2018 October Update

Bat Monitoring Project

Monitoring of bat calls was discontinued for September and October of 2018.

The Wildlife Acoustics Echometer touch has proven a very useful tool this year. Several driving transect cruises were undertaken as well as a walking tour of Coryell Island during the June through August time period. The total number of echo-location calls detected exceeded 250. Cruising speed during the cruises was limited to 10 to 15 MPH. When a signal was detected, travel was halted to obtain a better signal to noise ratio. Six species of bats were identified by the EMT2 software during the 2018 monitoring period:

Eastern Red
Little Brown
Big Brown
Hoary
Indiana (endangered)
Silver Haired (most recorded)

The locations of the signals obtained during the transect and walking tours are depicted in figure 1,2 and 3. A typical indication of a bat call and suggested identifier is shown in figure 4.

The bat call recording .wav files obtained were sent to Michael Fishman of Environmental Resource Management for verification of species identification. Mr. Fishman reviewed the recordings free of charge. His assessment in brief is that we do not have Indiana bats in the areas surveyed but Little Browns instead. His assessment is attached in the appendix. Mr. Fishman is also of the opinion that the remaining species identifications are correct. He also made several recommendations for obtaining higher quality recordings in the future.

Wildlife Acoustics does not recommend the Echometer Touch2 for the monitoring of Indiana or Northern Long Ear bats. Meeting the new federal standards for the definitive identification of these two species requires a recommended Song Meter SM4BAT FS Full-Spectrum Ultrasonic Recorder (microphone not included). These units with microphone cost $1000+.

FIGURES FOLLOW:

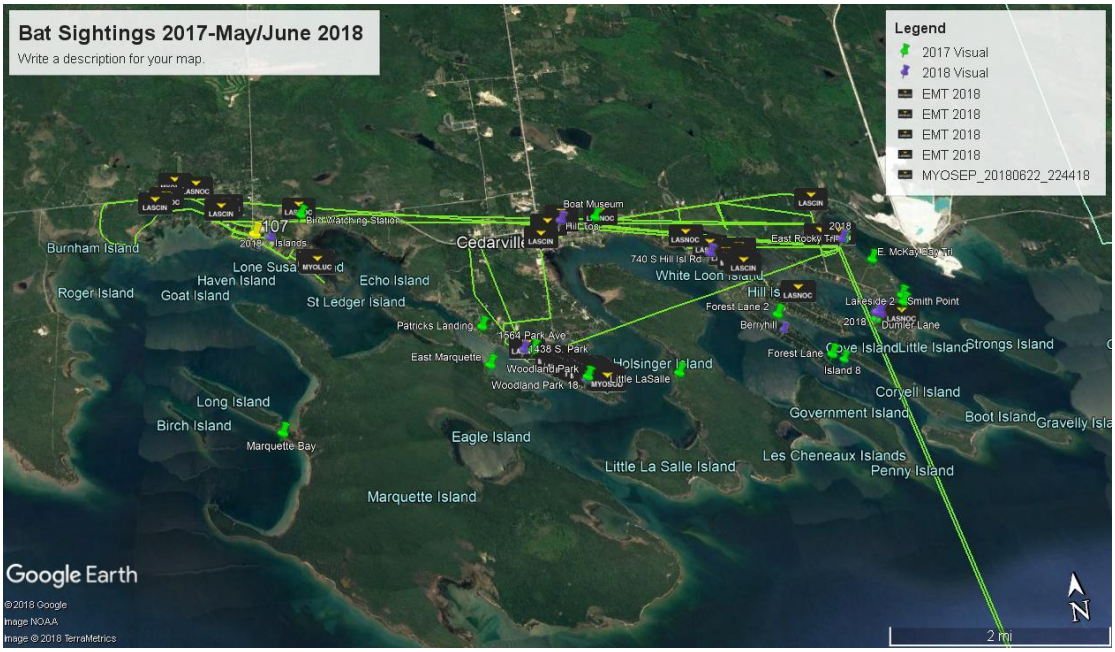


FIGURE 1 – SIGNAL LOCATIONS AND TRANSECT ROUTES THROUGH JUNE 2018

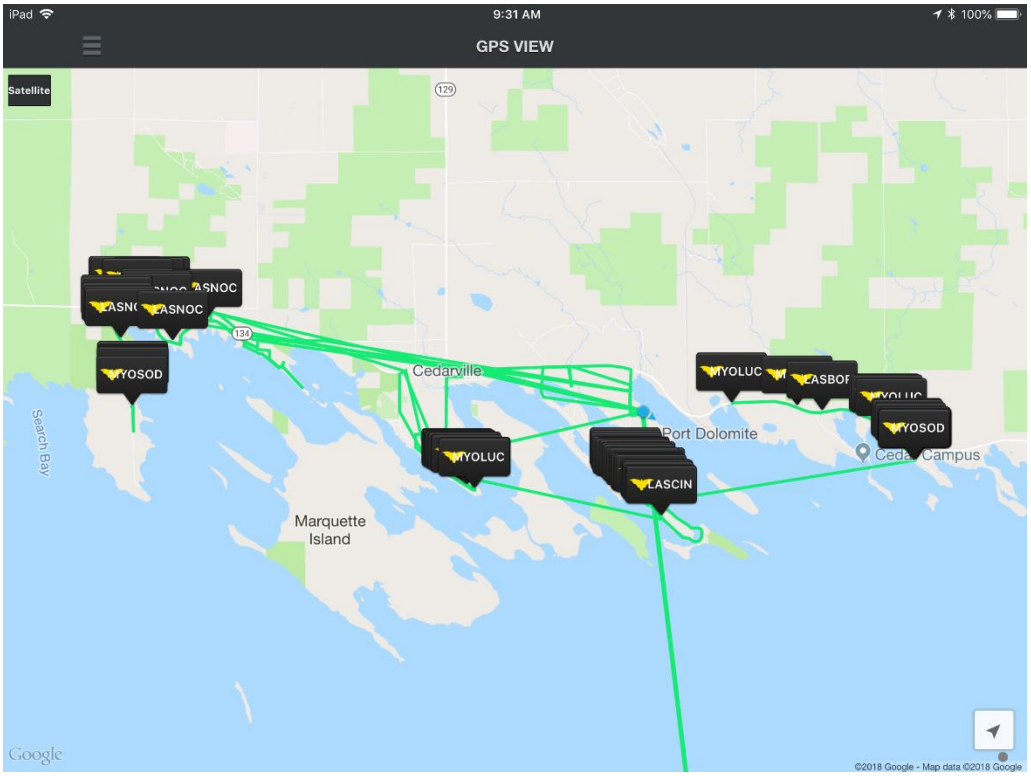


FIGURE 2 - BAT SIGNAL LOCATIONS FROM JULY TRANSECT CRUISES AND CORYELL ISLAND

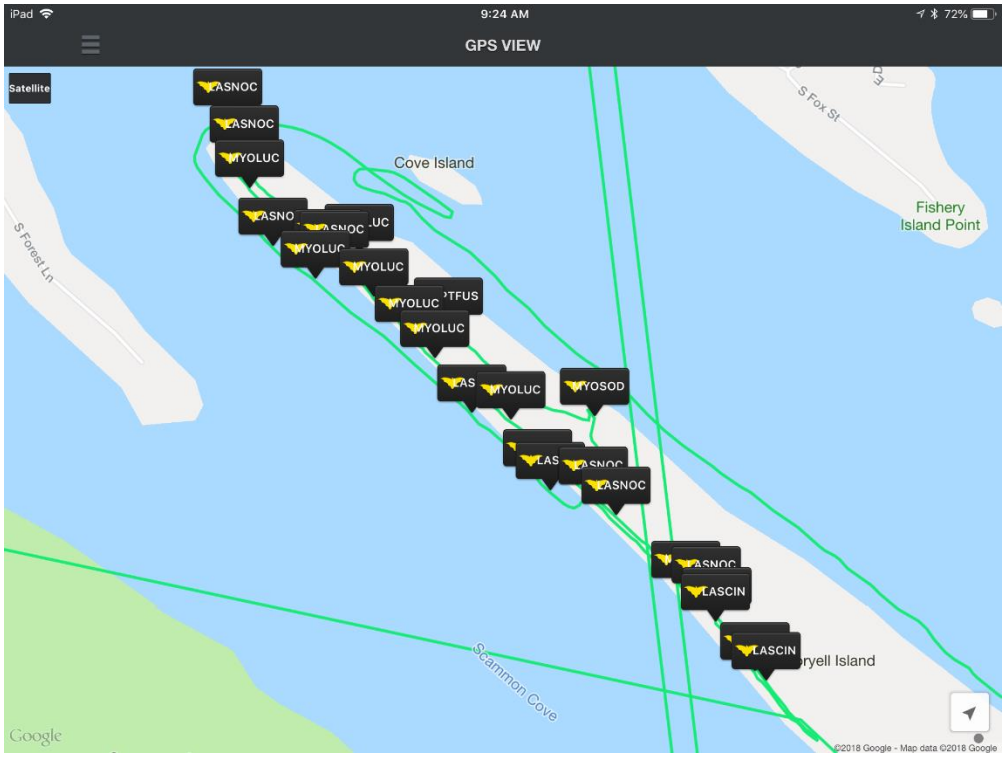


FIGURE 3 - BAT SIGNAL LOCATIONS CORYELL ISLAND, EXPANDED

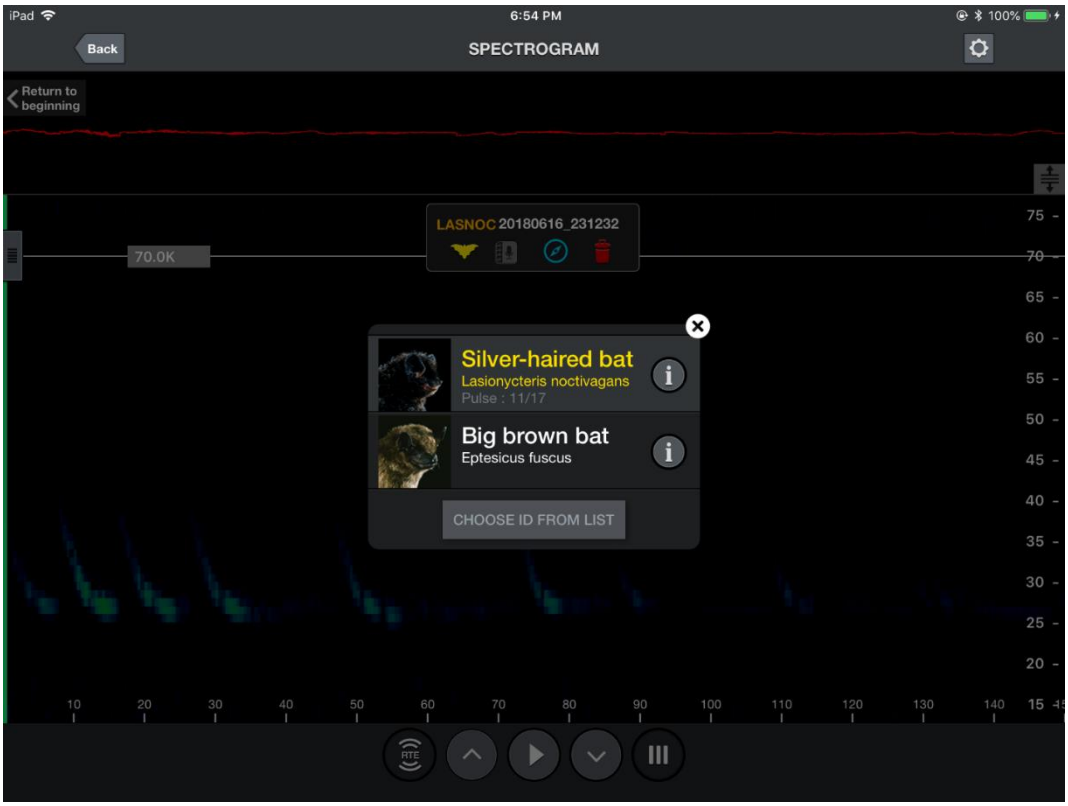


FIGURE 4 – TYPICAL BAT CALL INDICATION WITH SUGGESTED IDENTIFIER

The most common question asked after people see the above information is “Are the bats coming back?” The simple answer is we don’t know. Some of the signals received are signals from the same animal making multiple passes. This increases the apparent number of animals. The second most common question is “is there anything that can be done about the Whitenose Syndrome?” There are several groups working on the problem. Here are some of the approaches to cure or prevent WNS from the Whitenosesyndrome.org web site:

Here are just a few examples of disease treatments in the works. A combination of treatments may be the best way to help bats survive.

Biological: stimulate growth of beneficial microorganisms that either attack, or secrete substances that attack, *Pd* or compete with *Pd* in other ways to limit its growth.

- **Probiotics** - apply a probiotic mix of bacteria and fungi naturally found on bat wings to bats to kill or weaken *Pd.*
- **Chitosan -** apply chitosan, a naturally-derived antifungal agent with wound-healing and anti-inflammatory properties, to bats to decrease infection rates and limit tissue damage by *Pd.*
- **Bacteria –**apply a strain of *Rhodococcus rhodochrous*, which has antifungal activity.

Chemical: Apply to either bats or the environment to prevent, control, or eradicate *Pd.*

- **B23 -** apply B23, a mix of naturally produced antimicrobial volatile organic compounds, to the environment. This anti-fungal agent had been approved by the U.S. Food & Drug Administration for use in horse bedding.
- **polyethylene glycol (PEG) 8000** – apply this antifungal agent previously used in agriculture to bat roosts to hinder *Pd* growth.

Immunological: Use vaccines to prevent *Pd* in bats.

- **Vaccine** – develop a vaccine and a way to deliver it to bats to produce a protective immune response to *Pd.*

Genetic Manipulation: Reduce symptoms of *Pd* or alter *Pd* gene expression.

- **Gene silencing –** “Turn off” *Pd* genes that cause harm to bats.

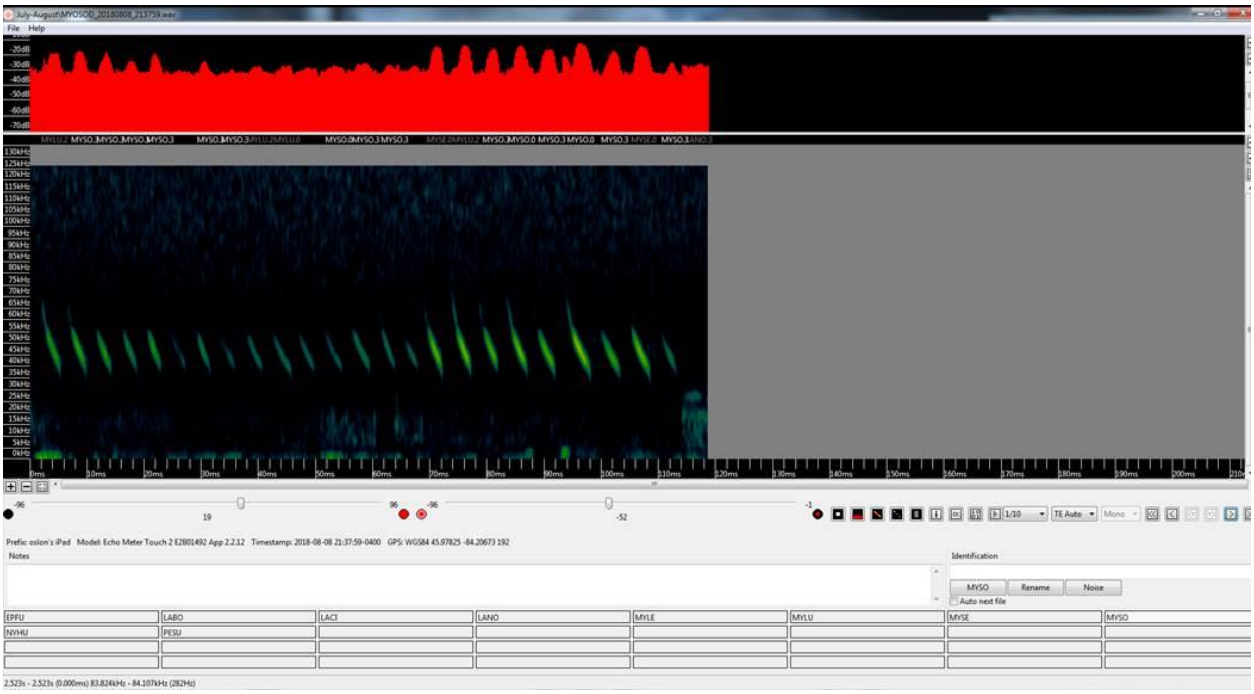
Mechanical: Change environmental conditions to prevent, control, or eradicate *Pd.*

- Habitat modification – change environmental conditions, for example temperature and humidity, to make *Pd* less likely to survive or bats more likely to survive.
- Heated bat boxes – provide heated bat boxes for bats in the early spring to help them survive the critical time of emergence.
- UV light – develop cost-effective ways.

APPENDIX

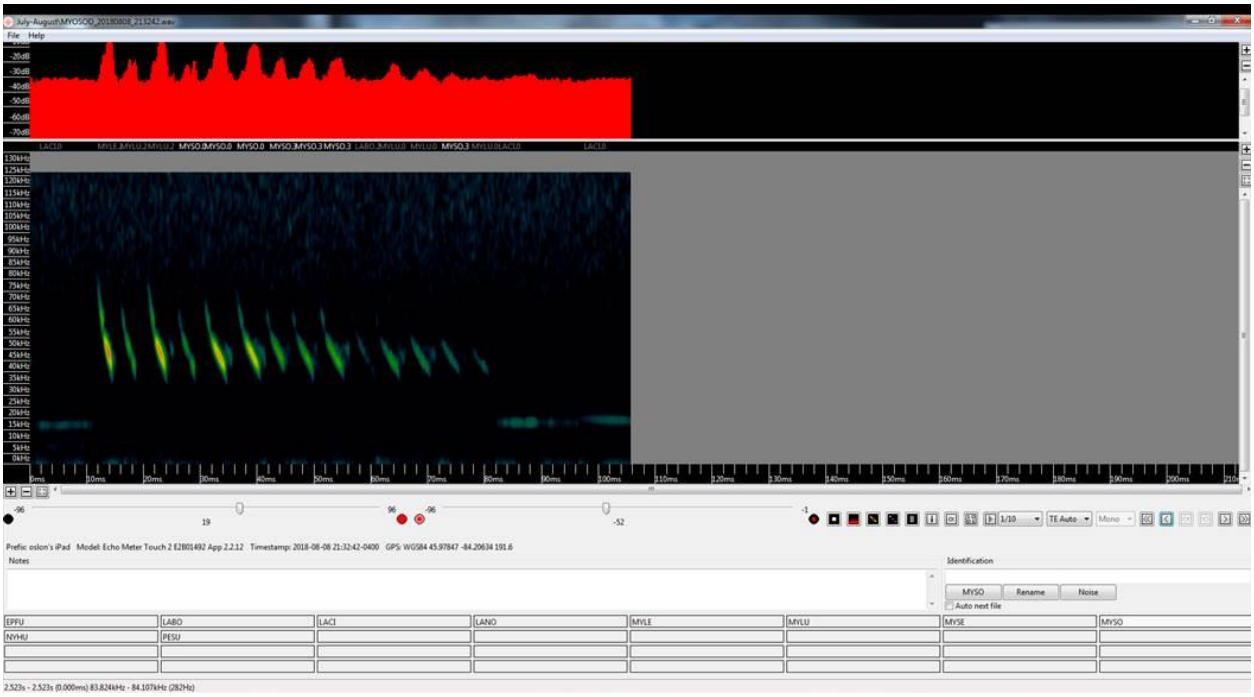
Mr. Meyers,

I've looked through the calls that you sent, and can pretty confidently confirm that the calls IDed as *Myotis sodalis* are either *Myotis lucifugus* (little brown bat), or are calls that can't be conclusively identified, as the call quality is not sufficient to display the call features necessary to make a conclusive ID. Kaleidoscope Pro sometimes tries to force an ID if it can measure certain call parameters, but you really need a very clearly formed call recording to distinguish between *M. sodalis* (MYSO) and *M. lucifugus* MYLU). Here is an example of a call that we really can't conclusively ID, other than to say that it's a bat call, and likely a Myotis species:

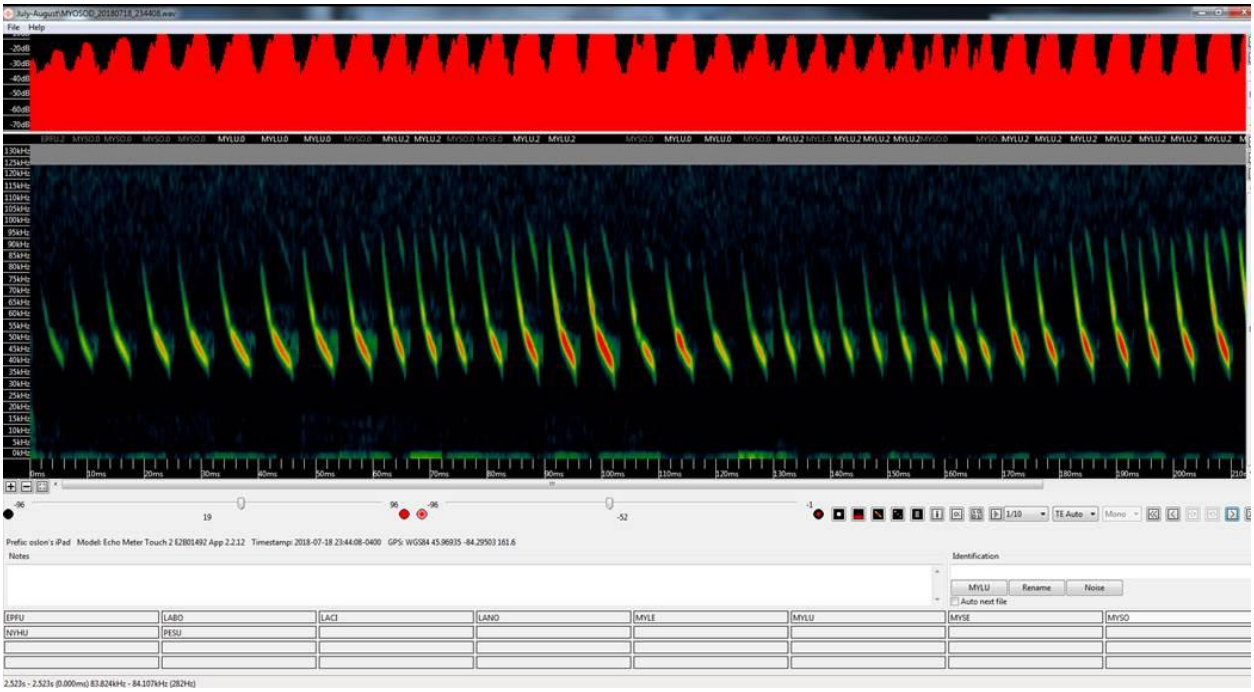


The call pulses aren't completely formed (fuzzy edges; call intensity isn't well defined (no high intensity [red] portion of the call); no harmonics to indicate a strong call pulse. Some of the pulses have "hanging tails" at the bottom, which suggests a Myotis species (all Myotids have this quality), but which one can't be distinguished without clearer call pulses that provide more information. Many of the calls you provided (even of other species) are similarly faint, so you may want to get your microphone up higher, potentially closer to bat flight paths. If you were recording with an Echometer Touch, holding it up over your head may help. For field surveys, we mount our microphones for our SM4BAT detectors at least 10 feet above the ground, with little to no clutter within 30 feet, to capture good quality calls.

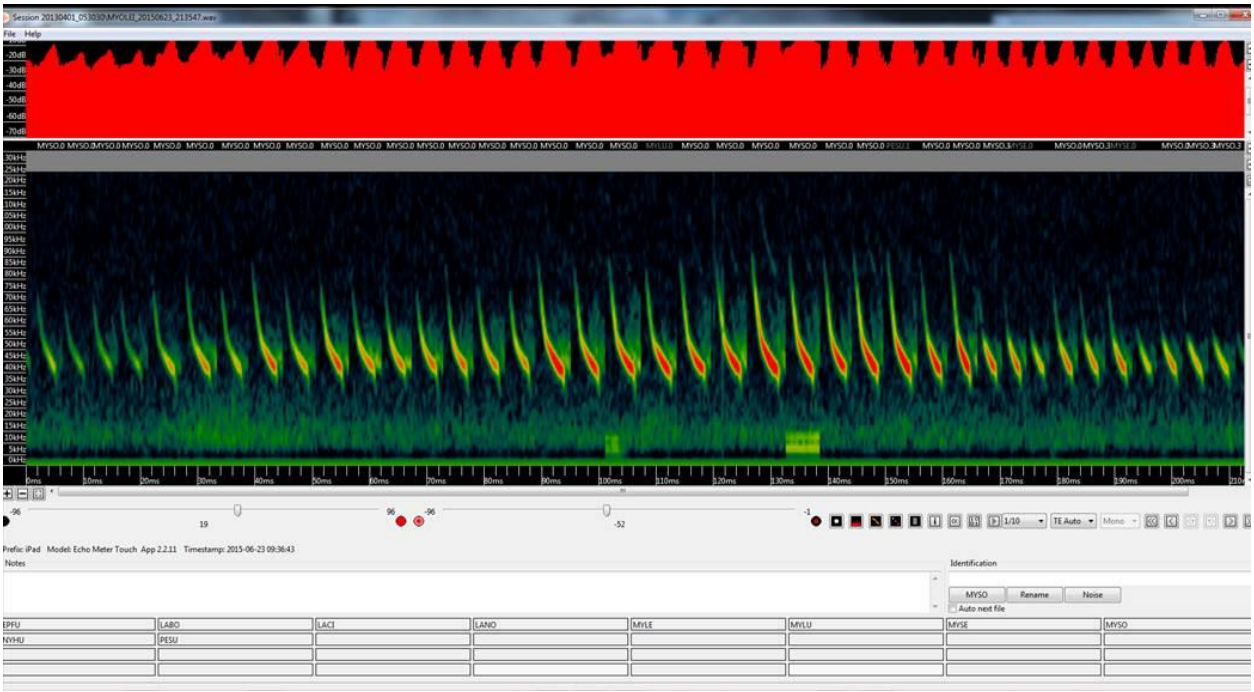
The call below has some slightly better formed call pulses, which show the typical Myotis “hanging tail”, and have better defined power centers (red areas), but there are only 2-3 pulses with those qualities, and they don’t appear to be complete/well formed. Again, with the hanging tail, we could say that it’s a Myotis species, but without 3-5 well-formed calls, it’s impossible to make a conclusive ID. There is nothing here that would confirm the call as a MYSO.



The call sequence below has much better formed call pulses with clear tails, strong intensity centers (red areas), and even slight indication of harmonics (the lighter lines above each pulse at about 2x the fundamental frequency (around 80 kHz). Given the power center (red area) above the knee (slight angle) in some of these pulses, I think this bat was close to the microphone. While some pulses are noted by Kaleidoscope Pro as MYSO, you’ll notice those are the more poorly formed call pulses, with breaks, or poorly developed power centers, and the IDs are grayed out, because they produce low-confidence IDs. The bolder IDs (MYLU) are more confident, because the measured parameters of the call provide a clearer indicator of the species ID (as far as Kaleidoscope Pro is concerned). You can also see in this sequence some variability in the slope of the call pulses, which can generate some confusion on the part of the program, as well. I would still call these MYLU.



Finally, the call sequence below, which has strong, well-formed calls, some of which exhibit harmonics (indicating a complete call pulse), are identified by Kaleidoscope Pro as MYSO (though the file was labeled MYOLEI). These call pulses have a smooth, gradual knee, and one definitive power center, both of which suggest MYLU, not MYSO.



As we discussed during our phone conversation, occurrence of MYSO at your location is unlikely, as you are located well north of their recognized range. Whereas that doesn't totally preclude the possibility of detecting them there (range expansion happens), it does make it unlikely.

I hope this helped. Please let me know if you have any questions, or if perhaps ERM can help your organization with anything further.