

On The Air

National Park Service - Air Resources Division - Quarterly Review

Fall 1998

Something's Fishy

Kathy Tonnessen

Anglers in parks may assume that the fish they catch in rivers, streams, lakes and ponds are uncontaminated by man's industrial by-products. To determine if this is actually the case across an array of ecosystem types, NPS natural resource experts worked with EPA chemists this summer and fall on a project in twelve of the parks in the Demonstration Intensive Site Project (DISPro). The principal investigator from the EPA-Las Vegas lab, Ed Heithmar, proposed a project of chemical contaminant screening to include development of methods to collect, handle, process and analyze samples for endocrine disrupting compounds (EDCs), volatile organic compounds, and trace metals (especially mercury).

Following a training session at Rocky Mountain National Park in July, staff from the EPA and NPS traveled to parks to join forces with local natural resource and science staff and collect samples of fish, water, sediments and vegetation. Kristi Heuer and Kathy Tonnessen from ARD concentrated on the western DISPro parks: Rocky Mountain, Glacier, Olympic, Sequoia, and Canyonlands National Parks. Alex Almario, a fisheries biologist from Assateague Island NS, visited Everglades, Great Smoky Mountains, Shenandoah, and Acadia National Parks. The EPA chemists welcomed the opportunity to visit Denali, Theodore Roosevelt, and Big Bend National Parks.

There has been intense speculation of late regarding the contamination of remote areas by airborne chemicals that can be carried long distances from their sources. The issue of EDCs and their effects on wildlife and human physiology culminated in the publication of the book on the subject titled, "Our Stolen Future." Elevated mercury levels in fish have been detected in a number of NPS units, including Acadia NP. Elevated mercury levels are also found throughout South Florida in many components of the natural systems there. A number of NPS Class I area managers expressed concern about the airborne transport of pesticide and herbicide residues from surrounding agricultural areas to sensitive systems.

This contaminant-screening project should give us some idea if there are "hotspots" of accumulation of these chemicals in the twelve parks under study. The chemists at EPA-Las Vegas should be providing us with data on these samples some time in 1999. This was truly an interagency cooperative effort with contributions by field and WASO office personnel from the NPS, Fish and Wildlife Service, USGS-Biological Resources Division, and EPA. ☆

NOTES FROM ALL OVER

- *Virgin Islands* - Hurricane Georges took a swipe at the new air quality monitoring station in Virgin Islands National Park, but only minor damage was sustained. Park staff removed the UV-B instrument from the shelter roof before the hurricane hit, and everything else was still standing after the winds and rain let up.
- *Three Rivers, California* - Sequoia National Park has a new wind generator to help supply electricity to the solar-powered monitoring station at Lookout Point. This experiment in alternate power production replaced a propane-powered generator that polluted the area and was noisy.
- *Denver, CO* - The new agreement with the EPA CASTNet program was finalized this summer and five new dry deposition monitoring sites have been added to the network as of early Oct. Filter-pack measurements for sulfate and nitrate have begun at Virgin Islands, Everglades, Acadia, Olympic, Denali, Great Smoky Mountains, and Theodore Roosevelt National Parks.
- *Twentynine Palms, CA* - In a surprise move, EPA delisted the parts of San Bernadino and Riverside counties that contain Joshua Tree National Park from ever having to meet the 1-hour ozone standard of 125 ppb. Joshua Tree has continued to have multiple episodes each year when the ozone concentrations exceeded both the 125 ppb old standard and the 8-hour average of 85 ppb specified in the new ozone standard. This delisting was part of a rather controversial nationwide move to revoke the old 1-hour ozone standard and remove the "nonattainment" designation from 2,900 areas.

We're getting Bigger and Better...

Dale Breitenfeld

The Air Resources Division is growing. We recently had the pleasure of adding three new employees to our staff.

Debbie Miller is our newest Physical Scientist. She is responsible for conducting data analysis as a member of the Research and Monitoring Branch. Debbie's most recent job before joining us was that of a US Forest Service Intern. She has also served with the US Air Force and is in the USAF Reserves. Debbie hails originally from Arlington, VA. She received her BS in Aerospace Engineering from the University of Virginia and an MS in Forest Sciences from Colorado State University. Debbie is duty stationed in Lakewood, CO. You can reach her at (303) 987-6947, fax (303) 969-2822, e-mail debbie_c_miller@nps.gov.

Bruce Polkowsky, an Environmental Protection Specialist, will be working in the Policy, Planning, and Permit Review Branch. He will focus on working with EPA on the soon to be promulgated "regional haze rules" which will protect visual air quality in the parks from long-distance transport of pollution. Bruce grew up in suburban New York City, but has spent the past 26 years in North Carolina. He has worked 21 of those

years for the EPA on air pollution issues ranging from air toxics to new source review. In his spare time (when he can find any) he likes to autocross (and fix) his 1976 Alfa Romeo. Bruce received both his BSE and MS from Duke University. He is duty stationed in Lakewood and can be reached at (303) 987-6694, fax (303) 969-2822, e-mail bruce_polkowsky@nps.gov.

Holly Sharpless is our new ARD Washington Liaison. After completing her masters degree in International Environmental Policy from the Monterey Institute of International Studies in Monterey CA, she began working with the BLM in Washington DC as an Air Policy Specialist in June 1997. Most recently, she completed a detail with the Assistant Secretary for Water and Science where she worked on the Clean Water Action Plan initiative. She is originally from Hazleton, PA, (go coal region!) and received her undergraduate degree from Gettysburg College in Gettysburg, PA, (a BA in Political Science and German). Holly loves the outdoors and enjoys anything that gets her outside and close to the resources that she loves...running, biking, hiking, a little bit of everything. Holly's duty station is Washington, D.C. You can contact her at (202) 219-3384, fax (202) 501-6806, email holly_sharpless@nps.gov. ☆

Test your skills by matching up these two lists.

- | | |
|--------------------------|---|
| 1. Brewer Instrument | A. Federal Land Managers' Air Quality Related Values Workgroup |
| 2. 8-Hour Ozone Standard | B. Home page on the Internet for ARD |
| 3. FLAG | C. UV-B radiation measurements |
| 4. AirWeb | D. Intensive study of haze particles at Grand Canyon NP |
| 5. GRAVS | E. 3-Year 85 ppb average of 4 th highest annual concentrations |

Accolades and New Beginnings

Kathy Tonnessen

The Air Resources Division (ARD) and the USGS-Water Resources Division, Colorado District, formed a partnership in 1992, which has grown and prospered under the leadership of John Turk (USGS). The NPS-ARD was in need of good field researchers to help us assess the status of deposition and surface water effects of nitrogen and sulfur emissions in the high-elevation ecosystems of the Rocky Mountains. What started as a cooperative program to measure snowpack chemistry seasonally throughout the Rocky Mountain region is now a significant program of research, monitoring, and technical assistance by the USGS-WRD to support ARD and park programs.

But there will soon be changes in this association. John Turk, after 25 years with the USGS, retired on October 1, 1998. We salute him for his exceptional efforts in support of Federal Land Managers in the Rocky Mountain region. He leaves a program that will continue to grow, with Don Campbell now leading the group, which includes field scientists George Ingersoll, Dave Clow, and Alisa Mast. Don recently presented the accomplishments of the "acid precipitation group" of the USGS-WRD to a review panel of experts from the National Academy of Sciences. This review panel is charged with the task of determining the relevance of the USGS programs into the next century. Don's presentation left no doubt that the USGS work on deposition chemistry and air-quality related values in alpine and subalpine ecosystems is distinctly relevant to the FLM activities in Class I areas in the west.

In FY 99 the Air Resources Division will be working with the USGS-WRD on a myriad of field projects and technical assistance issues. We will be calling on the USGS experts to help with the development and testing of the aquatic effects decision-support system included in AQUIMS. NPS and USGS will cooperate for the seventh year running on the Dividewide Synoptic Snow Survey, including collection of snowpack samples for chemical analysis at Glacier, Yellowstone, Grand Teton, and Rocky Mountain National Parks. This winter ARD will fund the USGS to set up a wet deposition gradient study on both sides of Rocky Mountain National Park to investigate the sources of nitrogen pollution to the park. We are also hoping to start the design phase of a project to allow for regular monitoring of lakes and streams in high-elevation areas of the Rockies. ☆

Eastern Parks will Benefit from Regional NO_x Reductions

John Notar

On September 24 the EPA announced the final rule requiring 22 eastern States and the District of Columbia to revise their State Implementation Plans (SIP) to achieve substantial reductions in summertime nitrogen oxide (NO_x) emission for the purpose of reducing ozone transport across State boundaries. The final rule calls for a 1.1 million ton per year reduction in NO_x emissions in the region. This is an average reduction of 28% from all source categories, with a 64% reduction for the electric utilities.

Although the rule focuses on compliance with the new ozone national ambient air quality standard, the targeted NO_x emission reductions should also have a positive effect on ozone, nitrogen deposition, and visibility levels at eastern NPS units. EPA performed modeling to quantify this effect for ozone and nitrogen deposition. EPA modeled the year 2007 assuming growth in emissions and no additional controls from what is currently required. This was called the base case. They then modeled a few scenarios assuming emission reductions at the largest sources (power plants) and allowing emissions trading within the States and regionally. The different scenarios modeled were 0.12 lb/MMBtu NO_x, this is called the trade-12 scenario; 0.15 lb/MMBtu—the trade-15 scenario (which formed the basis for the final rule); and a 0.20 lb/MMBtu—trade-20 scenario.

The modeling of the most and least stringent scenarios (trade-12 and trade-20) shows the greatest reduction in ozone concentrations of between 5-10 parts per billion (ppb) at SHEN, GRSM and MACA, with a smaller reduction at ACAD. The trade-15 scenario, shows a 5-10 ppb reduction at GRSM and MACA and less than a 5 ppb reduction at ACAD, SHEN, EVER, and ISRO.

To evaluate the effects to nitrogen deposition, EPA used output from the Reactive Plume Model (RPM) plus the Regional Acid Deposition Model (RADM). They modeled the same scenarios listed above for ozone. All 3 trade scenarios indicate greater than a 1.0 kilogram/hectare/year (kg/ha/yr) reduction in total annual nitrogen deposition (wet + dry) at SHEN, GRSM, and MACA. All 3 trade scenarios indicate less than a 0.5 kg/ha/yr reduction at ACAD, EVER, VOYA, and ISRO. ☆

It's a WRAP

John Bunyak

As follow-up to the Grand Canyon Visibility Transport Commission (GCVTC), which presented its recommendations to EPA in June of 1996, the Western Regional Air Partnership (WRAP) has been formed. The WRAP is a multi-stakeholder initiative formed to promote and monitor the implementation of the GCVTC's recommendations, and to consider other common regional air quality issues. WRAP stakeholders include several western States, Indian Tribes, federal agencies, industry, environmental groups, academia, and the general public. The WRAP has established oversight committees and will use "forums" on various topics to conduct its work. Forums under the Initiatives Oversight Committee (IOC) include: Pollution Prevention; In and Near Class I Areas; Market Trading; and Econometrics. Forums under the Technical Oversight Committee (TOC) include: Research and Development; Emissions; Monitoring and Reporting; Tribal Data Development; and Air Quality Modeling. Joint IOC and TOC forums include: Fire Emissions and Mobile Sources. All WRAP forums met in Albuquerque September 17-18 to learn about the background, purpose, philosophy, and charge of the WRAP, and the role of the forums. The meeting also provided an opportunity for forums to begin/continue their work.

The In and Near Class I Areas and Fire Emissions Forums are of particular interest as they specifically relate to park operations. Emissions from Class I parks (i.e., transportation sources, stationary sources, fire) contribute to visibility impairment. In order to be most effective in reducing external emissions, we should lead by example and minimize in-park emissions. One action item included in the In and Near forum's short-term workplan is to conduct a survey of park activities to quantify emissions and gather information regarding pollution control and minimization activities. Although WRAP is primarily concerned with Class I areas on the Colorado Plateau, the forum will attempt to gather information from all NPS units on the Plateau. Carl Bowman (Grand Canyon) and John Bunyak will gather this information, including: numbers and types of emissions sources (e.g., numbers of park vehicles, campgrounds, fireplaces, stoves, park visitors, recreational vehicles---boating is the number one source of VOC emissions in GRCA; type/amount of fuels or maintenance materials utilized---cutback asphalt, paints, solvents; etc.) and park activities to reduce/minimize in-park emissions (e.g., converting vehicles to cleaner burning fuels---propane, or converting to electric power; converting wood stoves/fireplaces to less polluting catalytic converter equipped designs, or to propane/natural gas fuel; use of mass transit systems; use of solar power; minimizing bus idling; etc.). ☆

A Trip on the Wild Side

Erik Hauge

I traveled to South Africa September 12-23 for two primary purposes: (1) to participate in and present a paper entitled "Regional Air Quality Partnerships: International Implications and Applications" at the 11th World Clean Air Congress in Durban; and (2) to make a presentation on the National Park Service air quality program and regional air partnerships at a meeting of business, government, and environmental representatives in East London (Province of the Eastern Cape). I also visited Kruger National Park as well as Doubledrift Game Reserve.

Between 500-600 people from more than 50 nations attended the Clean Air Congress. Each day began with a plenary session, and then we broke down into as many as seven concurrent sessions later in the morning. There were approximately 280 papers presented in those sessions, as well as 26 exhibits and posters. I took the full-day technical tour to Richards Bay, 150 miles north of Durban, to visit the new Alusaf aluminum smelter (its "state of the art" control technology eliminates 98-99% of the plant's emissions), as well as monitoring sites in the area operated by the Richards Bay Clean Air Association.

There were very few, if any, other land managing agency representatives in attendance at the Congress besides me. I fielded many questions after my presentation regarding the NPS air quality program and regional clean air partnerships. There was genuine, widespread interest in those programs and their applications in other parts of the world, and in particular, in South Africa.

Following the Congress, I toured Kruger National Park, where I enjoyed animal viewing, but was surprised to see only two uniformed Parks Board personnel. I was also surprised that there was a community named "Hazyview" just a short distance outside the park. And it was! There was agricultural burning being conducted in sugar cane fields nearby, as well as emissions from coal-fired power plants and pulp mills in the area.

After the Kruger tour, I flew down to East London to participate in a meeting of business, government, and environmental organization representatives to discuss ecotourism, sustainable development, and environmental quality. I gave the "keynote address" at the meeting, discussing the Park Service air quality program and the regional clean air partnerships I've helped establish in North America. One of the major results of the meeting was that the 40+ participants voted unanimously to begin to organize a regional clean air partnership to deal with the existing problem of air pollution impacts on the viewsheds and possibly

other resources of the nearby provincial and national parks and reserves. They are concerned about the possible economic impacts of this problem as well.

The trip provided an opportunity to share information regarding U.S. and North American air quality programs with others from around the world and also to learn about various aspects of air pollution control programs being conducted in other nations. ☆

Assessment Tool Available

Tonnie Maniero

The final report titled *Assessment of Air Quality and Air Pollutant Impacts in National Parks of the Rocky Mountains and Northern Great Plains* is now available. The report summarizes emissions, ambient monitoring, and air quality-related ecological and visibility effects information for northern Colorado, Wyoming, Montana, North Dakota, and South Dakota, with chapters dedicated to each of the NPS Class I areas in the region. In addition, the report provides recommendations for future research and monitoring efforts that would better clarify current conditions and resource effects thresholds. For a copy of the report contact Tonnie Maniero at (303) 969-2806. ☆

Summer 1998 High Ozone Hit List

John Ray

Several Parks Exceed the Ozone Standard - The table below gives a preliminary summary of the number of days that ozone concentrations over an 8-hour period exceeded the 85 ppb level set by the new National Ambient Air Quality Standard (NAAQS). September continued to have high ozone concentrations in the Eastern Parks. The number of 8-hour exceedances and their maximum values declined in the Pacific coast parks. Seven parks, where the NPS monitors ozone, now have the 4th highest 8-hour averages that exceed 85 ppb; these numbers will be averaged over 3 years to determine attainment status. With the exception of Shenandoah, the 4th highest 8-hour averages are within a few ppb of the average over the last 3 years. The high ozone episodes in May were somewhat unusual. They were associated with the very poor visibility periods caused by the wildfire smoke from southern Mexico and South America. This table is updated monthly on the ARD AirWeb site at <http://www.nature.nps.gov/ard/gas/o3hitlst.htm>

NPS monitoring stations exceeding the NAAQS of 85 ppb O3 over 8-hours in 1998

National Park	May	June	July	August	Sept.	Season	Max 8-hr O3	4th highest max.
	Count	Count	Count	Count	Count	Total 8-hr exceedances	(ppb)	8-hr O3 (ppb)
Great Smoky Mts								
Cades Cove	2			1	1	4	91	86
Clingmans Dome	6	1	1	15	13	36	113	104
Cove Mountain	8	1		13	7	29	111	108
Look Rock	7	1	1	14	12	35	123	110
Mammoth Cave	3			4	5	12	103	98
Shenandoah	2	1	2	7	10	22	109	96
Joshua Tree		1	8	5	3	17	123	105
Sequoia-Kings Canyon								
Lower Keweah		1	17	7	2	27	103	89
Lookout Point		2	6	19	3	30	108	85
Big Bend			1			1	94	--
Craters of the Moon				1		1	91	--
Death Valley			1			1	86	--
Pinnacles			1	3	1	5	97	97
Rocky Mountain		1	1	1		3	88	--
Yosemite			3	4	2	9	100	94

Note: This table based on screened raw data. Final values used for May, June, July.

Updated: 10/98 JDR

New Ozone Monitors Get a Workout

John Ray

Another ozone monitoring season has been successfully completed using a low-cost sampling device at 44 sites in 20 National Parks. The Ozone Passive Sampling Program fills in the monitoring gaps at NPS Class I areas. In addition, passive samplers allow monitoring in remote locations, at multiple locations within a park, and at sensitive or research study vegetation plots. What they don't do is determine peak ozone concentrations or the kind of 1-hour or 8-hour measurements that states use to determine compliance with the national ozone standard.

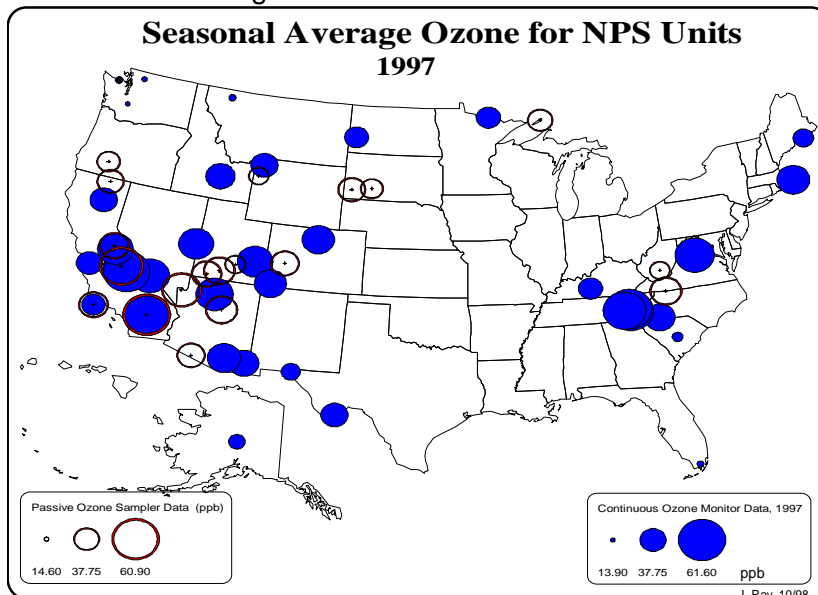
Even though the passive samplers can't be used for regulatory decisions, they provide useful information. Long-term ozone exposures and trends in the pollutant levels are important at the parks where we don't have continuous monitors. We get baseline ozone concentrations, trends in ozone (if concentrations are changing), a seasonal sum of ozone concentrations, and an estimate of the maximum seasonal ozone concentration. This provides an early warning if a problem is developing and indicates when the more expensive continuous ozone monitoring station is needed.

Some findings from the passive ozone monitoring program illustrate the range of uses for this device. The spatial representativeness of a monitoring site can be determined by using passive samplers at multiple sites. Thus, it was found that higher ozone concentrations occur away from the monitors at Olympic and Mt. Rainier, that the western side of Rocky Mountain NP is much cleaner than the eastern side, that high ozone concentrations can be found throughout most of Joshua Tree, and that the southwestern corner of Sequoia-Kings Canyon

has the highest ozone concentrations in the park. At Great Smoky Mountains, Mt. Rainier, Olympic, and Joshua Tree, we found that ozone concentrations increase with elevation. This could mean that plants at higher elevations would be effected by ozone injury sooner than at other locations. At Great Smoky Mountains, Sequoia-Kings Canyon, and Mt. Rainier, passive samplers have been co-located at vegetation plots being studied for ozone injury. The ozone concentrations were found to differ along ridges,

up mountains, and within the tree canopy. These devices can be useful in understanding the levels of ozone pollution in the parks.

More information on the monitoring program, the use of the passive samplers, data, and some of the results can be found on the Air Resources



Division web pages at <http://www.nature.nps.gov/ard/gas/passives.htm>.
☆

Answers to Quiz

- | | |
|--------------------------|----|
| 1. Brewer Instrument | C. |
| 2. 8-Hour Ozone Standard | E. |
| 3. FLAG | A. |
| 4. AirWeb | B. |
| 5. GRAVS | D. |