



Natural Sounds in Muir Woods National Monument

The Question: *What effects do human-caused noises have on the soundscape of Muir Woods National Monument?*



Muir Woods National Monument (NPS Archive)

Human-caused noise has been an escalating management issue in national parks for the past several decades. Unwanted noise is a byproduct of aircraft, watercraft, road traffic, machinery, and even voices. These noises have continually increased alongside a rapidly developing society, and researchers have begun to uncover their effects on park ecosystems and the experiences of those who visit them.

Recent studies document substantial changes in animal behavior, breeding success, spatial distributions, predator/prey interactions, and community structure in response to human caused noise. This interest was initially sparked among park managers in Muir Woods National Monument when they began to understand the effects of noise on the breeding endangered northern spotted owls within the monument.

Park managers have also become increasingly concerned about the impact these noises have on the quality of visitor experience in national parks. People come to these places expecting to hear the sounds of nature, and unwanted human-caused noises can significantly detract from the quality of the experience.

The Project: *The Natural Sounds Program, a department of the National Park Service, has partnered with social scientists to conduct soundscape surveys in Muir Woods National Monument.*

The initial phase of research at Muir Woods focused on identifying different indicators of quality for the visitor experience. Indicators are measurable, manageable variables that help define and quantify desired resource and social conditions. The results of this phase found that visitor-caused noise among other things is an important indicator of quality.

A follow up survey used a series of audio simulations to identify a standard of quality for visitor-caused noise, which defines the minimum acceptable condition of indicator variables. A total of 280 visitors participated in an exercise which consisted of listening to and identifying the sounds

heard in the park and rating the extent to which each type of sound was “pleasing” or “annoying.” This phase allowed researchers to better understand how much human-caused noise visitors could generally tolerate before detracting from the experience.

Researchers prepared five 30-second audio clips for the third phase of the study. Each clip became increasingly saturated with human noise, and participants were asked to indicate which one was most like the sound conditions they experienced in the park. This section of the study found that a substantial number of visitors were hearing significantly more human-cause noise than they would like.

The Results: *The information gained from these research efforts is being used in current planning processes to support development of desired conditions in the natural soundscape.*



Acoustic Monitoring Equipment

Proper management of soundscapes is becoming more complex and challenging as sound pollution increases. A growing body of information now exists to help support comprehensive soundscape management.

Using the results of this study, actions are being taken to ensure that identified standards of quality are maintained in places like Muir Woods. The analysis suggested that natural sounds significantly contribute to the visitor experience. These sounds include the water flowing through Redwood Creek, birds calling and wind blowing through trees. Visitor caused noise – on the other hand – is a quality that detracts from the visitor experience.

For this reason, park managers established an experimental quiet zone in the monument’s

Cathedral Grove. The effort proved to be successful in sensitizing visitors to human-cause sounds, and it provided visitors a greater opportunity to hear the natural sounds of the forest. The quiet zone has been permanently implemented with outstanding support from park visitors and staff. Findings from the program of research are being considered as part of the new general management plan that is being developed by Golden Gate National Recreation Area which includes Muir Woods.

Additional Resources:

To learn more about the National Sounds Program see the National Park Service’s Explore Nature website: <http://www.nature.nps.gov/naturalsounds/>

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