

Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Developing a Restoration Plan for the rare saltgrass, *Puccinellia howellii*, at Whiskeytown National Recreation Area, California

Discipline: Natural

Type of Project: Research

Funding Agency: National Park Service

Other Partners/Cooperators: Colorado State University

Effective Dates: 5/15/2007- 12/31/2008

Funding Amount: \$25,000

Investigators and Agency Representative:

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Project Abstract: *Puccinellia howellii* (Howell's alkali grass) is a local endemic restricted to a 1-acre salt spring in the foothills of the Klamath Mountains, in Whiskeytown National Recreation Area. California Highway 299 runs across the uppermost portion of the salt spring and is causing several direct and indirect impacts to the site. The major direct impacts are burial of a portion of the site under the road fill, diversion of saltwater flow by a large berm, discharge of freshwater runoff from culverts and the road fill prism onto the site, and sediment discharge onto the site from the fill material. The primary indirect impact of the roadway is foot traffic to the site from visitors stopping at a large pullout along the road.

Colorado State will cooperate with National Park Service resource managers to carry out the following activities in 2007-2008:

- Complete the monitoring of transplanted seedlings to determine the habitats that transplanted *Puccinellia* can and cannot survive and reproduce.
- Calculate the volume of fill to be removed from the east side of Spring 2 to lower the grade to within ~20 cm of bedrock.
- Calculate the volume of the berm to be removed, and the final grade that should be accomplished
- Calculate the volume of alluvial material to be removed from the two fans in Spring 2.
- Determine the volume of bare sediment at Spring 3 and its origin if possible.
- Develop a removal plan for the fill identified in all three spring areas. Determine the preferred equipment to be used and techniques that will minimize impact to the site.
- Develop concepts for extensions for the two pipes that currently discharge fresh water onto Spring 3 to transport this water down gradient from the *Puccinellia* areas.
- Develop a preliminary grading plan in conjunction with the berm removal that will allow the spring discharge emerging from the highway edge to flow into Spring 1.
- Develop concepts for a drainage system that will divert storm water runoff from the highway and deliver it down gradient of the spring complex.
- Develop concepts for a culvert, pipe, armored channel, or natural channel that will conduct the water that currently discharges from the under-highway culvert onto Spring 2, into Willow Creek or other down gradient destination.
- Develop concepts to reduce sediment from the highway and the stream that flows under the highway at spring 2.
- Develop concepts to collect, transport, and deliver off site, the non-point source discharge of fresh water from the road fill prisms along the north side of Spring 2, and the north, west and east of Spring 3.
- Develop a *Puccinellia* seeding, propagation and transplantation plan that includes amount of seed to be collected, method of germination and propagation, type of substrate and containers to be used, and method of transplanting or seeding onto the site.
- Develop concepts for an erosion control plan for all excavated areas.

Outcomes with Completion Dates:

- Progress Report (Mid-Year) - August 1, 2007
- Annual Report - May 15th, 2008
- Final Report/Restoration Plan - August 1st, 2008

Keywords: Whiskeytown NRA, Colorado State University, restoration, saltgrass, *Puccinellia howellii*, highway impacts

For Administrative Use Only:

Date Annual Report Received:

Date Final Report Received:

Publications, etc. on file: