

IMPROVE Steering Committee Meeting Summary
February 8 & 9, 2000
Desert Research Institute; 755 E. Flamingo Rd.; Las Vegas, NV
02/14/00 Draft by Gloria Mercer; 2/15/00 Revisions by Marc Pitchford

Overview

The steering committee met at the Desert Research Institute in Las Vegas, NV, on February 8th and 9th, 2000. A copy of the agenda and meeting participants is attached.

Major discussion topics included:

- Status of the aerosol network expansion (24 have been installed as of 02/07/00)
- The need for a clear definition of an IMPROVE Protocol site
- Camera systems are encouraged at all new monitoring sites
- Accountability issues including the need and availability of a budget summary, property management system, and a Quality Assurance Program Plan (including standard data processing procedures), all to be available on an IMPROVE Web site.

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

Network Status

Optical: Data are available through 05/31/99 on CIRA's FTP site. BRAVO data are also now available. Currently, 23 sites are operating in the network with 17 transmissometers, 8 nephelometers, and 5 camera systems. IMPROVE has on loan 16 camera systems to other agencies.

- ➔ Shenandoah NP and San Geronio W have experienced operator-related problems; help is needed from the respective agencies to address these.

ARS will assist aerosol sampler installation in the expanded network, and has received direction to visit optical sites during the next three months only in conjunction with aerosol site visits.

The USFS will direct ARS what sites to do spectrums for; 20 spectrums are done and 5 more will be completed this month. ARS maintains the IMPROVE slide archive since the inception of each camera system. If IMPROVE wants to store the slides elsewhere, federal requirements state they must be placed in the national archives; it will be cheaper to keep the slides at ARS.

Aerosol: Data are available through 08/31/99 on UCD's FTP site. Generally, the network has maintained a 93%-94% recovery rate, but a recent EPA assessment shows a lower data recovery rate. The EPA suggests requirements for a valid site-year are: 1) all major constituents must have valid measurements (using all three PM_{2.5} modules), and 2) data must be recovered during each quarter of the year. Using these two requirements, the recovery rate drops to the upper 80%'s.

Nylon filters with low pressure drop are harder to find in recent years. As a result, the nylon filters have been found to clog more often, apparently due to high sulfate loadings. The assessment by UCD shows that a significant bias is introduced by invalidating the data for periods with clogged nylon filters since these will be high aerosol loading days. They suggest that it would be much less of a problem to use the average nitrate loading for those days of missing nitrate rather than to remove them from the averages. Nylon filters are used to prevent nitrate loss, but carbon-impregnated cellulose filters could be used in place of the nylon. They will, however, require a lot more processing. UCD is looking for other sources of nylon filters and should seek other programs that share this problem (e.g. EPA's PM Speciation Network) to make a joint effort to procure filters with the needed specifications.

Network Expansion

The status of network expansion changes daily. As of 02/07/00, 24 of the new aerosol samplers are installed, 44 are ready, 16 are not ready, and about 26 have an unknown status (either ready/or not ready at this time). UCD plans to have the 44 "ready" samplers installed by the end of March. Samplers are assembled and shipped, as sites are ready for them; state land managers may telephone UCD about site preparation status. As the new samplers are installed, the old ones are removed and are either stripped for parts or will be brought back for side-by-side testing at a later date.

Impacts on Current Operations

Sampler operations are currently on a Wednesday-Saturday schedule. All samplers will switch to a 1-day-in-3 schedule when new samplers are installed at all existing sites. The question of when the change should occur was discussed; should it be at the beginning of a quarter, a season, or does it makes any difference? The date for the change from the current IMPROVE schedule to the EPA schedule will be discussed on the monthly conference calls on the network expansion.

- Neil Frank will have Rich Damberg of EPA check on the regional haze regulation regarding whether data should be summarized seasonally or by calendar quarter.

Funding Status

EPA/IMPROVE expenses for 1997-1999 include: 1) monitoring at 30 sites, 2) producing the IMPROVE Newsletter, reports, and data analysis, 3) construction of 110 new aerosol samplers, and 4) carbon and ion analyses. Other agencies need to get their funds to IMPROVE on a more timely basis. \$3.2 million is needed to operate the aerosol sampling at the 110 sites for one year, not counting the FLM contributions for field operations. A budget should be made for accountability purposes.

Schedule for non-IMPROVE sites

State and tribal aerosol site installations will be performed after all IMPROVE sites are completed.

- UCD will add the state/tribal samplers to the status report.

International Use of Old Samplers

There has been a request for the old IMPROVE particle samplers for use in East Asia. However, they are being stripped of the inlets, cyclones and manifolds to build new samplers. UCD needs to keep some intact for side-by-side testing.

- The IMPROVE Steering Committee agreed to donate the stripped samplers to those who want them.

Definition of a Protocol Site

Confusion exists regarding what constitutes an IMPROVE and IMPROVE Protocol site. Sites labeled as IMPROVE Protocol should be identical to IMPROVE sites in terms of data; the only differentiation should be whether the IMPROVE Steering Committee is responsible for management (an IMPROVE site) or an individual government organization is responsible (an IMPROVE Protocol site). Sites that have an IMPROVE sampler, Optec transmissometer, or Optec nephelometer, and operate with IMPROVE procedures will get the distinction of being called an IMPROVE Protocol site. Collected data should be separated into an IMPROVE database containing all IMPROVE and IMPROVE Protocol site data, and one or more non-IMPROVE databases contain all other data. Urban vs. non-urban site distinctions is not an issue for this definition of IMPROVE Protocol sites.

- Marc Pitchford will revise the definition and e-mail it to everyone.

Some confusion also exists with the current 4-letter site abbreviation codes; these were originally selected only as an internal code by UCD. A standard set of abbreviations or full names can be used for external communications and publications. Changing the older site abbreviations could result in confusion.

- Bob Eldred will collect suggestions from the steering committee members concerning possible changes to the site naming conventions and make recommendations at the next meeting.

View Monitoring Requirements

The IMPROVE Steering Committee will encourage the use of camera monitoring systems at all new sites. IMPROVE funding is currently not available for camera monitoring, so the decision to use cameras will be left up to the FLMs. Slide spectrums for all sites could be created over a number of years by a smaller number of monitoring systems that are operated for a time at some sites then moved to cover other sites.

In some FWS areas, there are no distant features available for scenic views. Photographs of a distant artificial target that could be made to look like a wildlife feature was suggested to document view impairment at such sites.

ARS is looking into new technologies for camera systems. The USFS plans to install 6 new-technology cameras this year.

- Rich Fisher and Dan Ely volunteered to join the View Monitoring Subcommittee.

The question was asked whether we should use IMPROVE resources for monitoring at non-class I areas to support anticipated data needs of modelers doing regional haze assessments instead of spending them on view monitoring. This would be a change of the IMPROVE mission.

- Agenda items for the next meeting: Should we change the mission of IMPROVE to include collection of data at other-than class I areas to support assessment activities? Bob Lebens and Marc Pitchford will create a subcommittee to consider this.

Bob Bachman made a color slide presentation for steering committee comments and feedback regarding the appearance of haze in the Columbia River Gorge and appropriate ways to describe the different levels. The Gorge currently has visibility protection from the state though it is not a class I areas. There is a move by some to have this protection removed as unnecessary and Bob is hoping to inform the decision process concerning the frequency of various levels of impact.

Equipment Inventory

IMPROVE equipment should be managed and accounted for with a property control system. The system should be updated frequently, made available to IMPROVE participants, and include: 1) type of equipment, 2) serial number, 3) status, 4) organization, 5) location, 6) date installed, and 7) comments. The database should contain only IMPROVE equipment, and be placed on an IMPROVE Web site or similar, which does not currently exist.

ARS currently maintains an inventory of all IMPROVE optical and scene property and summarizes it in monthly progress reports to the NPS. UCD also has this information on hand for aerosol equipment.

The question was asked whether the equipment at each monitoring site could be listed as property of the land managing agency that operates the site. Doing so would simplify the process for obtaining a permit for the site. It was agreed that this should not represent a problem.

- Marc Pitchford will draft a letter to work on a property control system and have the site operators accountable for the items.
- Scott Archer, Mark Scruggs, and Bill Malm volunteered to create a Web Site Subcommittee.

Summary Budget

A summary budget was distributed at the meeting and comments were requested regarding format and type of information provided. IMPROVE should create a one-page summary of how IMPROVE obtains and spends money, and publish this information annually.

- Mark Scruggs will put together an example summary budget to e-mail out for comment.

Quality Assurance Project Plan

The need for a QAPP is an accountability issue. EPA requires a QAPP for federally funded programs that generate data for use in regulations. The IMPROVE program resolved to prepare a QAPP at the previous meeting. A subcommittee composed of Tom Moore and Rich Fisher has begun looking into the possibility of arranging contractor support to prepare the QAPP. In the mean time UCD has begun a draft that may suffice until a final document can be prepared. An optical QAPP will not be needed as quickly as an aerosol QAPP. Neil Frank reached Mike Papp (QA officer for the PM_{2.5} program) to inquire whether the current UCD documentation is sufficient for a preliminary QAPP while a more polished document is being prepared. He indicated that he thought it might be adequate but that IMPROVE should send a list of the available document to him so that he can make a more informed decision. This will be done by the end of February.

- Agenda item for the next meeting: draft QAPP and approval of IMPROVE Steering Committee.

Data Processing and Archival

This and the next few data related agenda items are in response to inconsistencies and confusion concerning the availability of data and data processing. After much discussion it was decided that validated aerosol and optical data should be made available only from the contractors (i.e. UCD & ARS respectively) and that derived parameters (e.g. aerosol derived light extinction), summary statistical and graphical displays of data should be available more centrally, perhaps on an IMPROVE web site or by other easily accessed methodology.

CIRA currently has data available in ASCII format.

- UCD has agreed to provide aerosol data in the same ASCII format in about one week.

Optical data are currently available on CIRA's anonymous FTP site; recipients of the data are not tracked. Aerosol data are currently available on a password-protected FTP site; UCD tracks who gets it. Both the aerosol and optical archive should track all recipients of data.

- CIRA will take the data archive off their FTP site and give it to ARS for availability with a password.
- Scott Archer and Bill Malm will create a Data Availability Subcommittee to work on an information plan to be presented at the next meeting.

Inconsistencies Found by EPA

A subset of data needs to be submitted to AIRS. Standard data processing conventions need to be documented as part of a Quality Assurance Program Plan, and feedback should be allowed from data users. IMPROVE's standard data processing methods should be published.

- Bill Malm will make available by the next meeting, a report of the analysis of data processing procedures.

Standardized Data Processing for the Haze Regulation

EPA will publish a guidance document for standard use of data for the regional haze rule. EPA would prefer consistency with IMPROVE's methodology. Documentation of IMPROVE data processing procedures in the QAPP will permit EPA review, and adoption of those parts that they think appropriate. IMPROVE is committed to processing data in a manner consistent with EPA guidance when it is available.

Methods to Resolve Data Issues and Improve Efficiencies

Discussed above.

Status of Next IMPROVE Report

All chapters are now in draft form. The report is an update of the 1996 report and includes some special study and trends information. The 2000 report will not be in full color due to cost, but it can be put on a Web site in full color (along with the previous two reports).

- Bill Malm will send a draft report to the IMPROVE Steering Committee within 30 days for review.

Some data processing inconsistencies are known to exist in the previous two reports (such as $f(RH)$ and hygroscopicity of organics) due to changes in our understanding of the best approach to calculate various parameters. A discussion of this should be included in the new report.

Technical Presentations

Lowell Ashbaugh presented a review of EPA's sample shipping tests. Tests were done to determine the effect of transport temperature on losses of aerosol and effect of conditioning time on mass measurement. Nine pairs of samples were collected with 2 RAAS samplers. One set of samples was shipped at ambient and one at $<4^{\circ}C$. The EPA concluded: 1) cold vs. ambient temperature concentration ratio is 0.98 for mass, nitrate and 0.99 for sulfate, 2) mass loss on Teflon is 5% due to nitrate loss in shipment, 3) greater mass loss occurs with 2-day vs. 1-day shipments, and 4) there is no change in mass with equilibration times of 24 -120 hours. Lowell raised a number of procedural and data analysis concerns. The EPA did not perform statistical tests on the results and they did not discuss inconsistent results.

Bill Malm presented "Assessing Fire Emission Impact on Regional Haze and Fine Particle Concentrations." Does smoke impact haze and $PM_{2.5}$? Isopleth maps of IMPROVE and NDDN data at 89 sites during 1996 – 1998 were shown to indicate which of the major aerosol species were primarily responsible for the hazy periods in the various regions of the country. Needs are: 1) discern fire carbon from all other carbon, 2) extinction efficiency issues need to be resolved (hygroscopicity, how to calculate absorption), and 3) emission rates (current fire emission estimates are crude).

Bob Eldred made a presentation regarding sampler testing. Currently, Point Reyes, White River, and Shenandoah are collocated sites. Great Smoky Mountains and Hance (Grand Canyon) will also soon have collocated testing. Testing will include the clocks, microprocessing program, transducers, etc. About 10% of the network, or 16 samplers, will get a 5th module to test at a later date. UCD will perform collocated tests on new vs. old and new vs. new samplers.

Judy Chow presented a paper "Comparison of IMPROVE and NIOSH Carbon Measurements" which is currently out for peer review. Two different thermal/optical carbon methods were compared. IMPROVE uses Thermal-Optical Reflectance (TOR) carbon analysis and EPA has proposed adopting a draft NIOSH method. This work was done by a new analyzer capable of mimicking the process used by IMPROVES and by NIOSH. Data from the new analyzer was shown to compare well to data from the original analyzers. The two methods give the same total carbon but NIOSH gives lower elemental carbon than the TOR method. Recommendations are: 1) need traceable carbon standards for carbon and optical calibrations, 2) report well-defined fractions so organic carbon and elemental carbon can be reconstructed for comparison in extinction calculations, and 3) report pyrolysis carbon by reflectance and transmission methods to allow for evaluation of bias of optical correction. The IMPROVE carbon method meets the second recommendation and can be changed to meet the third without a loss of historic comparability, while the NIOSH method does not seem to meet the second recommendation.

Neil Frank made a presentation regarding CASTNet sites. Eight CASTNet sites supplement IMPROVE data in the midwest and east; these help fill in the regional gap in the IMPROVE network where there are no class I areas. Data and reports are available on www.epa.gov/acidrain.castnet. The Office of Acid Rain is interested in having IMPROVE run these sites. This could be done by having EPA operate them as IMPROVE Protocol sites, but this would require that they follow all of the IMPROVE protocols and use the IMPROVE sampler. The Acid Rain Office would like to explore the possibility of cost sharing these sites. For IMPROVE to do this would require a change in their mission (presently only class I areas are being represented by monitoring), which will be explored by a subcommittee.

→ Neil Frank will work on transferring the CASTNet sites to IMPROVE, and bring funding issues to the IMPROVE Steering Committee again.

-- end --

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Tuesday, February 8

1:30 pm	Welcome	Pitchford
1:35 pm	Introductions & participant visibility related news	All
2:15 pm	Agenda review	Pitchford
2:20 pm	Status of the network:	
	Optical	Molenaar
	Aerosol (including nylon filter issue)	Ashbaugh
	Network expansion:	
2:50 pm	Siting progress report (siting schedule, problem sites)	Eldred
3:15 pm	Impacts on current operations (data schedule, switch to 1 day in three sampling, etc.)	Eldred
3:30 pm	BREAK	
3:45 pm	Funding status with respect to IMPROVE expansion	Scruggs
4:00 pm	Schedule & plans for non-IMPROVE samplers & sites	Eldred
4:15 pm	Request for the old samplers for international use	Ashbaugh
	Status of interim subcommittees set up at the last meeting:	
4:30 pm	Definition of a protocol site	Pitchford, Poirot, & Eldred
4:45 pm	View monitoring requirements for new sites	Silva, Scruggs, Malm & Archer
5:00 pm	Adjourn for the day	

Wednesday, February 9

8:30 am	Summary format for equipment inventory	Pitchford
8:45 am	Summary budget sheet	Scruggs
9:00 am	Quality Assurance Project Plan approach	Fisher & Moore
	Data processing and database issues:	
9:30 am	Current system for data processing & archival (Role of UCD, ARS, & CIRA)	Malm/Sisler
10:00 am	Inconsistencies found by EPA	Frank
10:30 am	BREAK	
10:45 am	Standardized data processing for the haze regulation (EPA's plan for guidance & the WRAP database)	Pitchford
11:15 am	Methods to resolve data issues & improve efficiencies	Pitchford
11:45 am	LUNCH	
1:15 pm	Status of next IMPROVE report	Malm
	Technical Presentations:	
1:30 pm	Review of EPA's sample shipping tests	Ashbaugh
1:50 pm	Trends in IMPROVE data	Malm
2:20 pm	New version IMPROVE particle sampler testing	Eldred
2:40 pm	Reserved for 2 additional speakers	
3:20 pm	Review of action items	Pitchford
3:30 pm	ADJOURN	

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Scott Archer	BLM
Lowell Ashbaugh	UCD
Lara Autry	EPA - OAQPS
Bob Bachman	USFS
Judy Chow	DRI
Bob Dalley	UTAH DEQ
Bob Eldred	UCD
Dan Ely	STAPPA - ALAPCO
Rich Fisher	USFS
Neil Frank	EPA - OAQPS
Kristi Heuer	FWS
Bob Lebens	WESTAR
Bill Malm	NPS
Gloria Mercer	ARS
John Molenaar	ARS
Tom Moore	ARIZ DEQ
Marc Pitchford	NOAA
Mark Scruggs	NPS