

## **Deposition, Retention, and Loading of Nitrogen to Adirondack Lakes**

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Loading of nutrients from terrestrial ecosystems strongly influences the productivity and biogeochemistry of aquatic ecosystems. Human activities can supplement and even dominate nutrient loading to many lakes, particularly in agricultural and urbanized settings. For lakes in more remote regions such as the Adirondack Mountains of New York, N deposition represents the primary potential anthropogenic nutrient source. We have combined a detailed spatial model of N deposition with data on lake N concentrations and detailed spatial data on watershed configuration to identify the sources of watershed N loading for over 200 lakes in the Adirondacks. The analysis indicates that while wetlands would be a stronger source of N loading per unit area than forests in the absence of inorganic N deposition, wetlands retain essentially all of the inorganic N deposition, while forests retained ~ 87% of N deposition. Since forests represent close to 90% of the watersheds, on average, upland forests are the single largest source of N loading to these lakes. Direct deposition of N to the surface of the lake accounted for as large a fraction of total loading as loading from wetlands in the watersheds. We found no evidence that presence of wetlands along upland flowpaths to lakes reduced loading from upland forests. Moreover, there was no evidence that net loading to lakes declined with increasing distance from a source area to the lake. Both of these lines of evidence suggest that N may be transported through these forested watersheds primarily in organic forms.

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