

Impairment of Park Soundscapes

Soundscapes in National Parks

Soundscapes in national parks are a resource that is experienced by people, and which affects wildlife habitat and cultural resources. Soundscapes in parks often are composed primarily of natural sounds, but also are frequently composed of natural and non-natural sounds. Protection of this resource is part of the National Park Service (NPS) mandate to “conserve the scenery and the natural and historic objects” of the parks.

Inappropriate Sounds

Inappropriate sounds can adversely affect the desired soundscape conditions in a national park. Inappropriate sounds can also adversely affect other park resources or values, including but not limited to cultural resources, wildlife, and visitor experiences. Not all non-natural sounds are inappropriate, only those that are inappropriate to the particular time and place in the park.

Guiding Regulations and Policies

The management of the National Park System is guided by the Constitution, public laws, executive orders, regulations, and directives of the secretary of interior and the assistant secretary of fish, wildlife, and parks. All NPS policies must be consistent with these higher authorities. Relevant legislation includes:

- **National Park Service [Organic] Act, General Authorities Act, Wilderness Act, and Redwoods Act.** All of these acts address leaving parks and wilderness areas (which constitute a major part of park areas) *unimpaired* for the enjoyment of future generations or not *derogating* the values and purposes for which these various areas have been established.
- **Grand Canyon National Park Enlargement Act (1975), National Overflights Act (1987), and National Parks Air Tour Management Act of 2000.** These laws address “natural quiet” as a value or resource in its own right to be protected from significant adverse effect. They state that air tour operations have the potential to cause a significant adverse effect on natural quiet and visitor experiences of the park.
- **NPS regulations.** A variety of provisions in NPS regulations address issues of sound management. Key regulations address audio disturbance, snowmobiles, and sound abatement.
- **NPS policy.** A number of policy statements address or relate to soundscape management. In the current NPS management policies, Section 4.9, “Soundscape Management,” states: “The National Park Service will preserve, to the greatest extent possible, the natural soundscape of parks” (NPS 2000:44)
- **Director’s Order no. 47, Soundscape Preservation and Noise Management (NPS 2000a).** This order requires, “to the fullest extent practicable, the protection,

maintenance, or restoration of the natural soundscape resource in a condition unimpaired by inappropriate or excessive noise sources.” Park soundscape conditions should be consistent with park purposes as delineated in the authorization legislation and park management plans. Director’s Order no. 47 sunsets on December 1, 2004.

Impact Thresholds

The development of impact thresholds for analysis of proposed actions depends upon establishing indicators and standards based on park management zone objectives that are developed in the general management plan or other park planning documents. Indicators for impact/threshold analysis include various acoustical metrics, such as area and duration of audibility, time above natural ambient level, and sound exposure level (decibel level). Indicators must be viewed in the context of where and when inappropriate sounds occur. Context, time factors (e.g., duration, frequency of occurrence, and sensitivity of the time period of occurrence), location, and intensity interact in a complex manner to determine the level of sound for a given activity. For example, it follows logically that regular aircraft overflights at relatively low altitudes that occur over critical wildlife habitat or backcountry visitor-use areas will likely have more of an impact upon the affected wildlife or visitor experience than the same flights over a non-critical wildlife habitat or high visitor-use frontcountry areas of the park.

In addition to its impacts on the park soundscape, inappropriate sounds may have additional or different impacts on other resources. For example, a certain duration and inten-

sity of noise may have a moderate impact on the natural soundscape of a park but a completely unacceptable impact on a species of concern or on a particular cultural or religious site. Also, a given intensity would have greater impact if it occurred more often, for a longer duration, or over a greater area. The time of day or time of year a given noise occurs can also significantly influence the impact.

The various thresholds shown in Table 1 are types of criteria that *may* be applied in describing effects of inappropriate sounds on park soundscapes. Thresholds must be set by management zone for each park. For example, a national recreation area (NRA) is required to allow recreational boating uses, which will produce sounds, and therefore the thresholds for an NRA would be significantly different than for the wilderness areas of a park. However, where similar zones exist, the standard should be relatively consistent.

Impairment Determination

An impact on the natural soundscape is more likely to constitute impairment if:

- The natural soundscape is linked to the park purpose in the enabling legislation and/or subsequent general management plan (GMP); and
- The area of audibility is large;
- The sound level is at or above the natural soundscape level, or it produces frequencies not heard in the natural setting; or
- It occurs frequently, continuously, or indefinitely over long periods of time. An impact that achieves higher levels in most or all of these areas is likely to constitute impairment.

The decision-maker has the responsibility and authority to make a

Table 1. Examples of impact criteria.

Threshold / Management Zone		Definition
Negligible ¹	Wilderness	Inappropriate sounds are audible up to 5% of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is no more than 3 dB over the natural ambient sound level. The intent of the Wilderness Act of providing solitude and quiet is never affected by inappropriate sounds.
	Development	Inappropriate sounds are audible up to 5% of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is no more than 3 dB over the existing ambient sound level.
Minor ²	Wilderness	Inappropriate sounds are audible up to 5% of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is no more than 6 dB over the natural ambient sound level. The intent of the Wilderness Act of providing solitude and quiet is rarely affected by inappropriate sounds.
	Development	Inappropriate sounds are audible up to 10% of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is no more than 6 dB over the existing ambient sound level.
Moderate ³	Wilderness	Inappropriate sounds are audible up to 10% of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is no more than 6 dB over the natural ambient sound level. Inappropriate sounds interfere with the intent of the Wilderness Act on infrequent occasions.
	Development	Inappropriate sounds are audible up to 20% of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is more than 10 dB over the existing ambient sound level.
Major ³	Wilderness	Inappropriate sounds are audible 20% or more of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is more than 10 dB over the natural ambient sound level. Inappropriate sounds significantly interfere with the intent of the Wilderness Act.
	Development	Inappropriate sounds are audible 25% or more of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is more than 10 dB over the existing ambient sound level.

¹ Short-term impacts of a generally lesser degree are likely to fall into this category, whereas long-term impacts must be evaluated specific to the criteria. Short-term impacts are those that occur for the duration of a time-finite project such as facility construction or maintenance, or a one-time-only event. A general rule for short-term determination is any impact whose total duration is less than five years. Impacts that are caused by a use or an action that is permitted for a term of more than a year, or allowed to continue programmatically and indefinitely, could be considered long-term (as in 10-year term permits).

² Short-term impacts of a generally greater degree are likely to fall into this category, whereas long-term impacts must be evaluated specific to the criteria.

³ Short-term impacts are not likely to fall into this category; long-term impacts must be evaluated specific to the criteria.

determination of impairment on park resources and visitor experiences. This determination must be based upon consideration of direct, indirect, and cumulative impacts—as defined in the impact thresholds.

References

NPS [National Park Service]. 2000a. *Director's Order no. 47: Soundscape Preservation and Noise Management*. Washington, D.C.: NPS.
———. 2000b. *Management Policies 2001*. Washington, D.C.: NPS.

Bob Rossman, National Park Service, Natural Sounds Program Office, 1201 Oak Ridge Drive, Suite 100, Fort Collins, Colorado 80525-5596; bob_rossman@nps.gov

