Semi-Annual Progress Report, 7

20 December 2010

"Restoring Natural Fire Regimes at Golden Spike National Historic Site by Developing a Healthy Sagebrush/Grassland Vegetation Community to Prevent the Cheatgrass-Wildfire Cycle/Evaluating Restoration Seeding Techniques Using Native Herbaceous Species in Cheatgrass-Dominated Communities at Golden Spike National Historic Site"

RM-CESU Cooperative Agreement Number: H1200040001

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1. Progress to Date

The project was initiated on 1 September 2007. To date we have initiated three distinct research projects relevant to the goals of the cooperative agreement. One graduate student has completed 2.5 years on this project and is writing her thesis; a second student started on the project spring 2009.

1.1. Seeding by seed-caching rodents

No work was completed on this part during the period covered by this report.

1.2. Seeding into existing sagebrush stands, and
1.3. Restoration of cheatgrass stands

I combine the second and third projects because the accomplishments are the same.

I. Accomplishments and new preliminary results:

- A. We seeded plots again for the third year to continue to investigate whether repeated seeding can improve the success by slowly adding perennials or by 'hitting' a good year for establishment.
- B. Analyses show that both sucrose addition (N-immobilization) and imazapic pre-emergent herbicide application can effectively reduce the cheatgrass seed pool by reducing the density of cheatgrass and/or reducing size and reproductive output of cheatgrass. Thus, both might be useful for reducing cheatgrass seed pool in anticipation of seeding desirable species the following year.
- C. Although over 3000 perennial seedlings emerged and were marked this spring, it appears that they suffered complete or near complete mortality over the summer. Recensusing in the spring will clarify actual survival. Mortality was apparently due to a rapid shift from cool-wet early summer to a very hot and dry period combined with grasshopper herbivory. The summer of 2010 was an outbreak event for grasshoppers throughout northern Utah.
- D. The final germination period for the seed pool samples is nearing completion. Preliminary observations still suggest the seed pool has a higher diversity of native species than is evident above ground. However, it is still very strongly dominated by annual exotic grasses and forbs, especially cheatgrass.
- E. A thesis chapter/manuscript on treatment effects on cheatgrass emergence, growth, and reproductive success has been begun with a first draft completed.

2. Plans For Sixth Reporting Period, 1 January 2010–30 June 2010

2.1. Seeding by seed-caching rodents

We do not plan to work on this aspect of the project during the next 6 months.

2.2. Seeding into existing sagebrush stands, and
2.3. Restoration of cheatgrass stands

In the coming 6-month period we will:

I. Continue with thesis chapter/manuscript on treatment effects on cheatgrass and begin one on treatment effects on nutrients.
II. Finish greenhouse portion of seed pool study and begin analyses.
III. Re-census sampling plots for perennial grasses and cheatgrass.
IV. Begin analyses of perennial seedling emergence and establishment.