INTERAGENCY MONITORING OF PROTECTED VISUAL ENVIRONMENTS

# IMPROVE

**Volume 3, No.3** **Summer 1994** **October 1994**

## VISIBILITY PROTECTION INSERT

Included with this newsletter is a document recently prepared by IMPROVE, titled *Visibility Protection*. The document summarizes the primary issues, monitoring programs, and modeling efforts associated with the IMPROVE program. For additional copies of *Visibility Protection*, contact:

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## IMPROVE MONITORING UPDATE

Preliminary data collection statistics for the Summer 1994 season (June, July, and August) are:

| Data Type | Collection Percentage |
|---|---|
| Aerosol Data | 93% |
| Optical (transmissometer) Data | 91% |
| Optical (nephelometer) Data | 91% |
| Scene (photographic) Data | 86% |

Figure 1 is a map of the current IMPROVE and IMPROVE Protocol sites. The CASTNet program has adopted IMPROVE optical and scene monitoring protocols, but is using different aerosol monitoring techniques.

The USFS has expanded its IMPROVE Protocol monitoring network. Two sites, Sula Peak, Montana and Salmon National Forest, Idaho, were reconfigured to include IMPROVE aerosol samplers and cameras. The Mount Zirkel Wilderness, Colorado monitoring site, changed the location of its aerosol sampler and nephelometer to a slightly different area; the camera location has stayed the same. The Fish and Wildlife Service will also be expanding monitoring at two of its sites during the fall, at Moosehown NWR and Cape Romain NWR.

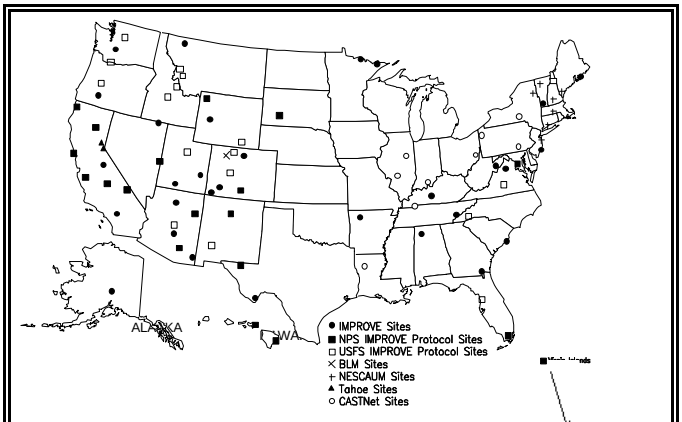


**Figure 1. IMPROVE and IMPROVE Protocol Sites**
**October 1994**

## *VISIBILITY NEWS...*

### AEROSOLS AND ATMOSPHERIC OPTICS SPECIALTY CONFERENCE

The AWMA/AGU International Specialty Conference, Aerosols and Atmospheric Optics, was held in Snowbird, Utah from September 26-30, 1994. The conference included over 150 papers that featured the most recent finding on visual air quality and radiative balance.

IMPROVE project participants and IMPROVE data played a key role in the conference. Over 1/3 of the presentations reported on IMPROVE research, applied IMPROVE monitoring protocols, or used IMPROVE data. The titles and authors of these presentations are listed on pages 2 and 3 of this newsletter. For information on conference proceedings, contact Beckie Armstrong at CIRA (refer to *Visibility Protection Insert*, at left, for address and phone numbers).

### MARC PITCHFORD ACCEPTS NEW POSITION

In response to the EPA-ORD cancellation of visibility research funding, NOAA has reassigned Marc Pitchford to the NOAA Air Resources Laboratory, Special Operations and Research Division. Marc will continue to be an active participant in all aspects of the IMPROVE program in his new position as Chief of the Applied Sciences Branch.

### MOUNT ZIRKEL VISIBILITY STUDY

The Mount Zirkel Wilderness covers 140,000 acres along the Continental Divide, east of Steamboat Springs, Colorado. In July 1993, the U.S. Forest Service formally certified visibility impairment in the wildernesses to Colorado Governor Roy Romer. The second step of the ongoing regulatory process to address visiblity issues in the wilderness includes the Mt. Zirkel Reasonable Attribution Visibility Study. This study will be co-managed by the U.S. Forest Service, Colorado Department of Public Health and Environment and the operators and majority owners of the Hayden and Craig power stations. A contract with the principle investigators Dr. John Watson (University of Nevada's Desert Research Institute) and Dr. Don Blumenthal (Sonoma Technology, Inc.) was signed on August 11, 1994. Field monitoring will begin this winter and the results of the study will be completed by June 30, 1996. For further information contact:

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## AEROSOLS AND ATMOSPHERIC OPTICS AWMA/AGU PAPERS

### 1. FIELD OBSERVATIONS

#### 1A Reviews of Sampling Methodologies and Programs

1A2 Atmospheric Extinction Monitoring in Urban Areas
*J.V. Molenar*

#### 1B Regional and Spatial Patterns

1B4 Consideration in the Assessment of Canadian National Visibility
*R.M. Hoff, L. Guise-Bagley, K.J. Puckett, and K. Macdonald*

1B5 Examination of the Spatial Variability of Visibility in the Lower Fraser Valley, B.C.
*S. Pryor, R. Simpson, D. Steyn, and S. Sakiyama*

1B6 Regional Patterns of Selenium and Other Trace Elements in the IMPROVE Network
*R.A. Eldred, T.A. Cahill, and P.J. Feeney*

1B7 Spatial and Temporal Patterns in Particle Data Measured During the MOHAVE Study
*K.A. Gebhart and W.C. Malm*

1B8 The Vertical Dimension of the Project MOHAVE Summer Intensive
*C. Rozzi, R. Farber, and J. Watson*

#### 1E Instrumentation (Gas; Gas and Particle)

1EP1 Nitrate Loss From Teflon Filters
*T.A. Cahill, R.A. Eldred, T. Pimienta, and L.K. Wilkinson*

1EP2 The Determination of $SO_x$, and SAS Particles and $F_{Total}$ as Endemic Tracers of $SO_x$ Using Diffusion Denuder and High Volume Impactor Sampling Systems During Project MOHAVE
*N.L. Eatough, M. Eatough, J.M. Joseph, F.M. Caka, L. Lewis and D.J. Eatough*

1EP3 Ten-Minute, Low Parts-Per-Trillion Field Measurements of Sulfur Dioxide Near the South Rim of the Grand Canyon
*D.E. Schorran, R.E. Keislar, and D.R. Lawson*

#### 1G Instrumentation (Optical Properties)

1GP1 Design and Field Operation of the Optec NGN-2 Ambient Nephelometer
*D.S. Cismoski*

#### 1H Measurement Summaries

1HP4 Visibility on the Colorado Plateau: The Chemical Composition of the Haze and the Impact of Alternative Carbon Formulations
*J.F. Sisler*

1HP5 Project MOHAVE Aerosol Measurements: A Characterization of the Haze and Its Chemical Composition
*J.F. Sisler and W.C. Malm*

### 2. ATMOSPHERIC OPTICS

#### 2A Climate and Aerosols

2AP2 Optical Albedo of the United Stated from Size-Resolved Aerosol Data
*T.A. Cahill, R.A. Eldred, R.G. Flocchini, R. Richards, P.H. Wakabayaski, B. Weare, and J. Zubillaga*

#### 2B Visibility and Extinction

2B1 Examining the Relationship Between Atmospheric Aerosols and Light Scattering and Extinction in the Grand Canyon Area
*W.C. Malm*

2B2 Comparison Between Optical Measurements of Extinction and Measurements of Absorption and the Impact on Light Extinction Budgets
*J.F. Sisler and W.C. Malm*

2B3 Relationship Between IMPROVE Optical Parameters and Aerosol-Modified Albedo
*R.G. Flocchini, T.A. Cahill, W.C. Malm, and K.A. Fuller*

2B7 Assessing the Relative Contribution of Natural Versus Human Activities to Visibility Impairment in Wilderness Areas. Models to Replace Independent Scattering Efficiency Models for Visibility Assessment Applications
*P. Middleton, D. Hopkins, N. Laulainen, and E. Trexler*

#### 2C Radiative Transfer

2C4 An Intercomparison of Doubling-Adding and Backward Monte Carlo Radiative Transfer Models for Aerosol Modeling
*T. Schneider and K.A. Fuller*

### 3. ATMOSPHERIC AEROSOLS

#### 3B Sulfate Aerosols

3B1 The Pacific 1993 Experiment: Aerosol Speciation Measurements in the Vancouver Urban Area
*L. Guise-Bagley, R.M. Hoff, H.A. Wiebe, and S. Sakayama*

3B3 Gas-Particle Distribution, Neutralization and Size of Sulfur and Nitrate in Southwestern Desert Aerosol
*B. Turpin, P. Saxena, P. McMurry, and G. Allen*

3B4 Analyses of Sulfur Aerosol Size Distributions for a Forty Day Period in Summer, 1992 at Meadview, Arizona
*M. Pitchford and M. Green*

3B5 Acidity of Fine Sulfate Particles in the Eastern U.S.
*D.E. Day*

## AEROSOLS AND ATMOSPHERIC OPTICS AWMA/AGU PAPERS

### 3C Organic Aerosols

3C1 Fine Particulate Organic Material at Meadview During the Project MOHAVE Summer Intensive Study
*W. Cui, J. Machir, and D.J. Eatough*

3C2 Aerosol Light Absorption at Remote Sites I: Modeling and Validation of $b_{abs}$ Using IMPROVE Data
*D. Huffman*

3CP1 The Formation of Sulfate in the Desert Southwest During Project MOHAVE
*F.M. Caka, L. Lewis, D.J. Eatough, and N.L. Eatough*

3CP2 Lidar, Nephelometer and In-Situ Aerosol Experiments in Southern Ontario
*R.M. Hoff, L. Guise-Bagley, H.A. Wiebe, J. Brook, T. Duisterdink, and B. Georgii*

3CP3 Chemical States of Sulfate at Shenandoah National Park During the Summer
*P.H. Wakabayaski, T.A. Cahill, and T.A. James*

## 5. ATMOSPHERIC DYNAMICS

### 5A Source Receptor Relationships

5A1 Analysis of Sulfur Data from the MOHAVE Study Using the Differential Mass Balance Model
*E. Brown, H. Iyer, and W.C. Malm*

5A2 Source Apportionment of Project MOHAVE Airborne Particle Sulfur Data
*R.C. Henry*

5AP1 Methylchloroform Transport to the Colorado Plateau: Implications for Visibility Degradation
*C.F. Cahill, R.E. Keislar, D.R. Lawson, D.E. Schorran, P.A. Walsh, and W.H. White*

5AP2 Regional Source Profiles of Sources of $SO_x$ at the Grand Canyon During Project MOHAVE
*D.J. Eatough, J.M. Joseph, F.M. Caka, B. Sun, L. Lewis, N.F. Mangelson, M. Eatough, N.L. Eatough, R.J. Farber, and J.G. Watson*

5AP3 Source Attribution and Statistical Summary of Data Measured at Grand Canyon National Park During 1989-1991
*K.A. Gebhart and W.C. Malm*

5AP4 Estimation of $SO_2$ and Organic Emissions in Mexico by Receptor Modeling
*K.A. Gebhart, W.C. Malm, and H.D. Huffman*

5AP6 Source Apportionment of Secondary Aerosols and Light Extinction Using Receptor Modeling Techniques
*W.C. Malm*

### 5B Roles of Emissions, Transport, and Transformation on Visibility in the Southwest

5B2 Multiple Linear Regression Model in Decoupling the Long-Term Effect of Meteorology on Visual Range in the Western United States
*Y. Golestani, W.C. Malm, and D.A. Latimer*

5B3 Clean Air Corridors: Geographic and Meteorologic Characterization
*M.C. Green and K.A. Gebhart*

5B4 The Relationship Between Air Flow Patterns and Particle Scattering at the Grand Canyon
*J.D.W. Kahl, A. Liu, W.H. White, E.S. Macias, and L. Vasconcelos*

5B6 The Validation of the RAMS Meteorological Fields Used in the MOHAVE Field Study
*R.A. Stocker, M. Uliasz, and R.A. Pielke*

5B7 The Impact of Climatology Variability on Visibility Impairment Distributions
*E.C. Trexler, J. Shannon, and M. Pitchford*

5B8 Source-Receptor Relationships for Visibility on the Colorado Plateau - I. Modeling Approach
*A. Venkatram, P. Karamchandani, P. Pai*

5BP1 Understanding the Summer Transport Patterns of the Mohave Power Project During Project MOHAVE
*R. Farber, M. Green, T. Hoffer, and P. Walsh*

5BP2 Source-Receptor Relationships for Visibility on the Colorado Plateau - III. Transfer Matrices
*P. Karamchandani, P. Pai, and A. Venkatram*

5BP4 Numerical Modeling of Air Pollution Transport in the Southwestern United States
*M. Uliasz, R.A. Stocker, and R.A. Pielke*

## 6. ATMOSPHERIC SCIENCE AS APPLIED TO SOCIETAL ISSUES

6A2 Natural Scene Haze Memory: The Ability of Human Observers to Accurately Recall Incremental Changes in Uniform Haze
*D.M. Ross, W.C. Malm, and H.K. Iyer*

6A4 Aerosols and Visibility at Lake Tahoe
*T.A. Cahill, P.H. Wakabayaski, J.V. Molenar, and D. Dietrich*

6AP3 Human Visual Sensitivity to Plumes: An Empirical Model to Predict Probability of Detection and Its Potential for Application
*D.M. Ross, H.K. Iyer, and W.C. Malm*

6AP4 Clean Air Corridors: A Conceptual and Functional Definition
*C.S. Sloane, P.J. Sampson, W.H. White, and W.C. Malm*

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**TO:**

First Class Mail

## 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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### *PREVIEW OF UPCOMING ISSUE . . .*

The next IMPROVE Newsletter will be published in January 1995 and will include:

- Network Status for the Fall 1994 Season
- **FEATURE ARTICLE:** Interagency Work Group for Air Quality Modeling (IWAQM)

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