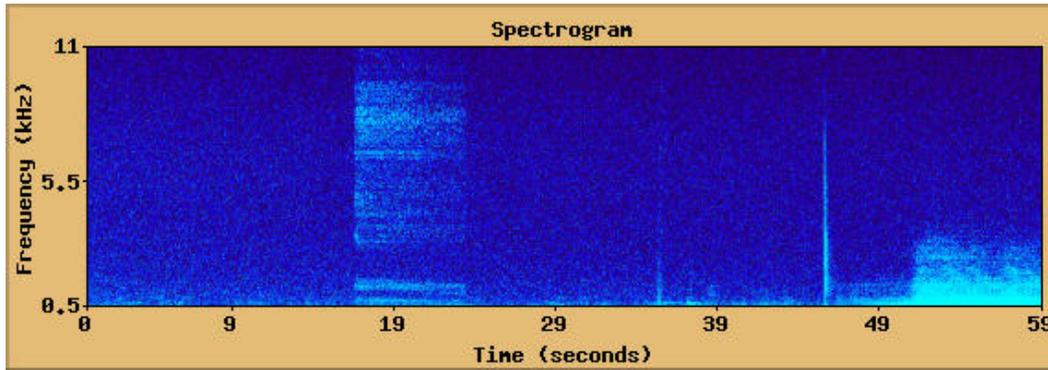


A different way of “looking at” sound

by Mandy Salminen



Spectrogram of a 1-minute sound sample from the Kenai National Wildlife Refuge. Anthroponic noise from an ice auger 50 seconds into the recording partially falls into the same bandwidth as biophonic chatter of a red squirrel at 19 seconds.

During my internship with Kenai National Wildlife Refuge, I have skied, hiked, and snowshoed. On these endeavors, I have had the opportunity to experience the almost surreal silence and uninterrupted natural sounds which I never heard in Ohio, my home state. My first experience with true silence was during a pause on a night hike. After the echo of my snowshoes crunching on the ice faded, all that was left was silence.

These experiences in Alaskan wilderness gave me a new perspective on my “wilderness” experiences back in Ohio. Hiking there, you accept that you are very unlikely to get away from the hustle and bustle of the human world.

Refuge biologists have been studying sounds within the landscape, or soundscape, to identify areas that are most and least affected by human-made noise. Sound recorders were placed at over 60 different locations on the refuge such as Caribou Hills, Mystery Creek, and Skilak Lake. These recorders captured a minute of sound or silence every half hour.

These recordings were uploaded to an online sound library called the Remote Environmental Assessment Laboratory (REAL). Anyone can check out the sound files on <http://www.real.msu.edu/> (click on projects). This library converts sound files into spectrograms and partitions them into 1 kHz frequency

bandwidths. An algorithm is then used to quantify the amount of sound energy within each bandwidth. This acoustic information provides soundscape ecologists a way to interpret sounds emanating from the landscape.

Soundscape ecologists categorize sounds into three general categories. Biophonic sounds are made by animals. Geophonic sounds are made by the earth such as rain and wind. Anthroponic sounds are made by humans and their activities. Fortunately, the REAL sound library provides a means to search sound files based on frequency and sound energy. This tool can be useful for identifying sound files with specific attributes.

For the past six weeks, I have been working eight hours a day, five days a week listening to thousands of sound files that were recorded over the winter of 2011-2012. These data are being used to study the distribution of anthrophony on the Refuge and its potential effects on moose.

About 90% of the sound energy created by anthroponic sources, such as automobiles, snowmachines and airplanes, lie within the 1–2 kHz band width. In contrast, most biophonic sources are typically above 2 kHz. What I have found interesting in my searches is that anthrophony and biophony overlap sometimes in the 1–2 kHz band width, so that the noise of snow-

machines and ice augers is mixed with the calls of ravens, eagles, goldeneyes, wolves, squirrels, coyotes, mallards, trumpeter swans and woodpeckers.

So why does this matter? Anthrophony can be very disrupting to an animal's communications. Soundscape ecologists believe that each species has its own acoustic niche. You may have heard of ecological niche, the ecological role (what a species eats, how and where it forages, and its interactions with other species) and space (habitat) that an organism fills in an ecosystem.

An acoustic niche is the frequency filled by the sound that a species creates within its habitat. These niches create something like an orchestra — initially all you hear is the “symphony” but, by focusing, you can pick out the “instruments”. This is how, in the middle of spring, different bird species can sing at the same time and still find a mate.

The problem is that certain anthrophonic sounds can fill those acoustic niches and mask biophonic sounds. This disturbance affects animals' ability to find mates, establish territories, announce a meal to share, and much more. These behavioral affects may be compounded with physiological stress responses to

human noise. There are multiple studies that show human noise, such as automobile or aircraft traffic, can increase stress levels and affect long-term health. Why would wildlife be any different?

Anthrophony can also take away from our wilderness experience. How many times have you heard an airplane overhead while hiking? Or casted a line out to catch that trophy king salmon and heard traffic whizzing by. The sounds of biophony, geophony and even silence have an intrinsic value to the natural landscape which many of us never stop to notice.

So even if our minds have categorized certain sounds as background noise, these still can have a huge effect on our mood, our health, and our wilderness experience. Silence is a beautiful “sound” that is rarely experienced in our busy world. I recommend a dose of this to everyone —allow yourself to slip into the silence only nature can offer you.

Mandy Salminen is a biological intern at the Kenai National Wildlife Refuge. She has a B.S. in Zoology and Environmental Science from Miami University. You can find more information about the Refuge at <http://kenai.fws.gov> or <http://www.facebook.com/kenainationalwildliferefuge>.