PROTOCOL

1. Random order locations
2. Random order song recordings
3. Analysis order: Field season recordings 2017 clear/ buzzy, Xeno Canto and Macauley
4. Read the collection data for the chose song recording, to make sure it isn’t a duplicate bird (for Xeno-Canto or Macauley) or that there are multiple birds in the recording
5. Number all songs with high enough quality to analyze in the recording on the jpeg images of spectrogram
   1. Signal is not obscured by other bird songs
   2. No large amount of noise obscuring signal
   3. Song distinct, all notes are loud enough to create dark outlines
   4. IF THERE ARE MULTIPLE BIRDS IN RECORDING, listen to recording to determine which song corresponds to what bird
6. Randomly choose 3 songs from eligible songs to analyze
7. Set View>Window Preset> “Townsend’s Warbler Preset” for TOWA preset. It will change/add:
   1. Selection Spectrum View
   2. Selection table:
      1. Automatic measurements: Begin Time, End Time, Low Freq, High Freq, Agg Entropy, Avg Entropy, Center Freq, BW 90%, Delta Time, Freq 5%, Freq 95%, Max Freq, Begin File, Begin Path
      2. Signal type – for labeling songs ~~and syllables,~~ song = song~~, syllable = sy [0-9][a-z]~~ ~~(number indicates unique syllable type, letter indicates repetition)~~
      3. Song ID – indicates which song being analyzed, corresponds to numbers randomly generated
      4. Num notes- number of notes in song
      5. Num Unique notes
      6. Buzzy or clear- b for buzzy song, c for clear song
8. Adjust window size to 512 (if not already) and contrast and brightness to have clearest image
9. Listen to the song
10. Create a box around the song and each syllable
    1. use amplitude graph to help determine the left and right boundaries of the box (duration)
    2. use spectrogram splice view to help determine the upper and lower boundaries of the box (max and min freq)
       1. drag the purple vertical line on the spectrogram view to the time point with the highest and/or lowest frequency. The spectrogram splice view will give you an output of the relative amplitude at each frequency at the time point where the purple line is. Create the margin of the box where the amplitude decreases to the noise level.
    3. Fill in the Annotation columns
11. Save selection table to ‘Selection\_table’ folder in the ORE TOWA analysis folder

Song characteristics being measured:

1. Total number of notes
2. Total number of unique notes

For each song and syllable:

1. Maximum frequency
2. Minimum frequency
3. Duration
4. Aggregate Entropy- the total amount of energy in the song (how complicated)
5. Average Entropy – On avg how complex
6. BW 90%- The bandwidth (frequency range) of a note, containing 90% of the energy of that note. Gives a measure of bandwidth that is very insensitive to measurement error
7. Center Freq - The frequency at which 50% of a note's energy lies above, and 50% lies below. Not sensitive to measurement error and spectrogram settings.
8. Freq 95 - The frequency containing 95% of the power below it
9. Freq 5 - The frequency containing 95% of the power above it