The MONITOR

A Newsletter for National Park Service Air Quality Site Operators

Fall 1998

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What's inside:

NETWORK NEWS

New Brewer contract

The EPA has been overseeing the operation and data collection of the Brewer ultraviolet monitoring program network since the units were originally installed. The contract to repair the instruments, collect and process the data, and to provide technical support to the Brewer network expired in July, and since then technical support for the instrument has been a little awkward. Just as this newsletter is going to print, the EPA announced that the University of Georgia was awarded a 5-year contract to continue supporting the network with instrument maintenance and data collection and validation.

Additional Brewer monitoring sites have been prepared and instruments have been recently installed at Sequoia-Kings Canyon and Theodore Roosevelt National Parks. These installations bring the total Brewer count at NPS sites to 13. Planning is underway to install one additional station at Hawaii Volcanoes National Park.

For information regarding the monitoring network, you may want to visit the EPA Ultraviolet Monitoring Program website. The site is under development but it already contains interesting information. The site's Internet address is:

http://208.160.205.80:7400/

Information on the DISPro program and use of the Brewer instrument may also be found on the NPS web site, at:

http://www.nature.nps.gov/ard/gas/dispro1.htm

New 8-hour primary ozone standard

The EPA has replaced the 1-hour primary ozone standard with an 8-hour standard. The 1-hour standard of 0.12 ppm was last revised in 1979. Numerous studies have suggested that adverse affects on plants and animals occur when exposure levels lower than 0.12 ppm persist for a number of hours. For humans, long-term exposure to ozone can cause inflammation or premature aging of the lungs, or impairment of lung defense mechanisms. Children and adults working or playing outdoors, and those susceptible to respiratory illnesses are at most risk. Some park units issue ozone alerts and post warning signs for the public during periods of high ozone.

The new ozone standard is exceeded when a running 8-hour average exceeds 0.08 ppm. An area will be within the standard when the 3-year average of the annual 4th highest 8-hour concentration is $\leq$0.08 ppm. ARS calculates this running 8-hour average for each park unit; results are displayed in the 1996 Annual Data Reports (page 2-13b). As presented on page 2-14 of the reports, nine park units measured 8-hour averages greater than 0.08 ppm in 1996.

Check your rain gauge

Precipitation is an important measurement at the air quality stations and ARS has noticed measurement inconsistencies in some of the older rain gauges. Please take the time to check the rain gauge during your weekly station visits.

First, display the current rainfall data using the "M" command (SumX) or review 5-minute data using the "G" command (Odessa). Then remove the top funnel from the gauge and manually tip the bucket mechanism 10 times, pausing a few seconds between each tip. This test should result in a 1.0 mm reading at Canyonlands, Denali, Pinnacles, Theodore Roosevelt, Voyageurs, and Yellowstone stations. The same test at other stations with SumX dataloggers should result in a 2.5 mm reading, and stations with Odessa dataloggers should indicate 0.10 inches. Repeat the procedure if the result is not correct and call ARS for assistance if needed. Carefully rout the heater wires when replacing the gauge funnel and make sure to note tipping activity, results, and any maintenance in the logbook.

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SITE OPERATOR FOCUS
Dawn Adams enjoyed the splendor that Mount Rainier National Park provides

Dawn Adams worked at Mount Rainier National Park for four years. She recently gave up her air quality monitoring duties to accept a position as Resource Management Specialist at Point Reyes National Seashore. Her time at Mount Rainier, however, provided her many opportunities, including two job assignments. Officially an Office Automation Assistant, Dawn had the additional responsibility of maintaining and servicing the ambient air quality instrumentation located at the Tahoma Woods site.

Dawn Adams, Ambient Air Quality Station Operator and Office Automation Assistant at Mount Rainier National Park.

Dawn was responsible for a variety of duties in the Superintendent's Office, including responding to visitor inquiries, being involved with strategic park planning, coordinating a wellness committee for health and fitness of park rangers, and other administrative functions. She earned a B.S. degree in biology from the University of Illinois at Champaign, and worked a variety of seasonal positions before coming to Mount Rainier. This background helped her get the air quality assignment. "I became involved with air quality monitoring two years ago due to my interest in natural resources, and my office was conveniently right next to the site," said Dawn.

Servicing the instrumentation usually took only a few hours every Tuesday, unless something needed to be replaced or a multipoint calibration needed to be done. "I loved the variety," said Dawn, "servicing the instruments gave me time by myself without telephones ringing or computers beeping." Instruments located at Mount Rainier include a nephelometer, a four-module IMPROVE aerosol sampler, an ozone analyzer, a CASTNet dry deposition system, and meteorological sensors.

Dawn was also the Administrative Assistant to the Centennial Planning Committee at Mount Rainier; the park will celebrate its 100th year anniversary next year.

Dawn also spent a lot of free time in the park. She couldn't help it -- she lived within its boundaries. She often hiked its trails or skied its snowfields. Her favorite ski spot was at Paradise; its elevation of 5,400 feet creates breathtaking scenery and splendid enjoyment for those who travel there.

DATA COLLECTION SUMMARY

Data collection statistics for January through June 1998 are:

- Sites with final validation of ambient air quality parameter collection greater than 90% include:

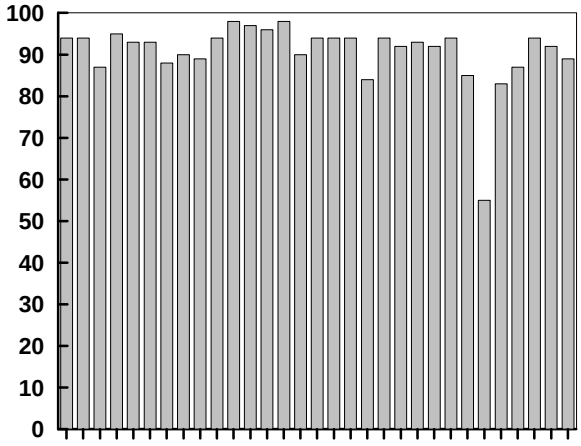
Big Bend	Great Smoky Mtns. (Clingman's Dome)	Mount Rainier
Canyonlands	Great Smoky Mtns. (Cove Mountain)	North Cascades
Craters of the Moon	Great Smoky Mtns. (Look Rock)	Olympic
Denali	Hawaii Volcanoes	Pinnacles
Death Valley	Joshua Tree	Rocky Mountain
Glacier	Lassen Volcanic	Voyageurs
Grand Canyon	Mammoth Cave	Yellowstone
Great Smoky Mtns. (Cades Cove)		

- Sites with final validation of ambient air quality parameter collection greater than 80% include:

Chiricahua	Mesa Verde	Virgin Islands
Everglades	Sequoia-Kings (Lower Kaweah)	Yosemite
Great Basin	Shenandoah	

- The entire network achieved 90.7% final validation of ambient air quality parameters.

Site by site comparison of ozone collection January - June 1998

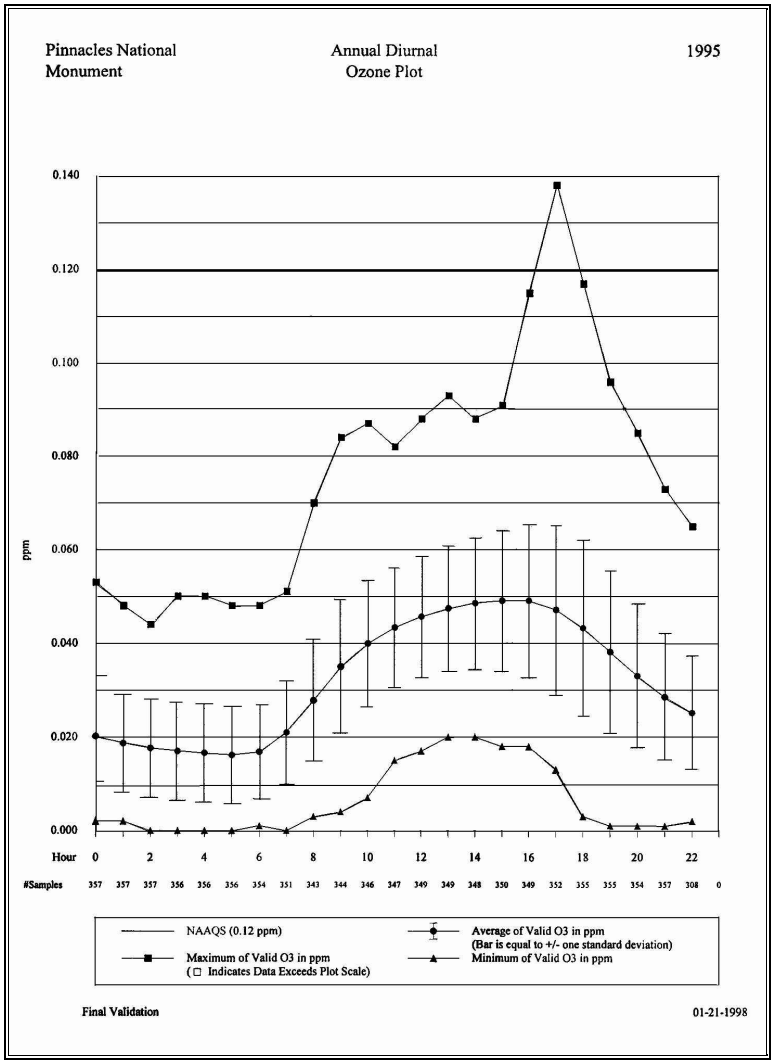


Bars represent individual ozone monitoring sites (in no particular order)

A LOOK AT THE DATA
Interpreting diurnal ozone plots

Diurnal ozone plots are prepared for both monthly and annual ambient air quality reports. Diurnal, or daily, refers to actions that recur every 24 hours. Thus, a diurnal ozone plot shows ozone concentration data that occur over and over again in a daily cycle, using individual hours as a basis of comparison.

Interpretation of a diurnal ozone plot begins with understanding its layout. Using the example figure below, the X axis (horizontal along the bottom of the plot) displays the time of day from hours 0 to 23 (midnight to 11 p.m.). The Y axis (vertical along the left side of the plot) displays ozone levels in parts per million (parts per billion if data were collected after January 1998). Data points correspond to ozone levels for each hour, using data collected for the time period stated in the plot header. In this example, the plot provides diurnal ozone concentration values for Pinnacles National Monument, using data collected during the year 1995.



Annual Diurnal Ozone Plot for Pinnacles National Monument, for the Year 1995.

Ozone levels for each hour are plotted; the maximum, average, and minimum valid hourly ozone levels form three lines of data. The top data line, an interconnected line of black squares, shows the highest measured hourly average ozone concentration for the plot period for each hour of the day. For example, the plot below indicates that the highest ozone level measured at Pinnacles National Monument at 0800 hours in 1995 was 0.070 ppm.

Similarly, the bottom line, an interconnected line of black triangles, shows the lowest ozone concentration measured for each hour, and the middle line, an interconnected line of black circles, shows the average concentration for each hour. Vertical bars surrounding each black circle indicate the ozone level for ± one standard deviation of the average value.

Below the X axis is the number of valid hourly samples used to plot the data, for each hour. Below this is a key to the symbols used in the plot.

Finally, the plot identifies the National Ambient Air Quality Standards' highest acceptable ozone level; a heavier horizontal line delineates this value. For 1995 data the highest acceptable value is 0.120 parts of ozone per million.

In the example at the left, the ozone peak at 1700 hours on the maximum level data line indicates that an ozone level of near 0.140 was measured during 1995. The lowest ozone concentrations for the year occurred between midnight and 7a.m., and average daily concentrations ranged from about 0.017 to 0.049 parts per million.

Notice on the example plot that there are no data points at 11p.m.; the ozone analyzer's automatic zero-span check occurs at Pinnacles NM at 11p.m. every night, so no valid ambient measurements are taken. Also note that the minimum ozone level drops to 0.000 overnight. This, and the large shift from day to night levels, is an indication of relatively fresh air pollution in the area. Peaks in the afternoon and an absence of morning and afternoon "rush hour" peaks indicate ozone pollution is transported other areas.

Telephone the Information Management Center at ARS if you have any questions in interpreting data plots.

NEWS FROM THE FIELD

New datalogger being tested

A new datalogger, from Environmental Systems Corporation (ESC), has been chosen to replace aging dataloggers in the network. The first of the replacement loggers is currently being field tested at Look Rock in Great Smoky Mountains National Park. The new datalogger will eventually replace all SumX and Odessa dataloggers. Replacement parts for these older models can no longer be obtained, and the loggers have input channel, control, and averaging option limitations.

The new ESC dataloggers should be more reliable and will be capable of calculating rolling 8-hour ozone averages and other useful calculations. These dataloggers will be operationally deployed to the field in stages, beginning next spring.

Standard operating procedure revisions

Before the new ESC dataloggers can be deployed, standard operating procedures and instructional videotapes will have to be revised. This work is in progress with help from site operator Andrea Blakesley of Denali National Park.

A significant effort is being made to streamline site operator procedures and to reduce redundant paperwork, while retaining the documentation required for high level quality assurance.

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The Monitor shifts to biannual production

About a year ago the NPS ARD felt that an ambient air quality station operator's newsletter would be an effective way to keep operators informed on current events in the network, and to provide them with information on maintaining and servicing station equipment. *The Monitor* was designed as a quarterly newsletter to fill these needs.

Based on input from the field, the NPS ARD has decided to shift the newsletter to a biannual production schedule. *The Monitor* will now be produced and delivered to station operators now once in the fall and once in the spring, to coincide with the general pre- and post-ozone season. The newsletter, along with site information and much more, is also available on the NPS web site, at:

http://www.nature.nps.gov/ard/gas/

Part of the production schedule change is due to the resurfacing of the NPS ARD newsletter. Called *On The Air*, this newsletter provides broad coverage of current air quality issues and has a quarterly delivery schedule. It is available on the NPS web site, at:

http://www.nature.nps.gov/ard/ota/

or contact:

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The MONITOR

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