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DIMINISHING VIEWS: AIR QUALITY IN WESTERN NATIONAL PARKS

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AIR QUALITY PROTECTION IN THE WEST

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**Diminishing Views:
Air Quality in Western National Parks**

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I. Introduction

A. Summary

Units of the National Park System contain some of the world's most spectacular scenery and other unique and diverse resources. Visitors place a high value on knowing these resources are being protected and preserved for future generations. Clean, clear air is one of the most important features of many parks.

Air pollution can damage and destroy the very resources and values that units of the National Park System have been created to protect and preserve. The National Park Service has a responsibility to protect air quality and related values in national parks, but has little direct authority to compel remedial or preventive actions to protect park resources from the adverse effects of air pollution. Instead, the NPS has placed a high priority on acquiring the information needed to influence other agencies' decisions.

Data collected through the National Park Service air quality research and monitoring program show that units of the National Park System are not islands isolated from the by-products of an urban and industrial society. Manmade air pollutants are transported long distances and have been detected at all NPS monitoring sites. Under certain meteorological conditions in some areas, locally-generated pollution also affects park resources.

Air pollution causes varying degrees of visibility impairment at all park monitoring stations virtually all the time. Sulfates are the single most important contributor to visibility impairment in parks, except in the Northwest where carbonaceous materials dominate.

When the atmosphere is initially clean, as it can be in many western parks, even a small increase in fine particulate matter is noticeable. Emission increases projected in the West could have a significant impact on the frequency of occurrence of good visibility days in western national parks.

Ambient air quality monitoring has found that ozone concentrations approach and even exceed national ambient air quality standards in several parks, including those located near urban areas as well as some that are relatively remote. Visible ozone injury on native vegetation has been found in parks throughout the country. Growth effects have been documented on some species.

The NPS has been able to use the information acquired through its research and monitoring program to promote better public understanding of the causes and effects of air pollution in national parks. The information has also been shared with federal, state and local agencies which have the authority to develop regulatory programs and permit new air pollution sources. Some progress has been made toward remedying existing and preventing future air pollution problems in parks, but the extent of that progress has been limited because of the cumulative and insidious nature of the problem.

Disclaimer

The opinions expressed in this paper do not necessarily reflect the views of the National Park Service or U.S. Department of the Interior, and no official endorsement should be inferred.

B. General References

1. D. O'Leary, ed., Air Quality in the National Parks: A Summary of Findings from the National Park Service Air Quality Research and Monitoring Program, Natural Resource Report 88-1, National Park Service, Air Quality Division, Denver, CO (1988).

2. Ross, "Legal Issues Associated with Protecting Park Resources: Air Quality and Related Values," External Development Affecting the National Parks: Preserving "The Best Idea We Ever Had," Natural Resources Law Center, University of Colorado, Boulder (1986).
3. Malm, "Atmospheric Haze: Its Sources and Effects on Visibility in Rural Areas of the Continental United States," Environmental Monitoring and Assessment 12:203-225 (1989)

II. National Park Service Air Quality Related Responsibilities

A. NPS Organic Act

1. 1916 law establishing the National Park Service directs the agency to "conserve the scenery and natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." 16 U.S.C. 1.
2. 1978 amendment reaffirmed that "the protection, management, and administration of these areas shall be conducted in light of the

high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these areas have been established except as may have been or shall be directly and specifically provided by Congress. 16 U.S.C. 1a-1.

B. Clean Air Act

1. 1977 amendments to the CAA supplemented NPS's responsibilities to protect park resources and values from the adverse effects of air pollution.
 - a. Prevention of significant deterioration provisions of the Act are specifically directed toward protecting and enhancing air quality in national parks, wilderness areas, etc. 42 U.S.C. 7470-7479.
 - b. Stringent requirements were established for "class I" areas, and federal land managers were given an affirmative responsibility

to protect air quality related values of those areas.

c. This responsibility is primarily carried out through NPS involvement in state and local new source permitting decisions (42 U.S.C. 7475) and federal and state regulation development proceedings.

2. Congress also established a national goal of remedying any existing and preventing any future manmade visibility impairment in mandatory class I areas. 42 U.S.C. 7491.

a. EPA was required to promulgate regulations to make reasonable progress toward the national goal. EPA has published and implemented visibility protection regulations in response to court orders. See Friends of the Earth, Inc. v. Costle, No. C80-3081 (N.D.Cal. 1980); Environmental Defense Fund v. Reilly, No. 826850 RPA (N.D.Cal. 1982).

b. Federal land managers responsibilities include: identifying areas where visibility is an important value, identifying areas with existing visibility impairment, identifying suspected sources of impairment, providing input to states developing visibility protection plans, and reviewing visibility impacts of new air pollution sources. See 40 C.F.R. 51.300-51.307 and 40 C.F.R. 52.26-52.29.

III. Efforts to Remedy and Prevent Visibility Impairment in Parks

A. Visibility Monitoring and Data Analysis

1. NPS has been monitoring visibility in some western parks for over 10 years; some kind of visibility monitoring (optical, aerosol and/or photographic) is currently being done in almost all NPS-managed "class I" areas.

- a. Scenic vistas experience varying degrees of visibility impairment over 90 percent of the time.
 - b. Visibility in West is order of magnitude better than in East, but very sensitive to even small increases additional fine particulate matter.
 - c. Sulfates (fine particulate by-product of gaseous sulfur dioxide emissions from fossil fuel-fired industries) comprise the principal component of visibility-reducing haze in all national parks, except in the Northwest where carbonaceous materials dominate (e.g., in Southwest, sulfates cause 40-60% of the visibility impairment).
2. Data analyses done to identify source-receptor relationships show that much of the visibility impairment in parks most likely results from long-range transport, particularly during summer when meteorological conditions promote atmospheric mixing.

- a. For western parks, the major distant sulfate "source" regions are Southern California, Southern Arizona and Mexico.
- b. A wide variety of sources and urban areas contribute to visibility impairment on an annual basis, but during some "episodes" a specific source or small group of sources may be the major contributor(s).

B. NPS Efforts to Influence External Decisionmakers

- 1. EPA's visibility regulations, as currently being implemented, only provide EPA (or States) with authority to remedy existing or prevent future visibility impairment if it can be reasonably attributed to a specific source or small group of sources.
 - a. NPS has identified a few areas where existing visibility impairment might be reasonably attributable to a specific source. An NPS report from an intensive study conducted in winter of 1987 helped

provide the basis for EPA's recent proposed finding that the Navajo Generating Station in Page, AZ., can be reasonably anticipated to cause or contribute to significant visibility impairment at Grand Canyon NP. See 54 Fed.Reg. 36948-36953 (1989). EPA is expected to propose degree of emission reduction (if any) that will be required at Navajo by February 1, 1990.

- b. New source review requirements are the only mechanism currently recognized for preventing future visibility impairment in class I areas. If the permitting authority can be convinced that a new major source or major modification would have an adverse impact on visibility, no permit will be issued. Modeling is only required for "plume" impacts. NPS has reviewed almost 300 permit applications for new air pollution sources proposing to locate near NPS or Fish and Wildlife Service-managed areas nationwide. An estimated 75 percent of these sources planned to emit pollutants

known to contribute to visibility degradation, but visibility screening models predicted no significant "plume" impacts except in a few cases.

2. NPS has certified to EPA that there is existing visibility impairment caused by "regional haze" in all its class I areas. The NPS has encouraged EPA to proceed with "regional haze" regulatory programs to address the cumulative impact of multiple air pollution sources--both new and existing.

a. Substantial increases in sulfur dioxide and nitrogen oxides have been projected in the West through the year 2030. See National Acid Precipitation Assessment Program, Interim Assessment, Vol II, p. 3-28 (1987). The NPS has made a first-order approximation of how future regional sulfate loadings might affect visibility in western parks and found there could be a significant impact on the frequency of occurrence of good visibility days.

- b. Most states have not established visibility-related regulatory requirements more stringent or comprehensive than EPA's. Western states primarily view visibility as an interstate issue, requiring a national, or at least regional, approach.

IV. Efforts to Remedy and Prevent Other Air Pollution Effects

A. Ozone effects native vegetation in many NPS units.

1. Ambient air quality monitoring shows ozone concentrations are high in some NPS units and even exceed national ambient air quality standards (NAAQS) in several parks, including some in relatively remote areas (e.g., Acadia NP in Maine, Sequoia NP in California). Ozone can be phytotoxic to sensitive vegetation at levels well below NAAQS.
2. Visible ozone injury has been documented on some native species of plants and trees in

almost all parks surveyed. Higher order effects have been found in some parks.

a. The most common symptom of ozone on vegetation is foliar injury--dead cells on leaves and needles. Foliar ozone injury has been found in parks throughout the East, as well as in California (Sequoia and Yosemite NP, Santa Monica National Recreation Area) and Arizona.

b. In Sequoia NP, where ozone levels exceed NAAQS, there was a significant increase in the degree of foliar injury and percentage of (ponderosa and jeffrey) pine trees injured between 1980-82 and 1984-85; trees with foliar injury had poorer needle retention; and growth decreases have been documented.

3. Long term research is needed to "tease" out ecological consequences of ozone air pollution effects on vegetation, as distinguished from

and as it interrelates with other stresses (climate, pests, etc.).

B. Elevated levels of sulfur and trace metals have been found in vegetation in some parks.

1. Although sulfur dioxide levels in parks are less than half NAAQS, some species of lichens, in particular, accumulate sulfur. Sulfur concentrations in lichens in several parks are well above estimated "background" levels. Lichen "deserts" have been found in some parks.

2. Elevated levels of other trace metals (lead, arsenic, copper, zinc) have been found in vegetation in several parks.

C. Legal mechanisms for addressing air pollution effects on park vegetation.

1. There is no legal requirement to remedy existing air pollution effects on vegetation, unless NAAQS or a PSD increment (none exist

for ozone) is exceeded. In states where park ozone levels are approaching NAAQS, NPS has requested that preventive actions be taken. NPS has also encouraged EPA to adopt a lower, secondary (welfare-based) ozone NAAQS to protect native vegetation.

2. New source review is the only mechanism for limiting additional pollution in both attainment and nonattainment areas.

a. In most states, new source review is only required of major new sources or modifications. In nonattainment areas, offsets are only required for major sources.

b. Models still need to be refined and accepted for estimating the impact of a single source on areawide ozone concentrations.

c. When reviewing permit applications for sources proposing to emit ozone precursors,

NPS has been reluctant to request denial of permits because of the difficulties associated with proving that "the emissions from the facility will have an adverse impact on air quality related values." 42 U.S.C. 7475(d)(2)(C)(ii). Instead, NPS generally requests that the best possible pollution control technology be used and that any remaining emissions be offset - - regardless of the size of the facility or the attainment status of the area.

V. NPS Outreach Efforts: Building and Educating Constituencies

A. Air quality issues and objectives are being integrated into internal NPS planning processes and training programs.

1. Over 250 NPS field personnel have received air resource management training.
2. Guidelines, manuals, and policies have been published.

3. Most park planning documents, particularly for class I areas, have been revised to incorporate air quality objectives.

B. Air quality issues are being interpreted--using all kinds of media--in many parks nationwide.

1. In 1983, only 6 parks were using air quality data in interpretive media.

2. Today, over 150 parks have received air quality-related slides for use in interpretive programs, and numerous parks have developed air quality-related slide shows or slide-tape programs; Site Bulletins or park newspaper articles have been published in several parks to alert visitors to air quality concerns; and over 30 wayside or visitor center exhibits have been or are being constructed to explain causes and effects of air pollution.

3. NPS believes that an informed public is our best hope for meeting the challenges posed by change.