How to set up a camera trap
for biodiversity monitoring projects
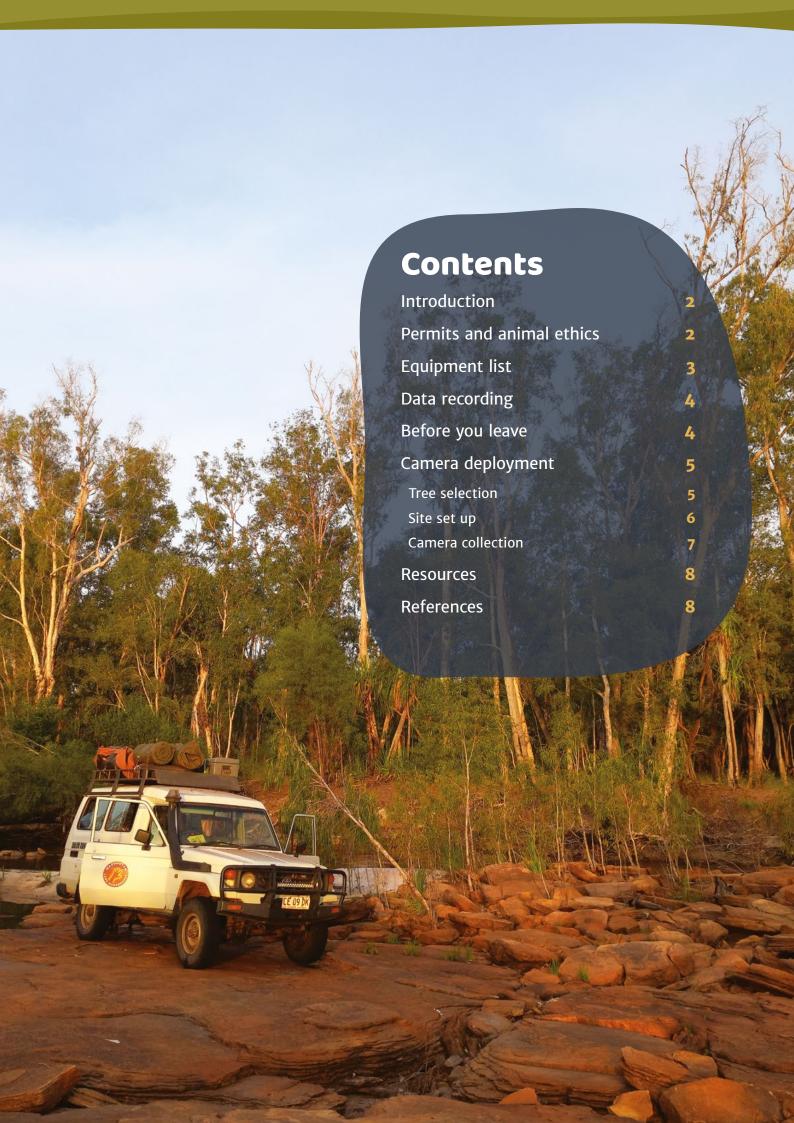
Camera trap work flow

Before you go

1. Make sure you have all permits
2. Make sure you have everything you need from the equipment list
3. Make the bait
4. Charge the batteries and set up the camera

On site

5. Record the site data and name the waypoint
6. Tie the flagging tape
7. Clear the area around the tree
8. Set up the bait station
9. Set up the camera
10. Check the camera's aim
11. Delete test photos
12. Scatter the ant granules
13. Arm the camera

When collecting the camera

14. Record the date and any issues
15. Take all equipment

Contents

Introduction

Remote cameras are an effective tool for wildlife monitoring. They are non-invasive, can record data over long periods and require minimal intervention from people. The methodology used to deploy remote cameras will vary from project to project, depending on objectives and resources. The purpose of this guide is to provide a simple overview of how to set up a remote camera and record data for wildlife monitoring projects. The method in this document is used for Warddeken Land Management's long-term biodiversity monitoring program, which was first implemented in 2017.

At Warddeken, we use what is called a 'five-camera linear array', which is essentially five cameras deployed in a straight line, with 50 m between each camera. The five cameras form a single site and are deployed for a minimum of six weeks. This method is used for general biodiversity surveys and is adapted from the Northern Territory Government's general fauna survey method (Gillespie *et al.* 2015). Warddeken combines this with a vegetation assessment to monitor trends in habitats over time, but this may not be required for your project.

Permits and animal ethics

It is important to note that if you are collecting biodiversity monitoring data for research purposes, you will need the licences and permits listed below. If you are partnered with a research institution, ask if they have applied for these on your behalf. Different states will have different requirements. See *resources* at the end of this document for more information.

- Northern Land Council (or relevant land council) research permit.

- Northern Territory Government Animal Research Registration.
- Charles Darwin University Animal Ethics Committee clearance.
- Depending on your role in the project, you may also need to complete Charles Darwin University Animal Ethics Training.

Equipment list

Camera equipment

- Monitoring cameras.
- Batteries.
- SD cards.
- Protective case or padded tub to transport cameras.
- Straps to secure cameras to trees.
- Flagging tape.
- A handheld camera to check the monitoring camera's aim. Linux cameras are good for this purpose, as some other brands do not display the images.
- Stakes.
- Bait stations.
- Cable ties to attach the bait station to the stake.
- Baits, rolled balls made of equal parts oats, honey and peanut butter.
- Ant granules.

General equipment

- GPS.
- Spare batteries.
- Compass.
- Measuring tape longer than 2 m.
- Note pad.
- Pencils.
- Recording app such as CyberTracker or paper-based camera deployment forms.
- Powerbank and cords.
- Tree marking tags.
- Nails.
- Umbrella.
- Gardening gloves.

Tools

- Fire rake.
- Secateurs.
- Hammer.
- Plastic cloth tape.

Before you leave

- Make the bait. This is best done the night before as scent weakens with time.

- Charge the batteries. Do this as close to the date you will deploy the cameras as possible.

- Check camera settings. These settings are for Reconnyx PC 850 and Hyperfire 2 White Flash cameras:

  » Change date / time / temperature and battery type

  » Motion sensor = On

  » Sensitivity = High

  » Pictures per trigger = 5

  » Picture interval = Rapid fire

  » Quiet period = No delay.

Data recording

Warddeken has used both CyberTracker and Touch GIS apps to record camera data. Many Ranger groups are familiar with CyberTracker and you can modify both to meet the requirements of your project. You can also use a paper–based camera deployment form, but this method is slower, increases the likelihood of errors and you will need to enter data manually when you return to base. Regardless of the system you choose, you should collect the following data as a minimum:

- Name of project.
- Date.
- Who is present.
- GPS coordinates. If using CyberTracker or Touch GIS on a GPS–enabled device/app, you can program the app to take a GPS reading when you begin to record data.

- Clan estate.
- Name of site.
- Camera number.
- SD card number.
- Distance to bait station.
- Type of bait.

This data is important for your own records and also to scientists, who may require it for the data analysis phase of your project. Scientists refer to this as 'metadata'. You could also record other data, such as season, habitat type, feral animal damage, weeds or evidence of fire.
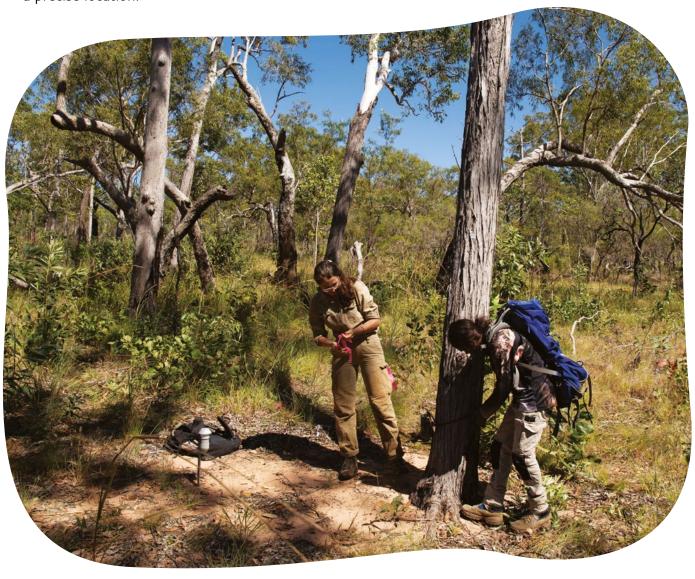
Camera deployment

Tree selection

If it is the first time you are deploying cameras for a project and they will be redeployed to the same locations in future, you will need to mark your camera trees permanently. You can do this using metal tree tags, which are nailed above head height on the trees. These sometimes fall off as the tree grows or can be burnt off in a fire, so it is good to have some spares in your field kit. As you approach the GPS waypoint for the camera, begin to look for the most suitable tree, closest to the waypoint. Create a waypoint for the actual tree you select so that you have a precise location.

A tree that is suitable for a camera should be:

- Greater than 20 cm DBH (diameter at breast height), so that the camera can be mounted securely and the tree doesn't sway in the wind, which can cause false triggers.
- Avoid dead trees, as they sway more in the wind, may fall down or be more likely to burn in a fire.
- If there are no suitable trees in the area, consider using a star picket.

Site set up

1 On arrival at the camera tree, mark a GPS waypoint. Name the waypoint using the site code and the corresponding camera number. Record this using an app or your camera deployment form. If you are using a paper-based system, ensure you record the coordinates, in addition to the waypoint name.

2 Tie flagging tape above head height.

3 The cameras should face south, so that the sun can't shine directly into the camera lenses, creating overexposed or blurry images.

4 Clear all vegetation 2 m in front of and 1.5 m either side of the camera. Clear 1 m around the sides and back of the tree. If you are in an area prone to intense bushfires, consider clearing a wider area around the tree. Move the cleared vegetation away from the site, so that it can't blow back in front of the camera or create a ring of intense fire around your clearing.
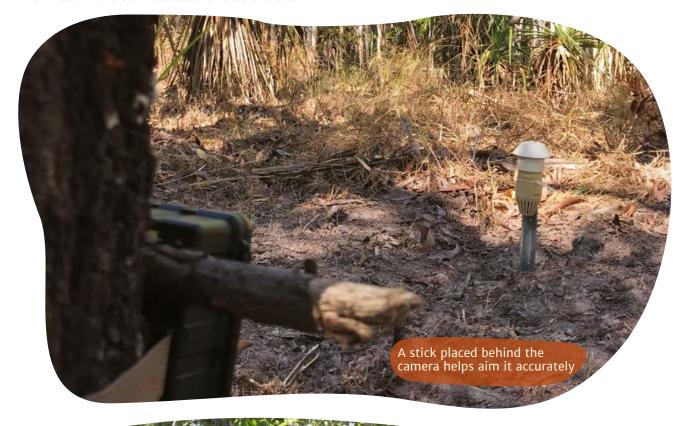

The base of the bait station stake should be in the centre of the camera field of view

5 Mount your camera so that the top of the camera housing is 30 cm above the ground. If you have experienced crows pecking out camera sensors, increase the height to 40 cm.

6 Place sticks behind the camera to angle it down towards the bait station. Make sure the camera is secure, it shouldn't move when you handle it.

7 Place the bait station 1.5 m in front of the camera. The top of the bait station should be approximately 30 cm high. Sprinkle the base lightly with ant granules.

8 Check that the camera is correctly aimed:

   a Arm the camera and trigger it to take some photos.

   b Switch the camera off, remove the SD card and put it inside the Linux camera. The base of the bait station's stake should be in the centre of the handheld camera's screen. This ensures you can see what animals are on the ground in the fore, middle, rear and sides of the camera's view.

   c Delete the images from the SD card using the Linux camera.

   d Re-adjust your camera or bait station and repeat the process until the base of the stake is in the correct position. This can be time-consuming at first, but with practice, you will develop a feel for where to aim the camera and will get it right in fewer attempts.

9 Collect all of your equipment, arm the camera and leave.

Site set up for a general biodiversity monitoring survey

Camera collection

When you return for the cameras, note the date that you collected each camera and any issues, such as the camera being damaged or moved, the bait station falling over or removed, or the camera being off upon collection. This information is also metadata and scientists use it to determine how much camera trapping effort was applied to each site. This information is also useful when uploading data to a computer and troubleshooting why there is no data from certain places.

A stick placed behind the camera helps aim it accurately

Site set up for a general biodiversity monitoring survey

Resources

Warddeken Land Management – How to set up a CPW database using EcoAssist
https://healthycountryai.org/files/WarddekenCPWDBSetup.pdf

Warddeken Land Management – How to set up a Timelapse database using EcoAssist
https://healthycountryai.org/files/WarddekenTimelapseDBSetup.pdf

CyberTracker Wiki
cybertrackerwiki.org/

Applying for animal ethics approval –
Charles Darwin University
cdu.edu.au/research-and-innovation/
industry-collaboration/animal-ethics/
applying-for-approval

Apply for a registration to use or allow an animal to be used for scientific purposes –
Northern Territory government
nt.gov.au/environment/animals/animal-welfare/
apply-for-licence-for-animals-in-teaching-
or-research

A guide for the use of remote cameras for wildlife survey in northern Australia –
Northern Territory government (pdf)
nesplandscapes.edu.au/wp-content/uploads/
2015/10/5.2.4_a_guide_to_use_of_remote_
cameras_for_wildlife_surveys_final_web.pdf

References

Gillespie, G. R., Brennan, K., Gentles, T., Hill, B., Low Choy, J., Mahney, T., Stevens, A. and Stokeld, D. (2015). *A guide for the use of remote cameras for wildlife survey in northern Australia.* Darwin: Charles Darwin University.