

# **Atmospheric Mercury in Vermont and New England: Measurement of deposition, surface exchanges and assimilation in terrestrial ecosystems**

## **Final Project Report – Additional Project Activities – 1/16/2009**

PI: Melody Brown Burkins, University of Vermont (UVM)  
Co-PIs: Eric K. Miller<sup>1</sup>, Ecosystems Research Group, Ltd.; Gerald J. Keeler, University of Michigan; and  
Jamie Shanley, US Geological Survey  
Collaborators: Sean Lawson, VTANR-VMC; Jen Jenkins, Mim Pendelton, Carl Waite and Alan Strong, UVM;  
Rich Poirot, VTANR-APCD; Alan VanArsdale, USEPA; Mark Cohen, NOAA; Chris Rimmer,  
Kent McFarland, and Steve Faccio, Vermont Center for Ecostudies; and Robert J. Taylor, Texas  
A&M.  
Project Officer: Eric Hall, USEPA

*Coordination with national, regional, and*

### ***Scientific communication and public outreach***

In addition to the research coordination activities described above project personnel made numerous presentations about project activities and results at regional and national meetings. Dr. Miller produced a public-outreach overview document describing mercury research activities at Underhill in conjunction with the VMC. Interviews were granted to print and radio media to convey project results to the public. Several peer-reviewed scientific publications were prepared, accepted and published that made use of project data. Additional manuscripts are currently being prepared for submission by the project team. The final results of the project (which are the subjects of these manuscripts) will be presented at national meetings and communicated to the air-quality management community.

#### Meetings, Public Presentations, and Publications (chronological)

- Dr. Keeler presented results from a coordinated, long-term event wet-deposition study (funding sources including NESCAUM and NOAA) at the October 2004 Vermont Monitoring Cooperative Research Symposium in Burlington, VT.
- Dr. Miller presented preliminary results from the air-concentration and flux measurement activities at the October 2004 Vermont Monitoring Cooperative Research Symposium in Burlington, VT.





### ***Summary of Project Results and Benefits***

This project achieved the extension of the longest continuous record of event-based mercury deposition in the world. The collector comparison study facilitated a successful transition from the UMAQL network to the national MDN network. Results from the comparison study provided critical guidance for collector improvements and interpretation of the data collected by various networks. As has been clearly demonstrated through analysis of the impact of reduced sulfur emissions, long-term records are invaluable for trend detection and confirmation of the efficacy of emissions controls. The long-term record of atmospheric mercury levels at Underhill, VT represents one of the few opportunities for this kind of assessment with respect to mercury emissions reductions. Initial results from the period 1993-2007 show no measurable impact of the substantial reductions in municipal-waste and medical-waste incinerator emissions that occurred regionally and nationally during this time period. Instead, the long-term record and studies of potential source contributions using air-mass back-trajectory methods and the observations at Underhill demonstrated that northern New England receives the majority of its mercury deposition from long-range industrial and EGU sources that have not reduced emissions over the observation period.

The project's measurements of bi-directional GEM exchanges over New England forests helped to close the gap in understanding of the magnitude and driving factors for bi-directional GEM fluxes in forests. As new anthropogenic mercury emissions continue to be curtailed, the importance of diffuse sources of re-emission

