Siegrist, D., Clivaz, C., Hunziker, M. & Iten, S. (eds.) (2006). Exploring the Nature of Management.
Proceedings of the Third International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas.
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Understanding and Managing Soundscapes in National Parks: Part 1- Indicators of Quality

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Introduction

A growing body of research has documented the potential impacts of outdoor recreation in national parks and related areas. These impacts apply to multiple components of the landscape, including soil, vegetation, water, and wildlife. Moreover, there are often aesthetic implications of these impacts that can degrade the quality of the visitor experience. Research and management attention is now being extended to include aural impacts of outdoor recreation, and natural quiet – the sounds of nature undisturbed by human-caused noise – is now being recognized as an important and endangered resource in national parks and related areas. Moreover, ecent policies by US National Park Service has made the protection, maintenance, and restoration of the natural soundscape a priority and consider natural quiet as a value and a resource in its own right.

Research related to sound and noise in national parks and related areas have traditionally given aircraft disturbances much attention. For example, Mace, Bell & Loomis (1999) questioned whether typical helicopter noise found in national parks would influence perceived aesthetic quality of landscapes and visitor's feelings of tranquility and solitude. They suggest that when sounds are considered inappropriate for a specific area, the noise would become annoying and likely detract from other experiences such as enjoyment of nature (Mace et al. 1999). Noise was defined as unwanted sound, and affect was defined as emotion. Results suggest that even low levels of helicopter noise would affect visitor tranquility and solitude (Mace et al. 1999).

There is now a growing interest in how noise created by the increasing numbers of visitors to parks and related areas can mask the sounds of nature and detract from the quality of the visitor experience.

Methods

Research conducted by Kariel (1990) suggested that simply investigating sound levels alone may not get at the true nature of annoyance with those sounds. Kariel suggested that understanding the physical characteristics and their socio-psychological characteristics along with sound levels may be a better way to predict whether sounds are deemed as annoying, pleasing, or acceptable. For example, high pitched sounds are usually deemed more annoying than low pitch sounds, and rhythmic sounds such as an engine are generally considered more annoying than continu-

ous sounds. However, because many sensory experiences occur along with sound, it is important to consider the larger context of the setting. Because many people tend to visit natural areas to get away, enjoy nature, and relax, sounds that interfere with these goals may also be deemed as annoying (Kariel 1990).

During the summer of 2005, a "listening exercise" was conducted at in Muir Woods National Monument. The purpose of this exercise was to 1) identify the natural and human-induced sounds that visitors heard most frequently, 2) distinguish the characteristics of sounds identified, and 3) understand how visitors perceived those sounds. From July 16th - 27th, 2005, visitors (n= 280) were asked to listen and then identify sounds on a checklist. Building on methods used by Kariel (1990), the checklists included possible physical characteristics of sounds, and allowed visitors to rate each sound on a scale of -4 (very annoying) to +4 (very pleasing).

Results

Figure 1 displays the median ratings of each sound heard by visitors (-4 through +4) and the percentage of visitors that heard the sounds. The results are displayed using a concept similar to Importance/Performance (Hollenhorst & Gardner 1994). Importance/Performance provides a graphic representation of the relationship between importance and performance and provides information as to where management action should be directed. It is broken into four quadrants, with the percentage of people hearing sounds listed on the Y axis, and the median ratings of those sounds listed on the X axis. The upper left quadrant contains sounds that were rated negatively and heard frequently. More than 70% of visitors heard all of the following sounds: people (73%), water (81%), wind (74%), and groups talking (73%). These sounds should be considered as first priority for management consideration. The lower left quadrant contains sounds that were rated negatively, but were heard by less than 50% of the people; in most cases these sounds were heard by less than 25% of the people. These sounds should be monitored, but considered second priority for management. The upper right quadrant contains water, wind and bird song, sounds that visitors heard most often and found most pleasing. The lower right quadrant contains sounds that visitors found pleasing but did not hear as often.

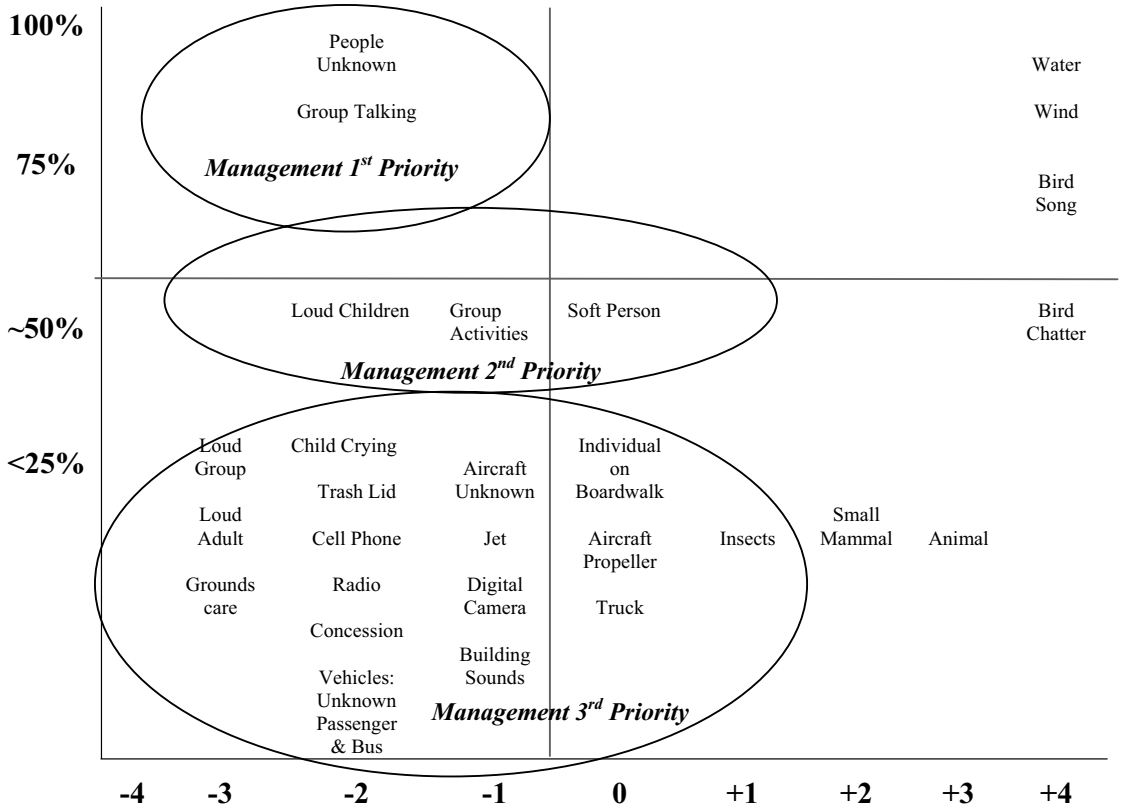

Figure 1: Median ratings of each sound heard by visitors (-4 through +4) by the percentage of visitors that heard the sounds.

Conclusion

These data provide important management information and can inform the development of indicators of quality related to soundscapes. In addition to supplementing current sound monitoring and logging efforts in Muir Woods, this study helped with the development of a study instrument for a 2nd phase of research. Based on study findings, the second phase was designed and conducted to measure normative standards of quality for the soundscape of the park. This study is described in a companion abstracts by Manning et al. and will be followed up with a conceptual piece on computer simulation modeling proposed by Lawson and Plotkin.

References

Hollenhorst, S. & Gardner, L. (1994). The indicator performance estimator approach to determining acceptable wilderness conditions. Environmental Management (18), 901-906.

Kariel, H.G. (1990) Factors affecting response to noise in outdoor recreational environments. In: The Canadian Geographer (34/2), p142-149.

Mace, B.L., Bell, P.A., Loomis, R.J. & Haas, E.E. (2003). Source attribution of helicopter noise in pristine national park landscapes. In: Journal of Park and Recreation Administration (21/3), p 97-119.