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Arboreal Mammal Habitat Associations in Wombat State Forest

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Front cover photo: Study site (WCR19) in Wombat State Forest (Phoebe Macak).

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Murray Ralph (BWG) originally proposed the study; Gayle Osborne and Murray Ralph (BWG) contributed to discussions regarding study design, and selected some of the study sites. The authors would also like to acknowledge the enormous effort made by members of the Wombat State Forest community to carry out the hair-tubing and collect vegetation data, which was coordinated by Gayle Osborne and Tanya Loos (BWG). Joanne Potts (ARI) advised on project design and statistical analysis in the pre-data collection phase; Dave Ramsey and Andrew Gormley (ARI) provided post-data collection statistical advice and assistance; Tuesday Phelan and Elisabeth Ashman (DSE Daylesford) provided regional support.

Note that the BWG has since been disbanded with the above members now part of Wombat Forestcare Inc.

Hair-tubing was conducted under Wildlife Act 1975 and National Parks Act 1975 Research Permit No. 10003522, and Department of Sustainability and Environment Arthur Rylah Institute for Environmental Research Animal Ethics Committee Approval No. 05/011. Fauna data collected during spotlighting surveys has been submitted to the DSE Atlas of Victorian Wildlife electronic database.

Summary

Wombat State Forest is a large (70,000 ha) mixed eucalypt foothill forest that has had a long history of timber harvesting. Messmate *Eucalyptus obliqua* has been the major sawlog extracted. Sawlog harvesting ceased in 2003 and a forest management trial was initiated to continue forest management as a community-government partnership. The Wombat Forest Biodiversity Working Group (BWG) obtained funding to conduct research into aspects of forest biodiversity. The Arthur Rylah Institute for Environmental Research (ARI) was asked to carry out a study to contribute to the understanding of the fauna-habitat associations in mature forest areas of Wombat State Forest. Thirty research sites of 1 ha each were selected in areas dominated by Messmate or gum-barked eucalypts. ARI conducted spotlighting surveys for arboreal mammals, and the BWG collected vegetation data (tree species and diameter classes, and cover abundance of understorey habitat attributes) and conducted hair-tubing for ground mammals. A total of 19 fauna species (15 mammal and 4 nocturnal birds) were recorded during spotlighting and hair-tubing. Agile Antechinus *Antechinus agilis* was the most widespread species recorded (20 sites) and Brushtail Possums *Trichosurus spp.* were the most widespread arboreal mammal recorded (13 sites). A total of 3,978 eucalypt trees over 40cm in diameter (DBH) were recorded with Messmate the most common, followed by peppermints, gum-barked eucalypts and stags. The number of trees at each site ranged from 78 to 178. The vegetation surveys revealed that several habitat attributes were present at most or all sites (including bracken, native grasses, rushes/sedges, shrub layer and *Acacia spp.*) while some were less common (including tree-ferns and Cherry Ballart *Exocarpus cupressiformis*): a summary of the results is provided.

Statistical analyses focused on arboreal mammals (particularly Greater Gliders *Petauroides volans*) and tree attributes. Logistic regression models found a positive relationship between the increasing numbers of peppermints and stags per site and the presence of Greater Gliders. There was also a less pronounced positive relationship between Greater Gliders and the number of large (over 100cm DBH) gum-barked eucalypts per site. The number of medium sized (80-100cm DBH) peppermints per site appeared to have a small positive influence on the presence of Brushtail Possums. No significant statistical relationships were found between tree attributes and other arboreal species. Note that the survey effort used to collect arboreal mammal data may not have been sufficient to detect all species at each site, or to identify patterns of occurrence in terms of habitat attributes. Data on hollows would strengthen any future analysis. Rates of harvesting in Wombat State Forest have greatly decreased and are now unlikely to impinge substantially on Greater Glider and other arboreal mammal habitat. The results of analysis of understorey and ground vegetation, and the presence of Agile Antechinus will be presented in a second report.

1 Introduction

Wombat State Forest (WSF), west-central Victoria, is characterised by mixed eucalypt foothill forest and covers an area of about 70,000 ha. It has a long history of timber harvesting, with Messmate *Eucalyptus obliqua* the major sawlog extracted. Widespread harvesting ceased in 2002 pending a review, and in 2003 a community forest management (CFM) trial was initiated, with the intention of forest management continuing as a community-government partnership. The last sawlog coupe was harvested in 2005. The last remaining sawlog licence was bought back by the State government in 2006. Since then there has been limited extraction of commercial and domestic firewood, wood chop logs, and timber for other products such as posts and poles.

The Wombat CFM Council of Stewards was formed to facilitate and coordinate community involvement in the on-going management of the forest, overseeing a number of community working groups that addressed particular issues. In 2004 one of these groups, the Wombat Forest Biodiversity Working Group (BWG) obtained funding from the Department of Sustainability and Environment (DSE) through the Council of Stewards, to conduct research into a number of topics relating to biodiversity in WSF. The Arthur Rylah Institute for Environmental Research (ARI), DSE was asked to be involved and as a result a short study was proposed that would increase the understanding of fauna-habitat associations in mature forest areas of WSF.

The Wombat CFM Council of Stewards and associated working groups were disbanded in 2006. The community group Wombat Forestcare Incorporated was subsequently formed, effectively replacing the BWG, and has since become one of the major contributors to community liaison with DSE on forest management.

The main focus of this research project was to investigate relationships between the presence of Greater Gliders (and to a lesser extent other arboreal mammals) and the number and proportion of broad types of eucalypt trees (i.e. stringybarks such as Messmates *Eucalyptus obliqua*, peppermints and gum-barked species) in mature forest areas of Wombat State Forest. Regrowth areas were avoided as Greater Gliders are known to be sensitive to harvesting (Kavanagh 2000, Lindenmayer 2002) and this study aimed to explore their habitat preferences in mature forest. Greater Gliders *Petauroides volans*, and many other possums and gliders, feed on eucalypts and depend on hollows for day-time shelter and breeding (Henry 1985, Kerle 2001, Gibbons and Lindenmayer 2002). The particular eucalypt species that are used for feeding, and the type (e.g. size and depth) of hollows which are suitable as dens, differ among possum and glider species (Henry 1985, Bennett *et al.* 1991, Lindenmayer *et al.* 1991a). Greater Gliders were considered to be of special interest as they depend on large hollow-bearing trees and have a relatively patchy distribution within Wombat State Forest (Atlas of Victorian Wildlife, DSE 2007a, Maries 2001).

The available funding allowed for selection of 30 study sites (Figure 1), and for arboreal mammal surveys to be conducted by ARI staff using spotlighting techniques. Data on eucalypt trees were collected by BWG members. A secondary component of the project involved vegetation, and ground and arboreal mammal surveys (via hair-tubes), carried out by the BWG on advice and instruction by ARI. This report is primarily intended to identify the suite of aboreal mammals present in areas of mature forest within Wombat State Forest, and to elucidate possible associations between arboreal mammals and vegetation characteristics (habitat elements) of sites. The implications of these findings on forest management are also discussed. More detailed analysis of this component will be presented in a second report.

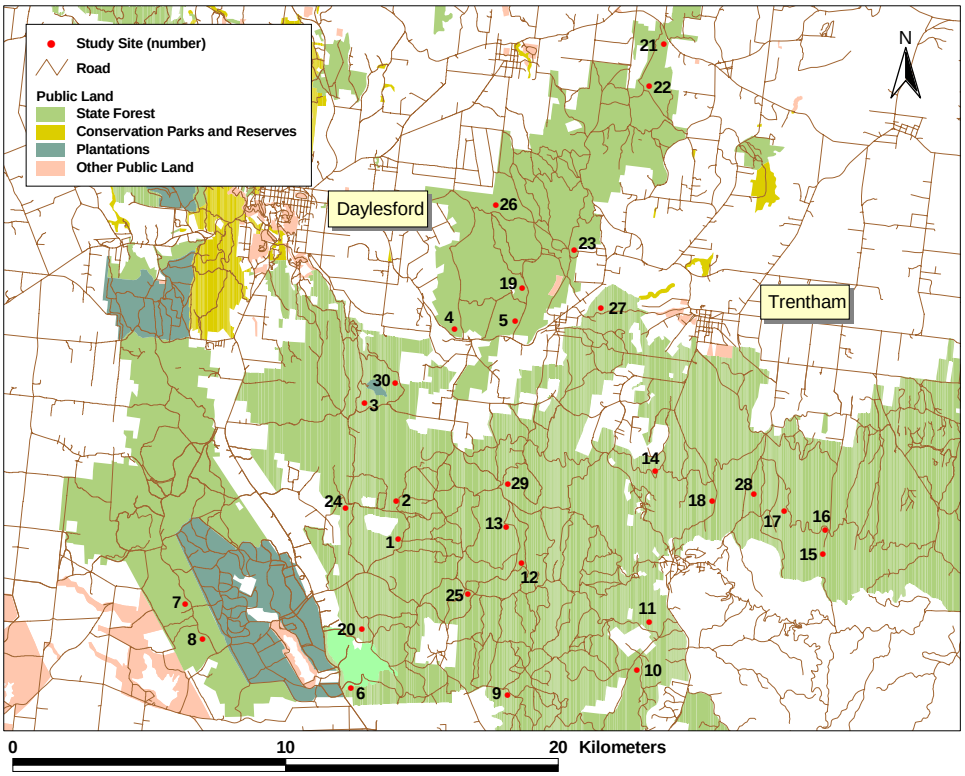

Figure 1. Study sites within Wombat State Forest used to investigate mammal habitat associations in mature forest

2 Methods

2.1 Study area

Wombat State Forest is located about 70km north-west of Melbourne, between Ballan and Woodend, and north of Daylesford to Yandoit, covering an area of about 70,000 ha. It is characterised by mixed species foothill forest, with Messmate the most common eucalypt. Other eucalypts present include Narrow-leaved Peppermint *Eucalyptus radiata*, Broad-leaved Peppermint *E. dives*, Manna Gum *E. viminalis*, Swamp Gum *E. ovata*, Mountain Grey Gum *E. cypellocarpa* and Candlebark *E. rubida*. Study sites were selected from an area of the forest roughly encompassed by Daylesford, Spring Hill, North Blackwood, Blackwood, Blakeville and Barkstead.

2.2 Site selection

Thirty study sites were selected in large blocks of continuous mature forest dominated by Messmate or gum-barked species (Figure 1). Twenty-six of these sites had been used previously during other ARI research projects and were selected based on State Forest Resource and Inventory Project forest polygon codes that identify age class and dominant eucalypt species. Including these sites in the current study reduced the amount of time spent on site selection and field reconnaissance to check access and suitability. Four additional sites were chosen from a selection made by the BWG. These were selected based on forest maturity, dominant eucalypt species, access and connectivity with the wider forest area. Sites were located a minimum of 1km apart from each other to ensure that individual animals targeted during surveys could not be recorded from two sites on the same night. Sites were chosen to cover a large geographic area within the forest in order to sample a wide variety of habitats present across the landscape.

Each study site was set up as a 250 m x 40 m (1 ha) area. A 250m transect line was measured along a compass bearing using a hipchain and marked every 10 m using flagging tape. The site extended 20 m on either side of the transect line. Coordinates (MGA GDA94) for each site were taken at the start of each transect (i.e. at 0 m) using a Garmin eTrex Vista global positioning system unit. Most sites were location within the general management zone of the forest. Two sites were within the grounds of the Bullarto Reservoir.

2.3 Arboreal mammal spotlighting surveys

Arboreal mammals were surveyed by timed spotlight walks and were carried out by Phoebe Macak and Ryan Chick (ARI) between 31 August and 23 September 2005. One observer walked slowly down a transect line for between 40-50 mins stopping every 10-15 m to systematically sweep the surrounding vegetation with a 55watt hand held spotlight powered by a 12 v 12 Ah battery. Observers used 10x40 Zeiss binoculars to confirm identification of any animals seen. All arboreal mammals observed (seen or heard) were recorded and noted as to whether they were on or off-site. Any other animals observed (e.g. birds or ground mammals that spotlighting surveys are not specifically designed to detect) were noted as incidental records. Each site was surveyed twice, on different nights.

2.4 Arboreal and small ground mammals hair-tube surveys

The presence of arboreal and small ground mammals was investigated by using hair-tubes (sampling devices designed to collect mammal hair). Two types of hair-tubes were used: small tree-mounted tubes and ground-based tunnels. Thee two types were arranged alternately along the transect line of each site every 10 m equalling a total of 24 tubes per site (12 of each type). Tubes were left *in situ* for 14-16 days between October-December 2005. The hair-tube survey was conducted in two stages, with half (15) the sites surveyed at a time. Tubes were collected, processed for hair, cleaned and re-taped between the two stages. Sites were selected within each

survey stage to cover the geographic spread of the study area, and sites closest to each other were not surveyed at the same time. The topographic position of each tube was estimated (ridge, upper slope, mid slope, lower slope, drainage line, gully, flat). A grand total of 720 hair-tubes (360 each of tree and ground) were deployed over the 30 study sites. Mammal hair caught on the sticky surface of the adhesive tape was identified to species level, where possible. Hair samples were analysed by Barbara Triggs ('Dead Finish', Genoa, Victoria)

Hair-tubes were constructed and deployed by the BWG after instructions from Ryan Chick (ARI). All hair-tubes were baited with a mixture of honey, peanut butter and rolled oats.

Tree-mounted tubes were constructed from PVC piping (38 mm diameter x 120 mm long). At each end of the piping three strips of double sided adhesive tape were stuck over the edge such that a strip extended for about 40 mm lengthwise along the outside and inside surface of the piping. Bait was contained within a small PVC tube (about 36 mm long) and held in place in the middle of the hair-tube when attached to the trunks of the largest trees (favouring eucalypts) by a nail that went through the diameter of the piping and down the length of the bait holder.

Ground-based tunnels were made from clear polycarbonate sheets (250 mm x 300 mm) ('Handiglaze Premium'; Laserlite Australia, Cheltenham Vic.). A stainless steel double-spoon type tea infuser was used to contain bait, and was placed into a 22mm circular hole cut 100 mm along the long edge and 12.5 cm along the short edge of the polycarbonate sheet. Four pieces of double sided adhesive tape (48 mm wide x 120 mm long) were placed along the length of the short edge of the sheet (two on each edge) over four pieces of reinforced garden hose (600 mm long). The sheets were bent and held in place in the ground by a length of galvanised wire (5 mm diameter x 600 mm long) bent into a 'U' shape. The wire passed through the protruding handle of the baitholder to hold the components together. The tunnels were placed with the short edge along the ground.

One site (WCR28) was re-surveyed using tree-mounted tubes during February 2007, in an effort to detect Brush-tailed Phascogales *Phascogale tapoatafa.* Three parallel lines of 12 tubes each (a total of 36 tubes) were deployed. Tubes were set at 20 m apart; the lines were 200 m from each other. Honey-water was sprayed onto the bark above and below tree-mounted tubes to enhance their attractiveness. Results from these will be presented separately to those from the main study.

2.5 Vegetation surveys

Vegetation surveys were designed to give an indication of the presence of structural and habitat elements of the forest, particularly those that provide shelter or foraging substrate for arboreal and small ground-based mammals. Some of these elements were chosen with the view that any future work on diurnal birds could draw on the survey results. Vegetation surveys were carried out by members of the BWG during 2006.

All live and dead eucalypts greater than or equal to 40cm diameter at breast height (DBH) were measured with a diameter tape and classified into three size ranges (40-79, 80-99, >100 cm DBH). Trees were also categorised into one of eight tree forms according to a scale representing increasing senescence (Appendix 2). Live trees were identified to species level in the case of Messmates or grouped according to their bark type as either peppermints or gum-barked eucalypts. The bark grouping was used as some peppermints and gum-barked eucalypts are difficult to identify to species level. Species included within the peppermint grouping included Narrow-leaved Peppermint and Broad-leaved Peppermint. Gum-barked eucalypts included Manna Gum, Mountain Grey Gum, Swamp Gum and Candlebark.

To collect data on understorey trees, shrubs, logs and stumps the site was divided into 13 segments along the length of the transect. Each segment was 40 m wide, with 12 segments 20 m long (e.g.

0-20 m, 20-40 m etc.) and one segment 10m long (the end of each transect i.e. 240-250 m). The density of understorey trees and shrubs was rated by visual assessment according to the Braun-Blanquet scale of cover abundance; * = rare, 1 = <5%, 2 = 5-25%, 3 = 25-50%, 4 = 50-75%, 5 = 75-100%. Cover abundance surveys were carried out by the same two observers at all sites. Understorey trees and shrubs were recorded by species or in broad groupings as follows: Blackwood *Acacia melanoxylon*, Silver Wattle *A. dealbata*, Cherry Ballart *Exocarpus cupressiformis*, Musk Daisy-bush *Olearia argophylla*, Coprosma *Coprosma spp*., woody shrubs < 2 m tall, woody shrubs >2 m tall, sedges, ground ferns, tree-ferns and grasses. Note that the woody shrub grouping did not include Blackwood, Silver Wattle, Musk Daisy-bush or Coprosma. The number of logs > 40 cm DBH within each site segment were categorised as 40-59 cm, 60-79 cm or >80 cm DBH. The DBH of logs was measured at the widest part of the log. Where a log crossed into two segments, it was only included in the segment that the longest part of the log lay in. Hence for some segments, the number of logs present may be an underestimate. The number of stumps >40cm DBH within each site segment was recorded and placed into one of three size classes: 40-59 cm, 60-79 cm or >80 cm DBH. The DBH for logs was measured at the top of stumps. For the purposes of summarising vegetation data to allow comparisons between sites, information for each segment was averaged post-survey to give an overall cover abundance rating for each site.

2.6 Data analyses

Simple linear regressions and logistic regressions (generalised linear models) were used to explore relationships between the abundance/presence of mammals and combinations of tree variables (numbers of individual trees, live and dead; numbers and proportions of eucalyptus tree types; DBH index; numbers of trees and tree types within DBH classes; tree forms).

Only on-site hollow-using arboreal mammal records were included in the analysis (Greater Glider, Sugar Glider *Petaurus breviceps*, Common Ringtail Possum *Pseudocheirus peregrinus*, Brushtail Possum *Trichosurus spp.* and Feathertail Glider *Acrobates pygmaeus*).

3 Results

3.1 Mammals and nocturnal birds

A total of 19 fauna species (15 mammals and 4 nocturnal birds) were recorded during the study. Six species of arboreal mammal and five native ground mammals were recorded on-site or nearby during spotlighting and hair-tube surveys (Table 1) Common Ringtail Possum, Mountain Brushtail Possum *T. cunninghami*, Sugar Glider, Feathertail Glider, Greater Glider, Koala *Phascolartos cinereus*, Swamp Wallaby *Wallabia bicolor*, Common Wombat *Vombatus ursinus*, Agile Antechinus *Antechinus agilis*, Bush Rat *Rattus fuscipes* and Swamp Rat *Rattus lutreolus*. Brushtail Possum hair was recorded in hair-tubes, but it could not be identified to species level.

Agile Antechinus was the most widespread species, present at 20 sites (including one site at which an unidentified Antechinus was recorded and assumed to be this species). Brushtail Possums were the most widespread arboreal mammal recorded (13 sites) following by the Common Ringtail Possum (11 sites). All the on-site Brushtail Possum records were from hair-tubes and could not be identified to species level to distinguish between Mountain Brushtail and Common Brushtail Possums *T. vulpecula*, both of which are present in Wombat State Forest. The Mountain Brushtail Possum was observed during spotlighting once, off-site. Greater Gliders were detected by spotlighting only and recorded from seven sites, with on-site records from six of these sites. Records for this species were dispersed over the study area.

Incidental records of the Powerful Owl *Ninox strenua* (listed as Vulnerable in Victoria, DSE 2007b), Southern Boobook *N. novaeseelandiae*, Tawny Frogmouth *Podargus strigoides*, Australian Owlet-nightjar *Aegotheles cristatus*, White-striped Freetail Bat *Tadarida australis* and Eastern Grey Kangaroo *Macropus giganteus* were noted during spotlighting. The introduced Red Fox *Vulpes vulpes* was recorded at three sites from a combination of spotlighting and hair-tube surveys, while the House Cat *Felis catus* was recorded from hair-tubes at two sites. Many diurnal bird species were observed during vegetation surveys.

The additional hair-tubing session at site WCR28 was carried out when hair analysis from the main round of surveys detected ‘probable’ Brush-tailed Phascogale from two tree-mounted tubes. All 36 tubes deployed during the second hair-tube survey returned hair identified as Agile Antechinus. Due to the ‘probable’ status of the Brush-tailed Phascogale identification, the presence of this species at this site remains unconfirmed.

Table 1. Mammals and nocturnal birds recorded during spotlighting and hair-tubes surveys within Wombat State Forest. X denotes on-site records; N denotes off-site but nearby records; * denotes records over 100m from site.

Site	Common Ringtail Possum	Mountain Brushtail Possum	Unidentified Brushtail Possum	Sugar Glider	Greater Glider	Feathertail Glider	Koala	Common Wombat	Eastern Grey Kangaroo	Swamp Wallaby	Agile Antechinus	Bush Rat	Swamp Rat	Southern Boobook	Powerful Owl	Australian Owlet-nightjar	Tawny Frogmouth	White-striped Freetail Bat	Red Fox	Feral Cat
WCR01		N								X	X								X	
WCR02			X			X				X	X									
WCR03											X									
WCR04							N	X		X	X^	X								
WCR05	X		X								X	X		*	*					
WCR06	X				N									X						X
WCR07									X	X	X									
WCR08				N			X				X									
WCR09					X				X	X				X						
WCR10	N																		X	
WCR11	X		X									X								
WCR12										X	X	X		X		X				
WCR13			X				N				X									X
WCR14										X	X					X			X	
WCR15	X				X					X	X					X		X		
WCR16	N							X		X				*						
WCR17	X						N				X						X			
WCR18							N		X	X	X									
WCR19	X		X		X			X			X				*					
WCR20			X		X						X			*						
WCR21				X			N			X	X	X						X		
WCR22					X		N				X			*						
WCR23			X								X	X		*						
WCR24			N				X			X				*						
WCR25	X										X	X								
WCR26			X				N			X										
WCR27			X							X										
WCR28	N		X					X		X	X			*				X		
WCR29			X		X		N	X		X			X							
WCR30	X											X		*						
Number on-site	**8**	**0**	**11**	**1**	**6**	**1**	**2**	**5**	**3**	**16**	**19**	**8**	**1**	**3**	**0**	**3**	**1**	**3**	**3**	**2**

X^ Unidentified Antechinus

3.2 Vegetation surveys

A total of 3,978 eucalypt trees were identified and classified into three size classes during the surveys (Table 2). Messmate was the most common eucalypt (2,301) followed by peppermints

(920), gum-barked eucalypts (611) and stags (146). The number of trees at each site ranged from 78 to 178. Peppermints were the most widespread, present at 29 sites. Messmates were present at all but three sites, while there were ten sites with no gum-barked eucalypts recorded.

Most trees recorded were within the smallest DBH class 40-79cm (3,310), followed by 80-99cm (545) and >100cm (123). Trees in the 40-79cm and 80-99cm DBH range were present at all sites, while three sites had no trees >100cm DBH. Most sites had under ten trees in the largest size class; three sites had over ten, the most being 19 (WCR05).

The majority of stags (dead trees) were classified as forms 7 and 8; the most decayed in the scale of tree senescence when trees are effectively a solid or hollow stump. Stags were recorded from all but one site.

Table 2. Number of trees counted per site, grouped into eucalypt species or type, size class and tree form. Dominate eucalypts are MM=Messmate or Gum=gum-barked

Site	Dominate eucalypt*	Number of trees	Gum-barked	Messmate	Peppermint	Stag	40-79cm DBH	80-99cm DBH	>100cm DBH	Total live trees	Form 1	Form 2	Form 3	Form 4	Form 5	Form 6	Form 7	Form 8
WCR01	MM	163	7	152	3	1	116	41	6	162	162	0	1	0	0	0	0	0
WCR02	MM	178	1	159	18	0	159	19	0	178	175	3	0	0	0	0	0	0
WCR03	MM	147	0	117	27	3	138	8	1	144	143	1	1	0	0	0	2	0
WCR04	MM	142	0	114	27	1	124	17	1	141	137	4	0	0	0	0	0	1
WCR05	MM	132	3	91	35	3	84	29	19	129	125	4	0	1	0	0	0	2
WCR06	MM	136	36	79	16	5	119	13	4	131	115	16	1	0	0	0	0	4
WCR07	MM	124	12	108	2	2	112	12	0	122	121	1	0	0	0	0	0	2
WCR08	MM	90	24	65	0	1	67	22	1	89	89	0	0	0	0	0	0	1
WCR09	MM	130	6	105	5	14	103	23	4	116	108	8	5	3	1	1	1	3
WCR10	MM	122	0	106	10	6	108	12	2	116	116	0	1	0	0	0	0	5
WCR11	MM	128	0	95	25	8	111	15	2	120	107	13	1	0	0	0	0	7
WCR12	MM	149	0	98	41	10	144	5	0	139	139	0	0	0	1	3	3	3
WCR13	MM	142	2	66	71	3	121	17	4	139	138	1	0	0	0	1	1	1
WCR14	MM	102	0	53	45	4	77	20	5	98	94	4	0	0	0	0	4	0
WCR15	MM	127	9	33	74	11	112	13	2	116	90	26	0	1	1	0	6	3
WCR16	MM	174	0	123	44	7	160	12	2	167	145	22	0	0	0	0	1	6
WCR17	MM	150	0	131	16	3	120	17	13	147	138	9	0	0	0	0	2	1
WCR18	MM	157	1	134	19	3	116	38	3	154	143	11	0	0	0	0	3	0
WCR19	Gum	112	28	39	42	3	90	15	7	109	105	4	0	0	0	0	1	2
WCR20	Gum	99	20	0	74	5	81	13	5	94	84	10	2	0	0	0	2	1
WCR21	Gum	91	60	1	24	6	75	12	4	85	82	3	1	0	0	3	2	0
WCR22	Gum	149	43	0	99	7	130	15	4	142	136	6	0	0	0	0	3	4
WCR23	Gum	121	66	0	51	4	107	12	2	117	111	6	1	0	0	0	2	1
WCR24	Gum	78	60	5	9	4	51	21	6	74	67	7	0	4	0	0	0	0
WCR25	MM	168	0	140	19	9	154	11	3	159	159	0	2	1	0	0	1	5
WCR26	Gum	104	59	14	26	5	68	25	11	99	91	8	0	0	0	0	1	4
WCR27	Gum	148	102	1	37	8	122	24	2	140	135	5	0	2	1	5	0	0
WCR28	MM	129	4	107	16	2	89	34	6	127	124	3	1	0	0	1	0	0
WCR29	Gum	148	68	45	30	5	135	11	2	143	136	7	0	0	0	1	0	4
WCR30	MM	138	0	120	15	3	117	19	2	135	133	2	1	1	0	1	0	0
Total		**3978**	**611**	**2301**	**920**	**146**	**3310**	**545**	**123**	**3832**	**3648**	**184**	**18**	**13**	**4**	**16**	**35**	**60**
Mean		132.6	20.4	76.7	30.7	4.9	110.3	18.2	4.1	127.7	121.6	6.1	0.6	0.4	0.1	0.5	1.2	2.0
Std Dev		25.3	28.1	51.7	24.0	3.3	27.8	8.5	4.1	25.4	26.1	6.4	1.0	1.0	0.3	1.2	1.5	2.1

3.3 Cover / abundance of vegetation attributes

Overall, the study sites varied a little in terms of shrubs and tree species present (Table 3). Mistletoe was present at seven sites, and only rarely at those. Of the two Acacia species surveyed, most sites had one or the other, sometimes both. Blackwood was recorded from more sites than Silver Wattle. Blackwood was present mainly in shrub form with 1-3 canopy-sized individuals recorded from 11 sites. When present, Acacia was usually rare throughout sites, or in low densities (up to 5% cover). Cherry Ballart was present at three sites in low densities. Musk Daisy-bush was recorded at eight sites from scattered individuals up to 5% cover, with two large trees (in the 40-60cm DBH range) at WCR09. All sites had a shrub layer, expect for WCR06, where a few scattered Acacias were the only shrubs. Coprosma was present at many sites, at low to very low densities. All sites had varying cover of leaf litter, generally between 5-50%, with three sites recording over 50%. Bracken and native grasses were present at all sites, generally in low densities, although a few sites had a high cover of grasses. Rushes/sedges were present at all sites, usually in low densities. Tree-ferns were scarce across the sites, present at eight, while ground ferns were recorded from the majority of sites, but at low densities. The number of logs and stumps varied between sites. Logs within the 40-59cm DBH range were present at all sites and were more numerous than those within the larger DBH ranges 60-79cm and >80cm, which were not always present. The total number of logs at individual sites ranged from 1 to 31, with 355 logs recorded overall. Stumps were present at all sites, with those in the smaller size range (40-59cm) more numerous than larger sized stumps. The total number of stumps counted per site ranged from 4 to 35, with 503 stumps recorded overall.

Within sites, the cover abundance of some vegetation attributes varied across the 13 segments while some were spread evenly throughout the 1ha area (Appendix 4). For example, rushes/sedges were sometimes concentrated in high densities over several adjacent segments, while being sparse within the rest of the site. This change in density over the transect sometimes corresponded to the landform at different points of a site with the highest densities of rushes/sedges recorded in gullies and drainage lines.

Table 3. Cover abundance measurements for habitat attributes and numbers of logs and stumps at each study site. Cover abundance values are averages of 13 measurements taken at each site according to the Braun-Blanquet scale: *=rare; 1=<5%; 2=5-25%; 3=25-49%; 4=50-75%; 5=75-100%.

Site	Mistletoe	Silver Wattle	Blackwood	Cherry Ballart	Musk Daisy-bush	Shrubs>1m	Shrubs<1m	Coprosma	Leaf litter	Bracken	Native grasses	Rushes/sedges	Tree-ferns	Ground ferns	Logs 40-59cm	Logs 60-79cm	Logs >80cm	Total logs	Stumps 40-59cm	Stumps 60-79cm	Stumps >80cm	Total stumps
WCR01	0	0	*	0	1	1	1	1	3	2	2	2	0	0	3	1	1	5	10	8	3	21
WCR02	0	0	0	0	0	2	2	0	3	2	2	1	0	0	5	1	1	7	18	7	2	27
WCR03	0	0	*	0	0	1	2	*	3	1	3	1	0	*	10	3	3	16	7	6	3	16
WCR04	0	0	*	0	0	1	1	0	1	2	4	1	0	0	3	0	0	3	8	4	2	14
WCR05	0	0	*	0	0	1	1	0	2	2	3	2	0	1	16	0	0	16	31	2	2	35
WCR06	0	*	*	0	0	0	0	0	3	2	2	2	0	*	1	0	0	1	8	5	1	14
WCR07	0	0	*	0	0	0	1	0	4	2	1	1	0	*	6	0	0	6	9	5	0	14
WCR08	0	0	1	*	0	1	1	0	3	2	2	1	0	0	5	1	0	6	12	4	2	18
WCR09	*	0	*	0	1	2	1	1	1	2	4	1	*	*	6	2	2	10	14	3	1	18
WCR10	0	0	0	0	0	1	1	*	2	2	2	1	0	0	9	4	3	16	13	4	4	21
WCR11	0	0	0	0	0	2	2	*	2	2	3	1	*	*	10	3	1	14	9	3	3	15
WCR12	0	0	0	0	0	2	2	0	2	2	2	1	*	*	8	3	2	13	11	5	2	18
WCR13	0	0	*	0	*	2	1	0	2	1	2	1	0	*	8	2	1	11	16	8	1	25
WCR14	*	0	0	0	1	1	1	*	2	1	3	1	0	0	9	2	0	11	3	3	0	6
WCR15	1	1	0	0	0	1	2	0	3	1	1	1	0	0	13	2	0	15	10	0	0	10
WCR16	*	0	0	*	0	1	1	*	3	1	1	1	*	*	11	7	1	19	20	6	0	26
WCR17	0	0	0	*	0	1	1	0	4	2	1	1	0	1	21	7	3	31	6	5	4	15
WCR18	*	0	0	*	0	1	1	*	2	2	3	2	*	*	14	7	1	22	14	10	3	27
WCR19	*	1	*	0	0	1	1	0	2	2	2	2	0	0	21	1	2	24	6	7	5	18
WCR20	0	1	1	0	0	1	1	1	2	2	1	1	0	0	9	1	4	14	5	5	0	10
WCR21	0	1	*	0	0	1	*	0	3	2	2	1	0	*	4	3	5	12	12	2	0	14
WCR22	0	1	0	*	0	*	*	0	5	1	1	1	0	0	4	3	0	7	8	0	0	8
WCR23	0	1	1	0	0	1	1	0	3	1	2	1	0	*	6	0	1	7	4	1	0	5
WCR24	0	0	1	0	0	1	1	1	2	2	2	2	0	1	8	0	0	8	5	4	0	9
WCR25	0	0	0	0	1	1	1	1	2	1	2	2	*	1	7	5	2	14	8	9	2	19
WCR26	0	1	*	0	0	1	1	1	3	2	1	1	0	*	9	4	0	13	10	6	2	18
WCR27	0	*	*	0	0	1	2	*	2	1	2	3	0	1	5	1	0	6	10	0	0	10
WCR28	0	0	*	*	1	1	1	1	3	2	1	1	1	*	14	4	0	18	14	5	1	20
WCR29	0	0	*	0	*	2	2	1	2	2	2	3	0	*	5	0	0	5	3	1	0	4
WCR30	*	0	1	0	1	1	1	1	3	2	2	2	*	2	3	1	1	5	19	4	5	28

3.4 Relationship between arboreal mammals and tree attributes

Four of the six sites where Greater Gliders were recorded had more peppermint trees than Messmate, gum-barked eucalypts or stags. Three of these were those with the highest proportion of peppermints of all sites. Two of these sites had no Messmates above 40cm DBH. Logistic regressions indicated that there was a positive relationship between the presence of Greater Gliders and numbers and proportion of peppermints, stags (particularly those of form 3-5) and gum-barked eucalypts over 100cm DBH. The presence of Messmate appeared to have a small negative effect on Greater Gliders. The interactions between these influencing factors are unclear with some

having a stronger effect than others. The model with the best fit to the data was that which included the number of peppermints and stags (form 3-5) per hectare (Table 4).

This model explained 40% of the variation in the response (i.e. the presence or absence of Greater Gliders) to these two factors. The model predicts that the chance of a Greater Glider being found to be present increases with the number of peppermints, which is enhanced with an increase in the number of relatively intact stags (Figure 2). The number of medium sized (80-99cm DBH) peppermints was found to have a small positive influence on the probability that Brushtail Possums would be present, with models explaining 13% of their response.

Analysis detected no statistically significant relationships between the presence of Greater Gliders or Brushtail Possums and other tree variables measured including the number and proportion of small to medium-sized gum-barked eucalypts, DBH index, the total number of gum-barked eucalypts, the total number of trees in the three DBH classes and the number of all trees per site.

There were no significant statistical relationships between the presence of other hollow-using arboreal mammal species or arboreal mammals as a whole, and tree numbers and attributes.

Table 4. Parameter estimates from best fit logistic regression model of the presence of Greater Gliders in Wombat State Forest using data collected in 2005-2006

Parameter	Estimate	Standard error	Test statistic	Probability
Constant	-5.11	1.64	-3.12	0.002
Number of peppermints per hectare	0.0725	0.0289	2.51	0.012
Number of stags (form 3-5) per hectare	0.639	0.302	2.12	0.034

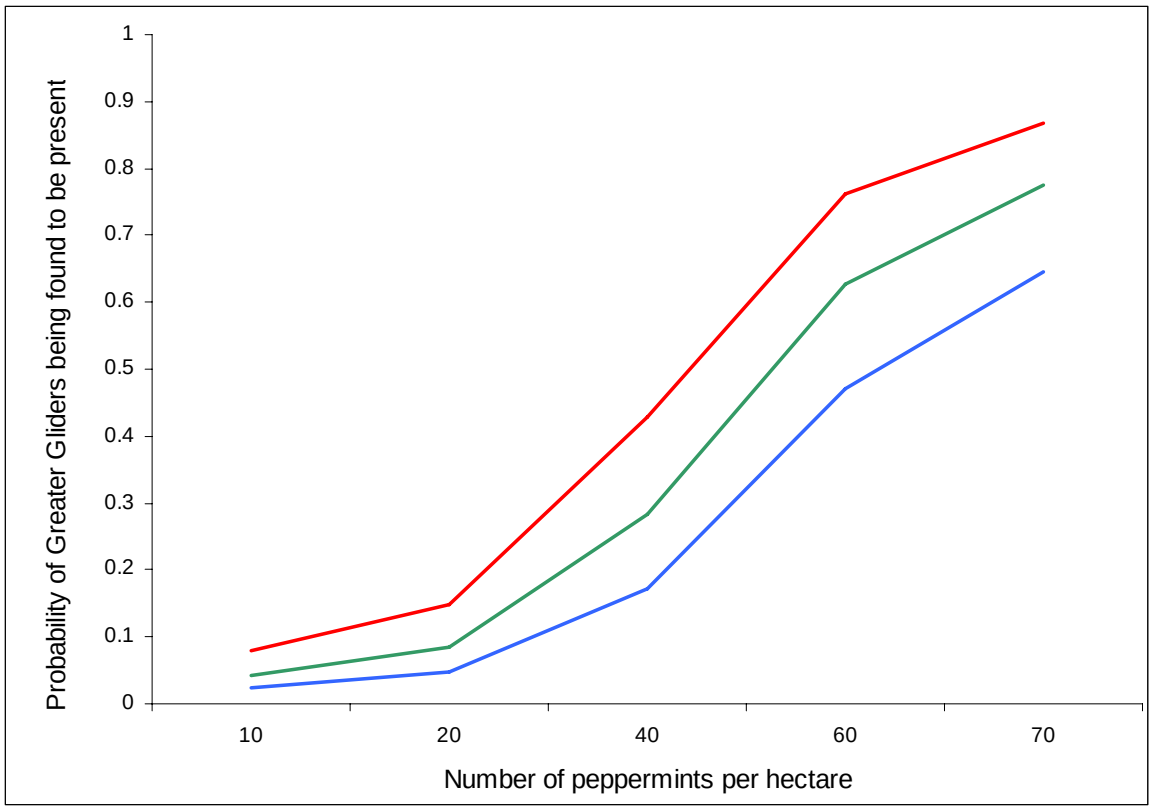

Figure 2. Predicted response of Greater Glider presence to the number of peppermints per hectare for one (blue), two (green) and three (red) stags (form 3-5) per hectare

4 Discussion

The low number of sites where Greater Gliders were recorded meant that there was limited data available for statistical analysis. The attributes most strongly related to the presence of Greater Gliders were the numbers and proportions of peppermints trees and relatively intact stags. The number of large gum-barked eucalypts was also identified as an influencing factor, although to a lesser extent. This has been identified as an important factor in an earlier study in the area by Maries (2001). The distribution of Greater Gliders will be due to a multitude of interacting factors, including social behaviour, rate of predation (e.g. by Powerful Owls) and habitat suitability (Lindenmayer 2002). Critical habitat elements include availability of suitable foraging areas and dens. Although Greater Gliders feed on a range of eucalypts, they are known to locally favour certain species which may be due to the nutrient content of leaves, which can change over different seasons (Henry 1985, Kavanagh and Lambert 1990). In Victoria Narrow-leaved Peppermint and Manna Gum are often preferred (Bennett *et al.* 1991), and these species are both prevalent in Wombat State Forest.

Hollow assessments were not conducted during this study as there are many difficulties and potential errors associated with identifying hollows (Koch 2008), and the expertise needed to ensure an acceptable level of accuracy was not available. However, tree size data were collected and this attribute may give an indication of the incidence of hollows (Gibbons *et al.* 2000). Greater Gliders require large hollows to den and breed (Lindenmayer *et al.* 1991a) and such hollows are more common in larger trees (Gibbons *et al.* 2000, Lindenmayer *et al.* 2000). Individuals also need access to many suitable hollows as they use multiple dens (2-18) throughout their home range (Henry 1985, Kehl and Borsboom 1984, Lindenmayer 2002). Calder *et al.* (1983) found that in Wombat State Forest gum-barked eucalypts more commonly had hollows than peppermints and Messmate, while Maries (2001) found an association between the presence of Greater Gliders and gum-barked eucalypts at sites in the south of the forest. Elsewhere, some eucalypt species have been found to form hollows at a younger age or size than others (Lindenmayer 2000). It is possible that most of the hollows that gliders can use are being provided by stags and large gum-barked eucalypts, and therefore having an influence on this species' distribution.

Although Brushtail Possums usually den in tree hollows, they are also able to den in stumps, logs and sometimes burrows and dense ground vegetation (Menkhorst 1995, Martin 2006), particularly when hollow-bearing trees are less abundant (Lindenmayer *et al.* 1991b). To what extent these alternative denning sites are used in Wombat State Forest is unknown. The incidence of hollows preferred by this species was not investigated and it is unknown whether the increased likelihood (albeit small) of their presence with increasing numbers of medium-sized peppermint trees is due to such attributes. Eucalypt leaves comprise a larger portion of the diet of Common Brushtail Possums than Mountain Brushtail Possums, which in some areas feed mainly on Silver Wattle as well as fungi and herbaceous plants (Menkhorst 1995). Many arboreal mammals that include leaves in their diet tend to prefer particular eucalypt species according to the concentrations of various compounds present in the leaves (Kavanagh and Lambert 1990, Lawler *et al.* 1998). Whether Common Brushtail Possums prefer peppermint leaves over others is unknown; however peppermints belong to a group of eucalypts that contain a certain leaf compound that this species has been shown to avoid (Marsh *et al.* 2003). Common and Mountain Brushtail Possums have slightly different habitat preferences and, as the data used for analysis were not differentiated at species level, it is difficult to identify the reason behind the apparent link with peppermints.

It is important to note that fauna data used for analysis were based on a survey effort which may not be sufficient to detect all species that are using a particular site (Wintle *et al.* 2005). Most

observations of Greater Gliders were from only one of the two nights surveyed; gliders can be present in an area and not be detected. This is despite their small home range (around 1-3 ha) (Henry 1985), bright eye shine and sedentary nature, all characteristics that make this species relatively easy to detect. A more intense survey effort and higher number of study sites may increase the number of glider records overall. Furthermore, the collection of additional habitat data, such as the occurrence of hollows could provide a more complete picture of the habitat relationships. This would allow more robust estimates of whether particular sites are occupied by gliders or not (especially if detectability probabilities can be calculated) and increase the likelihood of statistical models being able to identify patterns of glider occurrence in terms of habitat attributes.

All mammal species detected during the current study are known to occur in Wombat State Forest (Atlas of Victorian Wildlife, DSE 2007a) and are regarded as common in Victoria (Menkhorst 1995). The Short-beaked Echidna *Tachyglossus aculeatus* was not sighted but has been seen during other studies by the authors, and diggings believed to be by this species were observed by community group members during vegetation surveys. The Eastern Pygmy Possum *Cercartetus nanus* and Dusky Antechinus *Antechinus swainsonii* are also known to occur in the area but were not detected; however records of these species are scarce within the study area. The Eastern Pygmy Possum is not easily recorded by the methods used in this study. The Powerful Owl, listed as threatened in Victoria (DSE 2007b), was recorded on a few occasions from a restricted locality, but surveys were not designed to detect nocturnal birds and this species is known to be more widespread across the forest (Atlas of Victorian Wildlife, DSE 2007a).

Broad-scale timber harvesting no longer occurs in Wombat State Forest, and although a small amount of timber is still being extracted, it is on a scale unlikely to pose a serious threat to arboreal mammal populations. Indeed, the low level of current harvesting provides scope to actively segregate timber extraction from habitats known to be favoured by Greater Gliders. With these low levels of timber extraction, the forest can be expected to mature, especially in areas impacted by past broad-scale harvesting, thereby increasing habitat suitability for arboreal mammals over time.

The detailed vegetation data collected during this project are suitable for investigating the relationship between the presence of Antechinus (and perhaps the less commonly recorded Swamp Rat) and features of ground vegetation and any other habitat attributes (particularly understorey trees and shrubs, logs and stumps). This analysis will be the focus of a second report.

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Appendix 1 Study sites in Wombat State Forest used to investigate mammal habitat associations

Site	Dominant eucalypt	Map sheet[1] (1:25,000)	MGA easting^	MGA northing^	Compass bearing°	Location notes and directions
WCR01	Messmate	Bullarto	251431	5850166	220	Cairns Road, 900m south of Farm Road, almost opposite Rat Hole Track.
WCR02	Messmate	Bullarto	251331	5851588	250	Farm Track, 450m north of Farm Road (take left fork 300m from gate). Track is 400m north-west of Cairns Road, and 2km east of Specimen Hill Road. There is a distance post at start of track (B 22.9, D 19.8) and Restoration Forestry information board. Need to go through a road closure gate.
WCR03	Messmate	Bullarto	250205	5855215	0	Leonards Hill-Bullarto South Road, 700m west of Wombat Creek Rd - opposite water point.
WCR04	Messmate	Bullarto	253667	5858269	230	Site is ~50m up track off Osborne Road, track ~450m north of Trentham-Daylesford Road.
WCR05	Messmate	Bullarto	255852	5858430	230	site 100m up unmarked track off Babbington Rd, track 500m north of Daylesford-Trentham Road. Within Bullarto Reservoir area - notify Central Highlands Water.
WCR06	Messmate	Cleever Hill	249313	5844590	80	Blakeville-Bunding Road, 200m east of Ballan-Daylesford Road.
WCR07	Messmate	Barkstead	243380	5847762	260	Barkstead South Road, 2.4km north of Spargo Creek Road & ~ 180m north of Broken Track, opposite dam.
WCR08	Messmate	Barkstead	243938	5846489	190	Barkstead South Road, 950m north of Spargo Creek Road.
WCR09	Messmate	Cleever Hill	255489	5844213	175	off track along Binks Rd pointing to a water point; walk along track about 100m - will come to 20m marker with site starting up hill. Track 300m east of Neville Track & 1.75km east of Blackville Road.
WCR10	Messmate	Greendale	260646	5845163	90	Charcoal Tk ~500m south of Greenhills Road. Track 600m north-east of Paradise Road. Cross track running parallel to Paradise Rd near start. Take left at 1st fork and stay along forest/coupe interface. Start of transect is beyond a large fallen tree.

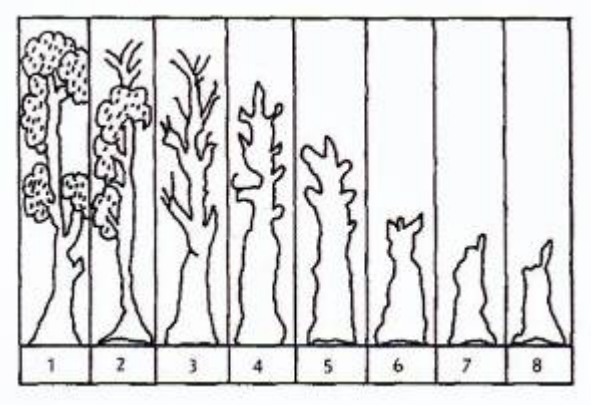
Site	Dominant eucalypt	Map sheet[1] (1:25,000)	MGA easting^	MGA northing^	Compass bearing°	Location notes and directions
WCR11	Messmate	Trentham	260658	5846763	50	Blackwood Ridge Road, ~750m west-north-west of Greenhills Road.
WCR12	Messmate	Bullarto	255868	5848921	20	Nolan Creek Road, 200m east of Stockyard Track.
WCR13	Messmate	Bullarto	255561	5850697	230	Nolan Creek Road, 2km north of Stockyard Track & 1.1km south of Lerderderg Road.
WCR14	Messmate	Trentham	261109	5852567	355	Yankee Road, 680m south-west of Pronks Track. **NOTE watch out for old mine shafts.
WCR15	Messmate	Trentham	267520	5849557	260	Ambler Lane ~ 950m south of Chettle Road (through Parks Vic road closure gate).
WCR16	Messmate	Trentham	267648	5850639	200	Chettle Road ~200m north-west of Ambler Lane. Along gully.
WCR17	Messmate	Trentham	266169	5851207	250	Chettle Road, 2.9km south-east of Golden Point Road, 1.75km south-east of Wombat Track, (600m south of waterpoint).
WCR18	Messmate	Trentham	263407	5851542	250	Old Blackwood Road, 800m south of Yankee Road.
WCR19	gum-barked	Bullarto	256053	5859713	230	200m west along track off Babbington Hill Road. Track ~30m north of Top Track & 500m north of Bullarto Reservoir Road. Within Bullarto Reservoir area (need to go through gate) - notify Central Highlands Water.
WCR20	gum-barked	Bullarto	249949	5846663	200	Track off McGee Road. Track ~360m north-west of Hell Hole Track. Site ~280m west of McGee Road.
WCR21	gum-barked	Coliban	261578	5869008	220	Track off Spring Hill Road (almost opposite another track) ~580m east of Mains Track. Site 200m south of SpringHill Road - take right fork. Site starts 60m north of track; site crosses track so need to walk in to start. NOTE watch for old mine shafts, particularly after 160m.
WCR22	gum-barked	Coliban	260818	5867212	30	Chinaman Track 1.75km north of Mudlark Road. To get to site: 350m north of Mudlark Road take left fork, another 250m along take right fork, site is another 1.15km along. Transect starts on S side of Chinamans Track and crosses back over. NOTE watch for old mine shafts.
WCR23	gum-barked	Coliban	257808	5861105	30	Springs Road, 100m south of Loddon River Road & 550m north of Mineral Springs Picnic Ground.

Site	Dominant eucalypt	Map sheet[1] (1:25,000)	MGA easting^	MGA northing^	Compass bearing°	Location notes and directions
WCR24	gum-barked	Bullarto	249329	5851402	190	Unmarked track off Farm Road - just west of Specimen Hill Road intersection. To get to site - go 100m south-west along track to start of another track - walk south 50m to start of site (keep right).
WCR25	Messmate	Bullarto	253984	5848184	160	Blackwood Ridge Road <100m east of Gentle Annie Track & Stockyard Track, 600m east of Camp Road
WCR26	gum-barked	Daylesford	255033	5862884	330	Rrack north off Kangaroo Creek Road, 1.2km east of Osborne Road and 200m east of Spout Track. Site is about 190m along track.
WCR27	gum-barked	Trentham	259044	5858780	0	Blighs Lane/Road, 800m east of Coliban Drive (turn off Daylesford-Trentham Road at Puekers Lane about 600m north-east of Lyonville). Take left fork 200m along Coliban Drive (at SPZ sign) then continue straight through small intersection 20m further. At 700m turn right (where ">" is painted on tree), stop at 800m at intersection (a track goes off to the hard right) and small clearing. Site on north side of road opposite clearing 30m in.
WCR28	Messmate	Trentham	264563	5851808	55	Golden Point Road, 1.7km south of Chettle Road (100m south of water point). Follow flags in to start of site about 30m in from road.
WCR29	Messmate/gum-barked	Bullarto	255345	5852274	120	Roach Road, 50m north of Lynch Track, just north of creek (east side of road).
WCR30	Messmate	Bullarto	251351	5856091	260	Wombat Creek Track, 1.25km from Leonards Hills-Bullarto South Road.

[1] Mapsheet numbers; Daylesford7723-3-1, Coliban 7723-2-4, Barkstead 7723-3-3, Bullarto 7723-3-2, Trentham 7723-2-3, Cleever Hill 7722-4-1

^coordinates in GDA94, Zone 55

Appendix 2 Tree form classification system used during eucalypt tree surveys



Classification of forms of trees (modified from Lindenmayer *et al.* 1991b). Tree form characteristics: 1. Living tree; 2. living tree with dead or broken top; 3. dead tree with most of branches still intact; 4. dead tree with 0-25% of the top broken off (branches remaining as stubs only); 5. dead tree with the top 25-50% broken away; 6. dead tree with the top 50-75% broken away; 7. a solid, dead tree with > 75% of the top broken away; and 8. hollow stump.

Appendix 3 Size and form of eucalypt trees measured at study sites

Only trees over 40cm DBH were measured. Trees are grouped according to species or bark type

Eucalypts	Messmate										Peppermint										Gum-barked										Stag																				Grand Total
DBH class	40-59 cm			60-79 cm			>80 cm			Total	40-59 cm			60-79 cm			>80 cm			Total	40-59 cm			60-79 cm			>80 cm			Total	40-59 cm							60-79 cm						>80 cm			Total	
Site/Form	1	2	Total	1	2	Total	1	2	Total		1	2	Total	1	2	Total	1	2	Total		1	2	Total	1	2	Total	1	2	Total		3	4	5	6	7	8	Total	3	5	6	7	8	Total	7	8	Total		
WCR01	109		109	39		39	4		4	152	3		3							3	4		4	1		1	2		2	7							1					1				1	163
WCR02	139	2	141	18		18				159	17		17		1	1				18	1		1							1																	178
WCR03	107	1	108	8		8	1		1	117	27		27							27											1				2		3										3	147
WCR04	95	3	98	16		16				114	25	1	26	1		1				27																										1	1	1	142
WCR05	54		54	21		21	14	2	16	91	24	1	25	8		8	1	1	2	35	3		3							3		1			1	2								1	1	3	132
WCR06	60	5	65	9	2	11	2	1	3	79	13	2	15					1	1	16	29	5	34	2		2				36	1				4	5									5	136
WCR07	97		97	11		11				108	2		2							2	10	1	11	1		1				12					2	2									2	124
WCR08	46		46	18		18	1		1	65											21		21	3		3				24														1	1		1	90
WCR09	78	3	81	19	1	20	4		4	105	3	2	5							5	3	2	5	1		1				6	4	3		1	1	3	12	1	1				2				14	130
WCR10	98		98	6		6	2		2	106	6		6	4		4				10											1				3	4					2	2				6	122
WCR11	79	1	80	12	1	13	2		2	95	13	11	24	1		1				25															7	7	1				1					8	128
WCR12	94		94	4		4				98	41		41							41													1	2	3	3	9			1			1				10	149
WCR13	49		49	14		14	3		3	66	69	1	70	1		1				71	1		1	1		1				2				1		1		1			1	1	3	142
WCR14	31		31	18		18	4		4	53	39	4	43	2		2				45														3		3						1		1	4	102
WCR15	22	6	28	2	2	4		1	1	33	54	16	70	4		4				74	5		5	2	1	3	1		1	9		1	1		6	1	9					2	2				11	127
WCR16	113	1	114	7	1	8	1		1	123	24	17	41		3	3				44														1	4	5				1	1		1	1	7	174
WCR17	100	4	104	14	1	15	9	3	12	131	13	1	14	2		2				16														1	1	2						1		1	3	150
WCR18	95	1	96	29	6	35	2	1	3	134	15	2	17	1	1	2				19				1		1				1				3		3									3	157
WCR19	30		30	6	1	7	2		2	39	36	1	37	5		5				42	20	2	22	1		1	5		5	28				1		1					2	2				3	112
WCR20											54	7	61	9	2	11	1	1	2	74	17		17	1		1	2		2	20	2				1		3				1		1	1	1	5	99
WCR21	1		1							1	23		23	1		1				24	44	2	46	10		10	3	1	4	60	1			2	2		5			1			1				6	91
WCR22											86	6	92	7		7				99	32		32	7		7	4		4	43					3	3	6					1	1				7	149
WCR23											42	6	48	3		3				51	56		56	8		8	2		2	66	1				2		3					1	1				4	121
WCR24	4		4	1		1				5	7	1	8				1		1	9	32	3	35	19	1	20	3	2	5	60		4				4									4	78
WCR25	127		127	11		11	2		2	140	19		19							19											2	1			1	4	8							1	1	9	168
WCR26	7		7	4		4	3		3	14	13	2	15	4	4	8	3		3	26	42		42	12	1	13	3	1	4	59					1	3	4							1	1	5	104
WCR27				1		1				1	34	1	35	2		2				37	77	2	79	19	2	21	2		2	102		2	1	5			8									8	148
WCR28	68	1	69	32		32	5	1	6	107	15		15		1	1				16	4		4							4	1					1			1			1				2	129
WCR29	39	1	40	5		5				45	26	3	29	1		1				30	59	2	61	4	1	5	2		2	68				1		4	5									5	148
WCR30	98	1	99	19		19	2		2	120	14	1	15							15											1	1		1			3									3	138
Grand Total	**1840**	**30**	**1870**	**344**	**15**	**359**	**63**	**9**	**72**	**2301**	**757**	**86**	**843**	**56**	**12**	**68**	**6**	**3**	**9**	**920**	**460**	**19**	**479**	**93**	**6**	**99**	**29**	**4**	**33**	**611**	**15**	**13**	**3**	**12**	**32**	**43**	**118**	**3**	**1**	**4**	**1**	**10**	**19**	**2**	**7**	**9**	**146**	**3978**
Mean	61.3	1.0	62.3	11.5	0.5	12.0	2.1	0.3	2.4	76.7	25.2	2.9	28.1	1.9	0.4	2.3	0.2	0.1	0.3	30.7	15.3	0.6	16.0	3.1	0.2	3.3	1.0	0.1	1.1	20.4	0.5	0.4	0.1	0.4	1.1	1.4	3.9	0.1	0.03	0.1	0.03	0.3	0.6	0.1	0.2	0.3	5.0	132.6
Std Dev	44.0	1.6	44.3	10.1	1.2	10.4	3.0	0.7	3.6	51.7	20.4	4.5	22.4	2.6	1.0	2.9	0.6	0.3	0.7	24.0	21.5	1.2	22.1	5.4	0.5	5.7	1.4	0.4	1.7	28.1	0.9	1.0	0.3	1.0	1.4	1.9	3.1	0.3	0.2	0.3	0.2	0.7	0.7	0.3	0.4	0.5	3.2	25.3

Appendix 4 Cover-abundance of understorey vegetation at each study site

Each site has data for 13 segments, plus an overall site average that was calculated post-survey. Cover-abundance was collected according to the Braun-Blanquet scale: * = rare, 1 = <5%, 2 = 5-25%, 3 = 25-50%, 4 = 50-75%, 5 = 75-100%

Site	Transect segment	Mistletoe	Silver Wattle	Blackwood	Cherry Ballart	Musk Daisy-bush	Shrubs>1m	Shrubs<1m	Coprosma	Leaf litter	Bracken	Native grasses	Rushes/sedges	Tree ferns	Ground ferns	Logs 40-59cm	Logs 60-79cm	Logs >80cm	Stumps 40-59cm	Stumps 60-79cm	Stumps >80cm
WCR01	0-20m	0	0	0	0	0	*	*	*	4	2	1	1	0	0	0	0	0	1	0	0
WCR01	20-40m	0	0	0	0	0	*	*	*	4	2	1	*	0	0	0	0	0	0	2	0
WCR01	40-60m	0	0	0	0	0	1	*	*	3	2	1	1	0	0	0	0	1	1	0	1
WCR01	60-80m	0	0	0	0	*	1	*	*	2	2	1	1	0	0	0	0	0	0	1	0
WCR01	80-100m	0	0	*	0	*	*	1	1	2	2	1	2	0	0	1	0	0	0	0	0
WCR01	100-120m	0	0	0	0	0	1	1	*	2	2	2	2	0	0	1	0	0	0	0	0
WCR01	120-140m	0	0	*	0	0	1	*	1	2	2	2	2	0	0	0	0	0	2	0	1
WCR01	140-160m	0	0	0	0	1	1	1	1	2	2	2	2	0	0	0	0	0	0	1	0
WCR01	160-180m	0	0	0	0	*	1	1	1	2	2	2	2	0	0	0	0	0	1	1	0
WCR01	180-200m	0	0	0	0	*	*	1	1	3	2	1	2	0	0	0	0	0	2	1	0
WCR01	200-220m	0	0	0	0	1	1	1	1	3	1	2	1	0	0	0	0	0	0	0	0
WCR01	220-240m	0	0	0	0	1	1	1	1	3	2	2	1	0	0	0	0	0	3	0	1
WCR01	240-250m	0	0	0	0	*	1	1	1	3	2	2	1	0	0	1	1	0	0	2	0
WCR01	average	0	0	*	0	1	1	1	1	3	2	2	2	0	0	3	1	1	10	8	3
WCR02	0-20m	0	0	0	0	0	1	1	0	3	2	2	1	0	0	0	0	0	1	0	0
WCR02	20-40m	0	0	0	0	0	1	2	0	3	2	3	1	0	0	0	0	0	1	0	0
WCR02	40-60m	0	0	0	0	0	1	1	0	3	2	2	1	0	0	0	0	0	0	2	1
WCR02	60-80m	0	0	0	0	0	1	1	0	3	2	2	1	0	0	0	0	0	0	0	0
WCR02	80-100m	0	0	0	0	0	2	1	0	3	2	2	2	0	0	0	1	0	2	2	0
WCR02	100-120m	0	0	0	0	0	2	2	0	2	2	2	2	0	0	0	0	0	2	1	0
WCR02	120-140m	0	0	0	0	0	2	2	0	2	2	2	1	0	0	0	0	0	2	0	0
WCR02	140-160m	0	0	0	0	0	2	2	0	2	2	3	1	0	0	0	0	0	1	1	0
WCR02	160-180m	0	0	0	0	0	2	2	0	3	3	2	1	0	0	1	0	0	3	0	0
WCR02	180-200m	0	0	0	0	0	2	2	0	3	2	2	1	0	0	0	0	1	2	0	1
WCR02	200-220m	0	0	0	0	0	2	2	0	3	2	2	1	0	0	0	0	0	2	0	0
WCR02	220-240m	0	0	0	0	0	1	1	0	3	2	2	1	0	0	4	0	0	2	1	0
WCR02	240-250m	0	0	0	0	0	1	1	0	4	2	1	1	0	0	0	0	0	0	0	0
WCR02	average	0	0	0	0	0	2	2	0	3	2	2	1	0	0	5	1	1	18	7	2
WCR03	0-20m	0	0	0	0	0	1	3	0	2	1	3	1	0	*	0	0	0	2	0	0
WCR03	20-40m	0	0	0	0	0	1	3	*	1	1	3	1	0	0	0	0	0	0	0	0
WCR03	40-60m	0	0	0	0	0	1	3	0	2	1	3	1	0	0	0	0	0	0	0	0
WCR03	60-80m	0	0	0	0	0	*	1	0	2	1	3	1	0	0	1	0	0	2	0	0
WCR03	80-100m	0	0	*	0	0	*	*	0	3	2	3	1	0	0	0	1	2	0	0	2

Site	Transect segment	Mistletoe	Silver Wattle	Blackwood	Cherry Ballart	Musk Daisy-bush	Shrubs>1m	Shrubs<1m	Coprosma	Leaf litter	Bracken	Native grasses	Rushes/sedges	Tree ferns	Ground ferns	Logs 40-59cm	Logs 60-79cm	Logs >80cm	Stumps 40-59cm	Stumps 60-79cm	Stumps >80cm
WCR03	100-120m	0	0	0	0	0	*	1	0	2	2	3	1	0	0	0	0	0	0	1	0
WCR03	120-140m	0	0	0	0	0	0	*	0	3	1	3	1	0	0	1	0	0	2	0	0
WCR03	140-160m	0	0	0	0	0	0	*	0	3	1	3	1	0	0	0	1	1	0	2	1
WCR03	160-180m	0	0	0	0	0	0	*	0	3	1	3	1	0	0	3	0	0	0	1	0
WCR03	180-200m	0	0	0	0	0	0	*	0	2	1	4	1	0	0	3	0	0	1	0	0
WCR03	200-220m	0	0	0	0	0	*	1	0	3	2	3	1	0	0	2	0	0	0	0	0
WCR03	220-240m	0	0	0	0	0	*	1	0	3	2	3	1	0	0	0	1	0	0	2	0
WCR03	240-250m	0	0	0	0	0	0	1	0	3	1	2	1	0	0	0	0	0	0	0	0
WCR03	average	0	0	*	0	0	1	2	*	3	1	3	1	0	*	10	3	3	7	6	3
WCR04	0-20m	0	0	*	0	0	*	*	0	1	2	4	1	0	0	0	0	0	1	1	0
WCR04	20-40m	0	0	*	0	0	1	1	0	1	1	4	1	0	0	0	0	0	0	0	0
WCR04	40-60m	0	0	*	0	0	1	1	0	1	2	5	1	0	0	0	0	0	0	0	0
WCR04	60-80m	0	0	0	0	0	1	1	0	1	1	4	1	0	0	0	0	0	0	0	0
WCR04	80-100m	0	0	0	0	0	1	1	0	1	1	5	1	0	0	0	0	0	0	0	0
WCR04	100-120m	0	0	*	0	0	1	1	0	1	2	5	1	0	0	1	0	0	1	0	1
WCR04	120-140m	0	0	1	0	0	1	1	0	1	2	5	1	0	0	0	0	0	1	0	0
WCR04	140-160m	0	0	0	0	0	1	1	0	1	1	5	2	0	0	1	0	0	1	1	0
WCR04	160-180m	0	0	0	0	0	1	1	0	1	1	5	1	0	0	0	0	0	1	0	0
WCR04	180-200m	0	0	0	0	0	*	1	0	1	1	4	1	0	0	0	0	0	1	0	1
WCR04	200-220m	0	0	0	0	0	1	1	0	1	2	4	1	0	0	1	0	0	1	0	0
WCR04	220-240m	0	0	*	0	0	1	1	0	3	1	3	1	0	0	0	0	0	0	2	0
WCR04	240-250m	0	0	0	0	0	1	1	0	4	1	1	1	0	0	0	0	0	1	0	0
WCR04	average	0	0	*	0	0	1	1	0	1	2	4	1	0	0	3	0	0	8	4	2
WCR05	0-20m	0	0	0	0	0	1	1	0	2	1	2	1	0	0	0	0	0	0	0	2
WCR05	20-40m	0	0	0	0	0	2	1	0	2	1	2	1	0	0	1	0	0	1	0	0
WCR05	40-60m	0	0	0	0	0	2	1	0	2	1	3	1	0	0	1	0	0	2	0	0
WCR05	60-80m	0	0	*	0	0	1	2	0	2	1	3	1	0	0	0	0	0	3	0	0
WCR05	80-100m	0	0	*	0	0	*	2	0	2	1	3	2	0	0	0	0	0	3	0	0
WCR05	100-120m	0	0	0	0	0	1	1	0	1	2	3	2	0	0	1	0	0	2	0	0
WCR05	120-140m	0	0	*	0	0	2	1	0	1	1	3	3	0	*	3	0	0	4	0	0
WCR05	140-160m	0	0	1	0	0	*	0	0	1	2	3	2	0	2	1	0	0	3	0	0
WCR05	160-180m	0	0	*	0	0	1	1	0	2	2	3	2	0	*	2	0	0	3	0	0
WCR05	180-200m	0	0	0	0	0	1	1	0	2	2	3	2	0	0	2	0	0	3	0	0
WCR05	200-220m	0	0	0	0	0	*	1	0	2	2	3	2	0	0	1	0	0	3	0	0
WCR05	220-240m	0	0	0	0	0	1	1	0	2	2	2	1	0	0	4	0	0	3	1	0
WCR05	240-250m	0	0	0	0	0	0	1	0	2	1	2	1	0	0	0	0	0	1	1	0
WCR05	average	0	0	*	0	0	1	1	0	2	2	3	2	0	1	16	0	0	31	2	2
WCR06	0-20m	0	*	0	0	0	0	0	0	5	1	1	1	0	*	0	0	0	0	0	0

Site	Transect segment	Mistletoe	Silver Wattle	Blackwood	Cherry Ballart	Musk Daisy-bush	Shrubs>1m	Shrubs<1m	Coprosma	Leaf litter	Bracken	Native grasses	Rushes/sedges	Tree ferns	Ground ferns	Logs 40-59cm	Logs 60-79cm	Logs >80cm	Stumps 40-59cm	Stumps 60-79cm	Stumps >80cm
WCR06	20-40m	0	*	*	0	0	0	0	0	2	1	2	3	0	*	0	0	0	0	0	0
WCR06	40-60m	0	0	0	0	0	0	0	0	1	2	3	3	0	*	0	0	0	0	0	0
WCR06	60-80m	0	0	0	0	0	0	0	0	2	1	2	2	0	*	0	0	0	0	0	0
WCR06	80-100m	0	0	*	0	0	0	0	0	2	1	2	1	0	0	0	0	0	1	2	0
WCR06	100-120m	0	0	0	0	0	0	0	0	2	3	2	*	0	0	0	0	0	1	1	0
WCR06	120-140m	0	0	0	0	0	0	0	0	2	2	2	1	0	0	0	0	0	0	0	1
WCR06	140-160m	0	0	0	0	0	0	0	0	4	2	*	0	0	0	0	0	0	1	0	0
WCR06	160-180m	0	0	0	0	0	0	0	0	4	2	*	1	0	0	0	0	0	0	0	0
WCR06	180-200m	0	0	0	0	0	0	0	0	4	2	1	0	0	0	0	0	0	2	0	0
WCR06	200-220m	0	0	0	0	0	0	0	0	3	2	3	0	0	0	0	0	0	1	2	0
WCR06	220-240m	0	0	0	0	0	0	0	0	3	1	2	0	0	0	0	0	0	1	0	0
WCR06	240-250m	0	0	*	0	0	0	0	0	3	2	3	1	0	0	1	0	0	1	0	0
WCR06	average	0	*	*	0	0	0	0	0	3	2	2	2	0	*	1	0	0	8	5	1
WCR07	0-20m	0	0	*	0	0	0	*	0	4	2	1	1	0	0	1	0	0	1	0	0
WCR07	20-40m	0	0	0	0	0	0	*	0	4	2	1	1	0	0	0	0	0	1	0	0
WCR07	40-60m	0	0	0	0	0	0	*	0	4	1	1	1	0	0	0	0	0	0	0	0
WCR07	60-80m	0	0	0	0	0	0	*	0	4	1	1	1	0	0	1	0	0	1	0	0
WCR07	80-100m	0	0	0	0	0	0	*	0	4	1	1	1	0	0	1	0	0	1	0	0
WCR07	100-120m	0	0	0	0	0	0	*	0	4	1	1	1	0	0	0	0	0	0	0	0
WCR07	120-140m	0	0	0	0	0	0	*	0	4	1	1	1	0	1	1	0	0	1	0	0
WCR07	140-160m	0	0	0	0	0	0	1	0	4	2	1	1	0	1	0	0	0	0	3	0
WCR07	160-180m	0	0	0	0	0	0	1	0	4	2	1	1	0	0	0	0	0	0	2	0
WCR07	180-200m	0	0	0	0	0	0	1	0	4	2	1	1	0	0	0	0	0	0	0	0
WCR07	200-220m	0	0	1	0	0	0	1	0	4	2	1	1	0	0	0	0	0	1	0	0
WCR07	220-240m	0	0	1	0	0	0	1	0	4	2	1	2	0	0	2	0	0	2	0	0
WCR07	240-250m	0	0	1	0	0	0	1	0	4	2	1	2	0	0	0	0	0	1	0	0
WCR07	average	0	0	*	0	0	0	1	0	4	2	1	1	0	*	6	0	0	9	5	0
WCR08	0-20m	0	0	0	*	0	*	*	0	4	*	1	0	0	0	0	0	0	1	0	0
WCR08	20-40m	0	0	0	1	0	0	*	0	4	1	1	1	0	0	2	0	0	2	0	0
WCR08	40-60m	0	0	0	*	0	*	1	0	3	2	2	1	0	0	0	1	0	0	0	1
WCR08	60-80m	0	0	0	0	0	*	1	0	3	2	2	1	0	0	1	0	0	1	0	1
WCR08	80-100m	0	0	0	0	0	*	1	0	3	2	2	1	0	0	0	0	0	1	0	0
WCR08	100-120m	0	0	0	0	0	0	1	0	3	2	2	2	0	0	0	0	0	0	0	0
WCR08	120-140m	0	0	0	0	0	0	1	0	3	2	2	1	0	0	0	0	0	0	0	0
WCR08	140-160m	0	0	0	0	0	0	1	0	2	2	2	1	0	0	0	0	0	1	0	0
WCR08	160-180m	0	0	0	0	0	0	1	0	2	2	3	1	0	0	0	0	0	1	0	0
WCR08	180-200m	0	0	1	0	0	*	*	0	2	2	3	1	0	0	1	0	0	0	2	0
WCR08	200-220m	0	0	1	0	0	1	1	0	1	2	3	1	0	0	1	0	0	3	1	0

Site	Transect segment	Mistletoe	Silver Wattle	Blackwood	Cherry Ballart	Musk Daisy-bush	Shrubs>1m	Shrubs<1m	Coprosma	Leaf litter	Bracken	Native grasses	Rushes/sedges	Tree ferns	Ground ferns	Logs 40-59cm	Logs 60-79cm	Logs >80cm	Stumps 40-59cm	Stumps 60-79cm	Stumps >80cm
WCR08	220-240m	0	0	1	0	0	1	1	0	1	3	3	1	0	0	0	0	0	2	0	0
WCR08	240-250m	0	0	1	0	0	0	1	0	2	3	2	2	0	0	0	0	0	0	1	0
WCR08	average	0	0	1	*	0	1	1	0	3	2	2	1	0	0	5	1	0	12	4	2
WCR09	0-20m	0	0	0	0	1	1	*	0	1	1	3	1	0	0	0	0	0	1	1	0
WCR09	20-40m	0	0	0	0	1	1	*	0	1	1	3	1	0	0	0	0	1	0	0	0
WCR09	40-60m	0	0	0	0	*	*	*	0	2	1	3	1	0	0	0	1	0	1	0	1
WCR09	60-80m	0	0	0	0	3	3	*	0	1	2	5	*	0	0	0	0	0	2	0	0
WCR09	80-100m	0	0	0	0	2	2	0	*	*	4	4	1	*	1	1	0	0	0	0	0
WCR09	100-120m	0	0	0	0	1	1	*	0	2	3	4	1	*	*	1	0	0	0	0	0
WCR09	120-140m	0	0	0	0	1	2	1	0	1	2	5	1	0	*	1	1	0	0	0	0
WCR09	140-160m	*	0	0	0	1	2	1	0	1	2	5	1	0	0	0	0	0	3	0	0
WCR09	160-180m	0	0	0	0	*	1	1	1	1	2	4	2	0	0	0	0	1	2	0	0
WCR09	180-200m	0	0	0	0	1	2	1	*	1	1	4	1	0	0	1	0	0	1	0	0
WCR09	200-220m	0	0	*	0	0	1	1	*	1	2	4	1	0	0	1	0	0	2	0	0
WCR09	220-240m	0	0	0	0	*	1	*	*	1	2	4	1	0	0	1	0	0	1	1	0
WCR09	240-250m	*	0	0	0	1	1	1	0	1	1	4	1	0	0	0	0	0	1	1	0
WCR09	average	*	0	*	0	1	2	1	1	1	2	4	1	*	*	6	2	2	14	3	1
WCR10	0-20m	0	0	0	0	0	1	3	0	2	1	2	1	0	0	1	1	0	2	0	0
WCR10	20-40m	0	0	0	0	0	1	2	0	3	1	1	1	0	0	0	1	0	0	0	0
WCR10	40-60m	0	0	0	0	0	1	1	0	4	2	1	1	0	0	0	0	0	4	1	0
WCR10	60-80m	0	0	0	0	0	1	1	0	3	2	2	1	0	0	1	0	0	0	0	0
WCR10	80-100m	0	0	0	0	0	0	0	0	3	2	3	1	0	0	2	0	0	0	0	0
WCR10	100-120m	0	0	0	0	0	*	*	0	3	2	2	1	0	0	1	0	2	0	0	1
WCR10	120-140m	0	0	0	0	0	*	*	0	2	3	2	1	0	0	1	0	0	1	0	0
WCR10	140-160m	0	0	0	0	0	2	*	0	2	2	2	1	0	0	0	0	0	1	1	0
WCR10	160-180m	0	0	0	0	0	*	*	*	2	2	2	1	0	0	1	0	0	0	1	0
WCR10	180-200m	0	0	0	0	0	1	*	*	2	2	2	1	0	0	0	1	1	0	1	1
WCR10	200-220m	0	0	0	0	0	1	*	0	2	1	2	1	0	0	1	1	0	0	0	1
WCR10	220-240m	0	0	0	0	0	1	*	*	2	2	2	1	0	0	1	0	0	4	0	1
WCR10	240-250m	0	0	0	0	0	1	*	*	2	1	2	1	0	0	0	0	0	1	0	0
WCR10	average	0	0	0	0	0	1	1	*	2	2	2	1	0	0	9	4	3	13	4	4
WCR11	0-20m	0	0	0	0	0	3	2	0	2	2	1	1	0	0	1	0	0	0	1	1
WCR11	20-40m	0	0	0	0	0	2	2	0	2	2	3	1	0	0	2	1	0	1	1	0
WCR11	40-60m	0	0	0	0	0	2	2	0	2	2	3	1	0	0	1	0	0	0	0	0
WCR11	60-80m	0	0	0	0	0	2	2	0	2	1	2	1	0	0	1	0	0	0	0	1
WCR11	80-100m	0	0	0	0	0	2	2	0	2	1	2	1	0	0	0	0	0	3	0	0
WCR11	100-120m	0	0	0	0	0	3	2	*	2	1	3	1	0	0	0	2	1	1	0	1
WCR11	120-140m	0	0	0	0	0	3	2	0	2	2	3	1	0	0	1	0	0	2	0	0

Site	Transect segment	Mistletoe	Silver Wattle	Blackwood	Cherry Ballart	Musk Daisy-bush	Shrubs>1m	Shrubs<1m	Coprosma	Leaf litter	Bracken	Native grasses	Rushes/sedges	Tree ferns	Ground ferns	Logs 40-59cm	Logs 60-79cm	Logs >80cm	Stumps 40-59cm	Stumps 60-79cm	Stumps >80cm
WCR11	140-160m	0	0	0	0	0	3	3	0	2	2	3	2	*	*	2	0	0	1	0	0
WCR11	160-180m	0	0	0	0	0	3	3	0	2	2	3	1	0	0	0	0	0	0	0	0
WCR11	180-200m	0	0	0	0	0	2	2	0	2	2	3	1	*	0	0	0	0	0	0	0
WCR11	200-220m	0	0	0	0	0	2	2	0	2	2	3	1	0	0	1	0	0	1	1	0
WCR11	220-240m	0	0	0	0	0	2	2	0	2	1	3	1	*	0	1	0	0	0	0	0
WCR11	240-250m	0	0	0	0	0	1	2	0	2	1	3	1	0	0	0	0	0	0	0	0
WCR11	average	0	0	0	0	0	2	2	*	2	2	3	1	*	*	10	3	1	9	3	3
WCR12	0-20m	0	0	0	0	0	3	2	0	2	2	3	1	0	0	1	0	0	0	0	0
WCR12	20-40m	0	0	0	0	0	3	2	0	2	2	3	1	0	0	0	0	1	1	0	0
WCR12	40-60m	0	0	0	0	0	2	2	0	2	2	3	1	0	0	1	1	0	0	0	0
WCR12	60-80m	0	0	0	0	0	2	2	0	3	2	2	1	0	0	0	0	0	1	1	0
WCR12	80-100m	0	0	0	0	0	1	2	0	3	2	2	1	0	0	0	0	0	5	0	0
WCR12	100-120m	0	0	0	0	0	2	2	0	2	2	2	2	0	0	0	0	1	0	0	0
WCR12	120-140m	0	0	0	0	0	2	3	0	2	1	2	1	0	0	1	0	0	1	0	0
WCR12	140-160m	0	0	0	0	0	2	2	0	2	2	2	1	0	0	1	0	0	0	0	1
WCR12	160-180m	0	0	0	0	0	2	2	0	2	2	2	1	0	0	1	0	0	0	0	0
WCR12	180-200m	0	0	0	0	0	2	3	0	2	1	3	1	0	0	1	1	0	1	1	0
WCR12	200-220m	0	0	0	0	0	2	1	0	2	1	2	2	*	1	0	0	0	0	2	0
WCR12	220-240m	0	0	0	0	0	1	3	0	2	1	1	1	0	1	1	1	0	1	1	1
WCR12	240-250m	0	0	0	0	0	1	3	0	2	1	1	1	0	0	1	0	0	1	0	0
WCR12	average	0	0	0	0	0	2	2	0	2	2	2	1	*	*	8	3	2	11	5	2
WCR13	0-20m	0	0	0	0	0	3	2	0	2	2	2	2	0	1	0	0	0	0	0	0
WCR13	20-40m	0	0	0	0	*	2	1	0	2	2	2	2	0	0	0	0	0	1	0	0
WCR13	40-60m	0	0	0	0	0	2	1	0	3	1	2	1	0	*	0	0	0	0	1	0
WCR13	60-80m	0	0	0	0	0	1	1	0	3	1	2	1	0	0	0	0	0	2	0	0
WCR13	80-100m	0	0	0	0	0	2	1	0	2	1	3	2	0	0	1	0	1	0	1	1
WCR13	100-120m	0	0	*	0	0	2	1	0	2	1	2	1	0	0	0	0	0	2	1	0
WCR13	120-140m	0	0	0	0	0	1	1	0	2	1	2	1	0	0	0	1	0	0	0	0
WCR13	140-160m	0	0	0	0	0	2	1	0	2	1	3	1	0	0	0	0	0	2	0	0
WCR13	160-180m	0	0	0	0	0	2	1	0	2	1	3	1	0	0	1	1	0	1	1	0
WCR13	180-200m	0	0	0	0	0	2	1	0	2	1	3	1	0	0	3	0	0	4	2	0
WCR13	200-220m	0	0	0	0	*	2	1	0	3	1	2	1	0	*	1	0	0	0	1	0
WCR13	220-240m	0	0	0	0	0	2	1	0	3	1	2	1	0	0	2	0	0	0	0	0
WCR13	240-250m	0	0	0	0	0	1	1	0	3	1	2	1	0	0	0	0	0	4	1	0
WCR13	average	0	0	*	0	*	2	1	0	2	1	2	1	0	*	8	2	1	16	8	1
WCR14	0-20m	0	0	0	0	0	1	2	0	2	1	3	1	0	0	0	0	0	0	0	0
WCR14	20-40m	0	0	0	0	0	1	1	0	3	1	2	1	0	0	0	0	0	0	0	0
WCR14	40-60m	0	0	0	0	0	1	1	0	2	1	3	1	0	0	0	0	0	0	0	0

Site	Transect segment	Mistletoe	Silver Wattle	Blackwood	Cherry Ballart	Musk Daisy-bush	Shrubs>1m	Shrubs<1m	Coprosma	Leaf litter	Bracken	Native grasses	Rushes/sedges	Tree ferns	Ground ferns	Logs 40-59cm	Logs 60-79cm	Logs >80cm	Stumps 40-59cm	Stumps 60-79cm	Stumps >80cm
WCR14	60-80m	*	0	0	0	*	1	2	0	2	1	4	1	0	0	1	1	0	0	0	0
WCR14	80-100m	*	0	0	0	0	1	1	0	2	1	4	1	0	0	1	0	0	0	0	0
WCR14	100-120m	0	0	0	0	0	1	1	0	3	1	3	1	0	0	0	0	0	1	0	0
WCR14	120-140m	0	0	0	0	*	1	1	*	2	1	4	1	0	0	1	1	0	0	0	0
WCR14	140-160m	0	0	0	0	*	2	1	0	2	1	4	1	0	0	0	0	0	0	2	0
WCR14	160-180m	0	0	0	0	*	3	1	0	2	2	4	1	0	0	0	0	0	0	0	0
WCR14	180-200m	0	0	0	0	0	2	2	0	2	1	3	1	0	0	1	0	0	0	0	0
WCR14	200-220m	0	0	0	0	1	1	1	0	1	2	4	1	0	0	1	0	0	0	0	0
WCR14	220-240m	0	0	0	0	1	2	1	*	1	2	4	1	0	0	1	0	0	2	1	0
WCR14	240-250m	0	0	0	0	1	1	1	*	1	2	3	1	0	0	3	0	0	0	0	0
WCR14	average	*	0	0	0	1	1	1	*	2	1	3	1	0	0	9	2	0	3	3	0
WCR15	0-20m	0	0	0	0	0	*	1	0	4	0	*	1	0	0	0	0	0	2	0	0
WCR15	20-40m	0	0	0	0	0	1	1	0	3	0	*	1	0	0	3	0	0	3	0	0
WCR15	40-60m	0	0	0	0	0	2	2	0	3	0	2	1	0	0	0	1	0	0	0	0
WCR15	60-80m	0	0	0	0	0	1	2	0	3	1	2	1	0	0	0	0	0	2	0	0
WCR15	80-100m	0	0	0	0	0	2	2	0	3	1	2	1	0	0	0	0	0	0	0	0
WCR15	100-120m	0	0	0	0	0	2	2	0	3	0	1	1	0	0	1	0	0	0	0	0
WCR15	120-140m	*	0	0	0	0	1	2	0	3	0	1	1	0	0	1	0	0	0	0	0
WCR15	140-160m	*	*	0	0	0	2	2	0	3	0	1	1	0	0	1	0	0	2	0	0
WCR15	160-180m	*	0	0	0	0	1	2	0	3	0	1	1	0	0	2	0	0	0	0	0
WCR15	180-200m	0	0	0	0	0	1	1	0	4	0	*	1	0	0	2	1	0	1	0	0
WCR15	200-220m	*	*	0	0	0	1	2	0	4	*	1	1	0	0	2	0	0	0	0	0
WCR15	220-240m	*	1	0	0	0	1	2	0	3	1	*	1	0	0	1	0	0	0	0	0
WCR15	240-250m	*	*	0	0	0	*	1	0	4	0	*	1	0	0	0	0	0	0	0	0
WCR15	average	1	1	0	0	0	1	2	0	3	1	1	1	0	0	13	2	0	10	0	0
WCR16	0-20m	0	0	0	0	0	1	1	*	3	3	2	1	0	*	3	1	0	4	1	0
WCR16	20-40m	0	0	0	0	0	1	1	0	3	1	1	1	0	*	0	0	1	2	0	0
WCR16	40-60m	0	0	0	0	0	1	1	*	3	2	1	1	0	1	0	0	0	3	1	0
WCR16	60-80m	0	0	0	0	0	1	1	*	3	1	1	1	0	0	0	0	0	3	0	0
WCR16	80-100m	0	0	0	0	0	1	1	0	3	1	1	1	0	0	2	0	0	2	2	0
WCR16	100-120m	0	0	0	0	0	1	1	0	3	1	1	1	0	0	0	2	0	0	1	0
WCR16	120-140m	0	0	0	0	0	1	1	0	3	1	1	1	0	0	2	0	0	2	0	0
WCR16	140-160m	*	0	0	0	0	1	1	0	3	2	1	2	0	0	0	2	0	2	0	0
WCR16	160-180m	0	0	0	0	0	1	1	0	3	1	1	1	0	0	0	0	0	1	0	0
WCR16	180-200m	0	0	0	0	0	1	1	0	3	1	1	1	0	0	1	0	0	1	0	0
WCR16	200-220m	*	0	0	0	0	1	1	0	3	1	1	1	0	0	2	0	0	0	1	0
WCR16	220-240m	*	0	0	*	0	1	1	0	3	1	1	1	0	0	0	2	0	0	0	0
WCR16	240-250m	*	0	0	0	0	1	1	0	3	*	1	1	*	0	1	0	0	0	0	0

Site	Transect segment	Mistletoe	Silver Wattle	Blackwood	Cherry Ballart	Musk Daisy-bush	Shrubs>1m	Shrubs<1m	Coprosma	Leaf litter	Bracken	Native grasses	Rushes/sedges	Tree ferns	Ground ferns	Logs 40-59cm	Logs 60-79cm	Logs >80cm	Stumps 40-59cm	Stumps 60-79cm	Stumps >80cm
WCR16	average	*	0	0	*	0	1	1	*	3	1	1	1	*	*	11	7	1	20	6	0
WCR17	0-20m	0	0	0	0	0	1	1	0	4	2	1	*	0	0	3	1	0	0	1	0
WCR17	20-40m	0	0	0	0	0	1	1	0	4	2	1	1	0	0	4	0	1	0	0	0
WCR17	40-60m	0	0	0	0	0	1	1	0	4	1	1	1	0	0	1	1	0	1	0	0
WCR17	60-80m	0	0	0	0	0	1	1	0	4	1	1	1	0	0	0	0	1	0	0	2
WCR17	80-100m	0	0	0	0	0	1	1	0	4	2	1	*	0	0	0	2	0	2	1	0
WCR17	100-120m	0	0	0	0	0	1	*	0	3	2	*	2	0	*	0	0	1	1	0	1
WCR17	120-140m	0	0	0	0	0	1	*	0	3	1	*	2	0	2	3	1	0	1	0	1
WCR17	140-160m	0	0	0	0	0	1	*	0	4	2	*	1	0	0	2	0	0	0	0	0
WCR17	160-180m	0	0	0	0	0	1	1	0	4	2	*	*	0	0	4	0	0	0	0	0
WCR17	180-200m	0	0	0	*	0	*	*	0	4	2	*	*	0	0	1	1	0	0	0	0
WCR17	200-220m	0	0	0	0	0	1	1	0	4	1	*	*	0	0	1	0	0	0	1	0
WCR17	220-240m	0	0	0	0	0	1	1	0	4	1	1	*	0	0	1	0	0	1	1	0
WCR17	240-250m	0	0	0	0	0	1	1	0	4	1	1	*	0	0	1	1	0	0	1	0
WCR17	average	0	0	0	*	0	1	1	0	4	2	1	1	0	1	21	7	3	6	5	4
WCR18	0-20m	0	0	0	0	0	1	1	0	2	1	3	1	0	0	0	0	0	1	3	0
WCR18	20-40m	0	0	0	0	0	1	1	0	1	1	4	2	0	0	2	0	0	3	0	0
WCR18	40-60m	0	0	0	0	0	1	1	0	2	2	3	1	0	0	4	1	0	3	1	0
WCR18	60-80m	0	0	0	0	0	1	1	0	3	2	3	1	0	0	2	1	0	3	2	0
WCR18	80-100m	0	0	0	*	0	1	1	*	2	3	2	1	0	0	1	0	0	1	0	0
WCR18	100-120m	0	0	0	0	0	1	1	0	2	3	2	1	0	*	0	2	0	0	1	0
WCR18	120-140m	0	0	0	0	0	2	1	0	1	1	4	2	0	0	3	1	0	0	1	1
WCR18	140-160m	0	0	0	0	0	2	1	0	2	2	3	2	0	0	0	0	0	0	0	0
WCR18	160-180m	0	0	0	0	0	2	1	0	2	2	3	2	0	0	0	0	1	1	0	1
WCR18	180-200m	0	0	0	0	0	2	1	0	2	1	4	2	0	0	0	1	0	0	2	1
WCR18	200-220m	*	0	0	0	0	1	2	0	2	1	3	3	*	0	0	0	0	0	0	0
WCR18	220-240m	0	0	0	0	0	1	1	0	2	2	3	3	0	0	2	1	0	2	0	0
WCR18	240-250m	*	0	0	0	0	*	1	0	1	1	3	2	0	0	0	0	0	0	0	0
WCR18	average	*	0	0	*	0	1	1	*	2	2	3	2	*	*	14	7	1	14	10	3
WCR19	0-20m	*	*	0	0	0	*	*	0	1	1	3	3	0	0	0	0	0	0	0	0
WCR19	20-40m	0	*	0	0	0	2	0	0	1	2	3	3	0	0	2	0	1	2	0	0
WCR19	40-60m	0	1	0	0	0	2	0	0	1	2	3	3	0	0	0	0	0	0	0	0
WCR19	60-80m	0	*	0	0	0	1	*	0	2	1	2	2	0	0	0	0	0	0	2	0
WCR19	80-100m	*	1	0	0	0	*	*	0	2	1	2	2	0	0	0	0	0	0	1	1
WCR19	100-120m	0	0	0	0	0	*	*	0	1	2	3	0	0	0	1	0	0	0	0	0
WCR19	120-140m	0	0	0	0	0	1	*	0	2	1	3	2	0	0	1	0	0	0	0	1
WCR19	140-160m	0	0	0	0	0	*	*	0	2	1	2	1	0	0	6	0	0	0	4	0
WCR19	160-180m	0	0	0	0	0	*	0	0	3	1	2	1	0	0	3	1	0	2	0	0

Site	Transect segment	Mistletoe	Silver Wattle	Blackwood	Cherry Ballart	Musk Daisy-bush	Shrubs>1m	Shrubs<1m	Coprosma	Leaf litter	Bracken	Native grasses	Rushes/sedges	Tree ferns	Ground ferns	Logs 40-59cm	Logs 60-79cm	Logs >80cm	Stumps 40-59cm	Stumps 60-79cm	Stumps >80cm
WCR19	180-200m	*	*	1	0	0	1	1	0	2	2	2	*	0	0	3	0	0	0	0	1
WCR19	200-220m	0	0	1	0	0	0	1	0	2	2	*	0	0	0	1	0	1	0	0	2
WCR19	220-240m	*	*	0	0	0	*	0	0	2	4	2	*	0	0	2	0	0	0	0	0
WCR19	240-250m	0	*	0	0	0	*	0	0	2	1	3	2	0	0	2	0	0	2	0	0
WCR19	average	*	1	*	0	0	1	1	0	2	2	2	2	0	0	21	1	2	6	7	5
WCR20	0-20m	0	*	*	0	0	*	0	0	3	1	1	1	0	0	1	0	0	0	0	0
WCR20	20-40m	0	*	0	0	0	*	0	0	2	1	2	2	0	0	1	0	0	0	1	0
WCR20	40-60m	0	1	*	0	0	1	0	0	3	2	2	2	0	0	0	0	2	1	1	0
WCR20	60-80m	0	1	0	0	0	1	0	0	3	1	1	1	0	0	0	0	0	2	0	0
WCR20	80-100m	0	2	0	0	0	2	0	0	3	1	1	1	0	0	1	0	0	1	0	0
WCR20	100-120m	0	2	0	0	0	2	0	0	3	1	1	1	0	0	0	0	0	0	0	0
WCR20	120-140m	0	2	0	0	0	2	0	0	3	1	1	1	0	0	1	0	0	0	0	0
WCR20	140-160m	0	2	0	0	0	2	1	1	3	1	1	2	0	0	0	0	1	0	2	0
WCR20	160-180m	0	*	0	0	0	*	1	1	2	2	2	2	0	0	1	0	1	0	1	0
WCR20	180-200m	0	0	*	0	0	1	1	1	2	3	1	1	0	0	1	0	0	0	0	0
WCR20	200-220m	0	*	*	0	0	*	1	1	2	3	1	1	0	0	1	1	0	0	0	0
WCR20	220-240m	0	0	*	0	0	1	1	1	2	3	1	1	0	0	2	0	0	0	0	0
WCR20	240-250m	0	*	*	0	0	1	1	1	2	3	1	1	0	0	0	0	0	1	0	0
WCR20	average	0	1	1	0	0	1	1	1	2	2	1	1	0	0	9	1	4	5	5	0
WCR21	0-20m	0	1	0	0	0	0	0	0	4	0	*	*	0	0	1	0	1	0	0	0
WCR21	20-40m	0	2	0	0	0	0	0	0	3	0	2	1	0	0	0	0	0	1	1	0
WCR21	40-60m	0	2	0	0	0	0	0	0	3	0	2	*	0	0	1	0	1	0	1	0
WCR21	60-80m	0	2	0	0	0	0	0	0	4	0	2	1	0	0	0	0	0	3	0	0
WCR21	80-100m	0	2	0	0	0	0	0	0	4	0	*	*	0	0	0	0	0	2	0	0
WCR21	100-120m	0	2	0	0	0	0	0	0	4	*	*	1	0	0	0	0	0	0	0	0
WCR21	120-140m	0	2	0	0	0	0	0	0	4	*	*	1	0	0	0	0	1	2	0	0
WCR21	140-160m	0	1	0	0	0	0	0	0	3	1	1	*	0	0	0	3	0	2	0	0
WCR21	160-180m	0	1	*	0	0	1	*	0	2	1	2	1	0	0	2	0	0	0	0	0
WCR21	180-200m	0	0	*	0	0	1	*	0	2	2	2	0	0	0	0	0	0	1	0	0
WCR21	200-220m	0	0	*	0	0	2	1	0	1	2	3	2	0	0	0	0	1	0	0	0
WCR21	220-240m	0	0	0	0	0	0	0	0	2	4	3	*	0	1	0	0	1	0	0	0
WCR21	240-250m	0	*	0	0	0	*	0	0	2	3	3	0	0	1	0	0	0	1	0	0
WCR21	average	0	1	*	0	0	1	*	0	3	2	2	1	0	*	4	3	5	12	2	0
WCR22	0-20m	0	*	0	0	0	0	0	0	3	1	1	2	0	0	0	0	0	0	0	0
WCR22	20-40m	0	1	0	0	0	0	0	0	4	1	1	1	0	0	0	0	0	1	0	0
WCR22	40-60m	0	1	0	0	0	0	0	0	5	2	1	1	0	0	1	1	0	1	0	0
WCR22	60-80m	0	1	0	0	0	0	0	0	5	1	1	1	0	0	1	0	0	0	0	0
WCR22	80-100m	0	*	0	0	0	0	0	0	5	1	1	1	0	0	0	1	0	0	0	0

Site	Transect segment	Mistletoe	Silver Wattle	Blackwood	Cherry Ballart	Musk Daisy-bush	Shrubs>1m	Shrubs<1m	Coprosma	Leaf litter	Bracken	Native grasses	Rushes/sedges	Tree ferns	Ground ferns	Logs 40-59cm	Logs 60-79cm	Logs >80cm	Stumps 40-59cm	Stumps 60-79cm	Stumps >80cm
WCR22	100-120m	0	1	0	0	0	0	*	0	5	0	1	1	0	0	1	0	0	2	0	0
WCR22	120-140m	0	1	0	*	0	0	0	0	5	0	1	1	0	0	0	0	0	2	0	0
WCR22	140-160m	0	*	0	0	0	*	0	0	5	0	1	1	0	0	0	1	0	1	0	0
WCR22	160-180m	0	1	0	0	0	*	0	0	5	*	1	1	0	0	0	0	0	0	0	0
WCR22	180-200m	0	1	0	0	0	0	0	0	5	1	1	1	0	0	1	0	0	0	0	0
WCR22	200-220m	0	1	0	0	0	0	0	0	5	0	1	1	0	0	0	0	0	1	0	0
WCR22	220-240m	0	*	0	0	0	0	0	0	5	1	1	1	0	0	0	0	0	0	0	0
WCR22	240-250m	0	0	0	0	0	*	0	0	4	1	1	2	0	0	0	0	0	0	0	0
WCR22	average	0	1	0	*	0	*	*	0	5	1	1	1	0	0	4	3	0	8	0	0
WCR23	0-20m	0	0	1	0	0	0	0	0	1	1	4	3	0	*	1	0	0	1	0	0
WCR23	20-40m	0	0	1	0	0	1	1	0	2	1	2	1	0	1	0	0	0	0	0	0
WCR23	40-60m	0	1	0	0	0	1	2	0	3	1	2	*	0	0	0	0	0	0	0	0
WCR23	60-80m	0	*	*	0	0	1	2	0	3	1	2	1	0	0	0	0	0	1	0	0
WCR23	80-100m	0	1	0	0	0	1	2	0	3	1	3	1	0	0	0	0	1	0	0	0
WCR23	100-120m	0	1	*	0	0	1	2	0	2	1	4	1	0	0	0	0	0	0	0	0
WCR23	120-140m	0	1	0	0	0	1	1	0	2	1	3	1	0	0	1	0	0	2	0	0
WCR23	140-160m	0	1	0	0	0	*	1	0	3	1	2	1	0	0	2	0	0	0	0	0
WCR23	160-180m	0	2	0	0	0	0	1	0	3	2	2	1	0	0	0	0	0	0	0	0
WCR23	180-200m	0	1	0	0	0	*	1	0	3	2	2	1	0	0	0	0	0	0	0	0
WCR23	200-220m	0	*	*	0	0	*	1	0	4	2	2	1	0	0	2	0	0	0	1	0
WCR23	220-240m	0	*	0	0	0	*	2	0	4	1	2	1	0	0	0	0	0	0	0	0
WCR23	240-250m	0	1	0	0	0	*	1	0	4	1	2	1	0	0	0	0	0	0	0	0
WCR23	average	0	1	1	0	0	1	1	0	3	1	2	1	0	*	6	0	1	4	1	0
WCR24	0-20m	0	0	2	0	0	*	1	*	2	2	2	1	0	0	0	0	0	2	1	0
WCR24	20-40m	0	0	*	0	0	0	*	*	2	2	2	*	0	0	0	0	0	1	1	0
WCR24	40-60m	0	0	*	0	0	*	1	0	3	2	2	*	0	0	1	0	0	1	0	0
WCR24	60-80m	0	0	0	0	0	*	1	*	3	3	2	1	0	0	1	0	0	0	1	0
WCR24	80-100m	0	0	0	0	0	1	*	*	3	2	2	2	0	0	1	0	0	1	0	0
WCR24	100-120m	0	0	*	0	0	1	*	*	1	2	2	4	0	*	1	0	0	0	0	0
WCR24	120-140m	0	0	0	0	0	*	*	0	2	1	2	4	0	0	0	0	0	0	1	0
WCR24	140-160m	0	0	*	0	0	*	0	0	2	1	2	4	0	0	0	0	0	0	0	0
WCR24	160-180m	0	0	2	0	0	*	*	*	2	*	2	3	0	0	0	0	0	0	0	0
WCR24	180-200m	0	0	*	0	0	*	*	0	2	1	2	2	0	0	1	0	0	0	0	0
WCR24	200-220m	0	0	0	0	0	1	*	0	2	1	2	2	0	0	2	0	0	0	0	0
WCR24	220-240m	0	0	0	0	0	1	1	*	2	2	3	2	0	1	1	0	0	0	0	0
WCR24	240-250m	0	0	1	0	0	*	0	0	1	1	1	0	0	2	0	0	0	0	0	0
WCR24	average	0	0	1	0	0	1	1	1	2	2	2	2	0	1	8	0	0	5	4	0
WCR25	0-20m	0	0	0	0	*	1	1	0	2	2	3	1	0	0	0	0	0	0	0	0

Site	Transect segment	Mistletoe	Silver Wattle	Blackwood	Cherry Ballart	Musk Daisy-bush	Shrubs>1m	Shrubs<1m	Coprosma	Leaf litter	Bracken	Native grasses	Rushes/sedges	Tree ferns	Ground ferns	Logs 40-59cm	Logs 60-79cm	Logs >80cm	Stumps 40-59cm	Stumps 60-79cm	Stumps >80cm
WCR25	20-40m	0	0	0	0	*	1	1	0	2	2	3	1	0	0	0	0	0	2	0	0
WCR25	40-60m	0	0	0	0	0	*	0	0	2	2	3	2	0	0	0	0	0	1	1	0
WCR25	60-80m	0	0	0	0	*	1	0	0	3	2	2	1	0	1	0	2	0	0	1	0
WCR25	80-100m	0	0	0	0	*	1	1	0	3	2	2	2	0	1	2	0	0	0	2	0
WCR25	100-120m	0	0	0	0	2	2	1	1	2	2	2	2	*	1	2	0	0	4	0	0
WCR25	120-140m	0	0	0	0	2	2	1	1	2	1	2	2	*	2	1	1	1	0	1	0
WCR25	140-160m	0	0	0	0	1	2	1	1	2	1	2	2	*	1	0	1	0	0	0	0
WCR25	160-180m	0	0	0	0	*	1	1	1	3	1	2	1	0	0	1	1	1	0	0	0
WCR25	180-200m	0	0	0	0	*	2	1	0	2	1	2	2	0	1	0	0	0	0	2	2
WCR25	200-220m	0	0	0	0	*	2	1	*	1	1	3	2	0	1	1	0	0	0	0	0
WCR25	220-240m	0	0	0	0	0	1	1	0	2	1	4	1	0	0	0	0	0	1	2	0
WCR25	240-250m	0	0	0	0	*	1	1	0	3	1	3	1	0	0	0	0	0	0	0	0
WCR25	average	0	0	0	0	1	1	1	1	2	1	2	2	*	1	7	5	2	8	9	2
WCR26	0-20m	0	1	0	0	0	*	1	0	3	3	2	1	0	0	0	0	0	1	1	0
WCR26	20-40m	0	1	0	0	0	0	1	0	3	3	2	1	0	0	0	0	0	1	1	0
WCR26	40-60m	0	1	0	0	0	0	1	0	3	2	2	1	0	0	1	0	0	1	1	0
WCR26	60-80m	0	1	*	0	0	0	1	0	4	1	1	1	0	0	1	0	0	0	0	0
WCR26	80-100m	0	1	0	0	0	1	1	*	3	2	1	1	0	0	0	0	0	2	2	0
WCR26	100-120m	0	1	0	0	0	1	1	1	3	1	1	2	0	0	2	0	0	1	0	0
WCR26	120-140m	0	1	0	0	0	1	1	1	3	2	1	1	0	0	1	0	0	0	0	0
WCR26	140-160m	0	1	0	0	0	0	*	*	3	2	1	1	0	0	1	0	0	0	0	0
WCR26	160-180m	0	2	0	0	0	*	*	*	3	2	2	1	0	0	1	2	0	0	0	1
WCR26	180-200m	0	1	0	0	0	0	1	1	4	1	1	1	0	0	2	0	0	1	1	0
WCR26	200-220m	0	2	0	0	0	0	*	*	3	2	1	1	0	0	0	0	0	1	0	1
WCR26	220-240m	0	0	0	0	0	2	1	2	3	2	1	2	0	0	0	1	0	1	0	0
WCR26	240-250m	0	*	0	0	0	2	2	2	2	1	1	2	0	*	0	1	0	1	0	0
WCR26	average	0	1	*	0	0	1	1	1	3	2	1	1	0	*	9	4	0	10	6	2
WCR27	0-20m	0	0	0	0	0	2	3	0	3	2	1	*	0	0	0	0	0	2	0	0
WCR27	20-40m	0	0	0	0	0	2	2	0	3	2	1	1	0	0	0	0	0	1	0	0
WCR27	40-60m	0	0	0	0	0	1	2	0	3	2	2	1	0	0	0	0	0	0	0	0
WCR27	60-80m	0	0	0	0	0	3	2	0	2	2	3	1	0	0	0	0	0	0	0	0
WCR27	80-100m	0	0	0	0	0	1	2	0	3	2	2	1	0	0	0	0	0	1	0	0
WCR27	100-120m	0	0	0	0	0	1	2	0	4	1	2	1	0	0	0	0	0	2	0	0
WCR27	120-140m	0	0	0	0	0	2	2	0	3	*	2	2	0	0	0	0	0	0	0	0
WCR27	140-160m	0	0	0	0	0	1	1	0	3	0	2	3	0	*	0	0	0	0	0	0
WCR27	160-180m	0	0	0	0	0	2	1	0	1	0	2	3	0	0	0	1	0	0	0	0
WCR27	180-200m	0	0	0	0	0	*	1	0	1	0	2	4	0	1	2	0	0	2	0	0
WCR27	200-220m	0	0	*	0	0	*	1	0	1	1	1	4	0	*	1	0	0	1	0	0

Site	Transect segment	Mistletoe	Silver Wattle	Blackwood	Cherry Ballart	Musk Daisy-bush	Shrubs>1m	Shrubs<1m	Coprosma	Leaf litter	Bracken	Native grasses	Rushes/sedges	Tree ferns	Ground ferns	Logs 40-59cm	Logs 60-79cm	Logs >80cm	Stumps 40-59cm	Stumps 60-79cm	Stumps >80cm
WCR27	220-240m	0	*	*	0	0	1	2	0	1	1	2	4	0	1	2	0	0	1	0	0
WCR27	240-250m	0	*	0	0	0	*	*	*	1	2	3	3	0	*	0	0	0	0	0	0
WCR27	average	0	*	*	0	0	1	2	*	2	1	2	3	0	1	5	1	0	10	0	0
WCR28	0-20m	0	0	0	*	0	0	*	0	4	1	1	1	0	0	3	3	0	2	2	0
WCR28	20-40m	0	0	0	*	0	1	*	0	4	1	1	1	0	0	0	0	0	0	0	0
WCR28	40-60m	0	0	0	0	*	2	*	0	4	1	1	1	0	0	0	0	0	0	0	0
WCR28	60-80m	0	0	0	0	0	2	*	0	4	2	2	*	0	0	2	0	0	1	0	0
WCR28	80-100m	0	0	0	0	*	2	*	*	3	2	2	1	1	0	0	0	0	1	0	0
WCR28	100-120m	0	0	0	0	1	1	*	*	3	2	1	0	0	0	1	0	0	0	0	0
WCR28	120-140m	0	0	0	0	1	1	*	*	3	1	1	1	0	0	0	0	0	1	1	0
WCR28	140-160m	0	0	0	0	*	2	*	0	3	2	2	1	1	*	0	0	0	0	0	0
WCR28	160-180m	0	0	0	0	2	*	*	0	3	2	1	*	2	1	2	0	0	2	0	0
WCR28	180-200m	0	0	0	0	*	*	*	0	3	2	*	1	0	0	5	0	0	2	1	0
WCR28	200-220m	0	0	*	0	2	1	*	0	3	2	*	*	0	0	0	0	0	2	0	0
WCR28	220-240m	0	0	*	0	1	2	*	0	3	2	*	*	0	*	0	1	0	3	1	0
WCR28	240-250m	0	0	1	0	3	*	1	1	3	2	1	*	0	0	1	0	0	0	0	1
WCR28	average	0	0	*	*	1	1	1	1	3	2	1	1	1	*	14	4	0	14	5	1
WCR29	0-20m	0	0	*	0	*	3	2	2	1	2	2	1	0	1	0	0	0	0	0	0
WCR29	20-40m	0	0	*	0	0	3	2	1	1	2	3	2	0	*	0	0	0	1	0	0
WCR29	40-60m	0	0	0	0	0	2	2	1	2	2	2	2	0	*	0	0	0	0	0	0
WCR29	60-80m	0	0	0	0	0	2	1	0	2	2	2	2	0	0	1	0	0	0	0	0
WCR29	80-100m	0	0	0	0	0	2	1	0	3	2	3	2	0	0	0	0	0	0	0	0
WCR29	100-120m	0	0	0	0	0	1	1	0	4	2	2	2	0	0	1	0	0	0	1	0
WCR29	120-140m	0	0	0	0	0	2	1	0	3	2	2	2	0	0	1	0	0	0	0	0
WCR29	140-160m	0	0	0	0	0	2	2	1	3	2	2	3	0	0	1	0	0	1	0	0
WCR29	160-180m	0	0	0	0	0	3	2	0	2	1	2	4	0	0	0	0	0	0	0	0
WCR29	180-200m	0	0	0	0	0	3	2	0	2	1	2	3	0	0	0	0	0	0	0	0
WCR29	200-220m	0	0	*	0	0	2	2	0	2	*	2	3	0	0	1	0	0	0	0	0
WCR29	220-240m	0	0	0	0	0	2	2	0	2	1	2	3	0	0	0	0	0	1	0	0
WCR29	240-250m	0	0	0	0	0	2	1	0	2	*	2	3	0	0	0	0	0	0	0	0
WCR29	average	0	0	*	0	*	2	2	1	2	2	2	3	0	*	5	0	0	3	1	0
WCR30	0-20m	0	0	0	0	0	2	1	0	3	2	2	1	0	0	0	0	0	1	0	0
WCR30	20-40m	0	0	0	0	0	1	1	0	3	1	2	1	0	0	0	0	0	2	0	0
WCR30	40-60m	0	0	0	0	0	1	1	0	3	1	2	1	0	0	1	0	0	0	0	2
WCR30	60-80m	0	0	*	0	0	2	1	0	3	2	2	2	0	1	0	0	0	4	0	1
WCR30	80-100m	0	0	2	0	0	2	1	*	2	2	2	2	0	2	0	0	1	4	0	1
WCR30	100-120m	1	0	*	0	0	2	1	1	2	2	2	2	0	1	0	0	0	0	0	0
WCR30	120-140m	0	0	*	0	0	1	1	*	3	2	2	3	0	1	0	0	0	1	2	0

Site	Transect segment	Mistletoe	Silver Wattle	Blackwood	Cherry Ballart	Musk Daisy-bush	Shrubs>1m	Shrubs<1m	Coprosma	Leaf litter	Bracken	Native grasses	Rushes/sedges	Tree ferns	Ground ferns	Logs 40-59cm	Logs 60-79cm	Logs >80cm	Stumps 40-59cm	Stumps 60-79cm	Stumps >80cm
WCR30	140-160m	0	0	*	0	1	1	1	*	3	2	2	3	0	1	1	0	0	0	0	0
WCR30	160-180m	0	0	*	0	1	1	1	*	3	2	2	3	0	1	0	0	0	0	0	1
WCR30	180-200m	0	0	*	0	2	2	1	*	3	1	1	2	0	2	0	0	0	0	0	0
WCR30	200-220m	0	0	*	0	4	1	*	*	3	*	1	1	0	2	0	1	0	0	2	0
WCR30	220-240m	0	0	0	0	4	*	*	*	2	*	1	2	0	3	1	0	0	3	0	0
WCR30	240-250m	0	0	2	0	3	*	*	*	1	1	1	2	*	3	0	0	0	4	0	0
WCR30	average	*	0	1	0	1	1	1	1	3	2	2	2	*	2	3	1	1	19	4	5