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RESEARCH REPORT

A program of research to support management of visitor-caused noise at Muir Woods National Monument

By Robert Manning, Peter Newman, Kurt Fristrup, Dave Stack, and Ericka Pilcher

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Introduction



NPS PHOTO/LOU SIAN

A couple strolls through Cathedral Grove on a quiet morning in winter when visitation is typically low. Signage at the entrance to this area reminds visitors that they are in a quiet zone.

NATIONAL PARKS ARE MANAGED to protect the environmental and experiential values of the landscapes they represent. As the nation continues to grow into a more populous, developed, and noisy place, these values have expanded from landscapes to “soundscapes” and include the natural and cultural sounds of national parks. In fact, sounds have been identified by the National Park Service (NPS) as a resource that must be protected. In doing so, the National Park Service is challenged to define “soundscapes,” understand the effects of noise on visitors and wildlife, and take appropriate management action when necessary.

Management of environmental and experiential impacts on national parks is increasingly guided by management-by-objectives frameworks such as the NPS Visitor Experience and Resource Protection (VERP) framework (NPS 1997; Manning 2001; Manning 2007). Like other such frameworks, VERP has three principal steps. First, indicators and standards of quality are formulated. Indicators are measurable, manageable variables that help define and quantify desired resource and social conditions. Standards of quality define the minimum acceptable condition of indicator variables. Second, indicators of quality are monitored over time. Third, management actions are taken to help ensure that standards of quality are maintained. With continued monitoring, VERP is an iterative or “adaptive” process, providing feedback that informs management about the degree to which management objectives are attained and the efficacy of management actions taken.

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VERP and management of visitor-caused noise at Muir Woods National Monument (Muir Woods) in California.

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Shhh, and Not Because the Fauna Are Sleeping

By FELICITY BARRINGER
 Published: February 21, 2011

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MUIR WOODS NATIONAL MONUMENT, Calif. — At times, deep within this vaulted chamber of redwoods, it is almost quiet enough to hear a banana slug slither by. For the [National Park Service](#), that stillness is as vital a component of the site as the trees' green needles, or the sudden darting rays of sunlight.

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Max Whittaker for The New York Times
 Robert, Tatini and Ami Montgomerie of Sweden visited Muir Woods National Monument on Jan. 26.

A decade after the agency resolved to restore natural sounds to [this park](#) in a metropolitan area of seven million people, managers at Muir Woods, in Marin County just north of San Francisco, have made big strides in vanquishing intrusive noise. Now the background sounds are dominated by the burbling rush of Redwood Creek, the soft sibilant breeze that stirs the redwood branches, the croak of a crow.



Humans do contribute, too, but, with the exception of toddlers' squeals, their voices tend to be pitched lower than usual.

The impact of noise on wildlife ranging from birds to whales to elk has been a growing focus of scientific study. Increasing evidence suggests that animals in natural settings modify their behavior, though sometimes only briefly, in response to human commotion.

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 Mia Monroe, a park ranger, on the changing soundscape at Muir Woods.



AUDIO: [Natural Park Sounds](#)
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Max Whittaker for The New York Times

One of the first things that a visitor to Muir Woods National Monument sees is a monitor that measures sound levels.

In a 2009 article in [Park Science](#), researchers explained that animals react to human intrusions as if they were suddenly being threatened by predators.

“These disturbances evoke antipredator behaviors and interfere with other activities that enhance fitness,” the article said, like foraging for food, mating and tending to the young. When such disturbances grow frequent, the researchers warned, “population consequences may result.”

By 2001 or so, Muir Woods had in fact long been abandoned by otters and pileated woodpeckers, and park managers had grown concerned that sightings of a pair of northern spotted owls, an endangered species, were becoming more and more infrequent.

There were other worries besides noise levels. An asphalt walkway was cramping the growth of the redwoods’ surprisingly shallow roots in some places, causing at least one tree to topple. And park visitors were straying from the path into the groves, compacting earth that was meant to be loose and harming the redwoods further.

But the noise question was the most vexing. The pathway could be altered, and was: in many places a slightly elevated boardwalk has replaced it. Visitors are firmly advised to stay on the paths. But the clatter and rumble of garbage can lids and maintenance vans remained.

Today, no Dumpsters or garbage cans are to be found along the trails. Maintenance vehicles powered by electricity glide by almost silently. Workers in emergency vehicles do not idle their engines while resolving whatever problem brought them to the park.

Once the diesel engines had been stilled, visitors began falling into line, heeding a subtle signal that human noises are superfluous here.

But some of the signals are hardly subtle: signs posted near Cathedral Grove in the heart of the park call for silence. Near the entrance to the food and gift shop close to the park’s entrance, a decibel meter measures the sound of a visitor’s voice.

“I could see myself crunching potato chips,” Chris Mueller, a New York City tourist interviewed in the woods, said, referring to the digital readout on the decibel meter.

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“Out here it is very quiet,” Mr. Mueller added appreciatively. “The mumbling of the tourists and the babbling of the stream, it has a very calming sense to it.”

What is more, the nocturnal spotted owls have responded: Muir Woods now has two breeding pairs instead of one.

The decade-long campaign for quiet in national parks has been little heard or noticed. The park system provides considerable autonomy to the individual parks, and officials at some parks have worried about noise and taken stronger steps more than have others.

Karen Treviño, the chief of the natural sounds and night skies division of the National Park Service, a system that includes hundreds of parks, monuments and historical tracts, said the noise issues varied widely.

In the Florida Everglades, the rhythmic thudding of electrical generators has been stilled at a campground, and park officials are negotiating with operators of airboats, whose revved-up fans can sound like miniature jet engines, to see how their impact might be reduced. They have also approached officials at Homestead Air Force Base south of Miami about the timing of the sonic booms that shake the saw grass.

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