

YOSEMITE VOICES

"Soundscapes"

RANGER RONEY: Podcasting from Yosemite National Park on this very hot July 9th, 2008. This is Yosemite Voices.

Yosemite Voices is a series of audio podcasts intended to provide insights into the natural and cultural history and management of Yosemite National Park. We also explore the lives and lifestyles of the people who live and work here.

(Music)

Hello. I'm Ranger Bob Roney. Welcome to Yosemite National Park's first audio podcast. It's called Yosemite Voices because that's what you'll hear, voices from Yosemite.

What I have in mind for this series is to introduce you to some of the people I work with, as well as to bring you some stories about what's going on here in the park.

Some stories may be about behind-the-scenes activities. Other stories may be well known but you'll hear them from more of an insider's perspective.

I also hope that you'll get to know some of the people who care for your park a little better. Overtime, you'll get to know me too but here are some of the basics.

I grew up in Southern California, fell in love with Yosemite when I was 18 and have been working here ever since. That's more than 40 years.

Even though my family had a television set, I really loved to listen to the old radio shows that were still being broadcast in the mid 1950's, and that love of sound remains with me today. In fact, that's one of the reasons that I'm producing these audio podcasts.

And speaking of sound, that's what our first episode is going to be about, the landscape of sound in wild places, like Yosemite.

Most people don't pay much attention to the sounds here in Yosemite, the visual scene is so big and exciting. But the National Park Service has recently begun to pay attention to our acoustical resources as much as we've been paying other resources, like water and air.

And earlier this spring, I spoke with Dr. Kirk Fristrup. He's the Senior Acoustic Specialist with the National Park Services' Natural Sounds Program based in Fort Collins, Colorado but he works with parks all over the country, including Yosemite.

The segment begins as I describe an early

experience I had away from the busyness of the suburbs.

(Music)

I remember as a child going to the mountains and getting out of the car and my dad saying:

"Listen. It's just so quiet, you can't hear anything."

And you can't. And then all of a sudden at some point you start hearing, like, the gravel under your feet which you would never hear your footsteps in the city. And then you hear a bird off in the distance and a cricket and then frogs and pretty soon the silence is, is alive.

DR. FRISTRUP: That I think is one of the really rare experiences which you can get in some national parks, that is that it's so quiet that you really become conscience of this enormous space around you in which you could hear something.

And so when they are really subtle, little sounds, even the sound of a cricket walking across the ground or if you're out working with someone, you can hear them fifty or hundred meters away, you can hear, you become aware of the sound of your own heart beating, there are places like that that are so quiet that they really approach our threshold of hearing and it's possible to

hear things at extraordinary differences.

And somehow you're right, there is -- you become aware of that vastly expanded audio horizon. Even if there isn't something happening in the space, you just become aware that you can hear so much farther out.

And it can be even unnerving. I have been in places where it's been so quiet that it's been, uhm, it's kind of been stimulating or unsettling until I get accustomed to what it is and what it means.

And certainly if you're a city dweller and you go out into a really quiet place and try to sleep, it can be hard to fall asleep because it's so quiet.

(Nature sounds and music)

We share with all other mammals the same basic sensory package. And, in fact, we have quite good hearing, especially at lower frequencies. We have better hearing than most other land animals. I think aboriginal man probably relied on both senses equally because in all other vertebrate animals, sound is the primary alerting sense. It's what keeps us informed of things that are happening all around us regardless of where we're looking or even if we're looking.

Sound wakes us when we are asleep. And the fact

that you and I can identify the directions from which a sound comes, that's an important part of that system so that when the alert comes in, we know where to look.

To make not a big leap here, I think that's one of the important things that can happen in national parks. That in our urban settings very often you want to turn your ears off just because there's so many irritating or distracting sounds around you and none of them is pertinent, none of them's relevant, except perhaps if you hear screeching tires approaching, you know, to warn you of danger.

But here in a park, sounds can alert you to the very things you come to see. They can alert you to the rare glimpse of an animal whose presence might be cryptic to your eyes but quite prominent to your ears. In fact, most bird sightings start by hearing a song and then looking and seeing the bird.

So I think it's a -- we have a chance in parks to sort of re-awaken a sense that we deliberately ignore in many urban settings.

RANGER RONEY: How would we go about helping the general public, or for that matter me, awaken that sense?

DR. FRISTRUP: I'd say there are two things that really work well.

Very often we conduct listening exercises where

we ask people to sit quietly for just a few minutes, even as short a span as three minutes can really be revealing. And we'll either blindfold them or ask them to close their eyes and listen very intently and make note of every sound they hear.

And oftentimes after that experience people tell us they walk away with a much richer awareness of what's going around them. That it isn't until someone asks them to shut off, to stop looking and just listen intently that they become aware of all the sounds that they are probably unintentionally ignoring.

It's a habit we form in our busier urban lives that serves us well in that environment but when we come out here, we're missing a lot. We're losing -- our experience is much poorer for not adding that sort of symphonic awareness of nature.

Another thing -- another unfortunate part of our urban experience is both our visual and acoustical horizons shrink. The acoustical one shrinks because it's so noisy around us, we're not likely to hear sounds unless they're fairly close. And the visual horizon because there are usually so many obstructions in the forms of buildings and houses.

So when you get out into a natural area, that sensation of depth is suddenly present on a much greater

scale than most suburban or urban communities. So re-awakening that sense of scale, of depth, I think would require special practice both for the visual and acoustical sense.

And I think the other thing, of course, is that you close your eyes and you reopen them again, you've broken the habit of seeing things the old way. And I think by turning off the eyes -- it's hard to really turn off the ears but, you know, by making that kind of fundamental change, you just break the old habits, the old patterns of processing and start listening to things and seeing things with fresh perspective.

(Nature sounds and music)

RANGER RONEY: Well, these noises that we humans bring to national parks -- generators on our RV's and just driving around on the roads -- how might that affect wildlife?

DR. FRISTRUP: Noise acts just like smog. So on a smoggy day, you can't see as far and those things you can see are blurred or less distinct than they would be in clear air.

So for -- on a noisy day, we can't hear sounds as far away from us as we might. And those sounds that we do

hear are less distinct, less identifiable.

So for wildlife, this means that instead of being able to continue foraging or looking for food or interacting with potential mates, animals have to spend a lot more time with their heads up in sort of a visual scanning mode substituting visual surveillance for what their ears would have given them without all that effort.

And, as I said, those animals cannot completely compensate for that loss of oral awareness. And so even though they can, you know, be a little more vigilant and offset some of those losses, many animals choose to be less active, to holdup in sort of hiding spots when it's really noisy just because they know they're at a greater risk.

It's really unclear, however, whether predators or prey are going to be more badly hurt by noisy conditions because there are many predators that actually the way they find their food is by listening. And so if you -- a given increase in noise level might cut a predator's search area in half but only represents sort of a marginal decrease in the alerting distance for the prey items he's trying to find.

So there actually could be conditions in which -- noisier conditions would actually favor the prey items rather than the predator items. We can't -- this is an

area of new and largely unexplored ecological research and it will take sometime for us to know how often the balance shifts towards the prey or towards the predators.

(Owls hoot)

RANGER RONEY: Owls, of course, can find their prey very easily with hearing.

I've noticed coyotes up here, even when there's snow on the ground, they'll focus and their ears are aiming at a point on the snow waiting to hear that sound again. And when they do, up they go down and down through a foot of snow and they'll get a mouse.

DR. FRISTRUP: An everyday example that many Americans would have in their front yards would be the Red-breasted Robin.

When you see a Robin running along a grassy surface and pausing, they're listening for prey with their ears. And it's been shown in numerous experiments, it's not vibrations from the ground, it's not vision, they actually hear the prey first and then they get close enough to see where it probably is going to be and then they grab the worm.

So, it's very likely that in places that are noisy, they aren't as able to find these little -- to

sense these incredibly quiet little accidental sounds of earthworms and other prey items.

And that's the other reason for being concerned about predator/prey interactions perhaps more than we are about communication. Because at least when two animals are trying to communicate, both the sender, the talker, and the listener can make adjustments in their behavior to try and compensate for noise. The talker can repeat the message. The talker can move to another perch or another location that's closer. We know that some birds sing higher pitch songs in urban environments than in rural environments because they're avoiding the low frequency noise in urban environments.

(Music)

DR. FRISTRUP: Generally speaking, road noise or aircraft noise is not in the same frequency band as a lot of bird signals. That doesn't mean that communication at those higher frequencies isn't affected when we have very loud noises.

And I guess where I was going with my previous note is that unlike communication, the sounds that are important for predator/prey interactions are all accidental. The animal that's producing them would prefer

in many cases to be absolutely silent. And they're certainly not going to adjust those sounds to make them more noticeable when the world gets noisier.

So, listening for those accidental sounds for nature, there will be a genuine loss of information when it gets noisier. There is no compensation; there is only lost opportunity.

So, it's -- this fog, this noisy fog that we're putting across landscape could have many effects. But I have to say the thing that concerns me the most is the effect of this chronic constant low level of noise and the extent to which that narrows all animals' sort of acoustical horizons and this loss of the accidental sounds of nature.

(Music)

The quality of visitor experience will be heavily dependent upon noise and the natural sounds just as the quality of a cinematic experience is heavily dependent on the quality of the sound track.

(Music)

If you take any movie, even a really scary movie,

and you turn off the sounds, the impact of the movie is greatly lessened. The same thing is true in the parks. The most beautiful scenes will lose their power and their sort of potency to evoke awe and wonder and contemplation if you imbed them in a noisy environment.

And we know this. There are actually good studies that show that ratings of scenic quality go down in noisier environments. So that a completely different mode of sensing can nonetheless impact people's impressions of visual resource quality.

RANGER RONEY: I imagine one of the best examples of that here in Yosemite would be the Tunnel View, where people come out of that big, long tunnel and it opens up and there's Yosemite Valley and all of its grandeur and yet on summer's days there are buses idling and cars driving back and forth and hundreds of people going and awing and they see the beauty but perhaps it's not the quality of the beauty that they really deserve.

DR. FRISTRUP: Right. I think that is -- as I said, that's been pretty well documented not only in place at overlooks and other places where people frequently admire scenes but also if you just take photographs and record sound, actual sounds and you go back to a cinder block room somewhere and conduct experiments with volunteers, their ratings of the quality of the photographs is

directly dependent on the quality of the sound environment that you present to them.

(Babbling brook sound and music)

RANGER RONEY: When we spoke earlier, you said something about a negative effect on blood pressure.

DR. FRISTRUP: Yes.

RANGER RONEY: How loud the sound has to be. And it's not very loud.

DR. FRISTRUP: This room is fairly quiet. I would guess if we were measuring this, it would be in the 30 decibel range somewhere. And you're lucky because most houses don't enjoy that kind of silence.

Sounds that go above 35 decibels have been shown to cause a blood pressure response in sleeping people even when they're not awakened by it.

And, furthermore, when a sequence of such sounds in areas where people are subjected to, you know, a regular patterns of those kinds of sounds -- noise intrusions, we find chronic elevation or, you know, long-term increases in the blood pressure which we know is associated with elevated risk of cardiac problems.

At the noisier end of the scale, there are many studies in Europe which show that people who live in

environments where the daytime noise level is on the order of 65 decibels or about the sound of my voice if you were standing three feet away from my mouth, you know, sort of the loudest that conversational speech routinely becomes, if some levels are chronically at that level, there's actually a measurable increase, you know, substantial increase in heart attack and other cardiac problems.

So, we know that substantial portions of our big cities actually have negative health consequences for the people living there.

RANGER RONEY: That's kind of scary when you think about it.

DR. FRISTRUP: It's like most environmental health problems, the effects are remote in time. You know, you're exposed for decades before there's a consequence. There are many other possible explanations for heart attacks, diet, many other factors. In fact, I shouldn't say possible, all of these are contributing factors.

But what these studies show is that when you control for all those other factors, noise exposure does have a bad effect, a harmful effect on people when it's high.

And what we can also say but which has not been heavily studied is there are probably beneficial, you know, salutary effects of really quiet environments. And

just as meditation and some other forms of intentional relaxation have been shown to have health benefits for chronically ill people, it's very likely that for those of us who enjoy good health, you know, periodic visits or periodic experience of really, quiet, beautiful places is likely to have beneficial effects.

(Music)

RANGER RONEY: Most people probably wouldn't think so much about the sounds when they go to a national park. In fact, most of the time they talk about I really enjoyed the quiet. And yet we in the National Park Service and you in particular are doing inventories; right?

DR. FRISTRUP: Correct.

RANGER RONEY: Inventories of sound resources.

DR. FRISTRUP: Yeah.

RANGER RONEY: Tell me a little more about that.

DR. FRISTRUP: Well, there are at least two ways of thinking about sounds in national parks. The first is from a purely physical resource just like we worry about air quality or water quality, or the integrity of geological resources.

Now another piece of the resource story is that the acoustical environment is vital to wildlife and if we

degrade it, we are going to change the ways that predators and prey interact. We are going to alter their opportunities to communicate with each other. And in doing those things it's certain that we'll make changes in the internal functioning of the eco system and also in the availability of those animals for, you know, wildlife viewing.

So, we need to worry about the physical resources in their own right and we need to worry about the impact of noise on the biological resources.

(Music)

Working with the staff here we have made recordings now at I think 13 locations, the primary purpose of which was just to measure physically how quiet it is and how much noise was creeping in at different frequencies.

But along with those recordings, of course, and at each site we were recording for over a month, a lot of those noise measurements or sound level measurements we picked up lots and lots of natural signals, including some sounds that experts really hadn't heard before.

In our earlier conversation I played what is probably a bleat of a bighorn sheep. And I talked to

several experts on both dolls and bighorn sheep who claimed that they never heard the animal's call at all.

(Bleat call)

RANGER RONEY: Here's that sound again but repeated a few times.

(Bleat call)

RANGER RONEY: And here's another unusual sound that was recorded in Yosemite.

(Sound)

DR. FRISTRUP: That other sound I played earlier today, that was probably a juvenile bear being driven off by its mom at the end of the season and producing that loud protest call, that's a sound that none of the bear biologists I've contacted could identify as having heard before but it's a fairly common animal here in Yosemite and yet it's probably a sound that probably hasn't been recorded.

(Sound)

RANGER RONEY: I was going to ask you about other unusual sounds and you've told us about a couple of really, you know, wonderful sounds.

How about odd-ball sounds?

DR. FRISTRUP: Well, we do record sounds that a park visitor will never here.

One class of sound is animals eating our equipment. For some reason, deer and elk and moose love the foam that we put around our microphones to shield them from the wind. Usually they don't damage the microphone but after they eat the foam away from the microphone, the recordings we get are almost useless because every slight puff of wind blows out the recording.

But we do also have problems with bears and often when they decide to munch on a system, they completely destroy it. They'll also get curious about battery cases and smash those.

So those kinds of sounds are just accidents of us being there and trying to measure something.

(Sound)

(Music)

RANGER RONEY: We have done some inventory in

monitoring of 13 sites.

DR. FRISTRUP: Yes.

RANGER RONEY: So how do we stand here in Yosemite? Is it a quiet place? Is it a noisy place?

DR. FRISTRUP: There are several sites here in Yosemite that are among the quietest sites here in the western United States. But that extraordinary quiet is regularly punctuated by noise sources, even in the most remote locations here in Yosemite. Just as it is, I'm afraid to say, at many of the big western parks.

And the principal noise source in these remote back country locations is from air travel. The phenomenal growth in the commercial airline business and in the private general aviation sector means that there are very, very few places where you could sit for an hour in the United States and not hear a plane for that entire hour. And here in Yosemite, the average interval between aircraft noise events is about three minutes during the day.

Yosemite has the misfortune of lying almost in the cross hairs of a major east/west route from the eastern United States into the Bay area and a major north/south route from the Pacific northwest down to the LA Basin.

So this morning when I was walking to our

meeting, I counted 17 jet con trails in the sky just over Yosemite Valley, four of which were oriented north/south and the remaining 13 were east/west. And I don't know how long a con trail persists, but those are probably flights that happened in the last hour.

When we look at these recordings from monitoring sites, we frequently see two to 300 aircraft noise events per day. The good news is inbetween those noise events it's as quiet as it ever was here in the back country.

(Babbling brook)

(Music)

DR. FRISTRUP: When people talk about why they come to parks, they come for respite, for inspiration.

To speak to the value of a quality scenic or acoustic experience there are really two components. One is the aesthetic. But independent of that there is a physiological response. Our pulse slows down. Our blood pressure drops. All of these things are going to be related not just to our appreciation for what the resources are but probably on the work that the environment does on our physiology. We respond really in an involuntary way.

(Music)

RANGER RONEY: Many of us have overlooked the value of the acoustic environment in Yosemite. It's like that old Joni Mitchell song, you don't know what you've got until it's gone. But, fortunately, the National Park Service is beginning to pay close attention to the sounds, the quiet and the noise in places like Yosemite.

Next time you come up to the park, try closing your eyes to the grand landscape and opening your ears to the soundscape. I'm sure you'll gain a whole new perspective.

Well, that's it for today's Yosemite Voices. More Yosemite Voices podcasts will be available in a few weeks, either at the iTunes store or at the Yosemite National Park website. That's www.nps.gov/yose.

You'll also find other multi-media there, including a new video podcast series called Nature Notes.

So until next time, remember, Yosemite is your National Park. We'll stay here and take care of the place until you return.

(Music)

(END)