



Project Impacts

NSRC-FUNDED RESEARCH FINAL REPORT

Forest Ecosystem Response to Experimentally Elevated Nitrogen Deposition: An International Synthesis

PROJECT AWARD YEAR AND TITLE:

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Forest Ecosystem Response to Experimentally Elevated N Deposition: An International Synthesis of the NERC N Network

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Concerns continue over potential impacts of elevated atmospheric nitrogen deposition on forested ecosystems of the northeastern United States and eastern Canada. Researchers have conducted numerous experiments over the last several decades to address these concerns at forest plot and watershed scales. Both individually and together, these studies contribute significantly to our understanding of the process of nitrogen saturation of forest ecosystems. The goals of this project were to increase communication and facilitate information exchange among researchers involved in experimental nitrogen addition studies in northeastern North America and northern Europe and to analyze ecosystem response to experimentally elevated nitrogen deposition by combining results of these many studies.

NSRC researchers held two international workshops to encourage communication, collaboration, and data sharing, and at least 20 collaborating researchers conducted an analysis of experimental results from 60 nitrogen addition experiments in the United States and Europe. Results showed that, across all sites, experimental nitrogen additions significantly increased soil solution nitrate, ammonium, calcium, and magnesium concentrations; increased foliar, leaf litter, and fine root nitrogen concentrations; decreased foliar and litter calcium and magnesium concentrations; and decreased soil respiration. Important factors affecting the susceptibility of ecosystems to response included: nitrogen status of the site, history of ambient and experimental nitrogen additions, total amount of nitrogen additions, and forest stand type.

Information on forest ecosystem response to elevated nitrogen deposition will be critical for making informed policy decisions relative to future controls on nitrogen deposition and reductions in carbon dioxide emissions, as well as for successful management of Northern Forest ecosystems.