United States General Accounting Office

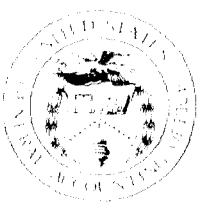
GAO

Report to the Chairman, Environment, Energy, and Natural Resources Subcommittee, Committee on Government Operations, House of Representatives

February 1990

AIR POLLUTION

Protecting Parks and Wilderness From Nearby Pollution Sources



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United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-226223

February 7, 1990

The Honorable Mike Synar
Chairman, Environment, Energy,
and Natural Resources Subcommittee
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

Following your request, we reviewed federal and state efforts to maintain clean air in national parks and wilderness areas. As you know, the Clean Air Act Amendments of 1977 authorized the Prevention of Significant Deterioration (PSD) program. Among other stipulations, the PSD program required strict emission controls on major new stationary sources of air pollution that are located near the 158 national parks and wilderness areas designated by the amendments as Class I areas (national parks over 6,000 acres, national wilderness areas and memorial parks over 5,000 acres, and international parks.) Under the PSD program, states issuing construction permits are required to forward permit applications for facilities proposed within 100 kilometers, or about 60 miles, of Class I areas to the Environmental Protection Agency (EPA). EPA, in turn, must notify the responsible federal land management agency. These agencies—the National Park Service, the U.S. Fish and Wildlife Service, and the U.S. Forest Service—are then required to review the applications. If they find, and can demonstrate to the state, that the proposed facilities would adversely affect Class I areas, then the permits cannot be issued.

In discussions with your office, we agreed to examine (1) the extent to which stationary sources located near Class I areas are regulated under the PSD provisions of the Clean Air Act, (2) how federal land managers are carrying out their responsibilities to protect Class I areas from stationary source emissions, and (3) why states have added no other federal lands to those that originally qualified under the act for Class I designation. We selected 5 of the 158 Class I areas for review—Rocky Mountain National Park and Flat Tops Wilderness in Colorado, Shenandoah National Park and James River Face Wilderness in Virginia, and Cape Romain Wilderness in South Carolina. (See app. I for a more complete discussion of our objectives, scope, and methodology.)

Results in Brief

The permit requirements of the PSD program cover few stationary sources of air pollution near Class I areas—only 1 percent of the sources near the five Class I areas in our review. Sources that are exempt from those requirements—either because they are considered minor sources or because they were in existence before the PSD program went into effect—account for up to 90 percent of the pollutants emitted near these five areas.

Further, although administrative improvements are either underway or planned, federal land managers have not fully met their responsibility to review PSD permit applications because (1) the EPA region originally receiving the permit applications did not forward them all, (2) the federal land managers lacked sufficient staff and time to review the permit applications received, and (3) the managers lacked sufficient data to determine whether the proposed facility would adversely affect the air quality of the nearby Class I area.

Finally, although the Interior Department and the Forest Service recommended additional federal lands in 14 states for Class I designation, the states have not designated any new areas, citing a variety of reasons, including the belief that recommended areas were already amply protected and concern that Class I designation would hamper state economic development.

Few Sources Near Class I Areas Are Subject to PSD Permit Requirements

PSD permit requirements cover very few sources of air pollution around Class I areas. As further described in appendix II, 99 percent of the stationary sources near the five Class I areas we reviewed were either grandfathered in or considered minor sources and therefore did not have to obtain permits under the PSD program. These exempt sources, particularly those that were grandfathered, also account for up to 90 percent of five pollutants emitted around these areas. These five—sulfur dioxide, nitrogen oxides, carbon monoxide, particulates, and ozone—are pollutants for which EPA has set national standards under the Clean Air Act.

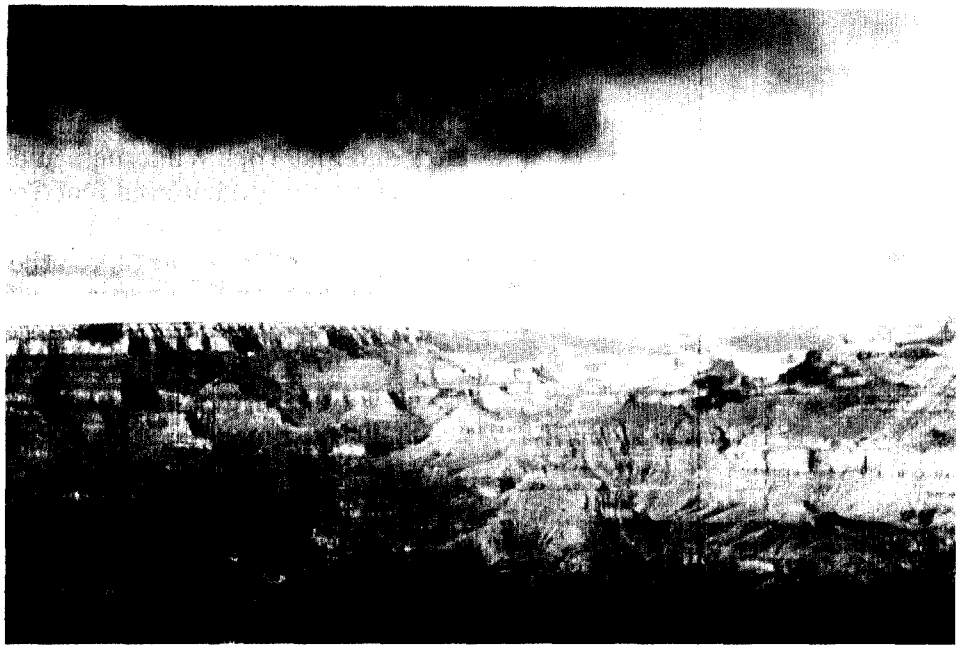
Around Shenandoah National Park, for example, where ozone levels in 1988 exceeded national standards, sources exempt from PSD permit requirements contributed 95 percent of the volatile organic compounds and 83 percent of the nitrogen oxides—substances that are both precursors to ozone formation—emitted near the park. Grandfathered sources accounted for most of these emissions.

Minor sources generally contributed only small portions of total pollutants emitted around the five Class I areas we reviewed. However, in some cases, their share was significant: They accounted for 60 percent or more of the particulates emitted around Rocky Mountain National Park and Flat Tops Wilderness and 64 percent of the volatile organic compounds emitted around Flat Tops Wilderness. EPA and the Park Service are already concerned about the contribution of minor sources, nationwide, to emissions of volatile organic compounds, and both have proposed that states consider lowering current thresholds for minor sources.

Under certain meteorological conditions, nearby sources can account for the major portion of pollutants that reach Class I areas, and in a number of national parks some of these pollutants have already begun to exceed national standards. In Shenandoah and in Mammoth Cave National Park (Kentucky), the Park Service estimates that from 60 to 80 percent of sulfur dioxide emissions that enter the parks come from local sources. The Park Service has also found that impaired visibility in Grand Canyon National Park (see figs. 1 and 2), which is caused mostly by high concentrations of sulfates (the oxidized form of sulfur dioxide) in the air, is largely attributable to a nearby power plant that is grandfathered under the PSD program. According to an air program official there, Arizona believes that most of its air quality problems in clean air areas are caused by sources exempt from PSD permit requirements; for this reason, the state has not attempted to create additional Class I areas.

Nearby sources may not account for all of the emissions that eventually enter Class I areas, however. Atmospheric modeling and monitoring data indicate that, to some extent, air pollutants are also being transported to some Class I areas over long distances from urban areas.

Figure 1: Clear Visibility in the Grand Canyon



Note: The visual range in the Grand Canyon, as measured on February 14, 1987, was 231 kilometers.
Source: National Park Service.

Figure 2: Impaired Visibility in the Grand Canyon

Note:The visual range in the Grand Canyon, as measured on February 12, 1987, was 46 kilometers. During a 6-week study period, over 40 percent of the visibility impairment, on average, was attributable to a nearby power plant. On winter days with the worst visibility, the power plant is highly likely to cause 70 percent of the visibility degradation.
Source: National Park Service.

The Clean Air Act currently provides for the installation of retrofit technology on grandfathered sources, but this provision applies only in cases in which certain existing facilities are found to be adversely affecting visibility in Class I areas. In 1981, however, a National Academy of Sciences study found that visibility was not the only air problem then affecting Class I areas and suggested that additional controls on both existing and minor sources might be necessary to correct acid rain and protect other air quality-related values.

Since our review looked at only 5 of the 158 Class I areas, we cannot say with certainty that there are similar proportions of exempt sources near all Class I areas. Nor do we know the extent to which nearby sources contribute to air pollution in Class I areas other than Shenandoah, Mammoth Cave, and the Grand Canyon. However, we believe that it would be worthwhile for EPA to examine a broader group of Class I areas to determine the extent to which exempt sources are contributing to emissions and the extent to which air quality in these areas is affected by these emissions. Depending on the outcome of these studies, it may be necessary to revise the Clean Air Act to lower the threshold for minor

sources of emissions or to require installation of additional controls on grandfathered major emission sources. We believe that with data maintained by state air quality offices and with currently available atmospheric monitoring and modeling capabilities, such a survey could be completed quickly enough to inform current efforts to reauthorize the Clean Air Act.

Permit Review Process Improved but Still Hampered by Lack of Data

As discussed further in appendix III, the PSD permit review process has not been well implemented, although improvements are either underway or planned. EPA regions did not forward all the applications that should have been reviewed by federal land managers, and the land managers, with the exception of the Park Service, did not always have the staff or time to review the applications they did receive. Most of these problems, however, appear to have been addressed. EPA plans steps to help ensure that its regions forward PSD permit applications to land managers with sufficient time for review. The Forest Service and the Fish and Wildlife Service have also devoted more staff to reviewing the applications.

Land managers' reviews continue to be hampered, however, because they do not have enough information about the resources they are trying to protect—wildlife, vegetation, and visibility, for example—and the effects of air pollution on those resources. Without this information, land managers believe they cannot adequately carry out their responsibility under the PSD program, which is to determine whether proposed industrial sources will have an adverse effect on park resources.

The Park Service, alone among the land management agencies, has been actively gathering information for a number of years. However, Park Service officials believe that they still need more information because their standards for information are highly rigorous: According to agency officials, any adverse impact determination might be legally challenged and would consequently have to be based on very certain information. By contrast, the Forest Service and Fish and Wildlife Service have collected far less information and have had much smaller research programs. The Forest Service now has plans, however, for a 10-year data-gathering and research program for which it has requested over $18 million. On the other hand, the Fish and Wildlife Service, which also has considerable data needs, has provided only a very small portion—$25,000 out of an estimated $10.5 million—of the funds that its air program staff believe is necessary to provide adequate information. According to an air program official, the Fish and Wildlife Service has

given higher priority to other data needs—relating to groundwater contamination, for one—and refuge managers have requested funding for studies only if they perceive air pollution to be a problem.

States Have Designated No New Class I Areas

On the question of designating new Class I areas (discussed in app. IV), we found that although states have the authority to do so, they have not designated any new Class I areas in addition to those established by the Clean Air Act Amendments. Officials in the 14 states and territories with areas recommended for Class I designation by the Forest Service and the Interior Department in 1979 and 1980 offered a variety of reasons, among them a belief that the areas were already adequately protected, the lack of resources to conduct the studies necessary before redesignation, and a concern that Class I designation would hamper economic development in their state. In some states, officials believed that there are other, more effective means of controlling their air quality problems. Neither the Interior Department nor the Forest Service has taken an active role in redesignation, having chosen not to encourage the process.

The absence of state designations is not surprising. Without some sort of federal initiative or requirement, it is difficult to imagine why states would choose to create additional Class I areas. Although it could be used more broadly, Class I designation is, by and large, a tool to protect federal lands. While those lands lie within state borders, the responsibility for protecting the resources of Class I areas is fundamentally a federal one. It seems to us that only in exceptional cases would states choose to constrain development in order to protect lands for which they are not responsible. Unless the Congress were to do so, the designation of many more Class I areas appears unlikely. However, the desirability of creating additional Class I areas depends, first, on whether the PSD program can be changed to better control air pollution.

Recommendations

We recommend that the Administrator of EPA, in cooperation with the National Park Service, the Fish and Wildlife Service, and the Forest Service, expeditiously survey a group of Class I areas where nearby emission sources are believed or are known to contribute to air quality degradation. The survey should determine the extent to which sources exempt from PSD permit requirements are contributing to air pollution in Class I areas. At the end of his review, the Administrator should report his findings to the Congress. Since the Congress is currently considering

reauthorization of the Clean Air Act, this information should be developed as quickly as possible, perhaps within the next 6 months.

We also recommend that the Secretary of the Interior instruct the Director of the Fish and Wildlife Service to develop a long-range plan for gathering the information necessary to support reviews of PSD permit applications. While we do not take issue with the agency's priorities, we note that the Fish and Wildlife Service has a responsibility to protect air quality-related values in its Class I areas, a responsibility it cannot exercise without sufficient information.

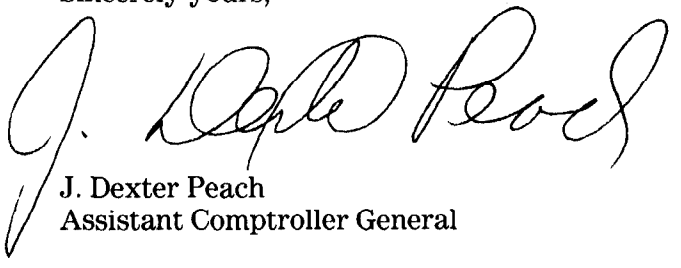
Matters for Consideration by the Congress

Depending upon the results of the EPA survey, the Congress may wish to consider whether the current thresholds for minor sources and exemptions for existing major sources contained in the Clean Air Act ought to be revised. Should the survey indicate a need for legislative change, the Congress may also wish to consider revising the process for designating Class I areas to make federal land managers responsible, rather than the states.

We have discussed the factual information in this report with EPA, National Park Service, Fish and Wildlife Service, and Forest Service officials and have incorporated their comments where appropriate. However, as you requested, we did not obtain official agency comments on a draft of this report. As arranged with your office, unless you publicly release its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, copies will be sent to appropriate congressional committees, the Administrator of EPA, the Secretary of the Interior, the Chief of the Forest Service, and other interested parties.

This work was performed under the general direction of Richard L. Hembra, Director, Environmental Protection Issues, who may be reached at (202) 275-6111. Other major contributors are listed in appendix V.

Sincerely yours,



J. Dexter Peach
Assistant Comptroller General

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Abbreviations

EPA	Environmental Protection Agency
GAO	General Accounting Office
PSD	prevention of significant deterioration

Background and Methodology

Background

The Clean Air Act Amendments of 1977 authorized the PSD program to ensure, among other things, that new development would not cause any significant deterioration of air quality in relatively clean air areas. Although the act established minimum air quality standards for the entire country, the PSD program goes beyond this to maintain the quality of air that was already cleaner than required by the standards.

The amendments gave the highest level of protection to 158 national parks and wilderness areas, designating them Class I areas. These areas, which make up about 1 percent of all U.S. lands, included the national parks over 6,000 acres, national wilderness areas and memorial parks over 5,000 acres, and the international parks that were in existence in 1977, when the amendments were enacted. All other areas in the United States that did not exceed national air quality standards were designated Class II. The Congress conferred authority on the states and Indian tribes to redesignate any of these Class II areas to Class I and directed federal land managers to determine if any other federal lands, including national monuments and preserves or primitive areas, should be redesignated Class I.

The amendments set certain tests that must be met before a major new source of pollution can be built near a Class I area. First, the owner or operator of the new source must demonstrate that it will not cause the National Ambient Air Quality Standards to be exceeded. These standards are for six "criteria" pollutants: sulfur dioxide, nitrogen oxides, lead, carbon monoxide, particulates, and ozone. In addition, for two of the criteria pollutants—particulates and sulfur dioxide—a new source near a Class I area may not emit more than a small amount beyond existing levels, allowable increments that are specified in the amendments. The amendments authorized EPA to develop allowable increments for nitrogen oxides, carbon monoxide, and ozone precursors, but as of September 1989, EPA had done so only for nitrogen oxides.

To receive a construction permit under the program, the owner or operator of a proposed facility must demonstrate to the state regulatory agency that it will meet the required emission standards and that it will employ the best available control technology. Under section 165(d) of the Clean Air Act, the state agency is required to send to EPA a copy of the permit application. EPA, in turn, must notify the responsible federal land manager of any permit application it receives that may affect a Class I area; EPA guidance requires federal land managers to be notified of a major source permit application within 100 kilometers, or about 60 miles, of a Class I area.

Once they receive a PSD permit application, federal land managers are responsible for determining whether emissions from new sources near Class I areas will have an adverse impact on the air quality-related values of the park or wilderness area. These values are the scenic, cultural, biological, recreational and other resources, including visibility, that may be affected by changes in air quality. If the federal land manager demonstrates to the state agency that the proposed facility will adversely affect these values, the facility may not be built, even if the allowable increments would not be exceeded.

The land management agencies that administer Class I areas include two agencies in the Department of the Interior: the National Park Service, which manages 48 Class I areas totalling 14.2 million acres, and the U.S. Fish and Wildlife Service, which manages 21 Class I wilderness areas totalling 2.3 million acres. The U.S. Forest Service, in the Department of Agriculture, manages 88 Class I wilderness areas totalling 13 million acres. One additional Class I area—the Roosevelt-Campobello International Park, which is in the United States and Canada—is administered by the Roosevelt-Campobello International Park Commission.

The PSD permit requirements apply to major stationary sources of pollution built after the law was enacted and to major modifications of already existing facilities. The act defines as "major" any facility with the capacity to emit at least 250 tons a year of any of the pollutants regulated under the act; for certain types of facilities, such as fossil fuel-fired steam electric power plants, petroleum refineries, and ore smelters, the threshold is 100 tons a year. Facilities emitting less than these amounts are considered minor sources and do not have to obtain PSD permits.

Major modifications, which must also meet PSD permit requirements, are defined as changes to a facility or its methods of operation that increase emissions by more than certain minimal levels, which vary by pollutant. A modification that would result in an increase of 100 tons or more per year of carbon monoxide, for example, or 40 tons or more per year of nitrogen oxides, would require a PSD permit. However, EPA exempts from this requirement any increases that result from fuel switching, routine maintenance and other procedures, changes in ownership, and any increases that are offset by decreases in emissions that occurred in the previous 5-year period.

Objectives, Scope, and Methodology

Following Chairman Synar's request and discussions with his office, we focused our review on (1) the extent to which stationary sources located near Class I areas are regulated under the Clean Air Act, (2) how federal land managers are carrying out their responsibilities to protect Class I areas from stationary source emissions, and (3) why states have added no other federal lands to those that originally qualified under the act for Class I designation.

To determine the extent to which stationary sources are regulated under the PSD program, we focused on five Class I areas in three states: Shenandoah National Park and James River Face Wilderness in Virginia, Cape Romain Wilderness in South Carolina, and Rocky Mountain National Park and Flat Tops Wilderness in Colorado. These include two areas managed by the National Park Service, two managed by the Forest Service, and one managed by the Fish and Wildlife Service. From the Park Service, we obtained information on air quality in its Class I areas, including Mammoth Cave National Park in Kentucky and Grand Canyon National Park in Arizona.

From each of the three state air quality agencies, we obtained the most recent annual inventory of stationary source emissions, developed by the states, in part, as a means of determining compliance with national air quality standards. Since these inventories do not include data on lead, we collected information on just five of the six criteria pollutants. Using these lists, we identified sources located within 100 kilometers of the Class I areas—the distance established by EPA as requiring federal land manager review—and determined the level of air pollutants annually emitted by these sources. For the two Class I areas in Virginia, this 100-kilometer range extends into portions of West Virginia, Maryland, and the District of Columbia, but we did not include any sources in these states and the District because the relatively small area did not justify the extra effort involved in collecting data from their emissions inventories. We also obtained from state agency officials a listing of the nearby stationary sources that were exempt from PSD requirements and, in most cases, the reasons for these exemptions.

We determined the extent to which federal land managers carried out their PSD program responsibilities largely through information compiled by the agencies at our request. These data included information on the numbers of permit applications they had received for review and their disposition. Agencies also supplied information on funding for data collection efforts and the need for additional research and information and its costs.

To examine EPA's implementation of its PSD permit responsibilities, we interviewed responsible EPA officials and examined PSD program policies and procedures. We also used the results of EPA's audits of state air programs for 1985 and 1986-87.

In order to address the redesignation issue, we conducted a structured telephone interview with officials of the air pollution agencies in the 14 states and territories in which lands had been identified by federal land managers as suitable for redesignation. These included Alaska, Arizona, California, Colorado, Florida, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Wyoming, and the Virgin Islands. In addition to asking officials why these areas had never been redesignated, we asked about any plans for redesignating other federal lands that had not been recommended in the earlier studies. We also interviewed federal land managers to determine whether they had followed up their initial efforts with other attempts to have additional Class I areas designated.

Following generally accepted government auditing standards, we conducted our review between August 1987 and August 1988, with some information updated to May 1989.

Few Sources Near Class I Areas Are Subject to PSD Permit Requirements

Of the 2,332 stationary sources operating within 100 kilometers of the 5 Class I areas in our review,[1] only 27—1 percent—were required to have permits under the PSD program. The remaining 2,305 sources did not have to obtain PSD permits for the following reasons:

- Ninety percent, or 2,105 facilities, were minor sources of pollution as defined by the act;
- Nine percent, or 200 facilities, were "grandfathered," that is, they were major sources built before 1977 when the amendments were enacted. Among these, seven facilities had undergone major modifications, but they were exempt from PSD permit requirements because they could demonstrate that emission increases would be offset by previous decreases.

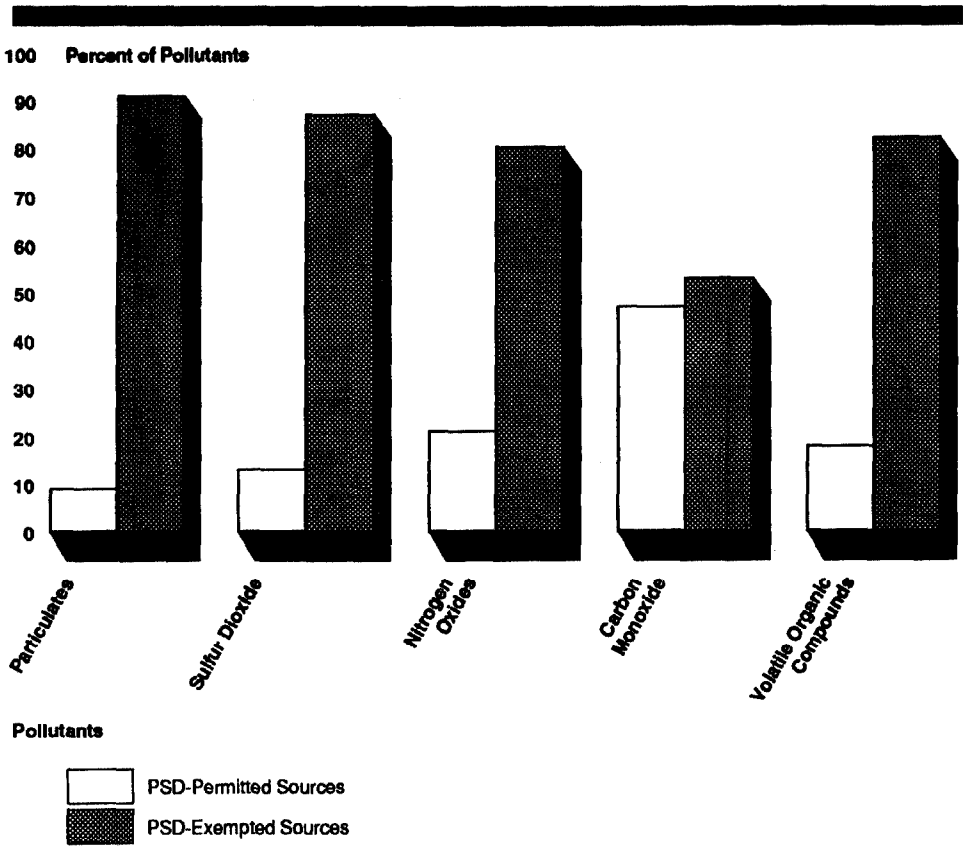
Non-PSD Permitted Facilities

Collectively, non-PSD permitted facilities contribute from 53 to 90 percent of five[2] of the six criteria pollutants emitted within a 100-kilometer radius of each of the five Class I areas. (See fig. II.1.)

[1]Although four additional sources were listed in Virginia's inventory, the state's listing did not contain enough information on these sources to allow us to determine their status.

[2]These are sulfur dioxide, nitrogen oxides, carbon monoxide, particulates, and volatile organic compounds (measured as precursors to the formation of ozone.)

Figure II.1: Pollutants Emitted by PSD-Permitted and PSD-Exempt Sources

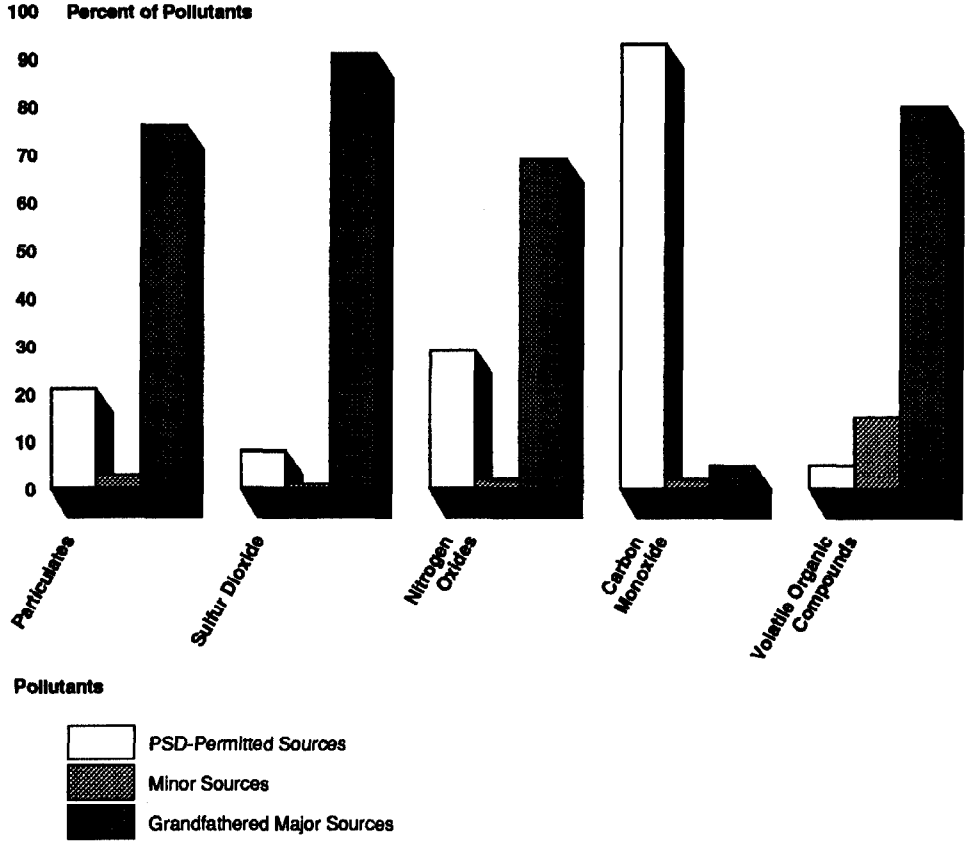


Note: Volatile organic compounds are measured as precursors to ozone, one of the criteria pollutants.

Grandfathered Sources

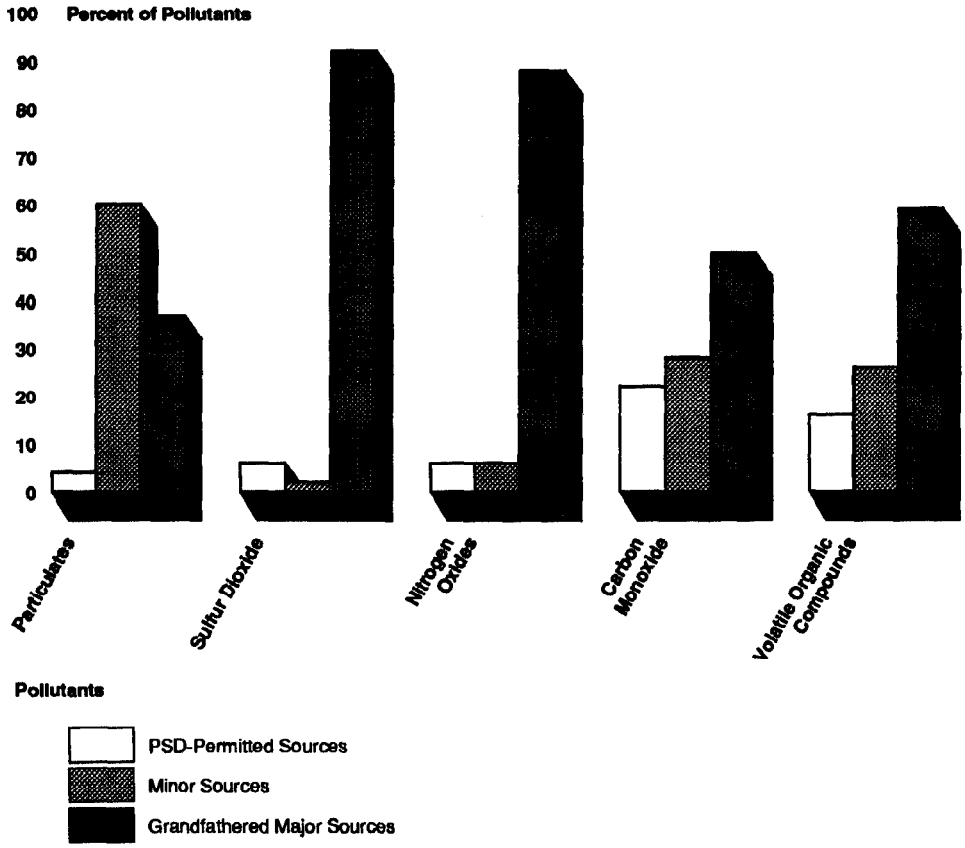
As shown in figures II.2 through II.6, most of the emissions around all five areas come from grandfathered facilities. Their contribution is particularly great to sulfur dioxide emissions, accounting for more than 75 percent in all five areas and more than 90 percent of the sulfur dioxide emissions around Cape Romain Wilderness and Rocky Mountain National Park (figs. II.2 and II.3). Close to 90 percent of the nitrogen oxide emissions around Rocky Mountain National Park also comes from existing major sources, as does about 80 percent of the nitrogen oxide emissions around James River Face Wilderness and Shenandoah National Park (figs. II.4 and II.5).

Figure II.2: Pollutants Emitted Near Cape Romain Wilderness



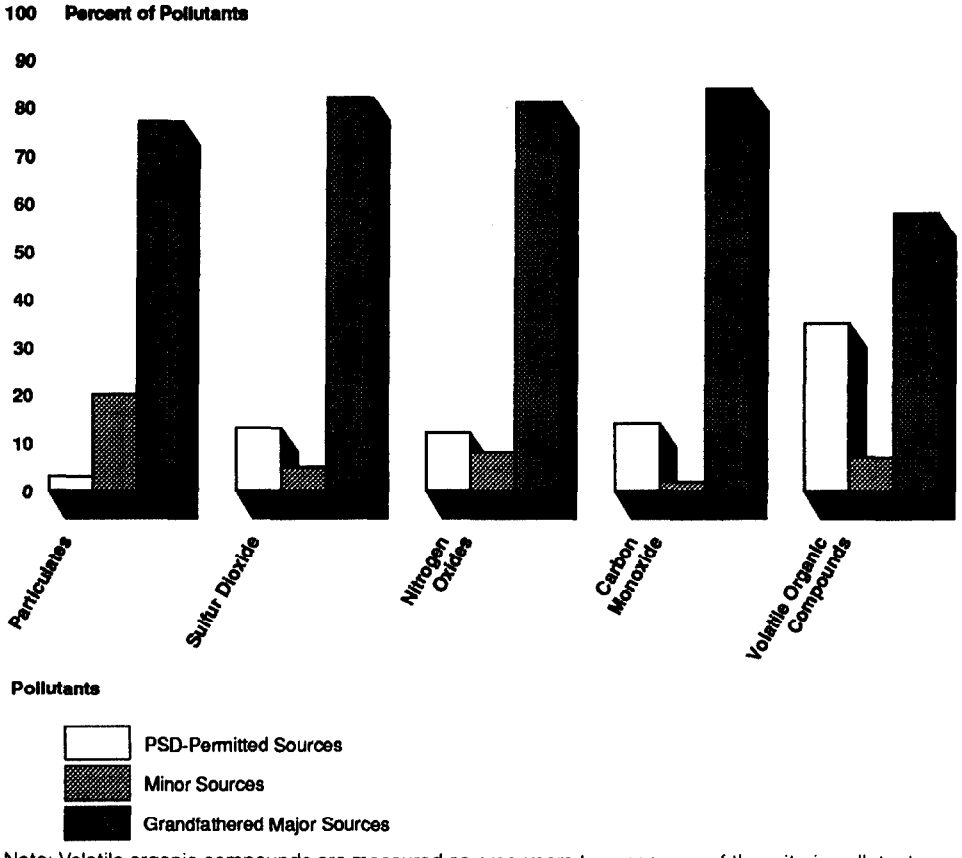
Note: Volatile organic compounds are measured as precursors to ozone, one of the criteria pollutants.

Figure II.3: Pollutants Emitted Near Rocky Mountain National Park



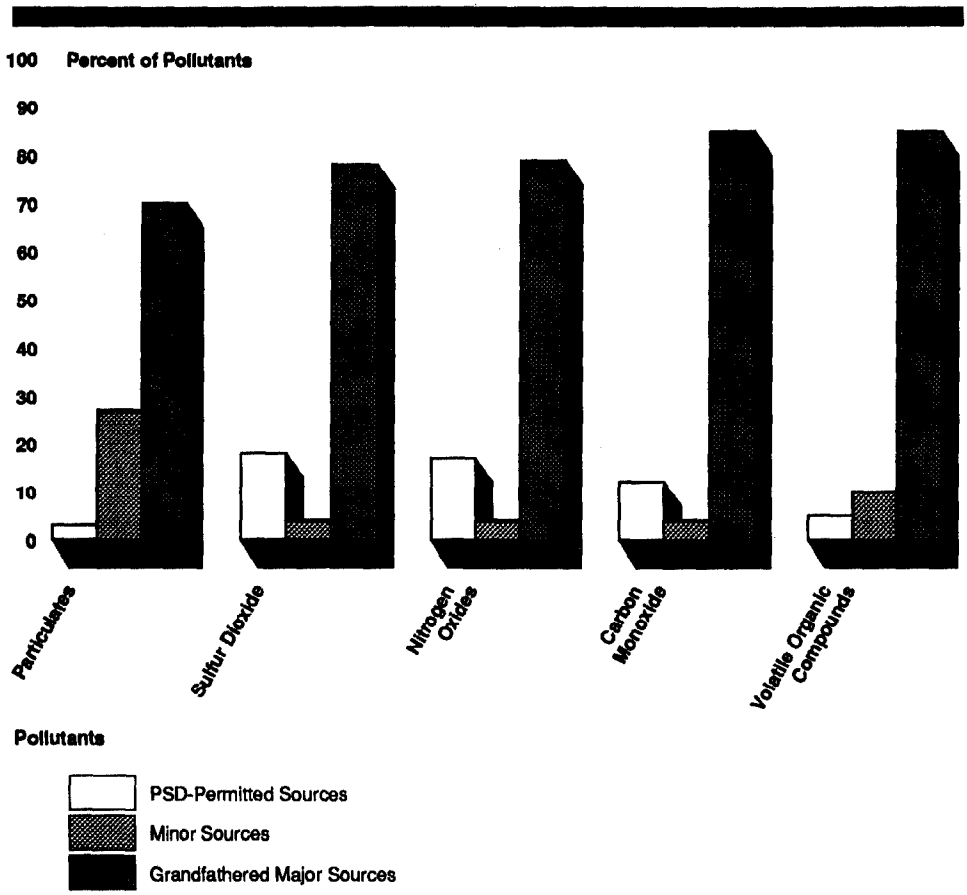
Note: Volatile organic compounds are measured as precursors to ozone, one of the criteria pollutants.

Figure II.4: Pollutants Emitted Near James River Face Wilderness



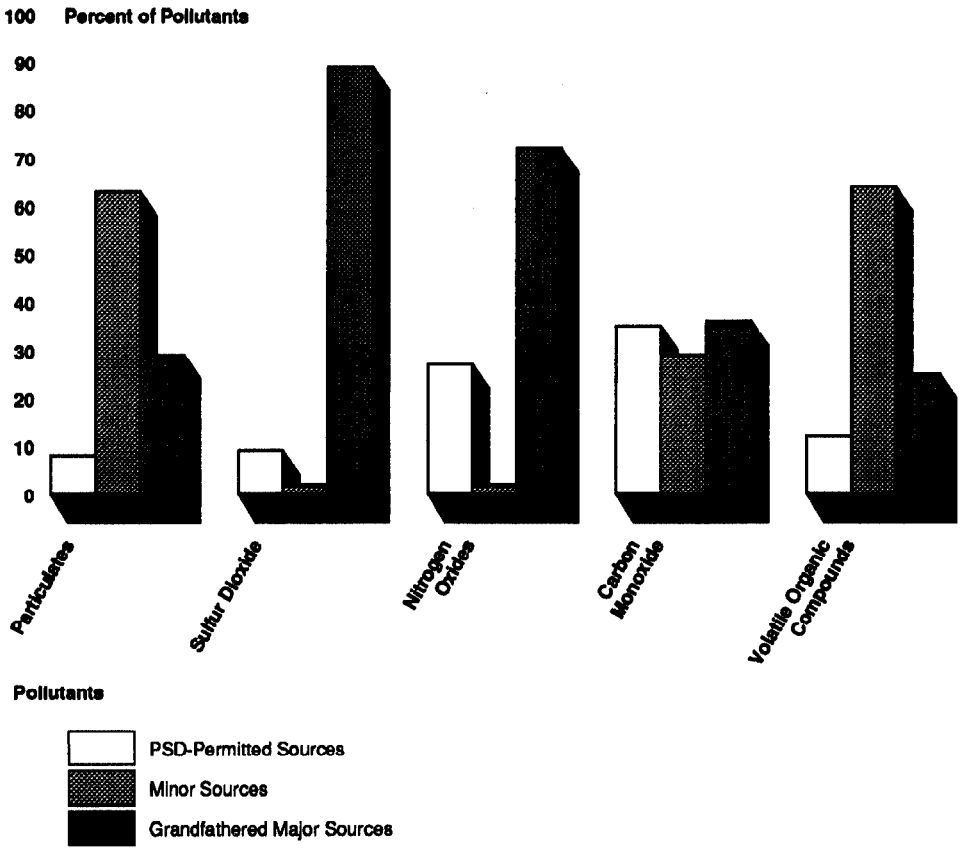
Note: Volatile organic compounds are measured as precursors to ozone, one of the criteria pollutants.

Figure II.5: Pollutants Emitted Near Shenandoah National Park



Note: Volatile organic compounds are measured as precursors to ozone, one of the criteria pollutants.

Figure II.6: Pollutants Emitted Near Flat Tops Wilderness



Note: Volatile organic compounds are measured as precursors to ozone, one of the criteria pollutants.

Around Shenandoah National Park, grandfathered sources are contributing to what has become a significant air pollution problem. These sources contribute 85 percent of the volatile organic compounds and 79 percent of the nitrogen oxides emitted near the park (fig. II.5). Both of these substances are considered ozone precursors, reacting together in the presence of heat and sunlight to form ozone. Since the Park Service began monitoring ozone in Shenandoah in 1980, concentrations have approached the national standard, and in 1988, the standard was exceeded. Shenandoah's ozone problem is not unique, however: Since 1982, ozone levels at seven other Class I parks and monuments—Acadia, Mammoth Cave, Joshua Tree, Yosemite, Pinnacles, Guadalupe Mountains, and Sequoia—have also exceeded the national standard.

Minor Sources

Minor sources, while large in number, generally contribute relatively small quantities of pollutants to the total. However, they account for nearly 30 percent of the particulates emitted around all five Class I areas, and in Rocky Mountain National Park and Flat Tops Wilderness, they account for over 60 percent. Minor sources around Flat Tops also account for 64 percent of the volatile organic compounds emitted by stationary sources within 100 kilometers.

Both EPA and Park Service officials have already expressed some concerns about the contribution, nationwide, of small sources to total emissions of volatile organic compounds. In its proposed post-1987 ozone policy, EPA noted that a significant portion of total emissions of volatile organic compounds generally comes from small sources. The agency suggested that as part of an overall ozone control strategy, states might want to consider lowering thresholds for regulating new sources to 25 tons of volatile organic compounds a year. EPA acknowledged, however, that even this level might be too high, citing a study that had shown that modifications and new sources emitting less than 5 tons a year compose 55 percent of total new volatile organic compound emissions. In commenting on the proposed policy, the Park Service expressed similar concerns about small sources and supported lowering the threshold to 25 tons a year.

Sources of Pollutants Entering Class I Areas

These exempt sources could account for most of the pollutants emitted near Class I areas. The Park Service has found that, under certain meteorological conditions, nearby sources are the primary source of air pollutants in Class I areas. According to an air program official, the Park Service estimates that local sources may account for 60 percent of the sulfur dioxide that enters Shenandoah National Park. Similarly, the Park Service has found that local sources can contribute about 70 to 80 percent of the sulfur dioxide in Mammoth Cave National Park in Kentucky, according to the air program official. In Grand Canyon National Park, the Park Service has traced visibility problems to a nearby coal-burning power plant. The agency has estimated that, at times, the power plant has contributed from 60 to 78 percent of the sulfur in the park, which, in the form of sulfates, is largely responsible for impaired visibility. On winter days with the worst visibility, the power plant is highly likely to cause 70 percent of the visibility degradation, according to the Park Service. Because the plant was built before 1977, it was not permitted under the PSD program, and it does not have any sulfur dioxide controls.

Under section 169A of the Clean Air Act, if EPA or a state regulatory authority finds that certain grandfathered sources are adversely affecting visibility in Class I areas, the agency can require the source to install retrofit technology to correct the problem. This retrofit provision applies only to cases of impaired visibility, however, and does not extend to other air pollution problems. Nevertheless, in a 1981 report on the implementation of the PSD provisions, the National Academy of Sciences found that impaired visibility was not then the only air pollution problem affecting Class I areas and warned that controlling only new sources would not deal adequately, in this century, with acid rain or the protection of other air quality-related values. The Academy study also concluded that minor sources could, cumulatively, cause significant deterioration of air quality and suggested that the administrative convenience and other factors that support the distinction between major and minor sources should not be allowed to subvert the basic intent of PSD, which is to regulate emissions causing significant deterioration, regardless of the type or source.

Information developed by the Park Service over the last several years indicates that, in addition to pollutants from nearby sources, some portion of certain types of pollutants that reach Class I areas are carried through the atmosphere from long-distance sources. For example, using data collected during the summer of 1978, the Park Service has estimated that high proportions of the airborne sulfates within four national parks in the eastern United States are the result of emissions quite distant from the parks. At Shenandoah National Park, the Park Service estimates that about 75 percent of airborne sulfates result from emissions generated more than 100 kilometers from the park. Similarly, it estimates that approximately 90 percent of the sulfate concentrations in Great Smoky National Park is attributable to sources more than 250 kilometers from the park, and that at Mammoth Cave National Park, 40 to 60 percent of sulfates come from sources more than 150 kilometers away.

Permit Review Process Improved but Still Hampered by Lack of Data

On the whole, federal land managers have not fully carried out their responsibility to review PSD permit applications, either because (1) EPA did not forward all applications to them, (2) they did not have the staff or time to review the permit applications when they were forwarded, or (3) they lacked sufficient information to determine whether the proposed facility would adversely affect the resources, or air quality-related values, of their Class I areas. Although many of these problems have been or are likely to be resolved, land management agencies—particularly the Fish and Wildlife Service—still do not have adequate information for determining the effects of proposed emission sources on the natural resources of Class I areas.

Permit Applications Not Forwarded

Since August 1977, when the PSD program began, 27 PSD permits have been issued in the 5 Class I areas we reviewed. Of these, federal land managers had received the applications for 12. The remaining 15 had not been forwarded to them by the EPA regions. Although EPA established a policy in 1979 to notify land managers of proposed facilities within 100 kilometers of a Class I area, the EPA regional PSD coordinators we spoke with said that at the time many of the permits were issued, in the early days of the program, EPA's policy was not well known. In addition, these staff decided, on the basis of the data submitted with the application, that the projected emissions would not reach the Class I area. One case, however, involved a facility that would be located 10 to 15 miles from Rocky Mountain National Park. EPA's regional PSD coordinator said that neglecting to send the application to the Park Service had simply been an oversight.

EPA's reviews have yielded similar findings. In its fiscal year 1985 and 1986-87 audits of the air program, EPA could find no record that land managers had been notified of approximately 30 percent of the permits involving construction within 100 kilometers of a Class I area. EPA's report did not explain why these omissions might have occurred.

To address this and other problems, EPA's Assistant Administrator for air programs informed the EPA regions that they were to make sure that state and local regulatory agencies follow certain notification procedures, including notifying the regions of all PSD permit applications they received for major sources. To aid this effort, EPA devised a checklist for regional reviewers to use to help ensure that the state has properly handled the application. One of the items included in the checklist has to do

with whether federal land managers have been notified when the application is near a Class I area. EPA transmitted the checklist to the regions in May 1989.

Permit Applications Not Reviewed

Even when they have received applications for review, federal land managers have not always reviewed them and provided comments to the permitting agencies. From August 1977 to August 1987, nationwide, 392 permit applications had been forwarded to federal land managers. (See table III.1.) Of these, comments were provided on 261, or two-thirds. Land managers did not provide comments on the remaining 131 permit applications, for a couple of reasons. For one thing, federal land managers did not receive a number of the permit applications until 30 to 60 days before they were issued, at the same time they were made available for public comment. According to the Park Service, about one-quarter of the applications it received arrived at this time; about half the applications sent to the Fish and Wildlife Service also arrived at this point. (The Forest Service could not furnish us with similar information.) Federal land managers believe this is not enough time for them to complete a review of emission impacts.

Table III.1: Federal Land Manager PSD Permit Application Review, August 1977 to August 1987

	Number of permit applications			Disposition of federal land manager recommendations		
Agency	Received	Reviewed and commented, as % of received	Recommended changes, as % of reviewed	Accepted/ partially accepted, as % of recomms.	Rejected as % of recomms.	Unknown, as % of recs.
Fish and Wildlife Service	40	25 63%	14 56%	4 29%	7 50%	3 21%
Forest Service	245	148 60%	25 17%	16 64%	5 20%	4 16%
National Park Service	107	88 82%	61 69%	26 43%	8 13%	27 44%
Total	**392**	**261** 67%	**100** 38%	**46** 46%	**20** 20%	**34** 34%

EPA's 1979 notification policy required that EPA regions notify federal land managers as soon as an application is received. Recognizing, however, that its notification policy has not always been followed, EPA has taken steps to address this problem. According to the EPA official in charge of new source review, the agency plans to hold training courses, beginning in fiscal year 1990, for regional staff that will emphasize the need for timely notification.

To help deal with the problem of insufficient time, the Forest Service plans to institute a screening procedure that will help its managers use their time more efficiently. By using estimates of expected pollutant concentrations, Forest Service managers could screen out those applications that are not likely to cause adverse impacts and concentrate on obtaining additional, more detailed information from the other projects. Published as a proposal in April 1989, the screening procedure is expected to be developed over the next year.

Federal land managers also did not respond with comments because they did not have the staff to review permit applications. The Fish and Wildlife Service, for example, did not have any staff assigned to permit application review between November 1982 and the end of 1984, according to a member of the agency's air program staff. Since 1985, however, the agency has had two full-time staff members assigned to review PSD permit applications, among other things, working under an interagency agreement with the National Park Service's air program office and receiving technical support from that office. The Forest Service has also had problems with insufficient staff. However, it requested funds to enlarge its air program staff in fiscal year 1988 to 12 full-time equivalent positions, and it planned to increase the number to 21 in fiscal year 1989 and to 30 in fiscal year 1990.

As shown in table III.1, the Park Service has had a somewhat better record in reviewing and commenting on permit applications than the other agencies. It reviewed 82 percent of the applications it received and made recommendations to the permitting authority in 69 percent of the cases it reviewed, recommending, among other things, that applicants install better control technology. For example, in its review of an application to construct and operate an energy/resource recovery facility near Shenandoah National Park, the Park Service recommended that the state agency not issue the permit as drafted unless the applicant employed a dry scrubber/baghouse system to reduce emissions. In another case, involving a permit application to modify a Department of Energy fuel-processing restoration facility near Craters of the Moon National Monument in Idaho, the Park Service recommended that nitrogen oxide controls be installed to mitigate and perhaps eliminate any visibility impacts.

The Fish and Wildlife Service and Forest Service each reviewed about 60 percent of the applications. While the Fish and Wildlife Service recommended changes to 56 percent of the applications, the Forest Service recommended changes to only 17 percent of the applications. We were

not always able to evaluate the outcome of these reviews, however, in part because agencies were not always informed by the permitting agencies about the disposition of their recommendations. The Park Service, for example, was not aware of how the permitting authority had handled about 44 percent of the applications on which it had made recommendations. In addition, even in those cases where land managers' recommendations were adopted, it is not clear whether changes were made because of the land manager review or whether the permitting agencies would have required the changes independently of the land manager review.

Insufficient Information for Land Manager Review

In order to evaluate whether a proposed facility will adversely affect air quality-related values in a Class I area, land managers believe they need to know what these values are—that is, the vegetation, wildlife and other natural resources of the area—the current condition of those values (or resources), the effect of anticipated pollution levels on those resources, and whether these effects are adverse. According to land managers, they have the burden of persuading the permitting authority that the emissions from a proposed source will have an adverse impact on air quality-related values. Therefore, assessments based on incomplete data or inadequate tools are likely to compromise the managers' ability to be persuasive. However, agency officials feel that they do not now have enough information to adequately determine adverse impacts in all cases.

Fish and Wildlife Service

The Fish and Wildlife Service, for example, does not have a complete inventory of air quality-related values in any of its Class I areas, and has studied causes and effects of air pollution in only 3 of its 21 Class I areas. According to the Fish and Wildlife Service, only one Class I area has been characterized (i.e., inventoried and assessed) well enough to provide an adequate basis for approving or denying PSD permit applications, and only in terms of visibility.

To obtain complete information about all its Class I areas, the Fish and Wildlife Service estimates that it would require nearly $1.6 million over 5 to 10 years for inventories of air quality-related values and about $8.9 million more, and 8 to 10 years, to adequately assess ambient air quality, visibility and biological conditions. By contrast, in the 10 years following the Clean Air Act Amendments (to August 1987), the Fish and Wildlife Service spent a total of $145,818 on related data-gathering

efforts. Nevertheless, the agency did not request any funds for inventory purposes for fiscal year 1988 and requested and received only $25,000 in fiscal year 1989. Also in fiscal year 1988, the air program staff requested $64,000 for air pollution cause-and-effect studies in 2 of the agency's 21 Class I areas, but the studies were not funded by the Fish and Wildlife Service.

According to the Fish and Wildlife Service official in charge of the day-to-day operations of the agency's air quality program and one of his staff members, air quality issues have been a low priority within the Fish and Wildlife Service, falling below groundwater contamination and other concerns. They explained that funds for studies were made available only when refuge managers were concerned about air pollution and requested funds through the normal regional budget process. There has been no Service-wide budget initiative to support the air quality program, they added, especially for ambient and biological effects monitoring, in order to fulfill PSD responsibilities.

National Park Service

The Park Service, by contrast, has spent considerably more to monitor and evaluate air pollution effects and believes it has at least partially inventoried or assessed all its Class I areas for the purposes of PSD permit application reviews. At the time of a permit review, the agency says, the Park Service reviews available information and may supplement it with additional studies as necessary. Between 1977 and 1987, the Park Service spent about $4.6 million on inventory and monitoring activities, focusing on visibility and vegetation resources as indicators of air quality-related values. The agency also spent about $11.8 million on cause-and-effect studies during this same period.

According to officials of the Park Service's Air Quality Division, the agency still lacks sufficient information to determine, in all cases, whether a proposed facility will have an adverse impact on park resources. This is particularly true in cases involving ozone, where it is difficult to establish a source-receptor relationship because ozone is not directly emitted. It is also difficult in the case of ozone to determine precisely what constitutes an adverse impact, that is, whether spots on leaves can be considered an adverse effect, or whether some more drastic effect, like a change in an entire ecosystem, must be demonstrated. Park Service officials acknowledged that they have set highly rigorous standards for information, anticipating that any adverse impact determination might be legally challenged and would therefore have to be based on very certain information.

Although Park Service officials believe the agency's air quality data are good, they believe more information is needed on the resources of Class I areas, along with additional research on the biological effects of air pollution. The Park Service estimates it will need about $11 million over the next 10 years for inventory and monitoring activities and another $15 million for cause-and-effect studies, again focusing just on visibility and vegetation. For an adequate inventory of additional air quality-related values, including visibility and vegetation, the Park Service estimates it would need a total of $14.4 million over a 5-year period, or $300,000 for each of the 48 Class I areas.

Park Service officials believe that the current level of staff and resources is more or less adequate and will ultimately yield the necessary information if funding levels are maintained. According to its fiscal year 1988 action program, the Park Service plans to develop inventory and monitoring programs for at least 20 parks a year over the next 5 years, beginning in fiscal year 1989. Officials said that the Park Service also plans to continue its biological effects research program at least at current funding levels, although the agency is currently in the process of reviewing its program and anticipates some internal redirection.

Forest Service

Although it did relatively little in the past, the Forest Service has begun to expand its air resource management program. Between 1977 and 1987, the agency spent $1.5 million on efforts to inventory air quality-related values, with no Class I area completely inventoried. Moreover, according to the Forest Service's watershed and air management director, none of the Class I areas had been adequately characterized for the purposes of reviewing Class I permit applications. During this same 10-year period, the Forest Service spent close to $10 million on research related to effects of air pollution, research it characterizes as applicable to numerous Class I areas.

In 1986, however, the Forest Service began to reevaluate its air resources program and its compliance with the Clean Air Act. According to its August 1987 draft report, the natural resources at risk from potential development around Class I areas were unknown. The Forest Service noted that because of this lack of information, permit applications were handled inconsistently, with regional foresters sometimes recommending approval of an application because of inadequate information, and in other regions, recommending denial for the same reason.

Following the evaluation, the Chief of the Forest Service decided to strengthen the agency's program by committing additional funds and staff to inventory and monitor the condition of air quality-related values in Class I areas. The Forest Service's goal is to inventory all Class I areas by the year 2000 and to monitor the 50 or so areas that are threatened. The Forest Service therefore added funds to its fiscal year 1988 and fiscal year 1989 air program budgets and requested $3.5 million for fiscal year 1990—more than twice the amount it spent on inventory activities in the entire preceding decade. The Forest Service plans to seek similar funding levels for inventory and monitoring purposes for each of the next 10 years. In addition, the Forest Service has undertaken a long-range research program on atmospheric effects on forest ecosystems. Although not aimed specifically at Class I areas, the Forest Service believes that research results are well suited for application to these areas. For fiscal year 1990, the Forest Service requested $14.7 million for the program and believes that the same amount (in constant dollars) would be required over each of the next 10 to 20 years to complete the studies necessary to adequately protect all Class I areas.

States Have Designated No New Class I Areas

In keeping with the states' overall responsibility for the PSD program, section 164 of the Clean Air Act authorized states and Indian tribes to designate any areas they deem appropriate as Class I areas. In addition, the act directed federal land managers to review national monuments, primitive areas, and national preserves, and recommend to the states and the Congress any areas appropriate for redesignation from Class II to Class I because of important air quality-related values. In 1979 and 1980, land managers recommended 59 areas to be redesignated. In addition, over 260 new national parks and wilderness areas have been created that meet the original acreage criteria for Class I areas. Nevertheless, the states have not designated any additional Class I areas.

Following the act, federal land managers evaluated 110 areas altogether: 82 national monuments, 2 national preserves, and 11 primitive areas administered by the Interior Department, and 15 Forest Service primitive areas. The Forest Service, in 1979, recommended that all 15 of its areas be redesignated as Class I. In 1980, the Secretary of the Interior published a final list of 44 areas recommended for redesignation, based solely on the presence of air quality-related values. However, none of the 14 states and territories in which these 59 areas are located—Alaska, Arizona, California, Colorado, Florida, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Wyoming, and the Virgin Islands—ultimately redesignated any of these areas, for a variety of reasons.

According to officials of the air quality agencies in 10 of these states,[1] the states often did not pursue redesignation because they lacked the resources or expertise to perform the redesignation studies required by the Clean Air Act, or because they did not believe they were responsible for conducting them. Although the act does not state who should conduct these studies, it requires an analysis of the health, environmental, economic, social and energy effects of redesignation, and it requires that public hearings be held before the states can redesignate any area.[2]

In Florida, which has three areas recommended by the National Park Service, an official of the state air quality office said that the state

[1] Air quality officials in Idaho and the Virgin Islands were not familiar with redesignation recommendations and could not respond to our questions. In South Dakota, the air program administrator had been unaware that the portion of Badlands National Monument recommended for Class I designation was not already a Class I area, along with the rest of the monument.

[2] In a June 1983 opinion, the U.S. Court of Appeals for the Ninth Circuit stated its view that the act required the state of California to conduct these studies.

believes that it is up to the Park Service to conduct the environmental studies since the state has neither the responsibility nor the ability. Officials in both Wyoming and Montana reported that their states require by law that the party seeking redesignation perform the necessary studies. In 1981, a citizens coalition petitioned the state of Wyoming to redesignate the Cloud Peak Wilderness, but the state denied the petition, according to its air program administrator, in part because the citizens had not conducted the required studies.

In other cases, state officials claimed that redesignation had not occurred because the state's air quality program already adequately protected the recommended areas; this was reported by Alaska, Montana, Nevada and New Mexico. Some state officials also believed that the PSD program was not the most effective way to deal with air quality problems. In California, for example, the state Air Resources Board began in 1980 to conduct redesignation studies for those areas recommended by federal land managers as well as for other Class II areas in the state (such as areas that had been designated wilderness after the 1977 amendments to the Clean Air Act.) However, according to a staff member of the Board, the state's ozone problem shifted priorities and resources away from the redesignation studies. This staff member said that the state currently believes that solving urban ozone problems would also solve air pollution problems in remote areas that were caused by atmospheric transport of pollutants.

According to a state air program official, Arizona also did not pursue redesignation for the nine areas in the state that were recommended because the state believes that the PSD program is not adequate to solve air quality problems in the state's clean air areas, which come from sources that are exempt from regulation, including grandfathered and minor sources. Similarly, a Colorado air program official said that the state believes that the PSD program is not adequate to deal with regional haze and acid deposition, two of the state's biggest air pollution problems, and it has therefore not put much effort into redesignation. He said the state believes that an EPA standard for fine particulates is a less complex and less controversial tool for dealing with visibility problems than is redesignation.

For a number of areas recommended by federal land managers, state officials did not pursue redesignation because of concerns about the effects on economic development in the surrounding areas. In Utah, for example, which has seven areas that were recommended for redesignation, state air program officials said that the state dropped further plans

after they were met with intense opposition from industry and elected officials during public hearings on redesignating one of the areas. In the case of Death Valley National Monument, which is located in both California and Nevada, the state of California undertook a redesignation study, but a Nevada air program official said that Nevada was opposed to redesignation because it claimed that it would cause economic hardship to nearby industries if they were required to reduce emissions. Similarly, according to an air program official, the state of Colorado dropped its plans to redesignate Dinosaur National Monument, which lies in both Colorado and Utah, after the state of Utah objected.

In a couple of states, officials told us that they had not pursued redesignation, in part, because federal land managers had not been more aggressive in recommending redesignation. Florida's air program official, for example, said that the state had given redesignation a low priority because the Park Service had not pressed the state. The Alaska air program official we interviewed said that he regarded Interior's recommendation as a finding of suitability rather than a recommendation for the state to act. He said that in his view, the federal land manager would have to actually recommend redesignation and conduct the necessary studies before the state would proceed. Neither Interior nor the Forest Service, however, have taken an active role in redesignation. The Forest Service's policy is to provide assistance and to consult with states considering redesignation but not to initiate redesignation. While Interior does not have a formal policy statement on redesignation, it has, in the past, discouraged Park Service officials from pursuing redesignation for wilderness areas in Alaska.

For the same reasons that kept them from redesignating areas to Class I status in the past, almost all of these states have no plans to pursue redesignation in the future. However, the state of Oregon began work in 1987 to redesignate 29 Class II areas in the state, most of which became wilderness areas after 1977. The state believes that a Class I designation would better protect these areas from possible new industrial sources and also from Forest Service burning practices. Formal action is not expected before the Spring of 1991.

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