

On The Air

National Park Service - Air Resources Division - Quarterly Review

Summer 1998

Early Season Pollution Hits Eastern Parks

John Ray

Some unusual events led to greatly reduced visibility (1-2 miles) and multiple exceedances of the new National Ambient Air Quality Standards (NAAQS) for ozone and particulate matter (PM_{2.5}) at two Eastern Parks in mid-May. Massive fires in Mexico and Central America produced smoke that was transported into central and eastern areas of the United States. The fine particulate standard was also exceeded over multiple days at both Great Smoky Mountains and Mammoth Cave. Visibility was greatly reduced during these smoke events.

Although the fires in Mexico continued to burn, the smoke plume was usually more localized in Mexico or transported to the west over the Pacific.

Great Smoky Mountains National Park had 11 days when the 8-hour ozone standard of 85 ppb was exceeded, Mammoth Cave National Park had 5 days when the standard was exceeded, and Shenandoah National Park had two days. Maximum hourly ozone concentrations were greater than 100 ppb during those periods. These high ozone concentrations are usually not seen until later in the summer.

Although these were unusual events and not the sort of man-made pollution that we usually deal with, they should not be discounted. There were serious health concerns that two pollutant standards were exceeded over several days. The plumes also demonstrated clearly that pollutants could be transported long distances and affect very broad areas.

Smoke from the fires in Florida during June have affected Everglades National Park to some extent, however, the heaviest smoke is in northern Florida. Winds have generally carried the smoke out over the Atlantic or caused localized heavy smoke in northern

Florida. The amount of wildfires and smoke is less in Florida than the Mexico fires.

During smoke and ozone events like these, sensitive individuals should limit vigorous outdoor activity in the Parks. It may be appropriate for parks to issue warnings or advisories when the NAAQS are likely to be exceeded. ☆

Want to see what the ozone concentrations are in your neck of the woods? Visit the EPA ozone-mapping site at <http://www.epa.gov/airnow/ozone.html>

FLAG Effort Praised at National Meeting

Tonnie Maniero

One of the papers presented at the 91st Annual Air and Waste Management Association Conference in San Diego this June discussed the Federal Land Managers' Air Quality Related Values Work Group (FLAG). Approximately 120 representatives from States, EPA, consulting firms and industry attended the presentation which included an overview of FLAG's purpose and organization, subgroup tasks and draft recommendations, and the timeline for the Phase 1 Report. During the question-and-answer period, attendees praised the Federal Land Managers for initiating this cooperative effort. There were a number of suggestions about the kind of clarifying information that should be included in the Phase 1 Report. In addition, there were suggestions on implementing finalized FLAG recommendations. The positive reception from representatives of organizations that will be directly affected by the FLAG recommendations was encouraging. ☆

The Year of the Tiger

Kathy Tonnessen



For two weeks in May 1998 a ten-person NPS delegation, headed by Director Robert Stanton, visited Beijing for the signing of a Memorandum of Understanding between the NPS and the National Parks Agency of China and then traveled to central China for tour of seven national parks, historic sites, and cultural gardens.

The group of NPS delegates included: B.J. Griffin (Superintendent of Presidio), Kathy Tonnessen (ARD), Sharon Cleary (International Office), Lorenza Fong (Santa Monica Mountains), J.T. Reynolds (Grand Canyon), Terry Savage (NARO), Tom McGrath (Historic Preservation Center, MD), and two translators, Linda and Tony Tsu. This group included expertise in all aspects of NPS operations, including park management, interpretation and education, architecture and landscape architecture, and natural resources. The trip was designed to allow NPS representatives to exchange information with national, provincial, and local park officials in China, and to lay the foundation for further exchange of technical information.

The National Parks Agency of China is organizationally located within the Ministry of Construction, and has been in operation since 1979. There are 119 National Parks that were established in three rounds of review in 1982, 1988, and 1994.

Provincial authorities nominate their parks for national recognition to the Central Government. These nominated sites are then reviewed and approved by the Ministry of Construction in Beijing. National park sites are managed and administered by provincial authorities. China's national parks are confronted with many similar issues of U.S. National Parks: visitor overuse and its impacts on resources, over-development and commercialization, boundary encroachment, impacts due to regional air and water pollution, and insufficient funding for research, monitoring and maintenance.

To further explore these issues with our Chinese hosts, we visited a number of cultural and natural resource parks in the east-central region of China in Jiangsu, Zhejiang and Jiangxi provinces. Many of these parks had been designated as World Heritage sites by UNESCO. Although these sites were officially declared as "national parks" within the last 20 years, most have preservation history dating back several millennia. In the Beijing area we toured the Summer Palace, the Great Wall, and the Imperial Palace in Beijing. After travelling to Shanghai we visited Suzhou Classical Gardens in Suzhou, West Lake National Park in Hangzhou, Double Dragon Scenic Spot (a cave site) in Jinhua City, Longhushan National Park in Jiangxi province, and Lushan National Park, located at the top of a 5000' granite massif, just south of the Yangtze River. In every park or city visited, the provincial or local officials from the Ministry of Construction, Park Directors, and Deputy Directors as well as officials from the provincial Foreign Affairs Ministry met us. Meetings, tours, and banquets were usually on the schedule. There was extensive media coverage at our stops; the Director even made it onto Beijing television.

The highlights of the trip for this "natural resource" person were the two wildland parks: Longhushan and Lushan National Parks. In Longhushan we hiked up red sandstone formations, reminiscent of Zion NP. The trail system was routed through bamboo forests, up the sides of rock formations (with the aid of cables), and through subtropical forests, having a large moth fauna. Tigers had been extirpated from the park in recent history due to resource conflicts with rice farmers working on the periphery of the park. At our last stop, Lushan National Park, we were treated to fog-cooled terrain, with extensive native vegetation, including ancient ginkgo and cryptomeria trees, and

cliff-hugging granite trails and staircases. We were not permitted to visit an ecological reserve area on the mountain, reputedly home to a small population of leopards. Because of Lushan's similarities with Yosemite NP, a "sister park" relationship for these two areas was suggested.

The "next step" in the exchange process is for the Chinese Vice Minister of Construction to travel to the United States to visit several national parks, presumably in fall of 1998. At that time a plan for information exchange should be formalized. ☆

Air quality has recently emerged as a major public education issue in urban areas in China. The newspapers regularly publish pollution index values for the major cities and are trying to get public support for elimination of residential coal burning. However, there is not a general perception that the national parks in China are under threat from air pollution. It was clear from our visit that agricultural burning, large industrial emissions, and domestic coal use are affecting air quality in most parks in this Yangtze region. To help educate the public on problems associated with visibility deterioration, acid rain and smog, the NPS delegation suggested that some of the park units begin monitoring air quality. This is a possible topic for follow-up discussions with our Chinese counterparts

Do you know?

1. The pollutant ozone is referred to as a "secondary pollutant" for what reason?
2. What National Park often exceeds the National Ambient Air Quality Standards for sulfur dioxide (SO₂), but is a favorite destination for tourists?
3. Name the National Parks that have real-time displays of air quality for visitors to see.

(See answers on last page.)

Western States Agree to Implement Grand Canyon Visibility Transport Commission Recommendations

Chris Shaver

When EPA published the proposed regional haze rule last July, there was an uproar from western states and industry over how EPA addressed -- or failed to address -- the Grand Canyon Visibility Transport Commission (GCVTC) recommendations.

The western states told EPA that they wanted to implement their "cleaner, cheaper, and faster" solution to improving visibility rather than the "top-down, one-size-fits-all," federal regulation proposed by EPA. However, the environmental community was publicly expressing outrage with the lack of progress made by the western states in following through on the agreements and recommendations contained in the GCVTC report. The NPS supported the GCVTC approach, but we asked EPA to establish a regulatory mechanism for holding the states accountable for actions and results. Industry was concerned that unless the alternative GCVTC path were paved, the federal regulations would force states to focus on controlling major stationary sources of pollution in lieu of the more holistic program endorsed by the GCVTC.

EPA wanted to accommodate the GCVTC approach, but EPA was reluctant to transform the 'recommendations' -- many of which were conceptual or characterized as options -- into enforceable, mandated actions.

These dynamics led the Western Governors' Association to convene a small group of known "problem-solvers" representing states, tribes, FLMs, industrial, and environmental interests to see if a negotiated agreement could be reached on how EPA should incorporate the GCVTC recommendations into the final rule. The group, which included ARD Chief Chris Shaver, began discussions in early May. Intensive negotiations led to substantial consensus on most issues fairly quickly, and an outreach effort to gather broad-based support was launched.

The negotiated agreement explains very precisely how EPA should hold the states accountable

for achieving the emission reduction objectives they agreed to during the GCVTC process. It also asks EPA to require the states to submit SIP revisions by 2003 that include enforceable strategies to achieve those objectives. This deadline is 5 years earlier than the SIPs would have been due under an amendment/ rider on the recent "T-21" (ISTEA) legislation (see related story below).

On June 29, Governor Leavitt (Utah), on behalf of the Western Governors' Association, transmitted the "carefully balanced compromise" to EPA for its consideration in developing the final rule. We expect EPA to provide an opportunity for public input on the document before finalizing the regional haze regulation. The full document is available on the WGA website (www.westgov.org). ☆

MOHAVE Update

[Mark Scruggs](#)

Project MOHAVE was an extensive monitoring, modeling, and data assessment project designed to estimate the contributions of the Mohave Power Project (MPP), near Laughlin, NV, to haze at Grand Canyon National Park (GRCA). The field study component of the project was conducted in 1992 and contained two intensive monitoring periods (~30 days in the winter and ~50 days in the summer). Unique, non-depositing, non-reactive perfluorocarbon tracer materials were continuously released from the MPP stack during the two intensive periods to enable the tracking of emissions specifically from MPP. Tracer, ambient particulate composition and SO₂ concentrations were measured at about 30 locations in a four-state region. Two monitoring sites, Hopi Point near the main visitor center at the south rim of the canyon and Meadview near the far western end of the park, were used as key receptor sites representative of GRCA.

Project MOHAVE has operated under the joint technical and program management of the Environmental Project Agency and Southern California Edison Company in close partnership with the NPS. Numerous other organizations have contributed to the operations and assessment work of the project. Since the end of the field study component of the project, data assessment and modeling efforts have been

undertaken by the many participants and have led to numerous papers and reports. By design, these efforts have been the products of their respective authors and have not been endorsed as findings of Project MOHAVE.

The following are some of the preliminary findings (subject to review) of the Project MOHAVE participants.

- Sulfur dioxide and tracer emissions measurements at the plant (MPP) and ambient measurements at the western edge of Grand Canyon NP (Meadview) indicate that MPP sulfur dioxide reaches the park in sufficient quantities in the summer to potentially cause visibility impairment.
- There were disagreements among the techniques used to estimate the MPP contribution to impairment, particularly when the results were compared on a day-by-day basis and in the estimates of the maximum contributions.
- In general, MPP contributes to visibility impairment at Grand Canyon NP, though other sources appear to be responsible for most of the observed impairment during the summer-period intensive.
- Concentrations of the unique tracer were measured at above background tracer levels at Meadview on about 90% of the summer-period days.
- Restricting the comparison of the different techniques to the estimated magnitude only, MPP contribution to visibility impairment (averaged over a 12-hour period) ranged from 0.3 to 1.2 and 1.9 to 6.7 % for median (50th percentile) and greater (90th percentile) conditions, respectively.
- Contributions for shorter-term averages were estimated to be as much as a factor of two more.
- Much greater uncertainty and disagreement surround the magnitude and the range of the estimates of the highest contribution to impairment, which was on the order of 2 to 16%.

(Extracted from the June 22, 1998, "Project MOHAVE Executive Summary of Assessment of MPP Visibility Impacts at Grand Canyon.") ☆

More Parks Have Unhealthy Air under New National Standard

David Joseph

The EPA announced its decision to revise the National Ambient Air Quality Standards (NAAQS) for ozone in July 1997. A recent ARD analysis indicates that more NPS units would not attain the new "primary" NAAQS designed to protect human health than was the case with the previous ozone standard. Based on NPS monitoring network ozone data collected between 1995 and 1997, nine NPS areas were found to have ambient ozone levels that exceed the level of the new standard: Great Smoky Mountains, Joshua Tree, Mammoth Cave, Sequoia, Shenandoah, and Yosemite National Parks, Cape Cod National Seashore, Pinnacles National Monument, and Cowpens National Battlefield.

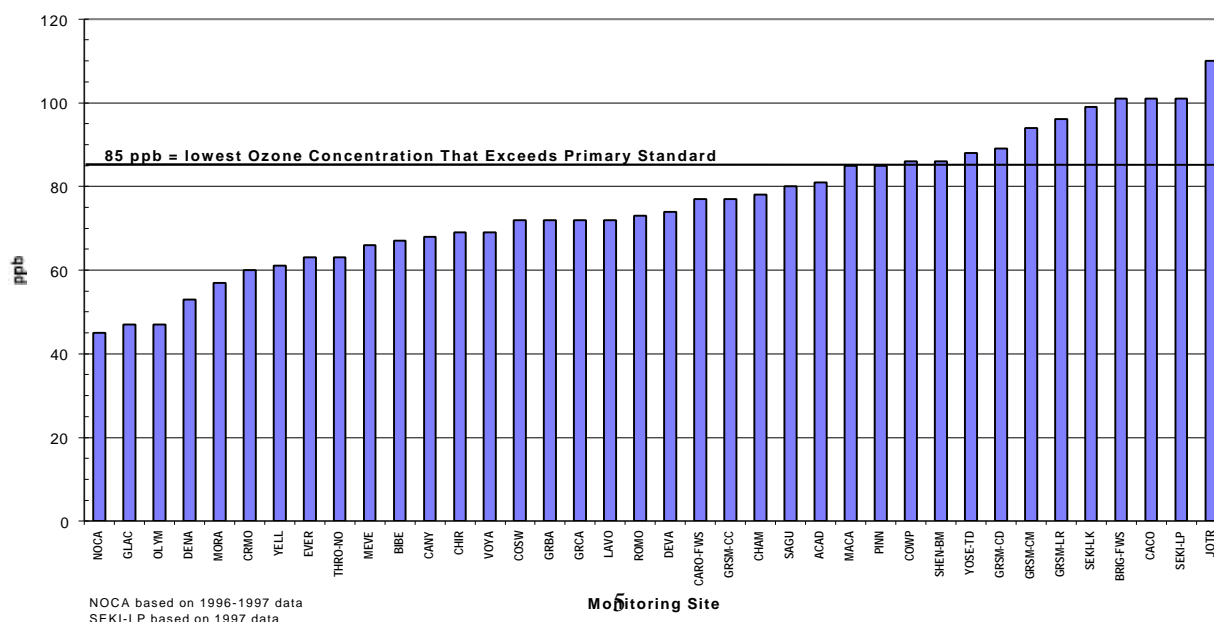
The revised primary standard is based on 8-hour rather than the 1-hour average ozone concentrations of the former standard, and the level of the standard is lowered from 0.12 parts per million (ppm) to 0.08 ppm. The test for exceeding this new primary standard is based on a 3-year average of 8-hour ozone concentrations. For a monitoring site to be attaining the new primary standard, the annual fourth highest daily maximum 8-hour ozone concentration, averaged over three years, must not exceed 0.08 ppm or 80 parts per billion (ppb). EPA has indicated that 0.085

ppm (85ppb) is the lowest concentration that would exceed the 0.08 ppm (80ppb) standard.

The bar chart below plots in ascending order the 1995-1997 3-year average of the annual fourth-highest 8-hour averages for the NPS and FWS monitoring sites that were operational during that three year period. The horizontal line in the figure is drawn at a concentration of 85 ppb. Sites with plotted 8-hour averages that equal or exceed this concentration of 85 ppb would violate the new primary ozone NAAQS. The highest computed 3-year average 8-hour concentrations were associated with NPS monitoring sites at Sequoia and Joshua Tree National Parks, and Cape Cod National Seashore, with average values above 100 ppb. Other NPS sites in the east had average values lower than these sites, with 3-year averages in the 80-100 ppb range. Sites with the lowest 3-year values in the NPS network included those in the northwest and north, with average 3-year 8-hour concentrations in the 45-65 ppb range. (The FWS Brigantine Wilderness Area/Edwin B. Forsythe National Wildlife Refuge 3-year average concentration is also shown on this chart as exceeding the revised standard in 1997.)

For more information see <http://www.aqd.nps.gov/ard/ozone.htm> or contact David Joseph at (303) 969-2816. ☆

1995-1997 Average of 4th Highest Daily Maximum 8-hour Ozone Concentrations



Congress Holds Hearings on Regional Haze Rule

Chris Shaver

On April 23, Chris Shaver testified before the Senate Committee on Environment and Public Works, Subcommittee on Clean Air, Wetlands, Private Property and Nuclear Safety, regarding the National Park Service's perspectives on EPA's proposed regional haze regulation. She summarized the NPS's legal mandates and indicated that we had documented visibility impairment in all the Class I areas managed by the Department of the Interior.

She generally applauded EPA's decision to develop regional haze regulations. While progress in reducing pollution in our parks may result from air quality programs already in place or expected to occur over the next several years, "Our National Parks and Wilderness Areas deserve the kind of insurance policy that would be provided through a regional haze regulation. EPA's proposal provides a good foundation for the development of those emission management programs that will be needed to unveil the spectacularly scenic resources that are so important to our public."

Constructive suggestions were also offered for how to improve the regulation. In particular, the testimony highlighted that EPA's proposed approach would allow 220-330 years to meet the visibility goal in some eastern national parks. "This is not acceptable to the people who visit our parks, and it is not acceptable to the people who think we are protecting these parks for future generations," Chris told the committee.

The testimony also supported the recommendations of the Grand Canyon Visibility Transport Commission (GCVTC). However, Chris highlighted the need to translate those recommendations into enforceable strategies that demonstrate compliance with the objectives agreed to by the GCVTC states and tribes: continuous emissions reductions, steady visibility improvement, and no perceptible degradation.

Other witnesses at the hearing included Governor Leavitt (Utah), the Director of EPA's Office of Air Quality Planning and Standards, and State officials from California, Nebraska, and New Hampshire. ☆

... and Delays Deadline for Visibility Plans

Chris Shaver

One of the primary purposes of the Senate regional haze hearing appeared to be obtaining a commitment from EPA to allow states to develop regional haze-related programs in conjunction with program planning needed to comply with the new air quality standard for fine particulate matter (PM 2.5). Under the Presidential Order accompanying the new standard, States would not be required to develop plans to meet the new standard until 2005-2007, whereas the proposed regional haze regulation required states to submit visibility plans by 2003.

In spite of EPA providing assurances that the planning schedules would be reconciled "where appropriate", Congress decided to codify that assurance in a rider attached to the reauthorization of the highway bill (formerly, ISTEA; now "T-21" legislation). Although the actual timeframe for submittal of visibility plans will depend on when areas are classified as either meeting or not meeting the new standard, the upshot is that regional haze plans will likely not need to be developed by the states until 2008.

This means we will need to rely on pollution control programs currently in place or scheduled for implementation to avoid further visibility degradation and promote additional pollution reductions in the short term. Routine dissemination of park air quality information – to the public and regulatory agencies – will provide a foundation for our collective efforts.

A more expeditious schedule may be allowed in the West. Congress indicated that this provision "shall not preclude the implementation of the agreements and recommendations set forth in the Grand Canyon Visibility Transport Commission Report dated June 1996." We hope that the recent request from the Western Governors' Association (see related story) will provide EPA with the encouragement it needs to require earlier state implementation of the Commission's agreements and recommendations.

Interim Prescribed Fire/Air Quality Policy

Joe Carriero - Fish & Wildlife Service

An "Interim" Prescribed Fire/Air Quality Policy was issued by the Environmental Protection Agency (EPA) in May. The policy addresses how best to achieve national clean air goals, including the new air quality standards for particulate matter, while improving the quality of wildland ecosystems (including forests and grasslands) through the increased use of fire.

The policy was developed by a partnership that included representatives of the National Park Service, the other Federal Land Managers, EPA, and the Bureau of Indian Affairs, as well as State and Tribal air regulators and managers, State foresters, and others.

The decision to issue an "interim" policy was made to provide immediate guidance to State and Tribal air quality and land managers. EPA plans to reevaluate the policy after finalizing regulations related to agricultural burning and regional haze. Taskforces are now working on both those issues to determine how to address air quality impacts from agricultural burning and to develop regulations that will better protect visibility from regional haze.

Fire has always been an integral part of many healthy ecosystems. Fire facilitates the release of important nutrients into the soil from flammable "fuels" or debris (e.g., logs and fallen timber on the forest floor). By naturally reducing the amount of debris and undergrowth, fire allows trees to grow taller and healthier, reducing their susceptibility to disease and insect infestation. In addition, prescribed, or controlled, fires help reduce the intensity and magnitude of wildfires by reducing the accumulation of flammable fuels in the forests.

However, smoke contains a number of pollutants. Particulate matter in smoke is the main pollutant of concern because it can cause serious health problems, especially for people with respiratory illness. Smoke also adversely affects the clarity of our air, which in turn affects the distance and sharpness with which we see objects. This is of particular concern in national parks, forests, and wilderness areas, where visibility impairment can impair our views and our appreciation of scenic vistas. Many techniques are used to manage the impacts from smoke, including scheduling burning

during favorable weather conditions and controlling the amount of fuel and acreage burned.

Under EPA's new policy, Federal prescribed burning must be done under a certified smoke management program developed by the State and Federal Land Manager. The policy, which outlines the components of a basic smoke management program, applies to both wildland and prescribed fires that are managed to benefit resources or the environment.

The Interim Air Quality Policy on Wildland and Prescribed Fires is now accessible on the WESTAR website at http://www.westar.org/projects_fp.html. This website also contains relevant issue papers, a fact sheet, and a list of frequently asked questions on the policy. Questions on the relevance of the new policy to NPS activities may be referred to Brian Mitchell of the Air Resources Division (303-969-2819). Brian was a significant contributor to the partnership that developed the new policy. ☆

And the winner is...

We had a large number of suggestions for naming our newsletter. Thanks to everyone who sent in your ideas. The gamut of entries ran from "Bad Air Day" to a last-minute write in vote for "Air Jordan." You can see the overwhelming response in this issue's masthead. We had two great minds come up with this entry independent of each other. Our winners are Kathy Tonnessen and Mark Scruggs, both of the ARD.

We hope you continue to enjoy reading our newsletter and that it keeps you informed and on top of the latest air resource issues.

If you have any question, comments, or suggestions, please contact Dale Breitenfeld at (303) 987-6694 or dale_breitenfeld@nps.gov.

Strengthening the Weak Link: New Park Initiative at ARD

Tonnie Maniero

ARD staff crunch numbers, write technical reports, supervise contractors, conduct research to fill scientific gaps, and negotiate with regulators and industry. We work in offices, conference rooms, and computer labs.

The tools of our trade are books, phones, computers, and the information highway. Only one member of the ARD has ever worked in a park, and most of us seldom travel to parks for business. This had made it difficult for us to understand how we can best meet the needs of the parks.

In order to strengthen our connection to the field, the ARD has initiated a new program called Adopt-a-Park. After reserving a subset of parks for new employees that will be hired later this year, each ARD employee "adopted" two Class I area parks (see table). The ARD employee is expected to become the Division expert on his/her parks. The ARD employee will visit the parks and learn firsthand about park resources and all park resource management issues. The park benefits because it has a main point of contact with the ARD and a vehicle for communicating what air quality information park managers want and how that information should be packaged to be most useful. The ARD employee prepares a customized briefing and makes a presentation to park staff that includes air quality information specific to that park. For example,

- ◆ **Rocky Mountain NP** was visited by several ARD staffers in mid-May, and the ARD and park managers subsequently did a joint presentation to the Colorado Air Quality Control Commission about air quality conditions and concerns (see related story).
- ◆ Tonnie Maniero visited **Yellowstone NP** in late June. She briefed park management on air resource issues during the park's squad meeting, spent additional time one-on-one with park staff, and got in touch with the park resources.
- ◆ Miguel Flores has taken the concept more seriously – he is spending most of the next three months at **Big Bend NP**, where he will live and work as the Acting Assistant Superintendent.

ARD employees will be contacting park staff to discuss issues and arrange visits over the next several months. Park staff should note that the Adopt-a-Park program is not intended to interfere with existing lines of communication, i.e., park staff who are used to contacting certain people in ARD for specific issues should continue to do so. ☆

ADOPT-A-PARK

Acadia NP	Shepherd
Badlands NP	Scruggs
Bandelier NM	Morse
Big Bend NP	Flores
Black Canyon of the Gunnison NM	Mitchell
Bryce Canyon NP	Maniero
Canyonlands NP	Vimont
Capitol Reef NP	Joseph
Crater Lake NP	Shepherd
Craters of the Moon NM	McPartland
Denali NP & Preserve	Vimont
Glacier NP	Mitchell
Grand Canyon NP	Malm
Grand Teton NP	Joseph
Great Smoky Mountains NP	Malm
Guadalupe Mountains NP	Morse
Haleakala NP	Nash
Hawaii Volcanoes NP	Garnand
Isle Royale NP	Ray
Joshua Tree NP	Ray
Lassen Volcanic NP	Notar
Mammoth Cave NP	Flores
Mesa Verde NP	Scruggs
North Cascades NP	Tonnessen
Olympic NP	Notar
Petrified Forest NP	Nash
Point Reyes NS	Hauge
Redwood NP	McPartland
Rocky Mountain NP	Gebhart
Saguaro NP	Shaver
Sequoia NP	Tonnessen
Shenandoah NP	Bunyak
Virgin Islands NP	Bunyak
Voyageurs NP	Hauge
Yellowstone NP	Maniero
Yosemite NP	Shaver
Zion NP	Garnand

Pollution in the Rockies Gets a Hearing

[Kristi Heuer](#)

On May 21, Chris Shaver, ARD Chief, and Randy Jones, Rocky Mountain National Park (ROMO) Superintendent, appeared before the Colorado Air Quality Control Commission (CAQCC) to update the members on air quality-related issues at ROMO and lay the groundwork for potential future requests for actions by the CAQCC. Many attended the hearing to offer technical support, including ROMO natural resource staff, USGS researchers, and experts from the ARD office. The information presented is summarized below:

Ozone concentrations measured at ROMO are below the national ambient air quality standard. Ozone levels are high enough to cause injury to vegetation and sensitive species do exist within the park, however, past field surveys have found no evidence of ozone injury. The NPS continues to monitor ozone levels in the park and would like to see vegetation plots re-surveyed for ozone injury.

Visibility impairment in ROMO is worst during summer months, when park visitation is highest. Visibility in winter months generally is best with an average standard visual range (SVR) of 215 km. An average summer day is 104 km SVR, with worst days being 81 km SVR. Strong decreases in SVR are characterized by sharp increases in particulate sulfates and nitrates, and light absorbing materials. Back trajectory analyses of air masses identified regions to the northwest and southwest that were associated with high sulfur concentrations, and regions to the west and northwest that were associated with high nitrate.

The good news reported to the CAQCC is that visibility conditions at ROMO appear to be improving, consistent with regional reductions in emissions. Additional reductions in local and regional emissions should continue this positive trend in the short term. The ARD recommended, however, that the CAQCC begin considering new air quality management programs that will likely be needed to avoid projected future increases in pollution

Nitrogen (N) deposition at ROMO is currently a concern to resource managers. High elevation ecosystems in the Rocky Mountains receive the highest amount of N deposition in the western U.S. Ammonium concentrations in the atmosphere have increased significantly over the past decade. Nitrate concentrations have also increased, but not significantly. Source areas include those on both sides of the Continental Divide and are largely dependent on seasonal meteorological events.

Because of the complexity of the N cycle, ecosystem responses to changes in N deposition are not likely to be direct or immediate. Soil microbial processes in part regulate nitrogen export from these watersheds during spring snowmelt. The contribution of talus landscapes to N export and the effects of climate variability also appear to be important. Episodic acidification has been documented in headwater streams on Niwot Ridge, which is just south

of the park and surface water nitrate concentrations within the park are relatively high. While these signs often indicate nitrogen saturation of an ecosystem, no biological effects have been documented. Future research will concentrate on air quality and deposition monitoring, surface water monitoring, watershed studies assessing biological effects, and synthesis and information management. The ARD recommended that the CAQCC avoid making decisions that would allow an increase in N deposition and that it begin considering ways to reduce ammonium emissions.

Overall, the ARD and ROMO delivered a positive, but cautious message: "Stay the course"—current air pollution control programs appear to be working, "but plan ahead" to avoid likely deleterious effects from projected future pollution increases. The NPS offered to do a follow-up briefing later this year to discuss the results of ongoing research and monitoring. ☆

Summer Intern Program

[Dale Breitenfeld](#)

"Who are all those kids?" That is the most asked question around the ARD this month. This answers two relevant questions. 1) No, NRPC employees aren't totally oblivious to what's going on around them. 2) Yes, we are all getting older e.g.; these young faces are all "kids."

We have had the pleasure of hiring and working with six summer interns, all of who are currently attending local universities. They have given us a new focus on how and why we do what we do. Hopefully they will learn enough about natural resource issues facing the NPS that they too will become crusaders for our national parks. We would like you to meet these fine students.

[Kathleen Clifford](#), Junior, Environmental Sciences, University of Denver

Job Assignment: Work with Bruce Nash and Dee Morse on AQUIMS and GAIA's Guard.

Why did you seek out working for the NPS? An interest in air quality and global climate change.

Biggest surprise about the NPS? That some people actually prefer bagels to donuts.

[Angela Crowley](#), Junior, Biochemistry, University of Colorado at Boulder

Job Assignment: Works for Mark Scruggs combining ozone and fine particle data in JMP so that it can be more easily analyzed.

Why did you seek out working for the NPS? I love the outdoors and have visited many of the parks and this gave me the opportunity to see how several different areas work to maintain the most effective park system possible. This particular job relates to my field of study and allows me to apply some of the information from class to an actual situation. Most importantly, I'm interested in the research and overall work that is done in this department.

Biggest surprise about the NPS? Several things surprised me, including the amount of air pollution that factories knowingly continue to produce, the amount and diversity of research that this Division does and the variety of people and departments the NPS works in conjunction with every day.

[Cassandra Garcia](#), Junior, Environmental Science and German, University of Denver

Job Assignment: Works for Bruce Nash, Dee Morse and Francine Patterson on AQUIMS and Gaia's Guard (air quality game).

Why did you seek out working for the NPS? I saw Bruce do a demo of AQUIMS and was very impressed by the system.

Biggest surprise about the NPS? I was surprised by the friendliness of everyone in this office.

[Reza Mirbaha](#), Mining Engineer Ph.D., Colorado School of Mines

Job Assignment: Computer support, website development and maintenance, programming for Doug Garnand

Why did you seek out working for the NPS? I saw an ad on school bulletin board.

Biggest surprise about the NPS? I like the environment more than ever.

[Dan Pabon](#), Junior, Mechanical Engineering, University of Colorado, Boulder

Job Assignment: Works for Miguel Flores on U.S./Mexico transboundary air pollution, currently on the WEB page.

Why did you seek out working for the NPS? I thought it was a unique opportunity to get a hands-on approach to the environment. I also thought it would be an interesting experience working with people from very different backgrounds.

Biggest surprise about the NPS? The National Park Service employs a wide variety of people. Geologist, biologist, engineers and more all work together in a common bond, to protect our National Parks.

[Megan Walsh](#), Senior, Environmental Science, University of Denver

Job Assignment: Work for John Bunyak on policy issues

Why did you seek out working for the NPS? I wanted to work for the NPS because I thought it would be relevant to what I'm learning in school. Happily, I was right. I also wanted to work for the NPS because I care so much about the environment and the National Parks, and I wanted to see and be a part of protecting them.

Biggest surprise about the NPS? The biggest surprise that I had was that just because you work for the NPS, that doesn't mean that you ever actually get to see the inside of a park! What I mean is that there is so much that goes on behind the scenes to keep the parks open and clean, I don't think everyone realizes that. It baffled me to find out how much actually goes on that I never knew about. ☆

Answers to Quiz

1. Ozone is not generally emitted directly by human activities. Instead the ingredients to make ozone are emitted, mainly organic compounds and nitrogen oxides, which then react in the sunlight to produce ozone.
2. We like think of the parks as clean, healthy places to visit, however, natural emissions of hydrogen sulfide or sulfur dioxide can be unhealthy. Emissions from volcanic vents at Hawaii Volcanoes National Park can be well about the national standards.
3. Visit Big Bend, Craters of the Moon, or Great Smoky Mountains National Parks and you can see the pollutant levels in the visitor centers.