Acknowledgements
Lindy Lumsden, Arthur Rylah Institute for Environmental Research

Author
Ryan Chick
Jemma Cripps, Louise Durkin, and Jenny Nelson of the Arthur Rylah Institute for Environmental Research
Jamie Molloy. Project Manager Forest Protection Survey Program

Photo credit
Cover photo: Louise Durkin Arthur Rylah Institute for Environmental Research 2018
Contents

1. Spotlighting for Arboreal Mammals ................................................................. 2
   1.1 Context ............................................................................................................... 2
   1.2 Objectives ......................................................................................................... 2
   1.3 Survey effort .................................................................................................... 2
   1.4 Staff requirements ............................................................................................ 2
   1.5 Equipment ......................................................................................................... 2
   1.6 Site selection .................................................................................................... 3
   1.7 Conducting the survey ....................................................................................... 3
   1.8 Data reporting requirements ............................................................................. 5

2. Owl Call Playback .................................................................................................. 5
   2.1 Context ............................................................................................................... 5
   2.2 Objectives ......................................................................................................... 5
   2.3 Survey effort .................................................................................................... 5
   2.4 Staff requirements ............................................................................................ 6
   2.5 Equipment for the technique ............................................................................ 6
   2.6 Navigation ......................................................................................................... 6
   2.7 Upon arrival at site ........................................................................................... 6
   2.8 Conducting the survey ..................................................................................... 6
   2.9 Data reporting requirements ............................................................................. 7
1. Spotlightting for Arboreal Mammals

1.1 Context
This Spotlightting method has been designed to detect presence of selected arboreal mammals, to the levels of abundance required to trigger a management action. The focus of spotlighting for arboreal mammals is the Greater Glider and the Yellow-bellied Glider.

Spotlighting for arboreal mammals will be conducted, in most instances, in conjunction with owl call playback at the same coupe. When conducting the two survey methods together, the owl call playback survey will be conducted before the arboreal mammal spotlighting survey.

1.2 Objectives
To detect presence and record abundance of arboreal mammals within, and immediately adjacent to, selected coupes.

To obtain estimates of relative abundance appropriate to an assessment of whether specific harvesting prescriptions may be triggered.

1.3 Survey effort
Spotlighting will be conducted along pre-identified transects within coupes. Total survey transect length is to be 1 km and may consist of multiple transects of varying lengths, straight or curved, totalling 1 km. When transects are curved it will be important to ensure animals are not double-counted (i.e. the same individual recorded twice from different points along the transect).

Transect locations are to be visited and flagged with reflective tape (or similar) during daylight hours.

A maximum of three repeat surveys are to be conducted along the same transect line for each coupe. In the East Gippsland Regional Forest Agreement area (RFA), if during the spotlight transect the abundance trigger for the target species is met after one or two visits, then no further spotlight transect surveys are required. If the contractor determines that there is a high detection likelihood for owl roosting and nesting sites, or other owl prescription trigger being met within the coupe, then all three nights of owl call playback may be conducted. In all other RFA’s, all three nights of spotlight call playback survey are to be conducted. Further surveys may be conducted if prescription triggers are almost met – this must be discussed and agreed upon with the FPSP Contract Officer.

If unsuitable survey conditions prevent reasonable observations (e.g. poor weather or visibility) the survey must be cancelled, and the site re-visited up to three more times.

For spotlight transects, two observers, 10 minutes apart, will spotlight the same transect(s) at a pace of 10 minutes per 100 m (not including recording time) for a total distance of 1 km. Maintaining the pace of 10 minutes between observers can be difficult, however it is critical that observations are independent, and observers do not receive information from one another. This technique is particularly effective for detecting Greater Gliders, which tend to sit still and are easy to identify with their bright eyeshine. Please note below the specific requirements for recording Yellow-bellied Glider that differ from record keeping requirements for Greater Glider.

1.4 Staff requirements
A field survey team of minimum two people.

Ability to visually and audibly identify all arboreal mammals (and owl species) that may be found within the study area.

Experience with applying the standard spotlighting and call playback techniques to detect and identify arboreal mammals.

Ability to use a GPS and hand-held compass to navigate off-tracks through forest at night.

1.5 Equipment

☐ 2x spotlights – bright handheld units or high-power headlamps (e.g. LED Lenser) equivalent to 750-1050 Lumens (50-70-watt incandescent bulb equivalent)

☐ Call playback equipment with speaker/megaphone

☐ 2x GPS


1.6 Site selection

The Contractor is responsible, via pre-survey desktop assessment, for determining which parts of the coupe contain the most likely habitat for any prescribed species identified. These parts of the coupe will be the priority areas to search, and may include gullies, particular aspects, sharp breaks in slope, tops of embankments etc. DELWP will conduct desktop assessments to provide some supporting information to identify highest quality habitat, where this information is available. However, contractors are expected to refine the data provided to identify the most likely areas to detect target species, and thus focus survey effort in those areas.

The location of the transect(s) are to be determined in the field during the day, based on the presence of suitable habitat e.g. hollow-bearing trees. Possible survey locations may be pre-determined (e.g. via desktop assessment or using results of other surveys) based on likely presence of old growth, areas with high densities of hollow-bearing trees, and tracks and ridgelines (for access). Spotlighting transects shall be located and positioned to maximise coverage of the best available habitat in the coupe and its immediate surrounds, access permitting, (note that Yellow-bellied Glider calls can travel up to 300 m in good conditions).

If the coupe is too small to allow a single transect line, either straight or curved, then alternative arrangements can be made such as surveying the entire coupe boundary, or multiple transects within and outside the coupe. Care should be taken with the layout to prevent the same area from being sampled more than once e.g. no tight turns. Multiple transects should be spaced as far apart as possible, with a recommended distance between them of at least 150 m to minimise the risk of duplicate detections from adjacent transects.

All transects must be walked during daylight hours and assessed for safety, unless the transect is along a track and the survey team has reliable knowledge that the track is safe (e.g. no collapses on steep slopes, bridges out or roadside fire-damaged trees yet to be assessed by regional staff, etc).

If the transect is not on a track, the transect(s) shall be flagged during daytime with enough reflective flagging tape (or similar) to facilitate easy passage at night. All flagging tape must be removed at the end of the survey.

1.7 Conducting the survey

General Methodology

Surveys may be conducted all-year round, but preferably outside of winter to maximise the number of nights with optimal conditions. Surveyors should avoid windy nights (e.g. average steady wind speed >~10km/hr on ground and/or >~20km/hr at canopy height (surveyors will need to make their own decision if wind is only occasionally gusty) or when it is raining or foggy. Wind significantly reduces detectability due to noise and visual distraction created by leaf, twig and branch movement.

All spotlight surveys are to commence at least one hour after local sunset and conclude no later than one hour prior to sunrise, as animals may return to their dens and not be available for detection.

The start and end points of the survey transect(s) shall be recorded in both GPSs. Enable tracking in each GPS to record the route taken during the entire time away from the vehicle.

Observations are required to be independent between observers for this survey method. Observers will commence the transect search 10 minutes apart i.e. the second observer will begin walking the transect and surveying 10 minutes after the first. Observers are to walk at an average pace of 10 minute / 100 m. (This is 0.6 km/hr. Note that normal walking pace on clear, flat ground (i.e. on a track) is about 4 km/hr).

The second observer is not to receive any information about the first observer’s observations during their survey. For example, the second observer shall avoid watching the behaviour of the first observer ahead, especially when the lead observer has just started, and the latter is still waiting to start. To ensure observer independence, on some occasions,
the second observer may need to stop, turn off their torch and wait if they are getting too close to the first observer during the survey.

Each observer is to record all animals seen or heard where the observer is confident that the observation is a unique record and not a duplicate. When an animal is seen (e.g. positively identified with binoculars), or heard, the observer will record the species, the time the animal was seen or heard, the GPS location of the observer on the transect, the magnetic bearing to the animal from the observer, the distance to the animal (using a range finder for animals that are seen, or an estimated distance for animals that are heard), and the distance from the start of the transect, using the GPS. You do not need to spend as much time trying to get accurate measurements for species that are obviously non-target/non-threatened (to maintain the specified average walking pace). Only one survey transect data line with a set of start and end time needs to be submitted from both observers combined, i.e. there is no need to submit separate tracklogs.

It is important to record the colour morph of each Greater Glider seen i.e. grey/white, black/white, all white, all black, all grey when it is observed as this will assist with discrimination of observations between the two observers at the end of the transect when notes are compared.

Any animals detected more than 50m beyond the perpendicular ends of the transect shall be recorded as opportunistic observations. Such records may still be used to assess potential triggers for prescriptions based on density calculations.

Upon completion of the survey, the first observer shall wait quietly with the spotlight off, for the second observer. If more than one transect is surveyed, the first observer shall wait until both can move to the next transect together.

In the East Gippsland RFA only, after the first night of survey has been completed at the coupe, the resulting abundance estimates for both species determines whether more surveys are required at that coupe. For example, if detections of >10 Greater Gliders or >5 Yellow-bellied Gliders are made on the first night of survey then no further transect survey is required. If <10 Greater Gliders and <5 Yellow-bellied Gliders are observed, then the next night of survey should be conducted.

When no more surveys are to be conducted at the site, remove all flagging tape as you travel back along the transect.

Save the GPS track upon return to the vehicle at the end of the survey to assist navigation in future surveys and for data reporting.

Reporting for observations of Greater Gliders only

At the end of the survey the total number of unique individuals detected shall be calculated by the observers. Compare observations to determine which have been detected by both observers and which were unique to one or other of the observers. This is typically done by walking back along the transect(s) together and comparing observations at each GPS point. It is important that observers make decisions in the field as to whether each person’s observations are unique (different animal observed) or a shared observation (same animal seen by both), and that this is recorded. If after retracing steps along the transect and comparing notes, it is still not clear whether an observation is unique or seen by both, then a conservative approach is required and only one observation is to be recorded.

Only clearly unique observations are to be reported in the FPSP datasheets whether seen by one or both.

Reporting for observations of Yellow-bellied Gliders only

For Yellow-bellied Gliders that were heard only, it may be very difficult to determine which records are duplicates. Plotting the approximate locations of each individual heard (using the location of the observer on the transect, the magnetic bearing to the animal from the observer and the estimated distance), together with the time of each observation, can help to determine unique observations. In those cases where it is not possible to separate likely duplicates, then a conservative approach is required and only one observation is to be recorded. In cases where there are multiple duplicates that cannot be separated between observers, the records from one observer only who detected the highest number of (unique) individuals are to be reported. Both observers may record unique records where there is no possibility of the record being a duplicate.

Post spotlight transect Call playback

Call playback can also be used to detect some arboreal species (e.g. Yellow-bellied Gliders, Koalas). In coupes where Yellow-bellied Gliders have not been seen or heard on a transect, a post spotlight transect call playback will be carried out after spotlighting surveys are finished. Koalas will be included in call playback surveys during the breeding season (Spring–Summer). If Yellow-bellied Gliders have been recorded on a transect then no post-transect call playback for will be conducted.

The 10-minute call playback sequence (at approximately 110-120% of natural volume) for Yellow-bellied Gliders and Koalas is given below.
Yellow-bellied Glider call – 3 minutes
Silence – 2 minutes
Powerful Owl call – 3 minutes
Silence – 2 minutes
Koala call – 3 minutes
Silence – 2 minutes

The playback device should be raised as far off the ground as practicable to facilitate call broadcast.

If a response call is heard and the easting and northing of the observed individual is unable to be obtained with accuracy, record the species, GPS the location of the observer, the estimated distance and the magnetic bearing to the source. Observers may separate by 100-200 m to triangulate calls to obtain higher quality estimates of glider position. Separating by 100-200m will decrease the risk of observers recording the same individuals twice.

During call playback keep spotlights turned off unless an unidentified animal is seen or heard close by and it is likely to be well within illumination and identification range of the spotlight.

At the end of the call playback, listen quietly for another 2 minutes.

Observations obtained in the post spotlight transect call playback are to be included in the transect abundance calculations.

1.8 Data reporting requirements
Observation data requirements and instructions are outlined in the Spotlight Call Playback data sheet.
Track logs are to be submitted in GPX data format.

2. Owl Call Playback

2.1 Context
This survey technique is designed to detect direct evidence of owls via a call playback survey.

Owl call playback will be conducted, in most instances, in conjunction with Spotlighting for arboreal mammals at the same coupe. When conducting the two survey methods together, the Owl call playback survey will be conducted before the Arboreal mammal spotlighting survey, preferably at or just after dusk.

Data obtained may lead to further survey effort e.g. dawn/dusk watch, diurnal tree searches to search for recent and frequently used nesting or roosting sites for these owl species. Decisions related to any requirement for further survey will be determined by DELWP.

2.2 Objectives
To detect threatened owl species (Powerful, Sooty, Masked and Barking Owls) within, and adjacent to selected coupes.

2.3 Survey effort
Owl call playback may be conducted from roads and tracks within or adjacent to selected coupes, or from within a coupe.

Two observers are to spend a total of about 40 minutes conducting the owl call playback with spotlighting, not including walking time to and from the site.

Playback and listening will take about 30 minutes.

After call playback, each observer will spend 10 minutes spotlighting, covering 100m either side of the call playback location.
Up to three repeat surveys may be conducted over separate nights. Records of owls (including estimated distance and bearing from the observer to the observed) will be used to inform whether further survey effort is required to search specifically for nesting and regular roost trees.

If owl call playback is conducted on the same night as a spotlighting transect(s) for arboreal mammals, then call playback can be conducted, from a road, preferably at least 200m away from the start or finish points of the transect, or within or adjacent to the coupe e.g. on a ridge. If Yellow-bellied Gliders are seen or heard during owl call playback they are to be recorded as observations as part of the owl call playback, and not part of the spotlight transect. If Yellow-bellied Gliders are then heard again during spotlighting, additional Yellow-bellied Gliders will only be recorded if they are definitely unique individuals, different to those recorded during the owl call playback. If there is any doubt, a conservative approach is required, and the suspected duplicate records are not to be recorded.

2.4 Staff requirements

A field survey team of at least two people.

Observers must be able to visually and audibly identify all the owl species (and arboreal mammals) that could be found within the study area.

Observers must be experienced with applying the standard call playback and spotlighting technique to detect and identify owls (and arboreal mammals).

Observers must be able to use a GPS and hand-held compass to navigate off tracks through the bush at night.

2.5 Equipment for the technique

- Call playback equipment with speaker/megaphone
- Audio recording of owl calls
- 2x spotlights – bright handheld units or high-power headlamps (e.g. LED Lenser)
- 2x GPS
- 2x range finders
- 2x time-keeping device
- 2x binoculars
- 2x hand-held compasses
- 2x hard or soft copies of the FPSP Arboreal Mammal Spotlighting Data Sheets
- Back-up hard copies of data sheets on waterproof paper on clipboards x2

2.6 Navigation

The location of the playback site and ends of the spotlight transect will be pre-determined and shall be recorded in both GPSs.

2.7 Upon arrival at site

Select an Owl call playback location that is at least 200 metres away from any part of the transect location.

Select and mark out the transect location in daytime.

Conduct the call playback and spotlight surveys as specified. If not surveying from a track, mark the transect in advance with enough reflective flagging tape (or similar) to facilitate easy passage along it at night.

2.8 Conducting the survey

Sites shall not be within 3 km of each other if being surveyed on the same night. Some owls can be heard up to two km away and care shall be taken not to repeat count the same animal from different sites.

Owl call playback is best done in the early hours of darkness. Commencing the survey on dusk can facilitate the location of owl nest or roost trees as animals responding at this time are likely to be near the roost or nest.

Owl call playback can elicit a response from Yellow-bellied Gliders, particularly on dusk as family groups are emerging from their den trees. To reduce the risk of observers recording the same individuals twice, observers may separate by 100-200 m to triangulate calls to obtain higher quality estimates of glider position.
Raise the playback device as far off the ground as practicable.

To commence the survey, record the start time and listen quietly for 5-10 minutes. Then play the audio recordings at about 110% of natural volume.

Allow for the 2 minutes listening period between calls. Owl call playback sequence:

1. Powerful Owl – 2 minutes
2. Silence – 2 minutes
3. Barking Owl – 2 minutes
4. Silence – 2 minutes
5. Sooty Owl – 2 minutes (6 territorial screams at 30 sec intervals)
6. Silence – 2 minutes
7. Sooty Owl – 1 minute (trilling)
8. Silence – 2 minutes
9. Masked Owl – 2 minutes (6 territorial screams at 30 sec intervals)
10. Silence – 2 minutes
11. Masked Owl – 1 minute (chattering)

Note that Masked Owl calls must be last in the sequence since they often only respond with a single shriek which may go unnoticed during the playback of the other species, especially if it is distant.

Be alert for glimpses of animals flying in quietly, especially silhouetted against the night sky.

During call playback keep spotlights turned off unless an unidentified animal is seen or heard, and it is likely to be well within illumination and identification range of the spotlight.

At the end of the call playback listen quietly for another 2 minutes.

Then commence a spotlighting session with observers moving in opposite directions (reciprocal bearings) away from the playback point.

Spotlight for 10 minutes out to 100 m each from the playback point (combined total of 20 minutes and 200 m of survey in total) targeting owls for detection but recording all target species seen and heard.

When an animal is heard or seen (identified with binoculars if possible), record the species, the GPS location of the observer on the transect, the magnetic bearing from the observer, and the distance to the animal (using the range finder). It is recognised that estimating distance is very difficult for animals that are heard only, so a best estimate is all that is required for these records.

For owls only during call playback, the record of the observed species will be:
• if the animal is seen, a grid reference of the animal’s location by transforming the bearing and distance
• if the animal is only heard, the grid reference of the observer (while also recording the bearing and estimated distance)

Record the end time of the survey.

Mark the end of each transect on the GPSs.

If no more surveys are to be conducted at the site, then all flagging tape is to be removed.

If one of the target owl species is detected, then the call of that species should not be played on subsequent surveys at that site to avoid disturbing that animal within its territory.

2.9 Data reporting requirements

Data requirements are outlined in the Spotlight Call Playback data sheet.

Key data rules are:
• Only one GPS track log per transect is required to be submitted
• Only one record of each observation is to be submitted. The second record of a duplicate observation (where the same animal has been seen and recorded twice by separate observers) may be retained by the contractor if preferred but it is not required to be submitted.

• Where two observers observe the same animal on a transect then the data field “Seen by both” is required to have “yes” entered

FPSP data is to be reported in accordance with the procedures outlined in the SOP.