Soundscapes to Landscapes

Sound Component Training Data Collection with Raven Lite

1. Download and install the software

Raven Lite 2.0 is free to download from this site:
https://store.birds.cornell.edu/collections/raven-sound-software/products/raven-lite-2-0-free-license

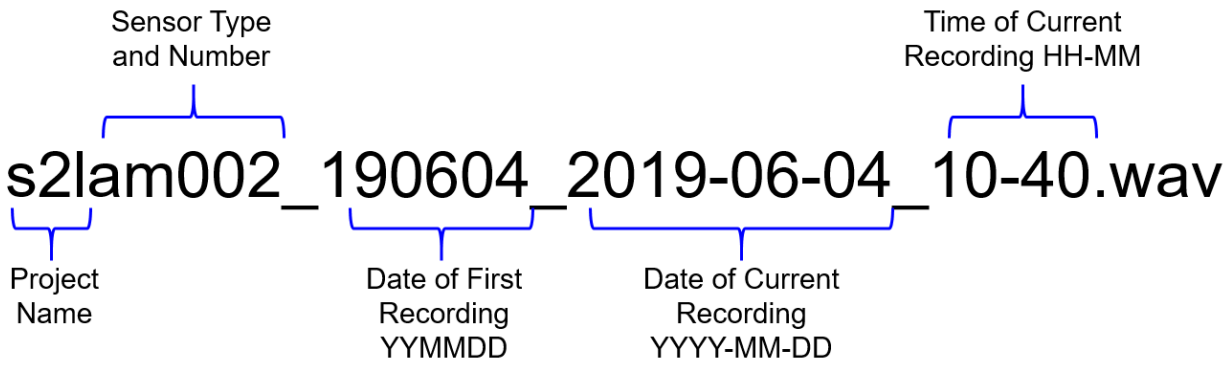
You will have to submit an official order, providing your contact information, but there should be no cost.

Next you'll receive an email with your Raven Lite License. This email will include instructions for downloading the software and installing on Windows, Mac, or Linux.

When you open the software for the first time, you'll need to provide the serial (license) number found in the email. This should be specific to your instance of the software.

2. Familiarize yourself with the acoustic data files

Each of you should have the necessary subset of S2L acoustic files downloaded on your machine (access here:). Make sure you're able to view these files with your OS file explorer. Here's an example file name with each component explained:



3. Open an acoustic data file in Raven Lite

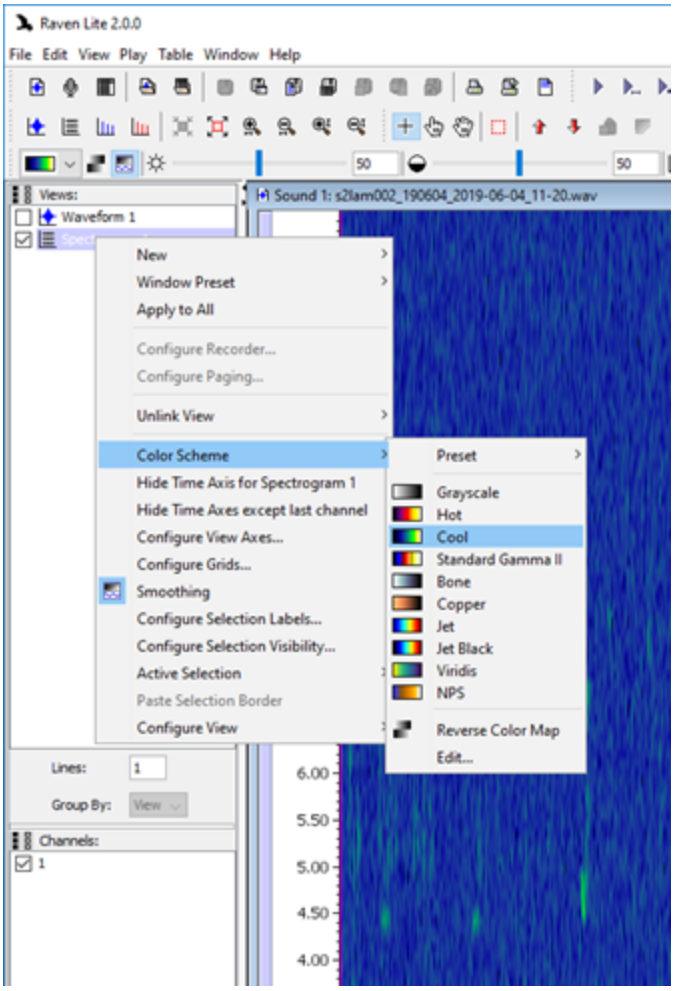
After installation you should be able to access Raven Lite from your start menu.

Once the program is open go to **File > Open Sound Files...**
Navigate to the directory where your acoustic files are stored and select a file. The **Configure New Sound Window** will pop up. Under the **Window Preset** dropdown, select **Default** and press **OK.**
Now you should see a Waveform and Spectrogram display. Turn off the Waveform display in the **Views:** box on the far left.

4. Setup your display presets

Let's first zoom in to our frequency range of interest. Right click on **Spectrogram** in the **Views:** box on the left hand side and select **Configure View Axes**. Set the Frequency Scale to 12000 Hertz / Line and click **OK**.

Now pick the "Cool" color scheme. Right click on **Spectrogram** in the Views box on the left hand side and select **Color Scheme**.

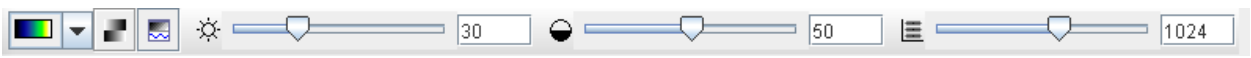


Lastly, you should pull up the **Table 1** box at the bottom of the Raven Lite window. Make it about one-fourth to one-third the height of your screen. We'll eventually use this table to record our annotation details.

Once you like your display settings right click anywhere in the Spectrogram window, go to **Window Preset** and click **Save As…**
Specify a name for this view preset (for example "spectro_cool_0to12kHz_wTable") and then click **Save**

The next time you go to open an acoustic file you should see your preset as an option under the **Window Preset** dropdown in the **Configure New Sound Window**. FYI:

- You may need to manually reset the vertical axis to 12000 Hz each time you load a new sound file.
- You should use a sampling rate of 1024 for the spectrogram generation. You may adjust the brightness and contrast sliders to enhance the various sound components:



5. Manipulate the spectrogram

Use your cursor to make “uncommitted selections” by clicking and dragging somewhere on the spectrogram. Initially, these will show up as dotted boxes. You can then use the **Zoom To Selection** button  to zoom in on a sound feature of interest. From there, press the **Filtered Play** button  and then **Play Visible**  or **Play Loop**  buttons to only hear that part of the spectrogram. You may need to turn your volume up in some cases. This is how you should look for and verify the different sound component classes (shown in the table below).

Level 1	Level 2	Level 2 Abbrev.
Anthro	Air traffic	AAT
	Vehicle horn	AVH
	Vehicle traffic	AVT
	Vehicle braking	AVB
	Rail traffic	ART
	Siren	ASI
	Machinery	AMA
	Human voice	AHV
	Music	AMU
Geo	Rain	GRA
	Wind - constant	GWC
	Wind - gust	GWG
	Stream	GST
	Ocean	GOC
Bio	Birds	BBI
	Insects	BIN
	Amphibians	BAM
	Mammals	BMA
Quiet	(Very little to) No noise	OQU
Interference	Physical Interference	OPI

6. Make annotations and copy to shared spreadsheet

Ideally we would identify between 100 and 500 annotations (AKA regions of interest) for each Level 2 sound class shown in the table above. In order to do this we'll divide and conquer, focusing first on acoustic files which have previously been tagged with certain sound components. You'll start with a list of files and go through these one-by-one, listening for any of the Level 2 sound classes.

To make an annotation, first draw an uncommitted selection as described in the previous section and verify that it is a sound class of interest. During the verification process you can adjust the time (x) and frequency (y) dimensions to focus in on the specific sound feature. Once you're happy with the dimensions of the selection, press **Enter** on your keyboard to make a "committed selection" and you will be prompted to enter a name for your annotation. Type in one of the Level 2 Abbreviations from the table above.

Repeat this process, identifying any of the Level 2 sounds which may be present in the file you have open. Please do not make more than 5 annotations for the same sound class in a single file so we can capture a wide range of variability of the sound class at different times/sites.

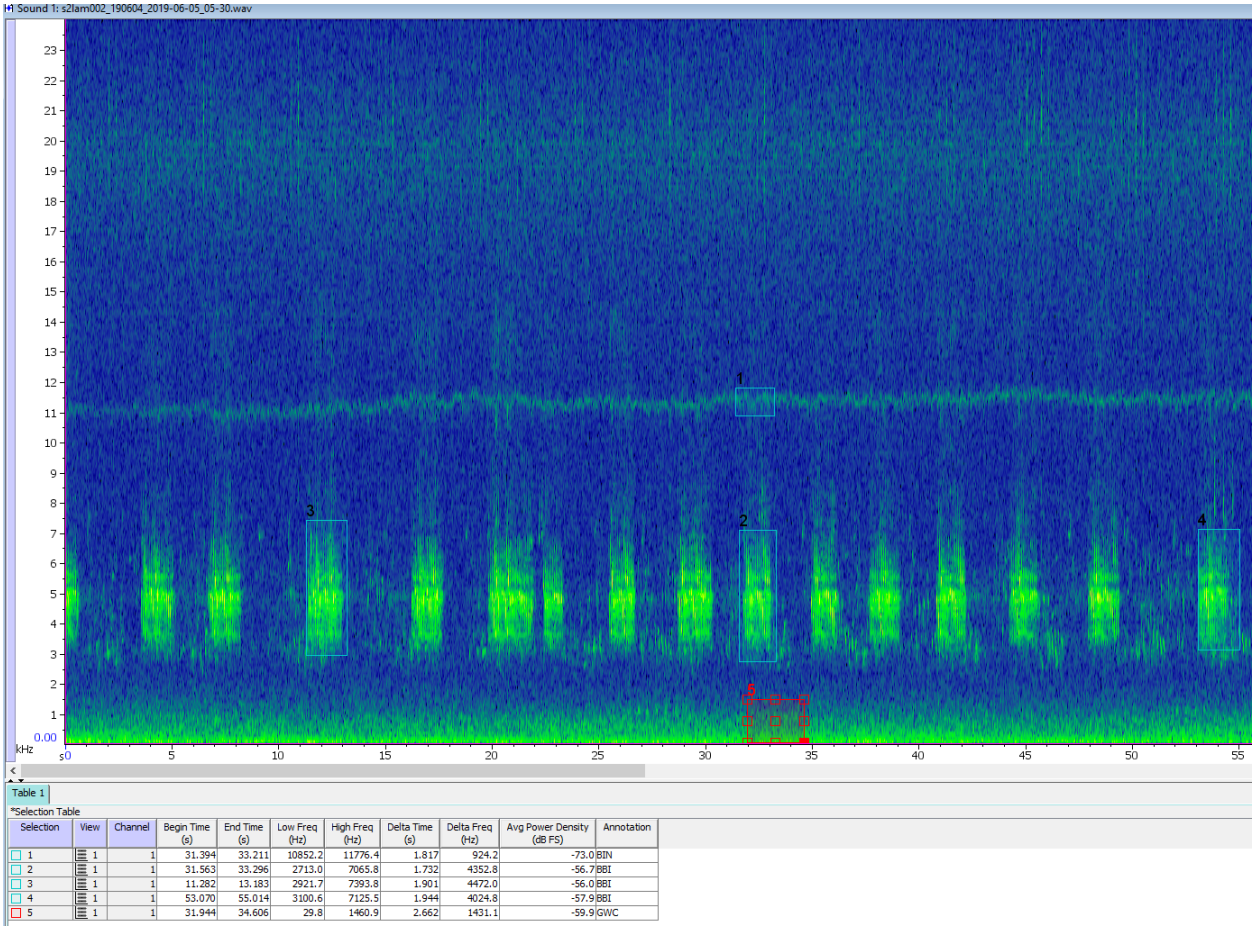


Table 1

*Selection Table

Selection	View	Channel	Begin Time (s)	End Time (s)	Low Freq (Hz)	High Freq (Hz)	Delta Time (s)	Delta Freq (Hz)	Avg Power Density (dB FS)	Annotation
1	1	1	31.394	33.211	10852.2	11776.4	1.817	924.2	-73.0	BIN
2	1	1	31.563	33.296	2713.0	7065.8	1.732	4352.8	-56.7	BBI
3	1	1	11.282	13.183	2921.7	7393.8	1.901	4472.0	-56.0	BBI
4	1	1	53.070	55.014	3100.6	7125.5	1.944	4024.8	-57.9	BBI
5	1	1	31.944	34.606	29.8	1460.9	2.662	1431.1	-59.9	GWC

Once you've made your last annotation, select all rows of Table 1 by clicking in the first row and column and then pressing **Ctrl-A**. Next, right click on the selected cells and copy by pressing **Ctrl-Shift-C**. Copy these cells to the tab with your name in the shared spreadsheet found here:

Make sure you are copying the same number of rows and columns as what you see in your Table 1 box in Raven Lite. We don't want to have to draw these annotations again!
Note that each of you has your own sheet in the shared spreadsheet. Your annotations are combined automatically in the "combined" sheet and then we calculate the total number of annotations per sound class in the "stats" sheet. Lastly, don't forget to copy the file name that you're working on into the first column of the spreadsheet.