



Standard Operating Procedure Placing Camera Traps

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The Orangutan Tropical Peatland Project
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Summary

Camera traps are a useful tool in the monitoring and conservation of forest wildlife and can be used to monitor the populations of many species that are otherwise difficult to study. This SOP is designed as a guide for field practitioners and we hope that it provides some insight into the practicalities of setting cameras in the field. Further information about the history of camera trapping and its statistical analysis can be found elsewhere. Ancrenaz et al.'s (2012) "Handbook for wildlife monitoring using camera traps" provides a useful primer while O'Connel et al (2011) "Camera Traps in Ecology Animal Ecology" goes into greater detail.

The most important feature of a camera trapping study is to get identifiable photos of the intended study animal, and selecting an appropriate site to set up a camera trap can be the most important variable to obtain useful photos and data. To maximize the trapping success, camera traps are best set in areas that animals use frequently. These areas can include animal trails, salt licks and watering spots, therefore, knowledge of signs that indicate the presence of animals is required to determine the best locations to set the trap. There are a few variables that should be taken into account in order to maximize the capture success and these may dependent on local weather conditions and whether the study aims to target specific species, habitat type.

Before selecting locations, it is important to assess the habitat, conduct several reconnaissance walks, and take notes of potential sites where animal trails are evident. Generally, a few days are required to assess locations before setting up the cameras. Local knowledge and advice on suitable locations should also be incorporated into the preliminary stages of your study. It is likely that the more time that is spent on this initial preparation and scoping phase, the better the trap locations will be, however this has to be balanced against other logistical and time constraints.

The specific methods especially spacing and use of paired cameras will be determined by the method and research question. No spaces between cameras (capture sites) and paired cameras are typical of a capture-recapture approach. For a standard occupancy approach it is typically advised to ensure that no individual is detectable at more than one station – the complete opposite of the capture-recapture (CR) approach. For occupancy, a much lower camera density (relative to the species of interest), landscape wide approach would be preferential. The following protocol makes recommendations on site selection for camera trapping based on our experience working in the Sabangau Peat swamp Forest, Sungai Wain Protection Forest and Murung Raya District, Indonesia (for example, see our recently published paper (Cheyne, S. M., et. al., (2013))

Camera Trap Positioning

Camera Height

The camera trap should be placed so that the target animal is captured clearly in the centre of the image. This is often approximately 50 cm above the ground attached to a tree or pole but can be adjusted if the ground is uneven or the researcher aims to target a specific species i.e. lower if the target is small mammal communities.

Distances from the trail

Cameras are generally set approximately 2 m from the trail in order to provide a sufficient field of view. The tree or the position of the pole should be chosen based on the optimal distance between the camera trap and the central point in the trail. This will vary between different models of camera and can be affected by factors such as trigger speed. Slow cameras will require larger distances (up to 5 m) to avoid capturing photos of animals that are not centred or are out of frame.

Camera position

In general cameras are set perpendicular to the trail to obtain side images of the passing animal, but also can be placed slightly off perpendicular to increase the path length. It is not recommended that the camera is positioned directly along an animal path as this can lead to photos of either the animal's front or rear which are difficult to identify. Check around the camera and its field of view to make sure it is clear of any debris or vegetation that may obscure, or reduce your chance of a picture. Large leaves or small branches blowing in the wind/rain can ruin a potentially good picture or produce a series of empty images. Clearing the area will also avoid plant regeneration during the time the camera trap is deployed.

Camera trap housing

The wooden house was initially used but this proved cumbersome so was replaced with the 'raincoats' (see below) and silica gel is placed between the raincoat and the camera or in the housing of the camera if there is space.



Camera trap wooden housing (left) and 'raincoat' (right)

Paired cameras

Setting cameras in pairs, opposite one another will increase the chances of getting photographs that enable identification of animals for assessing future recaptures. The cameras should be located opposite, facing one another, but slightly offset in order to avoid flash reflection, or the presence of the other camera in the photo.

Light

In open areas try to keep the cameras pointing North or South rather than East or West. This will reduce shots with bad light caused by reflection of the sun.

We recommend testing the cameras prior to setting them in the field in order to determine the detection zone and the trigger speed that will be required. One person should crawl in front of the camera on all fours, preferably at the estimated speed of the target species, and the results should be checked on the camera's display – if the camera doesn't have a built in display screen, a pocket camera can be used. It is important that the person crawls at approximately the same height and speed that the target species would, to ensure that the camera's motion/heat detector will trigger the camera when the target species walks in front of the camera, and to ensure that the animal is correctly in frame by the time the camera triggers.

Habitat and Animal Traits

Setting camera traps on known pathways frequented by animals will increase the chance of successfully trapping target wildlife, and here we give some advice to identify potential animal paths and trails:

Natural trails

Animals use natural paths in the forest, so placing cameras in these locations can be the most important factor to consider when designing a study. Large, long fallen trees are natural bridges, open areas surrounded by scrub or dense vegetation creates bottlenecks, and streams are a source of water. Human cut transects will not always be used by animals, but if the study species is known to use them then these can also be good locations. Some animals have specific preferences for trails, and felids are known to favour wide, old trails. Researchers have suggested that these trails increase their hunting success. In areas where the animal's pathway cannot be determined, such as open areas without clear trails or barriers, the trapping success is likely to be reduced.

Tree trails and scent marking

Positioning camera traps in areas where animal signs are evident may increase chances of capturing images. Some animals, such as muntjac and deer rub on trees to mark their territory, and the markings caused by deer are generally reddish-brown in colour. Scratch marks for bears and leopards can easily be identified in trees. If there is any doubt, local knowledge may be used to identify these. Including big trees in the camera's field of view can be a good choice if they are a target for scent marking animals.

Faeces

Locating and identifying animal faeces provides a good indicator of an animal's path. Some animals mark their territories with faeces and/or urine, and selecting sites where these are found will increase the chance of trap success.

Footprint Trails

Footprints can occasionally be found in mud or sand next to pools, rivers or streams. A trail field guide can be useful to identify target species. This is not always a reliable method though.

Distances between Camera Trap Positions

This depends on what you are surveying for but a general guide is this:

Variable	Wide-ranging species	High-density species
Trapping area size (km ²)	Minimum of 4x average home range	Small area due to small home range sizes (MMDM)
Minimum trapping effort/area (days)	Density – ensure do not violate assumptions of closed population so 40-60 days (all cameras active) Diversity – depends on rate of increase of species accumulation curve	Recommended 250-300 camera days
Number of trap sites	Large carnivores - ≥160 Large herbivores – probably less but will be species dependant	High number/density of traps
Distance between cameras	Large carnivores: 1-2km Small carnivores: 500m-1km Large herbivores: 1km	Small herbivores/rodents: 500m Specific natural locations: not fixed distance
Cameras paired?	Yes if you need to identify individuals	Yes if you need to identify individuals

Avoiding gaps in the camera set-up for capture re-capture survey design

As far as possible try to set up the cameras in a grid or formation that means there are NO gaps in the effective capture area i.e. there is no gap between cameras large enough that it might contain an individual's entire home range.

Field Equipment

1. Camera traps and straps
2. GPS units
3. Pocket camera to check angling of the camera traps
4. Notebooks or data sheets and pencils
5. Spare batteries
6. Spare memory cards
7. Spare camera-traps, if possible to replace damaged or broken units
8. Cloth to dry the unit before opening and to clean the lens if needed
9. Watch (some cameras need the date and time re-setting if the batteries run out, alternatively use the time on the GPS)
10. Parangs to clear the area in front of the cameras

The Cameras

1. Check time (am/pm), date (MM/DD), year and test
2. Check angle of camera to trail/location to ensure photo capture is good and full angle of photo is clear
3. Set cameras across the trail but not too close. Ensure that the cameras have a maximum angle of capture.
4. Select video and photo mode or photo only.
5. Advantages of video are that more behaviour can be captured but this will take up more space on the SD card. Also, if the camera takes a photo before the video and the capture rate is fast enough (e.g. 5s or less) then the video mode is less useful for scientific analysis and is more useful for media. One advantage of video is that it may improve the chances of catching additional individual if the study species is travelling along the trail as a group.

Location Set-up

1. Choose ridges, trails, fallen logs, mud gaps/open areas and anywhere there are animal signs.
2. Clear all vegetation between both camera, and if possible sweep the trail in each direction from the camera
3. Lay a bed of fresh large leaves on the ground in front of cameras to prevent mud

obscuring the lens or sensor.

4. Use vegetation to block pathways behind the cameras, to encourage the animals to walk in front of the cameras and not go around.
5. Place camera about 50cm from the ground but check the view by taking a test photo so always have a digital camera to check the photos.
6. When putting a camera near a stream or river that is likely to flood put the camera higher than usual and try to make the field of view a bit larger.
7. Make test-shots by crawling in front of the camera at approximately the same speed as the target species to ensure detection by the camera and to test field of view.
8. Place cameras approximately 1km apart (1-2km depending on the size of the study species). When selecting the actual trap location it is important to find the best possible spot to maximise the probability of photographing your animal. It is therefore possible to move some distance away from your theoretical location – quite how far is dependent on the size of your study species. In our studies we tend to allow \pm c.100m but in other studies they have allowed up to \pm 500m. The two most important considerations are (1st) that the best possible location is selected and (2nd) that no gaps are present in your array of traps. It is important that no holes are present in your array.
9. GPS each location of cameras and re-name the waypoint. Ensure all GPS units set up the same e.g. taking data in UTM and all units same.
10. If covering 160km² cameras will likely cross different habitat types so accurate recording of camera locations is crucial.
Take data on
 - a) location e.g. ridge, trail, stream, burnt area/disturbed area
 - b) altitude
 - c) SD card number
 - d) Camera numbers
11. Write everything down in case of GPS failure.
12. Try to use established trails rather than cutting new ones.



Testing out the camera with our best animal impressions

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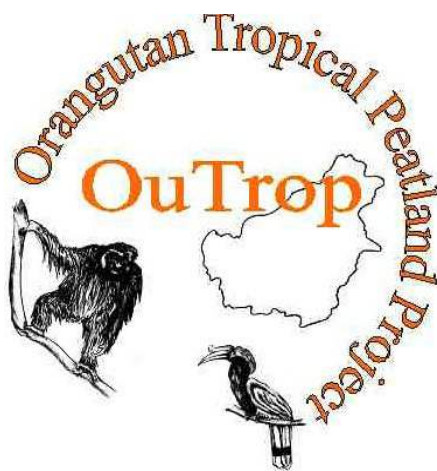
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The Orangutan Tropical Peatland Project,
91 Jalan Semeru,
Bukit Raya,
Palangka Raya 73112,
Kalimantan Tengah,
Indonesia.

The Orangutan Tropical Peatland Trust,
(registered UK Charity no.1142870),
Wildlife Conservation Research Unit,
Department of Zoology, University of Oxford,
Recanati-Kaplan Centre,
Abingdon Road, Tubney,
Oxfordshire OX13 5QL,
United Kingdom