

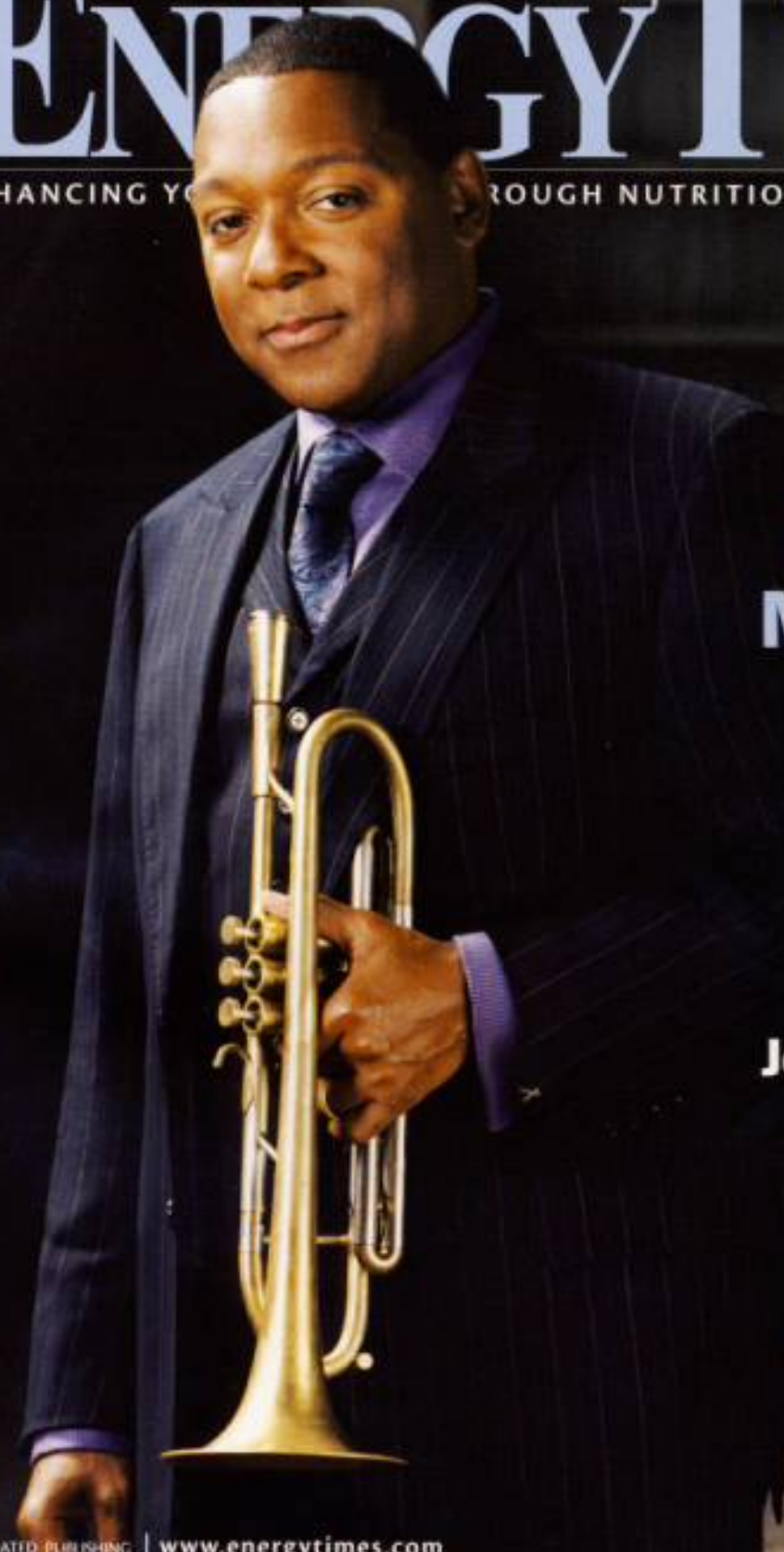
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Noise in Nature

Human-generated sounds threaten to overwhelm wild creatures.

Mowers and leaf blowers, sirens and jets—we sure can make a racket. All that blaring and blasting invades our lives and assaults our auditory canals. Whether we're aware of the noise or not, it can take its toll on us—and on other living creatures within earshot.

"For humans, noise causes stress. That's when the brain has to spend energy filtering out unwanted sound so our ears can receive the information we're trying to get," says Bernie Krause, PhD, bioacoustician and founder of Wild Sanctuary (www.wildsanctuary.com) in Glen Ellen, California, and author of *Wild Soundscapes: Discovering the Voice of the Natural World* (Wilderness Press). This explains why you can't help but wince when a motorcycle thunders by.

Little is known about precisely how wild creatures receive and process human noise in their natural habitats, although recent studies indicate that the effect can be profound, Krause says, adding that "if the acoustic fabric of their environment is interfered with, their communication is masked." That means they can't chirp about mating and migrating or grunt over foraging and fighting.

Scrambled Signals

In forests, tundras and other *biomes* (major ecological areas) undisturbed by human-generated noise—which Krause calls *anthrophony*—"all vocal creatures acoustically structure their aural signals in an interdependent relationship to one another [*biophony*]. They do so cooperatively or



competitively, much like instruments in an orchestra, so that each one can be heard distinctly from another," he says. "For example, in many healthy habitats, certain insects occupy a specific frequency—niches of the creature bandwidth—while birds, mammals and amphibians occupy others not yet taken and where there is no competition." But repeatedly bombard them with the roar of dirt bikes and the rumble of ships, and these creatures may flee their homes or even perish.

Consider the snowmobiles that vroom through Yellowstone and other national parks. In "Snowmobile Activity and Glucocorticoid Stress Responses in Wild Wolves and Elk" (*Conservation Biology* 2002), Montana State University's Scott Creel reported that the engines' commotion jacked up the stress levels in these animals.

Then there's the spadefoot toad in the Eastern Sierra Mountains of

California. At Mono Lake, Krause has observed that their synchronized choruses (so predators can't locate any one toad) are broken up by the high-level noise of military jets flying overhead, inviting great horned owls and coyotes into their midst. The toads don't start singing again for 45 minutes, enough time for predators to find a tasty amphibian treat.

Some animals adapt to our ruckus. Krause says that killer whales in the Straight of Juan de Fuca, bordering the US and Canada, and Friday Harbor in Washington State, for instance, "have learned to change the pitch and timbre of their vocalizations, generating a series of harmonics to make them sound louder." Other whales take a detour and adjust their migrational routes. But for many of their cousins around the world, underwater marine-engine noise interferes with their sleep or drowns out their ability to hear that swish of

a school of fish, and the whales can go hungry. The overall effect is that human-produced sounds make natural habitats noisier places while muzzling the wildlife.

Be Still and Listen

Krause has listened to the consequences of human cacophony over the decades: He has recorded more than 3,500 hours of natural soundscapes from all over the world since 1968. Today, nearly a third of the ecosystems he has collected have aurally vanished.

"Entire wild biome voices are disappearing at a rate so rapidly, that within this century there may be none left to record of any type unaltered or intact without the presence of human noise," Krause laments. "What are our children going to hear? The sounds of animals and insects are the sounds of the divine. And they're screaming for our help. But we're the ones who have to shut up."

When we do we can open our ears says R. Murray Schafer, one of Canada's pre-eminent composers and music educators (www.patria.org). In *A Sound Education* (Arcana Editions), he offers 100 exercises in listening to "help sensitize you to the sounds of the environment." One asks readers to note everything they hear right at that moment, pointing out sounds nearest and farthest away. Another has them write all the sounds that have disappeared in our lifetimes, such as the metallic ring of a telephone. "You have to listen, first, so you can understand how beautiful some sounds are and how vulgar others are," Schafer says. "Listening can change the way you think and act regarding the effect of sound on other people and living things."

When you tune your ears to the sounds around you, you begin to hear things you never had before. You notice the mundane hum of your refrigerator, but you also marvel in the miracle of

robins singing. And you become more aware of your own aural impact on the world. So use a manual push mower and ditch the car alarm. Then go to a

park or the beach and be still among the sounds of our animal and insect friends. Let them have their say.

—Claire Sykes

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immune system function, and restore cytokines that send the "all is well" message and we feel better.

NK cell function declines with age and in response to emotional stress and physical injury. This reduces the "all is well" cytokines, and increases cytokines that help the body respond to injury or infection, causing changes in endocrine and nervous system activity that make us feel fatigued.

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Finding the Peaceful Center: Music to Meditate By

You sit ready to meditate, gazing toward what you hope is the inner stillness within, but you are anything but still. In your surroundings, however, the sound of a meandering sitar begins to calm you, pulling you in deeper and deeper. Or maybe you choose this contemplative East Indian melody to quiet the end of a hectic, overwhelming day while you chop onions for tonight's dinner. Whether you use music as a meditation accompaniment or you just want to enjoy something meditative, you turn to calming tones and rhythms for relaxation and ease.



Some of the oldest music, found all over the world for thousands of years, was meant to encourage and enhance a meditative state while it was played or sung—think of the droning tambours of East Indian ragas and the groaning chants of Tibetan Gyuto monks, the flowing shakuhachi flutes of Japan and the moaning didgeridoos of Aboriginal Australia.

Most music that's considered meditative is categorized as New Age. "But there's a lot of schlock out there; the consciousness of its source is not true to the state of meditation," points out Pauline Oliveros, composer, accordionist and educator in Kingston, New York. She is also founder of the 23-year-old Deep Listening Institute, Ltd., and is internationally known for her Deep Listening Retreats, with their focus on sound meditation. "If the music comes from a quiet place, though, even if it's not a meditative one, it can still quiet your mind. Music certainly puts out wave forms, and if those waves are coordinated with your brain waves, and that brings about a calmness, peacefulness or openness that you're seeking, then it's working."

"Meditative music should provide a space that you can comfortably enter, allowing thoughts to come and go, or be free of thinking, so you can go into more spiritual depth," says Stuart Dempster, a Seattle composer and trombonist. For over 30 years, he has also played the didgeridoo, an instrument (historically made of eucalyptus wood hollowed out by white ants or termites) that, in his hands, calms and restores. "The didgeridoo is successful for this partly because the dynamic range doesn't fluctuate tremendously."

To find music that connects with your meditative center, seek out a CD store or a website where you can test-drive music before buying whatever resonates with you. Or make those soothing sounds yourself. You needn't be a musician to create meditative tones on the piano, kitchen pot lids or a simple kalimba (African thumb piano).

To make the most of meditative music, choose a quiet space and get in a comfortable position. "Have the intention of listening to the music," says Oliveros. "Enter it and bring your attention to it, totally, so you can calm your mind enough to be open to the sounds and take them in. Meditation practice with music is all about noticing the ways that you're listening."

—Claire Sykes

memory, less objective and emotionally detached than simple visualization, involves mentally positioning your body and instrument and practicing. That trains the motor cortex

without repeating the same movements and causing injury.

"Most musicians play something 10,000 times to teach the right brain how to map it," Lieberman says,



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