The Song Sleuth

I am sure many of us had the same thought when we first saw an advertisement for "The Song Sleuth: Audio Birdsong Detective". Let's put it this way: I was rather skeptical. I mean, really, hold up this device to a bird song and it will identify it for you? "Not going to work," I decided.

But then the fear set in—what if it *does* work? How many birding tour groups will downsize? How many fewer people will be joining my store's free bird walks? Who's going to buy "Birding by Ear" anymore?

The "Song Sleuth: Audio Birdsong Detective" hears a bird's song, digitizes it, analyzes it using algorithms, and produces three ranked choices of the singer's identity. © *Derek Lovitch.*

I needed to see it to believe it. I contacted Wildlife Acoustics, and told them I simply had got to give this thing a try. After our initial conversation, I was already relieved of both my fear and skepticism. The Song Sleuth has limitations, and has been created as a learning tool, not as a tour guide replacement. In Chapter 1 of the instruction booklet, Wildlife Acoustics lays out the limitations of the product, so you begin the process with legitimate expectations. The Song Sleuth will not replace the need to spend time in the field studying birdsong and training your ear, but it will focus your studies and give you instant feedback.

Personally, I have always had a tough time learning birdsong. It just does not come naturally to me. I seem to retain very little from listening to CDs, yet I have friends who hear a recorded snippet once and will never forget it. My ears are not very good at deciphering slight differences in pitch and tone, especially at high frequencies.

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(Those heavy metal concerts and thumping night clubs, before I understood the need for earplugs, couldn't have anything to do with that, could it?) My ability to recognize songs and calls comes only from the fact that I am out birding just about every single day. Practice, practice, practice! The Song Sleuth will not replace experience in the field, but it certainly will help optimize your time outdoors to your best advantage. Seeing a bird, while it is singing, and knowing the correct identity at the same time is of tremendous value in learning and remembering an unfamiliar song.

How It Works

The Song Sleuth uses digital technology to capture, record, and analyze birdsong. It uses a technology similar to what is used for human speech recognition, using algorithms to compare what the device is "hearing" to the song database within the module. According to the company, each module contains more than 500 recordings of about 60 species, totaling more than 15 hours of birdsong.

The Song Sleuth is a lightweight device, easily carried around one's neck or shoulders. At only 22

ounces, using lightweight nickel-metal hydride rechargeable batteries (which I recommend for the weight and also the environmental benefits of using rechargeable versus disposable batteries), it weighs less than most of our binoculars, and considerably less than most field-worthy tape recorders. Although it is lightweight, the large size and shape are a bit cumbersome, and the device looks like one of those "Viewmaster" kid's toys or a clock radio from the 1960s. Even the colors are a bit retro. Not the slim, sleek, elegant technological devices we have been getting used to. Also, the Song Sleuth is not water resistant, a significant impediment to its field-worthiness.

Does It Work?

My first subject was a Red-eyed Vireo, singing in the yard one sunny summer afternoon. As is typical in the Eastern woods on a hot summer day, it's the only bird singing, so I thought this was the perfect test. Wind was still, no background noise of note—except for the dog snuffling under the feeders—and one close bird was singing. I turned the Song Sleuth on, pointed it at the bird, and let it go to work. The screen displayed:

1. Red-eyed Vireo
2. Warbling Vireo
3. Purple Finch

These three birds do not sound that much alike to human ears, so obviously the algorithms are using certain parts or qualities of a given song to identify it, not the whole song. However, each of the three birds displayed has a clear, loud voice with a somewhat similar tone. As the vireo sang, and varied its pitch, the Song Sleuth would occasionally shuffle the choices, but Red-eyed Vireo was almost always one of the three options. Hitting the "mode" key freezes the screen into "confirm" mode, which allows the user to play back the song of the three choices. One can then compare that choice to what you are hearing, for instant confirmation. So, very simply, the Song Sleuth worked.

As we all know, most vireos like to sing from the tops of tall, dense trees. The singer is often heard, but not always seen. This is the exact situation in which I had envisioned

the Song Sleuth excelling. However, since you are limited to the 60 bird songs that are in each module, similar-sounding but less-common species cannot be evaluated. On my store's bird walks, which cater mostly to beginning and intermediate birders, I preach "learn your common birds first". You need to learn the song of a Red-eyed Vireo to be able to learn the song of the less-common Blue-headed Vireo or the rare (in my area) Yellow-throated Vireo, for example. When I held the Song Sleuth up to a Blue-headed Vireo, Red-eyed Vireo was the number one choice. Therefore, the user could become handicapped in learning more than the 60 species on the module. A possible solution for a next-generation Song Sleuth would be to display a percentage of probability for each of the three rankings, thereby suggesting that the observer look beyond the 60 species available in this module.

When a species that is not part of the database is "heard", three species will still be displayed. When the Song Sleuth listened to a Winter Wren, the choices it gave were Eastern

Jeannette Lovitch models the use of the Song Sleuth in the field. This is not a pocket-sized apparatus. In fact some people, such as Jeannette, thought that it looked a lot like a giant "Viewmaster". © *Derek Lovitch*.

Towhee, Song Sparrow, and Pine Warbler. Not one of those three is even close, which, in a sense, is just fine. You shift to the confirm mode, play back those three choices, and quickly know you are not hearing an Eastern Towhee, Song Sparrow, Pine Warbler, and probably not any of the other 57 species in the module, either. That does, to be certain, help to narrow down the choices.

The biggest foible to the overall success rate of the Song Sleuth is the parameters within which it functions. One needs to be within 50 feet of the bird, with limited background noise, and with only one bird singing. You'll definitely learn how close 50 feet is, as it is not always easy to get to within 50 feet of a singing bird. Also, the background noise problem is tough to deal with: Even the dripping of water from leaves in the woods on a foggy morning significantly reduces the success rate. It is also difficult to isolate one singer, especially on a busy May morning or during the dawn chorus in early summer.

However, when those clearly-expressed-in-the-manual-parameters are met, and the singer is included in the module, the Song Sleuth performs quite well. Wildlife Acoustics claims an "80% success rate". In other words, the Song Sleuth will list the correct identification as one of the top 3 choices 8 out of 10 times.

After becoming familiar with the field parameters of the limitations, I kept track of the success rate of the Song Sleuth for 100 bird songs of which I knew the identification and which I knew were featured in the Northeast Region module. I sampled 10–20 bird songs per day, over the course of two weeks, in order to vary conditions. These field tests took place at a number of different parks, as well as in my backyard, but all were within 30 minutes of my home in Pownal, Maine. I sampled each individual 1–3 times and varied the species tested as much as possible.

The Song Sleuth listed the correct species as the number one choice 40 times (40%), as the number two choice 18 times (18%), as the number three choice 14 times (14%), for a cumulative success rate of 72%. The Song Sleuth was unable to identify the singer 28 times (28%). I attempted to get a good cross-section of the birds contained in the module, but I was not able to test some species. Giving Wildlife Acoustics the benefit of the doubt, it is possible that the species I regularly encounter, like Pine Warbler, are particularly difficult for the Song Sleuth to analyze; in contrast, species such as Carolina Wren and Red-bellied Woodpecker (included in the module, but which do not regularly occur where I live, and which I therefore was unable to test) may be easier for the algorithm and more typical. Also, I tested the Song Sleuth only with the components included with the basic package. The use of an external microphone is suggested, and this enhancement would no doubt help mitigate background noise and focus the Song Sleuth's attention on the targeted singer. I have little doubt that the addition of a good directional microphone would increase the Song Sleuth's success rate.

Here are a few examples of the positives and negatives that I encountered:

- I held the Song Sleuth up to a Tufted Titmouse singing the one-syllable *peer, peer, peer* version of the song. It correctly identified the song, but when I played back the titmouse in "confirm" mode, the faster, two-syllabled song (*peter peter peter*) was not a great match for what I had just heard. Here's another example of where the probability of accuracy would help, or the ability to replay multiple versions of a song by the same species.
- I played the song of a Hermit Thrush as I was checking the quality of the recordings, and all of the sudden a very irate Hermit Thrush flew in looking for blood!
- The omnipresent background noise of the cement plant, which anyone who has ever birded Portland's Evergreen Cemetery knows all too well, really wreaked havoc on the Song Sleuth's ability to decipher a song, even after adjusting gain and frequency.
- One species that I found the Song Sleuth to be very helpful with was the American Redstart. As we all know, redstarts are incredibly variable, and can even seem to mimic nearby species. Although occasionally similar-sounding species like Chestnut-sided and Yellow Warblers would be one of the three options listed, American Redstart would almost always be ranked higher. The Song Sleuth could be a very helpful tool with this sometimes-frustrating group of species.
- Mimic-thrushes can be difficult for a beginner to learn because they are so variable. Gray Catbird is included, but only the easy-to-recognize *meow* call, not the complex and variable song, although for the most part calls are not included for other species. Brown Thrasher and Northern Mockingbird are not included at all.
- My own pishing registered as "Tufted Titmouse", so I am doing something right! Too bad warblers don't always have the same response.
- The volume and clarity of the Cedar Waxwing and some other recordings are very low, with some background noise (running water in the case of the waxwings), making it hard to hear the playback without the use of the (included) headphones.
- The Song Sleuth performed very well with some species, such as Red-eyed Vireo. In fact, in my tests, Red-eyed Vireos were correctly listed as the number one choice more than 95% of the time.
- The Song Sleuth did not perform nearly as well with some other species. It correctly listed Pine Warbler as

one of the three choices only 3 times out of 15 attempts (only six attempts were included in my success rate analysis above, by the way. If my sample had included more Pine Warblers, the overall success rate would be quite a bit lower). Chipping Sparrow, another triller, was correctly listed about 50% of the time. As trillers often present a problem to many birders, I would certainly like to see improved accuracy with these species.

- Overall, the species composition of the module, at least for the Northeast region, was pretty good. Most of the birds in my backyard and my local patch were covered. I am not sure what the selection process was for the 60 species that were chosen, but overall I was satisfied with its scope as a starter module.

But when it comes down to it, the Song Sleuth is not meant for me. Since I have already learned the 60 songs on the module (or at least I pretend to have when I'm leading a trip), I am not the target audience. The target audience is beginning birders who are looking for every edge, every possible new development, in their quest for new knowledge and who are looking to further develop their birding skills. Because people's learning styles vary, some may have success—and fun—with this device while others may not.

Personally, I would love to see the development of an "Advanced Birding Module" with things like *Empidonax* flycatcher songs or *Tyrannus* flycatcher calls, for example. You can be 25 feet from a little brown flycatcher and not have any idea what it is until you hear it. If the Song Sleuth can help us identify the birds that we can't identify even when we're looking directly at them, then we really have something to talk about! I also envision future habitat-spe-

cific and/or regional mixes such as "Atlantic Salt Marsh" or "Rio Grande Valley". The smaller the scope of coverage, the more useful a selection of only 60 species will become.

In fact, Wildlife Acoustics has recently released two Warbler Modules that will contain the songs of only 36 "Eastern" or 17 "Western" warbler songs. We can expect greater accuracy when the Song Sleuth sorts through fewer, and more closely related (vocally), birds. This will also allow us to focus our learning efforts, and I think these types of modules will be of great benefit to a student of birdsong.

Additional Features

The Song Sleuth also has the very useful ability of taking your field recordings and uploading them to your computer for further study or analysis or for producing your own CDs, MP3s, etc. This is a nice additional feature, and one that adds some gravy to the product. The Song Sleuth automatically records what it is hearing on a four-minute loop, and you can save sound recordings at any time. I found these recordings to be of only moderate quality, although I'm sure the use of a microphone would have helped significantly. Also, I'm sure that with more practice, I would get better results from this feature. And with recent developments in audio recording technology for birding, such as with an iPod (see Noah Strycker's article in *Birding*, November/December 2005, pp. 666–668), this feature of the Song Sleuth is probably of less value on its own. Besides, we want it to identify the birds for us!

Software included with the Song Sleuth allows one to manipulate and save field recordings, purchase and upload additional modules, manage the modules loaded on your Song Sleuth, and upload software updates. Software updates are

available from the Wildlife Acoustics web site and are free for the first year. Wildlife Acoustics is continuously improving the algorithms and content of the Song Sleuth, and they want to make these updates available to everyone. A brand-new update that was introduced just as I was reviewing the product may be very helpful to some users: a frequency-division feature that allows an observer who has suffered high-frequency hearing loss to shift the whole song to a lower—and therefore now audible—frequency (see *Birding*, November/December 2005, pp. 575–576).

As I mentioned earlier, we need to learn the common songs first, and this is really what the Song Sleuth is trying to help us to do. When you have learned the 60 songs in the module for your region, you are certainly well on your way to being a song sleuth yourself. Everyone's learning styles are different, and therefore the Song Sleuth won't be for everyone. Plus, at $399 (lowered late last year from the original price of $499), it's pretty darn pricey. However, if listening to CDs, playing with your Identiflyer, or other traditional methods of learning birdsong haven't worked, then the Song Sleuth may be worth a try. I certainly look forward to the continued improvement and development of this technology as well, but I hope—especially on behalf of those who work as tour guides—that it won't develop *too* much! We also don't need the Song Sleuth to identify that last sound we all just heard: That *whoosh* was the collective sigh of relief professional tour guides just let out—for now…

Acknowledgments