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Byard W. Mosher
University of New Hampshire

Robert W. Talbot
University of New Hampshire

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AN ASSESSMENT OF HISTORICAL AND CONTEMPORARY ATMOSPHERIC DEPOSITION OF MERCURY TO A NEW HAMPSHIRE WATERSHED AND LAKE

Principal Investigators: Dr. Byard W. Mosher and Dr. Robert W. Talbot

This project (Grant 1434--HQ-96-GR-02685-01) was originally scheduled to be performed between 8/16/96 - 8/15/97; however, a no-cost extension of 7 months was granted and the new closing date is 03/15/98. The following is a progress report of findings to date.

Problem and Research Objectives:

This research project is designed to address two issues critical to effective management decisions where data is sorely lacking at the present time: 1) the magnitude of present mercury wet deposition in central New England, and 2) the regional sources of the mercury deposited in this region. In order to address the first of these objectives, a sampling site has been established on the shore of Swain's Lake in southeastern New Hampshire. After some initial mechanical problems with the precipitation sampler, weekly wet deposition samples have been collected at the site since mid-April of 1997, and sampling will continue for one year. These samples are currently being analyzed for total mercury by cold vapor atomic fluorescence spectrometry and anions (nitrate, sulfate and chloride) and cations (ammonium, potassium and calcium) by ion chromatography. A network of mercury deposition monitoring sites (NADP/Mercury Deposition Network) has been established with sites stretching from Nova Scotia to Florida and Maine to Texas. Thus, the wet deposition data which we are collecting at Swain's will allow us to evaluate both the magnitude and seasonal patterns of contaminant input in this area in a regional and national context.

In an effort to put these measurements of contemporary mercury deposition into an historical perspective and examine the sources of the mercury currently being deposited in New England, we plan to collect several sediment cores from Swain's Lake. These cores will be collected this winter as soon as conditions permit. The cores will be sub-sectioned, dated, and analyzed for monomethyl mercury and total mercury. The historical record of mercury deposition which we establish will then be placed in context with the publicly available operational records of several potentially important local sources (large solid and medical waste incinerators) of mercury contamination. This analysis should allow us to evaluate the relative importance of local sources (incinerators) and more distant sources (coal-fired power plants in the mid-western US). This type of source-receptor evaluation is critical if sound regulatory policy is to be established.