

Project Summary

Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Evaluating the Influence of Nitrogen Deposition Gradients on Plant Diversity: Filling in the Gaps

Discipline: Natural Resources
Type of Project: Research
Funding Agency: National Park Service
Other Partners/Cooperators: University of Colorado at Boulder
Effective Dates: 6/27/2013 - 3/31/2014
Funding Amount: \$ 64,848

Investigators and Agency Representative:

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Project Abstract: Current rates of atmospheric N deposition in regions of the U.S. are sufficient to cause losses of species from plant communities, based on experimental manipulations (Clark and Tilman 2008), comparisons with N deposition gradients in Europe (Stevens et al. 2004, Dupre et al. 2010), and limited information from gradients in the U.S. (e.g. California, Fenn et al. 2010). The proposed research will combine with an effort funded by EPA and USGS that is evaluating existing data sets for vegetation across estimated gradients of N deposition spanning ~ 1 to 20 kgN/ha/yr. The EPA/USGS research effort primarily focuses on use of existing data collected from monitoring and research efforts of state and Federal agencies, NGOs, and individual researchers. Using these data sets of herbaceous species diversity, coupled with estimates of N deposition, our main objective is to determine if patterns of plant diversity correspond with variation in N deposition rates across landscapes with the same plant community types, soil parent materials, and climate regimes. In addition to determining if diversity is declining due to N deposition we hope to validate and refine critical loads of N deposition estimated from recent reviews (Pardo et al. 2011, Bobbink et al. 2010).

A second part of this research effort involves field surveys of plant diversity and soils across N deposition gradients which appear to have a high potential for evaluating whether changes in diversity of herbaceous plants is associated with N deposition rates. The objective for this component is to fill in some of the gaps in existing vegetation data sets to better span the N deposition gradients. Additionally the field research will provide information on targeted areas where concern over loss of biodiversity associated with N deposition is high, such as in national parks and monuments and other areas governed by more stringent air quality standards.

Outcomes with Completion Dates: March 31, 2014

Keywords: nitrogen, atmospheric deposition, plant, soil chemistry, National Park Service- Air Resource Division, University of Colorado at Boulder