



United States Department of the Interior

NATIONAL PARK SERVICE
AIR QUALITY DIVISION
P. O. BOX 25287
DENVER, CO 80225

IN REPLY REFER TO:

September 16, 1985

N3615 (475)

Memorandum

To: Chief, Research Branch, Air Quality Division, Denver

From: Ecologist, Research Branch, Air Quality Division, Denver

Subject: Trip Report - Craters of the Moon National Monument - 8/13/85

On August 13, 1985, I traveled to Craters of the Moon National Monument (CRMO) at the invitation of the park to assist the resource management staff in identifying AQRVs and to help design an air quality research plan for the park. Expenses for the trip were completely paid by the CRMO Natural History Association, whose support is hereby acknowledged. While at the park I spent all of my time with Resource Manager Neil King, and was able to briefly meet with Superintendent Bob Scott and Technician Betsy Cochran. All three were most helpful in making the trip a success.

CRMO is a class I air quality park unit, but since it is a national monument, only the wilderness portion is class I. The wilderness portion consists of most of the 21,000 hectares of lava fields, and does not contain the portion in the Pioneer Mountains where most of the air pollution sensitive vegetation is located. Thus, most of the biological AQRVs are not actually in the class I area, which is unfortunate.

After reviewing the flora and fauna of the park and visiting relevant portions of the park, I recommended that the species listed below be identified as biological AQRVs for the park. The species listed are either known to be sensitive to the listed pollutants, or are important ecologically in the park. The lichen and moss floras are not known for this park.

Ozone

Pinus flexilis
Populus tremula tremuloides
Populus balsamifera trichocarpa
Prunus virginiana

Sulfur Dioxide

Populus tremula tremuloides
Populus balsamifera trichocarpa
Agropyron spicatum
Oryzopsis hymenoides
Acer glabrum
Lichens
Mosses

Hydrogen Fluoride

Pinus flexilis

Heavy Metals

Lichens
Mosses
Deer

Just
McClark
Manning

Some parameters of air quality have been and are being monitored in the park. The park has had an NADP acid precipitation station since 1980, with the rainfall averaging about pH 5.0. The State of Idaho has had a high-volume particulate sampler in the park for 10 years and NPS has had a dichotomous sampler for 3 summers. The park also has an official NOAA weather station. A teleradiometer was added this summer. No gaseous pollutant monitoring has been done at the park.

The park had expected that their air quality was pristine. However, several lines of anecdotal evidence may suggest otherwise. First, park staff have occasionally observed visual signs of pollution entering the park. A yellow plume is sometimes seen coming from the Idaho National Engineering Laboratory where there is a chemical processing plant and a coal-fired power plant, both only 25 miles away. The chemical plant has been in operation for some time and the power plant began operation in 1984. Second, visual observations have also been made of a cloud of brown smog entering the valley from the east and southeast when winds are from that direction. Salt Lake City and Pocatello are both in that direction. Thus, visual observations suggest that sulfur dioxide, sulfates and photochemical oxidants (including ozone) could occasionally enter the park.

The other line of evidence stems from observations I made during my visit of possible air pollution injury to some vegetation. First, I observed red-banded tipburn on the limber pines in the lava fields, a type of injury that can be caused by hydrogen fluoride (HF). When I told King that common sources of HF are phosphate fertilizer plants, he told me the largest such plant in the country is located at Pocatello, which is about 60 air miles from the park. Being an old plant, it may not have HF controls, so the likelihood of HF emissions may be high.

Second, I observed dark stippling on choke cherry and black bifacial necrosis on aspen in the Pioneer Mountains. Both of these effects are symptoms of ozone injury. The symptoms were only observed on a few individuals and therefore may be questionable. If photochemical oxidant pollution from urban areas to the southwest does enter the park, it would explain the appearance of these symptoms.

The park is in need of a set of studies that address the issues raised above. I was able to generate a list of 11 such projects to meet these needs. The projects are divided into groups according to monitoring, laboratory analyses, and baseline studies. The latter could be appropriately added to the Baseline Resource Inventory project being initiated next year by Gerry Wright at the University of Idaho CPSU. These are indicated by a "BRI" following the project title. The projects are listed roughly in priority order and approximate cost is given.

<u>Project Title</u>	<u>Approximate Cost</u>
1. Sulfur and Fluorine Baseline Concentrations in Pine Foliage, Lichens and Soils (BRI)	\$35,000
2. Ozone Monitoring Station	\$30,000
3. Permanent Pine Plots	\$10,000
4. Lichen and Moss Flora and Map (BRI)	\$15,000
5. Composition of Fly Ash from INEL Coal-Fired Power Plant	(May be available from INEL)
6. Trace Elements in Wildlife and Vegetation (BRI)	\$30,000
7. Aspen, Choke Cherry and Lichen Permanent Plots (BRI)	\$15,000
8. Trace Elements in Tree Rings	\$20,000

Literature I received from the park while I was there included "Vegetation Types of [CRMO]" by Day & Wright, and "Coal-Fired Steam Generation Facility" by Westinghouse Idaho Nuclear Co. Both of these and photos I took on the trip are available for inspection by anyone interested.

With the park copy of this memo I am returning the draft copy of the Baseline Resource Inventory proposed by Wright and also enclosing a copy of the paper I presented at the Mesa Verde conference last year (per Neil King's request).

/s/ Dr. James P. Bennett

James P. Bennett

cc:

CRMO: Natural History Association, Resource Manager, Superintendent
 PNRO: Regional AQC, Regional Chief Scientist
 Idaho CPSU: Wright