

## **Project Summary**

### **Rocky Mountains Cooperative Ecosystem Studies Unit**

**Project Title:** Assessment of Nitrogen Deposition and its possible effects on alpine vegetation in the Grand Teton National Park

**Type of Project:** Research

**Discipline:** Natural

**Funding Agency:** National Park Service

**Other Partners/Cooperators:** Utah State University

**Effective Dates:** 5/1/2005 - 3/31/2009

**Funding Amount:** \$110,089

**Investigators and Agency Representative:**

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#### **Project Abstract:**

This project is a three year effort to develop baseline information and then perform experiments to determine the effects of atmospheric nitrogen deposition on the alpine terrestrial environments of Grand Teton NP.

During the first year of the project, Utah State researchers will carry out these tasks:

1. Plot identification and layout - Summer '05
2. Installation of soil moisture and temperature probes - Summer '05
3. Preliminary vegetation and soil sampling - Summer '05

In 2006, park staff and investigators from Utah State University will collaborate to:

1. measure the total loading of nitrogen to alpine areas in the park
2. establish vegetation plots in the sensitive alpine communities of GRTE to determine potential indicator species and processes,
3. apply nitrogen experimentally to begin to establish the dose/response relationships for soil processes and plant community dynamics.

In 2007-2008, the following will be completed:

1. Chemical analysis of year 1 samples - June 30, 2007
2. Field samples of soils and plants - September 1, 2007
3. Deposition and climate measurements - October 1, 2007
4. Data analysis - March 31, 2008
5. Final report completed - March 31, 2008

This project will build on the knowledge base already existing from N addition experiments conducted at Niwot Ridge LTER, on the Front Range of the Colorado Rockies and will allow for regional extrapolation of the extensive database on N deposition and its effects on alpine ecosystems in the Central Rockies. This information will be used to derive initial estimates for "critical loads" of N for alpine systems in GRTE and will provide input to park management, the NPS-Air Resources Division, and regulatory agencies towards protecting ecosystem function in Class 1 parks of the Rocky Mountains. The evaluation of results from this study, combined with those obtained at other N-fertilization experiments at Niwot Ridge, Rocky Mountain NP (ROMO) and Glacier NP (GLAC) will allow further refinement of critical loads estimates and the degree of uncertainty associated with those estimates. This will provide managers and regulators with a tool to extrapolate and apply dose/response data along a gradient in the Rocky Mountains

#### **Outcomes with Completion Dates:**

Interim report due September 30, 2005

Annual report due October 2006, and October 2007

Final Report due after the third field season - March 31, 2008

**Keywords:** nitrogen deposition, alpine ecosystems, plant species, soil chemistry, critical loads, Grand Teton National Park, Utah State University

#### **For Administrative Use Only:**

Date Annual Report Received:

Date Final Report Received:

Publications, etc. on file: