



Leadbeater's Possum Pre-Harvest Survey Instruction

Version 1.0

24 February 2016

Copyright © VicForests

All rights reserved. No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means electronic, mechanical, photocopying, recording or otherwise, without prior written permission of VicForests.

Table of Contents

1. Purpose	3
2. Background	3
3. Scope	4
4. Procedure	4
4.1. Coupe Selection Process	4
4.2. Survey Methodology	5
4.3. Survey Intensity	5
4.4. Sampling Process	6
4.5. Camera Location	6
4.6. Data Collection	6
4.7. Implementation of Harvest Plans	6
4.7.1. LBP presence detected	6
4.7.2. Reporting Process	7
4.7.3. VicForests Reserve Layer	7
4.7.4. Forest Coupe Plan	7
4.7.5. Reporting to DELWP	7
4.8. Review Processes	7
4.8.1. Pre-harvest survey coupe selection	7
4.8.2. Survey procedure and methodology	8
5. Document Administration	8
5.1. Risk	8
5.2. Document management and retention	8
6. Abbreviations	8
7. References	9
8. Appendices	10
8.1. Appendix One: Background species information	10
8.2. Appendix Two: Field data sheet	11
8.3. Appendix Three: Risk based Coupe selection criteria	12
8.4. Appendix Four: Leadbeater’s Possum Pre-Harvest Survey Selection Process	14
8.5. Appendix Five: Pre-Harvest survey sighting action form	15

1. Purpose

This instruction outlines VicForests' process to determine when and how to undertake pre-harvest surveys for the presence of Leadbeater's Possum (LBP) colonies in areas available for timber harvesting, and the subsequent actions that must be carried out following each survey. The objective of pre-harvest surveys for LBP is to reduce the risk of harvesting an area that may be occupied by a LBP colony.

VicForests' pre-harvest survey process is a voluntary initiative designed to identify and protect LBP colonies in proposed harvest areas prior to the commencement of operations. The process aims to support the LBP Advisory Group's 13 recommendations for the management and protection of this species, in particular Action 1: *Establish timber harvesting exclusion zones of a 200m radius centred on the detection site to protect each identified colony*. VicForests recognises that the likelihood of LBP occupancy is higher in some areas of forest than others, and as such will prioritise pre-harvest surveys for the species using a risk-based approach.

2. Background

In order to protect threatened species and their habitat, VicForests' planning systems contain extensive desktop and field assessment components to identify biodiversity values. Appropriate management prescriptions are then implemented in accordance with the current regulatory framework.

The forest management planning framework in Victoria includes measures to conserve a range of significant biodiversity values in State forest. These measures complement the protection provided by the national park and conservation reserve system.

The management of State forest in Victoria is primarily determined by the relevant Forest Management Plans. Forest Management Plans are prepared by DELWP for each Forest Management Area (FMA) or groups of FMAs. Forest Management Plans incorporate guidelines and prescriptions that apply in each FMA. The plans divide State forest into three zones:

- *Special Protection Zones* where the protection and management of identified or modelled biodiversity values is the principal objective.
- *Special Management Zones* where timber harvesting and key biodiversity values will be jointly managed using additional prescriptions for the harvesting of timber.
- *General Management Zones* where multiple use management is applied to produce timber and protect non timber values by the use of comprehensive prescriptions based on the Code of Practices for Timber Production (2014).

VicForests searches all areas planned for harvest within the LBP range (definition provided in DEPI, 2014b p. 26) for the presence of high quality LBP habitat as described by the species' Action Statement (DEPI 2014a). These areas are protected from harvesting. VicForests acknowledges the need to be precautionary in the approach to threatened species management and has committed to assisting with the recovery of the species across State forest by undertaking a species-specific, pre-harvest survey program. VicForests Leadbeater's Possum pre-harvest survey approach (survey methodology, risk-weighting process and reporting) has been developed in conjunction with advice from species experts (from Arthur Rylah Institute), advice from DELWP as well as peer-reviewed literature on the topic.

Additional information on the protection status and the habitat requirements of the LBP can be found in Appendix 1.

3. Scope

This document applies to Ash-dominated (*Eucalyptus regnans*, Alpine Ash *E. delegatensis* and Shinning Gum *E. nitens*) coupes located within the range of the LBP, that have either been formally approved on the Timber Release Plan (TRP) or are on the proposed TRP list.

4. Procedure

4.1. Coupe Selection Process

All un-harvested coupes dominated by Ash forest (Mountain Ash *Eucalyptus regnans*, Alpine Ash *E. delegatensis* and Shinning Gum *E. nitens*) that are either on an approved Timber Release Plan or proposed for inclusion on a Timber Release Plan and are located within the range of the LBP will be considered for a LBP pre-harvest survey. Following finalisation of the LBP pre-harvest survey program in February 2016, only coupes scheduled for harvest (those coupes where operations including forward roading have not begun) will be considered for a LBP pre-harvest survey.

In order to prioritise which coupes pose the greatest risk of LBP occupancy and therefore may require a pre-harvest survey, VicForests' has developed a weighted risk matrix based on a range of criteria which is outlined in Table 1. Further explanation of the criteria can be found in Appendix 3. Each criteria has been ranked according to the likelihood of a colony being present, with the criteria most likely to result in colony detection given a higher risk 'weighting'. In many cases more than one criteria may apply to a coupe, therefore a combined weighted score is required to determine the overall 'risk rating' of each coupe. It is important to note that the risk weighted assessment has been designed to ensure that those coupes that have presence of more than one of the criteria will be assessed as having an overall higher risk weighting. The resultant weighted score of each criteria is summarised in Table 1.

Table 1: Weighted risk scoring system of pre-harvest survey criteria

Criteria	Risk score	Weighting	Weighted Score	Data Source
LBP colony or an associated colony buffer located within coupe	5	2	10	Spatial Record
>5 colonies within 1km of the coupe	5	2	10	Spatial Record
LBP Zone 1A or Zone 1B in coupe (described in the species Action Statement, DEPI 2014a)	3	2	6	Coupe Reconnaissance or Spatial Record
Modelled old growth forest within coupe	3	1	3	Spatial Record
Rainforest detected within coupe	1	1	1	Coupe Reconnaissance
ANU LBP Monitoring site within coupe	1	1	1	Spatial Record
Montane Riparian Thicket within coupe	1	1	1	Coupe Reconnaissance

To determine the weighted score for each planned coupe, a desktop analysis is conducted for all coupes on the approved TRP and those proposed coupes that are ready to be submitted for TRP approval, within the range of the species. This process involves comparing the records of the above criteria across each individual coupe. Where the criteria is present the relevant risk scores are attributed to the coupe. This process is detailed in Appendix 4 below.

Coupes with a combined weighted score of 10 or greater are categorised as 'High Risk' and are assumed to have the highest likelihood of LBP colony presence, and will be targeted for an LBP pre-harvest survey.

High risk coupes are then aligned with the Rolling Operations Plan (ROP), which outlines the coupes to be harvested for the financial year. The ROP is assessed to identify which 'High Risk' coupes are scheduled for harvest.

To enable the implementation of the LBP pre-harvest surveys, only coupes scheduled for the commencement of operations (including forward roading) from February 2016 have been considered for a survey. Due to the time required to complete the pre-harvest survey and receive reporting, where possible, it is important that 'High Risk' coupes are identified greater than three months prior to the commencement of operations.

The timing of surveys in 'High Risk' coupes will be prioritised according to commencement of operations as outlined in the ROP. Prioritised coupes will be packaged according to geographic location to maximise survey efficiency and to reduce associated costs.

4.2. Survey Methodology

Surveys for LBP will be conducted by relevantly trained external consultants who possess expertise and qualifications to appropriately and safely undertake:

- 1) fauna surveys; and
- 2) tree climbing activities.

Surveys will be undertaken using baited remote motion-sensing infrared cameras, as this method has been described as an efficient means of collecting information about this species presence when positioned in suitable locations where animals are moving or foraging (Nelson *et al.*, 2015; Harley *et al.*, 2014). Remote motion-sensing infrared cameras are also a relatively non-invasive method for collecting information about the presence of nocturnal, cryptic species, potentially improving the detection rates of such species (Harley *et al.*, 2014). Although there has been relatively little work undertaken on remote camera surveys for arboreal species, baited remote motion-sensing infrared cameras have recently been found to have high detection rates for LBP at known occupied sites (Harley *et al.*, 2014) and in areas where the presence of LBP was unknown (Nelson *et al.*, 2015).

4.3. Survey Intensity

At each survey site three rapid-fire infrared digital cameras (brand Reconyx) will be installed at an approximate distance of 100m apart, within a planned harvest boundary. This configuration is based on the most current (2015) analysis conducted by DELWP (Arthur Rylah Institute 2015 unpublished) on optimal camera density for the detection of LBP. This preliminary assessment estimated that 3 cameras per site, typically spaced less than 100m apart, had an overall cumulative detection probability of 0.90, (95% confidence interval of 0.73-0.98). According to DELWP this level of detection probability applies approximately to an area of 2-3 ha (depending on camera array), which equates to an almost 100m radial survey site. Each coupe will contain three survey sites (total of 9 cameras per coupe). The survey sites will be positioned at locations offering the most suitable habitat, or movement pathways for LBP, as determined by on-site ecological consultants. Survey sites should be located greater than 200m from each other to ensure that adjacent detections are treated as new colonies and are therefore protected with an individual 200m buffer (as per the species specific colony protection measured, outlined in the LBP Action Statement, DEPI 2014a).

4.4. Sampling Process

The location of survey sites will be determined using a sub-sampling approach across each coupe. This involves selecting survey sites within the coupe that are expected to have the highest probability of containing LBP. The sub-sampling process for each coupe selected for a pre-harvest survey will be conducted as below:

1. Desktop GIS analysis of the proposed harvesting area, using spatial information such as: confirmed LBP detections; 200m LBP protection buffers; modelled LBP habitat; modelled Old Growth; State forest resource inventory; forest management zone; hydrology; topographic layers; and where available aerial imagery. This information is used to create maps that will assist independent ecologists determine appropriate survey site locations, within the proposed harvest area.
2. Field teams of ecologists and arborists will locate survey sites according to their judgement of the most suitable LBP habitat and foraging areas. Desired habitat features include: hollow-bearing trees (for nest sites and refuge); predominance of smooth-barked eucalypts with exfoliating bark (providing shelter for insect prey and nesting material); a structurally dense and interlocking canopy or secondary tree layer (to facilitate movement); and a wattle understory (providing food and connectivity for movement) (Smith and Lindenmayer 1988; Menkhorst & Lumsden 1995; Harley 2004).
3. As all VicForests' coupes occur in the regrowth forest (forest that is predominately 1939 regrowth), the density of hollow bearing trees may be less than that found in an older forest age classes, it is expected that foraging will be the main LBP activity in areas proposed for harvesting. Therefore connectivity of midstorey species should be a key priority when selecting survey sites. In addition to acacia species, midstorey connectivity can be provided by rainforest and riparian thicket species.

4.5. Camera Location

Once an appropriate survey area has been identified, three cameras with accompanying bait stations should be deployed, where possible at a distance of 100m from each other.

Bait stations and motion-sensing infrared cameras are to be located in the forest stratum where movement pathways of the LBP are most likely. The height of this location is variable and is dependent on the presence of suitable mid-storey connectivity.

Cameras should be positioned 2-3m from the bait station. Creamed honey has been found to be effective when compared to alternative attractants for the species (Harley *et al.*, 2014) and will therefore be used as the bait for these surveys. Cameras will be left in place for a minimum of 21 nights.

4.6. Data Collection

See Appendix 2 for the data collection field sheet to be completed by the ecologist on-site.

4.7. Implementation of Harvest Plans

4.7.1. LBP presence detected

Where pre-harvest surveys identify the presence of a new LBP colony, a minimum 200m radial buffer will be created to protect the colony from proposed timber harvesting and associated activities. All new LBP colonies will be managed in accordance with VicForests Special Management Plan (VFSMP64) and management actions relating to the colony that are specific to the coupe location will be implemented through the Forest Coupe Plan.

The LBP Action statement (DEPI 2014a) outlines the specific requirements of LBP special management areas. Where a LBP is detected within an existing 200m LBP buffer, the detection will be considered as a duplicate colony detection and will not be considered as a new, separate colony. Therefore, if more than one LBP is detected at a site (within 200m from another LBP detection) the detection will be considered as a duplicate colony within the existing 200m buffer.

4.7.2. Reporting Process

Once results of the LBP pre-harvest survey are complete, VicForests' Conservation Biologist will review reports for the identification of threatened species that may require management action. For each surveyed coupe, information regarding the location of positive detections and the recommended action related to detection, will then be recorded in the pre-harvest survey sighting action form (Appendix 5).

Those coupes where there were no LBP colonies detected from the pre-harvest survey will result in the action forms stating that there is no further action required and that harvesting may commence in that coupe, in line with all appropriate regulatory requirements. All completed pre-harvest survey sighting action forms will be forwarded to regional Operational Planning staff for action.

4.7.3. VicForests Reserve Layer

All LBP colony locations and their harvesting exclusion buffers will be spatially represented within the VicForests Reserves Layer. This layer is a spatially referenced regulatory dataset that represents forested areas containing values that require protection during future planning, and operational activities. The VicForests Reserve layer ultimately recognises the locations in which VicForests have designated to be managed as a 'Reserve Area' to ensure appropriate management of these areas of forest are recognised in future planning and operations.

4.7.4. Forest Coupe Plan

The coupe plan must display all relevant information with regards to LBP colonies identified and relevant prescriptions where these occur. VicForests Reserve Areas and Special Management Areas must be shown on the relevant coupe maps, with the management actions also identified within the coupe plan. Operations Planning and Foresters responsible for the management of the coupe should ensure that all relevant requirements appear in the coupe plan and are implemented in field.

4.7.5. Reporting to DELWP

The pre-harvest survey reports produced by the survey contractors and/or VicForests will be forwarded to VicForests Conservation Biologist, who will collate the results. Results of all LBP colonies that are detected are then provided to the Timber Compliance Unit at DELWP via the *fdp.reports* portal.

4.8. Review Processes

4.8.1. Pre-harvest survey coupe selection

All coupes planned for harvesting that predominantly consist of Ash species and are located within the range of the LBP will be checked against the risk based coupe selection criteria. This includes coupes that are added to the ROP throughout the year.

4.8.2. Survey procedure and methodology

A review of these processes will be conducted every 6 months in order to ensure continual improvement, while also taking into account new findings in the literature on the topic. This review will also be aimed at assessing ways in which cost and time efficiencies can be achieved in the pre-harvest survey program.

5. Document Administration

5.1. Risk

This instruction addresses the following risks:

Risk	Likelihood	Consequence	Risk Rating
134. Forest values not identified during coupe marking	Possible	Major	High
262. Damage to occupied Leadbeater's Possum habitat	Possible	Major	High
139. Biodiversity values not correctly identified and protected	Possible	Major	High

5.2. Document management and retention

Unless stipulated within this Instruction, documentation generated from this Instruction must be managed according to VicForests Records Management Policy and Procedures.

This Instruction should be retained for a minimum of 7 years after it is superseded by another version. If this instruction needs to be retained for a longer period of time, this needs to be stated clearly, with justification in this section.

6. Abbreviations

Term	Definition
DELWP	Department of Environment, Land, Water and Planning
GIS	Geographic information system
LBP	Leadbeater's Possum (<i>Gymnobelideus leadbeateri</i>)
ROP	Rolling Operations Plan
VBA	Victorian Biodiversity Atlas

7. References

DELWP (2015) *Threatened Species Survey Standards, Leadbeater's Possum*, The State of Victoria Department of Environment, Land, Water and Planning, Melbourne.

DEPI (2014a) *Leadbeater's Possum Action Statement #62*. The State of Victoria Department of Environment and Primary Industries, Melbourne.

DEPI (2014b) *Technical Report - Leadbeater's Possum Advisory Group*, The State of Victoria Department of Environment, and Primary Industries, Melbourne.

Harley, D.K.P. (2004). A review of recent records of Leadbeater's Possum (*Gymnobelideus leadbeateri*). Pp. 330–338 in Goldingay, R. and Jackson, S. (Eds.) *The Biology of Australian Possums and Gliding Possums*. Surrey Beatty and Sons, Sydney.

Harley, D. (2015) The use of call imitation to establish territory occupancy by Leadbeater's possum (*Gymnobelideus leadbeateri*). *Australian Mammalogy*, 37: 116-119.

Harley, D. Holland, G., Antrobus, J. S. (2014) *The use of camera traps to detect arboreal marsupials" Lessons from targeted surveys for the cryptic Leadbeater's Possum (Gymnobelideus leadbeateri)*. In: Meek, P., Fleming, P. Ballard, G., Banks, S. P., Claridge, A., Sanderson, J. and Swann, D (Eds) *Camera Trapping, Wildlife Management and Research*, CSIRO Publishing, Canberra.

Lindenmayer D. B., Blanchard, W., McBurney, L., Blair, D., Banks, S., Likens, G. E., Franklin, J. F., Laurence, W. F., Stein, J. A. R. and Gibbons, P. (2012) Interacting factors driving a major loss of large trees with cavities in a forest ecosystem. *PLOS One* 7, e41864.

Lindenmayer, D.B., Cunningham, R.B., Tanton, M.T., Smith, A.P. and Nix, H.A. (1991a). Characteristics of hollow-bearing trees occupied by arboreal marsupials in the montane ash forests of the central highlands of Victoria, south-east Australia. *Forest Ecology and Management* 40: 289– 308.

Lindenmayer, D.B., Cunningham, R.B., Tanton, M.T., Nix, H.A. and Smith, A.P. (1991b). The conservation of arboreal marsupials in the montane ash forests of the central highlands of Victoria, south-east Australia: III. The habitat requirements of Leadbeater's Possum *Gymnobelideus leadbeateri* and models of the diversity and abundance of arboreal marsupials. *Biological Conservation* 56: 295–315

Lindenmayer, D.B., Cunningham, R.B., Tanton, M.T. and Smith, A.P. (1990). The conservation of arboreal marsupials in the montane ash forests of the central highlands of Victoria, south-east Australia: II. The loss of trees with hollows and its implications for the conservation of Leadbeater's Possum, *Gymnobelideus leadbeateri* McCoy (Marsupialia: Petauridae). *Biological Conservation* 54: 133–145.

Nelson, JL, Lumsden, LF, Durkin, LK, Bryant, DB, Macak, PV, Cripps, JK, Smith, SJ, Scroggie, MP, and Cashmore, MP (2015). *Targeted surveys for Leadbeater's Possum in 2014–2015*. Report for the Leadbeater's Possum Implementation Committee. Arthur Rylah Institute for Environmental Research. Department of Environment, Land, Water and Planning, Heidelberg, Victoria.

Smith, A.P. and Lindenmayer, D.B. (1992). Forest succession and habitat management for Leadbeater's possum in the state of Victoria, Australia. *Forest Ecology and Management* 49: 311–332.

Smith, A.P. and Lindenmayer, D.B. (1988). Tree hollow requirements of Leadbeater's Possum and other possums and gliders in timber production ash forests of the Victorian Central Highlands. *Australian Wildlife Research* 15: 347–36

8. Appendices

8.1. Appendix One: Background species information

Conservation status

The Leadbeater's Possum (*Gymnobelideus leadbeateri*) is listed as a threatened species under the *Flora and Fauna Guarantee Act (1988)*, and is listed as critically endangered by the *Environment Protection and Biodiversity Conservation Act (1999)*. This small arboreal species is a communal nesting possum, living in small colonies of typically two or three individuals, although larger colonies of up to 12 individuals have also been recorded.

Habitat requirements for the Leadbeater's Possum

Leadbeater's Possum is known to occur in three distinct forest types across the Central Highlands of Victoria: Ash forests (Mountain Ash *Eucalyptus regnans*, Alpine Ash *E. delegatensis* and Shinning Gum *E. nitens*), sub-alpine woodland (Snow Gum *E. pauciflora*) and lowland floodplain forest (dominated by Mountain Swamp Gum *E. camphora* in the Yellingbo Nature Conservation Reserve).

The key habitat requirements of LBP are den tree abundance (where they are more likely to occur in areas with higher densities of hollow-bearing trees), vegetation structure and food availability (Smith and Lindenmayer 1988, 1992; Lindenmayer *et al.*, 1990, 1991a). Hollow-bearing trees provide den and nesting sites for this species, these hollows can occur in both large live or dead trees. In Ash forests, hollow formation due to age, starts at around 120 years, however, hollows suitable for Leadbeater's Possum do not typically form until trees reach around 190 – 220 years of age (Smith and Lindenmayer 1988; Lindenmayer *et al.*, 1991b).

Leadbeater's Possum require forested areas that are dominated by smooth-barked (or 'gum-barked') Eucalyptus species, which provide material for building nests and opportunities to forage for insects (Harley, 2004). Another important habitat feature, related to vegetation structure, is 'connectivity' (Harley, 2004), which is created by high stem density or interconnecting lateral branches. In montane Ash forest, a wattle stratum is also important for LBP habitat connectivity and provision of food for the species.

Fire is an integral component of the Ash forests and has an important influence on the occurrence, extent and viability of the Leadbeater's Possum and its habitat (Lindenmayer and Possingham 1995). In 2009, the Black Saturday bushfire impacted a significant portion of the forests within the LBP range, resulting in significant mortality, destruction of food resources, alteration of the forest structure and loss of hollow-bearing trees, particularly dead hollow-bearing trees (Lindenmayer *et al.*, 2012).

8.2. Appendix Two: Field data sheet

VicForests Pre-Harvest Leadbeater's Possum Survey

Coupe Address:

Date:

Coupe Name:

Field Staff:

Site Number:

		Bait 1	Bait 2	Bait 3
Site	Easting / Northing			
	Tree species (Bait tree)			
	Tree age class (Bait tree)			
	Photo of canopy (y/n)			
	Height of bait (m)			
	Camera to bait (m)			
Connectivity	Amount of connectivity (H,M,L)			
	Distance from bait to closest connectivity (m)			
	Species of connectivity			
Habitat	Basal area of Acacia sp (m ²)			
	Habitat Tree 1			
	Form of habitat (0.5-8)			
	Species			
	Bearing from bait (°)			
	Distance from bait (m)			
	Habitat Tree 2			
	Form of habitat (0.5-8)			
	Species			
	Bearing from bait (°)			
	Distance from bait (m)			
	Habitat Tree 3			
	Form of habitat (0.5-8)			
	Species			
	Bearing from bait (°)			
	Distance from bait (m)			
	Habitat Tree 4			
	Form of habitat (0.5-8)			
	Species			
	Bearing from bait (°)			
Distance from bait (m)				
Habitat Tree 5				
Form of habitat (0.5-8)				
Species				
Bearing from bait (°)				
Distance from bait (m)				
Reasoning for camera placement	<u>Bait 1:</u>			
	<u>Bait 2:</u>			
	<u>Bait 3:</u>			

8.3. Appendix Three: Risk based Coupe selection criteria

This section outlines a decision support system to assist staff in identifying high risk coupes that are to be prioritised for a pre-harvest LBP survey. Pre-harvest surveys should only be undertaken within the range of the LBP, within areas of forest dominated by Ash and where operations (including forward roading) has not commenced. The cost of undertaking surveys for LBP is relatively significant and therefore, not all areas planned for harvest can be surveyed. By using a 'risk-based assessment process', survey efforts are to be focused in areas with the highest likelihood of LBP occupancy.

There are four key criteria that VicForests considers key to determining which areas planned for harvest are more likely to have LBP present. These criteria have been generated from a review of the current literature regarding the habitat requirements of the species, as well as through information gathered by DELWP during the targeted species survey program. Lastly, the criteria chosen consider what data is available to VicForests for the risk assessment process.

The key criteria considered in the risk assessment process include:

1. The proximity of Ash coupes to known Leadbeater's Possum colonies;
2. The proximity of Ash coupes to known hotspots of high occupancy for the species;
3. The potential presence of Zone 1A or Zone 1B habitat within the coupe;
4. The presence of other characteristics within the coupe which increase the likelihood of an area supporting a LBP colony, especially if criteria 1, 2 or 3 are met.

The rationale for each of these triggers is explained in more detail below.

1. The Proximity of the coupe to known Leadbeater's Possum colonies

There is a large body of literature regarding the preferred habitat of LBP, however recent detections of the species (DELWP targeted survey program for LBP, Nelson *et al.* 2015) have detected this species foraging in areas outside of the listed preferred habitat of the species (for example in 1980s and 1990's regrowth forest). Therefore proximity of known colonies to a coupe is a trigger for a pre-harvest survey to explore the local area as a possible cluster or neighbourhood of LBP colonies. This species is known to be territorial, with breeding pairs (and their young) defending exclusive territories against neighbouring family groups (Harley, 2015). Therefore, colonies detected outside of a colony 200m protection buffer are likely to be separate colonies. Where there has been an LBP colony within or adjacent (within 200m) to an area planned for harvest, there is a risk that there may be further colonies present within the area. Therefore areas planned for harvest that have a LBP colony (including the 200m buffer) detected in the coupe, will be targeted for a pre-harvest survey.

2. The proximity of Ash coupes to known hotspots of high occupancy for the species.

Interrogation of the Victorian Biodiversity Atlas (VBA) and recent (<15 year old) detections of the LBP's reveals that there are some 'hot spots' of higher rates of occupancy within specific areas of the species' range. VicForests considers concentrations of >5 known LBP colony detections as a practical measure of a Leadbeater's Possum "hotspot". Coupes that have greater than 5 colonies within a

Leadbeater's Possum Pre-Harvest Survey Instruction

1km radius are considered to have a higher risk of LBP presence in the coupe, and will be targeted for a pre-harvest survey.

3. The presence of Zone 1A or Zone 1B habitat within the coupe

Leadbeater's Possum Zone 1A and Zone 1B as described in the Action Statement for the species (2014) is based on the highest quality, current and future LBP habitat. There is a regulatory requirement to exclude areas of LBP habitat from harvest if they meet the minimum size requirements (Zone1A - 3ha and Zone1B - 10ha). The potential presence of Zone 1A or Zone 1B habitat within a coupe increases the likelihood that the area planned for harvest may support LBP colonies either now or at some time in the future.

4. The coupe displays other forest characteristics which increase the likelihood of an area supporting an LBP colony

The presence of other features in conjunction with one or more of the above criteria (1-3) will increase the likelihood that an area planned for harvest could support a LBP colony. Other relevant features known to be favoured by LBP that VicForests will consider in the risk assessment process include:

- Presence of individual or small patches of old growth trees (such as those found within modelled old growth areas and stag watch monitoring sites);
- Presence of other dense understorey ecological vegetation classes that provide connectivity between potential nest trees and foraging areas (such as Cool-temperate rainforest and Montane Riparian Thicket).

8.4. Appendix Four: Leadbeater's Possum Pre-Harvest Survey Selection Process

Step 1	Create TRP checklist from Cengea
	Query: Tac Planning Coupes/Locations
	Filter TRP Status: "Approved", "Proposed" and "Submitted" Filter TRP Last Event: Un check; Approve removal and remove new boundary Filter Coupe Status: "Active", "Not-started", and "Proposed" Filter FMA: CG, CT, DD

Step 2	Create TRP checklist from Spatial
	Input Layers
	"Timber Release Plan - Approved" "Approved TRP Driveways" "TRP_Proposed_2015" "LBP Home Range"

Step 3	Filter all Ash categories from the Cengea attribute "Silvicultural Type". This excludes mixed species coupes from the matrix.
--------	---

Step 4	Compare spatial TRP checklist against each criteria. Produce a list of coupes for each criteria where the criteria is present.				
Criteria	Risk Score	Weighting	Weighted Score	Data Source	Layer or Query
LBP colony or associated buffer in-coupe (Search Area: 200m)	5	2	10	Spatial	Spatial: "LBP Known Colonies", "LBP New Colonies" point location datasets.
>5 Colonies or associated buffers within 1km of coupe (Search Area: 1.2km)	5	2	10	Spatial	Spatial: "LBP Known Colonies", "LBP New Colonies" point location datasets.
Potential LBP Habitat In-Coupe	3	2	6	Spatial & Cengea	Spatial: "Modelled LBP" intersects with coupe. Cengea Query: Mgt issues current TRP, Filter; Issue type description for LBP habitat in coupe; Value: LBP habitat and LBP reserve; Quantity: Present
Modelled Old Growth In-Coupe	3	1	3	Spatial & Cengea	Spatial: "MOG2009" intersects with coupe. Cengea Query: Mgt issues current TRP, Filter issue type description for Old Growth Forest In-Coupe
Rainforest In-Coupe	1	1	1	Cengea	Cengea Query: Mgt issues current TRP, Filter issue type description for Rainforest in-coupe, Rainforest site core area in-coupe, rainforest site in-coupe
LBP Monitoring Site Within Coupe	1	1	1	Cengea	Cengea Query: Mgt issues current TRP, Filter issue type description for Leadbeater's Possum research site within coupe
Montane Riparian Thicket In-Coupe	1	1	1	Cengea	Cengea Query: Mgt issues current TRP, Filter issue type description for Montane Riparian Thicket in coupe.

Step 5	Populate each criteria in the matrix for all of the coupes listed in the TRP checklist from Cengea.
--------	---

Step 6	Sum all criteria scores for each coupe in the matrix.
--------	---

Step 7	Apply Risk rating based on weighted score range of coupe. >9 = High; 5-9 = Moderate; <5 = Low
--------	---

Step 8	The result is each coupe on the Cengea TRP checklist having a risk rating according to the criteria present in that coupe.
--------	--

8.5. Appendix Five: Pre-Harvest survey sighting action form

VICFORESTS

Pre-Harvest Survey Sighting Action Form

Survey Date:		Survey Provider:	
---------------------	--	-------------------------	--

Coupe Number:		Coupe Name:	
Grid Reference (GDA):			
Species Detected:			
Detection Method:			

Survey Findings:

Recommended Action:

Reviewed / Actions By:		Title:	
Signed:		Date:	

Variation to Recommended Action:
Note: Any required variations to recommended actions need to be signed off by the person how undertook the initial review.

Actions Completed By:		Title:	
Signed:		Date:	