LOUD AND BRIGHT PROJECT INSTRUCTIONS
Sound Measurement
for **Apple Devices**

Thank you for your participation in the Loud and Bright Project, a citizen science project of the University of California, Los Angeles (UCLA) and the Cornell Lab of Ornithology. This document provides information about the study and the instructions needed to collect data. Please read over the entire document and the attached handout before performing any of the tasks.

Introduction

Your participation in this study will provide the Cornell Lab of Ornithology with a better understanding of the level of sound at times and locations with bird activity. Researchers can use this information to determine how these noise levels affect bird distribution, communication, and reproduction.

Scientific Background

What is Anthropogenic Sound?
Anthropogenic sound is undesirable sound that is created by human activity, including roadways, airplanes, loud music, *etc*. It is extra sound generated in addition to natural sounds.

What is natural sound?
Natural sound is created from nature such as rustling of leaves, crashing of ocean waves, birds chirping, *etc.*

Why is this Important?
Researchers have shown that excess sound can disrupt many of the sounds and songs birds use to communicate. If these social triggers are unheard, it can change the way some types of birds detect predators, select mates and reproduce, and choose territories. Humans have played a large role in raising sound levels, especially in urban areas. The heightened level of sound is an area of interest to scientists.

What can we do?
Your participation in this citizen science project can help raise awareness of our impact on sound levels. You can help scientists determine how sound can influence bird ecology by measuring sound levels.

Materials

You will need the following materials:

1. iPhone, iPod Touch, or iPad
    - Your device should have about 13 MB of space available to download the necessary apps and store data.
2. Device apps (Download instructions given below)
    - NoiseHunter app ($5.99): to measure noise in decibels (dB)
    - L & L app (Free): to find your longitude and latitude
3. Internet Access
    - To download the necessary apps
    - Optionally: To submit data online on your device or computer
4. Sound Measurement Data Sheet (attached at the end of protocol)

Preparing the Study Area and Materials

Downloading the apps

Step 1: Locate and tap the App Store icon (Figure 1). You will be brought to the App Store, where you can search/download apps.

Figure 1. App Store icon

Step 2: Tap the magnifying glass labeled "Search" in the bottom menu of the screen (Figure 2).

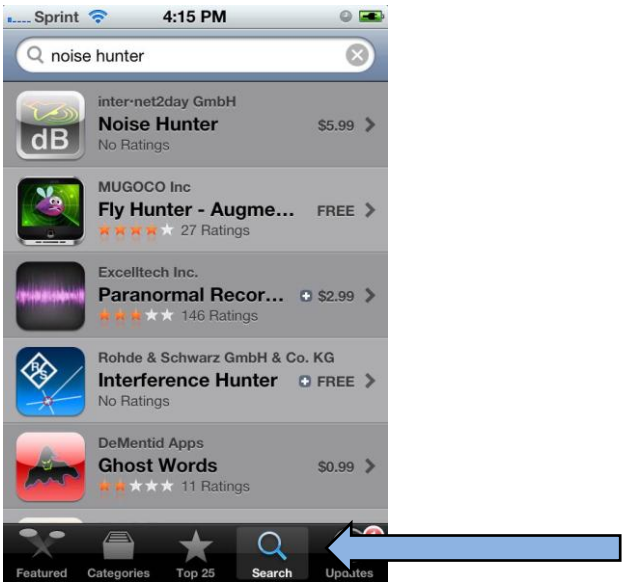

Figure 2. App Store screen

Step 3: Tap the top search bar (Figure 3) and type in the app name (i.e., Noise Hunter or L&L). Tap "Search" on the bottom right corner of the screen.

Figure 3. Search bar

Step 4: Tap the proper application icon (use Figure 4 to double check app icons) and you will be brought to the app's info page.

a) b)

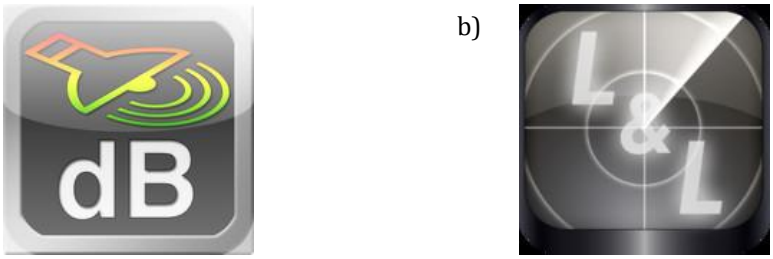

Figure 4.a) Noise Hunter icon b) L&L icon

Step 5: Tap the price box in the upper right blue box. It will turn green (Figure 5) and change to "Buy App" (for the app that costs money) or "Install App" (for the free app).

Figure 5. Noise Hunter's info page

Step 6: You will be prompted to enter your Apple ID information. Continue to sign in and complete the download.After the download is complete, you're done!

Preparing the NoiseHunter App

Step 1: Open the NoiseHunter app and tap the red power buttonto enter the main screen.
Step 2: Tap "More…"
Step 3: Tap "Settings"
Step 4: Select "1 Hz" in "Display" section
Step 5: Go back to the main screen.

Figure 6. Power button

Note: This must only be done once.

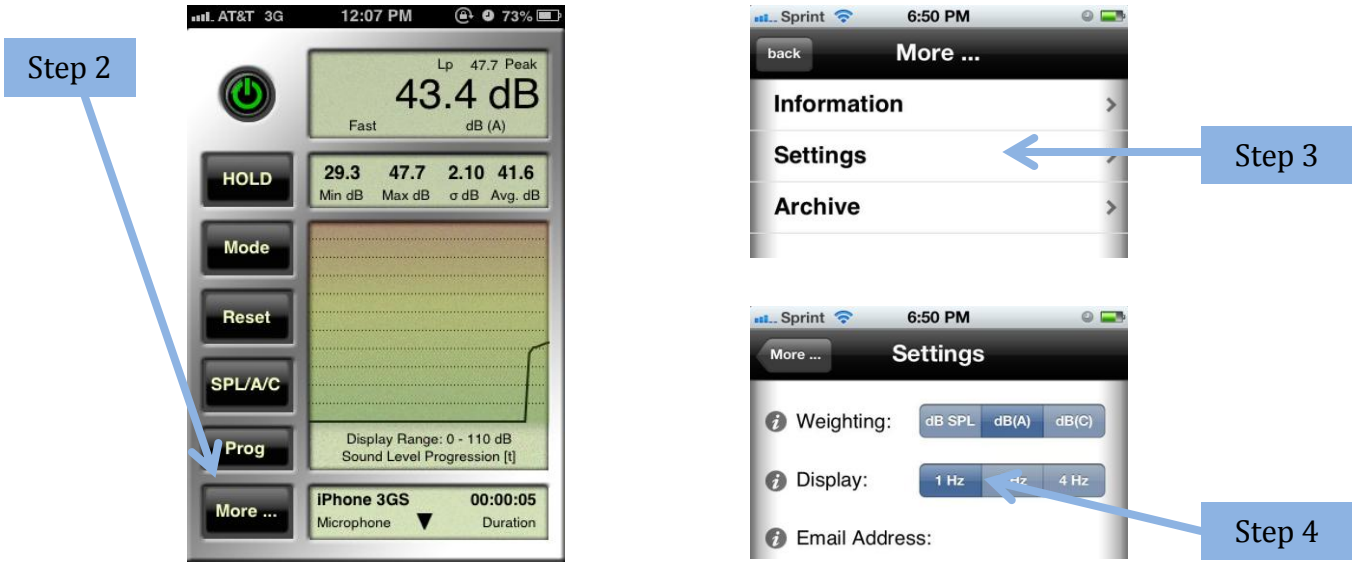

Figure 7. Preparing the Noise Hunter app

Preparing to take measurements

Timing: Sound measurements should be taken on a *weekday* at three time windows:

- Within 30 minutes before or after dawn
- Between 10am and 12pm
- Within30 minutes before or after dusk

Measurements for different time windows can be taken on different weekdays *within the same week*. However, it is recommended that you take all sound measurements on the same weekday.

Frequency: You will take three *consecutive* measurements in each time window for a total of 9 measurements.

Location: You should take measurements at the center of activity with which the noise measurement will be associated. E.g., near the feeder for Project FeederWatch, in the center of your backyard for Backyard Bird Count, at the nest for NestWatch, etc.

Weather: Measurements should NOT be conducted when there is precipitation or excessive wind because it will pick up natural sounds that we do not want to measure.

> *What is considered excessive wind?*
> If your surroundings have tree branches that are swaying intensely for periods longer than 1 minute, then there is too much wind.

In-the-Field Instructions

Task 1: Recording

You should record data with a pencil or pen on the data sheet, which can later be transferred to the "Loud and Bright" website. The handout is divided into three sections: Dawn Measurements, Daytime Measurements (between 10am and 12pm), and Dusk Measurements.

Task 2: Specify Location and Surroundings

Open your L&L app and determine your longitude and latitude. Record the coordinates with as many decimal places shown by the device on the handout. Also provide a brief description of your surroundings in the section, "Briefly describe your surroundings." You should specify:

- Whether you are in an urban, rural, or suburban setting
- Type of location (e.g., residential yard, woodland, etc.)
- Vegetation, buildings, or other obstructions
- General surroundings (e.g., near a busy roadway)

Task 3: Measure Sound

Standing at the center of activity, open your NoiseHunter app and tap the power button. Position your device as follows:

- At breast height
- With the microphone pointing straight up (microphone is usually located at the bottom of the device)
- Unlock portrait orientation from the settings menu on your device if the screen does not rotate
- You must stand STILL in one location
- Do not talk during the measurement

Note: The following instructions must be followed for each separate noise measurement.

Step 1: Tap the "Prog" button when you are ready to begin measuring.

Step 2: Another window will appear (Figure 8). Select "Sound Level Recording,"

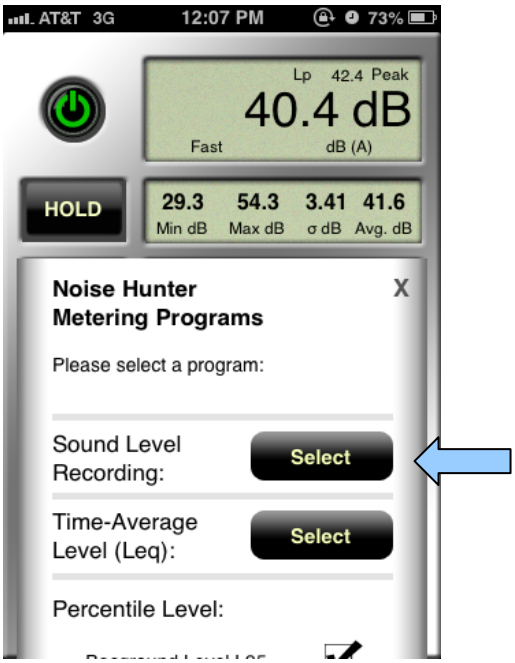

Figure 8. Program window

Step 3: Tap "Start" when you are ready to record, and measure for 30 seconds. The duration of your measurements can be seen in the bottom right corner of the main screen (Figure 9).

Figure 9. Duration shows the time elapsed

Step 4: Tap "Stop"when 30 seconds have elapsed, and "Save" when the following window appears(Figure 10).

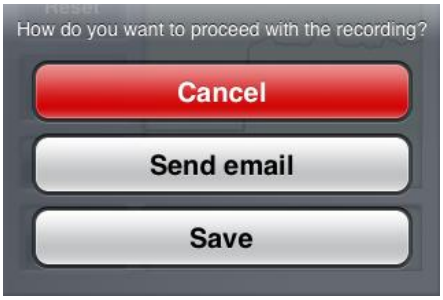

Figure 10. Save the recording

Step 5: Title your measurement data similar to Figure 11(with time period, number of measurement within that time period [1, 2, or 3], and the date).

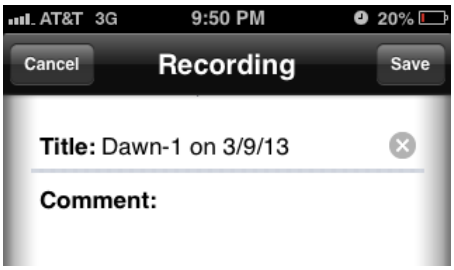

Figure 11. Title formatting for measurement data

Step 6: Record maximum and average levels, as well as time. Use Figure 12 as a reference to help you find these numbers.

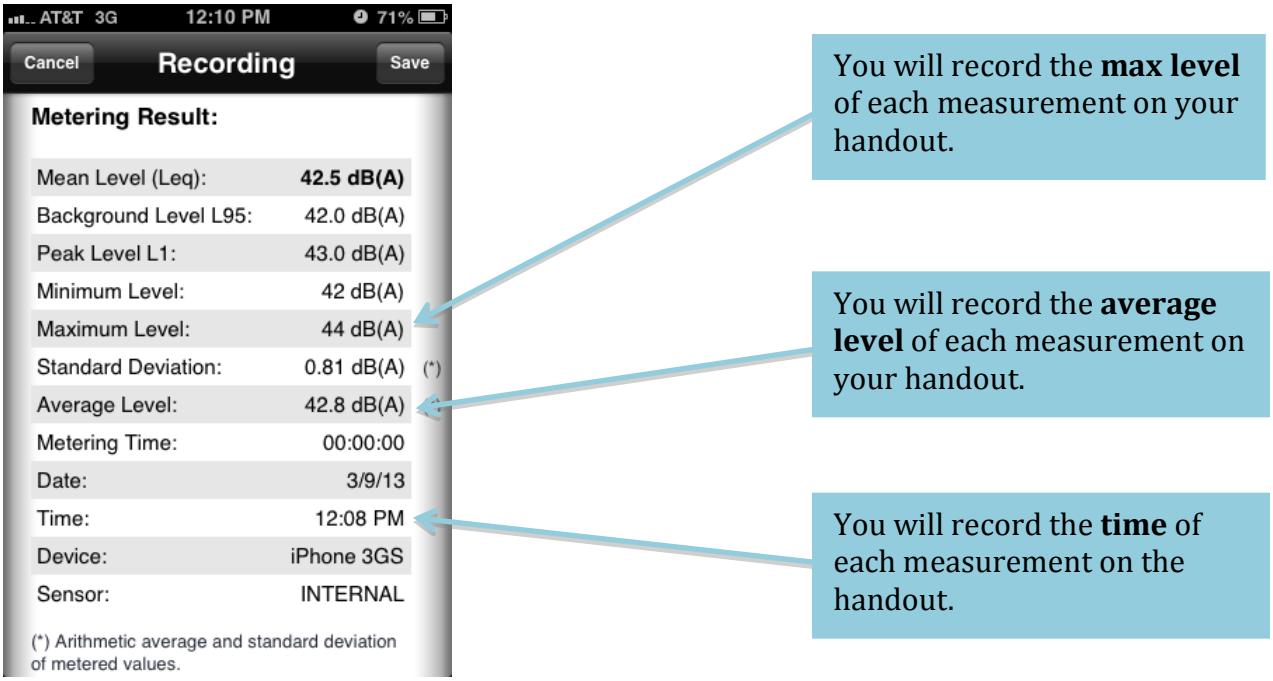

Figure 12. Measurement data

Step 7: Tap "Save" to save your measurement data to access later. Instructions to access your data is given at the end of this page.

Task 4: Keep Track of Sound Sources

While you are measuring, you should be aware of intermittent sound (e.g., airplanes, sirens, gusts of wind, etc.), as well as the dominant sound source. Record these observations on the handout in the section, "What is the dominant sound source and what intermittent sounds do you hear?"

Task 5: Repeat

Repeat the above tasks two more times in the same location. You should conduct three *consecutive* measurements at a single time around dawn (30 minutes before or after sunrise), three *consecutive* measurements between 10am and 12pm, and three *consecutive*measurements around dusk (30 minutes before or after sunset).

Task 6: Submit data

Option 1*: Loud and Bright Project Website*

- Go to www.LoudandBright.wix.com/LABP
- Click "Submit Data" located at the top right of the screen
- Click "Sound"
- Fill out the form, using your data sheet as reference
- Click "Submit"

Option 2*: Send Data Sheet by Mail*

Loud and Bright Project
c/o Dr. Travis Longcore
UCLA Institute of the Environment and Sustainability
300 La Kretz Hall
Los Angeles, CA 90095-1496

Accessing your saved data

Follow these steps to access your saved data, if needed.

- Tap "More…"on the main screen of the NoiseHunter app,
- Tap "Archive"
- You will find all of your saved data listed from newest to oldest