Monitoring update

Network operation status

The IMPROVE (Interagency Monitoring of Protected Visual Environments) Program consists of 110 aerosol visibility monitoring sites selected to provide regionally representative coverage and data for 155 Class I federally protected areas. Additional instrumentation that operates according to IMPROVE protocols in support of the program includes:

- 61 aerosol samplers
- 32 nephelometers
- 4 transmissometers
- 60 Webcamera systems
- 2 digital camera systems
- 5 interpretive displays

IMPROVE Program participants are listed on page 8. Federal land management agencies, states, tribes, regional air partnerships, and other agencies operate supporting instrumentation at monitoring sites as presented in the map below. Preliminary data collection statistics for the 3rd Quarter 2009 (July, August, and September) are:

- Aerosol (channel A only) 94% collection
- Aerosol (all modules) 92% completeness
- Optical (nephelometer) 97% collection
- Optical (transmissometer) 97% collection

Boulder Lake, WY, is a new protocol site that began operating its four-module sampler in August. It is sponsored by the USDA-Forest Service. The USDA-Forest Service digital camera systems at Mount Zirkel, CO; Shamrock, CO; and Agua Tibia, CA, all ended monitoring in July due to funding issues.

Data availability status

Data and photographic spectrums are available on the IMPROVE Web site at http://vista.cira.colostate.edu/improve/Data/data.htm and on the VIEWS Web site at http://vista.cira.colostate.edu/views. Aerosol data are available through December 2008. Nephelometer and transmissometer data are available through June 2009 and December 2008 respectively. Webcam displays that show near real-time images and data are available on agency-supported Web sites:

- National Park Service
  http://www.nature.nps.gov/air/WebCams/index.htm
- USDA-Forest Service
  http://www.fsvisimages.com
- CAMNET (Northeast Camera Network)
  http://www.hazecam.net
- Midwest Haze Camera Network
  http://www.mwhazecam.net
- Wyoming Visibility Network
  http://www.wyvisnet.com
- Phoenix, AZ, Visibility Network
  http://www.phoenixvis.net

The EPA AIRNow Web site http://airnow.gov includes many of these as well as additional visibility-related Webcams. Click on View Other Visibility Webcams.
Visibility news

IMPROVE calendars expected at year-end

The 2010 IMPROVE calendars are expected to be ready for delivery in late December. Packed full of information about current air quality studies, site operators and stations around the country, and helpful hints about station servicing, these calendars are a hit.

Look for your calendar in early January. If you haven’t received one or need an extra, contact us and we’ll send one out to you.

To request a calendar, contact Jeff Lemke at CIRA. Telephone: 970/491-2209. E-mail: lemke@cira.colostate.edu.

Steering committee meeting held at Wind Cave National Park

The IMPROVE Steering Committee conducted its annual meeting near Hot Springs, SD, in September. Wind Cave National Park and the National Park Service hosted this year’s meeting, which included 27 committee members, network and laboratory contractors, and air quality researchers.

Presentations and discussions included the status of the program, the state of air quality science, and current research being performed to learn more about speciated pollutants and visibility.

Meeting minutes and presentations from this and all past meetings can be found on the IMPROVE Web site, at http://vista.cira.colostate.edu/improve/Activities/activities.htm.

Networks achieve 90% completeness for calendar year 2008

Aerosol completeness for the IMPROVE and IMPROVE Protocol aerosol networks was 90% for 2008. Data from modules A, B, C, and D must all be present for a sample day to be considered complete. After being collected, data undergo validation using specific criteria stipulated by the Regional Haze Rule. For these data to be used to track progress in improving visibility and be included in preparing state implementation plans, monitoring sites must achieve:

- At least 75% annual completeness.
- At least 50% completeness in each calendar quarter.
- Have no more than 10 consecutive missed samples.

Out of 168 sites in the IMPROVE and IMPROVE Protocol networks, 13 failed to meet these criteria. Generally, sites that failed did so because of unique situations, and most involved the 10 consecutive missed sample stipulation. Additionally, 5 sites, Denali, Egbert, El Dorado Springs, Ike’s Backbone, and Trapper Creek, realized an impressive 100% collection for the year! Collection statistics for each site for 2008 are provided in the following listing.

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Networks achieve 90% completeness for calendar year 2008 continued on page 6....
Data advisory released

Under-correction of chloride concentrations for filter blanks

- Affects: Module B - Chloride (Cl\textsuperscript{-})
- Sites: All
- Period: 2007-2008

Blank corrections for reported chloride concentrations are based on observed field blank loadings. Before 2005, the median field blank value in each month or quarter was used for the correction. For 2005 and later samples, several months’ worth of field blanks were used to determine a common correction for all samples from a given lot of filters. Historical analyses had indicated that blank levels changed when a new filter lot was introduced and then remained stable while that lot was in use, typically a period of about one year.

For historical reasons not yet understood, chloride field blank levels began to depart from their historical pattern in 2007, rising with time during the consumption of a single filter lot. This departure escaped detection until its effects on reported pollutant concentrations were noted by visibility researchers. It is thus necessary to reprocess 2007-2008 chloride data (collected on Module B filters), returning to monthly blank corrections to account for the observed variations within lots. For consistency, all ion data back to 2005 will be reprocessed following the same procedure used prior to that year.

It is recommended that data users postpone analysis pending redelivery of revised 2005-2008 data. A complete discussion of this and all other data advisories can be found on the IMPROVE Web site at http://vista.cira.colostate.edu/improve/Data/QA_QC/Advisory.htm.

For more information or to submit an advisory, contact Bret Schichtel at CIRA. Telephone: 970/491-8581. Fax: 970/491-8598. E-mail: schichtel@cira.colostate.edu.

Operators of distinction

IMPROVE site operator Marc Ohms joined Wind Cave National Park, SD, as Physical Science Technician in 1998. Shortly thereafter the park received an IMPROVE aerosol sampler to begin monitoring, and it is still one of Marc’s routine duties.

The large monitoring site includes air monitoring instrumentation sponsored by various groups, including IMPROVE, the Clean Air Status and Trends Network (CASTNet), the National Atmospheric Deposition Program (NADP), the state of South Dakota, and the South Dakota School of Mines. In addition to servicing all the instrumentation, Marc conducts water quality work on park surface and groundwater resources, manages the cave survey project and its data, oversees cave Search and Rescue training and operations, conducts cave restoration work, and assists park biologists in a variety of projects including bison round-up and black-footed ferret surveys.

“I do something different every day,” said Marc. “My duties are varied and include monitoring the varied resources Wind Cave has both above and below ground.”

When one of these other duties takes longer than expected, IMPROVE backup operators Beth Burkhart, Botanist, or Jason Walz, Cave Technician, fill in to perform the weekly servicing. All three operators were on-hand to assist with questions and information from the recent IMPROVE Steering Committee visit to the park (see article and photograph of the monitoring site on page 2).

Marc came to Wind Cave from nearby Jewel Cave National Monument, where he met his wife, Rene (who currently works there). Before that, Marc worked at Mammoth Cave National Park, KY. His career working with the physical sciences began after earning a B.S. degree in physical geography from the University of Wisconsin at Platteville.

“I am fortunate to work in an environment where I can experience, care for, and study so many natural resources,” said Marc.

In his free time Marc enjoys many pursuits, including caving (spelunking is for amateurs), hunting, fishing, backpacking, and video games. When he is not surveilling the park’s landscape for the endangered black-footed ferrets, he cares for his two pet ferrets, Mango and Kona.
Wildfire destroys San Gabriel monitoring stations
(by C. McDade, University of California - Davis and Scott Cismoski, Air Resource Specialists, Inc.)

Introduction
The San Gabriel IMPROVE site (SAGA1), located in the mountains above Los Angeles, was destroyed during this summer by a huge wildfire. The Station Fire began on August 26, 2009, and burned throughout September. Burning over 250 square miles, it was the largest wildfire in modern history in Los Angeles County and the tenth largest in California. This destructive fire impacted visibility and aerosol monitoring, yet visibility monitoring during the event proved to be beneficial to USDA-Forest Service staff and tactical fire managers.

Aerosol monitoring station
The last retrievable IMPROVE samples from San Gabriel were collected on August 23, before the fire started. Filters were changed on Tuesday, August 25, the routine IMPROVE sample change day. By the following Tuesday, the fire had passed through the area. Figure 1 shows what remained of the shelter and sampler after the fire had passed through.

The San Gabriel IMPROVE site was on Vetter Mountain in Angeles National Forest, northeast of Mt. Wilson and its famous observatory (see Figure 2). The site was in the eastern sector of the Station Fire but well within the burned zone.

When Mike McCorison, Air Resource Specialist with the Angeles National Forest, learned that the IMPROVE site had been destroyed, he quickly scouted the area for an alternate location that could supply the needed power and space for a temporary site and could also meet IMPROVE siting criteria for distance from local emissions. He identified a promising spot near Wrightwood, approximately 22 miles to the northeast of the San Gabriel site, and notified UC Davis of both the loss of the sampler and the identification of a new site.

Fortunately, UC Davis had a spare sampler and a sampler rack available for immediate deployment. Kevin Goding and José Mojica of UC Davis loaded a truck and Kevin drove the 400 miles from Davis to Wrightwood. Kevin met Mike at the new site and they installed and calibrated the sampler on Tuesday, September 15. Only seven sample days were lost between August 23 and September 16, despite the total destruction of the site.

The new site is near the Mountain High Ski Resort, providing more reliable and easier year-round access. While summer site servicing will take a little longer due to the longer drive, winter visits are expected to be shorter as the need for skis and snowshoes will be eliminated. IMPROVE’s site naming protocol dictates that a site be renamed if it moves a significant distance, typically more than about a mile. Hence, the new site at Wrightwood was given a new site designation, WRIG1.
The future of this site is not yet clear. Ideally, it will be moved back to its original location and will resume its original name and designation, San Gabriel (SAGA1). Those plans, however, depend upon the availability of power at the original location and upon the Forest Service’s overall plans for recovery of the region. It is too early to predict how those plans will unfold. The WRIG1 site will continue to collect samples every three days until permanent plans are established.

Coordination and cooperation between the Forest Service and UC Davis allowed the swift replacement of this sampler. But most important was the attentiveness, dedication, and hard work by individuals involved in both organizations.

Photographic monitoring station

The forest service also operates a high-resolution digital Webcam system on Josephine Peak, near the original IMPROVE aerosol sampler. The system monitors three views of the wilderness using a pan-tilt unit. Images of one of the views can be found on http://www.fsvisimages.com. The other two views are short-term fire vistas, accessible to fire scientists and air quality managers. The general view from the camera looks east, as shown in Figure 2.

McCorison, who operates and maintains the camera system, can remotely control the camera settings including view angle, lens zoom, and timing of images, to focus on the area of interest. High-resolution images from this camera system are typically taken every 15 minutes, 24 hours a day. When short-term fire views are activated, Forest Service managers will often remotely download and distribute the images to others involved in the protection of an area, including air quality managers, tactical firefighters, and wildland managers.

In addition to supporting the regional haze monitoring protocol of the San Gabriel Wilderness, the collected images are used to monitor conditions of a forest airshed or the progression of a wildfire. Along with the camera image, air quality and weather data are also posted on the Web pages. The Air Pollution Control District also uses the images in evaluating open burning requests in the forested areas, at elevations well above monitoring stations in the valley.

Figures 3 and 4 show the two short-term fire views taken by the San Gabriel Webcam system the day after the fire started. Both views depict heavy smoke and pinpoint specific locations of fire or smoke plume activity. The camera system also was destroyed by this fire two days later. Air Resource Specialists staff shipped a replacement system to McCorison for temporary use and are fabricating an entire new system for ongoing monitoring.

For more information contact Chuck McDade at the University of California-Davis. Telephone: 530/752-7119. Fax: 530/752-4107. E-mail: mcdade@crocker.ucdavis.edu, or Scott Cismoski at Air Resource Specialists, Inc. Telephone: 970/484-7941. Fax: 970/484-3423. E-mail: scismoski@air-resource.com.
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Outstanding sites

Data collection begins with those who operate, service, and maintain monitoring instrumentation. IMPROVE managers and contractors thank all site operators for their efforts in caring for IMPROVE and IMPROVE Protocol networks. Sites that achieved 100% data collection for 3rd Quarter 2009 are:

### Aerosol (Channel A)
- Acadia
- Addison Pinnacle
- Badlands
- Birmingham
- Bliss
- Bondville
- Boundary Waters
- Bridgton
- Caney Creek
- Cape Cod
- Cape Romain
- Casco Bay
- Cedar Bluff
- Chassahowitzka
- Cloud Peak
- Columbia Gorge East
- Crescent Lake
- Death Valley
- Dolly Sods
- Douglas
- El Dorado Springs
- Flathead
- Frostburg Reservoir
- Fort Peck
- Grand Canyon
- Great Basin
- Great River Bluffs
- Great Smoky Mts.
- Haleakala
- Haleakala Crater
- Hells Canyon
- Hercules-Glades
- Isle Royale
- James River
- Joshua Tree
- Kaiser
- Lassen Volcanic
- Lava Beds
- Lye Brook
- Mammoth Cave
- Martha’s Vineyard
- MK Goddard
- Monture
- Moosetorn
- Mount Hood
- Mount Zirkel
- North Cascades
- Olympic
- Organ Pipe
- Pack Monadnock
- Point Reyes
- Presque Isle
- Puget Sound
- Quabbin Reservoir
- Quaker City
- Rocky Mountain
- Sac and Fox
- San Gorgonio
- Sequoia
- Shenandoah
- Sikes
- Simeonof
- Snoqualmie Pass
- St. Marks
- Starkey
- Swanquarter
- Tallgrass
- Theodore Roosevelt
- Three Sisters
- Tonto
- Trapper Creek-Denali
- Viking Lake
- Weminuche
- Wheeler Peak
- White River
- Wichita Mountains
- Yellowstone

### Nephelometer
- Ike’s Backbone
- Indian Gardens
- Mammoth Cave
- Mount Zirkel
- Petrified Forest
- Phoenix
- Queen Valley
- Shenandoah
- Sierra Ancha
- Sycamore Canyon
- Tucson Mountain

### Transmissometer
- Cloud Peak
- Gates of the Mountains
- Monture

Sites that achieved at least 95% data collection for 3rd Quarter 2009 are:

### Aerosol (Channel A)
- Brigantine
- Chiricahua
- Columbia Gorge West
- Fresno
- Gates of the Mts.
- Gila
- Glacier
- Hawaii Volcanoes
- Ike’s Backbone
- Acadia
- Big Bend
- Cloud Peak
- Dysart
- Columbia Gorge East
- Crescent Lake
- Death Valley
- Dolly Sods
- Douglas
- Elk Dorado Springs
- Flathead
- Frostburg Reservoir
- Fort Peck
- Grand Canyon
- Great Basin
- South Dakota
- Mount Rainer
- Brigham
- Great Smoky Mtns.
- Mount Rainier
- Organ Pipe
- Rocky Mountain
- Washington DC
- Zion Canyon

### Nephelometer
- Children’s Park
- Chiricahua
- Craycroft
- Estrella
- Greer
- Hance
- Children’s Park
- Craycroft
- Estrella
- Greer
- Hance
- Queen Valley
- Shenandoah
- Sycamore Canyon
- Tucson Mountain
- -- none --

### Transmissometer
- Cloud Peak
- Gates of the Mountains
- Monture

### Photographic
- Children’s Park
- Craycroft
- Estrella
- Greer
- Hance
- Children’s Park
- Craycroft
- Estrella
- Greer
- Hance
- -- none --
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.

U.S. EPA
Neil Frank
US EPA MD-14
Emissions, Monitoring and Analysis Div.
Research Triangle Park, NC 27711
Telephone: 919/541-5560
Fax: 919/541-3613
E-mail: frank.neil@epa.gov

NPS
William Malm
Colorado State University
CIRA - Foothills Campus
Fort Collins, CO 80523
Telephone: 970/491-8292
Fax: 970/491-8598
E-mail: malm@cria.colostate.edu

BLM
Scott F. Archer
USDI-Bureau of Land Management
National Science and Technology Center
Denver Federal Center, Building 50
P.O. Box 25047, ST-180
Denver, CO 80225-0047
Telephone: 303/236-6400
Fax: 303/236-3508
E-mail: scott_archer@blm.gov

NACAA
Terry Rowles
MO Dept. of Natural Resources
Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102-0176
Telephone: 573/751-4817
Fax: 573/751-2706
E-mail: terry.rowles@dnr.mo.gov

NOAA
Marc Pitchford *
c/o Desert Research Institute
755 E. Flamingo Road
Las Vegas, NV 89119-7363
Telephone: 702/862-5432
Fax: 702/862-5507
E-mail: marc.pitchford@noaa.gov
* Steering Committee Chair

USDA-FS
Scott Copeland
USDA-Forest Service
Washakie Ranger Station
333 E. Main Street
Lander, WY 82520
Telephone: 307/332-9737
Fax: 307/332-0264
E-mail: copeland@CIRA.colostate.edu

USFS
Sandra Silva
US Fish and Wildlife Service
7333 W. Jefferson Avenue
Suite 375
Lakewood, CO 80225
Telephone: 303/914-3801
Fax: 303/969-5444
E-mail: sandra_v_silva@fws.gov

MARAMA
David Krask
Maryland Dept. of the Environment
MARAMA/Air Quality Planning and Monitoring
1800 Washington Blvd.
Baltimore, MD 21230-1720
Telephone: 410/537-3756
Fax: 410/537-4243
E-mail: dkrask@md.state.md.us

NESCAUM
Rich Poiriot
VT Agency of Natural Resources
103 South Main Street
Building 3 South
Waterbury, VT 05676
Telephone: 802/241-3807
Fax: 802/244-5141
E-mail: rich.poiriot@state.vt.us

WESTAR
Robert Lebens
715 SW Morrison
Suite 503
Portland, OR 97205
Telephone: 503/478-4956
Fax: 503/478-4961
E-mail: blebens@westar.org

ASSOCIATE MEMBERS
Associate Membership in the IMPROVE Steering Committee is designed to foster additional comparable monitoring that will aid in understanding Class I area visibility, without upsetting the balance of organizational interests obtained by the steering committee participants. Associate Member representatives are:

STATE OF ARIZONA
Steven Peplau
Section Manager - Air Assessment
Arizona Dept. of Environmental Quality
1110 W. Washington Street
Phoenix, AZ 85007
Telephone: 602/771-2274
Fax: 602/771-2366
E-mail: peplau.steven@azdeq.gov