

GAO

Report to the Honorable
James J. Florio, House of
Representatives

October 1989

TRANSPORTATION NOISE

Federal Control and Abatement Responsibilities May Need to Be Revised





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

**Resources, Community, and
Economic Development Division**

B-235875

October 12, 1989

The Honorable James J. Florio
House of Representatives

Dear Mr. Florio:

As you requested, this report discusses transportation noise and the control and abatement activities of the Environmental Protection Agency currently and prior to eliminating its noise program in 1982. It also discusses the transportation noise control and abatement activities of the Department of Transportation and state and local agencies.

As arranged with your office, unless you publicly release its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, copies of the report will be sent to appropriate congressional committees; the Administrator, Environmental Protection Agency; the Secretary, Department of Transportation; and the Director, Office of Management and Budget. We will also make the report available to other interested parties.

This work was performed under the general direction of Richard L. Hembra, Director, Environmental Protection Issues (202) 275-6111. Other major contributors to this report are listed in appendix II.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'J. Dexter Peach'. The signature is written in a cursive style with a large initial 'J' and a long, sweeping underline.

J. Dexter Peach
Assistant Comptroller General

states to construct highway noise barriers. The Department has delegated responsibility for interstate motor and rail carrier noise standards enforcement to the Federal Highway and Federal Railroad Administrations.

Results in Brief

Transportation noise remains a problem for many communities. For example, FAA estimates that 3.2 million people live in areas generally incompatible for residential use because of high levels of aircraft noise. Although comprehensive data are not available, many more people are subjected to aircraft noise levels that may significantly interfere with sleep, conversation, and relaxation.

The major transportation focus of EPA's noise program was on controlling noise sources and providing technical assistance to state and local governments. EPA issued standards providing national, uniform treatment of interstate rail and motor carriers, trucks, and motorcycles, and recommended various aircraft noise standards to FAA. It also assisted state and local noise program development. EPA had plans to further lower transportation noise levels through additional regulations and greater emphasis on assisting localities in land-use planning around transportation facilities. With program funding eliminated, these plans were not realized.

Following program funding elimination, other federal, state, and local agencies have continued some transportation noise activities. For example, FAA and Federal Highway provide grants to airports and states, respectively, for noise abatement activities. However, these federal agencies, except FAA for aircraft noise, do not have the authority that EPA has to regulate transportation noise sources. More importantly, because the Noise Control Act and EPA's noise standards were not rescinded when program funding was eliminated, federal preemption remains in effect, thereby limiting state and local regulatory authority and noise control options. In other words, states and localities are prohibited from adopting their own noise emission controls for equipment and operations where EPA standards were issued and remain in effect. Further, because of other priorities, some states such as California and New Jersey have not expanded their noise control offices to provide the assistance that EPA had been providing.

Current Control and Abatement Efforts

FAA has a program that includes aircraft noise standards, aircraft operating controls, and noise abatement planning assistance and grants to airports. Airports have used these grants for purposes such as constructing noise barriers and acquiring land to prevent nearby residential development. Federal Highway's program requires states to consider noise in planning and designing federally aided highway projects. Federal Highway also provides funds to the states to construct noise barriers along federal-aid highways—the most recent data shows about \$338 million as of December 31, 1986. In addition, some state and local governments construct noise barriers on their own and control land use near transportation facilities.

The Federal Highway and Federal Railroad Administrations, however, do not have the authority to control the amount of noise generated by transportation equipment and operations. And, the Noise Control Act prohibits state and local governments from adopting or enforcing noise emission controls for specific equipment and operations that are not identical to EPA's. In addition, the Department of Transportation has substantially reduced its enforcement of the interstate rail and motor carrier regulations because of higher priorities and the very high compliance rates it had been finding. Because of other priorities, the states that GAO visited had not expanded their noise control offices to assist localities with noise problems.

Matters for Congressional Consideration

Since EPA's funding to carry out the Noise Control Act has been eliminated but the act's requirements, including the preemption provisions and uniform treatment goals, remain in effect, the Congress may wish to reexamine the federal role with regard to transportation noise control and abatement. If the Congress decides that a change in the federal role is needed, GAO offers a range of alternatives that it may wish to consider. These alternatives include (1) rescinding the Noise Control Act if the goal is less federal involvement and more regulatory authority for state and local governments and (2) establishing a more comprehensive federal transportation noise control program if the goal is uniformity among the states with respect to commerce.

Agency Comments

GAO discussed the factual information contained in a draft of this report with responsible EPA and Department of Transportation officials. Their comments have been incorporated into the report as appropriate. As requested, GAO did not obtain official agency comments on the report.

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Noise is measured in decibels, which are units of sound pressure. Zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Decibels are representative points on a sharply rising curve. Ten decibels is 10 times more intense than 1 decibel, 20 decibels is 100 times more intense (10 X 10), 30 decibels is 1,000 times more intense (10 X 10 X 10), and so on. Decibel ratings decrease as the distance from the noise source increases. The approximate sound levels of some typical noise sources are shown in table 1.1 for illustrative purposes.

Table 1.1: Approximate Sound Levels for Some Typical Noise Sources

Activity	Sound level in decibels
Whispering	30
Light auto traffic at 100 feet	50
Conversational speech	60
Vacuum cleaner at 10 feet	69
Freight train at 50 feet	75
Alarm clock at 2 feet	80
Riding inside a city bus	83
Heavy truck at 50 feet	90
Jet takeoff at 2,000 feet	105
Jet takeoff at 200 feet	120
Threshold of physical pain	130

A common measurement of community noise exposure is the day-night sound level (DNL or commonly Ldn), which was developed by EPA in the early 1970s. Ldn represents an energy averaged sound level for a 24-hour period. The 24-hour sound level is measured from midnight to midnight after adding 10 decibels to nighttime noise events from 10 p.m. to 7 a.m. The 10-decibel correction is applied to nighttime intrusion to account for increased annoyance resulting from noise during that period.

Ldn can be used to measure various kinds of noise affecting communities. It is used by federal agencies, such as the Federal Aviation Administration (FAA), the Department of Defense, the Department of Housing and Urban Development, and the Department of Veterans Affairs. An Ldn value of 65 decibels is the threshold above which many federal agencies generally consider land incompatible for residential use, including schools and hospitals. Ldn 65 was selected as the standard to balance the environmental effects of noise on various activities (sleeping, communicating, convalescing, and learning) that would take place on a

The Noise Control Act

Under the 1970 amendments to the Clean Air Act, EPA established an Office of Noise Abatement and Control and made it responsible for conducting a congressionally mandated study of noise and its effects on public health and welfare. The resulting December 31, 1971, report entitled, Report to the President and Congress on Noise, and subsequent congressional hearings led to enactment of the Noise Control Act in October 1972. According to the act, state and local governments are primarily responsible for noise control, but federal action is essential to deal with major noise sources in commerce, whose control requires national uniformity of treatment. The act established the goal of the federal noise control effort as the promotion of an “environment for all Americans free from noise that jeopardizes their health or welfare.” The act directs the Administrator of EPA to

- coordinate all federal programs relating to noise research and control and report to the Congress on the status and progress of federal noise control activities;
- publish criteria identifying noise effects and provide information on the levels of noise necessary to protect the public health and welfare;
- identify major sources of noise and prescribe and amend standards limiting noise emissions from any product or class of products identified as a major source of noise in the following categories: construction equipment, transportation equipment (including recreational vehicles), any motor or engine, and electrical or electronic equipment;
- prepare a comprehensive report on the problem of aircraft/airport noise and submit regulatory proposals to FAA for control of aircraft/airport noise;
- require manufacturers to label products that emit noise capable of adversely affecting the public health or welfare or are sold wholly or in part on the basis of their effectiveness in reducing noise;
- conduct and finance research on the psychological and physiological effects of noise and provide technical assistance to state and local governments on the various methods of noise control; and
- promulgate regulations limiting the noise generated from interstate rail carriers and interstate motor carriers, after consulting with the Department of Transportation.

The Noise Control Act was amended by the Quiet Communities Act of 1978 to assist state and local governments and to promote health effects research. Specifically, the amendments require EPA to

- Issued new product noise emission regulations for newly manufactured medium and heavy trucks, portable air compressors, garbage trucks (later rescinded, according to an EPA official, because of industry concerns about the cost of complying), and motorcycles and motorcycle replacement exhaust systems. Also issued initial in-use noise emission regulations for interstate rail and interstate motor carriers. (January 1976 - December 1980)
- Initiated a labeling program with publication in September 1979 of a general provisions regulation for noise labeling of products and proposed regulation for hearing protectors.
- Issued a report to the Senate Committee on Public Works in August 1973 entitled, Report on Aircraft-Airport Noise and subsequently proposed 11 noise regulations to FAA.

Although continuing its regulatory program, EPA in 1977 began to shift more of its resources toward providing states and localities technical assistance to establish and strengthen local noise control programs. A major activity of this type was implementation of the Quiet Communities Program to study and demonstrate effective means of local noise control and the Each Community Helps Others (ECHO) Program. The ECHO program sent volunteer state and local noise experts to other communities to provide on-site technical assistance and advice.

Other major activities in response to the Quiet Communities Act included financial and technical assistance to help states and localities identify and remedy noise issues and problems, surveys of state and municipal environmental noise programs, regional workshops to train state and local officials; development of a noise training manual; preparation of model state and local legislation; and establishment of a regional technical assistance center in each of EPA's 10 regions to provide assistance and training to state and local officials. EPA also provided airport, highway, and rail transportation planning assistance to localities.

Phaseout of the EPA Noise Program

Soon after taking office, the Reagan administration decided to terminate EPA's noise program and close down its Office of Noise Abatement and Control to reduce the federal budget. The administration's position was that noise control benefits are highly localized and the function could be adequately carried out at the state and local level without a federal program. The President's budget, which was submitted to the Congress in March 1981, recommended \$2.2 million for fiscal year 1982 to be used for an orderly phaseout of the program and no funds for fiscal year 1983 and beyond. The program had grown from \$2.7 million for fiscal

Current EPA Noise Control and Related Activities

With elimination of the program, EPA's noise control activities are limited. Agency personnel in the Office of Federal Activities and the Office of Air and Radiation respond to numerous industry and public inquiries on noise. According to agency officials, these inquiries include requests for noise information (e.g., pamphlets) and technical assistance regarding EPA's regulations. The officials also told us that some requests are from citizens or state and local governments wanting EPA's assistance in dealing with a noise problem. In these latter cases, EPA usually refers the requester to published documents and/or to another federal or state agency. According to an Office of Air and Radiation official, EPA will also take enforcement action against noncompliance with its noise regulations if cases of noncompliance are brought to its attention.

In accordance with Section 309 of the Clean Air Act, EPA continues to review and comment on environmental impact statements and many environmental assessments prepared under the National Environmental Policy Act for federally conducted or assisted activities. The activities' noise impact is one of the environmental considerations that are to be addressed by the assessments or impact statements. For example, noise could be a major consideration in expanding an airport or constructing a highway. If a project receives an "environmentally unsatisfactory" rating from EPA and no agreement on a new approach to the project can be reached with the applicable federal agency, EPA can refer the project to the Council on Environmental Quality for resolution. Also in accordance with section 309, EPA reviews regulatory proposals of other federal agencies that deal with or could have an impact on noise.

On June 15, 1988, a civil suit under Section 12 of the Noise Control Act, as amended, was filed against the Administrator of EPA and the Secretary of Transportation for their alleged failure to carry out the acts and duties required by the act. The United States filed a motion to dismiss in March 1989. No decision has been made in the case, which was filed in the U.S. District Court for the Western District of Tennessee.

EPA's Expectations for Noise Control in Absence of Its Program

At the time the decision was being made, EPA said that the phaseout of its noise program would have a slight to minimal impact. The agency pointed out that it had been concentrating on strengthening state programs to better assist local governments having complex noise problems. EPA also said that the dramatic increase in the number of state and local programs convincingly demonstrated that state and local governments can and would deal with environmental noise problems within their

has terminated its program. He said an indication of this situation is the large decrease in the association's membership. Several EPA officials also said that few states other than California and New Jersey now have noise control offices.

Objectives, Scope, and Methodology

Concerned about implementation of the Noise Control and Quiet Communities Acts in absence of EPA's noise control office, Congressman James J. Florio of New Jersey requested that we determine whether the acts' requirements are being carried out by other entities, such as FAA and state agencies. As agreed with the Congressman's office, our objectives were to examine the

- extent of the transportation (aircraft, railroad, and highway traffic) noise problem;
- status of EPA's transportation noise control and abatement efforts and plans for additional action at the time the decision was made to eliminate its program; and
- transportation noise control and abatement activities of federal, state, and local agencies.

As further agreed with Congressman Florio's office, the scope of our work was limited to the transportation noise control and abatement activities of EPA, FAA, FHWA, FRA, and the states of California and New Jersey. The Congressman's office was aware of transportation noise problems in New Jersey and had seen references to major aircraft noise abatement efforts in California.

To determine the extent of transportation noise problems, we reviewed available studies, reports, and surveys at EPA, FAA, FHWA, and FRA headquarters and their offices in California and New Jersey. We also held discussions with officials of these agencies, the appropriate California and New Jersey state agencies, and nine judgmentally selected local governments in these states (see app. I for a listing of these local governments). In addition, we met with the Chairman of the New Jersey Noise Control Council and the Administrator of the National Association of Noise Control Officials. In addition, we reviewed transcripts and attended public meetings held to discuss aircraft noise issues in California and New Jersey. Furthermore, we held discussions and obtained pertinent data from representatives of the operators of four airports: (1) Los Angeles International; (2) San Francisco International, (3) Newark International; and (4) Philadelphia International, whose noise affects nearby parts of New Jersey. Information on railroad noise complaints

Efforts to Control and Abate Aircraft Noise

Aviation noise has been a growing concern to people living near airports since the introduction of jet-powered commercial airline service in the early 1960s. Although federal, industry, and local airport efforts have helped in alleviating the noise, many people still find aircraft noise to be an unwelcome intrusion into their daily lives.

Local concerns about aircraft noise have been a major factor in creating a virtual standstill in constructing new airports and limiting expansion of existing ones. In addition, continuing public pressure to further reduce noise has led a growing number of airport operators to impose restrictions on the use of their airports. FAA and air transportation industry officials are concerned that these airport use restrictions, such as bans on flights at certain hours or certain types of planes, further constrain capacity and will adversely affect the aviation system's capability to meet the nation's growing demand for air transportation. Airport operators recognize this dilemma but believe that the noise concerns of surrounding residents have to be addressed. FAA officials and industry representatives, including airport operators, have called for a national aircraft noise policy to better balance noise concerns and aviation needs. The Department of Transportation is developing a national transportation policy that may include a noise policy.

According to industry representatives, a noise policy could involve the phaseout of noisier aircraft coupled with federal preemption of airport proprietors' authority to establish use restrictions. A phaseout offers substantial noise benefits, but it could be costly to replace noisier aircraft, which make up over half of the airlines' fleet. At issue is the time frame for completing the phaseout. A longer time frame would mean less cost because it permits normal aircraft replacement. The noise benefits and relief for residents near airports would be achieved more slowly, however. According to representatives of airport operators, if operators are preempted from establishing use restrictions, a major tool to respond to noise concerns, then the federal government should assume liability for noise damage.

FAA and industry representatives believe that a phaseout would substantially reduce the size of noise impacted areas, which FAA defines as areas of Ldn 65 or greater. Noise concerns, however, are not limited to these areas. To address the full range of noise concerns, federal programs may have to be expanded to encompass areas outside Ldn 65 or greater. Such a change in focus, along with the need to deal directly with communities surrounding airports, may result if federal preemption of airport operators and assumption of liability for noise damage occur under a national

were exposed to a noise level of Ldn 50.5. Comprehensive data on the number of affected people in the United States outside Ldn 65 areas are not available. However, EPA estimated that in 1979 45 million people lived in Ldn 55 to 65 areas and 5 million lived in areas of Ldn 65 or higher.

One common criticism of the Ldn measure is that it dilutes high levels of noise that may be experienced at various times during a 24-hour period. For example, 30 overflights of aircraft that each reach 83 decibels (approximately equal to the noise levels within a typical city bus) during the hours of 7 a.m. to 10 p.m. would result in an Ldn of about 60, which is well below Ldn 65.

Hearing damage does not appear to be a common result of aircraft noise exposure. According to FAA, the most prevalent effect is annoyance. People living or attending school near airports and along aircraft flight paths may find the noise loud enough and frequent enough to disrupt normal activities such as speech or conversation, periods of relaxation, sleep, or listening to television sound or music.

The above effects can also lower the value of real estate located in noise affected areas. According to FAA's March 1985 report entitled Aviation Noise Effects, studies have shown that a one decibel increase in Ldn usually results in a 0.5 to 2.0 percent decrease in property values. FAA concluded, however, that, at a minimum, the depreciation of a home because of aircraft noise is equal to the cost of moving to a new residence and that many other factors influence the price and desirability of a residence.

Noise can also have other economic impacts. For example, of 99 airports responding to a 1987 Airport Operators Council International survey, 11 airports reported that they had paid out over \$32.1 million for legal judgments against them on noise-related grounds during the preceding 10 years. In addition, 23 airports reported legal fees totaling over \$7.1 million during the same period. These costs may actually be much higher because of the limited number of airports that responded to the survey. A 1979 report of the Senate Committee on Commerce, Science, and Transportation stated that the nation's major airports had suits pending for hundreds of millions of dollars and potential liabilities that can be measured in the billions of dollars. San Francisco International Airport, for example, spent over \$1 million to defend against over 350 small claim actions alleging excessive airport noise filed by nearby residents between 1982 and 1985.

ensure that the land is used only for purposes that are compatible with noise levels from airport operation. Authority to issue these grants expired on September 30, 1981. However, the Airport and Airway Improvement Act of 1982 established the current grant program, which is known as the Airport Improvement Program. This program continues funding for airport planning and development. The 1982 act also authorized program funding for noise compatibility planning and to carry out noise compatibility programs. The latest extension of the program was the Airport and Airway Safety and Capacity Expansion Act of 1987, which authorized funding through fiscal year 1992.

The Quiet Communities Act of 1978 amended the Noise Control Act to require EPA, among other things, to conduct research on noise effects, measurement, and control; to administer a quiet communities program; and provide technical assistance to state and local governments to facilitate their development and enforcement of noise control. One specific requirement was for grants to states, local governments, and authorized regional planning agencies for developing noise abatement plans for areas around major transportation facilities, such as airports.

The Aviation Safety and Noise Abatement Act of 1979 set target dates for reducing the number of the noisiest jet aircraft then in use and emphasized airport noise compatibility planning (land-use planning and zoning). The act directed the Department of Transportation, in consultation with EPA, to establish single systems for measuring noise at airports and surrounding areas and for determining individual exposure to noise. The act also directed the Department to identify land uses that are normally compatible with the various exposures of individuals to noise. In addition, the act authorized the Department to make airport noise compatibility planning grants to operators of airports. Under the act, airport operators may also submit a noise compatibility program for Department review and approval. Approval of the program, which sets out the measures taken and proposed to reduce existing and prevent future non-compatible uses within the surrounding areas, makes the airport eligible for funds to implement the measures. Noise compatibility plans and programs are not mandatory for the airports. The Department has delegated these responsibilities to FAA.

FAA also has major responsibilities for developing and maintaining a safe and efficient system of air transportation. Thus, FAA has the dual statutory mandate of fostering a national system of airports and airways and controlling the negative effects of aircraft noise on the public.

EPA's Role Changed From Proactive to Reactive

Although FAA has the authority and responsibility to regulate aircraft for noise abatement purposes, the Noise Control Act of 1972 directed that EPA also play a role. This role was set out in requirements that EPA recommend aircraft noise regulations to FAA; FAA consult with EPA on various actions, such as prescribing and amending noise measurement standards and regulations; and EPA conduct noise research and provide technical assistance to state and local governments. In addition, EPA is authorized under Section 309 of the Clean Air Act to review and comment on environmental impact statements and environmental assessments prepared for federal and federally assisted activities. An impact statement for proposed airport expansion, for example, would be reviewed for potential increases in noise, as well as other environmental effects.

EPA's Earlier Role Was More Proactive

From December 1974 to October 1976, EPA submitted 11 proposals to FAA dealing with aircraft noise. FAA accepted one of EPA's proposals and parts of two others. A former EPA official, who is currently with FAA, told us that he now believes that the major reason most of the proposals were not accepted was that they were written too narrowly, that is, not reflecting a full understanding of total aviation operations. A Port Authority of New York and New Jersey official said that, although mostly not accepted, the EPA proposals pushed FAA to develop its own noise regulations.

EPA also provided some technical assistance in aviation noise abatement planning. For example, EPA developed the Airport Noise Evaluation Process, a simplified and objective approach for determining aviation noise impacts. The process was designed for use by individuals lacking an in-depth background in aircraft acoustics and uses information based on airport operations and local demographics. Another example was EPA's distribution of its Airport Noise Abatement Planning booklet to citizens wanting to learn what they could do at the local level. In addition, EPA helped communities develop noise exposure maps and interpret the results.

In February 1980, EPA's Office of Noise Abatement and Control prepared a 5-year plan for fiscal years 1981-85. The plan, which was prepared before the President's recommendation to phase out funding for the agency's noise program, stated that EPA was already devoting a high percentage of senior staff time to aviation noise and additional resources would be committed to it. The overall aircraft noise objective set out in

According to EPA Office of Federal Activities officials, the agency reviews all of the several hundred environmental impact statements and many of the thousands of environmental assessments prepared each year on all types of projects. The officials said that some environmental assessments and impact statements have concerned FAA actions. A recent example of EPA's review of the noise portion of an environmental impact statement is a draft statement for the extension of a runway at Baltimore/Washington International Airport. With regard to noise impacts, EPA officials stated that the project's Ldn data should be supplemented with data on single event exposures. EPA officials cited schools, which are only open during a fraction of the time over which the Ldn is computed, as an example where single event data are needed to supplement the Ldn data.

Some of the officials we talked to disagreed with EPA's current role in aviation noise abatement. For example, New Jersey's Department of Environmental Protection officials, including the Commissioner, told us that the Noise Control and Quiet Communities Acts have not been repealed and EPA should carry out its responsibilities under these acts. In December 1986, the Commissioner wrote EPA expressing concern about citizens' exposure to increased aircraft noise levels associated with Newark International Airport. The Commissioner asked EPA what role it planned to take in the control and abatement of increased noise at the Newark and other New Jersey airports. In March 1987, the Director of EPA's Office of Federal Activities transmitted a copy of the agency publication, Airport Noise Abatement Planning, to the Commissioner and said that the initiative for noise abatement action relative to airport noise usually must originate locally. The director stated that an appropriate path of action for noise mitigation at an airport would be for the airport proprietor to initiate a noise study under the Aviation Safety and Noise Abatement Act of 1979. EPA officials have more recently said that they will assist states on request to the extent that they have resources to do so.

FAA Aircraft Noise Control and Abatement Efforts Are Multifaceted

Aircraft noise impact reductions can be achieved through two basic approaches: quieting the source and separating or distancing the public from the noise. The first approach involves using quieter aircraft and operating aircraft in ways that generate less noise. The latter approach consists of following flight paths that take the aircraft away from people or so that they affect fewer people, soundproofing homes and other buildings, improving airport design, or implementing land-use planning and control measures to limit the number of people who live or engage

paths that will reduce aircraft noise near noise-sensitive areas. According to agency officials, FAA has taken numerous actions on flight paths to reduce noise impacts.

The Part 150 Program

Controlling the use of land adjacent to airports to create a buffer to airport/aircraft operations can reduce the number of people adversely affected by aircraft noise. In some cases, municipalities have jurisdiction over noise impacted areas and can control land use through zoning and building codes. In other cases, some noise impacted areas are located in jurisdictions that do not share in airport ownership, and the airport owners must rely on these jurisdictions to control land use in their areas near the airport.

FAA's Airport Noise Compatibility Planning Program (commonly referred to as the Part 150 program after the section of the Federal Aviation Regulations) is designed to encourage airports to prepare noise exposure maps² showing areas of land uses incompatible with noise levels of Ldn 65 or greater and to propose a program to reduce this incompatibility. According to FAA, airport noise/land use compatibility problems occur at many U.S. airports, and the potential for exacerbating these problems and the possibility of problems arising at other airports increase as urban areas and air travel continue to grow. FAA believes that a balanced approach to addressing these problems is needed. Nonaviation, as well as aviation, solutions should be considered and a balance between realistic environmental goals and the costs to the aviation system should be sought. The Part 150 regulation was issued, pursuant to the Aviation Safety and Noise Abatement Act of 1979, in January 1981 on an interim basis and in final form in January 1985.

An airport operator's first step under the Part 150 program is to develop a noise exposure map and submit it to FAA for review. After FAA's approval of the map, the airport operator may submit a noise compatibility program for FAA's review. Airport operators with approved maps and compatibility programs are eligible to apply for but not assured of financial assistance from FAA. In addition, the approval does not determine that all measures in the program are eligible for funding. Furthermore, a request for federal action or approval to implement specific measures may be required, and an FAA decision on the request may

²Noise exposure maps are scaled geographic depictions of an airport, its noise contours, and surrounding areas. Each map is to depict continuous Ldn contour lines for noise exposure levels of 65, 70, and 75. Within the Ldn 65 contour, the airport operator is required to identify land uses and determine land use compatibility in accordance with Part 150 standards and procedures.

the study was to determine whether program procedures could be revised to provide an expedited and simplified process. FAA has solicited input on the effectiveness of current rules and recommendations for possible changes.

In its January 1989 comments to FAA on the Part 150 regulations, EPA made several recommendations, including the following:

- Submission of Part 150 noise exposure maps and noise compatibility programs be made mandatory, rather than voluntary, for all airports that accommodate commercial carrier operations.
- Airport operators be required to execute a legally binding agreement to carry out all mitigative actions proposed in their Noise Compatibility Reports and establish a compliance monitoring system.
- Federal funding be provided for soundproofing of significantly impacted noise-sensitive receptors, even though they (residences, in particular) may not be public buildings.
- The Part 150 regulations provide more detailed guidance on the criteria applied by FAA in reviewing proposed mitigative measures.

EPA's major area of concern with the Part 150 regulations was the absence of consideration of possible noise impacts outside the areas of Ldn 65 or greater. According to EPA, substantial noise impacts can occur outside these areas, both from the standpoint of "highly annoyed" residents in the areas between Ldn 55 and 65 and of certain repeated disruptive single events (e.g., sleep interruptions and classroom disturbances). EPA further stated that it recognizes that a practical economic limit may govern the extent to which mitigative measures may be required in making an airport compatible with its neighbors. However, the agency added that nonetheless, fairness seems to require that, to the extent feasible, the full nature and scope of the noise impact from an airport should be disclosed, and maximum effort be expended to mitigate that impact within available funding.

FAA officials told us that the Part 150 program should deal with the most serious aircraft noise problems and that an objective standard beyond which the program will not or cannot go is needed. They said that they continue to support Ldn 65 as that standard but are examining the New Jersey situation to obtain an in-depth understanding of why the Expanded East Coast Plan generated the amount of noise concerns that it did outside the Ldn 65 areas.

According to the courts, airport proprietors may impose restrictions on the use of their landside facilities to reduce noise levels, but they generally cannot restrict airside operations. In imposing these restrictions, airport proprietors must act lawfully, reasonably, and nondiscriminatorily and must not impose an undue burden on interstate commerce. Any action to restrict operations for any reason other than a legitimate noise problem is prohibited.

State and local governments can address airport noise problems through zoning or other controls to ensure that surrounding land uses are compatible with airport operations. Federal airport grant agreements impose responsibilities on airport sponsors to achieve compatible land use to the extent reasonable, but many airport proprietors do not have zoning authority for all areas around their airports.

California and New Jersey State Airport Noise Actions

State governments generally are not airport proprietors and thus do not exercise direct control over airport operations. Nonetheless, California and New Jersey have taken some action to address airport noise. In 1969 the California Legislature required the State Department of Aeronautics, currently called the Division of Aeronautics, to adopt noise standards to govern the operation of aircraft and aircraft engines at airports operating under a state permit to serve the general public. In 1970, the aeronautics division established a limit of 65 decibels measured on the Community Noise Equivalent Level scale as the level to protect people residing in the vicinity of the airport. This level is similar to Ldn 65.

California's community noise standards require that no airport shall operate in a way that adjacent areas are exposed to noise levels in excess of a Community Noise Equivalent Level of 65 decibels unless the proprietor has obtained a variance. The variance process requires airport proprietors to develop and implement programs that will contribute to improving the noise environment around the airport.

The responsibility for enforcing the state noise standards is delegated to the county in which the airport is located. According to the Airport Environmental Specialist in the Division of Aeronautics, the counties are allowed complete flexibility and control in determining the extent of their aircraft and airport noise problem and identifying actions needed to resolve it. He said that Division of Aeronautics personnel provide some technical assistance to airport proprietors, but no state funding is

Many categories of noise control actions involve restricting airport access or use, and the number of these restrictions is increasing. According to the Working Group on Aircraft Noise/Airport Capacity³ report issued in 1987, the number of U.S. airports with noise abatement restrictions rose from 256 in 1983 to 312 in 1986. The following examples from the 1986 FAA report on airport noise control strategies illustrate these types of restrictions.

Table 2.2: Examples of Airport Use Restrictions as Reported by FAA in 1986

Noise Control Strategies	Number of airports
Use of a rotational system or routing traffic over certain runways to minimize flight over noise sensitive areas	149
Limit on number of aircraft departures or arrivals in a given time period or by noise capacity	6
Runway restrictions imposed for specific aircraft type	31
Banning of aircraft that exceed a certain noise level	16
Banning of certain types or classes of aircraft either totally or for certain times of day	35
A restriction on aircraft that do not meet one or more of the FAR Part 36 noise level requirements or are above some locally determined noise threshold level	25
Complete closure of an airport for noise during any period of time (usually at night)	4
Restriction of aircraft over a certain weight or thrust limit from using the airport	26

FAA has not updated its 1986 report, but agency officials and industry representatives believe that airport access restrictions are increasing as operators continue to react to concerns about lawsuits for noise damage and public pressure to reduce aircraft/airport noise levels. Proprietors can directly implement such restrictions, and these can be effective in reducing noise levels.

Noise Control and Abatement Efforts at Selected Airports

During our visits to the Newark, Philadelphia, San Francisco, and Los Angeles airports, we found that all of the airports were taking action to reduce aircraft noise or mitigate its effects. Many of these efforts have been going on for many years. For example, in 1959, the Los Angeles Department of Airports participated on a committee of air transportation industry representatives working on noise problems. Officials of the

³This special working group is part of the Industry Task Force on Airport Capacity Improvement and Delay Reduction and was formed in 1986 to examine the impact of aircraft noise on airport capacity and access. It is comprised of eight representatives of passenger and cargo air carriers and eight airport representatives.

Philadelphia

- Various operational controls have been implemented. These controls include directing flights along the Delaware River, using a preferential runway system to direct departures away from the highest concentration of residences, and prohibiting engine runups from 11:00 p.m. to 6:00 a.m.
- The airport manager, in September 1988, appointed an air services manager with the responsibility for the airport's noise abatement program. According to the air services manager, an expanded noise program is needed to respond to two planned changes that could generate more complaints. These are the United Parcel Service distribution facility under construction, which would mean more night flights, and plans to lengthen the commuter runway and build a new runway parallel to it.
- Airport officials are also planning to install a 24-hour telephone hotline to receive complaints. In addition, they are planning to install a noise monitoring system.

San Francisco

- Use of a preferential runway system allows for almost four out of five arrivals and departures to take place over the San Francisco Bay rather than residential areas.
- A Joint Powers Board representing the airport owners and nearby communities issued a Joint Land Use Study in March 1980, which presented specific actions to address airport-related environmental and land-use problems and a series of on- and off-airport actions to mitigate airport noise effects. In 1981, the Airports Commission developed an Airport Noise Mitigation Action Plan to implement many of the actions recommended in the study. The plan and study were submitted to FAA, and the agency approved a majority of the recommendations under Part 150.
- The airport is providing funds for sound insulation of almost 700 homes and 3 schools in noise-impacted areas with federal financial assistance.
- The Airports Commission, in April 1986, banned a Boeing Q707 Stage 1 aircraft retrofitted with hush kits to meet Stage 2 requirements from landing at the airport because it did not meet its noise regulations. The FAA and the Airports Commission, as of June 1989, are in litigation over the restriction because FAA believes that the policy is unjustly discriminatory. As a result of this ban, FAA has withheld Airport Improvement Program funding from the airport. As of April 1988, FAA's withholding of program funds, other penalties, and legal fees have cost San Francisco approximately \$25 million.
- The Airports Commission adopted regulations in January 1988, requiring all air carriers to gradually phase out their use of Stage 2 aircraft at the airport until 75 percent of their operations on January 1, 1999, are with Stage 3 aircraft. In addition, the regulations limit operations of

local restrictions without having to incur overburdening costs to convert to Stage 3 aircraft. FAA wants to protect the capacity of the aviation system and interstate commerce and assist in efforts to reduce aviation noise effects.

Increasing Air Transportation Demand and Airport Capacity Constraints

Air transportation has increased substantially since the Airline Deregulation Act of 1978, and this growth in demand is expected to continue. According to the Coalition for Aircraft Modernization, the number of passengers carried by the airlines was 275 million in 1978 and 450 million in 1988. The Air Transport Association of America anticipates that the number of passengers carried will increase to 780 million before the year 2000. Industry and FAA projections are that the number of air carrier hours flown per year and the air carrier fleet will increase 40 percent and 57 percent, respectively, between 1987 and 2000.

Although demand has grown substantially, no new commercial airports have been built in the United States since 1974. In addition, airport expansion has been limited by development surrounding airports. The Working Group, in its September 1987 report to the FAA Administrator, said that aircraft noise has been a major constraint on expanding current airports and virtually a total block to developing new airports. According to FAA, 3,219 airports nationwide handled commercial and general aviation activity in 1987. FAA estimated that 3,750, or an additional 531, airports would be needed by the year 2000 to keep up with demand.

FAA officials and industry representatives are concerned that the number of airport access or use restrictions is increasing as residents near airports continue to put pressure on airport proprietors to reduce the noise. FAA, industry, and airport officials believe that these types of restrictions limit the full use of the airports and/or the industry's fleet of aircraft. Air transportation service or the industry's operations are adversely affected to the extent that air carriers cannot make adjustments in their flight or aircraft schedules without limiting the number of flights or service they provide or incurring additional operating costs. For example, night curfews or time-of-day restrictions can mean fewer flights in and out of the airports or an increase during other hours. Thus, the level of service to the travelling public that wants to arrive or depart during the curfew or restricted hours is reduced. Furthermore, the total number of flights may have to be reduced if the airport cannot safely handle additional flights during the other hours. According to

could be imported after that date only if modified to meet Stage 3 certification standards.

- A phaseout schedule and final cut-off date for all Stage 2 low-bypass ratio aircraft be established. Each U.S. carrier would submit a plan to FAA for approval by December 31, 1992, for operational phaseout of the aircraft beginning no later than December 31, 1994, and ending before December 31, 2009. Once a Stage 2 is phased out, it could not be re-introduced as a Stage 2 aircraft for operations within the United States.
- A financial incentive program be established by the federal government to encourage U.S. airlines to accelerate the Stage 2 aircraft phaseout timetable. The program would be funded and structured so that all Stage 2 aircraft are phased out by December 31, 1999.

As an integral part of a federally mandated phaseout schedule and funding to permit a quicker phaseout, the Working Group recommended that the federal government preempt airport proprietors from enacting new local noise restrictions on the time of day and on the type or number of aircraft that may use their airports. In return, the federal government would assume the possible liability for noise damages, and the proprietors would continue to retain existing authority, after notice to and comment by the airlines, to impose regulations regarding such matters as preferential runways, noise run up areas, land-use acquisition, and aircraft training restrictions. The Working Group also recommended that the federal government take any action necessary to assure that the Ldn 65 area at a given airport does not expand to include additional population.

In an April 1989 update of its recommendations, the Working Group proposed that the federal government establish a national noise program based on three initiatives as follow:

- A strong program for the control and enforcement of land use within the Ldn 65 areas around all U.S. civil airports.
- A final cut-off date for operation of all Stage 2 low-bypass aircraft no later than December 31, 1999.
- A prohibition against airports imposing any new local airport noise restrictions as to type or number of aircraft or time of day of airline aircraft operations with appropriate federal government assumption of liability for any aircraft noise liability resulting from the prohibition.

Under the Working Group's proposal, the December 31, 1999, cut-off date would be dependent on several factors, such as the ability of manufacturers to produce Stage 3 aircraft and economically reasonable

- Carriers are bringing Stage 3 aircraft on line as fast as they can be produced. Manufacturers currently face a 4-year backlog of orders for Stage 3 equipment and are unable to keep pace with industry demand. The FAA forecasts that fleet modernization will occur naturally by the year 2005. Thus, an accelerated phaseout is not justified. (According to the Working Group, it appears that total replacement of Stage 2 aircraft is technically possible because free world manufacturers are currently capable of producing an estimated 650 new aircraft per year.)
- Stage 2 aircraft should be phased out gradually, consistent with their economic useful lives. Stage 2 aircraft are no longer in production, and carriers are replacing the older ones with Stage 3 aircraft.

Although the Coalition is opposed to a nonaddition rule, the Manager of FAA's Noise Abatement Division told us that one is needed. Under such a rule, when a Stage 2 aircraft is replaced, it could not be replaced by another Stage 2. According to the FAA official, the rule is needed to prevent the dumping of Stage 2 aircraft by Europe when it phases out its Stage 2s. According to industry sources, in June 1988, the European Civil Aviation Conference adopted a nonaddition rule to take effect after October 1990. This resolution is not binding; however, the European Economic Community is considering a proposal for a similar rule that would take effect in November 1990. This action is seen as a first step to banning the use of Stage 2 aircraft in Europe.

A major industry concern over a phaseout is its lost investment in Stage 2 aircraft—many of which are relatively new—and the cost to replace them with Stage 3s. Various estimates have been made as to the phaseout cost. These estimates range from the Working Group's preliminary estimate of \$1.5 to \$3.2 billion, which reflects the additional incremental cost of a phaseout (based on a 25-year life and a 30-year life) over the replacement that would normally take place. Other estimates include amounts such as \$36-46 billion and \$75 billion to replace the transportation capacity represented by Stage 2 aircraft. Cost estimates would vary by factors such as the salvage value of Stage 2 aircraft, the length of the phaseout period, the useful or economic life used, and cost savings achieved from using the more energy efficient Stage 3 aircraft. In addition, the use of hushkits, which are devices to adjust the flow of the engine exhaust to make Stage 2 aircraft meet Stage 3 noise standards, would be cheaper than buying a new plane.

Port Authority of New York and New Jersey officials told us that they would agree with federal preemption of local airport noise restrictions accompanying a mandated phaseout if the federal government assumed

Group, who is FAA's Acting Associate Administrator for Policy, Planning, and International Aviation, told us that the Secretary has said that he recognizes the need to develop a noise policy. He also told us that he anticipates that a noise policy will be developed with the national transportation policy. The impact of transportation on the environment is one of the major concerns that the cluster groups are to address.

Conclusions

Although the introduction of quieter aircraft and other actions by federal and local agencies, airport operators, and industry have reduced the number of people living in heavily impacted areas around airports, aircraft noise continues to be a concern. In response to continuing local pressure to further reduce the noise, an increasing number of airport proprietors have imposed airport use restrictions. Because of concerns that these restrictions further limit capacity and/or adversely affect industry operations and service, FAA, air transportation industry, and airport operator representatives have expressed the need for a national aircraft noise policy. The major issues in this regard are likely to be a mandatory phaseout of Stage 2 aircraft and local airport use restrictions. In the latter case, likely to be at issue are the effects of the restrictions on the nation's air transportation system and interstate commerce, whether the federal government will preempt airport proprietors' authority to institute such restrictions, and whether the federal government will assume the legal liability for airport noise damages. Likely at issue in a phaseout are how quickly it should be accomplished, and how it would impact airport operators and air carrier operations.

If federal preemption of airport use restrictions takes place, the airport operator's ability to respond to local noise concerns and problems could be substantially diminished. Thus, the issue of federal responsibility under such a national policy could be broader than federal assumption of liability for noise damages. It could also include how the federal government in its more direct role would seek to address local noise concerns and problems that continue or develop at individual airports after implementation of the policy. Some noise concerns are likely during and even after a Stage 2 phaseout, especially in areas of less than Ldn 65. At some point, noise concerns may begin to increase again because of greater air traffic. Thus, the federal government may have to become more directly involved with communities to identify, develop, and implement ways to further reduce noise levels or lessen the impact at specific locations. FAA's Part 150 program is directed primarily through airport operators, and financial assistance is limited to areas of Ldn 65

Efforts to Control and Abate Railroad Noise

Railroad noise can be a problem for those who live near a railyard or busy rail line. EPA, as required by the Noise Control Act of 1972, has established noise emission standards for rail cars, locomotives, car coupling operations and some other types of equipment used by rail carriers engaged in interstate commerce. Although EPA's noise program has been eliminated, these standards are still in effect. The Federal Railroad Administration provides limited monitoring of industry compliance with the standards and has found few violations.

State and local railroad noise control and abatement efforts have also been limited. One reason is that state and local officials believe that their authority to regulate noise emissions is restricted. The Noise Control Act preempts state and local governments from establishing noise standards that are different from the EPA standards for specific equipment and operations. Some of the local communities we visited had constructed noise barriers or sought voluntary railroad industry compliance with ordinances restricting use of train whistles.

Railroad Noise Is a Concern to Some Communities

A lack of recent data makes it difficult to accurately estimate the number of people whose daily lives are affected by railroad noise. According to a 1979 EPA estimate, 6.5 million or more people were exposed to noise levels greater than Ldn 55 from railroad operations. An estimate of those subject to higher levels of noise was not available. However, a 1980 National League of Cities nationwide survey, which was conducted under contract with EPA's Office of Noise Abatement and Control, showed that 20 percent, or 144, of the 706 responding communities identified noise from railroad operations as a significant problem. The survey was sent to cities with populations of 20,000 or more people.

Since 1980, the number of railroad locomotives in service has dropped more than 20 percent. In addition, FRA and Association of American Railroads (AAR) officials believe that technological developments have made trains quieter. AAR representatives also said that other changes, such as consolidation of operations, have reduced the number of people potentially exposed to railroad noise. This combination of events may have reduced the number of people exposed to excessive railroad noise, but neither EPA, FRA, nor the industry has made estimates that might show this change. Officials of six of the nine local governments we visited told us that railroad noise was a problem. Of these six local governments, officials of two viewed the noise as a major problem.

federal preemption of potentially conflicting state and local noise ordinances, as intended by the act. The court ruled in favor of the AAR and required EPA to substantially broaden the scope of its regulation.¹

In January 1980, EPA published final noise emission regulations for four railroad noise sources. The regulations, which took effect in January 1984, set noise emission standards for railyard operations and equipment, such as switcher locomotives, retarders, and car coupling.

Special Local Condition Exemptions Not Used

The Noise Control Act authorizes EPA to exempt communities from preemption of interstate rail regulation upon a showing that the community has a special local condition that merits exception and the resulting community standards are not in conflict with the national standards. EPA had plans to issue regulations governing the submission and approval/disapproval of applications for such exemptions. However, an EPA official told us that the agency decided not to issue the regulations because requests for exemptions would need to be considered on an individual basis.

According to the official, EPA has received about 12 informal requests for special local condition exemptions but no petitions for an exemption for EPA to decide on. The official said that the communities probably did not pursue their requests further because obtaining the information they would need to present their cases to EPA would be costly. The most recent request was from the city of Seattle, Washington. On August 12, 1986, the mayor of Seattle wrote the Administrator of EPA requesting special local condition status and advice regarding the appropriate procedure for applying and the information needed. The mayor's request was in response to petitions received from residents of a highly populated neighborhood in Seattle near railroad switch yards. Residents complained that the noise disrupted conversations; interfered with audibility of radios, televisions, and stereos; and disturbed sleep. FRA inspectors had found that the noise levels of the equipment and operations at the yards complied with the EPA standards. The mayor wanted authority to establish more stringent local standards to reduce the noise levels.

EPA's Office of Air and Radiation responded to the request on July 3, 1987, informing the mayor that the noise measurement data he submitted were not consistent with the measurement methodology needed to

¹Association of American Railroads v. Costle, 562 F.2d 1310 (D.C. Cir. 1977).

are received about train whistles, the caller is told that there are no federal restrictions on whistles because of safety reasons. In those cases where it appears there may be a solvable problem, the inspectors stated that they work informally with the railroad to change its operations.

Few Routine Inspections Are Conducted

In the states we visited, FRA staff conducted inspections only when they received a complaint. However, FRA headquarters records indicate that some routine tests are done. Between January 1 and August 29, 1988, FRA staff reported 42 routine inspections nationwide. An FRA headquarters official told us that he did not know why these routine inspections were done but that they probably took place during the time when some inspectors had noise monitoring equipment out to investigate complaints. According to FRA officials, the agency conducted many more routine inspections before it changed its enforcement policy.

FRA Finds High Compliance Rates

According to FRA officials, the principal reason for the decision to discontinue routine inspections was that FRA investigators found the rate of compliance to be extremely high. For example, the Motive Power and Equipment Specialist who handles noise complaints in FRA Region 7 told us that FRA staff conducted routine noise testing at California railyards from 1982 through 1986, but they were discontinued because all equipment was in compliance with the standards. According to an FRA headquarters official, the failure rates on noise inspections nationwide had generally been 1 percent or less.⁴ The failure rate for the small amount of testing that is currently done is also small. For the 42 routine tests conducted from January 1 through August 29, 1988, only one failure occurred.

According to FRA headquarters officials and its inspectors in California and New Jersey, trains almost never fail the tests because the standards are generally liberal. The Region 7 specialist stated that, in general, he considers the standards liberal for two reasons: (1) they are based on a weighted average noise measurement; as a result, when an intermittent loud noise is averaged with other periods of little or no noise, the standard is not exceeded; and (2) they are based on equipment maintained to adequate mechanical standards. A provision in the regulations states

⁴We found limited readily available data on the failure rates when FRA conducted numerous routine inspections. However, a July 1981 report, *Evaluation of the Department of Transportation Urban Noise Control Programs and Activities*, prepared by the International Science and Technology Institute, Inc., showed that FRA conducted 470 routine noise inspections during an 18-month period in 1979 and 1980. Only two inspections found noncompliance with the standards.

In absence of regulatory authority, some local governments have taken other courses of action. For example, we were told that Orange County has passed an ordinance that restricts train whistle use. Similarly, the Sacramento city code states that the whistles can be used only in cases of emergency or imminent danger.⁵ Other California local jurisdictions, such as Los Angeles County and the city of Pleasanton, have constructed noise barriers to reduce railroad noise. The city of Los Angeles has also encouraged railroads to provide buffer zones along railways in residential areas.

EPA officials believe that a recent court decision could increase the local role in railroad noise control. According to the officials, states and localities can now establish property line standards to regulate railyard noises. The U.S. Court of Appeals for the Third Circuit recently held in Baltimore and Ohio Railroad Co. v. Oberly, 837 F.2d 108 (3rd Cir. 1988), (Oberly) that the preemption provision of the Noise Control Act only forbids states and localities from regulating those sources of railroad noise that federal regulations specifically address. In Oberly, the state of Delaware had planned to take action against refrigerated cars at the Wilsmere, Delaware, railyard based on the state's property-line standard. EPA has not issued noise standards for refrigerator cars or a property-line standard. The court held that since EPA has not regulated either refrigerated cars nor noise emissions at railroad property lines, the federal Noise Control Act and the regulations EPA has issued do not "facially preempt" the mere existence of Delaware's regulations. According to AAR representatives, the association plans no further action with regard to the federal preemption provision of the Noise Control Act unless local noise regulation becomes a problem for the industry.

The Industry Has Made Efforts to Control Railroad Noise

According to AAR representatives, where noise is a concern, railroad companies work with local governments as "good neighbors" to address the problems. For example, FRA officials in New Jersey and California told us that railroads have installed noise barriers around railyards to reduce noise levels. On the other hand, two officials said that the industry could do more to consider noise in its operations. An official with the California Public Utility Commission and a New Jersey FRA official told us that the head-end power engine is a particularly noisy design since

⁵AAR representatives we talked to were concerned that measures taken by local governments to restrict the use of whistles or horns at crossing gates could create a safety hazard. FRA officials also said that whistle noise control measures can adversely affect safety.

Conclusions

Without routine monitoring, FRA does not know for certain that the industry is fully complying with EPA's railroad noise standards. However, greater enforcement may not be warranted unless the standards are made more stringent. Past routine monitoring found a very high rate of compliance, and the results of the limited number of tests currently being conducted similarly find high compliance rates. FRA officials attribute the low failure rate to the standards being liberal. In addition, FRA and industry representatives said that trains are quieter now than when EPA established the standards.

The standards have not been recently revised or reexamined. However, a comprehensive assessment of the railroad noise problem, the current noise emission levels of railroad equipment and operations, and an analysis of the technical and cost practicability of more stringent standards would be needed before deciding whether and how the standards should be revised. In addition, alternative ways to deal with railroad noise problems would need to be considered.

Recent national data on the size of the railroad noise problem and the extent that communities cannot address local noise concerns are not available. Potential exposure, however, should be relatively small because most Americans do not live or work close to major rail lines or railroad facilities. Although agency personnel do not record all the complaints they receive, FRA appears to receive relatively few noise complaints. The states of California and New Jersey also receive a small number of complaints. Nonetheless, some communities and individuals are subjected to what they consider excessive noise from nearby rail operations. For example, officials of two of the nine communities we visited considered railroad noise to be a major problem.

In view of the interstate nature of railroad operations, the continued existence of preemptive federal standards, FRA's enforcement responsibility, and indications of some railroad noise problems, a case could be made that additional federal action, such as assessing railroad noise problems, reexamining the EPA standards, reconsidering FRA's enforcement policy, and implementing the special local conditions exemption provision, may be warranted. However, as discussed in chapter 5, we believe that a more basic issue to be addressed is what the federal role in transportation noise control and abatement should be and how it should be carried out. With regard to the federal role regarding railroad noise, a major consideration is the implication of the recent court decision in the Oberly case for state and local regulation of railyard noise.

Table 4.1: 1980 National League of Cities Survey Results for Highway Traffic Noise Problems by Source

Specific noise source	Number identifying as a significant problem		Number stating that progress made in reducing the noise	
	Cities	States	Cities	States
Motorcycles	308	27	74	12
Trucks	292	24	62	14
Autos	246	18	78	12
Buses	105	13	59	8

With the elimination of EPA's Office of Noise Abatement and Control, the agency no longer compiles national data on the extent of highway traffic noise and whether the noise situation has deteriorated or improved. Since 1980, the number of motor vehicles has increased and population growth and development probably means that more people are living near more heavily travelled roads and streets. On the other hand, industry representatives believe that new trucks are quieter. In addition, FHWA and many state and local governments have noise abatement programs. Nonetheless, six of the nine local governments we visited in California and New Jersey cited traffic noise from freeways and arterial streets as a major problem for their residents, and state highway departments continue to receive many traffic noise complaints. .

Federal Requirements to Reduce Highway Traffic Noise

As previously stated, Section 6 of the Noise Control Act gives EPA the authority to establish noise regulations for products distributed in commerce that are major sources of noise. Transportation equipment and motors and engines are two of the specific categories EPA is to consider. In addition, section 18 of the act requires EPA to issue noise emission standards for interstate motor carriers. These latter ones apply to the operation of trucks and buses by motor carriers engaged in interstate commerce and that have a Gross Vehicle Weight Rating of over 10,000 pounds.

The Noise Control Act makes the Department of Transportation responsible for enforcing the interstate motor carrier standards promulgated by EPA. The act also permits state and local governments to adopt and enforce these standards, as well as those EPA issues under section 6. They are preempted by the act from establishing or enforcing standards that are different from the federal ones. However, EPA, after consulting with the Department of Transportation, can determine that the state or local ordinances are necessary because of special local conditions and are not in conflict with the EPA standards.

April 1976, limited noise from newly manufactured trucks at the following levels (measured at 50 feet) and effective dates: 83 decibels by January 1, 1979, and 80 decibels by January 1, 1982. EPA, in response to industry petitions, deferred the effective date of the 80-decibel requirement on three occasions: (1) January 27, 1981, (2) February 17, 1982, and (3) January 8, 1986. The requirement, which manufacturers are to meet, went into effect on January 1, 1988. Accompanying the January 8, 1986, deferral was a reduction of three decibels in the interstate motor carrier standard to at least partially offset the delay in the newly manufactured truck standards. The reduction applies to 1986 and later models. EPA's noise standard for newly manufactured motorcycles and motorcycle exhaust systems was published on December 31, 1980.

According to its 5-year noise plan for fiscal years 1981 through 1985, EPA planned to continue to place its greatest emphasis on the abatement of surface transportation noise, including trucks, buses, and automobiles. The plan states that noise from these sources impacts far more people than noise from any other source. In its analysis of ways to abate traffic noise, the report states that the most direct attack for solving the problem is on the source itself—the motor vehicle. The plan concluded that federal regulations were needed to reduce overall vehicle fleet noise levels. The agency planned to promulgate regulations for newly manufactured motorcycles, buses, and refrigeration units on truck trailers; to make trucks even quieter; and to implement the provision for special local conditions exemption from the interstate motor carrier standards. In addition, it planned to devise and implement strategies for controlling noise from light vehicles (including automobiles) and tires and assist localities in land-use planning along highways. The motorcycle regulation was issued, but with elimination of its noise program, EPA has issued no other new standards. Furthermore, the agency no longer routinely enforces the standards it has issued.

FHWA Emphasizes Noise Barriers Over Standards Enforcement

According to FHWA's Office of Environmental Policy, effective control of the undesirable effects of highway traffic noise requires that (1) land use near highways be controlled, (2) vehicles themselves be quieted, and (3) noise mitigation be undertaken on individual highway construction projects. The office considers the first component to be traditionally an area of local responsibility, with the federal government having essentially no authority to regulate land-use planning or the land development process. The other two components are viewed as the joint responsibility of private industry and federal and state governments.

FHWA regulations make a distinction between projects for which noise abatement is considered as a feature in a new or expanded highway and those for which noise abatement is considered as a retrofit feature on an existing highway. The former are defined as type I projects, the latter as type II. For type I projects, the consideration of noise abatement as part of the highway construction project is mandatory if federal-aid funds are to be used and if a noise impact is expected to occur. Type II projects are voluntary for the states and compete with all their other highway construction needs.

Noise abatement measures can include traffic management, buffer zones (undeveloped, open spaces bordering a highway), planting of vegetation, insulation of public use or nonprofit institutional buildings, and relocation of the highway to avoid land-use areas with a potential noise impact. However, the major highway noise mitigation measure is construction of noise barriers along the road to block the sound from reaching nearby buildings. Noise barriers can be built out of wood, stucco, concrete, masonry, metal, and other materials. Barriers can also be formed from earth mounds along the road. FHWA estimates that effective barriers can reduce traffic noise levels by 10 to 15 decibels, cutting the loudness in half or more. As of December 31, 1986 (the latest available data), FHWA estimates that states had constructed over 467 miles of noise barriers at a cost of \$338 million. Thirty-eight states and the Commonwealth of Puerto Rico accounted for the total. However, 10 states accounted for 75 percent of the length and 81 percent of the cost. Only 15 states had built noise barriers as type II projects, with California accounting for over half of the amount.

FHWA Has De-Emphasized Enforcement of Noise Standards

The Secretary of Transportation has delegated responsibility for enforcing interstate motor carrier noise standards to FHWA. Within FHWA, the Office of Motor Carrier Safety Field Operations has enforcement responsibility. According to an Office of Motor Carrier Safety official, the office stopped conducting routine noise tests around 1983, but it will investigate complaints that it receives pertaining to excessive truck noise. The official told us that his telephone survey of the office's regional staffs indicated that they had completed a total of four exterior truck noise checks nationwide during the past 2 years. Officials in the two regions we visited told us that they had not investigated any exterior noise complaints within the past 2 years.

According to the Office of Motor Carrier Safety official, the office reduced its enforcement of the standards because of high compliance

good working order is unenforceable because it does not specify excess decibel levels.

Highway enforcement activities cited by the state officials as higher priorities than traffic noise were smog control and safety in California and safety and transport of hazardous materials in New Jersey. The officials said that their agencies respond to noise complaints; however, each had received only one or two truck noise complaints within the previous year.

The New Jersey and California Departments of Motor Vehicles have virtually no role in controlling vehicle noise. The New Jersey office occasionally checks trucks with gross vehicle weight greater than 10,000 pounds but for safety only. According to state officials, California state law prohibits the sale of new motor vehicles in the state that produce noise in excess of California and EPA standards. The Department of Motor Vehicles requires auto dealers to certify that new motor vehicles do not exceed these limits but does not check the accuracy of the dealers' certifications.

State and Local Efforts to Reduce the Impact of Traffic Noise on Communities

In California and New Jersey, most state and local efforts to abate traffic noise appear to focus on shielding communities from the noise of freeways and busy streets with barriers. We also found that some communities require consideration of traffic noise levels during land-use planning and others have incorporated soundproofing requirements in building codes. Communities that we did not visit may also be employing these and/or other traffic noise abatement measures.

States Construct Barriers to Reduce Traffic Noise Levels

FHWA officials noted that the amount of noise barriers built with federal-aid highway funds varies by state need, the regional FHWA office's interpretation of FHWA's highway noise policy, and the aggressiveness of the state in identifying noise problems and applying for federal funds. The officials said, however, that the most important determining factor is the extent to which the public desires noise abatement. Federal-aid highway funds are not designated specifically for noise. Thus, noise barriers must compete for funding with other highway needs and states may have different priorities.

Both California and New Jersey have active highway noise barrier programs. The \$116 million spent in California represents more than 34 percent of the FHWA-estimated \$338 million in expenditures for noise

An Effective Traffic Noise Reduction Strategy: Vehicle Controls vs. Noise Barriers

A highway traffic noise issue that surfaced during our work was the question of what is the most effective abatement strategy—controlling the source (motor vehicles) to reduce the amount of noise produced or constructing noise barriers to reduce the amount of noise that reaches residences and other buildings along the highway. Constructing noise barriers is costly, and some officials we talked to believe that the funds could be better spent on controlling the source. On the other hand, developing and promulgating new or revised standards and enforcing them would result in some costs, and industry would incur costs if it had to make changes to comply with new or more stringent requirements.

FHWA officials told us that noise barriers can substantially reduce traffic noise with few adverse impacts. New Jersey state officials provided us a report showing barriers reducing noise levels by as much as 15 decibels in residential areas. State officials in California said that noise barriers typically reduce noise along highways by 7 to 10 decibels. According to FHWA, however, noise barriers do have some limitations. For example, they cannot effectively block noise for homes situated on hills above the highway or buildings which stand higher than the barriers. Their effectiveness is also reduced by openings for driveways and intersecting streets. FHWA and state officials estimated that noise barriers cost about \$1 million per mile to construct.

Several officials told us that greater emphasis should be placed on reducing the noise generated by motor vehicles. For example, the Chairman of the New Jersey Noise Control Council said that funds used to address traffic noise problems would be better spent on quieting vehicles than on constructing noise barriers. An FHWA official in California said that FHWA could place greater emphasis on the control of noise emissions, along with its noise barrier program. In this regard, FHWA/Office of Environmental Policy officials told us that source control is probably the most cost-effective way to address traffic noise problems but that, under the Noise Control Act, EPA is responsible for regulating the source.

Not all sources of vehicle noise are regulated, and at one time EPA planned to make truck regulations more stringent. As previously stated, EPA issued regulations for newly manufactured medium and heavy trucks and motorcycles and interstate motor carriers. In its 5-year plan for fiscal years 1981-85, EPA indicated that it planned to require trucks to be even quieter and to regulate buses and refrigeration units used on truck trailers. In addition, the noise office was considering what regulatory action is appropriate for light vehicles (including automobiles) and

motor carriers may not be maintaining their trucks up to EPA noise standards but if additional enforcement is needed, it should be done by state and local governments.

Some officials we interviewed believe that tire noise continues to be a problem. American Trucking Association representatives told us that future reductions in vehicle noise could be made in the tires, if safety is not compromised. The New Jersey FHWA state director indicated that he believes, with the phaseout of recap tires and the introduction of radials, tire noise has decreased. However, the FHWA official responsible for the noise barrier program in Region 9 told us that he believes the increased use of four-wheel drive vehicles with off-road tires on the freeways is contributing to an increase in noise.

Conclusions

Although comprehensive data are not available, highway traffic noise appears to be a problem for many communities. Before its program was eliminated, EPA promulgated regulations establishing noise emission standards for some types of vehicles that are major contributors to this noise. These regulations, however, receive little or no enforcement attention from EPA and FHWA. The major federal activity is in requiring states to consider noise impacts when planning and designing highway construction projects and contributing financial assistance to the states to construct noise barriers.

States can adopt and enforce the federal regulations but California and New Jersey had not done so because of higher priorities. Some local governments finance and construct noise barriers on their own and control land use near highways.

Some federal and state officials believe that more emphasis on controlling noise sources (motor vehicles) would be more effective than building costly noise barriers. Greater attention to source control is possible, as not all vehicle sources are currently regulated. However, a comprehensive assessment of the current highway traffic noise problem, an identification of the major noise sources or contributors, and an analysis of the practicability of new or revised standards from a technological and cost standpoint would be needed before deciding what additional regulation is needed. Alternatives, such as increased enforcement and more technical assistance in land-use planning and control, would also need to be considered.

The Federal Transportation Noise Control and Abatement Role

Transportation noise problems remain, and the overall effort to deal with them is not as comprehensive as it was when EPA's program was in existence. The Noise Control Act and EPA's noise standards were not rescinded. As a result, federal preemption also remains in effect, thereby limiting state and local regulatory authority and noise control options. In addition, activities, such as standards enforcement and technical assistance to localities, have decreased. In light of these issues, the Congress may wish to consider whether changes are needed in the current federal transportation noise role.

Federal Preemption Limits State and Local Noise Control Options

Federal preemption of state and local governments' authority to regulate transportation noise is pervasive. Only FAA can establish aircraft noise emission standards, and federal (EPA) standards are in place for interstate rail carrier equipment and operations and several major sources of highway traffic noise (motorcycles, medium and heavy trucks, and interstate motor carriers). Under the Noise Control Act, state and local governments cannot issue regulations that are different from or more stringent than the EPA standards for specific equipment and operations.

The basis for federal preemption is that without it state and local governments would establish varying requirements that manufacturers and/or operators of transportation equipment would have to meet. The concern is that meeting these many different requirements would increase manufacturing and operating costs and may adversely affect interstate commerce. Preemption, in effect, recognizes transportation and commerce as largely national rather than local in nature. Thus, the federal preemption issue in transportation is more about how extensive must it be to preclude undue interference with interstate commerce and unreasonable costs for manufacturers and operators than whether it is desirable or not.

Aviation illustrates this issue. Although aviation is substantially covered by federal preemption, airport proprietors have retained some authority related to the use of their facilities. To better respond to local noise problems, they are increasingly exercising this authority to restrict airport access or use. FAA and industry officials are concerned that these restrictions by limiting full use of airport capacity and/or the aircraft fleet will have an adverse impact on aviation and interstate commerce. A national aircraft noise policy being proposed by industry representatives would, in effect, extend federal preemption to at least certain types of airport restrictions in return for more stringent national

which is EPA's responsibility under the Noise Control Act, essentially no longer takes place, and FHWA and FRA no longer conduct routine noise tests to enforce the interstate motor and rail carriers regulations. State and local governments can adopt and then enforce these standards but the state and local governments we visited had not done so.

Another major focus of EPA's program was technical assistance to local governments in establishing effective noise control programs, performing land-use planning, assessing noise problems, and identifying mitigation measures. EPA's current assistance in these areas is very limited, and our work indicates that the activities of state noise control offices have not expanded to fill the void. While FAA and FHWA provide financial and technical assistance, their major focus is on working through airport operators and state highway agencies, respectively, to ensure adequate aviation and highway systems.

Technical assistance to local governments may be even more important today than when EPA had a program. Three basic ways to address noise problems are (1) controls or limits on the amount of noise from the source; (2) land-use planning to avoid incompatible land uses near transportation facilities; and (3) projects, such as noise barriers, to mitigate noise impacts. In absence of a program to control highway and railroad noise sources, the other two ways become more critical. In addition, population increases and continuing development create added pressure on local governments to make all lands available, including those near transportation facilities. Furthermore, major mitigation efforts can be costly for local governments, making it critical for them to have a good understanding of their noise problems and the mitigation alternatives available to them.

Matters for Consideration by the Congress

Although comprehensive data are not available, our review indicates that transportation noise continues to be a concern and the overall effort to control and abate it is not as comprehensive as it was with EPA's noise program. With a reduced federal role, the setting of standards to control transportation noise sources, enforcement of these standards, and the availability of technical assistance to local governments generally have declined.

In view of these issues, the Congress may wish to reexamine the federal role with regard to transportation noise control and abatement. Key considerations for the Congress are the extent of the transportation noise

expand the already broad range of EPA responsibilities, and increase the number of agencies currently involved in transportation noise. Additional or more stringent standards could increase industry costs.

- Assign responsibility for issuing, reassessing, and revising transportation noise standards to the Department of Transportation and/or expand the Department's technical assistance programs. The Department already has the responsibility for aircraft standards. Completely assigning these responsibilities would draw on the Department's transportation expertise and other existing programs. The Department's efforts, however, may not have the same level of credibility as EPA's with those affected by the noise and some state and local officials because of the Department's major responsibilities for promoting the development of transportation systems adequate to meet the nation's needs. Noise, as a byproduct of transportation, has proven at times to be a constraint to system expansion.

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Local Governments Included in This Review

California

City of Cerritos
City of Los Angeles
City of Pleasanton
City of Sacramento
Los Angeles County
Orange County
Sacramento County

New Jersey

Camden County
Middlesex County

problem, local needs for assistance in dealing with them, and the cost of additional activities to carry out an increased federal role.

Possible Alternative Courses of Action

If the Congress decides that a change in the federal transportation noise role is needed, some of the alternatives it may wish to consider include:

- Rescind the Noise Control Act and leave noise control entirely to state and local governments, except as provided by other statutes. Rescinding the act would confirm a reduced federal role and may expand state and local efforts because it would return regulatory authority to them. On the other hand, the potential adverse impact of varying state and local requirements on commerce is a concern.
- Provide funding for EPA to implement the Noise Control Act provisions related to special local conditions exemptions. Implementing the special local conditions exemptions provisions would retain preemption but give state and local governments the opportunity to regulate noise sources where problems are unique or severe. These provisions, however, currently apply only to the interstate rail and motor carrier regulations. Whether these exemptions would be effective in solving noise problems and whether the total number of such exemptions would be large enough to pose an undue burden on commerce or industry operations is not known.
- Limit federal preemption to interjurisdictional operations. Limiting federal preemption to interjurisdictional or interstate operations would recognize the national aspects of transportation and allow local governments to control noise at facilities located within their jurisdictions. Railyard operations and equipment, for example, normally would not be interjurisdictional, whereas locomotives and railcars would be. Current FAA and industry concerns about airport use restrictions, however, illustrate how local control over facilities may potentially have an effect on transportation systems.
- Establish an EPA transportation noise program that provides for periodic reassessment and revision of existing EPA standards, issuance of new standards as needed, standards enforcement and/or technical assistance to local governments. Establishing such a program with responsibilities for the standards and/or technically assisting localities would recognize the national scope of transportation, maintain federal preemption, and help ensure the continuing appropriateness and effectiveness of the standards. Technical assistance may reduce the need for national regulations and the cost of federal noise mitigation assistance, such as FHWA's noise barrier program. Although such a program would be more limited than EPA's prior program, the activities would require some funding,

regulations. The National Organization to Insure a Sound-Controlled Environment believes that restricting airport use where necessary is an effective way to deal with local aircraft noise problems and does not adversely affect interstate commerce because industry can make adjustments to implement the restrictions. The Airport Operators Council International is in favor of preemption if the phaseout of Stage 2 aircraft is made mandatory and the federal government assumes the potential liability for airport noise damages.

Preemption with regard to railroad transportation has also been a source of contention. EPA initially wanted to regulate only locomotives and railcars. EPA's view was that this equipment was the only part of railroad operations that move through various jurisdictions and thus could be subjected to varying local requirements. Railyards were to be left to be regulated as needed by the jurisdiction in which they are located. The court decision that standards limited to locomotives and railcars did not provide rail carriers with adequate federal preemption as intended by the Noise Control Act resulted in EPA having to issue additional standards. The more recent decision of the U.S. Court of Appeals for the Third Circuit in the Oberly case that the Noise Control Act only forbids states and localities from regulating those sources of railroad noise that federal regulations specifically address could mean that federal preemption is not total. However, preemptive federal regulations are in effect for most railroad equipment and operations.

Current Efforts Are Not as Comprehensive

The overall transportation noise control and abatement effort is not as comprehensive today as it was when EPA's program was operating. Major differences are in standards setting and enforcement and technical assistance to local governments.

EPA considered the standards that it issued to be initial standards. Before its program was eliminated, it had plans to make the medium and heavy truck standard more stringent and to control additional sources of noise. Since program elimination, the existing EPA standards have not been reassessed or revised, and standards to control additional sources have not been issued. Other federal agencies, except FAA for aircraft noise, do not have regulatory authority to control noise from these sources and state and local governments cannot revise the standards because of federal preemption.

Standards enforcement has declined since termination of EPA's program. Enforcement of the motorcycle and medium and heavy truck standards,

These analyses may show that various actions, such as reexamining existing regulations, promulgating regulations to establish standards for the remaining types of motor vehicles, implementing the special local conditions exemption provision, increased enforcement, and greater emphasis on land-use planning, could help to better address highway traffic noise problems. As in the case of railroad noise, we believe a more basic issue is what the federal role in transportation noise control and abatement should be (see ch. 5).

tires. Both labeling and mandatory noise emission limits were being considered.

According to EPA, even after newly manufactured trucks reached the level of 80 decibels—which went into effect on January 1, 1988—trucks would still dominate the traffic noise situation and significant further reductions are possible, conceivably to the 72-75 decibel level. On the other hand, EPA studies had shown that automobiles and light trucks comprised between 80 and 95 percent of the nation's urban traffic distribution, but their estimated noise contribution to total urban traffic noise was about 10 percent in 1980. However, EPA anticipated that this amount would increase to about 40 percent as the noise levels of trucks, buses, and motorcycles were brought into compliance with existing and planned EPA regulations. According to EPA, its studies showed that tire noise exceeded engine noise on most vehicles at speeds ranging between 30 and 60 miles per hour.

With the elimination of EPA's noise program and funding for these activities, the above plans—except for the motorcycle regulation—were not realized. The standards for trucks were not made more stringent, and standards for buses, light vehicles, tires, and refrigeration units were not promulgated. EPA also is not routinely enforcing its standards for newly manufactured motorcycles and medium and heavy trucks, and FHWA enforcement of the interstate motor carrier standard is limited. However, the effect of EPA not taking these actions and limited enforcement of existing standards is not known. EPA no longer assesses the extent of, or analyzes the cause or contribution of, the different types of vehicles to the highway traffic noise problem.

Although highway traffic noise can still be a problem, some federal and state officials we talked to agreed that newly manufactured trucks are quieter. American Trucking Association representatives stated that they are being told by truck users that newly manufactured trucks are very quiet. FHWA/Office of Motor Carrier Safety's state director for New Jersey believes that trucks are quieter because the industry is making an effort to comply with the EPA standards for newly manufactured trucks. On the other hand, a California Highway Patrol official said that he believes that older trucks create an excessive amount of noise. The FHWA/Office of Motor Carrier Safety's New Jersey state director told us that, in his opinion, older trucks are not well maintained and are the noise makers on the highways. American Trucking Association representatives stated that faulty mufflers and not replacing mufflers when they wear out can create excessive noise. They also said that a few

barriers as of December 31, 1986. California also has a list of proposed type II noise barrier projects with a total expected cost of \$190 million. The \$21.5 million spent in New Jersey represents about 6 percent of noise barrier expenditures as of December 31, 1986.

Local Community Efforts to Reduce Traffic Noise Vary

The nine local governments we visited in California and New Jersey have attempted to resolve traffic noise problems in a variety of ways. Cerritos, California, which is situated between three major freeways, began constructing noise barriers in 1975. According to a Cerritos official, the city requires noise barriers extending either at least 13 feet above the freeway surface (2 to 3 feet higher than a truck exhaust stack), or 2 to 3 feet above second story windows, whichever is higher. Houses on major arterial streets are protected by 8-foot tall, landscaped noise barriers. A city official estimated that noise barriers have cost the city about \$10 million but have effectively reduced traffic noise. Four other cities we visited had also built noise barriers.

Three cities and one county we visited in California consider noise in their land-use planning processes. For example, land-use policies of the city of Los Angeles specify that noise sensitive land uses and facilities, such as hospitals and schools, should be located and designed so as to reduce noise effects. On the other hand, a city of Pleasanton official said that the city encourages development of loop roads to re-route traffic away from residential units, and a Sacramento County official told us that the county tries to maintain a policy of discouraging residential buildings along highways.

Three California communities we visited have incorporated soundproofing requirements in building codes to shield building occupants from traffic noise. A city of Concord official told us that the city requires acoustical reports on new residential developments to assure that soundproofing measures are considered. According to this official, developers must identify current and likely future noise problems and must propose structural mitigation measures before the city will issue construction permits. To meet noise standards, the city's general plan suggests construction features, such as sealing windows, using alternate means of internal ventilation, and installing solid-core doors and double-glazed windows. Other features the plan suggests are facing doors away from noise sources and modifying the ceiling, roof, and walls.

rates and the addition of new, higher priority responsibilities. When the standards were enforced, the office found very few vehicles—only about 1 percent—in violation. For example, a Department of Transportation study shows that of approximately 15,000 noise tests conducted between 1978 and 1980, only 1.3 percent of the vehicles failed to meet the EPA standards. From July 1 through September 30, 1981, only 0.52 percent of 1,550 tested vehicles failed. According to an Office of Motor Carrier Safety official, legislation, such as the Surface Transportation Assistance Act of 1982, added major responsibilities related to other aspects of trucking, including truck safety, and the need to develop programs for these new activities and the high compliance rates led the office to decide to limit its enforcement to investigating complaints.

Office of Motor Carrier Safety officials also told us that the noise tests were time consuming and difficult to perform. Office officials in New Jersey and California said that inspectors frequently could not perform stationary tests on heavily traveled highways because of high background noise levels, which make it difficult to get accurate readings of noise from individual trucks. As a result, inspectors had to expend considerable time to relocate the tests to less frequently traveled highways. The officials in California and New Jersey further noted that because of staff turnover only a few staff members know how to perform the noise tests.

States We Visited Are Not Enforcing Traffic Noise Standards

Under the Noise Control Act, states can adopt EPA interstate motor carrier noise emission standards and enforce them within their boundaries, but officials in the states we visited said that their states had not done so. In addition, a California Highway Patrol official told us that state noise laws for passenger vehicles and trucks are not actually enforced. Similarly, New Jersey State Police and Department of Motor Vehicle officials said little effort is made to enforce their motor vehicle code provisions requiring vehicles to have mufflers in good working order. Noise enforcement is a low priority in comparison with other traffic issues.

California and New Jersey highway police agencies neither test noise emissions during routine vehicle inspections nor enforce noise codes while on the highways. Officials of both states told us that officers stop obviously noisy vehicles or vehicles without mufflers; however, officers are not equipped with monitoring equipment for noise tests. An engineer with the California Highway Patrol indicated that this equipment is too expensive to purchase. In addition, officials of the New Jersey State Police told us the state's motor vehicle code requirement for mufflers in

According to FHWA officials, the agency's major noise control and abatement effort is in highway project mitigation, principally the construction of traffic noise barriers.

Land-Use Planning and Control

FHWA encourages local governments to use their power to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. According to FHWA, some state and local governments have enacted statutes for land-use planning and control. For example, the state of California legislation on highway noise and compatible land-use development requires local governments to consider the adverse environmental effects of noise in their land development process.

FHWA believes, however, that it is nearly impossible to measure the progress of using land use to control the effects of noise because the issue of land use is extremely complicated with a vast array of competing considerations entering into any actual land use control decisions. Office of Environmental Policy officials told us that, in many cases, FHWA has financed the construction of highways along undeveloped land, and local governments later allowed development up to the highways. These situations created noise problems as homes and other buildings were now close enough to be affected by the traffic noise. The officials said that a major reason local officials allow this type of development is that, with the highways, the land becomes more valuable and desirable. The officials further said that efforts with state and local governments to control land use along highways have generally not been that successful. According to the officials, EPA previously provided technical assistance to local governments in land use planning and control when it had a noise program.

Highway Project Noise Mitigation

FHWA regulations require the following during highway project planning and design: identification of traffic noise impacts, examination of potential noise mitigation measures, the incorporation of reasonable and feasible mitigation measures into the project, and coordination with local officials to provide helpful information on compatible land-use planning and control. The regulations require every reasonable and feasible effort be made to provide noise mitigation when FHWA's noise abatement criteria are approached or exceeded or when there is a substantial increase in existing noise levels.

The Federal-Aid Highway Act of 1970 authorizes FHWA to promulgate standards for highway noise levels compatible with different land uses and to not approve the plans and specifications for a federally aided highway construction project unless the project includes adequate noise abatement measures to implement the appropriate noise level standards. In addition, the National Environmental Policy Act of 1969 directs federal agencies, including FHWA, to use all practical means and measures to promote the general welfare and foster a healthy environment. The act provides broad authority and responsibility for evaluating and mitigating adverse environmental effects from all federally assisted activities. The Federal-Aid Highway Act of 1973 provided that projects for noise abatement along existing highways can be voluntarily implemented by state highway agencies and that the federal share of the funding for the projects should be the same as that for the federal-aid highway system on which the project is located—usually from 75 to 90 percent. Such projects are not mandatory and are implemented only at the request of state highway agencies.

EPA Traffic Noise Control Activities Have Declined

EPA's major traffic noise control and abatement efforts have been in promulgating noise standards. Before EPA's noise program was eliminated, its staff also provided some technical assistance to local governments in land-use planning along highways. Currently, EPA's noise activities are limited to reviewing environmental impact statements and responding to traffic noise information inquiries from the public and industry.

EPA established its first motor vehicle noise regulation in October 1974. This regulation, as mandated by Section 18 of the Noise Control Act, set maximum permissible operating noise levels for vehicles engaged in interstate commerce (in-use buses and trucks). The regulation, which went into effect on October 15, 1975, called for the following noise levels measured at 50 feet: 88 decibels for stationary run up of the engine, 86 decibels in zones with speed limits under 35 miles per hour, and 90 decibels in zones with speed limits over 35 miles per hour. The regulation also required vehicle exhaust systems not to be defective and banned the use of certain noisy tread tires on vehicles subject to the regulation.

In accordance with section 5 of the act, EPA identified several products that were major sources of noise, including medium and heavy trucks, buses, and motorcycles. The truck standard, which was published in

Efforts to Control and Abate Traffic Noise

Residents of many communities appear to be exposed to what they consider “annoying” or “bothersome” noise from the growing number of cars, trucks, and other vehicles on the nation’s highways and streets. EPA has issued noise standards that newly manufactured medium and heavy trucks and motorcycles are to meet. The agency has also established in-use noise standards for motor carriers engaged in interstate commerce. However, federal, state, and local agencies primarily rely on the construction of noise barriers rather than enforcement of these standards to reduce traffic noise. Noise barriers are expensive to construct, and some federal and state officials believe that more emphasis should be put on controlling the amount of noise from motor vehicles. However, an analysis of the current highway traffic problem, the major contributors to that problem, the cost and technical feasibility of new or more stringent regulations, and alternatives to regulations would be needed before selecting this course of action.

Traffic Noise Is a Problem for Many Communities

Motor vehicle noise is a combination of the noise produced by the engine, exhaust, and tires. The level of highway traffic noise depends largely on the volume and speed of traffic and the types of vehicles. The loudness is generally increased by greater traffic volumes, higher speeds, and more vehicles, such as trucks, that generate more noise. It can also be increased by defective mufflers or other faulty equipment. Any condition, such as a steep incline, that causes heavy laboring of engines adds to the noise level.

The many millions of motor vehicles on the nation’s network of almost 4 million miles of roads and streets expose a large portion of the population to varying levels of traffic noise. EPA estimated that in 1979 over 81 million people in the United States were subjected to highway traffic noise levels above Ldn 55. Of the 81 million, 16 million and 1 million were exposed to noise levels above Ldn 65 and above Ldn 75, respectively. Furthermore, the 1980 National League of Cities survey of states and local communities found that motor vehicle noise was the number one noise problem cited. The survey results pertaining to specific highway traffic noise sources for the 706 cities and 43 states that responded¹ are shown in table 4.1.

¹The 1980 survey was sent to all cities with population exceeding 20,000, the 50 states, and Puerto Rico. Responses were received from 706 of the 1,223 cities (58 percent) and 43 states (84 percent). Forty-four percent of the responding cities and 53 percent of the responding states said that noise pollution was a fairly or very serious problem.

one engine powers both the train's main motors and its auxiliary functions such as lights and heat. They noted that because the engine runs more continuously at full throttle than other designs, it is noisier.

Federal Preemption of Local Regulations Raises Issue of Federal Role and Responsibility

An issue related to EPA's interstate railroad noise regulations is the federal role and responsibility to state and local governments when they have noise concerns not addressed by federal standards but are preempted from establishing their own standards or regulations. In these cases, state and local governments with railroad noise problems often have borne the cost of noise abatement efforts, such as noise barriers; relied on railroad companies to solve the problem; or endured the noise. As previously discussed, communities can also request a special local condition exemption from EPA. However, EPA has not received any formal petitions for exemptions. In contrast, the federal role in aviation and highway traffic noise is more comprehensive.

Some individuals and communities, as pointed out earlier, experience noise problems from nearby railroad facilities and the options available to deal with them have been limited by the preemptive feature of the federal standards. EPA had anticipated that such situations would occur. In early 1980, EPA noted that because its regulations are issued on a national uniform basis and of necessity focus on the "average" railyard, many communities will be confronted with serious problems from railyard operations that they cannot address (because of federal preemption) even though there may be simple low cost solutions to the problem at that particular site. EPA said that in comparison the area of aviation noise is heavily regulated by the federal government, but there is considerable room for state and local noise abatement actions. The Oberly decision, however, may have increased local options to include the authority to establish property-line standards.

Federal involvement in aviation noise, as well as highway traffic noise, also differs in that the Department of Transportation (FAA for aviation and FHWA for highways) provides financial and technical assistance for noise abatement. In addition, FAA has the direct responsibility for regulating aviation noise and has issued regulations since EPA's program was eliminated. FRA does not provide financial assistance and provides limited technical assistance for noise abatement. The agency also does not have authority to establish interstate railroad noise standards. Both FAA and FHWA also have noise abatement planning requirements when they contribute financially to constructing facilities.

that if the noise is not caused by a mechanical problem, there is no violation of the standard. He also told us that if a mechanical problem causing the noise is fixed and the train still exceeds the standards, it is FRA's policy that there is no violation because the railroad made a good faith effort. An EPA official told us that the standards were developed at a time of economic difficulty for the industry, and this was taken into account in setting the standards. The official said that the industry's economic situation has improved and thus the standards may need to be reexamined. It is EPA's responsibility under the Noise Control Act to reexamine the standards, if warranted.

Some Standards May Be Difficult to Enforce

In New Jersey, the FRA safety inspector who conducts noise inspections told us that it is difficult to enforce some of the standards. For example, to show noncompliance with the car coupling standard, the regulations require a measurement of 30 coupling operations in an hour. For two complaints investigated in 1986 and 1987, the inspector said that there was not enough coupling activity at the site to obtain a valid test. He stated that it appears this standard is designed more for coupling operations at major switching yards, rather than at side yards which are often near residential areas.

State and Local Role in Railroad Noise Control Has Been Limited

Officials of state and local governments we visited told us that their authority to regulate railroad noise is limited because of federal preemption. Both California and New Jersey state agencies have general jurisdiction and control over public utilities to assure that they protect public health and safety. In both states, officials said that under this general authority they respond to railroad noise complaints by working informally with the railroads to change operations whenever it is possible. California Public Utilities Commission officials stated that they receive and respond to approximately 15 noise complaints per year. A railroad safety official in the New Jersey Department of Transportation told us that the Department receives and responds to about 30 railroad noise complaints annually.

Officials of Camden and Middlesex counties in New Jersey told us that they have problems with railroad noise, but they believe that state and local governments are preempted from regulating railroad noise sources. As a result, Middlesex County has not put restrictions on switching yard operations that county officials believe are needed to help solve its railroad noise problems.

establish noise standards or regulations. The mayor was also informed that EPA would need to know what state or local regulations or standards the city proposed to impose. The city has not yet responded to EPA's request for more data.

Since elimination of funding for its noise program, EPA has not promulgated any new interstate rail carrier noise standards or revised any existing ones. The agency also has not issued any railroad noise standards under section 6 of the act.

FRA Enforcement of Railroad Noise Standards Is Minimal

The Department of Transportation has delegated to FRA the responsibility for ensuring compliance with EPA's noise standards for interstate rail carriers.² Agency personnel initially monitored industry compliance by conducting numerous routine inspections or noise tests nationwide. After several years of finding a very high rate of compliance with what FRA officials consider "liberal" standards, the agency basically limits its efforts to investigating³ noise complaints. Not all complaints are recorded, but the total number appears to be less than the number of routine noise tests that FRA used to conduct.

The Number of Formal Complaints Is Small but Not All Complaints Are Recorded

FRA headquarters' formal complaint system showed that 10 complaints were received during January 1 through August 29, 1988. We found that in New Jersey, inspectors had conducted formal noise investigations on two complaints in the last 2 years. In California, three complaints were formally investigated between 1983 and 1988.

Most noise complaints that FRA officials in California and New Jersey receive are not reported to FRA headquarters, however. According to FRA inspectors in California and New Jersey, most complaints are resolved informally over the telephone and are not officially recorded or tracked by the agency. The inspectors estimated that they receive about 1 to 2 such calls per month. They said that they are generally able to resolve these complaints by explaining what the railroad noise emission standards do and do not cover. For example, in California, when complaints

²FRA initially published its Railroad Noise Emission Compliance Regulations on August 24, 1977. These regulations set out detailed inspection and testing procedures, evaluation guidelines, and measurement criteria and procedures to ensure compliance with EPA standards. The regulations were revised in December 1983 for the additional EPA standards to become effective in January 1984.

³A formal investigation consists of a series of noise tests for numerous trains, analysis of the results, and preparation of a report on the final determination regarding compliance.

Federal Requirements to Reduce Railroad Noise

Section 17 of the Noise Control Act requires EPA to set noise emission standards for the equipment and facilities of interstate railroad carriers and the Secretary of Transportation to enforce them. Under the act, these standards are to reflect the degree of noise reduction achievable through the application of best available technology, taking into account the cost of compliance and safety. Any standard or revision to a standard may be issued only after consulting with the Secretary of Transportation to ensure consideration of safety and technological availability. These standards apply to the equipment's use and maintenance.

EPA's Railroad Noise Standards

On December 31, 1975, EPA issued its first railroad noise regulation. This regulation set noise emission standards for locomotives and rail cars operated by interstate rail carriers. The regulation, which became effective December 31, 1976, set the following noise emission standards for locomotives measured at 100 feet: 73 decibels at idle; 93 decibels stationary at all other throttle settings; and 96 decibels moving at any speed. The standards established for rail cars were 88 decibels up to 45 miles per hour, and 93 decibels greater than 45 miles per hour. For new locomotives in service after December 31, 1979, the standards were 70 decibels at idle, 87 decibels stationary at all other throttle settings, and 90 decibels moving.

EPA limited the 1975 regulation to locomotives and cars because it believed that this was the part of the railroads' equipment that would clearly be adversely affected if state and local jurisdictions were to set their own, varying standards. EPA recognized that railroad yards created noise, but it considered them to be a stationary localized noise source for which state and local jurisdictions should establish noise emission requirements based on local needs and concerns, as long as they do not conflict with the federal standards for locomotives and rail cars.

The railroad industry disagreed with EPA's decision to limit its standard-setting to locomotives and rail cars. On April 13, 1976, the AAR filed suit in the U.S. Court of Appeals for the District of Columbia Circuit, requesting a judicial review of the regulation. The AAR challenged the regulation on the grounds that it did not include sufficiently comprehensive standards for railroad equipment and facilities under the Noise Control Act, and therefore did not provide rail carriers with adequate

or greater. Incorporating local governments that are not airport proprietors and areas outside Ldn 65 would expand FAA's program and add to its costs. EPA previously studied local noise situations and provided some technical assistance directly to communities near airports. Its prior program may offer some insights into what would be involved in such an effort.

the airports' liabilities for potential noise damages. The Executive Director of the Los Angeles Department of Airports has also called for a federal mandate requiring the removal or retrofit of Stage 2 aircraft by the end of 1999. The Airport Operators Council International has supported both of these positions.

According to the Executive Director of N.O.I.S.E., current voluntary conversion to Stage 3 is an example of "bottom-up" decision-making. He said that airports with bad noise problems are restricting the use of Stage 2 planes, thus addressing the problem where it is the worst. He added that the restrictions force Stage 2 planes to be used in other locations and reward the carriers that are able to make the conversion. The Executive Director did not know that a national conversion policy would accomplish the change any better. According to the Executive Director, his members do not want a national policy that preempts local authority. He said that there could be a national policy that has as its goal a quieter fleet, perhaps accomplished with incentives to the industry for a faster conversion to Stage 3.

FAA's Request for Public Comment on a Phaseout

On February 2, 1989, FAA issued in the Federal Register a notice of request for public comments, suggestions, and information regarding options and alternatives for phasing out operations of Stage 2 aircraft and replacing them with Stage 3 aircraft. FAA's request was in response to a directive by the House Appropriations Committee to update its April 1986 report, Alternatives Available to Accelerate Commercial Aircraft Fleet Modernization. In the update, FAA is to discuss whether public policy in both aircraft noise abatement and aviation safety might be advanced by imposing a deadline, to be determined through rulemaking, for operations of older Stage 2 aircraft in the fleet. Responses to the request were to be received on or before March 6, 1989. FAA is currently summarizing the comments.

Department of Transportation's Plans to Develop a National Policy

A Department of Transportation priority is to develop a comprehensive national transportation policy. The Secretary of Transportation plans to issue a policy statement in early 1990 setting forth the policy guidelines and strategies for meeting the nation's transportation needs over the next decade and into the next century. A major aspect of the policy development process is the formation of "cluster" groups to conduct analyses of transportation market areas or clusters, such as urban/suburban and rural transportation systems and services, intercity freight, and intercity passenger. The head of the Intercity Passenger Cluster

retrofit hushkits and re-engine assemblies (to make Stage 2 aircraft meet Stage 3 standards) and a study to measure the economic impact of the Stage 2 cut-off date on the airline industry and the U.S. economy.

With regard to a land use control program, the Working Group has recommended that the federal government encourage the states to accept responsibility for creating Airport Environmental Protection Areas to implement and enforce compatible land use and noise mitigation measures for nonairport property within Ldn 65 areas around airports. The Working Group believes that the federal government should provide the guidelines for operation of such areas and tie its transportation financial assistance to the state's timely implementation of these areas.

The Working Group, which is comprised of both airport and airline industry representatives, believes that its recommendations reflect compromises needed to address the major problem of aircraft noise/airport capacity. Others, however, disagree with at least some aspects of the recommendations.

The Coalition for Aircraft Modernization, which is currently made up primarily of aircraft leasing companies, believes that a national noise policy must be established to preempt airport noise restrictions and restore carrier ability to efficiently plan the deployment of their aircraft fleet, of which Stage 2 aircraft are the most heavily used. It believes that the current "patchwork of local noise regulation" must be preempted to ameliorate the capacity crisis that is related to the issue of aircraft noise. However, the Coalition's position is that any proposed law or regulation on aircraft noise should take into account the overall economic and service impact on the public and apply equitably to all parties. According to the Coalition, phaseout of Stage 2 would have a profound impact because it would involve replacing or modifying over 2,400 aircraft in the United States. Its position statement notes the following:

- Phaseout would have a staggering impact on the asset value of Stage 2 aircraft. Aircraft valuation experts estimate the value of Stage 2 equipment could fall as much as 50 percent over the next 5 years. This, in turn, would lower the net worth of the carriers and leasing companies that own the aircraft and impair their ability to finance new aircraft purchases.
- Stage 2 replacement costs of an estimated \$78 billion could financially devastate many airlines if the federal government does not allow adequate transition time.

industry representatives, the varying restrictions from airport to airport can also make scheduling more difficult.

Conversion to Stage 3 Offers Substantial Noise Benefits

According to the Working Group, Stage 2 aircraft certification noise levels generally exceed Stage 3 aircraft levels by the following decibels shown in table 2.3.

Table 2.3: Differences in Decibels Between Stage 2 and Stage 3 Aircraft

	(in decibels)		
	Takeoff	Landing	Sideline
Stage 2 with high-bypass engines	3	3	0
Stage 2 with low-bypass engines	12	7	9

The vast majority of the Stage 2 aircraft in operation are low-bypass. Thus, on takeoff Stage 2 aircraft noise levels generally exceed Stage 3 noise levels up to 12 decibels. (Ten decibels is usually considered to represent a doubling of perceived noise.)

The cumulative effect of a complete changeover to Stage 3 could be large. According to the Coalition for Aircraft Modernization, as of January 1988, the U.S. operating fleet included 3,650 passenger and cargo aircraft. About 63 percent, or 2,316 aircraft, are Stage 2, which includes aircraft, such as the B-727, B-737-100 and -200, DC-9, BAC-111, and F-28. Stage 3 includes aircraft such as the B-757 and McDonnell-Douglas (MD)-80. According to the Working Group, under normal (25-year useful life) replacement of Stage 2 aircraft, the impacted population (those living within the areas of Ldn 65 or greater) would reduce to 2.6 million by 1995, 2.2 million by 2000, and 1.6 million by 2005. If an all Stage 3 fleet was achieved by the year 2000, the impacted population would decline from the current 3.2 million to about 0.7 million people. The number of people receiving high levels of noise outside the Ldn 65 areas should also decrease.

Views and Concerns About a Mandatory Phaseout

The following examples illustrate the similarities and differences in views and concerns over a mandatory phaseout of Stage 2 aircraft. Among other things, in its September 1987 report, the Working Group recommended the following:

- December 31, 1989, be established as a cut-off date for final registration and importation of all low-bypass ratio Stage 2 aircraft. Stage 2 aircraft

Stage 2 aircraft between 1:00 a.m. and 6:00 a.m. through 1989, with the hours of operations being gradually reduced in subsequent years. Violation of these rules could result in fines, and repeat offenders could have their airport permits or licenses revoked.

Los Angeles

- The airport uses a voluntary preferential runway system, restrictions on night-time engine run-ups, and arrivals and departures over the ocean to reduce noise impacts.
- The airport purchased 2,834 residences from 1965 through 1974 to reduce the number of residents exposed to excessive aviation noise. About 7,000 people were relocated at a cost of about \$142 million. In addition, a recommendation in the airport's noise compatibility program approved by FAA in April 1985 proposed the removal of almost 2,600 residential units from noise-impacted areas in the city of Inglewood. The Los Angeles Department of Airports provided \$3 million to the city in 1987 to help with the purchases.
- The noise compatibility program also contained a recommendation to soundproof over 4,200 single and multi-family residential units. In 1985 and 1986, two phases of a demonstration project were completed with soundproofing of 100 residential units.
- The Board of Airport Commissioners has adopted a resolution calling for increased use of Stage 3 aircraft in operations at the airport.

Issues Regarding a National Aircraft Noise Policy and Phaseout of Stage 2 Aircraft

Concerns about the adverse environmental impacts of aircraft/airport operations—largely the noise impacts—have made it difficult to build new airports or expand existing ones. In addition, increased pressure by residents near airports has led to various types of restrictions on airport use, such as those cited earlier in this chapter. These constraints on full capacity of the aviation system at a time of large growth in demand for air transportation have led various FAA officials, air transportation industry representatives, airport operators, and others to label noise as a major challenge facing aviation and to call for a national policy to coordinate efforts to deal with it. A major issue is converting the nation's commercial aviation fleet from Stage 2 to Stage 3 aircraft, which many of these representatives believe would provide substantial, further reductions in noise levels, but could be costly.

In calling for a national aircraft noise policy, airport operators want a phaseout of Stage 2 aircraft in hope that noise concerns will be reduced and airport use restrictions can be removed. Industry representatives want to eliminate the "patchwork quilt" or "hodge-podge" of varying

Port Authority of New York and New Jersey, which operates the Newark and other major airports in the New York area, told us that the Port Authority has been a pioneer in the use of noise abatement techniques. The following examples illustrate the type of measures taken and planned by the airports.

Newark

- Port Authority of New York and New Jersey officials stated that the Port Authority, working with FAA, has implemented for its airports a preferential runway system and preferential flight tracks that require pilots to make maneuvers that take them over water or nonresidential property. In addition, airport managers have issued bulletins to the airlines restricting engine run ups.
- The Port Authority has had a noise monitoring system since the late 1950s. According to Port Authority officials, the system provides reports on aircraft arrivals and departures that exceed a certain noise level. They also said that notices are sent to violators of this threshold, though the only punitive action taken is a \$250 fine against violators at Kennedy Airport. The Port Authority is planning to install a more advanced system that will work with FAA's radar tracking system. This system will monitor airline adherence to prescribed flight paths and other operational procedures used to decrease noise over populated areas. According to a Port Authority official, they will use the monitoring data to inform community organizations which airlines are creating excessive noise.
- The Port Authority, in 1983, began to implement a program to sound-proof schools within noise-impacted areas. The anticipated cost for the 26 schools targeted by the program as of 1988 is about \$23 million, of which 80 percent is provided by FAA. According to a Port Authority official, about 80 schools within the Ldn 65 noise contours for its airports remain to be soundproofed. The official said that the Port Authority has averaged soundproofing about five schools per year.
- On August 10, 1989, the Port Authority announced that it will impose night time restrictions on takeoffs and landings of Stage 2 low-bypass ratio aircraft to further improve the noise situation. Under regulations adopted by the Port Authority, aircraft operators that have been flying Stage 2 aircraft between midnight and 6:00 a.m. in the last year will have until 1992 to modify or replace their planes to achieve Stage 3 noise levels. Those operators who have not been flying Stage 2 aircraft during these hours in the last year will be prohibited from doing so as of January 1, 1990. The Port Authority will also study the feasibility of prohibiting all Stage 2 flights during the day.

provided for airport noise abatement efforts. He also told us that division personnel review county noise monitoring data to ensure compliance with the state noise standards and grant temporary variances when they are warranted.

According to the Director of New Jersey's Aeronautics Division, the state has not adopted noise standards to govern aircraft operations at state-licensed airports. Division officials said that airports may adopt individual aviation noise regulations provided that they do not conflict with FAA guidelines. However, the Division of Aeronautics has primary responsibility for ensuring compliance with the state's Air Safety and Hazardous Zoning Act. The act establishes minimum standards for the control of the type, location, and height of structures adjacent to airports. These requirements are for safety reasons, but they can indirectly affect noise impacts by prohibiting residential buildings in certain areas near airports. Two of the state's larger airports—Newark International and Teterboro—are under Port Authority of New York and New Jersey authority rather than state jurisdiction.

New Jersey's Noise Control Council has an advisory role in the state's noise control efforts. The Council is responsible for conducting public hearings on noise issues and advising the Commissioner of the State Department of Environmental Protection of its findings. Hearings were held in 1986 and 1988 in response to increasing public concern about aircraft noise in New Jersey and implementation of the Expanded East Coast Plan. In addition, the Council is supposed to comment on and recommend changes to state noise control codes, rules, and regulations.

Local Airport Noise Control and Abatement Efforts Increasingly Involve Airport Use Restrictions

Although the regulatory authority of airport operators is limited, a wide variety of noise control and abatement measures are employed by the nation's airports. These can be achieved through the exercise of airport proprietor's rights, working with FAA to identify aircraft operational changes for FAA implementation, and working with surrounding municipalities to identify incompatible land uses and implement ways to develop compatible uses. Many airports have employed these measures to reduce noise levels. A May 1986 FAA report, entitled Airport Noise Control Strategies, listed about 400 local airports that had reported implementing at least one measure to reduce noise levels.

Airport Improvement Program Grants for Noise Compatibility Projects

FAA's approval of an airport's noise compatibility program makes it eligible to receive federal grant funds to implement the program. As table 2.1 shows, FAA provided almost \$425 million in grants for noise compatibility projects during fiscal years 1982-87.

Table 2.1: Airport Improvement Program Grants for Noise Compatibility Projects for Fiscal Years 1982-87

Dollars in millions	
Project category	Funding
Land acquisition and relocation	\$327.64
Noise insulation	58.38
Runway and taxiway construction	30.22
Noise monitoring equipment	4.89
Noise barriers	2.26
Miscellaneous	1.23
Total	\$424.62

The amount of available funds has increased. The Airport and Airway Safety and Capacity Expansion Act of 1987 provided for a 10-percent set aside for noise compatibility planning and abatement. Thus, at least 10 percent, or \$870 million, of the \$8.7 billion authorized for the Airport Improvement Program for fiscal years 1988-92 is designated for noise abatement.

State and Local Authority Limited by Federal Preemption

FAA has statutory responsibility for aircraft noise abatement through regulation of flight operations and aircraft design. In addition, FAA has control over the management of airspace. State and local governments are generally preempted by the federal government from taking regulatory actions in these areas.

The courts, however, have placed the financial responsibility for aircraft noise damage on airport proprietors. The courts' reason for assigning them this responsibility is that the airport proprietor selects the location and is responsible for purchasing adequate land around the airport to prevent noise damages. Along with financial responsibility, the courts have given airport proprietors certain limited rights within federal preemption on the basis that a party that may be held liable for the damages caused by an activity must be able to exercise sufficient control over the activity to prevent the damage from occurring. State and local governments have these proprietors' rights only when they are airport proprietors.

require an environmental assessment of the proposed action. Funding for noise compatibility planning to develop noise exposure maps and compatibility programs is available to airport operators under the Part 150 program.

The Part 150 program is voluntary, and many of the over 3,000 airports eligible for funding under the program have not yet participated. As of December 1, 1988, the latest available data from FAA, 41 airports had approved noise compatibility programs. However, this number should increase. A total of 165 airports have received grants to prepare Part 150 noise compatibility planning studies. An FAA official told us that he believes that 300 or more airports should be participating because of their noise problems.

A reason cited by some FAA and industry representatives for the reluctance of some airports to conduct Part 150 studies was the concern that the studies will raise the awareness to noise of those living near the airports and/or unrealistically raise their expectations for noise reductions. The reason cited by officials of the Port Authority of New York and New Jersey for not conducting Part 150 studies for its airports was that they are located in areas that are already highly developed and populated, which means that little land-use planning—a major component of airport noise compatibility programs—can be done. They also said that other options, such as purchasing or soundproofing the large number of homes within areas of Ldn 65 or greater, are not feasible in the New York area because of the high cost that would be involved. Although completing an FAA-approved noise compatibility study can make an airport eligible for federal funding for its noise compatibility program, the Philadelphia Airport Director told us that, because there is competition with other airports for the limited funds, there are no assurances that it will receive funding. Los Angeles and San Francisco International Airports, the two other airports we visited, have conducted Part 150 studies and have FAA-approved airport noise compatibility programs.

FAA is considering changes in the Part 150 program. According to the Manager of FAA's Noise Abatement Division, these changes could include making program participation mandatory, establishing additional planning requirements, and implementing some form of enforcement to ensure that airports implement the programs. As part of the Airport and Airway Safety and Capacity Expansion Act of 1987, the Congress required FAA to conduct a study of Part 150 procedures and report the results by June 30, 1989. According to FAA officials, the report will be issued in October 1989. The major interest of the Congress in requiring

in noise-sensitive activities near airports. FAA has major activities to address both approaches.

Quieting the Source

Part 36 of the Federal Aviation Regulations and subsequent amendments prescribe noise emission standards for the manufacture and certification of aircraft. It, in effect, identifies three stages of noise standards, with Stage 1 being the loudest and Stage 3 the quietest.

In 1976, FAA issued regulations that required the phasing out of operations within or to the United States of Stage 1 large (over 75,000 pounds) transport aircraft. The rule set January 1, 1985, as the completion date for the phaseout; however, the Aviation Safety and Noise Abatement Act of 1979 directed the Department of Transportation to grant exemptions to operators of certain aircraft until January 1, 1988. According to FAA officials, any new transport aircraft designs submitted to FAA for certification must be Stage 3. As discussed later, some groups have called for a similar phaseout of Stage 2 aircraft to achieve further noise reductions.

Aircraft can be operated safely in ways that generate various noise signatures translating to different noise levels on the ground. FAA has issued regulations prohibiting supersonic flight that may result in sonic booms and requiring certain aircraft to not exceed the minimum certified landing flap setting. Lower flap settings require lower thrust and higher altitude during approach, thereby leading to less noise. In addition, FAA has issued an advisory circular on noise abatement procedures and works with local operators of airports and aircraft to identify additional flight procedures that can be used safely at individual airports.

Séparating People and Noise

Procedures controlling aircraft operations can also be effective in separating people and noise. Through its management of the air traffic control system and overall responsibility for control and management of airspace use, FAA has taken various actions to reduce noise impacts in this way. For example, it has issued operational orders to air traffic controllers and other agency employees designed to minimize flying time at lower altitudes and eliminate holding patterns.

FAA has issued advisory circulars providing guidance related to noise abatement actions. For example, its Visual Flight Rules (VFR) Near Noise Sensitive Areas advisory circular encourages pilots to fly at altitudes higher than the minimum permitted by regulation and on flight

the plan was to obtain national consensus on a new strategy and carry out EPA's part of the strategy.

EPA's proposed new strategy involved a goal of relocating families living in neighborhoods expected to remain exposed to noise levels of Ldn 75 or higher and providing relief to families living within the Ldn 65 areas at least inside their homes. Soundproofing appeared to be the ultimate solution for these families if relief was not obtainable in other ways at less cost. EPA proposed that the following steps could be taken to reduce the number of people who would need to be protected through soundproofing or relocation:

- Optimization of aircraft flight procedures, flight tracks, and preferential runway utilization.
- Development of airport noise abatement plans.
- Off-airport land-use management that prevents future encroachment of neighborhoods on airports.

For its part, EPA proposed to take, among others, the following actions:

- Initiate a program with several airport operators to monitor approach and departure flight procedures routinely employed by commercial air carriers.
- Work with FAA to develop a unified federal policy regarding appropriate noise abatement actions by airport proprietors.
- Work with local officials in communities surrounding the nation's largest airports to get them involved in the airport planning process and the development of compatible land-use around the airport.
- Propose to FAA a joint program office to develop a plan for implementing a soundproofing and relocation program.
- Undertake several joint aircraft noise research projects with the National Aeronautics and Space Administration to demonstrate the effectiveness of available emerging technology in reducing noise levels.

Current Activities Are Primarily Reactive

With the phaseout of its noise program and Office of Noise Abatement and Control at the end of fiscal year 1982, the strategies in EPA's 5-year plan were not accomplished and its role in aviation noise became primarily a reactive one. The agency now becomes involved when it receives from FAA advance copies of proposed noise regulations for written comments, reviews environmental impact statements and environmental assessments concerning proposed airport projects or other proposed FAA actions, or provides comments on proposed regulations.

Aircraft Noise Control and Abatement Responsibilities Are Shared

The Aviation Noise Abatement Policy, which was jointly issued by the Secretary of Transportation and the Federal Aviation Administrator in November 1976, outlined the following division of authorities and responsibilities for reducing aircraft noise:

- The Federal Government has the authority and responsibility to control aircraft noise by regulating source emissions, by flight operational procedures, and management of the air traffic control system and navigable airspace in ways that minimize noise impact on residential areas, consistent with the highest standards of safety. The federal government also provides financial and technical assistance to airport proprietors for noise reduction planning and abatement activities, and works with the private sector to conduct continuing research into noise abatement technology.
- Airport Proprietors are primarily responsible for planning and implementing action designed to reduce the effect of noise on residents of the surrounding area. Such actions include optimal site location, improvements in airport design, noise abatement ground procedures, land acquisition, and restrictions on airport use that do not unjustly discriminate against any user, impede the federal interest in safety and management of the air navigation system, or unreasonably interfere with interstate or foreign commerce.
- State and Local Governments and Planning Agencies must provide for land-use planning and development, zoning, and housing regulation that will limit the uses of land near airports to purposes compatible with airport operations.
- The Air Carriers are responsible for retirement, replacement, or retrofit of older jets that do not meet federal noise level standards, and for scheduling and flying airplanes in a way that minimizes the impact of noise on people.
- Air Travelers and Shippers generally should bear the cost of noise reduction, consistent with established federal economic and environmental policy that the adverse environmental consequences of a service or product should be reflected in its price.
- Residents and Prospective Residents in areas surrounding airports should seek to understand the noise problem and what steps can be taken to minimize its effect on people. Individual and community responses to aircraft noise differ substantially and, for some individuals, a reduced level of noise may not eliminate the annoyance or irritation. Prospective residents of areas that are affected by airport noise thus should be aware of the noise effects on their quality of life and act accordingly.

Airport and aircraft operators also incur costs to implement noise abatement procedures. For example, less than direct flights to avoid flying over heavily populated areas can increase fuel costs. An FAA Eastern Region official told us that the industry has incurred millions of dollars in additional costs to carry out these actions.

Federal Requirements to Reduce Aviation Noise

Several federal statutes have provisions related to aviation noise abatement and control. The Aircraft Noise Abatement Act of 1968 amended the Federal Aviation Act of 1958 to give FAA the authority to regulate aircraft noise. FAA is responsible for prescribing and amending standards for measuring aircraft noise regulations to provide relief and protection to the public from such noise and sonic boom. The act requires FAA to apply noise standards and regulations, as appropriate, to the issuance, amendment, modification, suspension, or revocation of certificates issued for aircraft operations.

The National Environmental Policy Act of 1969, as amended, requires a comprehensive analysis of the environmental consequences of major federal actions as part of each agency's decision-making process. In this regard, such an analysis may be required for proposed FAA actions, such as flight procedure changes and grants for airport expansion. An increase in noise could be an environmental consequence that should be examined.

The Noise Control Act of 1972 amended Section 611 of the Federal Aviation Act to authorize EPA to work with FAA to reduce aviation noise to protect public health and welfare. Among other things, section 611 requires (1) EPA to submit proposed aviation noise abatement regulations to FAA for consideration; (2) FAA to consult with EPA before finalizing any new or amended standards or regulations, regardless of which agency initiates them; and (3) FAA to consult with EPA before granting exemptions from compliance with noise abatement standards and regulations, unless reasons of safety require an exemption before EPA can be consulted. The act also authorized FAA to review flight and operational procedures at airports to determine how they might be used to mitigate noise impacts.

In 1976 the Congress amended the Airport and Airway Development Act of 1970 to allow airport development grants to be used for noise suppressing equipment, construction of physical barriers, and landscaping to diminish the effect of aircraft noise on areas adjacent to public airports. The amendment also allowed land acquisition when needed to

aircraft noise policy. These changes, however, could substantially increase program costs.

EPA previously proposed aircraft noise standards to FAA and provided technical assistance to local governments in aviation noise abatement planning. With phaseout of its noise program, EPA's efforts in the aviation noise area primarily involve activities under Section 309 of the Clean Air Act. These activities include reviewing environmental impact statements and environmental assessments for airport projects and commenting on proposed FAA regulations that potentially have a noise impact.

Aviation Noise Affects Several Million People

According to FAA, an estimated 3.2 million people live in aircraft noise impacted areas, which the agency defines as receiving noise levels of Ldn 65 or above. In 1985, FAA estimated that about 5 million people lived in noise impacted areas. According to FAA officials, the number of people living in noise impacted areas in the mid-1970s was 7 million. The agency anticipates that the size of the impacted areas will continue to decline, at least in the near future, despite air traffic and general population increases, because of the greater use of quieter aircraft and other efforts discussed later in this chapter.

Aircraft noise, however, can also be a problem for people living outside the Ldn 65 areas. For example, some studies of attitudes toward aircraft noise have found that approximately 20 percent of the population residing in Ldn 60 to 65 areas find that noise level unacceptable. According to Port Authority of New York and New Jersey and FAA Eastern Region officials, most of the large number of noise complaints received from New Jersey residents after FAA changed flight patterns around Newark International and other New York area airports as part of its Expanded East Coast Plan¹ came from residents outside the Ldn 65 areas. Some complaints received by the Port Authority came from New Jersey residents 30 or more miles from Newark airport. Complaints were received from residents of one community that FAA analysis indicated

¹The Expanded East Coast Plan is a comprehensive revision of air traffic control routes and flight procedures in the eastern United States. The primary purpose of the plan, which FAA began to implement in February 1987, was to reduce air traffic delays at the New York City metropolitan area's three major airports: LaGuardia, John F. Kennedy, and Newark. According to the Port Authority of New York and New Jersey, about 5,700 noise complaints were documented from the inception of the plan through June 1988, of which about 4,400 complaints came from northern and central New Jersey as a direct response to Expanded East Coast Plan operations. Our report, *Aircraft Noise: Implementation of FAA's Expanded East Coast Plan* (GAO/RCED-88-143, Aug. 1988), discusses FAA's implementation of the first phase of the plan.

was obtained from FRA and California and New Jersey state agencies. Similar information for aircraft noise was obtained from the airports we visited and FAA. We met with representatives of associations in the aircraft, railroad, and trucking industries. Comprehensive data on current transportation noise levels and the major contributors to these levels were not available.

To determine the status of EPA's transportation noise control and abatement efforts, we reviewed annual reports of the EPA noise control program, federal noise control regulations, agency budget justifications, and other reports. We also interviewed EPA officials and officials at FAA, FHWA, FRA, and state and local agencies knowledgeable of EPA's activities.

To determine EPA's noise control plans prior to program elimination, we obtained EPA's 5-year plan (fiscal years 1981 through 1985) for implementation of the noise control program. In addition, we reviewed EPA's budget justification for fiscal year 1981, which was submitted before the program was terminated.

The transportation noise abatement and control activities of EPA, FAA, FHWA, FRA, California and New Jersey state agencies, and the selected local governments were determined through discussions with appropriate officials of these agencies and review of legislation, regulations, studies, reports, and other information on their activities. We also reviewed the fiscal year 1988 Federal Managers' Financial Integrity Act reports of the EPA Administrator and Secretary of Transportation and found no previously reported internal control weaknesses related to current noise control and abatement activities.

Our work was conducted primarily between May 1988 and March 1989 in accordance with generally accepted government auditing standards. We discussed the factual information contained in a draft of this report with responsible EPA and Department of Transportation officials. Their comments have been incorporated into the report where appropriate. As requested by Congressman Florio's office, we did not obtain official agency comments on the report.

jurisdiction. EPA estimated that 16 of the 22 state noise programs receiving grant funds during fiscal year 1980 would continue operating after federal support was dropped. In addition, federal agencies, such as FAA, the Federal Highway Administration (FHWA), and the Federal Railroad Administration (FRA), were to continue their noise activities under the Noise Control Act and other legislation. FAA, for example, continued to be responsible for aircraft noise regulation.

State Noise Control Offices

Some states have or have had noise abatement and control offices. For example, the California State Office of Noise Control, Department of Health Services, was established in 1973 by the California Noise Control Act to assist local communities in addressing noise problems. According to a state noise official, resources provided the office have decreased from a high of \$250,000 and five staff members in 1973 to a low of \$60,000 to \$70,000 and one staff member in 1988. The office's Noise Control Engineer attributed the decrease in resources to a general trend at the state level away from interest in some environmental issues. The office currently helps local governments develop noise ordinances and noise elements in their general plans. The California Noise Planning in Land Use Act requires every city and county government to have a section in their general plan to address the impact of noise in land-use planning.

The New Jersey Office of Noise Control, Department of Environmental Protection, provides some technical assistance to local governments. However, it primarily investigates complaints of violations of the state noise law and regulations pertaining to industrial and commercial stationary sources, such as a manufacturing plant. According to the noise office chief, the number of staff has varied from one to two people since the office was established in 1972. Funding has fluctuated from \$100,000 for the office's first 1-1/2 years of operation to \$45,000 for 1980 and \$100,000 for 1988. The 1988 budget covered salaries for two full-time staff members plus office expenses. In addition, he said that four inspectors from the air pollution division help with noise investigations when needed. According to Department of Environmental Protection officials, it is difficult to obtain funding from the state legislature for the state's noise program when the federal government has eliminated its program.

According to the Administrator of the National Association of Noise Control Officials, who is also the Chief of the New Jersey State Noise Control Office, very few states have noise control offices now that EPA

year 1973 to President Carter's fiscal year 1982 budget proposal of almost \$13 million.

The House and Senate differed substantially in their views on funding for the noise program. The Senate Environment and Public Works Committee proposed further cuts in the program to \$1 million for fiscal year 1982 and no funding thereafter. The House Committee on Energy and Commerce wanted to authorize \$7.3 million for each of the fiscal years 1982 and 1983. In the latter case, the House Committee proposed to continue technical and financial assistance to state and local governments but to substantially reduce the regulatory program in view of the need to reduce the budget. Under its proposal, EPA's authority to regulate noise emissions for products would have been limited to transportation equipment distributed in interstate commerce and any motor or engine designed for use in the equipment. These regulatory efforts were to remain to provide continued federal preemption over state and local noise control regulations in these areas. The Noise Control Act provides that where there are federal regulations with respect to noise control of products distributed in commerce and to equipment or facilities of interstate rail and interstate motor carriers, no state or local government can adopt or enforce noise control requirements applicable to the same products, equipment, or facilities unless they are identical to the federal regulations. This concept is commonly referred to as federal preemption. The Committee was concerned that, in the absence of federal preemption, state and local governments would establish a myriad of conflicting noise requirements that could increase the production and carrying costs of certain carriers and transportation equipment manufacturers and operators.

After the Congress approved the President's budget request of \$2.2 million for fiscal year 1982 and no funding after that, EPA immediately began to phase out the program and reduce the staff of the Office of Noise Abatement and Control. Emphasis was put on transferring knowledge and experience EPA had gained to state and local governments. The phaseout of the program and noise office was completed by September 30, 1982. Although funding for the program was terminated, the Congress did not rescind the Noise Control and Quiet Communities Acts, primarily because it wanted to retain federal preemption for the EPA standards that had been established.

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- develop and disseminate information and educational materials on the public health and other effects of noise and the most effective means of noise control;
 - conduct or finance research on the effects, measurement, and control of noise;
 - administer a nationwide Quiet Communities Program to include grants to state and local governments and authorized regional planning agencies, purchase of noise monitoring equipment for loan to state and local noise control programs, and technical support to help state and local governments establish effective noise abatement and control programs;
 - establish regional technical assistance centers that use the capabilities of university and private organizations to assist state and local noise control programs; and
 - provide technical assistance to state and local governments to facilitate their development and enforcement of noise control, including direct on-site assistance of agency or other personnel and preparation of model state or local legislation.

EPA's Implementation of the Acts

After the Noise Control Act was passed, EPA developed health and welfare criteria, promulgated regulations, completed a study of airport noise impacts on communities, and made recommendations to FAA on regulating aircraft noise. Among other things, EPA:

- Developed health effects criteria and identified levels necessary to protect health and welfare with a margin of safety. EPA's report, Public Health and Welfare Criteria for Noise, dated July 27, 1973, represented an appraisal of available knowledge relating to the health and welfare effects of noise. Its report, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, dated March 1974, provided guidance on the noise source regulatory process, especially noise reduction goals for preventing hearing loss, annoyance, and sleep disturbance.
- Identified portable air compressors, medium and heavy trucks, wheel and crawler tractors, truck-mounted solid waste compactors (garbage trucks), motorcycles and motorcycle replacement exhaust systems, buses, truck-transport refrigeration units, power lawn mowers, pavement breakers, and rock drills as major sources of noise for regulation. Also conducted several preidentification studies concerning possible identification of additional major sources of noise, including automobiles and light trucks, tires, chainsaws, and earth moving equipment. (June 1974 - February 1977)

piece of land and the economic effects (ability to qualify for a mortgage, need to soundproof building interiors, and property resale value) of declaring land incompatible with certain uses. EPA, in its 1978 report, Protective Noise Levels: Condensed Version of EPA Levels Document, stated that outdoor yearly levels on the Ldn scale are sufficient to protect public health and welfare if they do not exceed Ldn 55 in sensitive areas (residences, schools, and hospitals). This protective level, which was not established as a standard, was derived without concern for technical or economic feasibility and contains a margin of safety to ensure their protective value.

Table 1.2 illustrates the effects of noise on people in residential areas at various Ldn levels.

Table 1.2: Examples of Noise Effects in Residential Areas at Various Ldn Levels

Ldn level	Hearing loss	Percent of population highly annoyed	Average community reaction	General community attitude towards area
75 and above	May begin to occur	37	Very severe	Noise likely most important of all adverse aspects of the community environment
70	Will not likely occur	25	Severe	Noise is one of the most important adverse aspects of the community environment
65	Will not occur	15	Significant	Noise is one of the important adverse aspects of the community environment
60	Will not occur	9	Moderate to slight	Noise may be considered an adverse aspect of the community environment
55 and below	Will not occur	4	--	Noise considered no more important than various other environmental factors

Source: Guidelines for Considering Noise in Land Use Planning and Control, Federal Interagency Committee on Urban Noise, June 1980.

Table 1.2 shows the percent of people highly annoyed at the various Ldn levels. The percent of people reporting annoyance to a lesser extent would be higher in each case. For example, other studies have shown that at an Ldn of 55 decibels, 33 percent of the people are “moderately or more annoyed,” 17 percent are “very or more annoyed,” and 5 percent are “extremely annoyed.” Thus, 55 percent of the general population is a little or more annoyed at an Ldn of 55 decibels.¹

¹Karl Kryter, The Effects of Noise on Man, p. 564.

Introduction

Noise, commonly defined as unwanted sound, is a byproduct or waste created by various human activities. Most notably, it is generated by the operation of machinery and equipment in the workplace, at home, and during the transportation of people and goods. Although it is well documented that certain noise levels can damage human hearing and may cause other physiological and psychological harm, noise to most people is an intrusion that adversely affects the quality of their daily lives.

Because levels and effects can vary substantially by where one lives and works, noise is often viewed as a local issue to be dealt with through local efforts and police powers. The federal government, however, is substantially involved in the control and mitigation of some types of noise, such as transportation noise, through various laws and programs. The Noise Control Act of 1972 and the Quiet Communities Act of 1978 recognized noise as an environmental pollutant and gave the Environmental Protection Agency (EPA) responsibilities for conducting research, identifying major noise sources and establishing national standards or regulations to control them, and providing assistance to state and local governments. In 1982, funding for EPA's noise program was eliminated to reduce the federal budget. However, the Noise Control and Quiet Communities Acts remain in effect.

Noise Effects and Measurements

Noise has generally not been shown to increase deaths, shorten life-spans, or cause incapacitating illnesses. Nevertheless, it can be a problem. Exposures of sufficient intensity and duration can result in damage to the inner ear and hearing loss. According to EPA, studies have also identified noise as an important cause of physical and psychological stress. Although not conclusively shown by research, it is thought to have other effects. Noise is suspected of interfering with children's learning and with development of the unborn child; it is reported to have triggered extremely hostile behavior among people presumably suffering from emotional illness. In addition, noise is suspected to lower resistance, in some cases, to the onset of infection and disease.

The more common concern of those exposed to noise is its effect on their quality of life. Noise can interfere with speech communication, disturb sleep, adversely influence mood, and disturb relaxation. In addition, it can be a source of annoyance when it interferes with other activities, such as television viewing. Noise can also lower real estate values as the affected areas become less desirable as a place to live because of these effects.

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Abbreviations

AAR	Association of American Railroads
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
GAO	General Accounting Office
NOISE	National Organization to Insure a Sound-Controlled Environment

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Principal Findings

Transportation Noise Problems

EPA estimated that in 1979—its latest estimate before its noise program was eliminated—that the number of Americans exposed to aircraft, railroad, and highway traffic noise levels that could significantly interfere with activities, such as sleep, conversation, and relaxation, in normal environments were 50 million, 6.5 million, and 81 million, respectively.

Although similar data are not available for the current noise situation, FAA estimates that 3.2 million people live in areas generally incompatible for residential use because of aircraft noise. In addition, six of the nine judgmentally selected local governments in the two states included in GAO's review—California and New Jersey—said that highway traffic noise is a problem. Railroad noise was considered to be a major problem by two of the nine.

Past EPA Noise Program Activities and Plans

Under its noise program, EPA, among other things, issued noise emission standards for newly manufactured medium and heavy trucks and motorcycles and interstate motor and rail carriers; proposed aircraft noise regulations to FAA; and assisted state and local governments in noise program development, noise abatement, and land-use planning. Before the program was eliminated, EPA's plans included making the truck standard more stringent; issuing standards for buses and refrigeration units on truck trailers; and devising noise control strategies for light trucks, automobiles, and tires.

EPA had also planned more effort in assisting localities in land-use planning along highways and obtaining national consensus on a new aircraft noise reduction strategy. For its part of the strategy, EPA intended to concentrate on activities, such as working with (1) FAA to develop a soundproofing and relocation program for areas heavily impacted by noise and a federal policy on appropriate noise abatement actions by airport operators and (2) local governments on compatible land-use development around airports. Because the noise program was eliminated, EPA did not carry out these planned activities.

Executive Summary

Purpose

Transportation is a major noise source that affects millions of people living near airports, major rail lines and yards, and busy highways and streets. Noise can damage hearing and may contribute to other physiological and psychological harm. Its more likely effects, however, are those often described as eroding the quality of life. These effects include interference with speech communication, sleep, and relaxation. The Environmental Protection Agency's (EPA) noise program, of which transportation was a major focus, was established by the Noise Control Act of 1972 to promote an environment free from noise that jeopardizes public health and welfare. As proposed by the Administration, the Congress eliminated funding for the program in 1982 on the basis that noise control benefits are highly localized and the function could be adequately carried out by state and local governments.

Concerned about transportation noise control in the absence of EPA's program, Congressman James J. Florio of New Jersey requested GAO to examine aircraft, highway, and railroad noise, focusing on the (1) extent of the transportation noise problem, (2) status of EPA's noise control activities and plans when its program was eliminated, and (3) current noise control activities of federal, state, and local agencies.

Background

According to the Noise Control Act, state and local governments have primary responsibility for noise control, but it also states that national, uniform treatment is essential for control of noise sources in commerce. On this basis, the act requires EPA, among other things, to (1) identify major noise sources and prescribe emission standards for products distributed in commerce in the categories of transportation, electrical/electronic, and construction equipment and motors or engines; (2) submit regulatory proposals to the Federal Aviation Administration (FAA) for consideration in controlling aircraft/airport noise; and (3) promulgate regulations limiting noise from interstate rail and motor carriers for Department of Transportation enforcement. It also provides for EPA to conduct and finance research and provide assistance to state and local governments on noise control methods.

The Department of Transportation also has various noise responsibilities under the Noise Control Act and other legislation. The Department's FAA is responsible for regulating aircraft noise and administering programs of financial and technical assistance to airports for noise abatement. Similarly, the Department's Federal Highway Administration is responsible for legislative requirements related to considering noise impacts in planning and designing highways and financial assistance to

