INTERAGENCY MONITORING OF PROTECTED VISUAL ENVIRONMENTS

# IMPROVE

**Volume 7, No. 2** **Spring 1998** **July 1998**

## IMPROVE MONITORING UPDATE

Preliminary data collection statistics for the Spring 1998 season (March, April, and May) are:

| Data Type | Collection Percentage |
|---|---|
| Aerosol Data | 95% |
| Optical (transmissometer) Data | 91% |
| Optical (nephelometer) Data | 94% |
| Scene (photographic) Data | 75% |

Particulate data and seasonal summaries have been submitted through February 1998. The data are available electronically on an FTP site. To obtain the address, send your request to Paul Wakabayashi at Wakabayashi@crocker.ucdavis.edu

## VISIBILITY NEWS....

### IMPROVE developing site selection strategy

The IMPROVE Steering Committee is currently developing a site selection strategy to use in expanding the network. Their goal is to monitor regional haze in as many of the 156 visibility-protected Class I areas as practically possible.

The future IMPROVE network is expected to have 108 sites (30 current and 78 new) and more than 30 IMPROVE protocol sites that are now operated by various organizations. Monitoring in some of the 156 areas may be impractical. Other areas may be situated in clusters, where one monitoring site may represent more than one visibility-protected Class I area.

Proposed siting criteria takes three factors into account: 1) the monitoring sites should be no more than 100 km away from the Class I areas they represent, 2) the monitoring sites should have elevations between the maximum and minimum representative Class I area elevations, and 3) major emission sources should be more than twice the distance between the monitoring sites and representative Class I areas.

The site selection strategy is expected to be finalized this summer with site selection of the first 20 sites to follow later this year.

For more information, contact:

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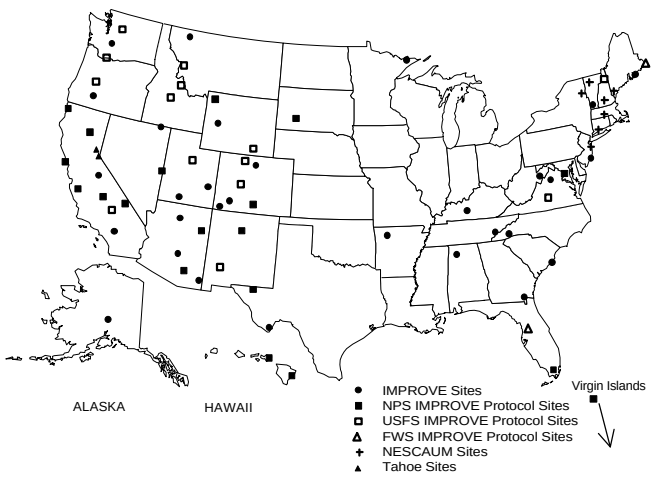


**IMPROVE and IMPROVE Protocol Sites**
**Spring 1998**

### WinHaze freeware update available

WinHaze, a Level-1 visual air quality model, is available on the Internet as freeware. Version 2.7.0 offers 30 scenic wilderness and urban views to model. The computer-imaging software simulates visual air quality differences of various scenes based on different optical parameters or aerosol species input by the user.

WinHaze also contains aerosol and optical data collected at IMPROVE monitoring sites for use in the visual air quality simulations. It can accurately and quickly display visual air quality levels from Rayleigh (visual range of approximately 390 km) to a visual range of less than 1.0 km, using actual monitoring data or user supplied inputs.

Computer imaging visually illustrates how measured or modeled chemical and physical properties of atmospheric aerosols can affect the appearance of a scene. Atmospheric aerosols, in combination with meteorology and varying lighting conditions, affect optical parameters such as extinction, contrast, and color. Computer displays or photographs are effective ways to illustrate how changes in optical parameters affect scenic resources, allowing scientists, decision-makers, and the public to visually interpret monitored or modeled parameters. WinHaze is available for download from:

http://www.air-resource.com

***VISIBILITY NEWS continued on page 3....***

Feature Article

# Air quality exhibit at Great Smoky Mountains communicates science through new technologies

## Introduction

A solution to the problem of disseminating timely air quality monitoring information to the nation's public was developed, not through changing technologies of air quality science, but through changing technologies of communication. Now available are digital cameras (that record images quickly without the need of film or film developing), and computer software packages that enable us to create a variety of graphics. Computer technology has helped to meet the challenge of providing important, timely air quality information to visitors at Great Smoky Mountains National Park.

The unique interpretive air quality display at Sugarlands Visitor Center in Great Smoky Mountains National Park, Tennessee, provides park visitors with real-time air quality measurements and information about air quality and its effects on park resources and public health. Information from visibility sensors, air quality analyzers, meteorological monitoring sensors, and a digital camera at a remote location are connected by computer and the Internet to the Sugarlands Visitor Center where the data are displayed on computer monitors as images and graphics.

## The data

Data are collected every 15 minutes by a computer at the air quality station at Look Rock, about 23 miles west of the visitor center. Air quality instrumentation operating at the station includes a nephelometer, an ozone analyzer, and meteorological sensors (air temperature, relative humidity, wind speed, wind direction, and precipitation). A digital camera is also located on an observation tower near the station. The Look Rock computer transmits the collected information via the Internet to another computer inside the display in the visitor center. The display's computer presents the images and data graphically on the display's color monitors for visitors to view.

## The display

The display's title, "How's the Air Quality Today?" entices visitors to take a closer look. The 9-foot tall 3-sided kiosk is covered with colorful panels on two of its sides (see Figure 1). Information inset on the panels inform visitors about the air quality resource at the park and how changing air quality affects park resources and public health. The text explains where haze and ozone pollution come from, sources of air pollution, how weather affects visibility, and how more than 30 species of park plants have shown visible effects of ozone pollution.

Each of the two sides also have a 21-inch color computer monitor that graphically display three sequencing screens of recently collected air quality data and comparison data collected at Look Rock. The three screens are updated every 15 minutes with current air quality measurements and an image of the current visibility at Look Rock. The screens also provide visitors with an understanding of how current data values compare with seasonal averages and how these values may affect park resources and the quality of the visitor's experience.

## Conclusion

The interpretive air quality display at Great Smoky Mountains National Park provides quantitative data to the public in a graphic, easily understood, and appealing way. Nearly 1 million people visit the Sugarlands Visitor Center annually. The same real-time information will also soon be available to the public on the World Wide Web at:

http://www.aqd.nps.gov/ard1/parks/grsm/grsmvc.htm

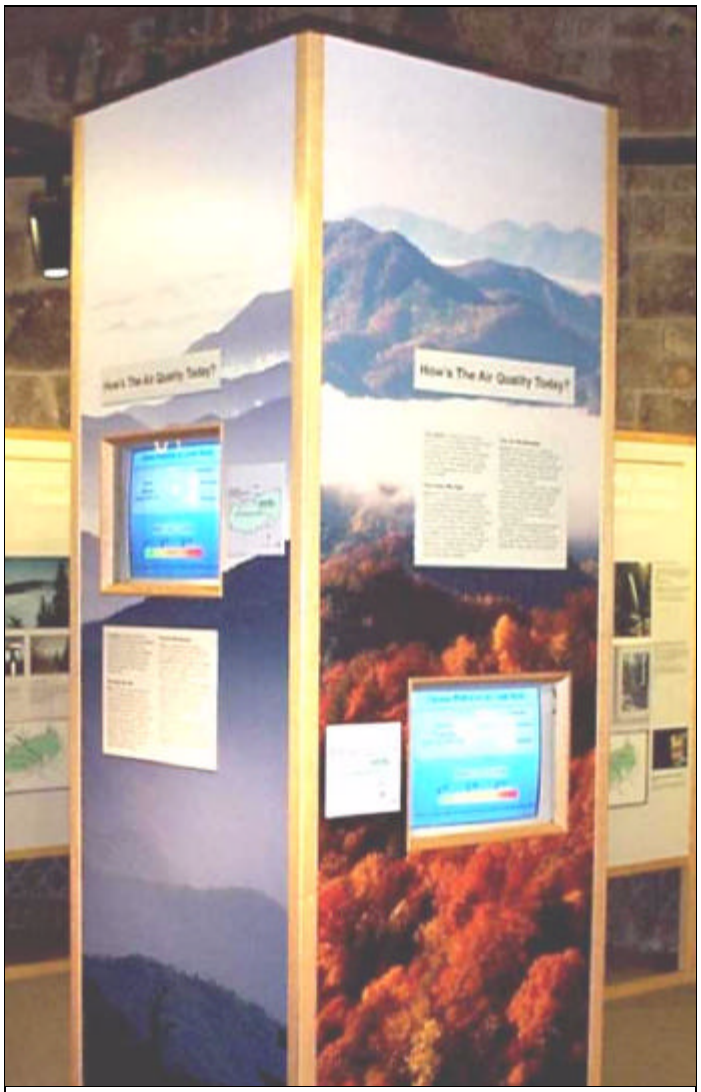


Figure 1. "How's the Air Quality Today?"
The air quality kiosk in the Sugarlands Visitor Center,
Great Smoky Mountains National Park.

## SPECIAL STUDIES

### Grand Canyon Regional Air Quality Visibility Study (GRAVS)

To obtain a better understanding of light absorption characteristics of particles and the causes of haze, a five-week intensive study was prepared to supplement standard IMPROVE monitoring at Grand Canyon National Park. During June and July, researchers from private and academic organizations assisted the National Park Service in the Grand Canyon Regional Air Quality Visibility Study (GRAVS). The study involved a variety of instrumentation operating under various humidity conditions along the South Rim. For more information, contact:

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***VISIBILITY NEWS continued from page 1....***

### WRAP holds visibility monitoring workshop

The Western Regional Air Partnership (WRAP) held a visibility monitoring workshop in early June to discuss future monitoring needs and protocols in the West. Workshop participants included representatives from state air pollution control agencies for Arizona, Colorado, Utah, New Mexico, California, Washington, and Idaho; representatives from tribal air programs for the White Mountain Apache (AZ), Flathead (MT), and Shoshone-Bannock (ID); and representatives from the EPA, USFS, metropolitan air pollution control agencies, and industry.

The three-day Phoenix workshop provided participants with discussions regarding visibility impairment, monitoring instruments and methods, data analysis methods and statistical techniques, air quality models, and IMPROVE network sampling protocol. Participants also discussed present and future air quality protection policy influences on visibility monitoring, and were informed that a draft visibility monitoring guidance document is under review by the EPA.

Workshop participants took a day-long field trip to several sites to focus on siting considerations and criteria for Class I areas. The group discussed current EPA monitoring guidance goals and objectives, and suggested the following additional objectives:

- Integrate $PM_{2.5}$ data collection with visibility data.
- Promote a better understanding of the links between visibility data collected in urban haze networks and data acquired in Class I settings.
- Characterize background and natural visibilties.
- Gain an understanding of fire impacts.

The Partnership also identified priorities for future WRAP Visibility Monitoring Forums:

- To encourage and ensure that the EPA and IMPROVE draft, seek review, and publish information and guidance, which interested parties can use to determine where and how many sites are needed for adequate Class I monitoring. This would include:
  - Identifying siting priorities.
  - Ranking sites needing monitoring coverage with available resources.
  - For IMPROVE network expansion, resolving concerns and questions about meeting both Federal Land Managers and state air quality agency representativeness.
- To focus on regional monitoring network operations coordination across jurisdictional boundaries on an ongoing basis, to ensure maximum efficiency in collecting and analyzing regional haze data.
- To identify criteria for additional monitoring used to supplement IMPROVE monitoring, such as installing extra monitors at IMPROVE sites, obtaining more sites with data comparable to IMPROVE data, and operating an adequate number of representative sites for large, complex Class I areas.
- To identify and track data comparability/exchange protocols and quality assurance/control standards.
- To review and recommend natural background values to the WRAP Modeling Forum, using an EPA method or a refinement, and to review and recommend extinction efficiency coefficients to the Modeling Forum, which could include field tests and research.
- To conduct ambient data analyses and receptor modeling as needed.

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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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The next IMPROVE Newsletter will be published in October 1998.

**Please Contact Us:** If you know someone who would like to receive the newsletter or if you are no longer interested in receiving a copy, please call us at 970/484-7941. Your ideas and comments are always welcome. We continue to look for ways to improve the newsletter and to provide you with interesting and pertinent information.

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