Department of Parks and Wildlife

Information Sheet 87 / 2016
Science and Conservation Division

Assessment of Camera Traps to detect mammals

by Neil Thomas[1] and Mark Cowan[2], Department of Parks and Wildlife, Science and Conservation Division:
[1]08 9405 5119, neil.thomas@dpaw.wa.gov.au; [2]08 9405 5121/9219 9093, mark.cowan@dpaw.wa.gov.au

Background

Camera traps have the potential to offer a comparatively reliable and relatively unbiased method for monitoring a suite of terrestrial native and introduced animal species. In Western Australia, they are being widely used to assist with species inventories, single species detections and a number of introduced predator monitoring programs. However, assessment and determination of appropriate design and analysis methods for the use of camera traps as a broad and quantifiable fauna survey and monitoring tool, particularly for conservation significant critical weight range (CWR; 35-5500 g) mammals, has received little attention. Without an appreciation of the limitations of camera traps for this fauna, along with design and analysis considerations of trapping data, there remains a risk of misinterpreting information and drawing erroneous conclusions.

Numbat in Dryandra Woodland

A number of camera trap trials have been undertaken at three sites in the south-west of Western Australia (Dryandra Woodland, Tutanning Nature Reserve and Julimar Conservation Park) to investigate methods to detect and monitor activity of all mammals of CWR size and above.

Field camera trap trial

Firstly, the performance of three popular camera trap were compared: Reconyx HC600, Bushnell Trophy Cam 119405 and Scoutguard SG560D at Julimar Conservation Park. The three camera trap model were set adjacent to one another at five independent locations and operated over 30 consecutive nights to assess detections. While the Reconyx HC600 camera traps detected more individuals at every site, the total number of species detected was similar across all models, and there was no statistically significant difference between mean detections of individuals or species (Figure 1). However, as there are differences between camera trap models it is important to be consistent in the choice of model (and settings) for any particular project thereby minimising variability in detections due to inherent difference in equipment.

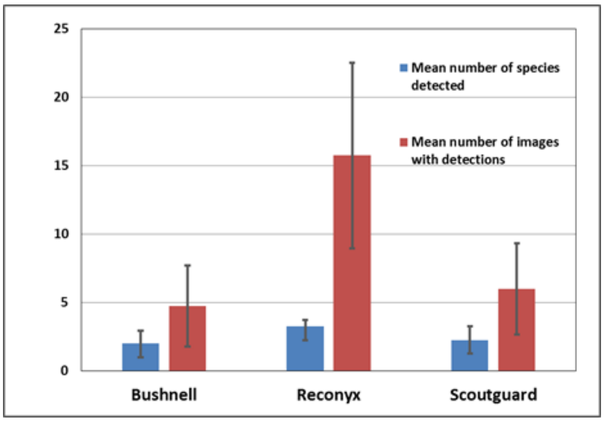

Figure 1. Mean number of species detections and images with detections for three camera trap types.

Baited and non-baited camera traps

Secondly, the consequences of using lures with camera traps was examined. Whether to use a lure will depend on the specific question and target species in the study. Species that are arboreal, have unique habitat and/or spatial requirements, or are at low densities, may require a more targeted approach and the use of a lure may increase the likelihood of detecting such species. However, lures have the potential to change the behaviour of some species and to bias results. For example, lures have the potential to vary in their capacity to attract animals over time as individuals in some species may quickly become de-sensitised and/or habituated to the lure. Additionally, reward lures, such as food items or a carcass, can result in direct conflict with conspecifics or exposure to potential predators. The resulting potential bias is of particular concern in monitoring programs where the aim is to observe changes in detection rates over time. A trial undertaken at Dryandra Woodland indicated that woylies were initially attracted to lures but this response declined dramatically after a short period (Figure 2), implying that the lure lost its appeal. Conversely, there was an increase in possum detections over the same period (Figure 2). It is possible that woylies were initially excluding possums from the lures (Figure 2); this is despite possums being at a relatively higher abundance than woylies in Dryandra Woodland (Figure 4).

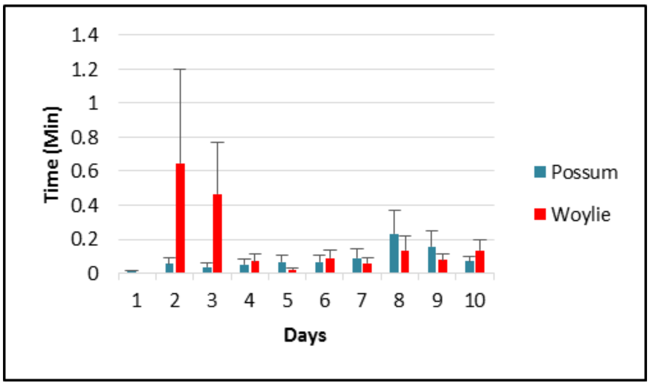

Figure 2. Average time spent per visit per lure (non- reward) station.

Survey design and data analysis

It is well known that there is no single optimal survey design that will reliably detect all fauna in a given area, and this is no different when using camera traps. The appropriate survey design should always consider the target species and the question/s to be addressed. For example, the deployment of 60 Reconyx PC900 camera traps for 60 days, stratified across the major vegetation types, set with a minimum distance of 750 m between camera traps, and no lure, detected all CWR and larger mammals (including introduced pest species) within the Dryandra Woodland (Figure 3). Reducing the number of camera traps, or the number of days deployed, to around 50% still resulted in more than 90% of species being detected (Figure 3). The relative spatial and temporal detection rates of each mammal species were also examined by plotting the percentage of camera traps each species was detected on against the percentage of days each species was detected (Figure 4). A strong correlation between temporal and spatial aspect was observed with widespread species such as the woylies and possums being detected with high frequently across the main block of Dryandra Woodland.

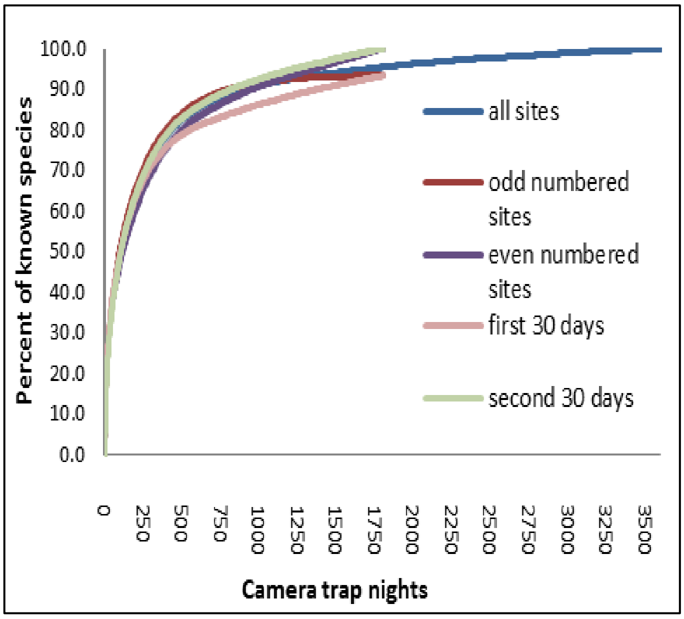

Figure 3. Species accumulation curve for camera trap data collected in Dryandra Woodland.

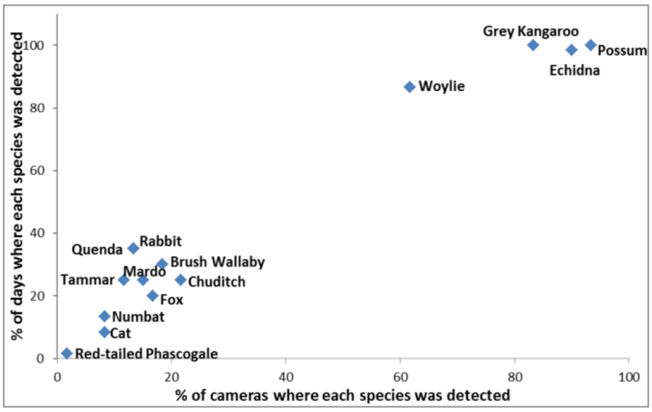

Figure 4. Temporal and spatial distribution of CWR fauna and pest species in Dryandra Woodland

Management Implications

This study demonstrated that with adequate spatial coverage and temporal deployment, camera traps can be a reliable means for monitoring CWR and larger mammal species. An examination of detection rates in space and time provides baseline monitoring data for comparison over extended time frames to reveal trends in species activity. Activity data interpolated across space can also assist in targeting areas for introduced animal control or to focus conventional methods of trapping to areas of high activity for target species. As shown here, attention needs to be given to the specific species being targeted, questions being addressed, model of the camera trap employed, survey design and the potential use of lures before undertaking any camera trap monitoring program.

Produced and published by the Science and Conservation Division, Department of Parks and Wildlife, Western Australia,
Locked Bag 104, Bentley Delivery Centre, WA 6983