



Arboreal species presence following adaptive harvesting in the Central Highlands of Victoria

Michael Ryan



Powerful Owl M.F. Ryan



Southern Greater Glider M.F. Ryan



Yellow Bellied Glider B. Drouyn

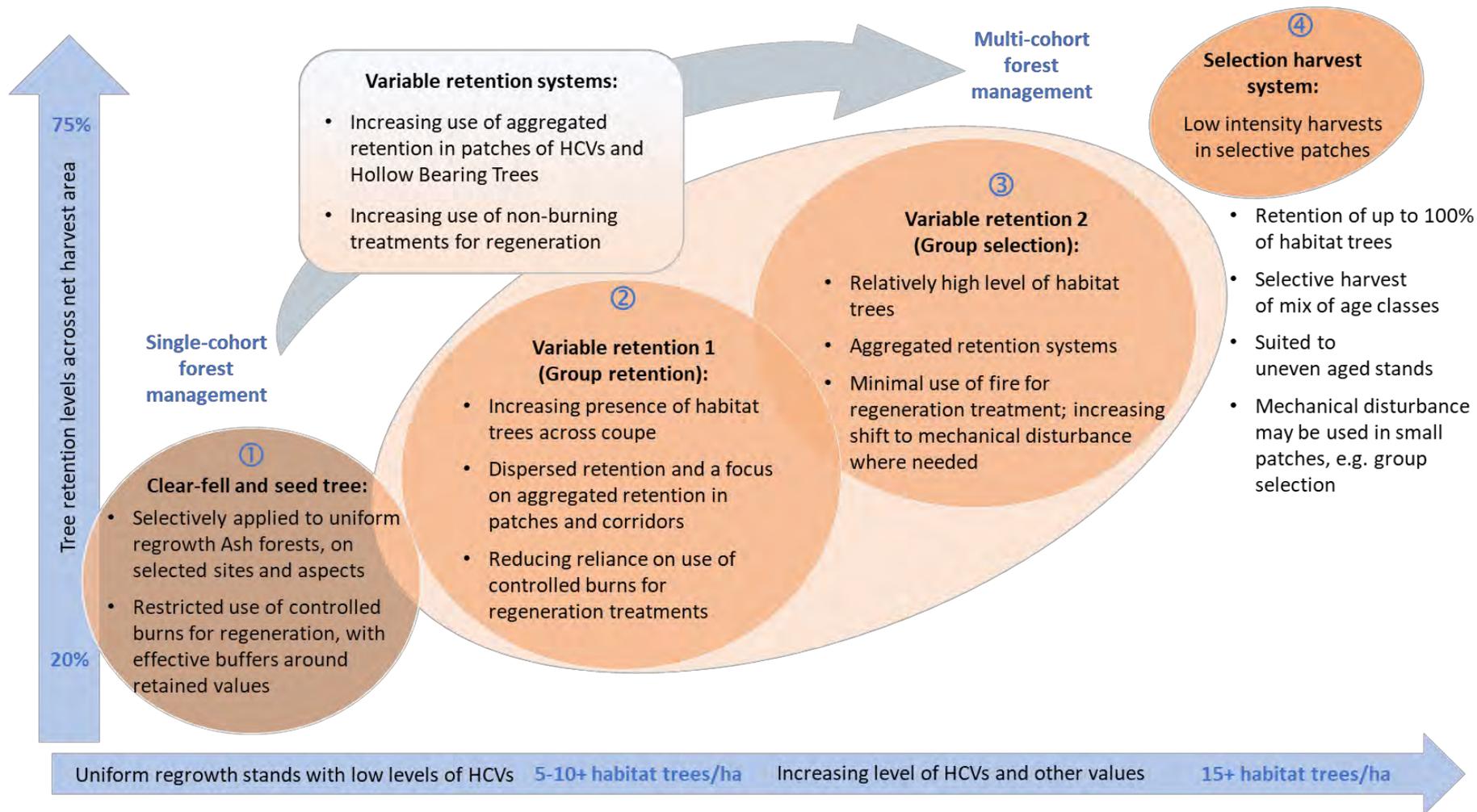


Leadbeater's Possum M.F. Ryan



Feather Tailed Glider M.F. Ryan

VicForests implementation of Variable Retention Harvesting



Source: VicForests

Figure 2: Planning retention based on habitat quality and pre harvest survey detections.

The harvesting transition from clearfell to Variable Retention Systems



Gross planned area (TRP boundary)



Removal of Code of Forest Practice Exclusions



Reservation of high quality habitat



Additional islands around high quality habitat trees



Calculation of Area of Influence for Regrowth Retention Harvesting



Additional Dispersed habitat and seed trees for Variable Retention 1 (moderate) or Variable Retention 2 (high).

Each of these systems have differing implications for wildlife



1993 regrowth within 1939 age class Mountain Ash Powelltown 2004 (photo 2004 M.F.Ryan)

And site suitability for wildlife changes as the forests mature



1993 regrowth within 1939 age class Mountain Ash Powelltown 2014 (photo 2014 M.F.Ryan).

New harvesting creates the mosaic of age classes

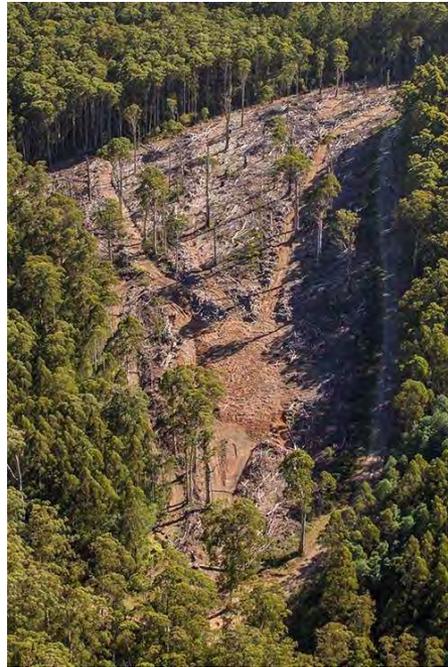


1993 regrowth within 1939 age class Mountain Ash Powelltown 2019 (photo 2019 M.F.Ryan)

Forest suitability changes can be subtle



We also need to understand landscape context,
i.e. both inside and outside of harvested areas

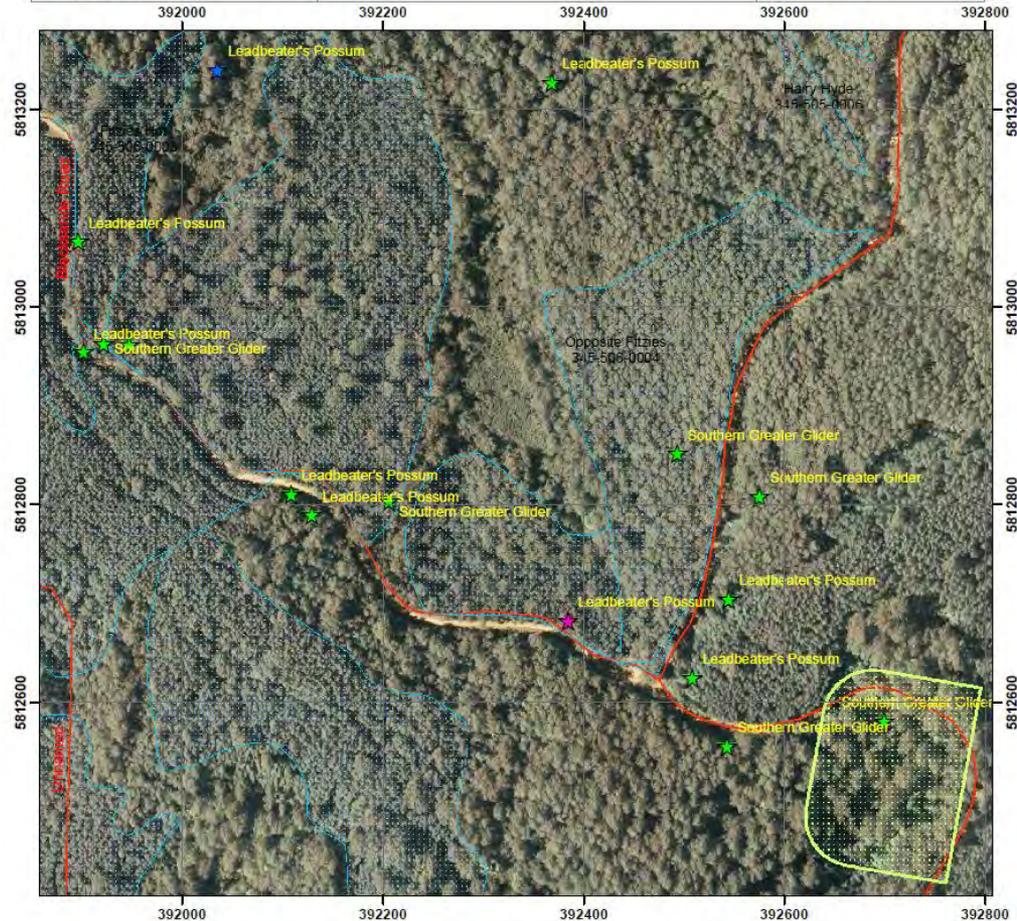


We also need to understand landscape context,
i.e. both inside and outside of harvested areas



FMA:	Dandenong	District:	Powelltown	Gross Area ha:
Coupe Address:	345-506-0004	Easting/Northing:	392129 5812794	Est Nett. Area:
Coupe Name:	Opposite Fitzies	Lat/Long:		Silvic System:

- Pre-2019 focus was on reserving the best habitat outside harvest areas
- The harvest area was expected to be re-occupied over the next 10-30 years as regeneration establishes.
- Post 2019 the best habitat is still reserved outside the harvest area and most or all habitat trees and recruitment trees are also retained within the harvest area as well.
- Even pre-2019 harvest areas are being used by threatened species



LEGEND Forest Management Zones <ul style="list-style-type: none"> General Management Zone Special Management Zone Special Protection Zone Code of Forest Practice Other Public Land Conservation Parks and Reserves Other Parks and Reserves OPR - Limited Timber Harvesting Plantations Commonwealth Land 		<ul style="list-style-type: none"> Lastlog25 LBP Monitoring Sites Roads simple style VF Reserve Area VF Harvesting History 	Map Scale 1:5,000 Map Projection: MGA55 Map Date: 20/09/2021 <small>Map Template: LBP_detections Opposite Fitzies 20200707 Produced By: Michael Ryan</small>
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Surveying gear and surveying methods – thermal the game changer

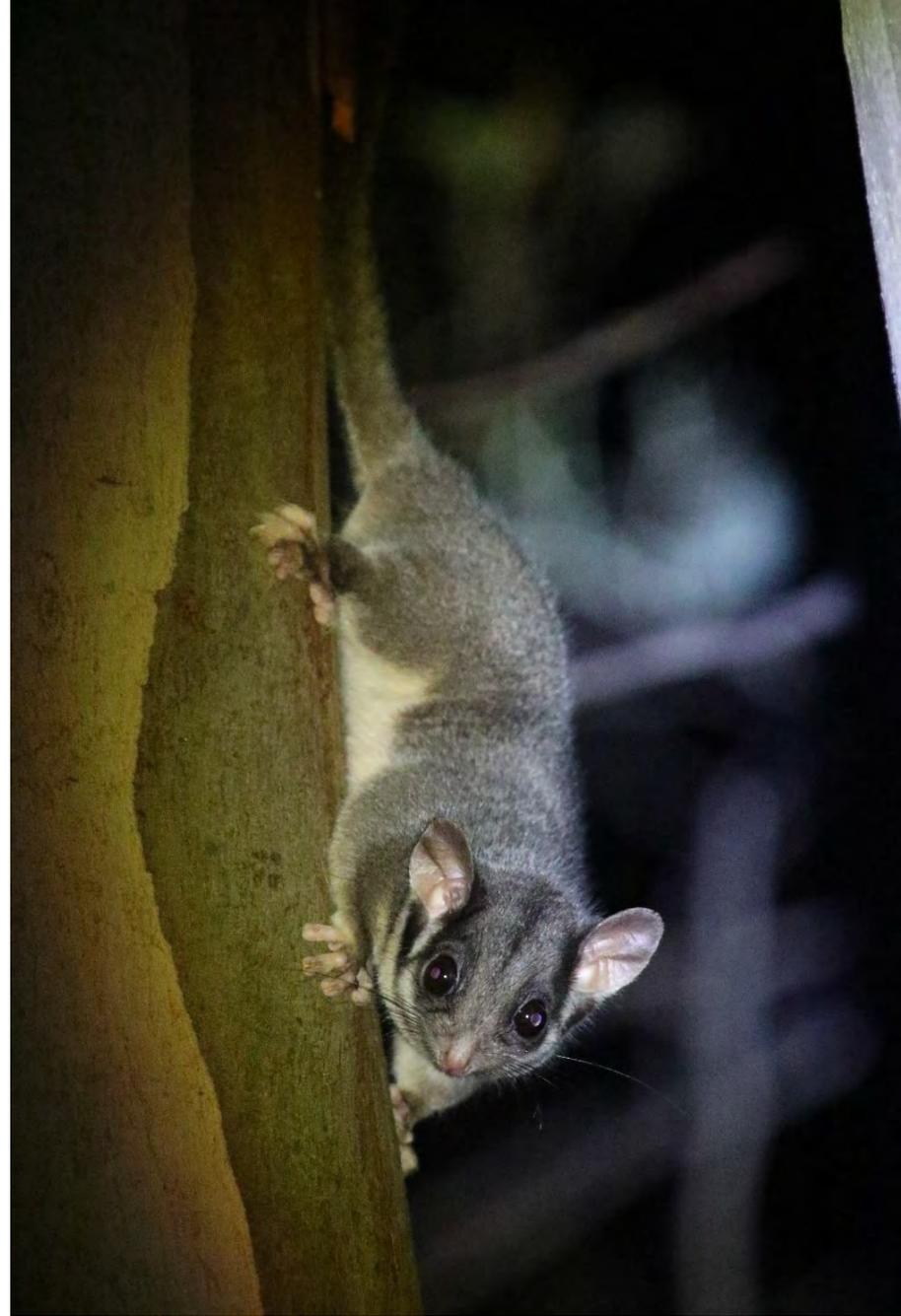


Surveying for Leadbeater's Possum Connors Plain (M.F. Ryan)

Thermal and conventional photo using FLIR T420- (M.F. Ryan)



Leadbeater's Possum keyhole entry 2006 Alpine Ash regrowth Connors Plain winter 2017 (photo M.F. Ryan)



Leadbeater's Possum: Connors Plain (photo 2017 Ben Drouyn)

Survey gear and survey methods

- > Most surveys are two person one scanning with the thermal and second person with a spotlight.
- > When there is a thermal detection the operator directs the second person where to photograph.
- > Some is solo surveys when on tracks and especially during COVID to minimise risk



Photo gear: Canon 7D Mark 2, Tamron 18-400mm lens, Olight Javalot 1300Lm torch



Thermal Gear – FLIR T540 (geotag), E86 (geotag) or FLIR T420 (no geotag) (M.F. Ryan)



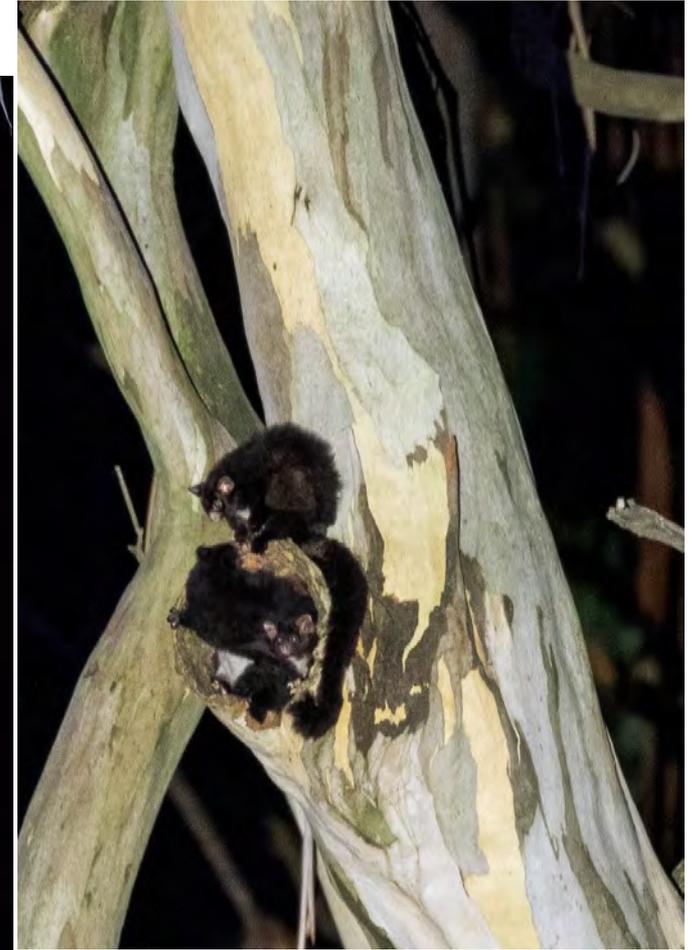
Solo surveys are less desirable but sometimes necessary. The camera harness (Cotton Carrier) helps. (M.F. Ryan)

Survey methods

- > Surveys done largely as per Department Survey standards
- > Thermal and spotlight gives the best chance of detections of species not detected by eyeshine
- > Thermal alone allows observation without changing animal behaviour – especially for stag watching
- > We do not call in animals.



Powerful Owl with a Greater Glider in its talons. Bendoc
(photo 2018 M.F. Ryan)



Great Gliders emerging from Grey Gum trunk hollow. Toolangi Coles Creek track
(photo 2020 M.F. Ryan)

Detection by method

Greater Gliders ~80% eyeshine, 20% thermal. Record tree species, diameter, colour morph

Yellow Bellied Gliders ~80% by their calling when they glide, then thermal, then spotlight

Leadbeater's Possum ~95% by thermal, 5% heard or spotlight. Wildlife cameras work well

Powerful Owl, Sooty Owl - mostly by their call, sometimes thermal

Feather-tailed Glider, Eastern Pygmy Possum ~95% thermal or wildlife cameras work well

Koala – Spotlight and thermal 50:50. Easy to miss if they not looking by spotlight alone



Eastern Pygmy Possum— photo M.F. Ryan



Greater Glider eyeshine – photo M.F. Ryan

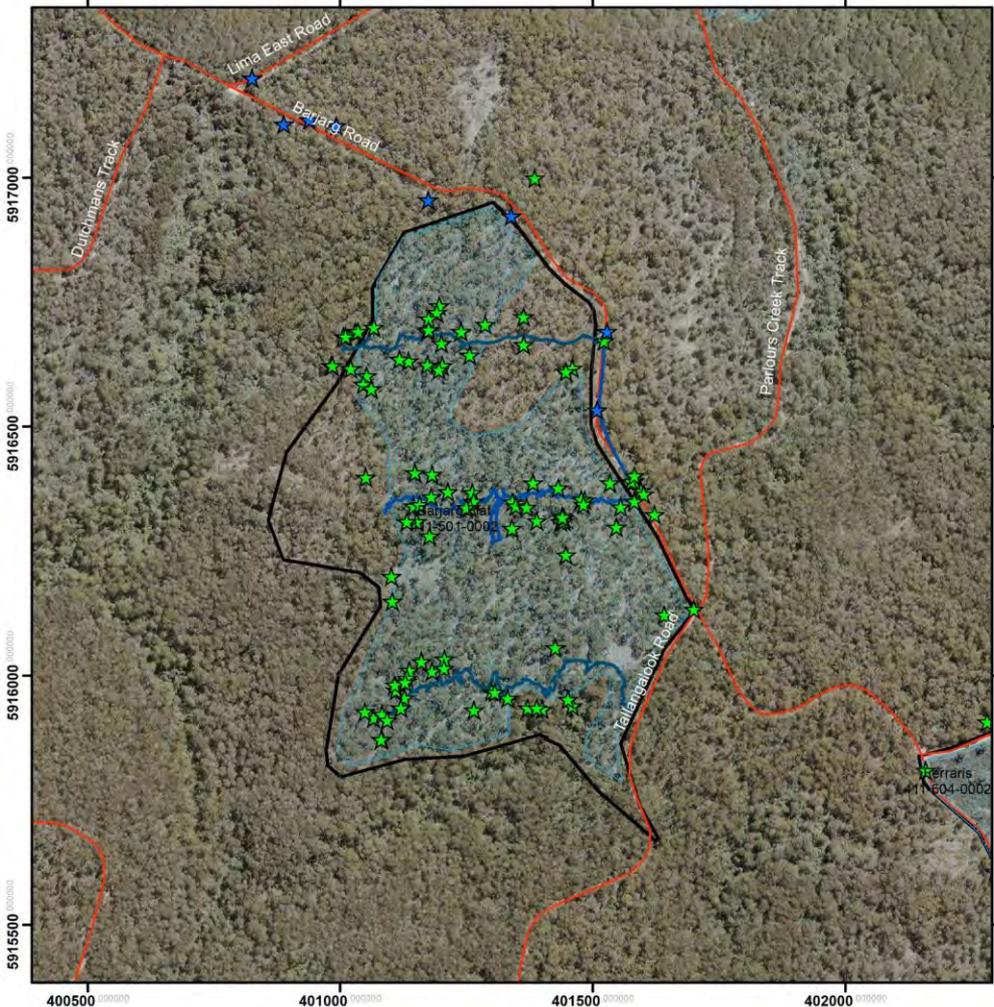


Leadbeater's Possum (Kalatha Tk 2020 M.F. Ryan)

Example 1: Selection Harvesting – Barjarg Flat Strathbogies

- 3x500m transects assessed every 3 months for two years, then annually
- 130 Greater Glider detections over the 9 surveys
- Also Koalas, Mountain Brushtail Possums, Ringtail Possums, Feathertail Gliders





Repeat No	Mountain					
	Greater Gliders	Koala	Ring-tailed Possum	Brush-tailed Possum	Feather-tailed Glider	Sugar Glider
R1 2018	14	2	3	3	2	0
R2 2019	10	0	1	0	0	0
R3 2019	23	1	3	0	1	1
R4 2019	22	1	4	3	0	1
R5 2019	12	4	3	5	1	0
R6 2020	11	0	1	1	0	2
R7 2020	11	1	5	2	0	1
R8 2020	15	0	0	1	0	1
R9 2021	13	1	0	1	0	0
	131	10	20	16	4	6

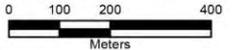
Table 1: Post harvest arboreal species presence.

Note: There were 22 pre-harvest detections but note some differences in detection probability.
https://www.ari.vic.gov.au/__data/assets/pdf_file/0025/396700/ARI-Technical-Report-293-Estimating-density-of-Greater-Gliders-in-the-Strathbogie-Ranges.pdf

LEGEND

- Forest Management Zones**
 - General Management Zone
 - Special Management Zone
 - Special Protection Zone
 - Code of Forest Practice
 - Other Public Land
 - Conservation Parks and Reserves
 - Other Parks and Reserves
 - OPR - Limited Timber Harvesting
 - Plantations
 - Commonwealth Land
- Base Features**
 - Roads simple style
- Species Observations**
 - responsibleParty
 - DELWP
 - Third Party
 - VicForests
 - PostHS_Barjarg_20191217_T2 Track
 - PostHS_Barjarg_20191217_T3 Track
 - PostHS_Barjarg_20191212_T1 Track
 - Timber Release Plan - Approved
 - VF Reserve Area

Map Scale 1:10,000



Map Projection: MGA55

Map Date: 13-05-2021

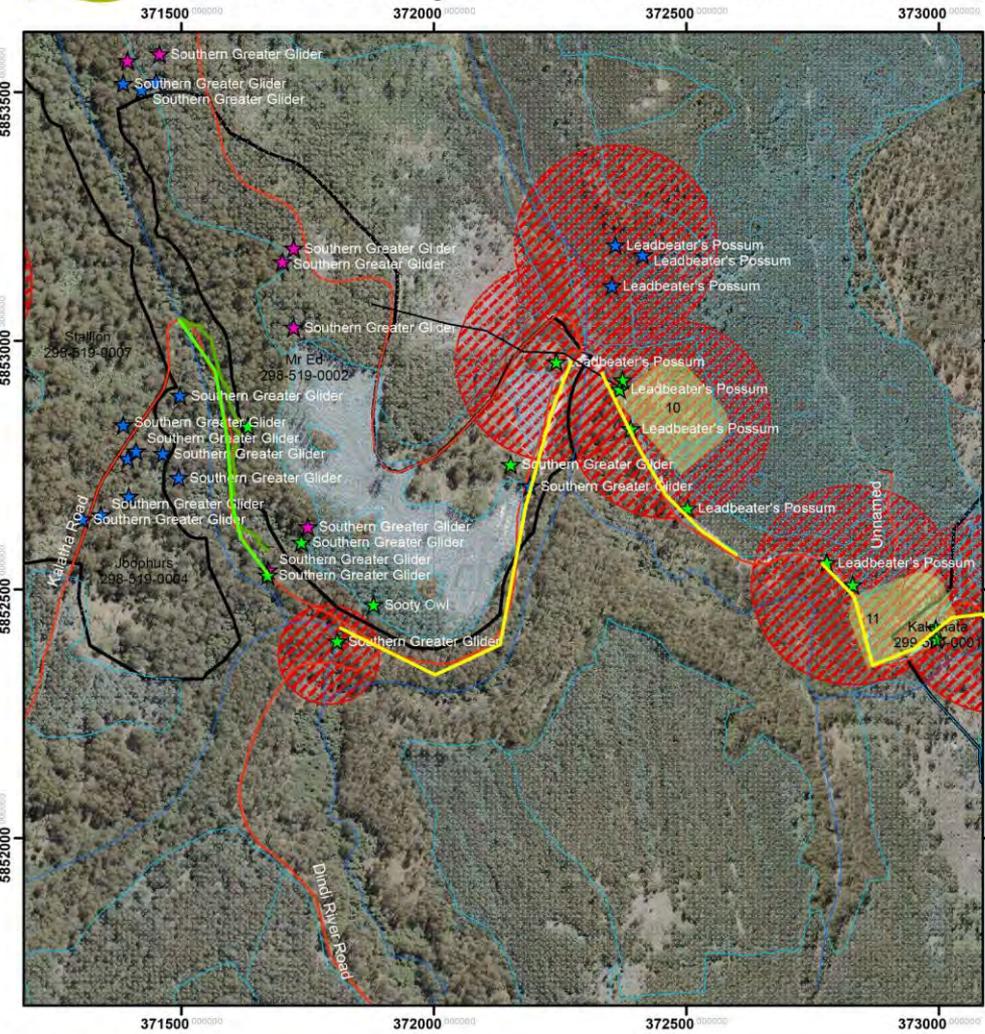
Map Template: Post harvest Greater Glider detections
 Produced By: Michael Ryan

Example 2: Regrowth Retention Harvesting – Mr Ed Toolangi

- Predominately island retention to facilitate safe harvesting and burning
- Surveys every 6 months 500m control, 1000m adjacent to harvest area
- Gliders present but up to 3 surveys to find them
- **Leadbeater's Possum detected in adjacent 2009 fire regrowth**
- Sooty Owl detected most surveys

Sooty Owl at Mr Ed 2019. M.F.Ryan





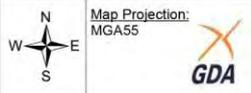
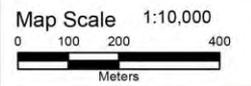
Mr Ed Regrowth Retention Harvesting 2019. (Photo 2021 M.F.Ryan)

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- Base Features**
- Watercourses
 - Roads simple style

- Species Observations responsibleParty**
- DELWP
 - Third Party
 - VicForests
 - PostHS_Kalatha track T1 20200401
 - PostHS_Kalatha track C1 R1 20200401
 - Lastlog25
 - Timber Release Plan - Approved
 - VF Reserve Area



Map Date: 27-09-2021

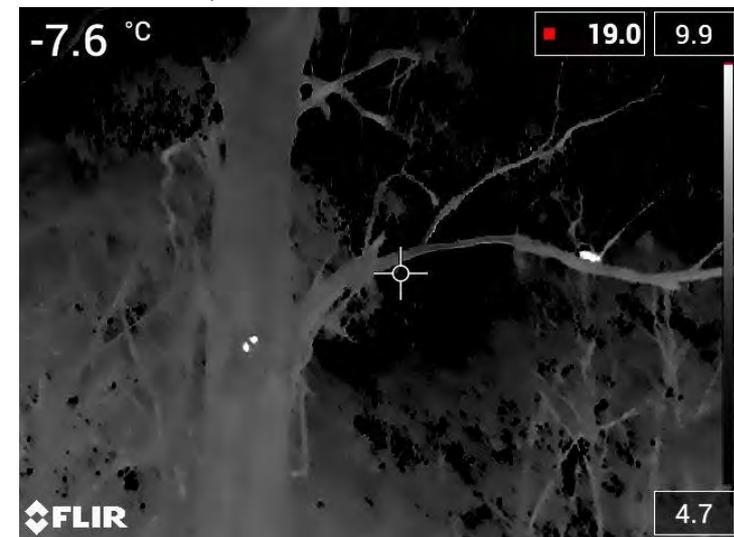
Map Template: Post harvest Greater Glider detections Mr Ed
Produced By: Michael Ryan

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Example 3: Variable Retention

– Jokes, Gags Toolangi State Forest

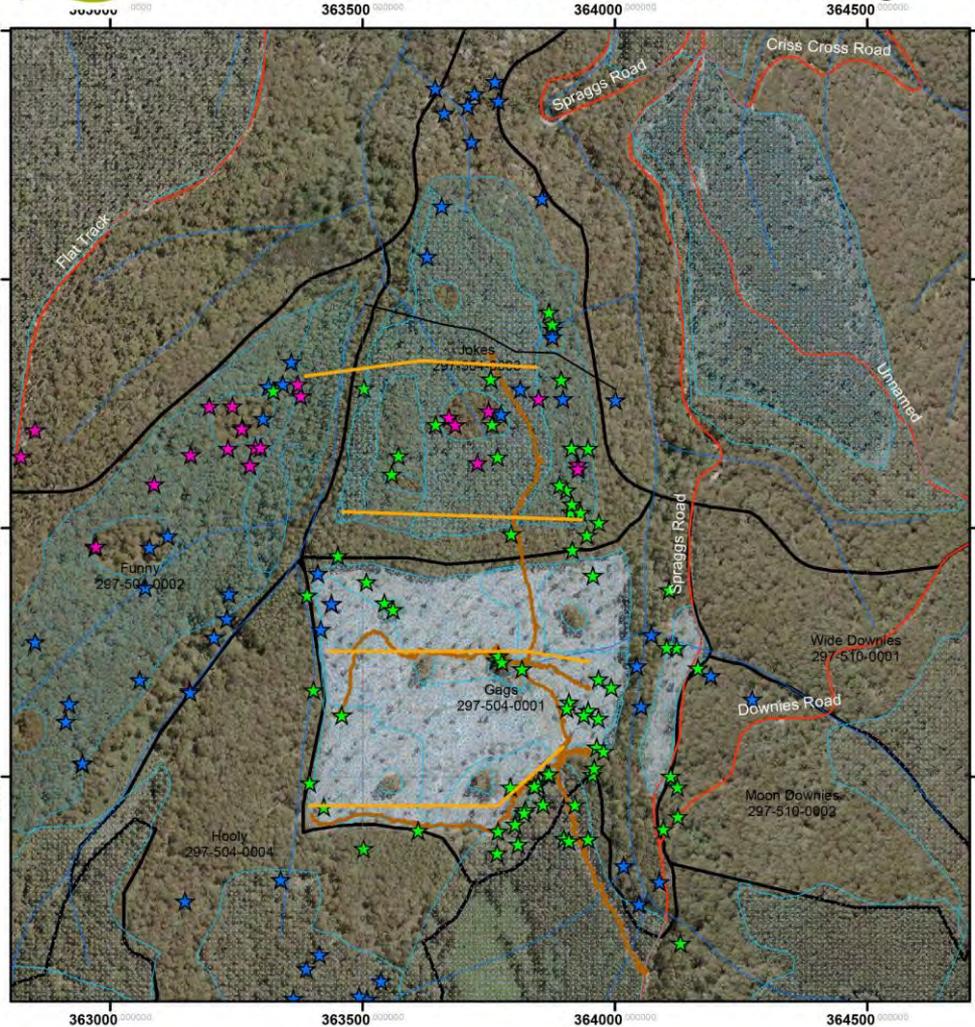
- 4 x 500m transects pre burn, post burn
- Repeat each 6 months for 4 years (after which regrowth too high)
- Last survey September 2021
- One long term transect 1500m along track
- Greater Gliders on each transect in island and in dispersed trees



Thermal of Gliders emerging from hollow (M.F.Ryan 2020)



Jokes 2020 and Gags 2019 Variable Retention Harvesting 2019. (photo 2021 M.F.Ryan)



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 - T5 R1 297-504-0001
 - T1 R4 297-504-0001
 - T2 R4 297-504-0001
 - Lastlog25
 - Timber Release Plan - Approved

Map Scale 1:10,000

0 100 200 400 Meters

Map Projection: MGA55

Map Date: 13-05-2021

Map Template: Post harvest Greater Glider detections

Produced By: Michael Ryan



Grey morph Greater Glider in messmate (photo 2021 Ben Drouyn)



White morph Greater Glider in mountain ash (photo 2020 M.F.Ryan)

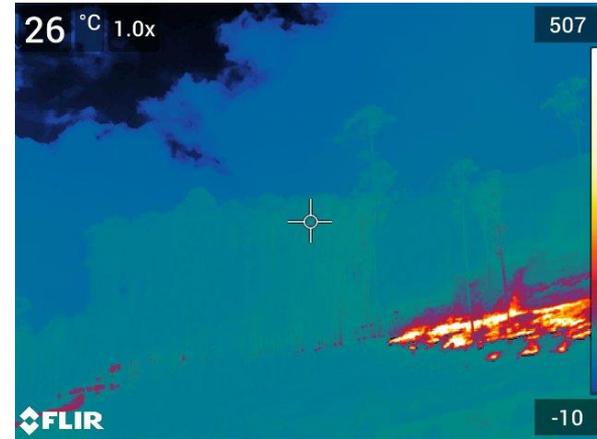
Repeat No	Transect	Year	Greater Gliders	Koala	Ring-tailed Possum	Mountain Brush-tailed Possum	Boobook Owl
R0	T1-T2	Nov-2019	3	1		1	1
R1	T1-T2	June-2019	7		2		
R2	T1-T2	Mar-2021	4				
R3	T1-T2	Sept-2021	7			2	2

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Post harvest detections Gags 2x500m transects.

Some outcomes to date relevant for Greater Glider

- Adaptive harvesting means Greater Glider persistence on or adjacent to most harvest areas provided no crown scorch.
- Gliders on sites harvested 5-10 years previously
- Variable Retention is difficult to burn but can be done.
- One site burnt too hot had crown scorch in the harvest area and Gliders will not re-colonise until crown re-establishment. Gliders still in unburnt Code buffers.



Snobs 14 Variable retention burn monitoring FLIR T540. Slow backing burn retains island and dispersed Ash (photos M.F.Ryan)

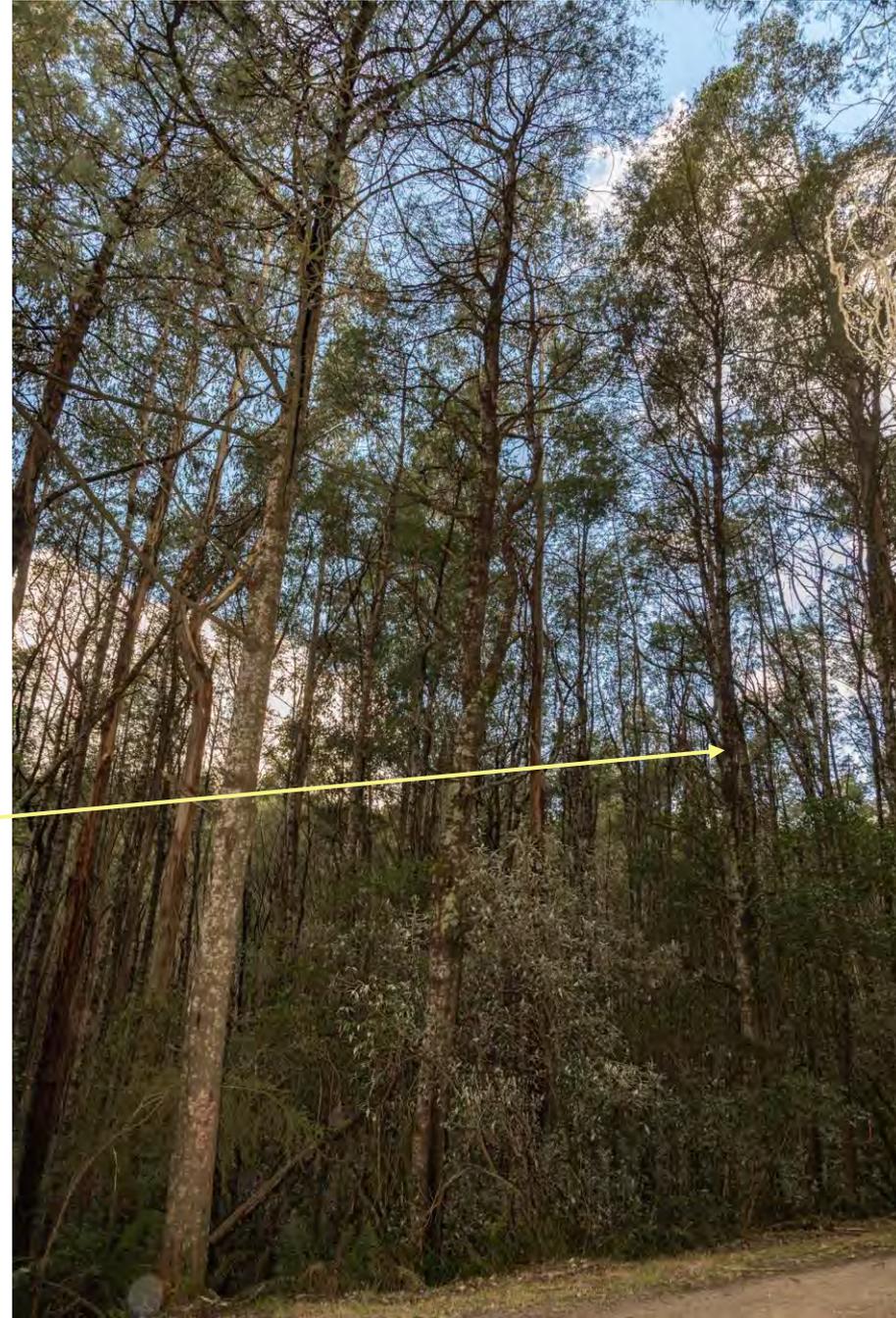
Some outcomes to date Leadbeater's Possum

- foraging in harvesting regrowth after 6 years
- living in fire killed ash forest 9 years post 2009
- found nesting in a 34cm silver wattle in 28 year old regrowth



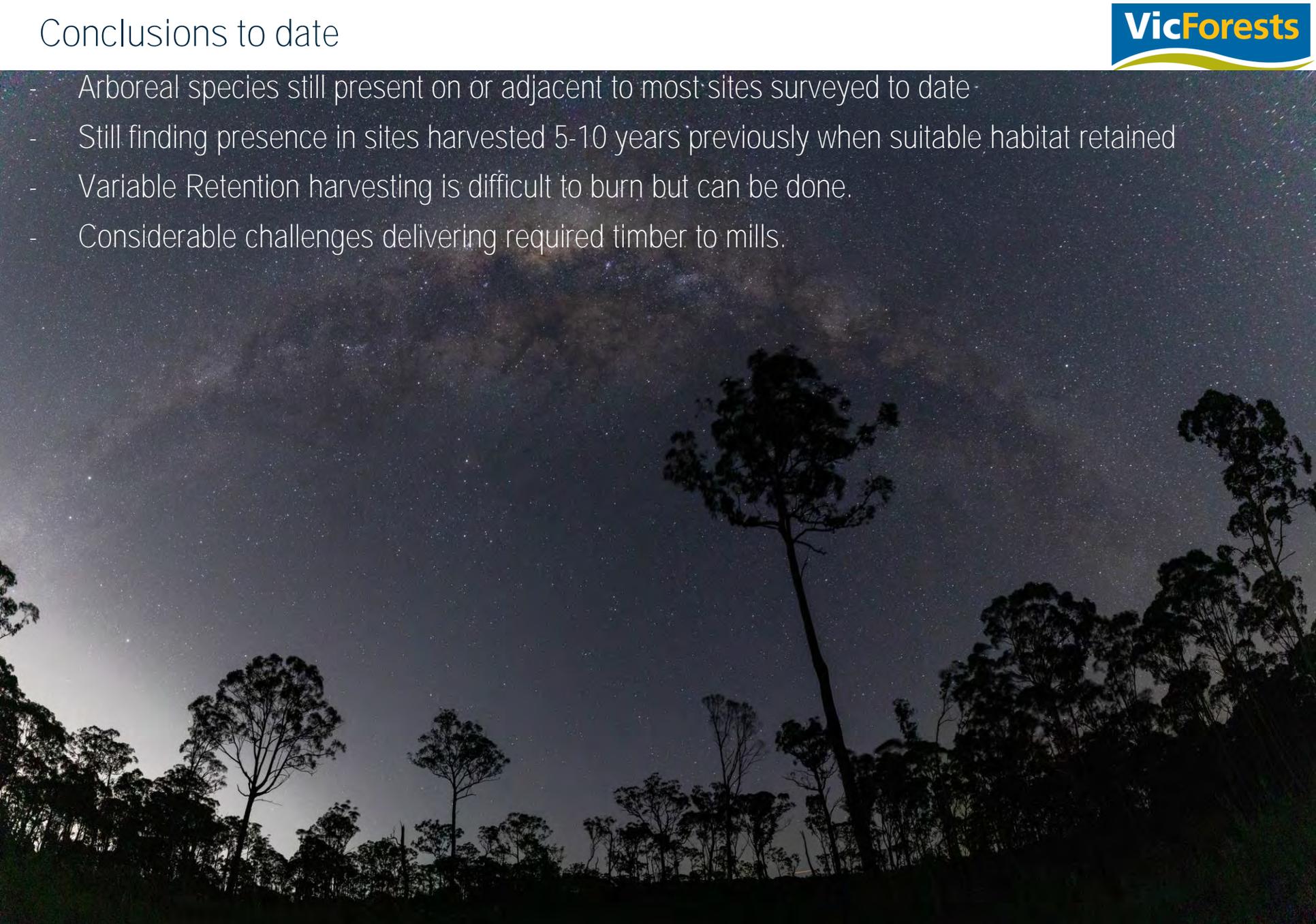
Thermal of LBP and 34 cm Silver Wattle with LBP nest (M.F.Ryan)

34 cm Silver Wattle with
LBP nest (photo M.F. Ryan 2021)



Conclusions to date

- Arboreal species still present on or adjacent to most sites surveyed to date
- Still finding presence in sites harvested 5-10 years previously when suitable habitat retained
- Variable Retention harvesting is difficult to burn but can be done.
- Considerable challenges delivering required timber to mills.



Acknowledgements

- > We acknowledges the Traditional Owners of the land and resources in Victoria and their special and enduring connection to country.
- > The VicForests biodiversity team of Bill Paul, Courtney Whitford, Ben Drouyn and Jess Slapp along with the former managers Tim McBride, Dr Maria Cardoso and Dr Elizabeth Pryde.
- > VicForests staff who have assisted in surveys over the past 5 years and have been adapting harvesting practices to better achieve biodiversity outcomes while still delivering wood to mills
- > Julian Black for the 3D graphics showing silvicultural systems
- > My partner Kerrie and our soon to be born first child who allow me to be absent for so many night surveys.