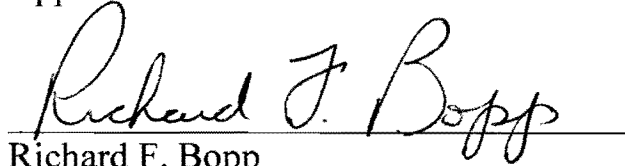


ATMOSPHERIC MERCURY DEPOSITION IN LAKES
OF THE ADIRONDACKS, NEW YORK

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Approved:

A handwritten signature in black ink that reads "Richard F. Bopp". The signature is written in a cursive style and is positioned above a horizontal line.

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ABSTRACT

Sediment cores collected from eight lakes in the Adirondack State Park (New York) were analyzed for radionuclides and total mercury, with the intent of determining recent fluxes of mercury to the study area. Radionuclide analysis, specifically of Cs-137 and Pb-210, was used to assign time horizons to each section of the sediment core. Inventories of these radionuclides were also used to establish focusing factors, and to normalize the mercury flux of each core.

Analysis of the sediments for mercury was performed using a direct mercury analyzer, which required no chemical pre-treatment of the samples. Total mercury concentrations were used to discern background levels of mercury in each core, and different methods of determining “background” were explored. A single, integrated flux value was calculated for each core.

The integrated fluxes and background mercury concentrations of these cores suggest an uneven distribution of atmospheric mercury deposition across the study area, with the mercury fluxes ranging from $6.8 \mu\text{g}/\text{m}^2/\text{yr}$ to $36.4 \mu\text{g}/\text{m}^2/\text{yr}$. Many of the cores in this study show evidence of post-depositional mixing, and all have experienced cesium diffusion. These facts, as well as the very slow sedimentation rates of these lakes, make it difficult to draw conclusions regarding very recent fluxes of mercury to the area. The range of mercury fluxes suggests that the effects of local mercury sources are dominant, and core profiles of the total mercury concentrations suggest that fluxes have remained constant, and possibly decreased, in recent years.