



Resilient  
Landscapes

National Environmental Science Program

# Before going on Country

## Night Parrot Acoustic Monitoring with Song Meter 4 (SM4)

Standard operating Procedure



# Get ready to go on Country

## Gather your gear

Electronic device(s) – charge ready for use, check data collection systems (e.g., Fulcrum) and navigation system (e.g., Avenza, GPS) have site points, and load site maps.

Song meters and SD cards – one of each for every site you want to monitor.

## Consider

### Training and skills

Preparing rangers trained and competent in:

- Mapping software (e.g., ARCGIS, QGIS)
- Navigation systems (e.g., Avenza/GPS)
- Data collection systems (e.g., Fulcrum/Datasheets)
- Setting up song meters

### Timing

Prepare well before Going on Country so that you have time to gather equipment or train staff, if needed.

### Check Permissions

- Which areas you can go to set up monitoring sites.
- Data sharing permission, and who it can be shared with is determined by the decision makers in the community, and any rules about who can see the data, and when they need to check back in with you for its use.

## Actions

### Plan

1. Plan which dates you will put song meters out and collect them.
  - If you are going to put song meters out for a long time, you may also plan another visit to change SD cards and batteries, or service solar panels.
  - A good time to survey can be soon after a good rain.
2. If this is the first year you are monitoring:
  - Gather Night Parrot records in your area and identify where potential Night Parrot habitat is.
  - Discuss with decision makers in the community where you can go to set up sites.
  - Set up data sharing agreements e.g. with the Commonwealth Government if you would like to contribute to a big picture understanding of Night Parrots.
  - Check with decision makers in the community who they are happy to share data with and decide on any rules about the data.
3. Check equipment lists for all steps and get any equipment you don't have. See 'ARU buying guide' for advice on which recording units may be suitable to buy.
4. Plan how you will store the sound recordings, as they can take up a lot of memory.
5. Plan how you will record information on when, where, and for how long each song meter will be recording e.g. Fulcrum electronic data forms.
6. Prepare maps to show where song meters will be placed, e.g. georeferenced PDFs for Avenza, with existing sites and/or potential sites (Night Parrot potential habitat and records).
7. Load maps onto your electronic device(s).
8. Check that rangers know how to use the devices, data collection apps, navigation systems etc. and how to identify Night Parrot habitat.
  - Arrange training if staff don't know how to use equipment or identify Night Parrot habitat.

## Set Up Song Meters (SM4)

1. Give each song meter a unique name e.g. 'SM01' and write it on the outer cover with permanent marker.
2. Give each SD card the same name as the song meter it will be used with.
3. Insert SD cards into song meters.
4. Turn the machine on. From the main menu, select 'Settings' – 'Date and Time', then set the date and time. Return to the 'Settings' menu.
5. Select 'Location'
  - a. Enter the unique identifier for the SM4 assigned at step 1 as a prefix.
  - b. Enter the approximate latitude/longitude for the site where the SM4 will be deployed. This does not need to be exact – within 10 km is fine.
  - c. Set the time zone for the site where the SM4 will be set up, then return to the 'Settings' menu.
6. Select 'Sunrise/Sunset Type' and set to 'sunrise/set'. Return to 'Settings' menu.
7. Select 'Advanced' – 'Battery Cutoff'
  - a. If using D-cell batteries, set to '00.0'
  - b. If using solar panels, set to '05.0'
  - c. Return to the 'Settings' menu.
8. Set up the song meter for recording.

## Song Meter (SM4) recording settings

1. You can adjust recording settings in the song meter by navigating to the 'Settings' > 'Audio' menu, or by using a program created with the SM4 configurator software. Decide if you want to set up the song meter for recording using the preconfigured program, or manually.
  - a. If using a preconfigured program, insert an SD card containing the program into slot A. Select 'Schedule' – 'Import Sched+Setts' then select the appropriate program and press 'Enter'.
  - b. If setting the recording settings manually, insert an SD card into the slot, and select 'Settings' – 'Audio' and set parameters.

2. The recommended settings for Night Parrot detection are (parameters not specifically mentioned below should remain on the default setting):
3. Channel – record one channel only (left or right – doesn't matter).
4. Sample rate – 24 000 Hz.
5. Max Length –30 minutes.
6. Period – sunset to sunrise:
7. If setting using the configurator, open the configurator on your computer, click the 'Load built in schedule' drop down box in the 'Schedule' section and select 'Load Record Sunset-Rise'. Save the program and load onto the sSM4 per Step 7 in 'Machine set up'.
8. If setting on the SM4, from the Main Menu select 'Schedule' – 'Edit schedule'. For START select 'set' with a +00:00 offset. For DUTY select 'always'. For END select 'rise' with a +00:00 offset.
9. Note that Prefix, Timezone, Position, and Battery Cutoff settings can all be set within the SM4 configurator program, instead of in the SM4 itself. If you do it this way, uploading the program will overwrite any setting currently in the SM4.
10. Return to the 'Settings' menu. The song meter is now ready to be used.

## Resources

[Song Meter SM4 Bioacoustics Recorder User Guide - Wildlife Acoustics](#)

## Next step

Going on Country



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## Going on Country

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# Going on Country

## Gather your gear

One set of this gear is needed for each song meter location:

- Song Meter (with microphone)
- SD Card
- Solar panel or 4 D-cell batteries
- Star picket
- Cable ties (300 x 4.8 mm size is recommended)

One set of this gear:

- Electronic device(s) – charged and ready to record data, take photos and navigate to sites; with:
- Ability to take photos.
- Data collection system (app and form)
- Navigation system e.g., Avenza
- Site maps
- Optional: GPS device to record Song Meter locations
- Hammer or picket driver
- Multi-tool or side cutter for snipping cable tie ends

## Personal protective equipment PPE

- Hat
- Sunscreen
- Sunglasses
- Long shirt and pants
- Gloves
- Boots

## Consider

### Location

Known Night Parrot locations and potential Night Parrot habitat.

Are stock and/or wildlife that might damage the ARUs present? You may need to consider additional set up equipment e.g. guy lines.

## Training and skills

Field staff trained and competent in:

- Field staff trained and competent in:
- Navigation systems (e.g., Avenza)
- Data collection systems (e.g., Fulcrum)
- Setting up song meters
- Identifying Night Parrot habitat

## People

At least 2 people

## Timing

After rain can be a good time to survey for Night Parrots (Murphy et al., 2017)

## Actions

### Choose where to place Song Meters:

1. Visit the sites and decide if it is good Night Parrot habitat. To help you decide:
  - If the answer to all the questions below is yes, you should consider putting a song meter out:
  - Is the spinifex long unburnt?
  - Are there large spinifex hummocks?
  - Is the structure of the spinifex hummocks complex?
  - Is the spinifex open, with very few trees or shrubs?
  - Are there lots of patches of suitable spinifex in the area?
  - Is there suitable feeding habitat in the area?
2. Decide how many song meters you will put out to get good coverage of the habitat. SM4s can pick up Night Parrot calls up to 214 metres away, so units can be placed approximately 400 metres apart (Leseberg et al., 2022).

### ***Putting the Song Meter out:***

1. Hammer in a star picket and attach the song meter with cable ties. Attach it securely so that no noise is made from a loose machine moving against the picket.
  - Avoid setting up near objects that will cause noise (e.g. branches etc.). Take into account that grasses may grow near the units if they are out for long periods of time.
2. Set up the song meter so that the microphone is pointed towards the Night Parrot habitat. Ensure the microphone is horizontal, or, pointed slightly down. This allows moisture that collects to drain away. **DO NOT POINT THE MICROPHONE UP.**
3. Ensure that all steps in the 'Song Meter set up' and 'Song Meter (SM4) recording settings' section have been completed.
4. Ensure SD cards are inserted into the machine.
5. Connect the SM4 to power (either by loading 4 x D-cell batteries and selecting 'INT' on the side panel or connecting to the solar panel and selecting 'EXT' on the side panel). The SM4 should now show the 'Main Menu' screen. If not, press the 'CHECK STATUS' button. The SM4 may display a 'Preparing to record' message – if so, check details are correct in the next step.
6. Press 'SCHEDULE START' on the SM4. The LCD will display 'Preparing to record', then will show the time and date, and say 'Going to sleep until' the time and date that it is programmed to start recording. Check that the time and date displayed are accurate, and that the time the SM4 indicates it will start recording matches the expected time (sunset).
7. Close the front cover of the SM4.

### ***Record***

#### ***Information to record when putting a Song Meter out:***

1. The date the song meter was set up at a site.
2. The name of the song meter.
3. The name of the SD card (usually the same as the song meter).
4. The exact location the song meter is placed on site e.g. mark a waypoint with a handheld GPS device or Avenza.
5. Name the location with the Song Meter's name and the date.
6. Who put the song meter out on site.

#### ***Suggested information to record about each site:***

1. Are there signs of predators e.g. scats or tracks?
2. What is the fire age?
3. Any other signs of disturbance, or interesting things worth recording about the site?
4. Is the site a place where you already know there were Night Parrots?
5. Capture a photo of the habitat.
6. What sort of habitat is it?
7. What are the most common shrub and understorey plant species? What is the size of the spinifex?

### **Service the Song Meter**

1. Check that the song meter is securely attached to the picket and clear of new plant growth.
2. Open the front cover of the SM4 and press the red 'SCHEDULE STOP' button. The SM4 should go to the 'Main Menu' screen, or it may bring up the 'Preparing to record' screen. If this occurs, press the 'SCHEDULE STOP' button again, and the SM4 will go to the 'Main Menu'.
3. Press 'CHECK STATUS' and the SM4 will display a read out of the SD card usage and battery voltage. The SD card usage is a good way to make sure the SM4 is working and recording. If the SM4 is to remain at the site, the battery voltage should be above 5.0V.
4. Turn the SM4 off using the switch on the right-hand side. Eject the SD card and replace with a new SD card.
5. Turn the SM4 on again using the side switch.
6. If the SM4 is to continue using the same recording program, and the SD card has been formatted, simply press 'SCHEDULE START' and follow the procedures in Step 6 of the [Link] 'Deploy the Song Meter' instructions.
7. If a new program needs to be loaded from the SD card, go to Step 6 in the [Link] 'Set Up Song Meters (SM4)' instructions.
8. If you need to format the SD card, this can be done through 'Utilities', which is the fourth option (off the screen) in the 'Main menu'. If you need to load a recording program from the card, do not format the card until you have loaded the program.
9. Follow from step 5 in [Link] 'Deploy the Song Meter' to commence recording.

### **Record**

#### **Information to record when servicing a Song Meter:**

1. The date the song meter is serviced.
  2. The name of the new SD card you put into the song meter.
  3. Who serviced the song meter?
- Information to check is correct

4. The name of the song meter.
5. The exact location where the song meter is set up.

#### **Collect the Song Meter**

1. Open the front cover of the SM4 and press the red 'SCHEDULE STOP' button. The SM4 should go to the 'Main Menu' screen, or it may bring up the 'Preparing to record' screen. If this occurs, press the 'SCHEDULE STOP' button again, and the SM4 will go to the 'Main Menu'.
2. Press 'CHECK STATUS' and the SM4 will display a read out of SD card usage and battery voltage. The SD card usage is a good check to make sure the SM4 has been working and was still recording data.
3. Turn the SM4 off using the switch on the right-hand side. If running on a solar panel, flick the switch to INT. If running on D-cells, flick to EXT.
4. If you don't plan to reuse the site, remove the song meter and any accessories, including the star picket.

### **Record**

#### **Information to record when collecting a Song Meter**

1. The date the song meter is collected.
- Information to check is correct
2. The name of the song meter.
  3. The name of the SD card.
  4. The exact location the song meter was set up.

### **Next step**

After going on Country



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# After going on Country

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# After going on Country

## Gather your gear

- Electronic device(s) that you used to record your song meter set up and service data.
- Data management system e.g. cloud storage
- SD cards from song meters
- Computer or laptop
- Bioacoustics sound analysis software e.g. Kaleidoscope

## Consider

### Location

Your office

### Training and skills

Rangers/staff managing data are trained and competent in:

- Use of data collection apps and data management system(s).
- Use of computer.
- Bioacoustics sound analysis software.

### People

At least one data manager.

Ranger team.

### Timing

Download your sound recordings as soon as possible after your site visits so that SD cards are not overwritten or misplaced.

### Check Permissions

Data sharing permission, and who it can be shared with, is given by the decision makers in the community, and any rules about who can see the data, and when they need to check back in with you for its use.

## Action

1. Upload the song meter set up details (when, where, how long and other site detail etc) to your data management system.
2. Remove SD cards from song meters.
3. Download the recordings from SD cards and copy to your data management system.
4. Check recordings for Night Parrot calls using computer software such as Kaleidoscope. You can choose to skip this step and go straight to the experts.
5. Contact experts to help confirm Night Parrot calls and check for any that may have been missed – Night Parrot calls vary a lot and can be easy to misidentify.
6. Discuss with the ranger team any reasons for the presence or absence of Night Parrots at sites, and if there have been any changes to previous years.
  - Discuss whether these might be related to management e.g. cat or fire management, to check how well management is working, or if adjustments might need to be made.
7. Share the data according to any data sharing or funding agreements you have made.