

Project Summary

Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: EVALUATION OF LONG-TERM SPECIES CHANGES AND RESPONSE TO NITROGEN FERTILIZATION IN ALPINE PLANT COMMUNITIES.

Discipline: Natural Resources

Type of Project: Research

Funding Agency: National Park Service

Other Partners/Cooperators: University of Colorado at Boulder

Effective Dates: 6/1/2005 - 7/1/2009

Funding Amount: \$99,483

Investigators and Agency Representative:

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Project Abstract:

Atmospheric nitrogen (N) deposition has increased significantly in several western National Parks, which are protected under the Clean Air Act Amendments of 1977 as Class 1 areas. Changes in aquatic ecosystems have been documented in Rocky Mountain NP, but to date there have been no evaluations of terrestrial ecosystem change, nor have critical thresholds of vegetation change been established. The proposed research will establish levels of N input for vegetation changes in communities most susceptible to species compositional change. Experiments using a range of N fertilization levels (ambient, +5, +10, and +30 kg N/ ha /yr) will be used to obtain response curves of vegetation composition. The experiments will provide lists of plant species sensitive to N levels that can be used as indicators of terrestrial N loading for evaluation in existing and newly established permanent monitoring plots. The research will be done in Rocky Mountain and Glacier National Parks, representing sites with high and low rates of N deposition. This project will extend over three years.

The objectives of this project are to 1) perform in situ experiments to establish critical N loads for alpine vegetation response (changes in species abundance, diversity), 2) to establish a list of indicator plant species for terrestrial vegetation responses to N deposition, and 3) to establish permanent monitoring plots in ROMO and identify existing permanent plots in GLAC for future evaluation of vegetation change to N deposition and other environmental stressors. The proposed research will evaluate the utility of vegetation change as an ecological indicator of N deposition, and provide input to park managers on the components of the vegetation that should be monitored most closely.

Outcomes with Completion Dates:

- Short one to two paragraph quarterly updates are to be provided via electronic mail to the ROMO and GLAC representatives.
- One hard copy and one electronic copy of the interim report due, December 31, 2006 to be delivered to the ROMO key contact and GLAC representative
- Final report of the three year project, due December 31, 2008.
- An oral presentation will be provided to the ROMO and GLAC staff describing the project and the resulting management implications of this work.

Keywords: nitrogen, atmospheric deposition, alpine, plant, critical loads, Rocky Mountain National Park, Glacier National Park, University of Colorado at Boulder, fertilization

For Administrative Use Only:

Date Annual Report Received:

Date Final Report Received:
Publications, etc. on file: