INTERAGENCY MONITORING OF PROTECTED VISUAL ENVIRONMENTS

IMPROVE

2nd Quarter 2006 | The IMPROVE Newsletter | Volume 15 / Number 2

Monitoring update

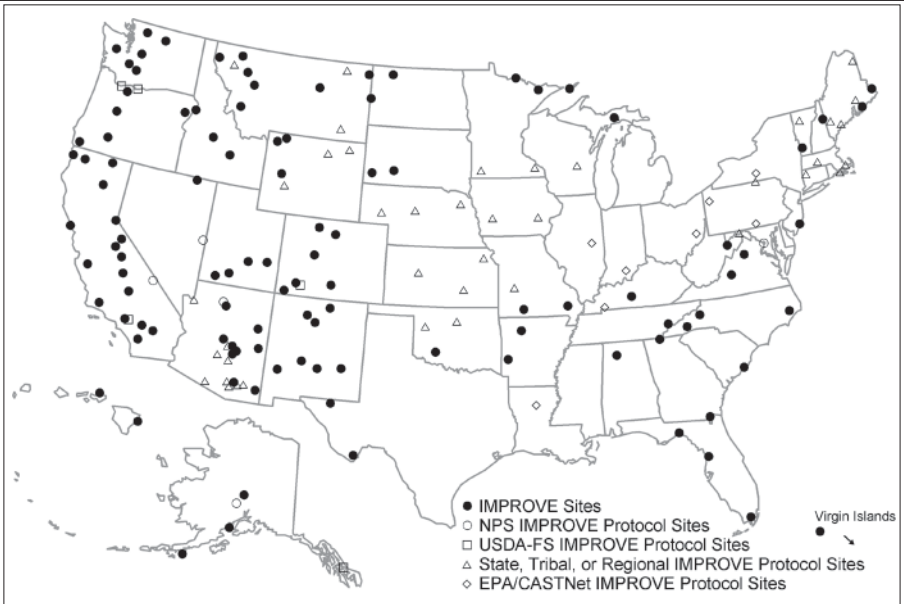
Feature Article: STN modifies carbon sampling, Page 4

Network operation status

The IMPROVE (**I**nteragency **M**onitoring of **Pro**tected **V**isual **E**nvironments) Program consists of 110 aerosol visibility monitoring sites selected to provide regionally representative coverage and data for 156 Class I federally protected areas. Additional instrumentation that operates according to IMPROVE protocols in support of the program includes:

- 58 aerosol samplers
- 14 transmissometers
- 41 nephelometers
- 8 digital or film camera systems
- 56 Web 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 2nd Quarter 2006 (April, May, and June) are:



IMPROVE and IMPROVE Protocol Sites
2nd Quarter 2006

- Aerosol (channel A only) — 94% collection
- Aerosol (all modules) — 93% completeness
- Optical (transmissometer) — 95% collection
- Optical (nephelometer) — 95% collection
- Scene (photographic) (does not include Webcameras) — 99% collection

The Denali National Park & Preserve Webcamera resumed summer operation on June 30. Near real-time and archived views of Mt. McKinley are available on the NPS Web site at *http://www2.nature.nps.gov/air/webcams/parks/denacam/denacam.cfm.*

Four Webcameras in the Midwest hazecam network ceased collecting high-resolution images as of June 30. The cameras are located in Detroit, MI; Grand Portage, MN; Mayville, WI; and Milwaukee, WI. See the article on page 3 for more details.

Data availability status

Data are available on the IMPROVE Web site, at *http://vista.cira.colostate.edu/improve/Data/data.htm.* IMPROVE and other haze-related data are also available on the VIEWS Web site, at *http://vista.cira.colostate.edu/views*.

Aerosol data are available through March 2005. Transmissometer and nephelometer data are available through December 2004 and March 2006 respectively.

Photographic slide spectrums are also available on the IMPROVE Web site, under *Data*. Real-time Webcamera displays are available on a variety of agency-supported Web sites.

***Monitoring update** continued on page 6....*

Visibility news

VIEWS continues progress

The Visibility Information Exchange Web System (VIEWS) has continuously been undergoing improvements since its introduction in 2003. Funded by the regional planning organizations to be a source of the most relevant, up to date, and quality assured air quality data for visibility and other applications, VIEWS has, in the past year, maintained its operation and upgraded its functionality for data users.

In the areas of maintenance, VIEWS has:

- Updated all major data sets;
- Incorporated resubmitted 2000-2004 IMPROVE data;
- Added raw data and regional haze metrics calculated by old and new IMPROVE algorithms;
- Corrected various Web tool bugs/issues;
- Responded to user feedback and questions, and;
- Worked with EPA to update the AQS IMPROVE data.

With regard to upgraded functionality, VIEWS either already has or is anticipated to have by October 2006:

- Links for regional haze State Implementation Plan (SIP) writers to get direct access to regional haze rule data products (baseline values, natural condition estimates, glide slopes);
- A new Data Query Wizard (by October), and;
- Dynamic contour maps (by October).

The technologies upon which the VIEWS data management system and Web tools have been constructed also have broader application potential. For example, to link air quality monitoring data, emissions data, and modeling results to support environmental science, planning, and regulations, and to simplify and coordinate SIP development activities for states and tribes. The VIEWS team at CIRA, working with Air Resource Specialists, Inc., ENVIRON, and Image Matters, are implementing an initial version of the Western Regional Air Partnership's Technical Support System (WRAP TSS) to realize this potential.

- The VIEWS data management system and Web tools have application beyond regional haze:
  - Potential to link air quality monitoring data, emissions data, modeling results to support environmental science, planning, and regulations.
  - Simplify and coordinate SIP development activities for states and tribes.
- The development of the WRAP TSS is realizing this potential:
  - VIEWS infrastructure is being leveraged to facilitate the development of the WRAP TSS.
  - Applicable WRAP TSS developments are being incorporated back into VIEWS.

For more information contact Doug Fox at the Cooperative Institute for Research in the Atmosphere. Telephone: 970/491-3983. Fax: 970/491-8598. E-mail: dfox@cira.colostate.edu.

National Air Monitoring Conference coming in November

The 2006 National Air Monitoring Conference, sponsored by the EPA and STAPPA/ALAPCO, will be held November 6-9, 2006, at the Riviera Hotel, Las Vegas, NV. State, local, and tribal air quality staff involved with operating, planning, or managing air monitoring networks and those involved with reporting data to AQS, AIRNow, and others users are invited to attend.

The conference will provide essentials of training on air monitoring topics to help prepare for future challenges of air monitoring and is designed for new or seasoned air monitoring professionals. The conference will also discuss new monitoring regulations. The most significant changes to air monitoring regulations in over a decade will have been finalized just prior to this conference. Learn first-hand how these changes will affect you and your organization.

Registration is free. The preliminary agenda includes:

November 6 - Training Sessions:

- Network Assessments
- Air Monitoring Instrumentation (continuous PM monitors, precursor/trace/gas/ calibration systems, aethalometers, black carbon monitors)
- Data Validation and Analysis

***National conference** continued on page 6....*

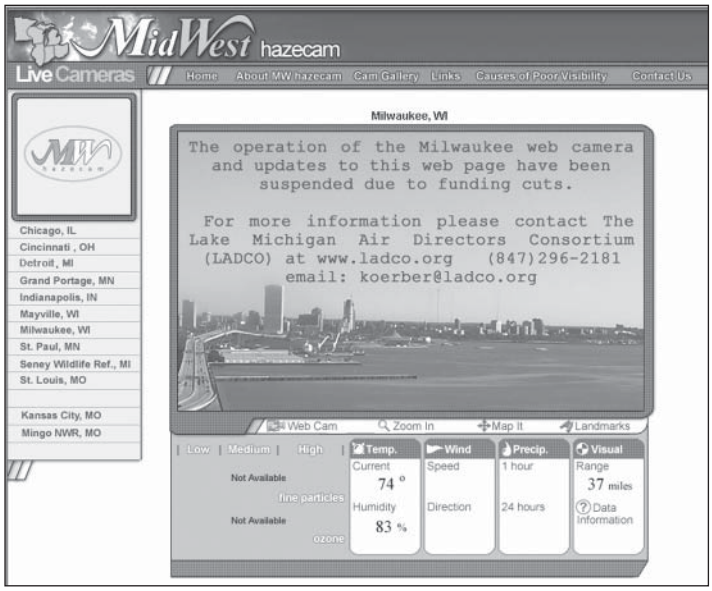
Monitoring Site Assistance:
Aerosol sites: contact University of California-Davis telephone: 530/752-7119 (Pacific time)
Optical/Scene sites: contact Air Resource Specialists, Inc. telephone: 970/484-7941 (Mountain time)

Midwest RPO Webcam network sees funding cuts

The Midwest Regional Planning Organization (MRPO) and the Lake Michigan Air Director's Consortium (LADCO) operate the Midwest hazecam Web site (*http://www.mwhazecam.net*) and its 12 monitoring locations. Effective June 30, 2006, the EPA cut funding that allowed the MRPO to operate these Webcams, which provide important visibility information to the public.

After June 30, all Webcams in the network are funded by their individual, sponsoring agencies, usually a state air quality agency. Those sites that have not obtained funding as of yet, have been forced to at least temporarily cease operation. These sites include Detroit, MI; Grand Portage, MN; Mayville, WI; and Milwaukee, WI. All sponsoring agencies are currently seeking other funding sources to continue or to restart Webcam operations.

For more information contact Mike Koerber at LADCO. Telephone: 847/296-2181. Fax: 847/296-2958. E-mail: koerber@ladco.org.



IMPROVE Steering Committee meeting scheduled

The IMPROVE Program's steering committee will gather at Mammoth Cave National Park, KY, September 26-28, 2006, to discuss network operations, research studies, future direction, and other topics relevant to the program.

The committee meets annually for a comprehensive review of the program to ensure federal requirements are met and quality data are available for state and other users.

For more information contact Marc Pitchford at the National Oceanic and Atmospheric Administration. Telephone: 702/862-5432. Fax: 702/862-5507. E-mail: marc.pitchford@noaa.gov.

Recalculation of natural background

EPA's Regional Haze Regulations (RHR) guidance issued in 2003 concerning tracking progress and estimating natural conditions were based on the original IMPROVE algorithm (available at *http://vista.cira.colostate.edu/improve/Publications/GuidanceDocs/guidancedocs.htm*). This guidance defines a consistent set of instructions for implementing the RHR. However, in late 2005 a new IMPROVE algorithm was developed that mitigated some of the technical criticism of the original IMPROVE algorithm especially as it applied to the RHR. Many of the regional planning organizations (RPOs) and states have indicated their preference to use the new algorithm, but to do so they need natural haze conditions for their Class I areas determined in a consistent manner (i.e., by the new IMPROVE algorithm). A report describing the new algorithm is available on the IMPROVE Web site at *http://vista.cira.colostate.edu/improve/Publications/GrayLit/019_RevisedIMPROVEeq/RevisedIMPROVEAlgorithm3.doc*

Estimates of natural haze levels using either algorithm involves applying the algorithm to estimates of natural species concentrations. The natural species concentration estimate used for this purpose come from the NAPAP State of Science Report 24 by John Trijonis (1990) and are typical values for the eastern and western U.S. Some methodology is needed to adjust these typical values to estimate the 20% best and 20% worst values. A goal in developing the new values is to avoid problems identified in the EPA default approach.

The Natural Haze Levels II Committee was established by the RPO Monitoring/Data Analysis Workgroup in Spring 2006 to review and refine, as appropriate, a methodology developed by Roger Ames (CIRA) for applying the new IMPROVE algorithm for estimating light extinction from aerosol species concentrations to natural species concentration estimates. The ultimate purpose of this is to determine natural haze estimates for the 20% best and 20% worst day for each of the visibility-protected Class I areas. The committee was composed of Marc Pitchford, NOAA; Bill Malm, NPS; Bruce Polkowsky, NPS; Pat Brewer, VISTAS; Tom Moore, WRAP; Ivar Tombach, consultant; John Vimont, NPS; Rich Poirot, Vermont; Roger Ames, CIRA; and Naresh Kumar, EPRI.

The committee work has been summarized in an annotated presentation that will be available in the Gray Literature section of the IMPROVE Web site. This information will be presented August 14 at the RPO Monitoring/Data Analysis Workgroup conference call. Comments received by August 25, 2006, will be used to generate an approved version that will be forwarded by the end of August to the RPOs for their consideration.

For more information contact Marc Pitchford at the National Oceanic and Atmospheric Administration. Telephone: 702/862-5432. Fax: 702/862-5507. E-mail: marc.pitchford@noaa.gov.

Feature article

Speciation Trends Network modifies carbon sampling

Introduction

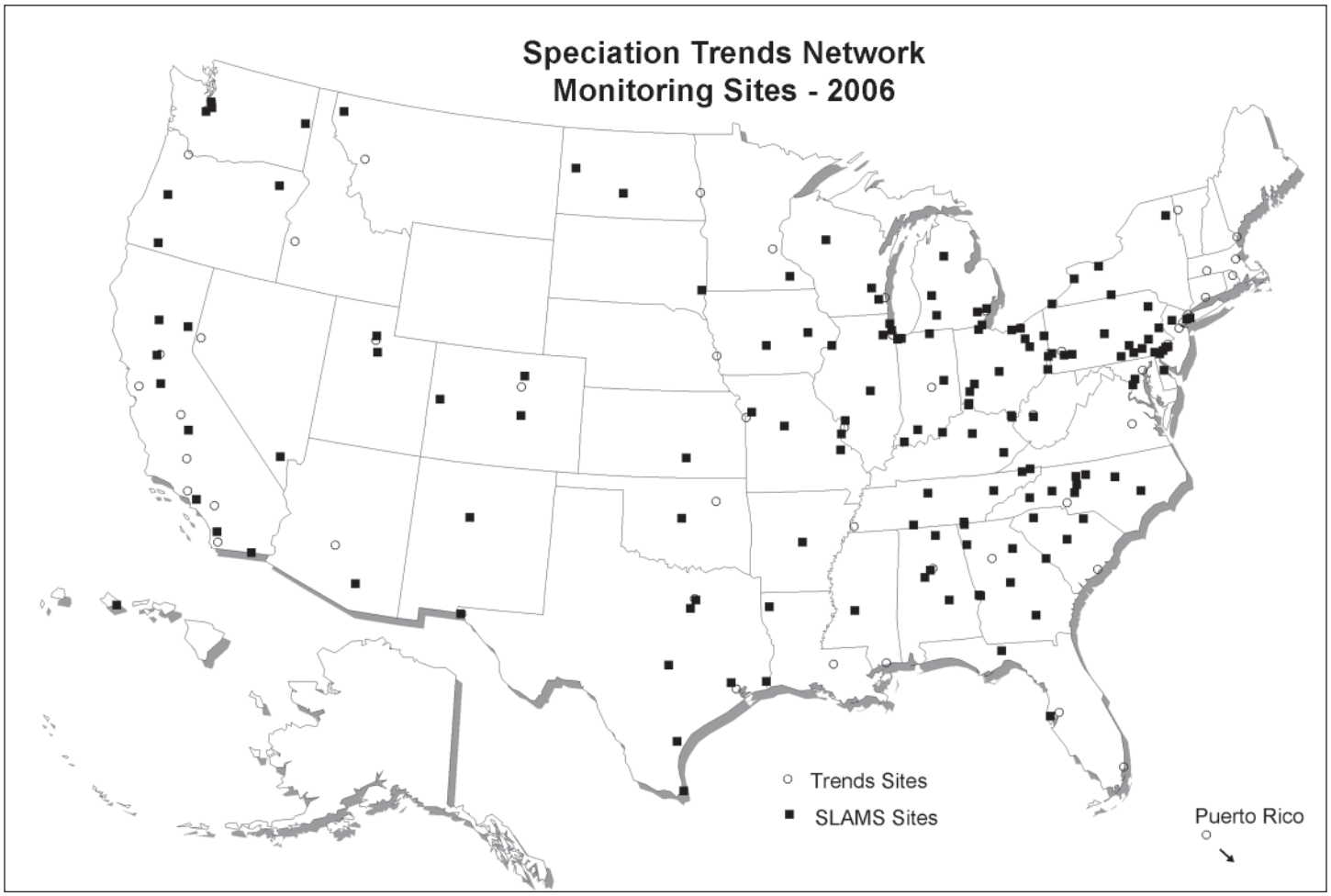
While the IMPROVE aerosol monitoring network collects $PM_{2.5}$ and PM_{10} data at nearly 200 rural areas across the United States, the Environmental Protection Agency (EPA) operates the Speciation Trends Network (STN) in urban areas of the country. The STN currently includes 54 Trends sites and about 150 State and Local Air Monitoring Station (SLAMS) sites, and monitors $PM_{2.5}$ including mass, ions, elements, and carbon species. The program's objectives are to:

- Provide data to support the development of modeling tools.
- Assess the effectiveness of emission reduction strategies.
- Support other air quality programs and the National Ambient Air Quality Standards (NAAQS).
- Support research studies.

A map of the current site locations included in the STN (Trends and SLAMS sites) is provided as Figure 1 below.

The IMPROVE and STN programs differ in various aspects of data collection and analysis. The STN program uses the MetOne SASS sampler at most of the Trends urban monitoring locations (a few sites operate samplers of other manufacturers), and the IMPROVE program uses the Version II IMPROVE modular aerosol sampler manufactured by URG at its rural monitoring locations. Measurement of carbon species is one objective in both networks. IMPROVE analyzes the Module C filters using Thermal Optical Reflectance (TOR) to determine elemental (EC) and organic (OC) carbon concentrations. Currently, the STN analyzes a SASS filter using Thermal Optical Transmittance (TOT) to determine EC and OC concentrations.

Figure 1. Speciation Trends Network (STN) Trends and SLAMS sites in 2006.



Data users have expressed the need for consistency across the OC and EC measurements provided by these two programs. Given that data consistency is desirable, EPA's Office of Air Quality Planning and Standards (OAQPS) requested that the Clean Air Scientific Advisory Committee (CASAC) provide expert advice and recommendations regarding the strengths and weaknesses related to the harmonization of the rural- and urban-based $PM_{2.5}$ chemical speciation networks. CASAC has recommended that strong general support be given to making changes to the STN for comparability with IMPROVE. See CASAC's recommendations in "EPA's Final Draft National Ambient Air Monitoring Strategy", at *http://www.epa.gov/sab/pdf/casac-05-006.pdf.* The EPA responded with a plan to convert all of the Trends and supplemental sites (about 200 sites total) to carbon sampling and analysis protocols that parallel IMPROVE over a two to three year period. This will add consistency in the networks for carbon and allow for retention of the longer-term record for other STN species.

Methodology

Later this year, a URG-3000N Sequential Particulate Speciation System, modeled after the IMPROVE aerosol sampler Module C unit, with controller and volumetric flow control, will be installed at 56 STN sites, and the STN SASS carbon channel will be discontinued. Regions, states, local agencies, and other data users will be kept informed when specific site installation will occur. Air Resource Specialists, Inc. (ARS) will install the modules, controllers, and subsystems, perform an initial instrument calibration, and instruct site operators on operating and maintaining the systems.

Collection and analysis of the carbon filter samples will parallel IMPROVE methods, but will retain the STN's quality assurance (QA) requirements.

URG-3000N sampler design

Sites will sample on both a 1-day-in-3 and a 1-day-in-6 sampling schedule, requiring site operators to change filters every 3 or 6 days per the normal STN protocol. The URG-3000N sampler will retain the basic sample train, cyclone, and filter configuration as the IMPROVE Version II Module C, but will contain several significant changes. The volumetric flow will be actively controlled with a mass flow controller (a change from the IMPROVE critical orifice), and the sampling software will specifically accommodate the STN sampling schedule. The sampler and the control module will be housed in a supporting shelter with a standard stack height which will accommodate convenient installation at STN sites. Figure 2 shows the preliminary support structure design of the URG-3000N instrument.

Operator responsibilities

State operators will be responsible for the URG-3000N operation. Only one filter cassette will be used per cartridge; the remaining three cartridges will be blank to support the cartridge base evenly. Some of the spaces will be used for field blanks and "dynamic blanks" will be collected periodically. Figure 3 shows an IMPROVE Module C sampler with the filter cassette and four cartridges, which will be nearly identical to the URG-3000N.

Final notes

The URG-3000N samplers will be installed at monitoring locations by region, but all 56 will begin operation the same day, in early 2007. The preliminary site selection has been completed and discussions are beginning with regional, state, and local representatives.

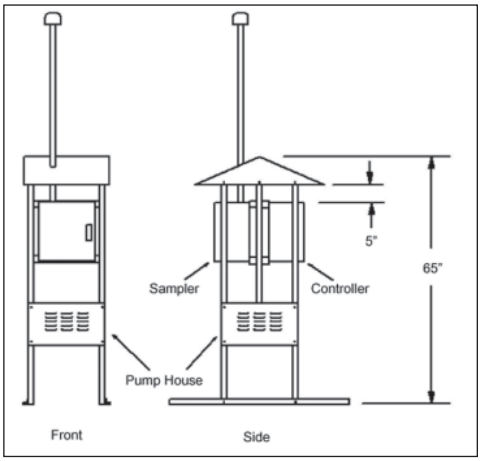


Figure 2. Preliminary design of the URG-3000N support structure.

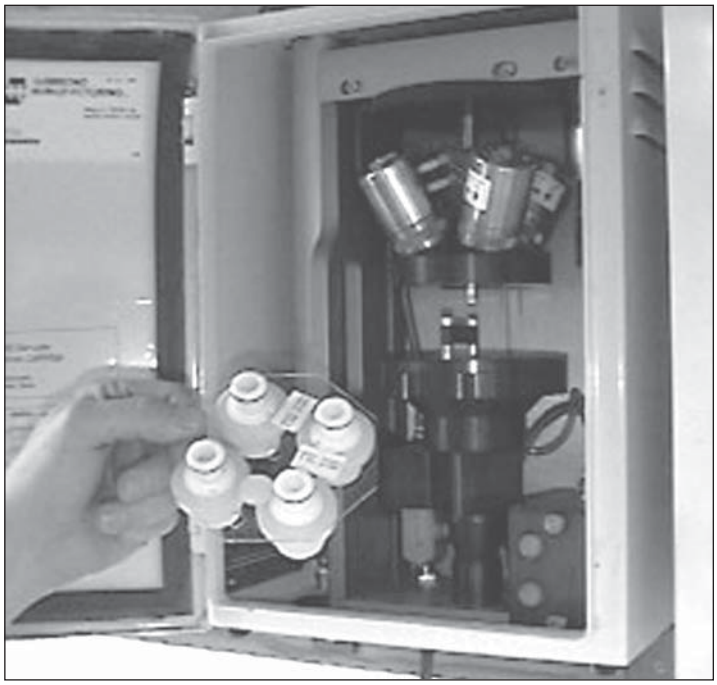


Figure 3. Example IMPROVE aerosol sampler module with removable filter cassette and four cartridges. Each cartridge holds filter media which carbon from ambient air is deposited onto. In the STN program, only one of the cartridges will hold a filter and the other three will hold a blank. The operator will change the filter cartridges every 3 or 6 days, depending upon individual station protocols.

National conference continued from page 2....

November 7 - Plenary Session:

- Comments from the EPA and STAPPA/ALAPCO (hosts of the conference)
- Presentation of air monitoring regulations with panel discussion and Q&A
- PM coarse network design, proposed technologies, and performance testing
- Other monitoring programs (IMPROVE, CASTNet, and NADP)
- PM studies and ozone studies

November 8 - Break-out Sessions:

- Data acquisition
- Air toxics
- Tribal monitoring
- Supersite information
- Quality assurance
- New monitoring technologies
- Web access
- Data reporting

November 9 - Presentations:

- Clean Air Scientific Advisory Committee's (CASAC's) role in air monitoring advice
- Future directions of air monitoring

An exhibit area with poster session will also be included at the conference.

STAPPA/ALAPCO, the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials, are two national associations of air pollution control agencies throughout the United States.

For more information or to register, visit http://www.epa.gov/ttn/amtic/vegasmtg.html.

Monitoring update

continued from page 1 ....

Operators of distinction

Zion National Park has experienced a change of operators this summer, but their devotion to data collection remains strong. Cynthia Wanschura came to Zion in June, and although a fire ravaged the air quality monitoring area of the park, no instruments were damaged, and only minimal filter changes were missed, due to the area being closed off.

Cynthia, a GIS technician for the park, provides technical support to the resource management division with spatial analyses and mapping. She provided GIS services for the National Capital region in Washington, D.C. prior to coming to Zion, in the area of exotic plant management. "There are 17 Exotic Plant Management teams across the country," said Cynthia, "My specific team duties involved performing GIS aspects of the job."

Her varied college interests reflect why she relocated out West. Cynthia earned a B.S. degree from the College of William and Mary in Virginia, majoring in both environmental science and psychology, and minoring in anthropology. She loves to travel around the various, diverse parts of the country and see the many interesting things. After visiting Tucson, Arizona and other parts of the desert West, she found she loved it, and now lives in southwest Utah. "Utah is stunning," said Cynthia, "it allows me to seek out my interests in both cultural resources and natural resources of the area."

Cynthia loves her job, "It's fun going to the weather station and collecting data. I service and maintain the IMPROVE sampler and the National Park Service's Gaseous Pollutant Monitoring Program air quality shelter, which collects ozone and meteorological data." She loves the Utah outdoors, be it hiking, camping, or an excursion here or there, which she does when backup operator Kodi Schoppman steps in. Kodi performs a station visit once a month to keep current on filter changing procedures. The team effort at Zion, with Cynthia, a new operator, and Kodi, a seasoned operator, reflect in their near 100% data collection every quarter.

IMPROVE site operator Cynthia Wanschura maintained at least 90% data collection for the quarter at Zion NP, Utah, even though a fire closed access to the IMPROVE station in June.

Monitoring update *continued from page 3 ....*

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 2nd Quarter 2006 are:

Aerosol (Channel A)

Acadia	Guadalupe Mountains	Pinnacles
Addison Pinnacle	Haleakala	Presque Isle
Badlands	Hance	Quaker City
Baltimore	Hercules-Glades	Queen Valley
Bondville	Hoover	Rocky Mountain
Bridgton	Ike's Backbone	Saguaro West
Bryce Canyon	Indian Gardens	San Gabriel
Cadiz	Isle Royale	San Rafael
Caney Creek	James River Face	Simeonof
Cape Romain	Joshua Tree	Snoqualmie Pas
Casco Bay	Mesa Verde	St. Marks
Chassahowitzka	Mingo	Sycamore Canyon
Cherokee	Mohawk Mountain	Theodore Roosevelt
Chiricahua	Monture	Three Sisters
Cloud Peak	Moosehorn	Tonto
Columbia Gorge West	New York	Trapper Creek-Denali
Crescent Lake	North Cascades	Tuxedni
Denali	Northern Cheyenne	UL Bend
Dolly Sods	Okefenokee	Upper Buffalo
Douglas	Olympic	Virgin Islands
Frostburg Reservoir	Petersburg	Washington D.C.
Great Gulf	Phoenix	Weminuche
Great Smoky Mountains		

Transmissometer

Cloud Peak	San Gorgonio	Thunder Basin

Nephelometer

Cloud Peak	Grand Canyon (Hance)	National Capital
Craycroft		Phoenix
Dolly Sods	Grand Canyon (Indian Gardens)	Thunder Basin
Dysart		Tucson Central
Estrella	Mammoth Cave	

Photographic

Agua Tibia	Gates of the Mtns.	Monture
Agua Tibia North	Grand Canyon	Shamrock Mine
Cucamonga		

Sites that achieved at least 95% data collection for 2nd Quarter 2006 are:

Aerosol (Channel A)

Bandelier	Kaiser	Organ Pipe
Bliss	Kalmiopsis	Petrified Forest
Bridger	Lassen Volcanic	Point Reyes
Cedar Bluff	Lava Beds	Quabbin Reservoir
Crater Lake	Livonia	Saguaro
Flathead	Lostwood	San Gorgonio
Fresno	Meadview	Sequoia
Glacier	MK Goddard	Sikes
Great Sand Dunes	Mount Rainier	Tallgrass
Hawaii Volcanoes	Nebraska	White River

Transmissometer

Badlands	Canyonlands	Great Basin
Bandelier	Grand Canyon (South Rim)	Guadalupe Mountains
Bridger		Rocky Mountain

Nephelometer

Acadia	Greer	Queen Valley
Big Bend	Ike's Backbone	Seney
Bliss	Lake Tahoe Blvd.	Shenandoah
Boulder	Mayville	Sycamore Canyon
Children's Park	Organ Pipe	Vehicle Emissions
Cohutta	Petrified Forest	

Photographic

--none--

Sites that achieved at least 90% data collection for 2nd Quarter 2006 are:

Aerosol (Channel A)

Big Bend	Great River Bluffs	San Pedro Parks
Birmingham	Hells Canyon	Sawtooth
Blue Mounds	Jarbidge	Seney
Bosque del Apache	Linville Gorge	Shamrock Mine
Brigantine	Lye Brook	Starkey
Columbia Gorge East	Mammoth Cave	Viking Lake
Connecticut Hill	Martha's Vineyard	Voyageurs
Craters of the Moon	Mount Hood	Wheeler Peak
Death Valley	Mount Zirkel	Wichita Mountain
Ellis	Pasayten	Wind Cave
Everglades	Petrified Forest	Yellowstone
Fort Peak	Proctor Research Center	Yosemite
Gila	Redwood	Zion Canyon
Great Basin		

Transmissometer

--none--

Nephelometer

Chiricahua	Mount Rainier	Tucson Mountain
Great Smoky Mountains	Mount Zirkel	Upper Buffalo

Photographic

Bryce Canyon

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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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* Steering Committee chair

ASSOCIATE MEMBERS

Associate Membership in the IMPROVE Steering Committee is designed to foster additional IMPROVE-comparable visibility 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:

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Government organizations interested in becoming Associate Members may contact any Steering Committee member for information.

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The IMPROVE Program was designed in response to the visibility provisions of the Clean Air Act of 1977, which affords visibility protection to 156 federal Class I areas. The program objectives are to provide data needed to: assess the impacts of new emission sources, identify existing human-made visibility impairments, and assess progress toward the national visibility goals as established by Congress.

To submit an article, to receive the IMPROVE Newsletter, or for address corrections, contact:

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