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# The Importance of Soundscapes in National Park Management

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All profound things and emotions of things are preceded and attended by Silence.  
— *Herman Melville*

## Introduction

Soundscapes have emerged in recent years as a key issue in national park management. Soundscape management objectives are addressed in current National Park Service (NPS) policy, and a program specifically designed to help implement policy was created in 2000. This paper defines the “soundscape” concept and its importance in national park management. It also introduces the Park Service Natural Sounds Program and its functions in acoustics, planning, and impact assessment.

## The soundscape concept

What is a “soundscape?” The term “soundscape” is coined in Park Service policy. It is the audio equivalent of a “landscape,” “viewshed,” or “watershed,” terms that are in fairly common usage by land management agencies. The soundscape could alternatively be called the “sound environment” comprising all the sound conditions within an area. As defined in Park Service policy, “the natural soundscape is the aggregate of all the natural sounds that occur in parks, together with the physical capacity for transmitting them.”

Natural soundscapes exist in the absence of human-caused sound. This is often what is meant by “natural quiet,” recognizing that nature is often not quiet. The term “natural quiet” is commonly used, as shown by references to it in various laws. However, because nature is often not quiet, the Park Service has adopted the soundscape terminology.

The soundscape concept extends beyond “natural.” Other important soundscape characteristics for national parks may be identified. For example, some human-caused sounds may be important to the understanding, appreciation, interpretation, or use of culturally or historically important sites. The natural soundscape, or the absence of noise, could be an important component of such sites at times. So, an additional construct is that of the “*appropriate soundscape*.” A soundscape, whether it is natural or has a large component of human-generated sounds, may be viewed as appropriate to the *purposes and values* for which a park was established.

## Why it is important to protect national park soundscapes

There are three fundamental reasons why it the Park Service recognizes and protects soundscapes: (1) laws; (2) the importance of sound to the natural environment, to cultural values, and to people; and, (3) the apparently diminishing part natural soundscapes are playing in American life and experience.

## The Organic Act and other laws

Under the Park Service Organic Act, a premier part of the agency's mission is to preserve or restore the natural resources of the parks. We are to protect and conserve scenery, wildlife, water, air quality, geologic features, etc., as part of the natural setting. We protect them first for their intrinsic value, and then so they can be enjoyed by people. It is revealing for us to ask, "Why would we preserve all components of the natural setting except for sound?" In trying to answer the question it is difficult to imagine either the natural environment, or the human experience one might have there, without it!

We conclude that natural sounds are intrinsic elements of the environment, associated with the parks and their purposes. They are inherent components of "the scenery and the natural and historic objects and the wildlife therein" protected by the NPS Organic Act. We further conclude that other sounds may be appropriate to parks whose purposes are less associated with natural phenomena, and that these soundscapes also are to be protected. Soundscapes are resources.

Other laws have been promulgated, at least in part, by concern for the impacts of noise on people and the environment. Here is a selection.

- Wilderness Act (1964 P.L. 88-577)
- Noise Control Act of 1972, as amended (P.L. 92-574)
- Grand Canyon National Park Enlargement Act (1975 P.L. 93-620 §8)
- National Parks Overflight Act (1987 P.L. 100-91)
- National Parks Air Tour Management Act (2000 P.L. 106-181)

The soundscape concept exists in law, or as an assertive response to law. For example, the Grand Canyon National Park Enlargement Act of 1975 recognizes "natural quiet as a value or resource in its own right, to be protected from significant adverse impact." The National Parks Overflight Act of 1987 requires the Park Service to report on the nature and scope of overflight problems in parks, as well as on the injurious effects of overflights, including noise, on natural, historic, and cultural resources, impairment of visitor enjoyment, and impacts of noise on safety of park users. The Park Service's response to this act, *Report to Congress on Effects of Overflights* (1995), affirms that "natural quiet" is a park resource whose preservation is within Park Service mandates.

## Demonstrating the importance of soundscapes

### **The importance of sound in preserving ecosystems and the natural environment.**

Natural soundscapes are vital to the natural functioning of park fauna. The precise relationships between species and their habitats, and how they are influenced by various sound characteristics, have not been studied comprehensively. We do know, in general, that the sound environment is important for some species in these ways:

- Intra-species communication and behavior;
- Territory establishment, finding desirable habitat;
- Courtship and mating;

- Nurturing and protecting young;
- Predation and predator avoidance; and
- Effective use of habitat.

The importance of sound in the natural environment should be self-evident. A natural environment in a park should *look, feel, smell, and sound* natural. This is the comprehensive view of a natural environment having intrinsic worth, held in trust for the American people. As presented earlier, the preservation of the natural environment as an inherent value is a basic tenet in the agency mission.

**The importance of sound for cultural or historic values.** Some sounds, natural or not, accompany the use, interpretation, appreciation, or enjoyment of cultural or historic settings in a park. Such sounds or the emphasis on a “quiet, contemplative, reverent” environment can be part of the cultural or historic value established for a park in legislation. The use of traditional cultural properties or religious sites, or their protection, may demand an environment free from sound other than that which is part of the site’s character. Sites that celebrate or commemorate historic events may use certain sounds to enhance the understanding or appreciation of those events. Parks that are established to maintain a living history or traditional cultural practices similarly depend on appropriate soundscape characteristics for these purposes.

**The sound environment and the opportunity for people to enjoy parks.** The public, in general, supports and is concerned about preserving national parks and what they represent. Visitors, though they may not always be aware of noise, nevertheless have expectations about being able to appreciate and enjoy park resources. People should be able to hear and attend to interpretive programs. Historic, cultural, scenic, geologic, and biological resources in parks all have a soundscape context that is important to the opportunity for their enjoyment. It should be evident that noise which discourages the presence of wildlife also prevents visitors from viewing and enjoying them. Visitors come to parks to enjoy the sights and sounds of a natural environment and to learn about and appreciate cultural and historic treasures, and in some instances to retreat from the noise of everyday life.

### **The natural sound environment is a diminishing resource**

Increasingly, even those parks that appear—visually—as they did in historical context do not sound like they once did. A number of sources of sound potentially affect parks by detracting from the purposes for which they were established. The ambient sources of sound include:

- Overflights of all kinds;
- Adjacent land uses, growth, and development;
- Through traffic;
- Park operations and maintenance;
- Other motorized uses, including all-terrain vehicles, snowmobiles, and personal watercraft;
- Numbers of visitors (there was a 226% increase in national park system visitation

between 1972 and 2000: from 190 million to 429 million visits per year); and

- Cumulative sources.

The impacts of these sources can derive from a variety of sound characteristics, beginning with sound frequency (tone), amplitude (sound pressure or “loudness”), and source proximity. Along with the physical characteristics of sound, impact is further defined by the duration, time of day or season, and temporal frequency (continual, random, frequent, or infrequent) of the sound events. The significance of the impact is defined by the types and locations of resources, values, or visitor opportunities that are affected. How sound is transmitted from the source to the receptor through a medium is also a major factor in determining impact. Is the sound generated from above, and transmitted through the atmosphere to create a “soundprint” on the ground, or is it generated on the ground, to travel across the landscape? Many parks have marine habitats where sources of sound can generate effects both below and above the water surface.

Given the nature of sound impacts as described, there is a clear potential for conflict between many sources of sound and the purposes and values for which a park was established. This includes the opportunity for visitors to enjoy the park precisely for those purposes and values. Most visitors have expectations about their park experience. Many times, expectations are defined in contrast to what people routinely experience day-to-day. In terms of sound, many people expect to hear only natural sounds in a natural environment or a wilderness area—not the continual drone of traffic miles away. They expect to hear the quiet, harmonious tradecraft of an Amish farm community, not the sound of race cars at a nearby track. They expect to hear and enjoy a ranger talk along a quiet nature trail, but instead get a ranger straining to be audible above the sound of a hovering helicopter.

### **The National Park Service Natural Sounds Program**

The Natural Sounds Program began in 2000. Its establishment responded in part to the passage of the National Parks Air Tour Management Act of 2000. The issue of overflight noise from air tours above national parks, and the potential for impacts on park resources and visitors, is directly addressed by this act. Overflight impacts and noise had been a simmering issue owing to the experience with air tours at Grand Canyon National Park, and the question of how overflights affect parks throughout the system. Both are the subjects of earlier legislation. The issue of noise arose directly in dealing with the impacts of winter motorized use in Yellowstone and Grand Teton National Parks, and similarly with the use of personal watercraft in a number of other park units. The need for a specific program about acoustics and soundscape management was evident.

The Natural Sounds Program’s work plan for 2005 is briefly described below. For Park Service employees, more information about the program is available at <http://www1.nrintra.nps.gov/naturalsounds/>. A similar site is available on the worldwide web at <http://www.nature.nps.gov/naturalsounds/>.

### **The Natural Sounds Program mission**

“The Natural Sounds Program works to protect, maintain or restore natural soundscape

resources in parks in a condition unimpaired by inappropriate or excessive noise sources. We fulfill this mission by working in partnership with parks and others to increase scientific and public understanding of the value and character of natural soundscapes and to eliminate or minimize noise intrusions.”

## **Organization**

The program offices are located in Fort Collins, Colorado, as a detached Washington Office unit of the National Park Service Division of Natural Resources Stewardship and Science. Organizationally, it is within the Air Resources Division headquartered in Denver, Colorado. The present staff includes people with expertise in planning and National Environmental Policy Act, acoustic data collection and analysis, and military liaison.

## **Current program priorities**

As reflected in the introductory paragraph, current program priorities are heavily weighted to overflight issues. Soundscape policy goes well beyond that issue to express general objectives for soundscape management and related planning. The program staff is therefore engaged in a number of activities to help implement the policy. In order of priority, these activities are briefly presented below.

**Air tour management planning.** The National Parks Air Tour Management Act requires the development of a plan for each park with air tours. These plans are to prevent significant adverse impacts to park resources and visitors from air tour operations. The act requires the Federal Aviation Administration (FAA) to be the lead agency for developing environmental documents, and the National Park Service to be a cooperating agency. The directors of both agencies are to sign each plan. The Natural Sounds Program represents the estimated 120 park units, coordinates between parks and FAA, and is part of the national team for implementing the act.

**Soundscape management planning.** Soundscape management policy provides direction for planning: “Using appropriate management planning, [NPS] will identify what levels of human-caused sound can be accepted within the management purposes of parks.” Objectives for soundscape planning can be paraphrased as: NPS will preserve natural soundscapes, restore degraded soundscapes to their natural condition, and protect natural soundscapes from degradation due to noise, as far as possible. The program has developed a number of practical guides to assist parks with soundscape management planning, and a number of such plans are underway. Guides are to be published on the program website.

**Guidance to the field on acoustic data collection, and methods development.** The program has devised a number of practical guides to soundscape management and acoustic data collection. These are to be published on the program website.

**Acoustic data collection.** The program maintains a number of equipment sets for the collection of acoustic data. Some sets have been loaned to the FAA for collecting data at air tour parks. Program acousticians are actively engaged in collecting data in strategically meaningful park locations.

**Responding to park requests for assistance on noise issues and impact assessment.** The annual call for technical assistance draws requests from park units that wish to have

acoustic data collected to deal with a variety of noise issues. Issues include airport developments, ambient noise, air tours, military overflights, and adjacent land use. Program staff has responded with assistance in soundscape planning and acoustic data collection methods. A number of workshops have been conducted at park units for this purpose.

**Providing liaison with military on overflight issues.** The program staff maintains contacts in the military community, and uses those contacts when parks have problems with military overflights. A sourcebook for parks in the Pacific West Region was developed in 2002, in cooperation with the U.S. Air Force.

Silence is something more than just a pause; it is that enchanted place where space is cleared and time is stayed and the horizon itself expands.

— *“The Eloquent Sounds of Silence” (Preamble to the Report to Congress on Effects of Overflights on the National Park System)*