

Here's (and Ears) to the Bay Area Soundscape:
A Journey Into the World of Acoustic Ecology
By Jonah Raskin

Sharon Perry and her husband Dan Dugan inhabit a converted warehouse with double walls to keep out the racket from a neighborhood wedged between Interstate 280 and Highway 101. Today, on the pavement outside their living and workspace, I don't hear a bird chirp or tweet, but inside it's another world. Perry and Dugan have a vast digital library of bird songs they've recorded across Northern California. At any time of day or night they can press a button and transform their stark urban environment into a rich auditory habitat.

Right now they're higher than kites. They've just returned from an expedition to a marsh in the Sierra Nevada where they taped cranes, ibises, pelicans, and snipes. Perry and Dugan didn't spy a single snipe—a bird that perches invisibly among reeds—but they heard them. “The snipe makes an amazing winnowing sound,” Dugan tells me. “It came out of nowhere. We heard a snipe solo and then a whole orchestra of birds.” Dugan pressed a button and turned up the volume; instantly, I felt transported to a wild marsh.

Tried and true members of the Nature Sounds Society, Perry and Dugan are near the very heart of the fast-growing field of “acoustic ecology” which studies the relationships between sounds, species, and geographical spaces. Acoustic ecologists listen to the “geophony” – the rumblings and grumbings of the earth itself including wind and rain – and the “biophony” – the cries and whispers made by living creatures, from whales and wolves to crickets and birds. A third key term, “anthrophony,” refers to the sounds made by human beings and their machines such as airplanes, refrigerators, and air conditioners. Naturalists who study the geophony and the biophony draw “acoustic maps.” They chart and measure local and global “soundscapes.” Acoustic ecologists rely, of course, on their ears, an organ that has played second fiddle to human eyes for too long especially when it comes to the environment. So Nature Sounds Society members insist.

R. Murray Schafer, a Canadian musician and the father of acoustic ecology, conducted the first soundscape studies in the late 1960s, though earlier scientific recordings of nature were made by the British in the 1930s and released on Gramophone records. For decades, Schafer has called for the preservation of

“soundmarks” - the aural equivalent of landmarks. With his colleagues at the World Soundscape Project he has systematically taped the sounds of the planet, starting in British Columbia and moving further afield.

Like many of the members of the Nature Sounds Society, Perry and Dugan come to acoustic ecology from different, though not antithetical, ways of operating in the world. Dugan is an engineer, inventor, and technological wiz who designed the microphones used on TV by David Letterman and by professional sports broadcasters. Perry is a naturalist and environmental educator. For years, she gave workshops to show kids and adults how to listen to nature and be aware of the sounds they heard. Perry enjoyed the work. She also she found it challenging to persuade the young and the old alike to sit still and turn on their ears.

“The Nature Sounds Society reaches out to artists and scientists,” Perry tells me. “We’re creating a nexus in which artists can appreciate the science of sound and scientists can appreciate the art of sound. We want birders with binoculars and sharp eyes to share their lore and skills with engineers equipped with recording devices and trained ears, and vice-versa.”

On their weekend in the Sierra, Perry, Dugan, and their colleagues attended a talk by Bernie Krause, whose book *The Great Animal Orchestra* (2012) sums up a lifetime of global soundscape exploration. Perhaps more than anyone else in the country, Krause popularizes the seminal ideas at the heart of acoustic ecology: that animals communicate, through sounds, with one another; that they’re largely cooperative rather than competitive – after all, they play together and harmonize; and that the animal orchestra has fewer members now than it once had because of environmental degradation and the decimation of species. Moreover, Krause insists on recording a whole ecosystem, not just one species of birds or frogs. He wants of all us to understand the whole environment and not just isolated parts of it.

A keen listener, whether around Mono Lake, in the Amazon, or in his own backyard, Krause has recorded birds and beasts howling, hooting, humming, bleating, cackling, and more. He’s made his passion for sounds infectious and he’s turned inventors like Dan Dugan into naturalists. “I was a techie,” Dugan told me. “I’ve become a birder.”

For years, I’ve played over and over again the CD Krause recorded in Borneo that includes the pitter-patter of rain that seems to be falling on my roof, especially

when I turn off the lights and listen in the dark. I also enjoy his CD of the more familiar but no less intriguing sounds of the early morning bird chorus – tweets, chirps, and warblings - at Sugarloaf Ridge State Park near my home in Sonoma County. On a recent visit to interview Krause and to view his recording studio, we lounged on the deck. I couldn't see a single bird, but he identified birds by their songs. "That's a hungry crow," he says. "That's a robin looking for a mate and that's a pileated woodpecker."

Born in Detroit in 1938, Krause fell in love with the expressions of frogs, crickets, and birds when he was a boy. A folk singer and a skilled guitar player, he joined the Weavers and toured with the group after Pete Seeger departed. Krause went on to study electronic music at Mills College in Oakland. In the 1960s, he teamed up with Paul Beaver to create electronic music for the Byrds and George Harrison, and to make soundscapes for movies such as *Rosemary's Baby* and *Apocalypse Now*. These days, Krause still enjoys the Beatles and the symphonies of American composer, Charles Ives, though the melodies he longs to hear come from nature itself. If everyone turned off cell phones and went into woods to listen acutely he'd be in heaven.

On his deck, with birds chirping and tweeting in the background, he tells me that the trouble began in the Middle Ages when "they built churches to keep out the sounds of nature, and later with the Renaissance that elevated the visual and downgraded the auditory."

Krause has a message for almost everyone he meets: buy a recording device and tape the sounds of the earth and its creatures, especially at sunrise when birds perform the dawn chorus, or after sunset when crickets in a healthy environment can create a symphony of sound. "A camera is a device that teaches you to see," he explains. "A recorder is a device that teaches you to hear."

He and Beaver made their first recordings of nature at Muir Woods. For their 1970 album, *In a Wild Sanctuary*, they synthesized the sounds of woods with the rhythms of jazz orchestras and the melodies of electronic music to produce a cultural hybrid that wasn't purely natural or entirely man-made, either. Increasingly, Krause became aware of the gaps and the silences in the soundscapes when he listened to them with earphones. "Hearing with earphones is similar to seeing the world for the first time through really awesome binoculars," he tells me. "Earphones both amplify and level out the sources of sounds."

These days, when he looks back at his career, he's especially proud of the digital recordings that he began to make decades ago that provide clear evidence of the environmental devastation caused by the industrial harvesting of timber. In 1988, a logging company gave him permission to record the sounds at Lincoln Meadow in Yuba Pass both before and after vast tracks of forest were leveled. Krause's first recordings captured a rich biophony: woodpeckers, quail, sparrows, and insects, along with the gurgling of a near-by stream. A year later, at the completion of the logging operation, he returned to Lincoln Meadow and set up his equipment again. His second recordings - using fully functioning, top-of-the line digital equipment - captured only the sounds of a lone woodpecker and the stream.

Over the next 20 years, Krause returned to Lincoln Meadow to record a dozen times. Using standards set by researchers at Michigan State University, he analyzed and interpreted the data he gathered and found that the total numbers of vocal organisms at the site dropped by about 80 percent. The total number of species declined by 40 percent. Logging at Lincoln Meadow led to a soundscape that was far less diverse and far too quiet for its own good.

Krause has inspired a generation of ecologists and naturalists, though he hasn't been the only one to play a pioneering role. Others who are fighting the good fight include Dick Hingson, Paul Matzner, Wes Henry, Gordon Hempton, and Karen Trevino as well as the Sierra Club. There's a vast, largely unheralded group of activists working to protect the sounds of nature, even as the animal orchestra has been depleted. In 1972, in response to lobbying by environmentalists, Congress passed the Noise Control Act that requires the federal government to regulate sounds - including those from noxious snowmobiles - in national parks. By the start of the twenty-first century, the acoustic environment in the entire National Parks System (NPS) was deemed a valuable natural resource in and of itself. Like trees, streams, and mountains, soundscapes were entities to be protected, nurtured, and revered. Activists are still fighting to stop noisy aircraft with tourists from flying over parks like the Grand Canyon.

The NPS selected Muir Woods as a site for soundscape studies. Paul Matzner at the Oakland Museum Library of Natural Sounds recommended Dan Dugan and Sharon Perry. Not surprisingly, they leapt to the task. Once a month for a whole year, they traveled from San Francisco to the park at the end of the day with all their equipment in tow. They spent the night in the library at the education center at Muir and rose before

sunrise to record the dawn chorus. They also recorded in the dark and captured the hoots, and more, of four different kinds of owls: barred, saw-whet, great horned, and northern spotted (which are endangered). There were more owls at Muir than most of the park rangers realized. Dugan and Perry also learned there were more birds—including band-tailed pigeons and winter wrens—to be heard in the woods of oak, madrone, and fir than in the stands of old growth redwoods which tend to muffle sounds and which don't offer the diverse food supply necessary for many species.

Furthermore, Dugan and Perry enlisted volunteers to wander about the park and keep lists of human-made noises: blaring radios, the clicking of cameras, and the rings of cell phones. The data and analysis led to significant noise-reduction measures, such as moving the parking lot away from the forest itself and eliminating the clanging of cash drawers and effacing the noise of irritating ice machines. Thanks to these changes, visitors can hear, without interference, the silence of Muir Woods - one of its primary attractions. Signs at the entrance and at Cathedral Grove, the park's "spiritual heart" - in Dugan's words - call for quiet: no talking, no snapping of photos, and no cell phone rings.

Last December at the solstice, Dugan set up a table where visitors could wear headphones and listen to Muir's soundscapes. They could also see on display a recording vest with microphones on the shoulders and a recorder in the pocket that seemed to make acoustic technology fun. "It was raining hard," Dugan tells me. "But Muir has fierce fans and the rain didn't stop anyone from showing up and putting on the headphones. My wife Sharon calls it 'listening with bionic ears.' Some ask why we amplify the sounds of nature. I explain it this way: binoculars magnify an image. When we turn up the volume, you hear details and into the distance you wouldn't normally hear."

Dugan pauses and tells me about a sign he recently saw in Hawaii that he'd like to see in Muir. "Quiet, Trees At Work," it read.

Probably no one knows the soundscapes of Muir Woods more intimately than Mia Monroe, the renowned park ranger and site supervisor who has worked there for 35 years. Monroe led the charge to help create an environment in which the endangered spotted owls can sleep and mate without interference from loud noises, and so that visitors from all over the world can actually hear the redwood forest. A graduate of the forestry program at UC Berkeley and a naturalist who has learned from Krause, Dugan,

and Perry, Monroe describes Muir Woods as “a habitat where humans hear the creaking of trees, the whispering of the wind, the babbling of Redwood Creek, and the very heartbeat of Earth itself.”

“Muir Woods provides a haven from the racket of civilization,” Monroe tells me. “The fact that it’s so close to a boisterous urban environment makes it all the more special. After 35 years, it still moves me in wonderful ways.”

Michael Stocker has been listening to the wonders of nature nearly all his life. A bio-acoustician, and a jazz musician who worked on the movie *Koyaanisqatsi* (the 1982 visual tone poem scored by Philip Glass), he’s spent much of his career studying ocean sounds, though he also monitors ecological niches on land, including his own niche in Marin County’s San Geronimo Valley – not far from the protected soundscape at Muir Woods.

The founder, in 2007, of Ocean Conservation Research, Stocker has long insisted that if we want to save the earth we must also save the seas. When the U.S. Navy announced plans to conduct tests of low-frequency sonar in the name of national security, he complained as politely though as passionately as he could that the tests would disrupt the sonic environment in which whales and other marine mammals communicate across vast distances. “Ensonifying the seas,” he tells me, “was bound to disrupt the underwater life of blue and gray whales. It wasn’t fair to them and I don’t think it did much to improve the security of the nation, either.”

Now, close to home, he worries about the life and death of crickets, a species that has a long history of co-evolution with human beings. A hearth with a chirping cricket is said to be a sign of a healthy home—ask the Japanese, read Charles Dickens, or talk to Michael Stocker. According to scientists, the number of chirps per second can help provide an accurate reading of air temperature. Once upon a time, Stocker’s own backyard throbbed with crickets. Then it went silent. “On summer nights over the last five years,” he explains, “I’ve noticed there’s not a single cricket chirping in the whole of the San Geronimo Valley. It’s not just one species, but all the many different kinds of crickets. I know. I’ve travelled the length and breadth of the valley on bicycle and listened carefully. A world without crickets gives me the creeps.”

Stocker alerted his Marin County neighbors to the plight of the crickets, and, while he didn’t conducted scientific studies, he had enough soundscape lore to realize that something was very wrong. Indeed, he believes that the absence of chirping

crickets - and the “holes in the acoustic niche” - are the result of colder winters and hotter summers. Unable to adapt to climate change, the San Geronimo Valley crickets may have become largely extinct.

After meeting with Stocker, I conducted additional research and learned that citizens in dozens of locations around the country have made the same or very similar observations. Indeed, nature lovers report “silent summers” when no crickets chirp.

In his forthcoming book, *Hear Where We Are*, which is part sociology and part natural science, Stocker explores the ways that animals communicate with one another and with members of other species. *Hear Where We Are* offers compelling facts and figures. It also appeals to basic human emotions. In one of the most evocative sections in the book, Stocker writes about a woman in Borneo who explains, “We yearn for the sounds of the forest. We have always heard these sounds. And now it’s harder for us because we hear the sounds of the bulldozers.”

Like her, Stocker yearns for the sounds of his own ecosphere beyond the roar of cars and the blasts of bulldozers. “Today, the challenge for acoustic environmentalists is to remain optimistic in the midst of unprecedented noise, clutter, and in the wake of devastating weather systems that are almost certainly the result of humans messing with the earth,” he tells me.

Along with Bernie Krause, Dan Dugan, Sharon Perry and Mia Monroe, Stocker persuaded me in his own subtle way to listen to nature more carefully than I’ve ever listened in my entire life. In fact, the whole tribe of acoustic ecologists prompted me to slow down and to hear all the many diverse voices of the natural world. Now, in my own backyard, I tune into the songs of robins, the lyrical beating of the wings of hawks, and the croaking – the *rok-rok* - of herons. I hear the meandering creek, the wind in the oak trees, and the scampering of ground squirrels. Thanks to groups like the Nature Sounds Society and Dugan’s and Perry’s research at Muir Woods, the slogan, “Quiet, Trees at Work,” will perhaps become an environmental rallying cry around the world. I’d like to see—and hear—that day.