



25 Years of IMPROVE Steering Committee Meetings

A Glance at the Highlights

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The Early Years



- **1985** Fort Collins, CO and Grand Canyon, AZ
 - Determine viability of an interagency visibility monitoring program
 - Develop an administrative approach
 - Review/revise technical plan
 - IMPROVE approved as the program name/acronym
 - Begin to select/prioritize 20 to 35 candidate monitoring sites
 - Representatives: Stan Coloff – BLM, Ty Berry – USFWS, James Blankenship – USFS, William Malm – NPS, and Marc Pitchford – EPA
- **1986** Fort Collins, CO and Denver, CO
 - Create four RFPs: visibility monitoring, aerosol sampling and analysis, carbon analysis, and ion analysis
 - Determine information needs for the long-term program and attributions studies
- **1987** Page, AZ and Denver, CO
 - Review plans for the upcoming WHITEX attribution study of the Navajo Generating Station near Page, AZ
 - Review ongoing deployment of the long-term monitoring network
 - Report on particulate sampler performance during WHITEX
- **1988** Fort Collins, CO and Denver, CO
 - Clarify contribution of participant funds
 - Review status of ongoing 20 site long-term monitoring network
 - Draft Memorandum of Understanding for IMPROVE begun in 1985 is hung up by red tape – effort suspended
 - Agree to invite state representatives to the next meeting
- **1989** Reno, NV
 - Status of program
 - State organization (WESTAR and NESCAUM) seek continuing involvement with IMPROVE

The Steering Committee

NPS

USFS

FWS

BLM

EPA

The Contractors

UC-Davis

**Elemental Operation
and Analysis**

RTI

Ion Analysis

DRI

Carbon Analysis

ARS

**Visibility and Scene
Operation and Analysis**

The Early Years of Bill Malm and John Molenaar



Development and Expansion



- **1990** Research Triangle Park, NC
 - Approval to expand steering committee to include state representatives
 - Steering Committee agrees to begin submitting data to EPA AIRS (now AQS) when the system is modified for variable detection limits
 - Agreed to EPA's proposal to add 10 new eastern IMPROVE sites to track the effects of newly mandated SO₂ emission reductions
 - Briefing on the PREVENT Study was presented
- **1991** Luray, VA
 - Data distributed by 9-track tape proposed, since AIRS is not yet ready to distribute it
 - Plans for Project MOHAVE are presented
- **1992** Las Vegas, NV
 - IMPROVE changes focus from establishing the network to providing clients with data and related products
 - Premier issue of the quarterly newsletter is issued
 - Presentation on Mt. Zirkel Wilderness potential visibility impacts
- **1993** Fort Collins, CO
 - USFS develops 5-year monitoring strategy
 - USFWS and NPS have draft visibility monitoring strategies
 - Newly available first multi-year IMPROVE report was discussed
 - Aerosol reconstructed extinction discussed as means to track visibility
- **1994** Denver, CO
 - EPA discussed a possible future regional haze program and role of IMPROVE to track haze trends
 - A new effort to have participants approve a memorandum of understanding is discussed

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**STAPPA /
NACAA**

WESTAR

New Technologies and New Rules



- **1995** Las Vegas, NV
 - Presentation by EPA on the role of the Grand Canyon Visibility Transport Commission in the development of regional haze policy
 - Develop site evaluation criteria
 - Begin second network 3-year report
 - Independent peer review of the program by 4 reviewers was conducted in Las Vegas Nov 1995
- **1996** Conference call only
 - Memorandum of Understanding approval still stalled after two years
 - Feedback on the independent peer review of IMPROVE was positive
- **1997** Las Vegas, NV
 - Description of the EPA approach to regional haze regulation, including the use of the deciview metric on the 20% most and 20% least hazy conditions
- **1998** Las Vegas, NV and Portland, OR
 - EPA proposed major expansion from 30 sites to 108 (later 110) in support of the anticipated Regional Haze Rule
 - New sampler required for every 3rd day sampling instead of twice weekly
 - Major input from sites on proposed criteria and suitability of specific sites
 - Unanimously approved adding MARAMA to the Steering Committee
- **1999** Reno, NV
 - Specific proposal with state input approved for 80 new IMPROVE sites
 - Commissioned preparation of a Quality Assurance Project Plan (QAPP)
 - Unanimously approved category of Associate Membership and accepted the state of Arizona

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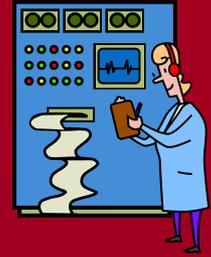
**STAPPA /
NACAA**

WESTAR

MARAMA

ARIZONA

The Beat Goes On



- **2000** Las Vegas, CO and Estes Park, CO
 - New sites and new samplers are deployed (~100) and sampling changed to 1-day-in-3
 - Draft QAPP available for review
 - Data recovery/completeness goals and improvement methods identified
 - Update on IMPROVE Web site development
 - Role of digital photography for documenting visibility conditions discussed
- **2001** Davis, CA
 - Six sites not yet deployed for logistical reasons
 - EPA sponsored independent field and laboratory audit program initiated
 - Web site operational
- **2002** New Orleans, LA
 - New version IMPROVE samplers now commercially available (URG)
 - XRF to replace PIXE for elemental analysis at UCD
 - Regional Planning Organizations (RPO) plan the VIEWS Web-based data archive and assessment tool to include all IMPROVE data
 - Status and future of scene monitoring is discussed

The Beat Goes On



- **2003 Tucson, AZ**
 - Speciation monitoring now at 164 sites including 11 tribal protocol sites
 - Rural – urban comparisons now possible because of urban speciation sampling by STN
 - Unexplained nitrate trend glitches noticed in 1996 and 1999 data
 - Use of digital photography for documenting visibility conditions now widespread
 - First IMPROVE calendar commissioned
- **2004 West Glacier, MT**
 - Routine collation of IMPROVE sampler modules instituted to develop precision information
 - Special studies of the denuder efficiency on the B module conducted to better understand nitrate data issues
 - UCD institutes rooftop PM sampling test platform
 - Ion sampling and analysis on nylon filter study results discussed
 - Proposal to replace outdated carbon analyzers with a new instrument reviewed and assessment methods discussed

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February 2000



Who joined the meetings in 2000?



September 2000



April 2001

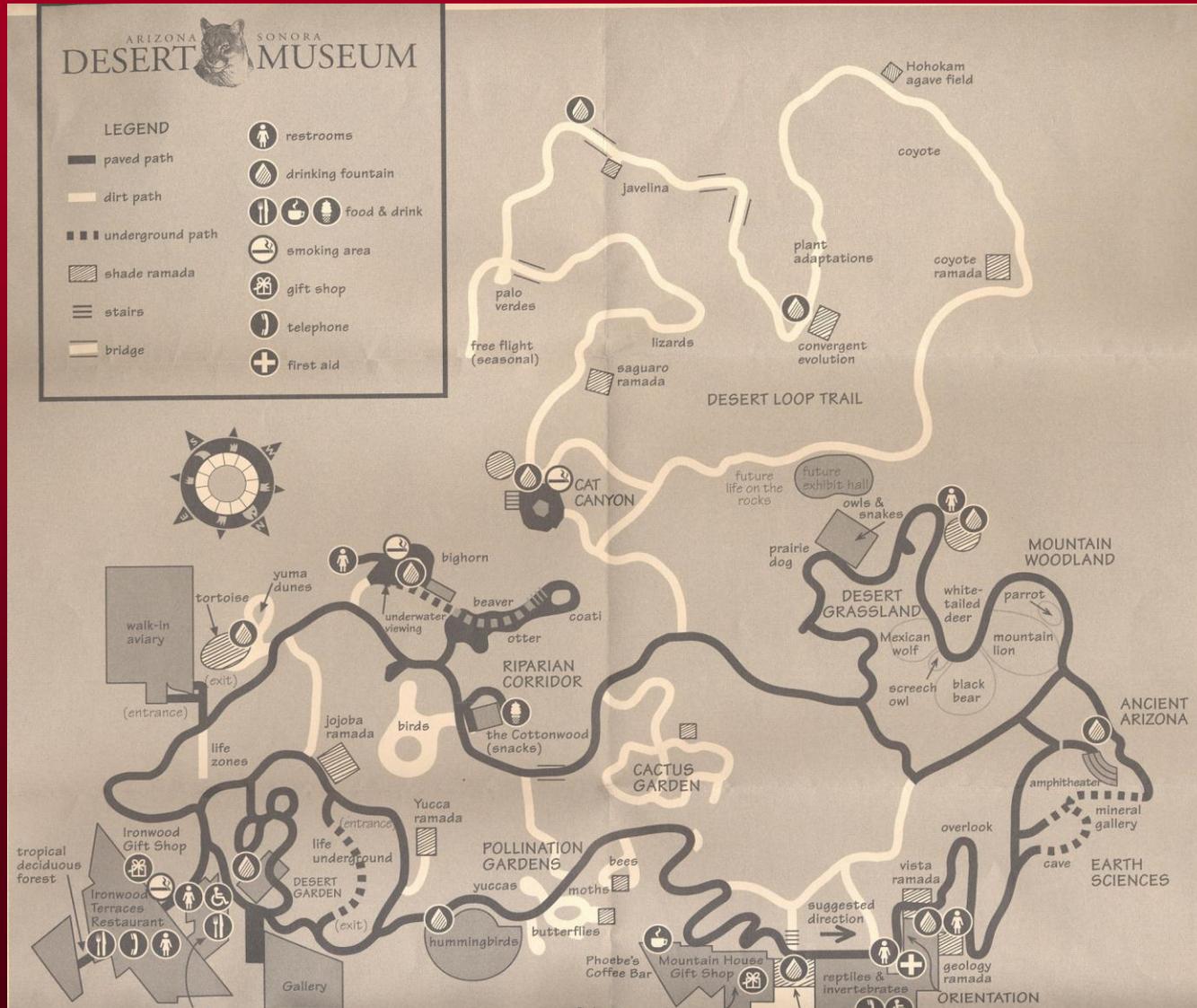


UC DAVIS
UNIVERSITY OF CALIFORNIA

March 2002



June 2003



June 2004



June 2004



Moving Toward Milestones



- **2005 Bar Harbor, ME**
 - Use of new carbon analyzer approved for data starting January 2005
 - First independent field audits identified issues with respect to temperature and time accuracy
 - First independent laboratory audit found good mass comparisons in spite of marginal temperature and humidity control for the UCD weighing room
 - A revision to the algorithm for estimating extinction from aerosol composition was discussed
- **2006 Mammoth Cave, KY**
 - With input from RPOs and states, least unique monitoring sites were identified for decommissioning of EPA's 2007 funds are reduced by 15%
 - New IMPROVE multi-year report is completed
 - NPS ROMANS study of nitrogen deposition at Rocky Mountain NP is discussed
- **2007 Durango, CO**
 - Redesigned sampler inlets to reduce insect problems
 - STN to convert to IMPROVE-like sampler and analysis for carbon
 - Data analysis raises questions about comparability of carbon data before and after switch to new analytical system
 - Four corners regional air quality issues associated with oil/gas production was discussed

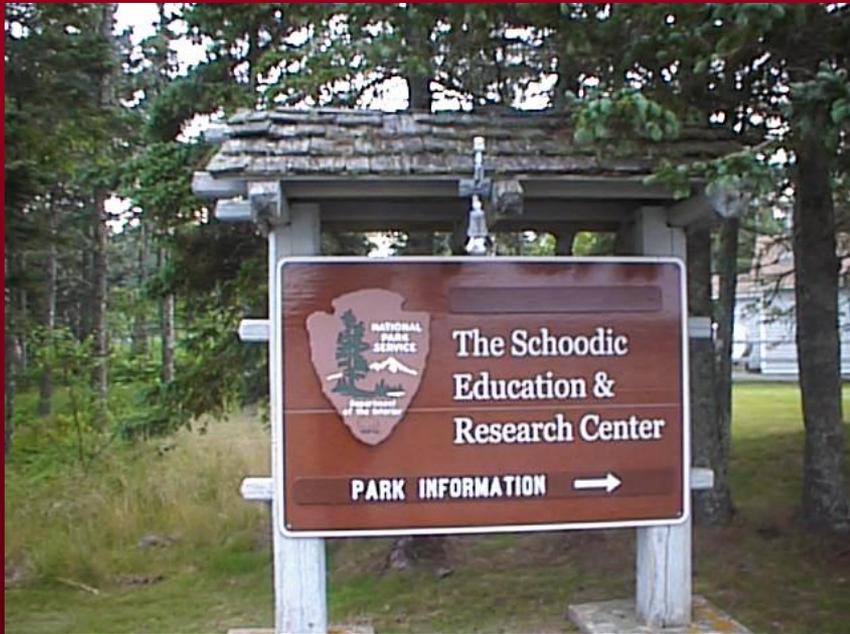
Moving Toward Milestones



- **2008** Folkston, GA
 - Metadata documentation and availability issues discussed
 - Summary of the IMPROVE-CSN Carbon Analysis Workshop (January 2008)
 - Data Advisories available on the Web site inform users of specific quality issues and anomalies that we've discovered

- **2009** Hot Springs, SD
 - RTI discussed unusual peaks in the ion chromatograms for IMPROVE samples impacted by fire; a readily available smoke tracer?
 - Assessment of the relationships between EC and optically measured BC for CNS and IMPROVE samples were presented
 - Ammonium nitrate shown to be a major component in the upper Midwest during winter based on data from sites in the center of the U.S.

July 2005



September 2006



Underground Tours

September 2007



October 2008



September 2009





IMPROVE Steering Committee Meeting Site Locations

