Fall ARU Deployment Standard Operating Procedures

- Song Meter Minis -

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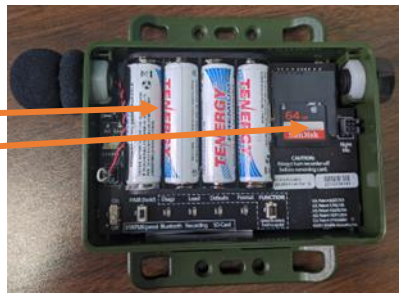
General

Most states will be using Song Meter Minis for monitoring. Only a few states (NY, PA, NJ, DE, MD, and WV) will use AudioMoth ARUs instead (see AudioMoth SOP here).

Use the following links to watch a video about setting up the audio moths:
Song Meter Programming: https://www.youtube.com/watch?v=LnAUn36WW0E
Song Meter Deployment: https://www.youtube.com/watch?v=8s4qwKvtmBg
[Note: the videos are helpful, but please also read this SOP in its entirety. The SOP receives periodic updates with new information; the videos do not.]

Preparation

- 4 AA batteries
- SD card



ARUs will be set up using a smartphone to set date, time, time zone and location.

- You will need to download the **Song Meter Configurator App by Wildlife Acoustic, Inc.** This app will work with most smartphones or tablets that have Bluetooth version 4.0 or later and run either iOS 10 or later, or Android 5.0 or later. This app will not work with Android devices produced by Huawei.

GET IT ON Google Play

Available on the App Store

ARU Settings for Song Meter Mini

1. Turn on your smartphone's Bluetooth and open the "Song Meter" app.

2. Press and hold the "pair" button on the ARU for ~4 seconds.
    a. If this is your first time pairing this particular ARU with the phone, look for the ARU's serial number to appear in the main menu of the app.
    b. If you've previously paired this ARU with your phone, the ARU will already be listed in the main menu. However, you will still need to press and hold the "pair" button on the ARU.

3. A "pair" icon should appear in the app next to the ARU ID. Click it to create a connection between the ARU and the phone.

4. To adjust the settings, click "configure".

5. It is recommended to format SD cards prior to all deployments for optimal performance. This helps prevent SD cards being marked as "dirty" (dirty means a system flag has been set, potentially leading to data corruption or errors). Formatting can also sometimes be used to make a corrupt SD card work again, but if not, the card may be defective.
    a. Select "Utilities" in the upper righthand corner.
    b. Select "Format SD Card".
    c. You will get a message warning that this action will erase all the data on the card.
    d. Click "yes" *only* if you are ready to format the card.

    IMPORTANT: This procedure erases all data on the SD card. Verify that you have saved any audio files before running this utility!

6. Change the "recorder name" according to the following conventions: *UnitID-PointID*, where *UnitID* is the 5-digit number found on the front and/or side of the ARU, and *PointID* is the 4-digit number representing the location. IMPORTANT: The recorder name *must* be changed anytime the ARU is moved to a new location.

    E.g., If deploying ARU 10776 at point 1223, the recorder should be named 10776-1223.

7. Go to the "location and time zone" settings and adjust them accordingly.
    a. In the field, you may click the "set" button if you have cell service, but make sure the map shows the correct area where the ARU will be placed.
    b. Or you can program ahead of deployment using the point coordinates.

8. Return to the main "configure" page.

9. It is recommended to turn on the “send Bluetooth beacons” option. This allows you to later check the status of the recorder and SD card without first pairing with the ARU (you will need to be within range, ~10m, of the device).

   Additionally, because in-person point counts are to be paired with an actively-recording ARU, it is recommended that you not set a "date range”. This ensures that the ARU will continue to record each morning in case weather or unexpected scheduling conflicts prevent you from surveying on the originally anticipated deployment dates.

10. Record data for 1 hour every morning the ARU is deployed (45 minutes before sunrise to 15 minutes after sunrise). Adjust the recording windows in the app so they resemble the following settings:

a.	Start time		hours	minutes
b.	Rise	-	00	45
c.	Time Duty Cycle = Always			
d.	End time		hours	minutes
e.	Rise	+	00	15

Please make sure the highlighted (+/-) signs are exactly as shown above.

IMPORTANT: This is the fall SOP; the spring survey window is very different. For spring deployments, please see the Spring ARU Deployment SOP.

11. After setting the schedule, click the “estimated battery and SD card life”. Make sure the dates are as expected.

12. After configuring the ARU, return to the main menu (i.e., the list of previously paired ARUs).

13. Click on “status” to double-check storage and battery levels. This is also where you can check to make sure the SD card is properly seated. Then click the return button to return to the main menu again.

14. When you have completed the programming for the Song Meter, click “unpair”. The lights will turn off on the Song Meter as the connection between the phone and ARU is disconnected. The lid to the device has a list of definitions for what the different lights mean when you click the “function” button on the song meter. At this point, the song meter should be properly programmed and ready for the next recording window.

Important Notes

- SD cards coming unseated during deployment seems to be a recurring issue with the Song Meter Minis.
    - When you insert the SD card, assume it is not seated properly if you don't hear a click the first time. If you don't hear it, remove the card *completely* and reinsert it.
    - Secure the SD cards with a small strip of painter's or duct tape. Be cautious; please ensure that gum from the tape does not build up or jam the port as you remove and replace it during card swaps.

    - Please double check your SD cards as a last step of ARU deployment. Pair the ARU with your phone and click "status". If you see a "no SD card" warning message under "storage info", this means the SD card is not seated properly.

    - Deploy ARUs upside down (see photo on pg. 5).
    - Any in-person covey counts should be done in tandem with an actively-recording ARU. If you have Bluetooth beacons turned on, you can check the status of your ARU and SD card once you get within ~10m of the device to confirm the ARU is working properly before you start your survey.
- If using a government computer, **never** encrypt SD cards (details in the Data Management Guidelines, pg. 2).
- Ensure the lid snaps on tightly during deployment.
    - Be sure the thin rubber weather strip on the ARU's outer edge remains clean.
    - The lids can be deceiving by snapping on loosely; so please press on the lid to make sure it is snapped on all the way.
- Squirrels sometimes like to nibble on the microphone covers.
    - If you have a location where squirrels are a problem, you can try *lightly* dusting the microphone cover with ground red cayenne pepper or a similarly hot spice.

In the field

At the survey point, one mini should be deployed as follows:

1. Drive a 5-foot metal t-post approximately 15-20 cm into the ground using a mallet.
2. Attach the ARU upside down to the posts using 2 or more zip-ties (photo below).
    a. If securing the ARU to something other than a thin post (e.g., tree or fence post), make sure the microphone is sticking out and not blocked on one side.
    b. Deploying the ARUs upside down may help prevent SD cards from coming unseated.
3. Double check that ARU settings are correct before leaving. Make sure the ARU is switched on!
4. The ARUs are waterproof *as long as the lid is secured properly*, so they do not need to be placed in a bag/under cover.

Deploy ARUs upside down with the microphone sticking out to the side.