

Southeast Coast Network

National Park Service
Inventory & Monitoring Program



Standard Operating Procedure (SOP) #1.4.22

Deployment and Retrieval of Automated Recording Devices for Vocal Anuran and Landbird Monitoring

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Summary

This Standard Operating Procedure describes deployment and retrieval of the automated recording devices (ARD) used by the Southeast Coast Network (SECN) to monitor vocal Anurans and landbirds. Implementation of this SOP assumes the ARDs have been prepared following SOP 1.4.1 (Byrne and Smrekar 2012). The ARDs covered by this SOP are the Song Meter device, developed by Wildlife Acoustics, Inc. The user manual for the Song Meter (Wildlife Acoustics 2011) must be read prior to use of these devices as a monitoring tool. Currently, the SECN uses Song Meter (SM) models 1, 2, and 2+.

Revision Log

Previous Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #

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Overview

The field methods for the amphibian community monitoring protocol consist of automated recording devices, focusing on vocal Anurans. The ARDs are programmed to record for 30 seconds every 10 minutes from 1800 to 0650 to target amphibians, and then for 12 continuous minutes from 0730 to 0742 and 0800 to 0812 to target birds during 20 separate sampling events over a 77-day consecutive deployment period. Up to 30 ARDs are deployed within a park during a sampling event at the center point of the 0.5-ha sampling location.

Equipment

The equipment necessary for ARD deployment is listed in the Table 1 checklist. Personal equipment is also listed.

Table 1. Project equipment and personal equipment checklists for ARD deployment.

#		Project			Personal
	61	SM I ARDs		1	Compass
	70	SM II ARDs		1	GPS with sample points loaded
	4/ARD	ARD rechargeable/ alkaline batteries		1	GPS charger
	1/ARD	SD cards, recording program loaded		1	GPS extra battery
	2/ARD	SM II Microphones		1 roll	Flagging
	5	Power squid		1 pair	Waders
	30	Battery Charger		1	Wader Hanger
	1	Clipboard		1 pair	Snake Gloves
	20	ARD datasheets		1 pair	Snake Gaiters
	2	Cameras (memory cards clean)		1	Hand lens
	2	Camera Chargers		1	Ruler
	3 Sets	Park Maps with Sampling Locations		1	Emergency Whistle
	1	List of Park Contacts		1	Watch with timer or stopwatch
	2	Field Phone		1	Multi-tool
	2	Field Phone Chargers		1	Bug Spray/Permethrin
	10	Extra watch batteries for SM I ARDs		1	Sunscreen
	10	Extra AA batteries for SM II ARDs		1	Backpack
	5 sets	Extra rope and clips for ARDs		1	Medical Kit, fully stocked
	10	Extra SD cards		1	Bug Head Net
	1	All purpose battery charger		1	Binoculars
	2	38 qt. Cooler		1	Field Notebook
	4	Phillips Head Screw Drivers		1 roll	Toilet Tissue
	15 pieces	Camouflage Fabric		1+	Sweat Towels/Bandanas
	1	Loctite Tube		1	Camelbak Water Reservoir
	1	Caulking Gun		1 roll	Duct Tape
	10	Extra Microphone Covers		4	Pens/Pencils
	1	Laptop Computer		1	Head Lamp
	2	Industrial Permanent Marker		1	Small LED flashlight
	1	SD/XD card reader		1	Match Holder
	2	Waterproof Backpack		1	Lighter/Matches with striker
	1/person	Sm. Bag for SM II Microphones/ Covers		2 to 3	Carabiners
	1/person	Small roll extra velcro		2+	Bottles of Water/Gatorade or electrolyte tablets in med kit
	1	Data Box, loaded with driving directions, park maps, and hotel reservations		1	Pair of Pliers
	1/person	Hard Hat for work in burned areas			
	8 to 10	Metal and Wood Stakes for Outer Banks parks			

Procedure

1. Navigate to the center point of the sampling location (macroplot) with the GPS unit. Use a compass for navigation as necessary.
2. Evaluate the sampling location in accordance with the selection criteria set forth in SOP 1.4.19 –*Installation and Relocation of Permanent Terrestrial Monitoring Sampling Locations* (Byrne 2012). If the sampling location is accepted, proceed to the next step.
3. After you have located the center point, remove the back cover of the ARD and install the batteries. Identify which ARD is intended for that location: the Song Meter 1, 2, or 2+ because the device setup procedures vary according to the ARD model. When using the SM2 ARDs, it is **imperative** that the SD card is removed from its slot **before** the batteries are installed or removed to avoid damage to the card reader. Place a strip of duct tape over the batteries to ensure that they do not dislodge if the ARD is subjected to high winds during storm events. Ensure the SD card is in the unlocked setting so that it can accept data. After the unlocked SD card is installed into the device, also place a small strip of duct tape over that as well to secure it.
4. All devices are deployed at or near the center point of the macroplot for 77 days (eleven full weeks) during which time 20 separate sampling events are recorded. Because of the long deployment duration, a higher likelihood exists that the ARD will be exposed to storms, people with bad intentions, or other potential sources of harm to the device. Consequently, ensure the device is secured properly and that it is in as much of a concealed position as possible (e.g., if a trail exists in the sampling location then secure the device to the side of a tree that faces away from the trail). If the center point is next to a trail or otherwise highly visible, it is acceptable to place the ARD in a more hidden location, provided that it is deployed within the 0.5-ha sampling location.
5. The ARD should be secured tightly to a tree (or stake) using the harness and mounting cords. Attempt to mount the device in a sheltered location as close to the center of the macroplot as possible. Use your best judgment when choosing a position for the ARD. For example, if the ARD is behind or immediately adjacent to a large sabal palm (*Sabal palmetto*) frond, even slight breezes will be loud and could preclude the ARD from detecting species within the 0.5-ha area. Additionally, vines or branches that could move with the wind and strike the ARD will affect the recordings and possibly damage the device.
6. Place the ARD as high as can be reached safely and comfortably. If the area is prone to flooding events, try to safely climb to a spot that will place the ARD above the high water mark.
7. If ARDs are deployed in sites that are frequented by the public, cover the ARD with camouflage fabric and Locktite, or another polyurethane construction adhesive or camouflage duct tape.

8. Record all required information of the ARD Deployment Datasheet (**SECN Form ARD-1**), which is attached at the end of this SOP. Complete the form in its entirety and add any information that will assist in relocating and retrieving the ARD after the deployment period. Elaborate as much as necessary and draw a rudimentary sketch of the mounting location, small landmarks, or other features that will aid in retrieval.

Pre-Deployment Checklist

The following checklist is part of the ARD setup and programming procedures detailed in SOP 1.4.01 (Byrne and Smrekar 2012) and should be completed prior to deployment. If several of the settings below require editing, use your best judgment to determine if the device was overlooked or indeed setup properly prior to commencing fieldwork, and that the device might not be functioning properly and another ARD should be used in its place. This checklist is part of the datasheet, although repeated here for reference. This checklist should be followed at the sampling location for every ARD deployment.

- Install batteries; ensure they are touching metal connections; duct tape batteries into battery case.
- Install SD card; make sure it clicks into position and secure with a small piece of duct tape; ensure that the SD card is in the unlocked position.
- Turn on ARD: a) check that the correct date and time are showing - if deployment date is during daylight savings time, make sure to set the clock accordingly, b) check that the recording schedule is set and correct, c) for the SM1 ensure that compression is ON via Settings > Compression, d) for the SM2 and SM2 ensure the compression is set to WAC6 via Settings > Audio > Compression, e) for the SM2+ only, switch the power source to Internal.
- Change the file prefix in the following manner: Settings > Location > Prefix; PARK-###-### (Park-SL#-ARD#).
- Turn off ARD; check that it reads "Going to sleep until 18:00 on [deployment date]" and that the green light is blinking (SM2 and SM2+ only).
- Ensure that the waterproof gasket edge surrounding the entire box is clean and free of debris. Replace lid and secure firmly. Finger-tighten all black connectors to ensure waterproofing. Ensure all unused ports are covered with a waterproof cap. Finger-tighten white vent to ensure waterproofing.
- Install microphones (SM2 and SM2+ only) and wire covers (KEMO, CHAT, HOBE, and OCMU only).

Deployment Schedule

Because of the latitudinal variation in the SECN, the peak calling period for many species of vocal Anurans, local breeding birds, and the arrival of spring migrants varies across SECN parks. The deployment timing of the ARDs reflects this variation and is presented in Table 1.

Table 1. Deployment time for automated recording devices programmed to collect 20 sampling events over a 77-day deployment period targeting vocal Anurans, local breeding birds, and spring-migrating birds.

Park	Month
CAHA	June
CALO	June
CANA	February
CHAT	April - May
CONG	May
CUIS	March
FOFR	March
FOMA	March
FOPU	May
FOSU	May - June
HOBE	May
KEMO	April
MOCR	June
OCMU	March - April
TIMU/FOCA	March - April

Raw Data Transfer and Analysis

After the sampling event, data are copied from the SD cards to the office computers and to an external hard drive for backup and analysis. Only the current year Song Meter data is stored on the shared X:\ drive; all archived Song Meter data is stored on one of two external hard drives located at the CUIS office. Song Meter data used for amphibian monitoring (i.e., all recordings from 18:00 through 06:50) are separated from data used for bird monitoring (i.e., 07:30-07:42 and 08:00-08:12). Amphibian data are stored in the following location: X:\SamplingYEAR\Frog Data\PARK. Data from each ARD is stored in the appropriate park folder in a folder named PARK-###-### (PARK-3 digit Sampling Location-3 digit ARD number). This is the same name in the prefix that is programmed into the ARD at the time of deployment. Song meter data used for bird monitoring is stored in the following location: X:\Sampling YEAR\Bird Data\PARK. Data from each ARD is stored in the appropriate park folder in a folder named PARK-###-### (PARK-3 digit Sampling Location-3 digit ARD number). This is the same name in the prefix that is programmed into the ARD at the time of deployment.

Example

All recording files made from 18:00 through 06:50 taken from ARD 025 at sampling location 018 in Ocmulgee NM during the 2011 sampling effort are placed in the following location: X:\Sampling 2011\Frog Data\OCMU\OCMU-018-025. All files from the same ARD and sampling location that are to be used for bird monitoring (i.e., the extended morning recording sessions at 07:30 and 08:00) are placed in the following location: X:\Sampling 2011\Bird Data\OCMU\OCMU-018-025.

Literature Cited

- Byrne, M. W., S. L. Corbett, and B. D. Smrekar. 2012. Installation and relocation of permanent terrestrial monitoring sampling locations. Southeast Coast Network Standard Operating Procedure NPS/SECN/SOP-1.4.19. National Park Service, Athens, Georgia.
- Byrne, M. W., and B. D. Smrekar. 2012. Programming and maintenance of the automated recording devices. Southeast Coast Network Standard Operating Procedure NPS/SECN/SOP-1.4.1. National Park Service, Athens, Georgia.
- Wildlife Acoustics, Inc. 2011. Song Meter user manual. Wildlife Acoustics, Inc. Concord, MA. Available online at <http://www.wildlifeacoustics.com/wp-content/uploads/2011/08/Song-Meter-Users-Manual.pdf>

SECN Form-ARD1

Park:

Pre Deployment Checklist:

1. Install Batteries; ensure they are touching metal connections; duct tape batteries into battery case.
2. Install SD card; make sure it clicks into position and secure with a small piece of duct tape; ensure that the SD card is in the Unlocked position.
3. Turn on ARD; a) Check that the correct date and time are showing- **if deployment date is during daylight savings time, make sure to set the clock accordingly!**
b) Check that the recording schedule is set and correct c) Ensure that compression is ON (SM1); Settings>Compression or set to WAC6 (SM2 and SM2+); Settings>Audio>Compression d) Switch the power source to Internal (SM2+ only)
4. Change the file prefix in the following manner: Settings>Location>Prefix; **PARK-###-### (Park-SL#-ARD#).**
5. Turn off ARD; check that it reads "Going to sleep until 18:00 on [deployment date]" and that the green light is blinking (SM2 and SM2+ only).
6. Ensure that the waterproof gasket edge surrounding the entire box is clean and free of debris. Replace lid and secure firmly. Finger-tighten all black connectors to ensure waterproofing. Ensure all unused ports are covered with a waterproof cap. Finger-tighten white vent to ensure waterproofing.

Install Microphones (SM2 and SM2+ only) and wire covers (KEMO, CHAT, HOBE, and OCMU only)

[illegible]