INTERAGENCY MONITORING OF PROTECTED VISUAL ENVIRONMENTS

IMPROVE

Volume 8, No. 3 **Summer 1999** **October 1999**

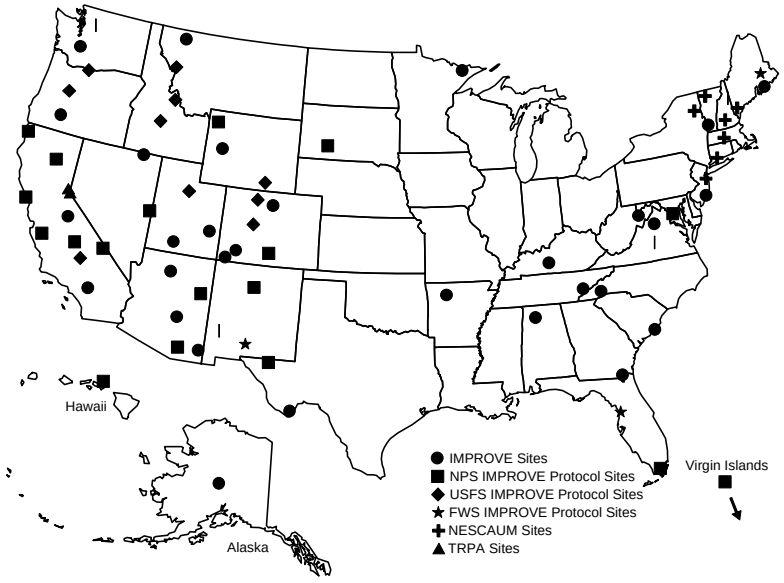
IMPROVE MONITORING UPDATE

Preliminary data collection statistics for the Summer 1999 season (June, July, and August) are:

Data Type	Collection Percentage
Aerosol Data	94%
Optical (transmissometer) Data	91%
Optical (nephelometer) Data	97%
Scene (photographic) Data	94%

Particulate data have been submitted through May 1999 for all measurements including carbon. All data are available electronically on the UC-Davis FTP site. The seasonal summaries beginning with Fall 1998 will soon be available on a Web site.

Optical data have been submitted through August 1998 and are available on the CIRA FTP site, at ftp://alta_vista.cira.colostate.edu. Scene data are archived but are no longer routinely reported.



IMPROVE and IMPROVE Protocol Sites
Summer 1999

VISIBILITY NEWS....

IMPROVE aerosol sampler Y2K ready

The new version of the IMPROVE modular aerosol sampler uses a microprocessor to control the sampling modules and to record flow rate and temperature throughout the sampling period. This microprocessor is Y2K ready and will operate correctly with no special programming until the year 2095.

The microprocessor will report the date (with a 4-digit year), time, flow rate and vacuum for each module, temperature, and relative humidity (if desired) every 15 minutes. Each record is an average of 15 readings taken every minute. The data logging capability can be expanded easily by adding an additional A/D converter on the main circuit board. For more information, contact:

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"Introduction to Visibility" booklet available

A revised and expanded edition of the 1983 *Introduction to Visibility* booklet is now available from the National Park Service. The 68-page booklet explains the basic concepts of visibility. The new 1999 edition includes a range of visibility topics, including:

- The nature of light
- Interaction of light and particles
- Transport and transformation of particles
- Measuring visibility
- Particle concentration and visibility trends
- Identifying sources contributing to visibility impairment, and
- Perceived visual air quality

To receive a free copy, contact:

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Fax: 970/491-8598
E-mail: burke@cira.colostate.edu

VISIBILITY NEWS continued on page 3....

Feature Article

IMPROVE monitoring sites document unusual haze episode in the Northeast

by Rich Poirot, Vermont Dept. of Environmental Conservation, and John Molenar, Air Resource Specialists, Inc.

Optical measurements at IMPROVE sites are a critical component of the IMPROVE monitoring approach. One unique feature of optical data is the continuous (transmissometer or nephelometer) instrumentation, which provides both a high degree of temporal resolution (hourly or shorter) and an opportunity to "see" the extinction data as it is being collected or shortly thereafter. These high resolution/rapid response features have been invaluable in contributing to a quick evaluation of a major haze episode that impacted a large region of the northeastern U.S. and eastern Canada in mid-July 1999.

The episode, seen in the right side of Figure 1, was characterized by unusually high regional concentrations of both ozone and fine particle pollution. In the 12-state northeastern Ozone Transport Region (OTR), exceedances of the proposed 8-hour ozone standard were recorded at 138 monitoring sites on July 16, 1999, and at 100 sites on July 17, 1999. Peak concentrations in the region were as high as 135 ppb (8-hour) and 178 ppb (1-hour). Fine particle mass concentrations in New England (based on preliminary results from FRM and TEOM samplers) ranged from about 35 to 50 $\mu g/m^3$ on July 17th, with peak 1-hour concentrations of 57 $\mu g/m^3$ at Roxbury, MA (just south of Boston) on the evening of July 16th and 88 $\mu g/m^3$ on the evening of the 17th.

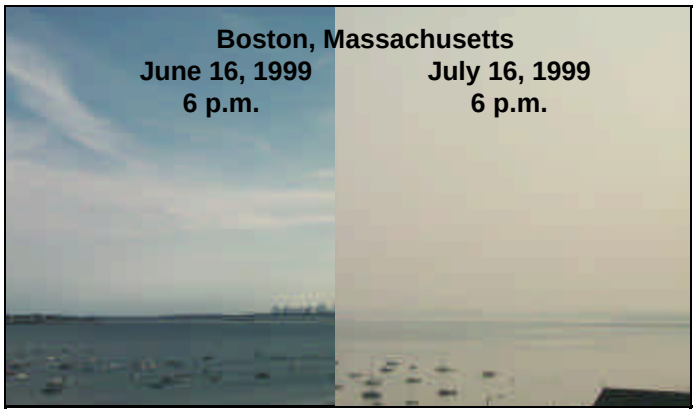

Figure 1. View of the Boston Skyline One Month Prior to the July 16, 1999 Haze Episode, and During the Episode.

Preliminary nephelometer and humidity data from IMPROVE monitoring sites at Acadia National Park, ME and Great Gulf Wilderness, NH, indicate some of the highest filtered aerosol light scattering (b_{sp}) levels ever recorded at these sites (250-300 Mm^{-1}) despite atypically low nighttime humidity levels on the 16th and 17th (see Figure 2). When relative humidity is below 95%, the filter flags hourly b_{sp} data that has a rapid rate of change (>50 Mm^{-1}/hr). Under these conditions (rh<95%), unfiltered data may actually provide a better estimate of the severity of short-term visibility impacts.

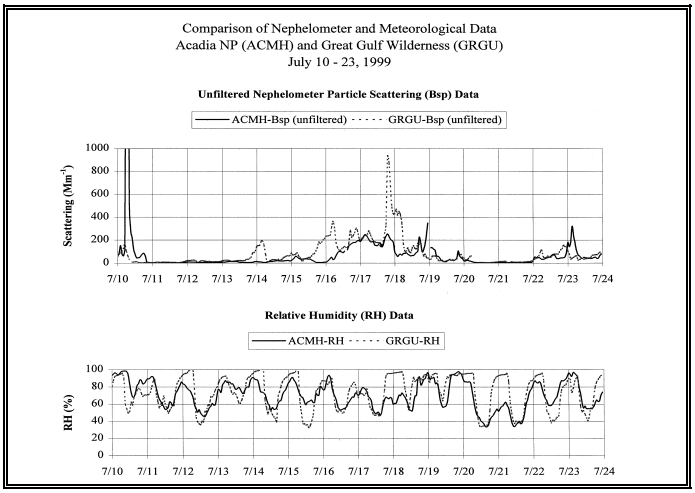

Figure 2. Nephelometer and Relative Humidity Data Plot for Acadia National Park and Great Gulf Wilderness, July 10-23, 1999.

The unfiltered nephelometer data from Great Gulf (Figure 3) indicate a short-term b_{sp} of nearly 1000 Mm^{-1} (visual range <3 miles, IFR conditions) on the evening of July 17th. Figure 3 also shows that these levels are similar in magnitude to the peak extinction estimates derived from the Burlington, VT airport (ASOS) visibility observations during this time period. The fine particle measurements made in Roxbury, MA with a TEOM indicate the same rapidly varying pattern in aerosol concentration (Figure 4). All these continuous data show a surprisingly high degree of short-term temporal variation ("blobiness"), which provides an interesting contrast to the spatial uniformity of the daily average concentrations, which will drastically underestimate the magnitude of the visibility impact.

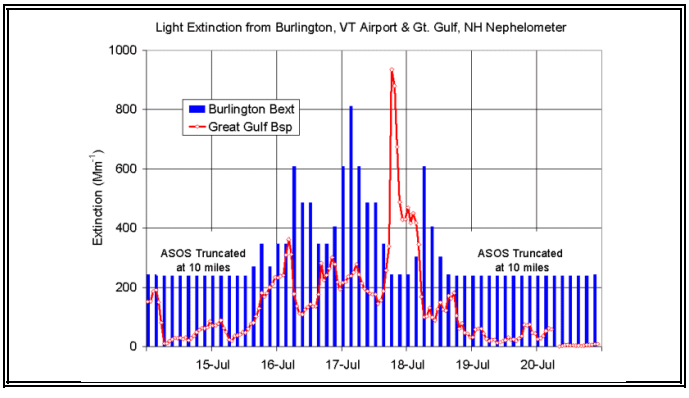

Figure 3. Light Extinction Calculated From Burlington, VT Airport ASOS Data and Scattering Measured at Great Gulf Wilderness. Note: ASOS data is truncated at visibilities >10 miles, thus extinction levels cannot be estimated below 240 Mm^{-1}).

Haze Episode continued on page 3....

***Haze Episode** continued from page 2....*

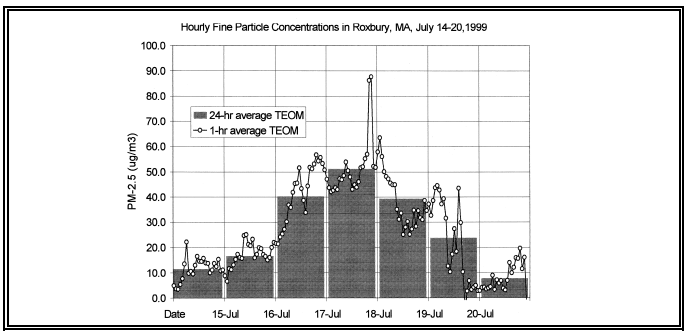

Figure 4. Hourly and 24-Hour Fine Particle Concentrations at Roxbury, MA , July 14-20, 1999.

Automated digital cameras also provided a "scene" during this event. Figure 1 shows comparable CAMNET views of the Boston skyline recorded on the evenings of June 16, 1999, and on July 16, 1999, a few hours before John F. Kennedy, Jr.'s tragic plane crash in the hazy skies near Martha's Vineyard. A more detailed summary of this haze episode is available at: http://capita.wustl.edu/neardat/Activities/july99/july99.htm
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***VISIBILITY NEWS** continued from page 1....*

National Park Service updates BRAVO site

The National Park Service has updated its Web site to include data and information collected during the Big Bend Regional Aerosol and Visibility Observational Study (BRAVO). The four-month air monitoring study at Big Bend National Park, Texas, began July 1, 1999 and is funded by the U.S. Environmental Protection Agency and the National Park Service. Air quality researchers at the park are trying to determine the causes and extent of decreased visibility at the park.

The BRAVO Web site, located on the Internet at http://www2.nature.nps.gov/ard/bravo is updated frequently and currently contains:

- Study data (aerosol, optical, meteorology, tracers)
- Trajectories
- Current conditions (a real-time photograph of a park view, visual range, temperature, and relative humidity values)
- Related air quality Web links

Environmental Protection Agency forms regional groupings for its regional haze program

The Environmental Protection Agency (EPA) has moved forward with its regional haze program, which was announced to the nation in April, by releasing the regional groupings of the states that will work together to reduce emissions that contribute to haze.

Five regional groupings were designated in July (see Figure 1), and will begin work in designing and implementing strategies and programs to make reasonable progress toward "no man-made impairment" in national parks and wilderness areas. Regional funding organizations were recommended, and funds for the work are expected to be awarded by the EPA by the end of this fiscal year.

The majority of states provided the EPA with suggestions regarding the program and the formation of the regional groupings. Indian Tribes active in air quality programs also provided input which will be incorporated into the states' work.

The regional groupings will begin by setting up basic organizational structures and technical work plans, then develop specific plans to reduce regional haze.

For more information, the regional haze regulations are available in their entirety on the EPA's Web site at: http://www.epa.gov/oar/vis/overview.html. A summary of the regulations can be found in the July 1999 issue of the *IMPROVE Newsletter*.

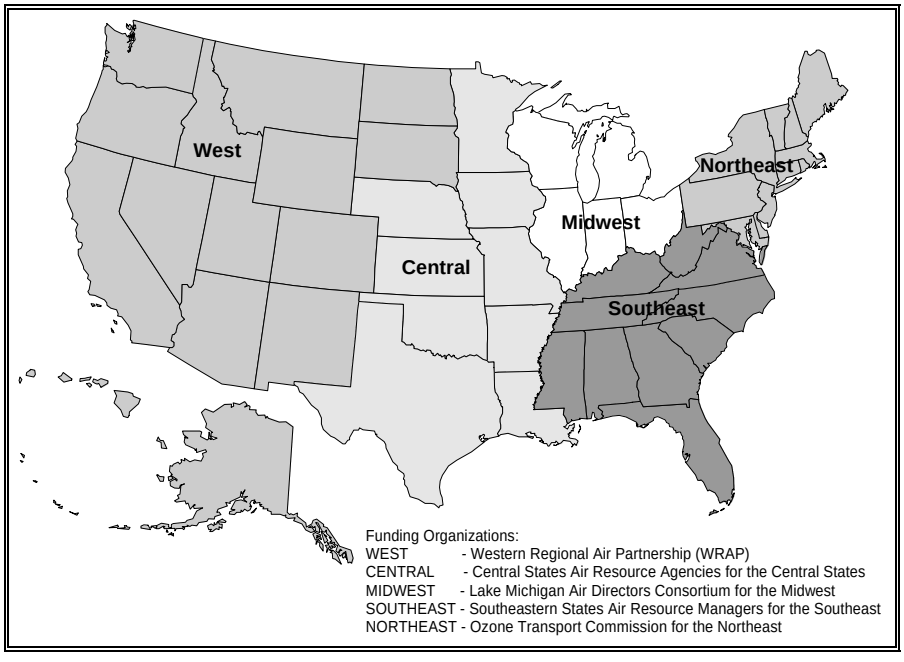

Figure 1. EPA's Regional Groupings and Funding Organizations for the Regional Haze Program.

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IMPROVE STEERING COMMITTEE

IMPROVE Steering Committee members represent their respective agencies and meet periodically to establish and evaluate program goals and actions. IMPROVE-related questions within agencies should be directed to the agency's Steering Committee representative. Steering Committee representatives are:

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