IMPROVE Steering Committee Meeting Summary
October 21-22, 2010
Skamania Lodge; Columbia River Gorge National Scenic Area, WA
Final version 12/15/2010

Overview

The Steering Committee met at Skamania Lodge in the Columbia River Gorge National Scenic Area, WA, on October 21-22, 2010. The location is home to the Columbia River Gorge (Mt. Zion and Wishram) IMPROVE Protocol sites, sponsored by the USDA-Forest Service. A copy of the agenda and meeting participants is attached.

Major topics included:

- Aerosol, optical, and scene operation update
- Ion, carbon, and XRF analysis update
- Laboratory audits
- XRF weighing and lab improvements
- XRF standards
- LPV-4 transmissometer testing
- IMPROVE V report
- PM NAAQS update

The following summarizes meeting discussions in greater detail as shown in the agenda.

October 21

Welcome, introductions, and agenda review

The meeting began with a welcome from the Columbia River Gorge National Scenic Area Manager Dan Harkenrider. President Ronald Reagan signed the National Scenic Act in 1986, and the Columbia River Gorge National Scenic Area was created to protect resources and encourage economic development. The Gorge was created through eons of cataclysmic flooding, and although it is not a Class I airshed, it operates two protocol monitoring sites: 1) Wishram to the east and 2) Mt. Mt. Zion to the west. Based on a 2004 visibility study, atmospheric nitrogen in the Gorge is more predominant now than in 2004, but there is an improving trend in visibility. The Boardman coal-fire power plant, built in 1977, is located at the east end of the Gorge, and is a source of deposition and acid fog in the area. Mt. Adams and Mt. Hood, both Class I areas, are also affected by this power plant. Wind turbines are also located eastern end of gorge.

A brief mention of the previous day's IMPROVE Carbon Trends Workshop was made during the introduction. Electronic copies of the workshop presentations, agenda, and a summary will be posted to the IMPROVE web site.

Network Review

Aerosol monitoring

Three sites were decommissioned this year: Petersburg, AK (PETE1); New York City, NY (NEYO1), and Addison-Pinnacles State Park, NY (ADPI1). The IMPROVE and IMPROVE Protocol aerosol networks currently include 168 monitoring sites. Two new

sites are expected to begin monitoring later this year: Barrier Lake, near Banff, Alberta, at a research station operated by the University of Calgary; and Londonderry, NH, an NCore site near Manchester.

The 2009 sample recovery rates for the entire network (Module A) are: Q1=94%, Q2= 94%, Q3=94%, Q4=94%, and All of 2009=94% (2008=93%). The 2009 sample recovery rates for the entire network (all modules) are: Q1=90%, Q2=91%, Q3=90%, Q4=92%, and All of 2009=91% (2008=90%). The sample loss rate for 2009 is 9% for all modules and is due to the typical reasons such as equipment problems, operator no-shows, and power problems. The following 11 sites failed Regional Haze Rule (RHR) requirements for 2009:

1) Hance, AZ – samples lost because PM-10 stack had not been securely replaced during prior maintenance visit.
2) Linville Gorge, NC – samples lost because PM-10 stack had not been securely replaced during prior maintenance visit.
3) Mohawk Mountain, ME – samples lost because PM-10 stack had not been securely replaced during prior maintenance visit.

   [University of California-Davis (UCD) has since instituted failsafe procedures to alleviate future problems during maintenance visits. The sampler stacks are now taped with electrical tape after servicing, and photographs are taken afterwards as documentation.]
4) Gates of the Arctic, AK – power and equipment problems due to extreme weather conditions.
5) North Absaroka, WY – repeated lightning strikes.
6) Glacier, MT – faulty electrical wiring.
7) Indian Gardens, AZ – faulty electrical breaker.
8) Meadview, AZ – Power outages in area.
9) Thunder Basin, WY – operator missed samples and did not report problems promptly. [Air Resource Specialists, Inc. (ARS) also maintains numerous air quality instrumentation at this site; ARS is looking into obtaining a new operator to obtain better weekly servicing.]
10) Hells Canyon, OR – faulty pump.
11) Makah, WA – failed controller.

The December 2009 aerosol data are expected to be delivered to CIRA in a few weeks time. These data represent the second 5-year block of RHR data. Data are now also delivered to and are available from EPA's Air Quality System database.

Optical and Scene monitoring

The optical network now includes 2 rural and 2 urban transmissometers (down from 5 and 7 last year, respectively), and 15 rural and 6 urban nephelometers (down from 25 and 9, respectively). The scene network includes 82 Webcameras and 6 visibility exhibits. Most of the reduction in instrumentation was due to the state of Arizona reducing their networks. The optical network was at its largest in 2004, having 67 pieces of instrumentation operating at that time. All optical and scene standard operating

procedures are current. Nephelometer data through June 30, 2010 were delivered to CIRA on September 28, 2010. Transmissometer data through 2009 (San Gorgonio and Bridger) were delivered August 30.

The Glacier NP nephelometer was relocated from the air quality shelter due to operator safety issues concerning the use of an OSHA-approved ladder to access the shelter's roof. The instrument is now located on a tower next to the IMPROVE aerosol platform; it relays its data via wireless communication to a modem inside the air quality shelter.

An urban visibility nephelometer study, the Cleveland Multiple Air Pollution Study, was performed December 2009 through June 2010 with Tim Hanley of EPA. The study involved two sites in Cleveland, OH, equipped with Optec and Ecotech nephelometers. The study evaluated the usefulness of nephelometry in a proposed urban visibility standard. Study results are unknown at this time.

The NPS and state of Wyoming have partnered to monitor in Grand Teton NP, WY. Monitoring is expected to begin Spring 2011 and will include ozone, meteorology, nephelometer, and Webcamera instrumentation at the park's Science Center. The state's monitoring site in South Pass, WY, is also expected to receive a nephelometer in December 2010.

The NPS began the last year of its 3-year agreement with the Olympus camera manufacturer on October 1, 2010. All 16 NPS Webcameras and controlling-system computers have been upgraded with new equipment this year. The Web site was redesigned and upgraded to be faster for users, more reliable and easier to maintain for the Web manager, and includes higher resolution images available for user download. Some user statistics: In 2009, the Great Smoky Mountain Webcam page received 3,000 daily visits on average (the most) and Acadia and Big Bend each received 200 daily visits (the fewest). The year also saw visitors downloading 13,000 images from the Grand Canyon Webcam page (the most) and 624 images from Acadia (the fewest).

ARS is currently developing apps (applications) for the iphone and Android smartphones. The apps will provide simplified versions of the Webcam pages, access to data displays, and tools to support field technician visits. Joe Adlhoch will consider additional ideas for app uses to be developed.

Quality assurance field audits

Audit coverage for the 2006-2009 period is full on the east coast, Washington, Oregon, Iowa, and Alaska, and audit support is aggressive in Arizona, Colorado, Missouri, and New York. Areas lacking audit coverage include California, New Mexico, Utah, Montana, North Dakota, South Dakota, and Nebraska.

The IMPROVE QAPP states the program performs audits at 25% (42 sites) of its sites per year. In 2009, 35 audits were performed, which is comparable to the last few years. Over the 2006-2009 period, audit found that flow rates are good but some gauges are not well-calibrated. Improvement is also needed in the areas of training, usage of correct reporting forms, and cartridge replacements. Auditors also must request site

coefficients, which isn't always occurring. UCD addresses all issues following an audit report. Some misinterpretation occurs in reading audit results and is due to either a site operator error or an auditor error.

In 2002, EPA OAQPS provided $13,000 for audit travel, to train potential auditors at the state, local, and tribal levels. EPA cannot audit 25% of the network themselves, so instead trains state, local, and tribal staff to be auditors, who can perform the audits at a lower cost because they already perform audits for the Chemical Speciation Network (CSN). The state, local, and tribal staff, however, are having difficulty obtaining funds to travel to auditing classes, which are required annually. IMPROVE currently has 40+ auditors, but certifications are lapsing and we are now losing auditors due to lack of available travel funds. Three solutions are proposed for this funding issue: 1) train current IMPROVE contractors to take over audit responsibilities from the states (costs about $1,500 per site), 2) use the current audit team and develop an online training program (can only apply to currently certified auditors), and 3) use a hybrid of #1 and #2. Discussion followed; the FWS can perform audits during its 18 regular site visits each year. ARS also visits 30-50 IMPROVE sites annually and travel is already paid for, so auditing would have a minimal cost. CIRA staff can also perform a few audits during regularly scheduled site visits. MARAMA also offered to extend their auditor to other sites in the region, along with some additional funding. Annual audit recertifications were deemed necessary, as the audit personnel must be current with updated documentation and it provides two-way communication for questions and collaboration.

➔ Action item: Dennis Crumpler will make a list of site audit history.

➔ Action item: Dennis Crumpler and Jeff Lantz will develop more thoughts on audit funding solutions for the Committee.

Laboratory Review & Methods Development

Carbon analysis

Desert Research Institute (DRI) operates 24-hours/day 6-7 days/week, with two full-time and four part-time staff. They completed the IMPROVE backlog of 23,000 samples in June 2009. A post-doctoral staff member has been hired to calibrate and maintain the analytical systems. DRI has refined the temperature ramping for OC1 and OC2; software enhancements include an improved, integrated maintenance database with troubleshooting guide, and an analyzer status program that allows the operator to record abnormal findings. It includes a status viewer to provide real-time monitoring on any computer, bringing up maintenance history, thermograms, and current status.

The EAF is going green with a condensed data summary (3 pages down to 1 double-sided page), a PDF format option for stored data, and highlights of key fields. Example software screens were shown.

Ion analysis

RTI International (RTI) has discovered some challenges in the analysis of ammonia on phosphorous acid-coated cellulose filters used for the NPS NH_x study at some of the IMPROVE monitoring sites. Dry and wet deposition of NH_4^+ and dry deposition of gaseous NH_3 are important contributors to reactive nitrogen deposition in the U.S.

Current monitoring networks measure only about 45% of the reactive nitrogen, with large biases. CSU has prepared a sampling and analysis strategy for measurement of NH_x (the sum of gaseous ammonia and $PM_{2.5}$ ammonium ion) at nine IMPROVE sites (Bandelier, Bondville, Cedar Bluffs, Chiricahua, Glacier, Mesa Verde, Rocky Mountain, Wind Cave, and Yellowstone). Most of these sites are near Clean Air Status and Trends Network (CASTNET) or National Atmospheric Deposition Program (NADP) sites.

To test the procedures, CSU loaded filter cartridges with phosphorous acid-coated cellulose filters, placed the cartridges in cassettes, and shipped the cassettes directly to the site operators. The site operators deployed the cassettes and, at the end of the sampling period, shipped them directly to RTI for disassembly of the cartridges and analysis of the filters. For shipment, the cassettes were placed inside Ziploc bags, along with a paper towel soaked in a phosphorous acid solution. They were then shipped to RTI in the standard blue box. RTI disassembled the cassettes and cartridges and placed the filters in extraction tubes, all in an ammonia-free glovebox. The filter extracts were analyzed for ammonium ion on a Dionex ICS-3000 ion chromatograph. Chromatograms of the initial samples looked good and analysis results agreed reasonably for collocated samples. A Bandelier sample, however, showed an unusual double peak at the ammonium ion retention time, and the Dionex software incorrectly identified the second peak as ammonium ion. The double peak was separated by using a gradient elution and a heated separator column (60°C). RTI then confirmed their hypothesis that methylamine (MEA) is the second component of the double peak. MEA appears in extracts of coated filters but not in the extracts of the nylon filters from the IMPROVE sites, consistent with the expectation that it would appear primarily in the gas phase in the atmosphere. RTI then purchased a Dionex CS18 cation separator column, which yielded baseline separation of ammonium ion and methylamine, and would also allow for identification and quantitation of other amines if they were detected.

To further investigate this interesting but unexpected finding of MEA, CSU also performed analyses for the presence of MEA. CSU found no MEA on filters they extracted, posing the question that the difference in findings could be due to differences in sample handling. CSU obtained a new, stainless steel filter cartridge and used it in a study in Brush, Colorado, a small, rural, and agricultural town. Stainless steel and Delrin cartridges were used in three samplers for four days. No MEA was found on fresh extracts, but it appeared on “aged” (2-week) samples. The filter cartridges were also tested at the Cedar Bluff, NE, monitoring site. No MEA appeared on aged Cedar Bluff samples, but MEA was found on the standard IMPROVE NH_x samples. Laboratory experiments were performed to reproduce MEA at CSU. MEA appeared with acid etching of filter cartridges, so new cartridges will be made from a non-reactive plastic with phosphorous acid. Candidate plastics include Noryl and Lexan. UCD is making sample cartridges for testing.

XRF analysis

Several quality control checks are performed at UC Davis to monitor and quantify the performance of the X-ray fluorescence (XRF) systems. A set of calibration standards is analyzed approximately weekly to track the stability of the instrument calibration. For many years this check has been performed by assessing relative (percentage) drift

since the most recent calibration. During the past year UC Davis has added a check using the raw counts reported by each instrument, which can identify longer-term changes to the instrument, such as degrading detector performance. In addition to the calibration standards checks, a set of 40 IMPROVE field samples is reanalyzed approximately monthly to search for drift over time. As a further check, routine field sample data obtained from the copper and molybdenum anode XRF instruments are compared against one another for a subset of elements such as iron and calcium that can be quantified on both systems. Finally, monthly median and 90th percentile values of field sample concentrations are compared against monthly values in prior years for each XRF element to search for any major changes that may be evident over a multi-year period.

Both the copper and molybdenum anode XRF systems required several adjustments and repairs during 2009-10. The molybdenum system required a new anode, a major repair, and it was out of operation for three months during early 2010.

UC Davis is embarking on a special experiment to assess the effects of XRF analytical changes over a sixteen year period beginning in 1994. Every available filter will be analyzed from three sites – Great Smoky Mountains, Mount Rainier, and Point Reyes. The experiment will provide a multi-year data set analyzed under a single calibration and a single set of instrument conditions. The resulting data will be compared against the routine IMPROVE data, which are subject to a number of analytical changes over the years. This comparison will provide an assessment of the importance of these long-term uncertainties, which are not reflected in the short-term precision calculations or in collocated measurements. As an example of an analytical change, PIXE was abandoned in 2001 and replaced by copper anode XRF for the lighter reported elements.

Laboratory intercomparisons & issues

Scientists at the National Air and Radiation Environmental Laboratory (NAREL) perform three main quality assurance functions: PT (single blind) samples, laboratory technical systems audits (TSAs), and special studies. Seven speciation laboratories from the IMPROVE and CSN programs participated in a recent inter-laboratory study. These labs are: South Coast Air Quality Management District (SCAQMD), California Air Resources Board (CARB), DRI, Oregon Department of Environmental Quality (ODEQ), RTI, UCD, and NAREL. NAREL has four collocated MetOne samplers on its roof. The samplers collect replicate filters which are sent to the seven laboratories for comparison analysis. XRF intercomparison analyses were performed for thirty 47mm filters sent to six labs and twelve 25mm filters send to three labs for analysis. Intercomparison results are not pass/fail; each lab can choose what they want to do with the intercomparison findings.

Each lab also received 6 filters for carbon thermal optical analysis, which resulted in typical results that varied in carbon mass measurements. Various graphs were presented showing lab results. Quartz filters were analyzed for OC1, OC2, OC3, OC4, pyrolytic carbon, and elemental carbon.

IC analysis was also intercompared among labs; each participating lab received 6 nylon filters. ODEQ showed much more potassium than the other labs. Gravimetric mass was

determined at each lab by weighing 10 filters and two metallic samples. Test results were presented along with 3-sigma advisory limits rather than using pass/fail criteria. The NAREL lab has a new MTL Faraday weighing pan, which is being used in a special study. More information is available at http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/multilabspeciationpt2009.pdf.

Improvements in XRF, weighing, and sample handling

UCD is planning to replace its custom-made XRF system with a PANalytical Epsilon 5 system. This planned change was prompted by instability in the data appearing with the older system, system component failure, and rising cost and diminishing expertise to maintain the system. Excellent commercial XRF systems are now available that are fully developed, tested, and documented. The new system also allows secondary targets to be used, providing excitation energies that are selected to be best for each element.

The standard Epsilon 5 instrument is equipped with sample cups that must be frequently loaded and then removed by the instrument operator. UC Davis analyzes about 2,000 samples per month, so more efficient sample throughput will be needed to make the operation run quickly, efficiently, and cheaply. Through its design engineer and machine shop, UC Davis has designed and fabricated a new set of sample trays that can increase the instrument capacity from about 50 samples to 125 samples in a single loading. UCD is scheduled to receive the new XRF instruments in December 2010.

Initial testing of the old (UCD) and new (Epsilon 5) XRF systems shows good agreement for elements that are measured well above their detection limits when the systems are calibrated similarly. Upcoming tests include: 1) exploring system parameters to select the most appropriate routine protocol to be used, 2) reanalyzing IMPROVE filters to characterize the old and new XRF systems, 3) reanalyzing 15 years of filters for 3 sites, and 4) assessing the best methods of calibration.

UCD is redesigning its lab to include two new Mettler XP-6 microbalances for weighing filters. The new balances are durable, are fully compatible with the SQL database, and agree to within 1 microgram of each other. The old microbalances achieve weight stability in about 90 seconds while the new microbalances achieve weight stability in less than 8 seconds. UCD is also investigating barcode use on Teflon filters to uniquely identify each filter.

XRF standards

UCDavis has created aerosol sulfur standards with the objective of providing standards that more realistically represent IMPROVE samples. Sulfur mass on the standards was based on primary method (gravimetry) and was confirmed with IC. The standards reveal non-linearity in response of the XRF instrument (Cu-vacuum housemade system) to sulfur. Self-absorption by sulfur is experimentally confirmed and is important at high mass loading. The new sulfur standards provide a more precise calibration than current methods and also improved inter-lab comparisons of IMPROVE filters.

Organic artifacts

OC data quality was investigated using alternate models for artifacts, as quartz filters are artifact-prone. The quantitative limit of artifact correction was estimated using IMPROVE carbon-back filter data. IMPROVE increased the number of sites that collect back filters from 6 through mid-2008 to 13 by mid-209. As of October 2009, there was one year of back filter data from 11 sites, including collocated samplers at Phoenix. The back filters from Phoenix are higher than other sites and have the opposite seasonal trend (high in winter, low in summer), than all other IMPROVE back filter sites. Using back filters from October 2008 through September 2009, it was found that at lower concentrations, the monthly median artifact correct method currently employed by IMPROVE underestimates OC on the filters and at higher concentrations, the monthly median method overestimates the OC on filters. Because of the bias at high concentrations, very little reported artifact corrected IMPROVE OC data has less than 10% precision. A linear model and power law model for artifact correction was investigated to see if they could improve (lower) the precision of the artifact corrected data. Both models produced better precision and increased the number of samples that had precision less than 10%. An alternate model for the back filter, that is that the back filter collects both positive and negative artifact material, was also investigated. The linear model between front and back filter was used with the slope representing the negative artifact (increasing blow-off with increasing front filter mass) and the intercept representing the positive artifact.

LPV-4 transmissometer development and evaluation

The transmissometer may soon have a comeback in use. Currently, only two transmissometers operate in the IMPROVE Program (at Bridger and at San Gorgonio) and two instruments operate in Denver and Ft Collins, in Colorado. It is the only instrument that provides a true measurement of the atmosphere (extinction without modifying ambient aerosols), but it is a complex instrument, requiring several calibration factors to be accounted for, to calculate extinction from the path transmittance measurement. The LPV-0 was developed in 1985 as a new instrument that measured atmospheric extinction, and was first tested at Grand Canyon NP. Later that same year the LPV-1 was tested at Meteor Crater, AZ, and compared to extinction measurements made by radiance difference using a large black target , contrast photometry with natural targets, and scattering measurements by nephelometers. Further improvements were made to the instrument, and in 1987 the NPS approved the deployment of an LPV-2 network at Grand Canyon, Petrified Forest, and Canyonlands NPs as part of WHITEX. The LPV-2s most variable component was the lamp, which caused a 2% brightening of the bulb over 500 hours of use.

This lamp brightening factor lead the way to development of the LPV-3 in 2001, which included new optics and a new transmitter feedback block alignment. The LPV-4 is now being tested, and instead of an incandescent bulb, an LED light source is used, which causes no polarization effect and has no chopper motor. The light pulse is instead electrically modulated, giving the LED 10,000 hours of use over its lifetime. The LPV-4 operates on lower power and should provide better measurement stability. The LPV-4 is currently being tested at ARS' optical calibration and testing facility in Ft Collins, CO.

Mt. Zion Site Visit

IMPROVE Protocol monitoring site visit

Site Operator Mark Kreiter hosted the monitoring site tour at the Mt. Zion protocol site. Participants viewed the aerosol shelter and vicinity.

October 22

Data Processing & Distribution

Aerosol data uncertainties

The Speciation Trends Network (STN) and IMPROVE networks include about 170 and 150 sites respectively. A study was performed to investigate the assumption that instrument errors are independent among analytes. The study shows this assumption is incorrect. The study used log ratios to estimate actual errors at the Phoenix, St. Marks, and Bakersfield collocated monitoring sites. Scatterplot matrices showed that slope dominates as the most important part of error. Three sources of errors were considered: volume error, size characterization error, and chemical analysis error. A covariance matrix model showed error estimates of several chemical species at the Phoenix and St. Marks sites, resulting in about 3% error in non-soil elements (indicative of volume error). The collocated Phoenix sites showed the dust elements having much higher individual and shared errors than other species, and the collocated Bakersfield sites showed a common error of 2% to 4% amongst all species. The study concluded that STN and IMPROVE instrument errors are not independent amongst species, that dependencies may bias data analysis results, and ultimately, showing modification to sampling techniques is needed to reduce errors.

Black carbon trend issues

The calibration of the HIPS (Hybrid Integrating Plate/Sphere) measurement of filter darkness was checked this year with a range of neutral density filters. 'Elemental' carbon reported by TOR analysis has declined since 2005 relative to total mass and total carbon, but the 'black' carbon indicated by HIPS has not. The large charring artifact that is subtracted in reporting 'elemental' carbon has increased in relative importance. The reasons for these trends need to be understood.

Data distribution through VIEWS & AQS

The VIEWS Web site is no longer going to be supported. It is going to be archived, and in its place, a new database is being developed. The FED (Federal land manager Environmental Database) includes air and water quality data and more. Once fully online, it can be accessed from http://www.colostate.edu/FED. The latest IMPROVE data is currently in VIEWS and will continue to be through next summer. The FED is not yet operational but will include news, data, and geolocations. It will also include IMPROVE data, USFS weather data, ozone data, deposition, and CASTNET data as well as other programs' data.

Update and preview of the IMPROVE Report

A draft of the IMPROVE Report V is expected to be completed by December 31, 2010. The report will be similar to previous IMPROVE reports, and include a network description and discussions of protocols, instrument and analysis changes, ROMANS,

ammonia sampling, and fine mass biases. It will include IMPROVE and CSN mass data displayed in spatial distribution, reconstructed extinction, and spatial variability in monthly mean major PM species components and reconstructed extinction. Regional monthly and annual mean concentrations and mass fractions of species from 2005-2008 data will be included as U.S. isopleths. Trend analyses for 1989-2008 (20 years) and 2000-2008 (9 years) by species will be included, as well as urban excess, the ratio and difference in urban and rural concentrations of species, using CSN and interpolated IMPROVE concentration at the CSN sites.

Other Related Topics

Update on the EPA review of the PM NAAQS

EPA periodically reviews the National Ambient Air Quality Standard (NAAQS). They completed the last review of the Particulate Matter NAAQS in 2006 and are scheduled to complete a new review next year. This nearly completed review includes an assessment of whether a secondary PM NAAQS should be implemented to reduce the welfare effects of poor urban visibility.

This secondary PM NAAQS would have indicator, averaging time and form that are more appropriate to visibility effects than is the current PM NAAQS, which is based on 24-hour averaged $PM_{2.5}$ mass. The indicator that is being considered is speciated $PM_{2.5}$ mass-calculated light extinction during daylight hours. One part of the assessment conducted by EPA involved generating an hourly PM light extinction for 15 urban areas over 3 years using PM measurements, with which they showed the effectiveness of PM light extinction versus PM mass concentration as a visibility indicator. One of the primary reasons for this result is that PM light extinction incorporates the effects of relative humidity on the visibility impairment by particle, while PM mass concentration does not.

While EPA recognizes that directly measured PM light extinction would be a superior indicator for a visibility based PM NAAQS, they do not have a Federal Equivalent Method (FEM) or Federal Reference Method (FRM) for measuring light extinction. Speciated $PM_{2.5}$ mass-calculated light extinction estimates light extinction would be determined using a version of the IMPROVE algorithm with hourly $PM_{2.5}$ mass from continuous FEM monitors, hourly relative humidity from continuous instruments, and monthly averaged composition to determine the dry and moist light extinction efficiency from collocated Chemical Speciation Network samplers.

EPA used results from urban visibility preferences studies conducted in four urban areas (Denver, Phoenix, Vancouver, BC and Washington, DC) as the basis for selecting a range of levels of light extinction that would be used in a possible secondary PM NAAQS. In their reanalysis of these urban preference studies a range from about 65 Mm^{-1} to 190 Mm^{-1} was determined as the highest PM light extinction values that were considered acceptable by the study participant who viewed scenes with wide range of haze conditions.

A proposed rule on the visibility standard is expected February 2011 with a final rule scheduled for October 2011. For more information, see *http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_index.html*.

Other IMPROVE Topics

IMPROVE budget summary

The budget is tightening again and in 2011 it will be the tightest it has ever been. In 2009 all IMPROVE contracts were funded at the full level. In 2010 the NPS had to cover some shortfalls that developed in the budget. The budget is reflected now on a per monitor basis, and these per monitor costs have not changed much. All IMPROVE contracts are up for rebid in 2010 and will be posted within the next month or so to the public. The contracts for DRI and RTI will be due March 31, 2011. The contracts for ARS and UCD will be due December 31, 2010, and July 31, 2011, respectively. Protocol sites are sponsored individually; the Columbia River Gorge NSA protocol site is expected to be shut down in 2011.

IMPROVE's 25th anniversary

A comprehensive presentation included major topics discussed over the 25 years of Steering Committee meetings, the four major contractors for the program, and progression of agencies included on the steering committee. Major special studies associated with IMPROVE were also described. Finally, collages of instrumentation (obsolete and currently used) as well as contractor and laboratory staff and site operators were shown. Baseball caps sporting a new, IMPROVE 25th year anniversary logo were distributed to all meeting attendees.

Newsletter and calendar

ARS produces the quarterly newsletter, which is delivered as hardcopy to over 600 interested parties, including all site operators, steering committee members, laboratory staff, state agencies, 12 universities, 18 tribes, 4 Canadian agencies, and several private, environmental firms. The newsletter is also distributed via e-mail to 15 recipients and is also available on the IMPROVE Web site. Technical articles are always needed and solicited. Ideas brought forth included featuring the carbon workshop discussion and the FEM Database (in about 6 months time).

CIRA staff are currently producing the 2011 IMPROVE calendar, which will feature aspects of the IMPROVE Program over its 25 year history. The calendar is expected to be completed and delivered by late December.

Next meeting location & timing

Discussion of the next meeting included moving eastward since most recent meetings have been in the West. Some of the sites that were discussed as possible location for the next meeting included Wichita Mountains NWR, OK; Frostburg Reservoir in western Maryland that has an NCore site; Boundary Waters Canoe Area W, MN; Everglades NP, FL; Isle Royale NP, MN. Time of year for the meeting should be selected to avoid snow, mosquito, and tourist seasons in the host area. The next location should have adequate meeting and guest facilities and be reasonably easy travel for all expected attendees. Location and time of year were not decided upon; meeting attendees should consider possible locations and inform Marc Pitchford.

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IMPROVE Steering Committee Meeting Agenda
October 21-22, 2010
Skamania Lodge; Stevenson, WA

Time	Topic	Discussion Leader
	Thursday, October 21	
8:00am	Welcome	To be announced
8:15am	Introductions and agenda review	Marc Pitchford
	Network Review	
8:30am	Aerosol monitoring	Chuck McDade
9:30am	Optical & scene monitoring	Mark Tigges
10:00am	Break	
10:15am	Quality assurance field audits	Dennis Crumpler/ Jeff Lantz
	Laboratory Review & Methods Development	
10:15am	Carbon analysis	Judy Chow
11:15am	Ion analysis	Eva Hardison
11:45am	Lunch	
1:00pm	XRF analysis	Chuck McDade
1:30pm	Laboratory intercomparisions and issues	Jewell Smiley
2:00pm	Improvements in XRF, weighing, and sample handling	Chuck McDade
2:30pm	XRF standards	Ann Dillner
3:00pm	Break	
3:15pm	Organic artifacts	Ann Dillner
3:45pm	LPV-4 transmissometer development and evaluation	John Molenar
	Mt. Zion Site Visit	
4:15pm	Carpool to the monitoring site	
5:15pm	Adjourn for the day (group dinner for those interested)	
	Friday October 22	
8:00am	Aerosol data uncertainties	Nicole Hyslop
8:30am	Black carbon trend issues	Warren White
9:00am	Data distribution through VIEWS & AQS	Bret Schichtel
9:30am	Update and preview of the IMPROVE Report	Jenny Hand
10:00am	Break	
	Other Related Topics	
10:15am	Update on the EPA review of the PM NAAQS	Marc Pitchford
	Other IMPROVE Topics	
10:45am	Budget	John Vimont
11:00am	IMPROVE's 25th Anniversary	Group effort
11:30am	Newsletter and calendar	Gloria Mercer
11:45am	Next meeting: location & timing	Marc Pitchford
Noon	Meeting adjourned	

IMPROVE Steering Committee Meeting Participants
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