

PHYSICAL & BIOLOGICAL RESOURCES

AIR QUALITY AND SMOKE MANAGEMENT

(1) Overview & (2) Monitoring Activities

The following monitoring summary will address the monitoring question “*To what extent is air pollution causing stress or impairment of forest ecosystems, human health, or human enjoyment of forest resources?*”, by breaking the question into two parts; one focusing on sources of air pollution located outside the forest, one inside.

1. Monitoring Of Air Pollution From Sources Outside The Forest And Its Effects On Forest Ecosystems, Human Health, and/or Human Enjoyment Of Forest Resources

The forest monitors the affect of air pollution from sources outside the forest by measuring: A) the chemistry of the air and precipitation directly, and B) the health of sensitive parts of the ecosystem (these activities are summarized under *C1. Riparian-Aquatics; from the Watershed Health, Riparian, And Soils* section).

1.A. Measuring Air And Precipitation Chemistry

For the time period of this report the forest funded, in partnership with a number of other federal and state agencies, the collection of air and precipitation chemistry monitoring data at the forest’s air monitoring site at Fernberg.

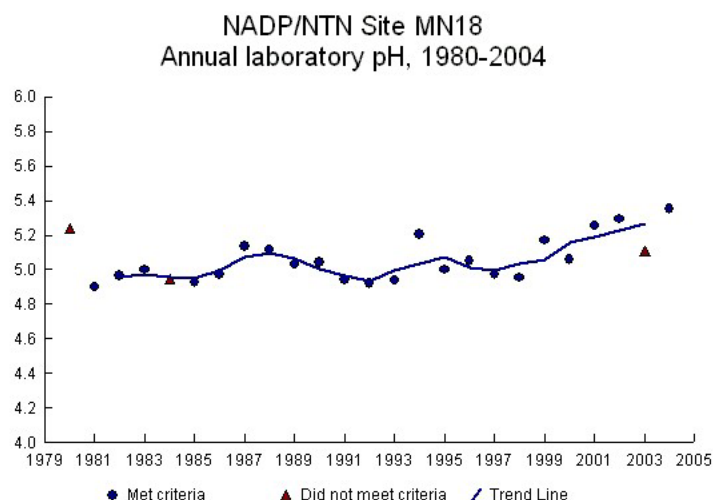
Most of these monitors are part of national networks. One advantage of being a part of a national network is access to free data analysis done by outside parties. A national report looking at acid rain was just released and numerous detailed analyses of the visibility data are currently being completed by a number of groups in preparation for the implementation of the regional haze rule in every state in the US in 2007.

One measure of our success in maintaining our site is that we achieved data collection at rates exceeding each network’s standards, as shown in Table 1 (for the most recent time calendar year available). This is particularly noteworthy considering the extreme environment the equipment runs in.

Table 1

Data Sets	Date Monitoring Began	Network Data Collection Std	Data Collection Achieved
Ozone, smog	1976 - present	75%/90% - EPA/MPCA	98% (2003)
NADP-NTN, acid rain - precip chemistry	1980 - present	75%	84% (2004)
IMPROVE, visibility - aerosol chemistry	1991 - present	75%	93% (2004)
NADP-MDN, mercury in precip	1995 - present	Unknown	88% (2004)
Meteorology	2000 - present	90%	ND
BAM 1020, continuous fine particulate	2005 - present	75%/90% - EPA/MPCA	Installed -Fall 2005
HazeCam, digital camera to document visibility	2005 - present	Unknown	To be installed-12/05.

Overall, air quality monitored at the Fernberg site over the period of this report showed no major changes from that seen over the past five or so years, as illustrated by the chart showing precipitation acidity.

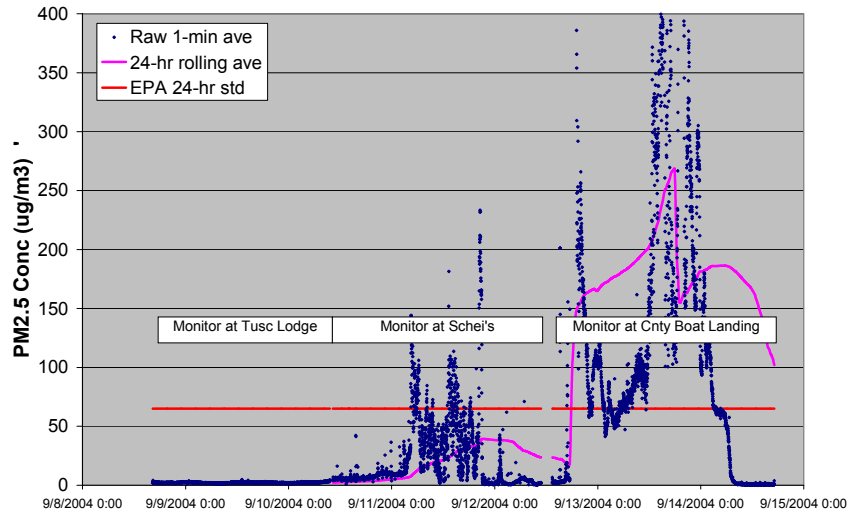


Two new monitors were added to the site in 2005. The BAM 1020 will monitor fine particulates on a continuous basis. Along with the existing ozone monitor this new fine particulate monitor makes Fernberg a fully operational piece of the MPCA’s AQI network to inform citizens when air pollution is dangerous to their health. The BAM is also a great compliment to the IMPROVE sampler that collects (and chemically speciates) the same fine particulates on a 1-in-3 day cycle. The new hazecam will work well together with the BAM as both transmit data to the internet in real time and will provide paired fine particulate information with actual visibility scenes.

2. Monitoring Of Air Pollution From Forest Management Activities

By far the forest management activity that generates that most air pollution on the Superior NF is prescribed burning. The forest screens all burning activities for possible air quality impacts during the development of each burn plan. Those burns identified as having the potential to adversely impact air quality are studied more closely. This could mean air quality modeling or other studies. Air quality monitors that measure fine particulates are deployed during the implementation of potentially problematic burns. The goal is to measure the maximum smoke impact at sensitive receptors. Sensitive receptors could be hospitals,

Monitor 43

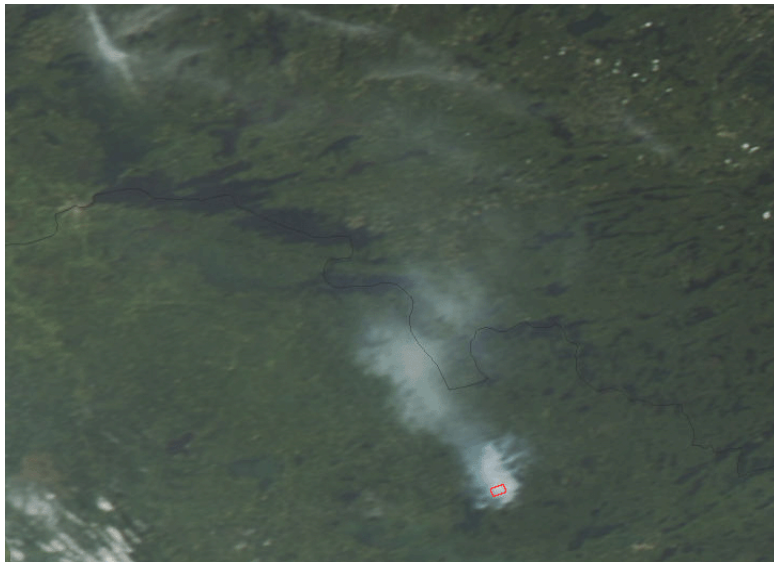


roads, or a collection of homes. The data collected is fed back to fire managers so they can learn, in an adaptive management framework, what types of conditions lead to adverse smoke impacts.

During the period of this report smoke monitoring was focused on burns associated with treating the BWCAW blowdown. Specifically this involved 10 separate burns totaling 22,691 acres. The burns ranged in size from 10,056 to 36 acres and took place during the fall of 2004 and 2005. A total of about 37 monitor-days were collected for these burns. The monitoring data showed 6.5 monitor-days with values over our benchmark which is roughly equivalent to the EPA health standard. It should be noted that the smoke monitors we used are not EPA-approved to determine an exceedance of EPA standards because they do not have high enough precision or accuracy. They do give

us a rough idea of the severity of the smoke at any given place and time. An example of data from one of the monitors showing an exceedance is included. A complete report on the Forest's smoke monitoring program is available by request.

Satellite Photo Showing Smoke From Trout Burn Going About 30 miles Downwind Into Canada On The Afternoon Of September 8, 2005



(3) Evaluation and Conclusions. *Achievement of Desired Conditions & Objectives.*

Desired Conditions/Objectives

Monitoring Driver(s): Desired Condition. D-AQ-1. Air on the forest is of high quality so that: 1) ecosystems are not impaired by pollutants originating in the air, 2) the health of visitors, residents, and employees are not impaired, 3) poor visibility does not impair scenic quality, and 4) other air quality related values are not adversely affected. **AND Desired Condition. D-AQ-3.** Air emissions from National Forest management actions do not degrade natural resources or uses of the Forest

2005 Accomplishments. One measure of our success in maintaining our Forest’s air monitoring site at Fernberg is that we achieved data collection at rates exceeding each network’s standards for the most recent time calendar year available. Overall, air quality monitored at the Fernberg site over the period of this report showed no major changes from that seen over the past five years. Moreover, two new (2005) monitors that continually record fine particulates in conjunction with the existing ozone monitor makes the Fernberg site a fully operational component of MPCA’s AQI network.

Smoke monitoring of 10 separate BWCAW fuel reduction burns totaling 22,691 acres was accomplished. The burns ranged in size from 36 to 10,056 acres and occurred during the fall of 2004 and 2005. The monitoring data showed 6.5 days with values over our benchmark which is roughly equivalent to the EPA health standard.

2005 Accomplishment Contribution Towards Desired Conditions & Objectives

A. FOREST PLAN DIRECTION/FEIS CONDITION				
Record of Decision(7/04)	(DECADE 1)		2005 Accomplishments and/or Condition	
Existing Condition	FP Desired Condition, Objective, or S&G’s.	FEIS Projected or Proposed Condition	Actual Accomplishments implemented	Actual Accomplishments & Approved NEPA Decisions
From Table FIR-4. p 3.5-6. Site AnnAvg 24hrmax 24hrmin UMD 7.7 21.6 0.9 Virginia 8.2 25.8 1.1 SilBay 7.9 21.0 1.0 BWCA 5.0 22.0 0.5		Annual Stnd: 15 PM25 24hr Stnd: 65 PM25	Fernberg Site: No major changes from that seen over the past 5 years. BWCAW BURNS: 6 1/2 days with values over our benchmark or EPA health standard.	

B. ACHIEVEMENT OF FOREST PLAN DIRECTION/FEIS CONDITION			
% Achievement of Decade 1 Direction/Condition		Trend	
Actual accomplishments implemented	Actual Accomplishments & Approved NEPA Decisions	Actual accomplishments implemented	Actual Accomplishments & Approved NEPA Decisions
NA	NA	Air quality is generally steady	

Standards and Guides

Standard & Guide Descriptor	Standard & Guide Description	Compliance	Applicable Design Criteria or Other Necessary Follow up Action (If Any)
S-AQ-1	Prescribed burning activities on the National Forest will only be conducted if they comply with requirements of the most current Minnesota Smoke Management Plan (SMP).	YES NO NA	Maintain dialogue with other burners and MPCA as SMP may be modified in the near future

(4) Necessary Follow-up and Management Recommendations

Monitoring Driver	Follow-up Actions
Air Quality	Continue to monitor trends in air quality related parameters as a number of new industrial sources come on line.

(5) Opportunities To Improve Efficiency And Quality Of Monitoring Effort.

Collaborator/Partner	Monitoring Activity	Accomplishment
MPCA & USGS	Water quality monitoring	Plans are in place for a lake monitoring partnership for 2006 and beyond