 5 rare species. They also have seed banks for 9 rare species including all species listed above.

Partners
Red Butte Gardens
Nevada Conservation Corp

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Funding
This project was a Cost Share Agreement. Clark County agreed to provide $48,960 and Red Butte provide $20,460.

Completion Date or Status
This project has been completed.

Documents/Information Produced
2004 Annual report, 2005 Annual Report, 2006 Final Report, and 2006 Germination Protocol.

Two (2) Project Photos

Figure 1. Clokey milkvetvh and Clokey Eggvetch seedlings, January 2005. (K. Wilson)

Figure 2. Clokey Thistle seedlings, une 2006 (A. Sibul)

Introduction

Description of the Project

Beginning in May 2004, Red Butte Gardens and the Forest Service began collection of rare plant seeds. Seeds from 6 taxa, collected in the Spring Mountain National Recreation Area, were sent to Red Butte Garden for germination testing and seed banking. In addition, collections of native common plant seeds, including from endemic butterfly host plants, have been collected for seed that is, and will be, used for restoration projects.

Background and Need for the Project

We identified the need to understand the germination and cultivation requirements of rare plant prior for use in restoration and re-introduction efforts. We also have a need for supplies of common native species on hand for ongoing restoration projects.

Management Actions Addressed (As identified in the MSHCP)

Goals and Objectives of the Project

Our goal was to establish germination procedures for 5 rare pant species and to build a seed bank of native rare and common species.

Methods and Materials

- Seeds from nine taxa were collected by Spring Mountain National Recreation Area (SMNRA) during 2004 and 2005.
- Seeds were stored in a drying chamber to dessicate the seeds before storing in the seed bank
- Once the seeds were properly dried, they were placed in the seed bank with some of the seeds being used for the germination trials
- Native common seeds were also collected for seed banking and restoration around the Forest.

Results and Evidence of the Results

2004 Annual report, 2005 Annual Report, 2006 Final Report, and 2006 Germination Protocols and seed banks were established.

Evaluation/Discussion of Results

We now understand the germination and cultivation requirements of rare plant for use in restoration and re-introduction efforts. We also have seed bank supplies of common native species on hand for use in ongoing restoration projects.

Conclusion and Recommendations

Germination studies for some additional rare plant species would benefit the Forest. Understanding the needs of rare plant species helps us in managing for them so that we can sustain their populations.

Germination testing of some common native species would also help us to understand techniques necessary for restoration efforts.

It is recommended to continue to collect native plant seeds for future restoration efforts.