

A Voice to End the Government's Silence on Noise

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Noise Pollution Loses Federal Dollars

With little fanfare and few citizen groups to mourn the loss, the United States government terminated federal funding for the Office of Noise Abatement and Control (ONAC) in 1982. The States were put on notice that they would no longer be assisted in their efforts to curb noise pollution. Despite the growing awareness in the 1970's that noise was a dangerous pollutant, the Office of Management and Budget (OMB), in accordance with the views of its leader President Ronald Reagan, terminated its funding for ONAC. The Noise Control Act (NCA) of 1972 had largely assigned the responsibility of curtailing noise to the Environmental Protection Agency (EPA). ONAC was the vehicle by which EPA was to carry out its mandate under the Noise Control Act that specifically stipulates the protection of Americans from the harmful effects of noise. Despite the fact that there was a federal law on the books guarding people against noise pollution (Noise Control Act of 1972), former President Reagan was permitted by Congress to eliminate funding for ONAC.

Would the States Pick Up the Responsibility for Noise Abatement?

The closing of ONAC was in keeping with former President Reagan's philosophy that noise pollution is a local problem, best dealt with at the local level. But would state and local agencies fund noise abatement activities now that there would be no aid from the federal government? Would noise abatement be a high priority for environmental state agencies?

Seeking answers to these questions, a group of concerned citizens, newly formed as the Coalition for Quieter Communities, met with representatives of the New York City Noise Control Office in January 1982. At that time New York City had its own noise control program, a program that was started in 1969. The budget for New York City's program came from the Department of Housing and Urban Development and from the State Department of Environmental Conservation. New York State's noise control program in 1981 was much smaller than the City's, with two-thirds of its funding coming from the federal Environmental Protection Agency. Now that the federal government had decided to cease the funding of ONAC, New York State's Department of Environmental Conservation had to determine for itself how much of its environmental budget would be used for noise programs.

Worried that New York State would allocate little money to combat noise, the Coalition wrote to the State Commissioner of Environmental Conservation to plead its case for a fair distribution of

funds directed toward noise abatement activities. On September 10, 1982, then Commissioner Robert F. Flacke answered the Coalition as follows:

The termination of federal funding on September 30, 1982, will have a significant impact on the State noise control program, but I fully intend to continue a limited number of noise control functions to be financed solely by State funds.

The Commissioner's response left little doubt for Coalition members that ONAC's closing foretold the cessation of the New York State Department of Environmental Conservation's efforts to curtail noise. The Coalition itself met a few more times in 1982; but, unable to get any funding to support initiatives that it hoped to start in educating the public to the dangers of noise, the group stopped meeting as a Coalition. However, its individual members continued their interest in the noise area. The author of this paper was one of them.

New York State was not unique in its response to the termination of federal funding. Terry Obteska, Noise Manager in Oregon, wrote the following: "The demise of the federal program in 1981 has been a disastrous experiment, resulting in the wholesale death of state and local programs." (Shapiro, 1991). Sidney Shapiro, who elicited Mr. Obteska's response, as well as similar responses from other state environmentalists for his report *The Dormant Noise Control Act* (1991), wrote in this report that Congress' decision not to fund ONAC sent a signal to the states that noise was not important. Noise pollution was no longer seen as a serious problem that demanded state action but instead was relegated to the category of "nuisance," a condition that can be handled by human adaptation. So in 1982 the federal government got out of the noise business and the states followed suit, safely assuming that they could treat noise complaints as annoyances that certain segments of the population would have to learn to contend with.

Noises Increase As Do Citizen Complaints

During its short tenure, ONAC may not have been especially successful in regulating noise emissions from products nor from the operation of railroads and aircraft, but it had taken preliminary steps in that direction. Now without ONAC, there is no one in charge of these regulations, and without this overseeing agency, noise has risen to new heights.

Urban traffic has grown and the sounds coming from automobiles, buses, trucks and motorcycles have increased the city din immensely, exposing more and more people to intrusive, disturbing noises. The 1980's and 1990's has seen a tremendous increase in air travel and the expansion of airports; thus, aircraft noise is increasingly disturbing more and more people throughout the country and does not discriminate among urban, suburban and rural residents. Aircraft noise may be considered an "equal opportunity offender." Additionally there has been an increase in helicopter usage, and the low altitude operation of helicopters makes them particularly bothersome.

Annette Zaner (1991) identifies transportation as a major source of noise but is quick to note that noises from increased construction, mechanization of agricultural methods and the development of noise-intensive household appliances paralleled "...the increase...in transportation." Dr. Zaner

also carefully categorizes other sources of noise that continued to grow rapidly during the last fifteen years.

As the types of noises increased in number and intensity and as more and more people were exposed to these horrendous sounds, citizen complaints rose sharply. Furthermore, these citizens were not willing to have their complaints dismissed as annoyances that required adaptation and coping on their part. To the contrary, during the past fifteen years, the public was asking the local authorities to curtail the noises. They were also complaining that the noises were not simply bothersome; the noises were making them "sick."

Should the Environmental Protection Agency Regain Control over Noise Pollution?

Possibly in response to citizen noise complaints, the Environmental Protection Agency asked the Administrative Conference of the United States to recommend options for reconciling EPA's obligation to abate noise with its lack of resources to do so. As part of this request to resolve the existing anomaly of having a mandate to do something about noise but no funds with which to implement the mandate, the Conference commissioned two noise reports.

One report, entitled *The Dormant Noise Control Act and Options to Abate Noise Pollution* (1991) written by Professor Sidney A. Shapiro, a law professor, examines noise abatement in the 1960's before the Office of Noise Abatement and Control (ONAC) was opened. It describes the activities undertaken by ONAC in its attempt to implement the Noise Control Act of 1972 (NCA) as well as ONAC's shortcomings, looks at noise abatement after the office was closed, and then discusses the current status of noise abatement. Mr. Shapiro's harsh conclusion: "The NCA's goal of a quieter country does not deserve the irresponsible treatment that Congress and EPA gave it."

The second report, *Noise and Its Effects* (1991), was written by Dr. Alice H. Suter, an acoustical consultant. Dr. Suter presents an overview of noise and its effects on people and is careful to include the studies on noise effects that were conducted after ONAC was closed. Her report contains the World Health Organization's definition of noise as a health issue and then discusses the effects of noise on hearing, health, sleep, learning, and social behavior. Her conclusion: "Noise has a significant impact on the quality of American life."

In keeping with the request to make recommendations as to how EPA and Congress can address the issue of noise, a paper entitled *Recommendation 92-6 --Implementation of the Noise Control Act* (June 1992) followed the Shapiro-Suter reports. In this document Congress and EPA were asked to take certain things into account, including "the scientific and technological developments that have occurred since 1981," clearly indicating the importance of updating the information on noise effects in order to set forth appropriate policy statements. The concluding statements of the 92-6 Recommendation: "Congress should then either repeal the Noise Control Act or fund whatever responsibilities under the Act Congress delegates to EPA." In response to this latter recommendation, Congress neither repealed the Noise Control Act nor did it decide to refund ONAC. Congress' inertia on noise speaks loudly to its position on this important issue.

Another Federal Agency Steps in To Comment on Aircraft Noise

Noise pollution affects millions of Americans, but citizens disturbed by aircraft noise constitute one of the most vocal groups speaking out against noise. Again, possibly in response to this growing citizen outcry against aviation noise, the Federal Interagency Committee on Aviation Noise (FICAN) was born. FICAN, founded in 1993, brings together representatives of federal agencies that are involved in research on aviation-related noise. FICAN can conduct conferences, to which the public is invited; it can serve as a clearinghouse for federal aircraft noise research; it can distribute technical information; and it can make recommendations concerning aircraft noise. However, FICAN does not itself conduct research nor does it have regulatory or enforcement powers.

Recognizing the need for an update on the latest research on the effects of noise, FICAN commissioned Dr. Charles Harris to prepare such an article and asked him to pay special attention to those studies examining the effects of noise on children. His report *The Effects of Noise on Health* was issued in December 1996.

Overall Dr. Harris stated that he did not believe that there are sufficient data to support a noise/health relationship. For the most part, he rejected the studies that demonstrate "suggested" adverse effects of noise on health because he claimed equal weight had not be given to those studies that show no "suggestive effects." He dismissed the "interference with the learning of children" research as a quality of life issue, but in making that determination, he ignored the growing body of literature on the adverse effects of noise on children's cognitive, language and learning skills. Dr. Harris also labeled those scientists who believe there is some evidence to support a noise-health relationship as "headline seekers." Although Dr. Harris acknowledged "the impact of noise on the health of an individual is more likely to occur through the psychological processes of appraisals and perceived mode of coping" (p.36), he failed to look at the role of these processes in the interpretation of noise events. It is essentially these psychological mechanisms that provide our understanding of why noises don't have to be loud to be bothersome and stressful. Essentially Dr. Harris gives little weight to the effects of noise on mental health and well-being.

Shapiro (1991) had labeled Congress irresponsible with respect to noise control, and Suter (1991) underscored this irresponsibility when she concluded that noise has a "significant impact on the quality of American life." Noise pollution continues to worsen in every area and dramatically so from overhead aircraft. Air travel is expected to grow considerably in this country and "at least 32 of the country's 50 busiest airports have plans for expansion" (Natural Resources Defense Council, 1996) to meet this soaring demand for air transportation. The effects of aircraft noise alone on people is particularly alarming. The newly formed anti-aircraft-noise coalition (US-Citizen Aviation Watch or US-CAW) most certainly has its work cut out for it in as it demands both curtailment of overhead jet noise and restrictions on unbridled airport growth. It certainly has to worry when a document prepared for a federal interagency on aircraft noise concludes that it has not yet been adequately demonstrated that noise adversely affects people's mental and physical health.

Aircraft Noise: Who Is Really in Charge?

Under an amended section of the Noise Control Act of 1972, the Federal Aviation Administration (FAA) was to consult with the Environmental Protection Agency on the issue of aircraft noise even though the FAA still had the authority to regulate aircraft noise emissions. Edelman & Genna (1985) stated it well: "Thus, the EPA proposes as to aircraft and sonic boom noises, but the FAA disposes" (p. 362). Edelman & Genna's assessment is underscored by the fact that the FAA did not act on most of the proposals issued to it by the EPA between December 1974 and October 1976.

However, Shapiro (1991) in judging the influence of ONAC and EPA in regulating airport noise concluded that despite the rejection of most of the EPA proposals by the FAA "...this result may not be a fair measure of their impact. By drawing public attention to the adequacy of FAA regulation of aircraft and airport noise, EPA undoubtedly influenced how the FAA proceeded. Moreover, FAA regulation was based on the scientific and technical work done by the EPA concerning the impact of aircraft noise" (p. 9).

Public attention is exactly what ONAC did extremely well and it excelled in identifying noise as a health concern, not simply an irritant. One of its numerous booklets entitled Noise: A Health Problem ends as follows: "It is finally clear that noise is a significant hazard to public health. Truly, noise is more than just an annoyance." That EPA was also aware of the importance of quieter aircraft can be illustrated by its 1976 Administrator Russell Train's remarks at an Inter-Noise Conference in Washington: "We need a national air transportation which is healthy as well as safe. The evidence is overwhelming that, unless we make that system quieter, both human health and the financial health of the industry will continue to suffer. We need no miracles to achieve that kind of system" (p.17).

Why the Loss of Interest in Noise Abatement? Some Hypotheses!

Twenty years after the Honorable Russell Train said that we could quiet our air transportation system without miracles, aircraft noise has worsened. In the 1970's the Environmental Protection Agency published a pamphlet that clearly identified noise as a health problem (EPA, 1978). This pamphlet quoted then Surgeon General Dr. William H. Stewart as follows:

Calling noise a nuisance is like calling smog an inconvenience. Noise must be considered a hazard to the health of people everywhere (p.24).

The other booklets, posters, school program materials, film slides and public service announcements produced by the Environmental Protection Agency, in order to educate the public about the dangers of noise, strongly signified the federal government's commitment to noise abatement. Now twenty years after the federal government recognized noise pollution as a serious threat to public health and engaged in a vigorous program to educate the public to this peril, the roles have been reversed, and the public has to educate its federal leaders on the hazards of noise pollution. **What happened? Why did the federal government abandon its interest in curtailing noise?**

One can only hypothesize as to the reasons the federal government relinquished its role in noise education and, for the most part, abandoned its spirited interest in noise abatement. That Ronald Reagan believed noise pollution could be handled at the state level and that he was less than interested in environmental issues are two common reasons often given for the closing of the

Office of Noise Abatement and Control. However, Ronald Reagan is no longer President. Presently sitting in the White House are two men who appear to be more interested in federal control of public health and welfare as well as environmental issues. Why hasn't the Office of Noise Abatement and Control been reopened and refunded by the present administration?

There have to be other explanations for the closing of an office that was essentially protecting citizens. Is it possible that this protection came at a cost to another more influential segment of our population, namely big business? Was ONAC a threat to corporations and businesses that would have to be more cautious in producing their wares and in carrying out certain operations? It's easier and cheaper for these businesses to function without the federal government breathing down their backs. This does not mean to imply that corporations cannot voluntarily lower the decibel level. But if they are not required to do so by law, then they can do things at their own pace.

So many of today's toys for children are too loud, with some exceeding 140 dBA (Nadler, 1997). Toy manufacturers don't have to meet standards that could protect our children's hearing. Video arcades (Plakke, 1981) are exceedingly loud with game manufacturers turning up the volume so as to attract new players to their games. Again, no restrictions on the noise level. Zaner (1991) reports that home appliances, construction equipment, automobiles, motorcycles, and recreational vehicles are still too loud for comfort. Where is the protection from such intrusive, harmful noise levels?

The biggest beneficiaries of our federal government's largess with respect to dropping the ball on noise abatement -- the airlines and airplane manufacturers, of course. **The individuals involved in the air transportation business have been given the green light to get bigger without paying much heed to the impact of this increased air travel on the millions of people on the ground who reside near the airports. The boom to the air transportation industry has resulted in bringing the plague to those who live beneath the roar of jets. Plague is not too strong a word to describe the roar of overhead jets as it descends on the lives of those below, playing havoc with their physical and mental well-being.**

There are some who may argue that the FAA has been charged with protecting people from overwhelming noises. **To hear the FAA referred to as the protector of residents would only bring anger and indignation from the many citizen groups that have turned to the FAA for some relief. To these community-based groups, the FAA is the enemy.** To support this contention, the Helicopter Noise Coalition has circulated an article from the Aviation International News (December 1, 1997) in which Arlene Feldman, FAA regional coordinator, is quoted as urging CEOs who use New York City's helicopters to attend helicopter-noise meetings and speak in favor of these heliports. In an accompanying letter (personal communication) Joy Held, president of the Coalition, has interpreted Ms. Feldman's action as one of instructing helicopter owners how to battle community residents who oppose increased helicopter flights.

Working aggressively toward reducing aircraft noise to ameliorate its adverse impact on the health of community residents may be a conflict of interest for the FAA because its major role is the encouragement of air travel. Ms. Feldman's concern for helicopter owners speaks to this primary role of the FAA. Although the FAA may not really be the enemy, it is doubtful that it can serve as an advocate for the citizens living near airports.

Former President Reagan may have closed the Office of Noise Abatement and Control, but it is President Bill Clinton who has decided to keep this office shut. Otherwise, why not open the office by executive order? That Congress has moved so slowly on the two bills introduced by legislators in the House and Senate (H.R. 536 and S. 951) to refund ONAC may also reflect a fear on the part of legislators to offend their largest financial supporters. The supposition that the large corporations of this country, especially those involved with air transport, prefer a dormant federal noise office is indeed a viable assumption.

The Quiet Communities Act of 1997 -- Is This the Way To Go?

Two articles in this issue discuss the legislation dealing with the Quiet Communities Act of 1997; legislation that in general calls for the refunding of ONAC and specifically asks for a study of airport noise. One of the articles is in strong support of the legislation as introduced by Congresswoman Nita Lowey and Senator Robert Torrecelli (H.R. 536 and S.951), whereas the other weighs both the strengths and the weaknesses of the legislation as presently written. The writers of both articles, as well as some anti-noise activists who oppose the form of the proposed legislation, all agree that the federal government should become more actively involved in the noise issue. The best path to achieve this goal accounts for their differences.

Those advocating the legislation as written believe that the first step must be the reopening of ONAC, even with a limited budget. They are not foolish enough to believe that the small budget allocated in the legislation is sufficient, but they envision the proposed legislation as the first step in a procession of steps that will lead to greater funding. They do believe, however, that in opening the office the government will be acknowledging the harmful impacts of noise. To them this is the critical reason to support the legislation.

There are those individuals who believe that the present legislation will not provide real help to the people who are beleaguered by aircraft noise, nor for that matter, to all who complain about our increasingly noisier society. To support their reasoning: proposed appropriations are far less than when the office was in operation; the office will still be unable to regulate aircraft noise; and the office will still be guided by an out-of-date Noise Control Act.

Determining the best course of action is more a matter of political strategy than scientific inquiry. As a researcher and individual who has been writing about noise pollution for over twenty-five years, I would rather deal with decisions based on reason and science than political maneuvers. To help me in this decision, as well as the readers of this issue, I will bring into my discussion some of the comments made by Sidney Shapiro, who in preparing his report on ONAC, gave considerable thought to the contributions made by ONAC, particularly in the area of aircraft noise.

With respect to aircraft noise, the FAA has the regulatory powers; but, as noted earlier, by drawing attention to the "adequacy of FAA regulation of aircraft and airport noise, EPA undoubtedly influenced how the FAA proceeded." Furthermore, Mr. Shapiro believes there is bad blood between EPA and FAA and an approach to "aircraft noise abatement that avoids direct confrontation with FAA is therefore more likely to be successful." In my opinion, it is doubtful that the FAA will relinquish any of its powers over aircraft noise without a strong fight, and the airlines, as well as all others in the air travel business, would support the FAA. Additionally,

much influence would be exerted on our legislators to retain FAA's control. Can one possibly conceive of legislation usurping the powers of the FAA and the air industry being passed by this Congress or any other in the near future? Stipulating that EPA should oversee aircraft noise would very likely turn the present ONAC legislation into the "dormant ONAC bills."

One of the arguments put forth by the people critical of the proposed noise bills is that these bills don't address the deficiencies in the Noise Control Act. This is true because the Noise Control Act of 1972 is a separate entity from the Quiet Communities Act of 1997. As to whether we need to alter the Noise Control Act before supporting legislation to reopen ONAC is really another question entirely. As an aside, it could be mentioned that a strong argument for the repeal of the Noise Control Act, made by its proponents, rests with the fact that federal preemptions limit the authority of local communities to control noise pollution. Sidney Shapiro cites a case in which the federal government's right of preemption was overruled and the state was declared to have the right of regulation. Mr. Shapiro urges local authorities to look to the law before accepting industry claims of preemption. Apparently states have more rights than they know they have.

A Long-Overdue Issue: Studying the Impacts of Noise on People

One of the strong reasons for reopening ONAC is the expected role this office will play in advocating for noise research dollars. In a recent letter to NASA inquiring about its research program on noise, its Senior Scientist for Acoustics Clemans A. Powell responded: "We in the acoustics research organization at the NASA Langley Research Center are committed to increasing the state of knowledge on the true impact of aircraft noise on communities. ...Unfortunately, I expect that the earliest any appreciable funding would be available would be about five years from now (personal communication). Thomas Fay in his book *Noise and Health* (1991) listed only one federal funding source for noise, and that was a limited one. Without ONAC, this author believes noise research will remain on the back burner.

How ironic that in 1980 the Anchorage Times reported the government's pledge to spend a quarter of a million dollars to study how man-made noise affected Alaskan whales (August, 31, 1980)! To this news then New York Congressman Stephen Solarz stated that the government has "...never spent a penny on the half million New Yorkers who live near ear-splitting high speed trains." The Congressman further added that he would ask the National Institutes of Health for a task force to examine the effects of noise on the health of Americans. We still await this research!

If NASA's communication is taken at face value, it will be at least twenty-three years after the whale research dollar allocation before NASA assigns dollars for noise research on humans. Then if this research corroborates existing data supporting the harmful effects of noise, it will be even more years before appropriate noise abatement techniques are put into place.

The impact of whale watchers' noisy boats on nearby whales was not taken lightly by the National Park Service. That the National Park Service continues to protect animals is evidenced by the government's decision to postpone construction of an airport near Homestead, Florida. This decision came after environmental groups argued that "a new airport and its accompanying noise could threaten the health and reproductive abilities of wildlife in the Everglades National Park" (New York Times, December 25, 1997, p. A17).

Whether the decision to postpone the building of this airport will withstand the environmental study to be done by the Air Force and the FAA, two agencies friendly to air traffic, remains to be determined. However, wouldn't it be wonderful if decisions on airport expansion could be similarly delayed until the appropriate studies on the effects of aircraft noise on individuals living near these airports were completed. Similarly, noise studies should precede plans for the expansion of railroads or highways and for the increased use of our waterways. Maybe with ONAC functioning to protect humans, as the National Park Services protects animals, the time for research would be now, not later. The time for noise education would also be now, not later, and the time for noise curtailment, based on available data, would take place now, not later.

Reopening ONAC: Answering Industry's Opposition

Undoubtedly there will be heavy lobbying against ONAC, especially from the airlines. To these lobbyists, I respond with the following example. The New York City Transit Authority first received complaints about its noisy train operation in 1873, and it continued to receive complaints for the next hundred years. For the most part the authority had been slow to abate noise, and only after great pressure, especially from citizen groups, did the authority attend to its noise problem, even agreeing to purchase quieter traction motors. The transit agency had argued that quieting the traction motors would cost too much money. However, when they were finally forced into purchasing quieter motors, the authority learned that the new motors were more efficient and had a longer life expectancy (Bronzaft, 1986). In other words, quiet and cost-savings went together.

The transit authority responded, as had other corporations and businesses that have been asked to engage in environmentally-sound initiatives, that meeting this demand would be exceedingly costly. Just as the transit authority learned to the contrary, so too did these other corporations. To cite another example: "...from 1988 to 1995, dangerous toxic emissions by U.S. companies declined 56 percent, even as petrochemical manufacturers hit record domestic production and enjoyed record profits" (Easterbrook, 1997, p.48).

American manufacturers have adjusted to the requirements for quieter air conditioners and quieter motors as they have to the phaseout of chlorofluorocarbons without financial disaster. So it is hypothesized that industries, even the airlines, will be able to curtail noise without bringing about a catastrophe to their economy. To paraphrase Mr. Easterbrook:

But if the history of noise abatement is any guide, positive outcomes are possible both for the economy and a quieter society.

References

- Administrative Conference of the United States. (June 19, 1992). Recommendation 92-6 - Implementation of the noise control act. Washington, D. C. Administrative Conference of the United States.
- Associated Press. (August 31, 1980). Subway noise is whale of an issue. The Anchorage Press.

- Aviation International News. (December 1, 1997). Northeast helo ops fight for their lives. Aviation International News, 76-77.
- Bronzaft, A. L. (1986). Rail noise: The relationship to subway maintenance and operation. Urban Resources, 4, 37-42.
- Edelman, P. S. & Genna, A. J. (1985). Noise and the law in the United States. In W. Tempest (Ed.), The noise handbook, London: Academic Press.
- Easterbrook, G. (December 22, 1997). Hot air treaty. U.S. News and World Report, 46-48.
- Fay, T. H. (Ed.) (1991). Noise and Health. New York: The New York Academy of Medicine.
- Harris, C. S. (1996). The effects of noise on health. Wright-Patterson Air Force Base, Ohio: Air Force Material Command.
- Nadler, N. (1997). Noisy toys - some toys are not as much fun as they look Hearing Rehabilitation Quarterly, 22, 8-10.
- New York Times. (December 25, 1997). Call for environmental study delays plan for a Florida airport. New York Times, p. A17.
- Plakke, B. L. (1983). Noise levels of electric arcade games: a potential hearing hazard to children. Ear and hearing, 4, 202-203.
- Shapiro, S. A. (1991). The dormant noise control act and options to abate noise pollution. Washington, D. C. The Administrative Conference of the United States.
- Suter, A. H. (1991). Noise and its effects. Washington, D. C. The Administrative Conference of the United States.
- Train, R. E. (April 4, 1976). Remarks for delivery before the inter-noise: '76 conference. Washington, D. C. United States Environmental Protection Agency.
- United States Environmental Protection Agency. (1978). Noise: A Health Problem. Washington, D. C. Office of Noise Abatement and Control, US EPA.
- Zaner, A. (1991). Definition and sources of noise. In T. H. Fay (Ed.), Noise and Health. New York: The New York Academy of Medicine.

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