

SUPPLEMENTARY INVESTIGATION REPORT

HIGH DENSITY RECORDING OF GREATER GLIDERS (*Petauroides volans*)

COTTONWOOD RANGE ROAD #3

**VicForests' Logging Coupes:
895-505-0011, 895-505-0015, 895-511-0010, 895-511-0011, and 895-511-0012**

Abstract

Forest areas within and/or adjacent to VicForests scheduled logging coupes 895-505-0011, 895-505-0015, 895-511-0011, and 895-511-0012 were investigated to assess the presence and density of Greater Glider (*Petauroides volans*) individuals and other nocturnal fauna.

High numbers of Greater Glider (*Petauroides volans*) individuals were recorded from this location within a nocturnal spotlighting survey.

The Greater Glider (*Petauroides volans*) records obtained within the principal “survey transect” detailed within this investigation was assessed using spatial analysis which identified an area of forest supporting densities requiring protection under the relevant mandatory biodiversity conservation measures set out in the regulatory framework governing logging operations in Victoria's State Forests.

Recommendations are made to the Department of Environment, Land, Water and Planning (DELWP) and to VicForests to ensure that the areas of high Greater Glider (*Petauroides volans*) densities are protected from logging through their inclusion in the “Special Protection Zone” of the “Forest Management Zone Scheme”. The methodology, results, discussion and recommendations arising from this investigation are further detailed within this report.

Relevant Legislation

- Code of Practice for Timber Production 2014, Department of Environment and Primary Industries, The State of Victoria, 2014
- “Management Standards and Procedures for timber harvesting operations in Victoria’s State forests 2014”, Department of Environment and Primary Industries, The State of Victoria, 2014
- “Planning Standards for timber harvesting operations in Victoria’s State forests 2014, Appendix 5 to the Management Standards and Procedures for timber harvesting operations in Victoria’s State forests 2014”, Department of Environment and Primary Industries, The State of Victoria, 2014
- Forest Management Plan For The East Gippsland Forest Management Area, Victoria Department of Conservation and Natural Resources, East Melbourne, December 1995

Relevant Organisations

- VicForests

Status of Site

Logging has commenced within coupe 895-505-0011 and remaining coupes are scheduled for logging.

Date of Investigation

16/07/2016; 19-20/07/2016;
28/07/2016; 05-06/08/2016; 06-
07/08/2016

Surveyors

Owen Hanson
Ed Hill
Andrew Lincoln

Authors

Andrew Lincoln
Fauna and Flora Research Collective Inc.
asl80@hotmail.com;
Ed Hill
Goongerah Environment Centre Office
geco.media@gmail.com

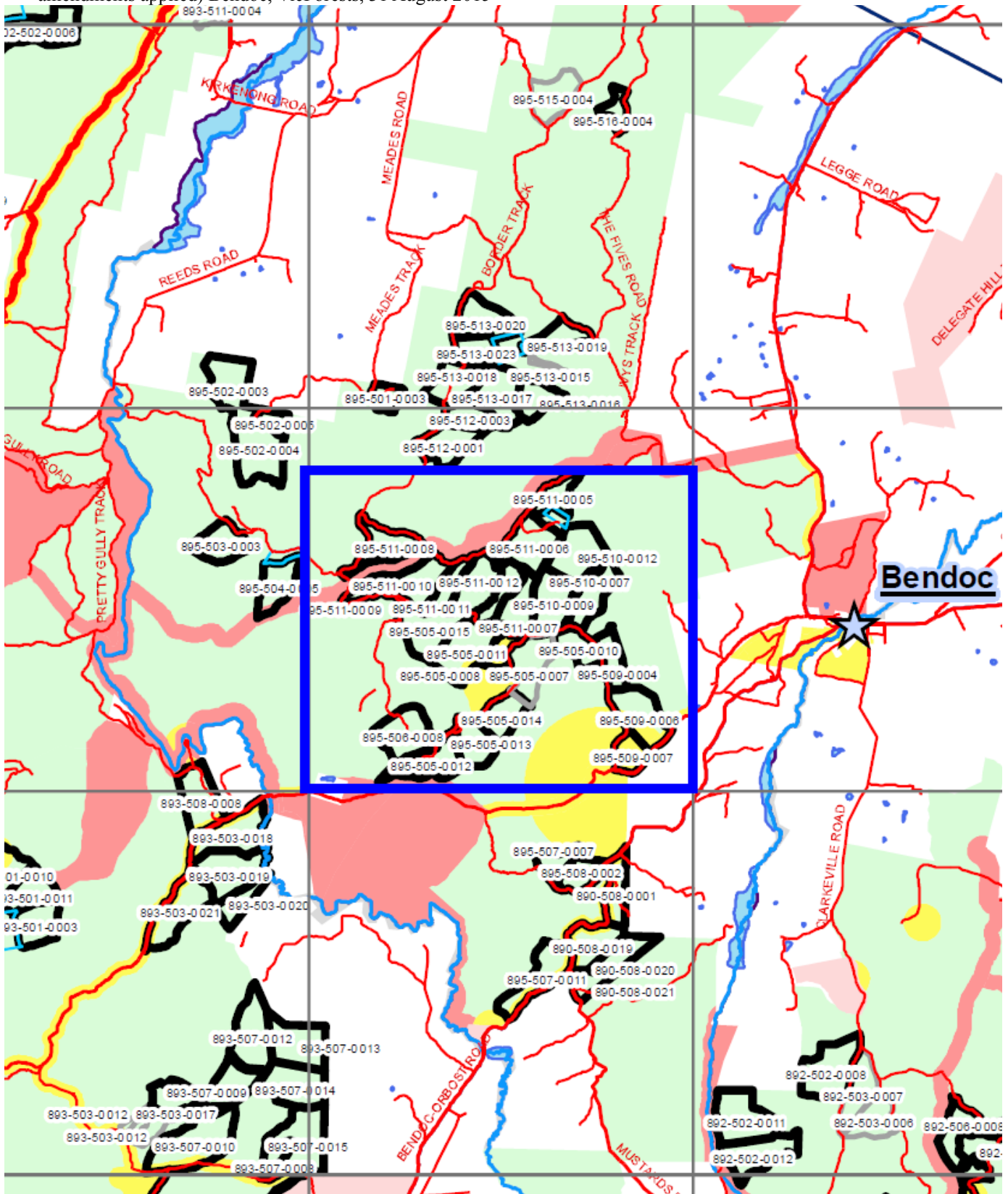
Date of report

08/08/2016

Study Location Overview

Within multiple VicForests scheduled logging coupes off Cottonwood Range Road and Bumperbar Track in the Cottonwood Forest Block near Bendoc in East Gippsland.

Figure A(i). Detail from: "Approved Timber Release Plan 2013 - 2016 Change Map; August 2015 (with all approved amendments applied) Bendoc, VicForests, 31 August 2015



*Investigation location within blue box

Method 1 (Nocturnal Fauna Spotlighting Survey)

Nocturnal Fauna Surveys [16/07/2016; 19-20/07/2016; 28/07/2016; 05-06/08/2016; 06-07/08/2016]

Equipment Used

- Hand-held Spotlight
- Binoculars
- Digital Camera
- Global Positioning System (GPS)
[Garmin GPS]
- Compass, pen and paper

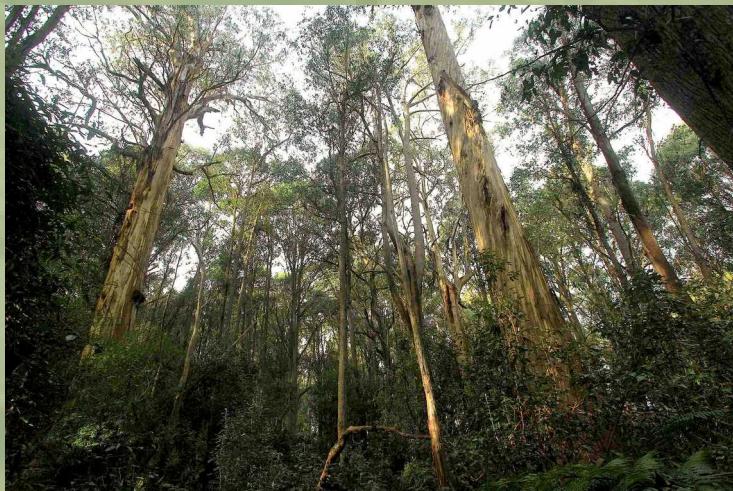
Method - General

1. On each of the dates listed above spotlighting survey transects were commenced at various locations and times listed below in the relevant Tables of the Results 1. section in the Cottonwood Forest Block.
2. The forest within logging coupes 895-505-0011 and 895-505-0015 and along Cottonwood Range Road within and adjacent to coupes 895-511-0011 and 895-511-0012 was searched for the presence of nocturnal fauna principally by shining a hand-held spotlight to detect fauna movement or “eye shine”.
3. As fauna were observed their locations were marked with a GPS and time, species, bearing from and a rough estimate of the distance from observation location were noted.

(NB: where bearing is recorded as "N/A" and distance as "0m" location coordinates of fauna species were recorded at or beneath the fauna location.)

See the Tables in “Results 1” below for details of the fauna encountered.

4. Fauna record location data were analysed using Geographic Information Systems (GIS) mapping software to determine compliance requirements with the regulatory framework governing logging operations in Victoria's State Forest with respect to fauna detection based biodiversity conservation measures.
5. Further presentation of these results, as well as conclusions and discussion arising from this investigations results are provided in their relevant sections below.



Method 2 (analysis/recommendations/legislation considered [as at August 2015])

From: “Management Standards and Procedures for timber harvesting operations in Victoria’s State forests 2014”, Department of Environment and Primary Industries, The State of Victoria, 2014.¹

“2. Planning and Record Keeping

2.1 FMZ and planning information

2.1.1.3 Where evidence of a value that requires protection via the establishment or amendment of an SPZ or SMZ is found in the field application must be made to the Secretary or delegate prior to commencement of the timber harvesting operation to create or amend an SPZ or SMZ in accordance with Appendix 5 the Planning Standards. SMZ applications must be accompanied by an SMZ plan and must be complied with during timber harvesting operations.

4. Biodiversity

4.2 Fauna

4.2.1.1 Apply management actions for rare and threatened fauna identified within areas affected by timber harvesting operations as outlined in Appendix 3 Table 13 (Rare or threatened fauna prescriptions).

Table 13 Rare or threatened fauna and invertebrate prescriptions.

FMA	Common name	Scientific name	Management action
East Gippsland	Greater Glider	<i>Petauroides volans</i>	Where evidence of this value is found in the field follow clause 2.1.1.3 of this document using table 4 in Appendix 5 the Planning Standards for information.

From: “Planning Standards for timber harvesting operations in Victoria’s State forests 2014, Appendix 5 to the Management Standards and Procedures for timber harvesting operations in Victoria’s State forests 2014”²

“4. Biodiversity

4.2 Fauna – fixed zoning

4.2.1 Statewide

4.2.1.1 Plan management actions for rare and endangered fauna in accordance with Table 3 (Fixed FMZ rules for fauna) below.

4.2.1.2 Maintain FMZ schemes for rare and endangered fauna in accordance with Table 3 (Fixed FMZ rules for fauna) below.

4.3 Fauna detection based zoning

4.3.1 Statewide

4.3.1.1 Apply the management actions outlined in Table 4 (Detection based FMZ rules for fauna) below for zoned rare or threatened fauna.

4.3.1.2 Implement FMZ amendments and reviews in accordance with Table 4 (Detection based FMZ rules for fauna) below for new verified rare or threatened fauna records and FMZ amendment requirements outlined in section 2.

Table 4 Detection based FMZ rules for fauna.

FMA	Common name	Scientific name	Zoning management actions	Management actions	Review
East Gippsland	Greater Glider	<i>Petauroides volans</i>	Establish a SPZ of approximately 100 ha of suitable habitat where verified records report more than 2 individuals per hectare, more than 10 individuals per km or more than 15 individuals per hour of spotlighting, or where substantial populations are located in isolated or unusual habitat.		

1 “Management Standards and Procedures for timber harvesting operations in Victoria’s State forests 2014”, Department of Environment and Primary Industries, The State of Victoria, 2014, p. 23, 32, 36, 76, 79

2 “Planning Standards for timber harvesting operations in Victoria’s State forests 2014, Appendix 5 to the Management Standards and Procedures for timber harvesting operations in Victoria’s State forests 2014”, Department of Environment and Primary Industries, The State of Victoria, 2014, pp. 16, 17, 20, 43

From: "Forest Management Plan For The East Gippsland Forest Management Area, Victoria Department of Conservation and Natural Resources, East Melbourne, December 1995".³

"Chapter 3 BIODIVERSITY CONSERVATION

3.4 - NATIVE FAUNA

CONSERVATION GUIDELINE Mammals

Arboreal mammals. For each of the following occurrences, approximately 100 ha of suitable habitat will be included in the SPZ:

- resident Koala populations.
- Greater Glider and Common Brushtail Possum - >2 individuals per ha, >10 per km, or >15 per hour of spotlighting.
- Yellow-bellied Glider - >0.2 per ha, >5 per km, or >7 per hour of spotlighting.
- Eastern Pygmy Possum - >5 per standard pitfall line over 5 days.
- substantial populations of the above species that are isolated or in unusual habitat.

Results 1 (Summary – Nocturnal Spotlighting Survey Results)

Results 2 (Tables and Maps)

This section shows 5 Tables that present the summarised results from each of 5 spotlighting surveys undertaken within the study location.

Following the tables detailed above are two maps (Figures 1. and 2.) displaying the Greater Glider detection records detailed in the five tables. Also shown is the location of the "High Density of Greater Glider" configurations formed by the relevant Greater Glider records detailed below.

In each of the two maps 12 Greater Glider records are shown as "the large dark blue white outlined pentagons" and are labelled from 01 to 12 representing the cumulative unique individual count as they were encountered during the survey of 06-07 August 2016. These 12 labelled Greater Glider records are shown within a 5.46ha polygon and 11 of the 12 Greater Glider records are shown along a one kilometer transect line.

Numerous other Greater Glider records from various surveys (including as detailed within this report and in a previous FFRC and GECO report of March 2016) are also shown. These records display the minimum encountered Greater Glider occupancy of the forest area surveyed.

5 of these additional Greater Glider records ("red outlined and dark blue pentagons") were observed within forest areas that have now been logged since the commencement of this survey.

Results 3 (Photos)

The "Results 3. (Photos)" section presents photographs of Greater Glider (*Petauroides volans*) individuals encountered and photographed throughout the study location and recorded within the "Surveys" (Spotlighting Transects) detailed above. See the note beside each photo for further detail.

³ Forest Management Plan For The East Gippsland Forest Management Area, Victoria Department of Conservation and Natural Resources, East Melbourne, December 1995, p. 12, 27, 29, 30

Results 2 (Tables and Maps)

Table 1. 06-07 August 2016_High Density of Greater Glider Recording_Cottonwood Range Road #3

Time	Waypoint	Recording Location	Species	Common Name	Type	Bearing	Distance	Animal Location (projected)	Unique Individuals (Cumulative Tally)
21:39	CCASL01	55H 661932 5886870	<i>Petauroides volans</i>	Greater Glider	Visual	N/A	0m	55 H 661932 5886870	(1)
22:09	GG1B260D2	55H 661875 5886915	<i>Petauroides volans</i>	Greater Glider	Visual	260°	2m	55 H 661872 5886915	(2)
23:21	CCASL02	55H 661619 5886999	<i>Petauroides volans</i>	Greater Glider	Visual	340°	20m	55 H 661613 5887018	(3)
23:45	CCASL03	55H 661704 5887043	<i>Petauroides volans</i>	Greater Glider	Visual	N/A	0m	55 H 661704 5887043	(4)
23:45	CCASL03	55H 661704 5887043	<i>Petauroides volans</i>	Greater Glider	Visual	N/A	0m	55 H 661704 5887043	(5)
00:38	CCASL04	55H 661660 5887340	<i>Petauroides volans</i>	Greater Glider	Visual	N/A	0m	55 H 661660 5887340	(6)
00:38	CCASL04	55H 661660 5887340	<i>Petauroides volans</i>	Greater Glider	Visual	N/A	0m	55 H 661660 5887340	(7)
00:40	CCASL05	55H 661666 5887352	<i>Tyto tenebricosa</i>	Sooty Owl	Aural	90°	200m	55 H 661866 5887349	
01:10	CCASL06	55H 661795 5887316	<i>Petauroides volans</i>	Greater Glider	Visual	N/A	0m	55 H 661795 5887316	(8)
01:10	CCASL06	55H 661795 5887316	<i>Petauroides volans</i>	Greater Glider	Visual	N/A	0m	55 H 661795 5887316	(9)
01:26	CCASL07	55H 661975 5887384	<i>Petauroides volans</i>	Greater Glider	Visual	N/A	0m	55 H 661975 5887384	(10)
01:55	CCASL08	55H 662042 5887358	<i>Petauroides volans</i>	Greater Glider	Visual	50°	30m	55 H 662066 5887377	(11)
02:12	CCASL09	55H 662255 5887386	<i>Petauroides volans</i>	Greater Glider	Visual	350°	20m	55 H 662252 5887406	(12)

Table 2. 05-06 August 2016_Greater Glider Detections_Cottonwood Range Road #3

Time	Waypoint	Recording Location	Species	Common Name	Type	Bearing	Distance	Animal Location (projected)	Unique Individuals (Cumulative Tally)
22:09	GG1B140D15	55 H 661615 5887346	<i>Petauroides volans</i>	Greater Glider	Visual	140°	15m	55 H 661625 5887334	(1)
22:22	GG2B20D15	55 H 661818 5887332	<i>Petauroides volans</i>	Greater Glider	Visual	20°	15m	55 H 661824 5887345	(2)
22:28	GG3B200D20	55 H 661874 5887326	<i>Petauroides volans</i>	Greater Glider	Visual	200°	20m	55 H 661866 5887307	(3)
22:35	GG4B100D10	55 H 661963 5887365	<i>Petauroides volans</i>	Greater Glider	Visual	100°	10m	55 H 661972 5887364	(4)
22:43	GG5B180D50	55 H 662061 5887340	<i>Petauroides volans</i>	Greater Glider	Visual	180°	50m	55 H 662060 5887290	(5)
23:59	GG6B90D15	55 H 661979 5887043	<i>Petauroides volans</i>	Greater Glider	Visual	90°	15m	55 H 661994 5887043	(6)
01:13	GG6B260D5	55 H 661919 5886918	<i>Petauroides volans</i>	Greater Glider	Visual	260°	5m	55 H 661914 5886917	(7)
01:30	GG8B300D20	55 H 661820 5887002	<i>Petauroides volans</i>	Greater Glider	Visual	300°	20m	55 H 661803 5887012	(8)
02:21	GG9B90D20	55 H 662036 5886784	<i>Petauroides volans</i>	Greater Glider	Visual	90°	20m	55 H 662056 5886783	(9)

Table 3. 28 July 2016_Greater Glider Detections_Cottonwood Range Road #3

Time	Waypoint	Recording Location	Species	Common Name	Type	Bearing	Distance	Animal Location (projected)	Unique Individuals (Cumulative Tally)
21:34	GG1	55 H 662427 5887136	<i>Petauroides volans</i>	Greater Glider	Visual	180°	5m	55 H 662426 5887131	(1)
21:56	GG2	55 H 662539 5887082	<i>Petauroides volans</i>	Greater Glider	Visual	300°	10m	55 H 662530 5887087	(2)
22:53	GG3	55 H 662012 5886783	<i>Petauroides volans</i>	Greater Glider	Visual	200°	15m	55 H 662007 5886770	(3)
23:04	GG4	55 H 662004 5886773	<i>Petauroides volans</i>	Greater Glider	Visual	160°	30m	55 H 662014 5886745	(4)

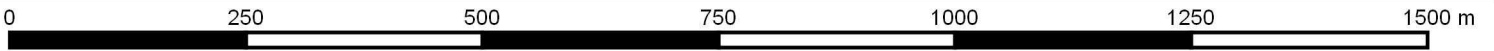
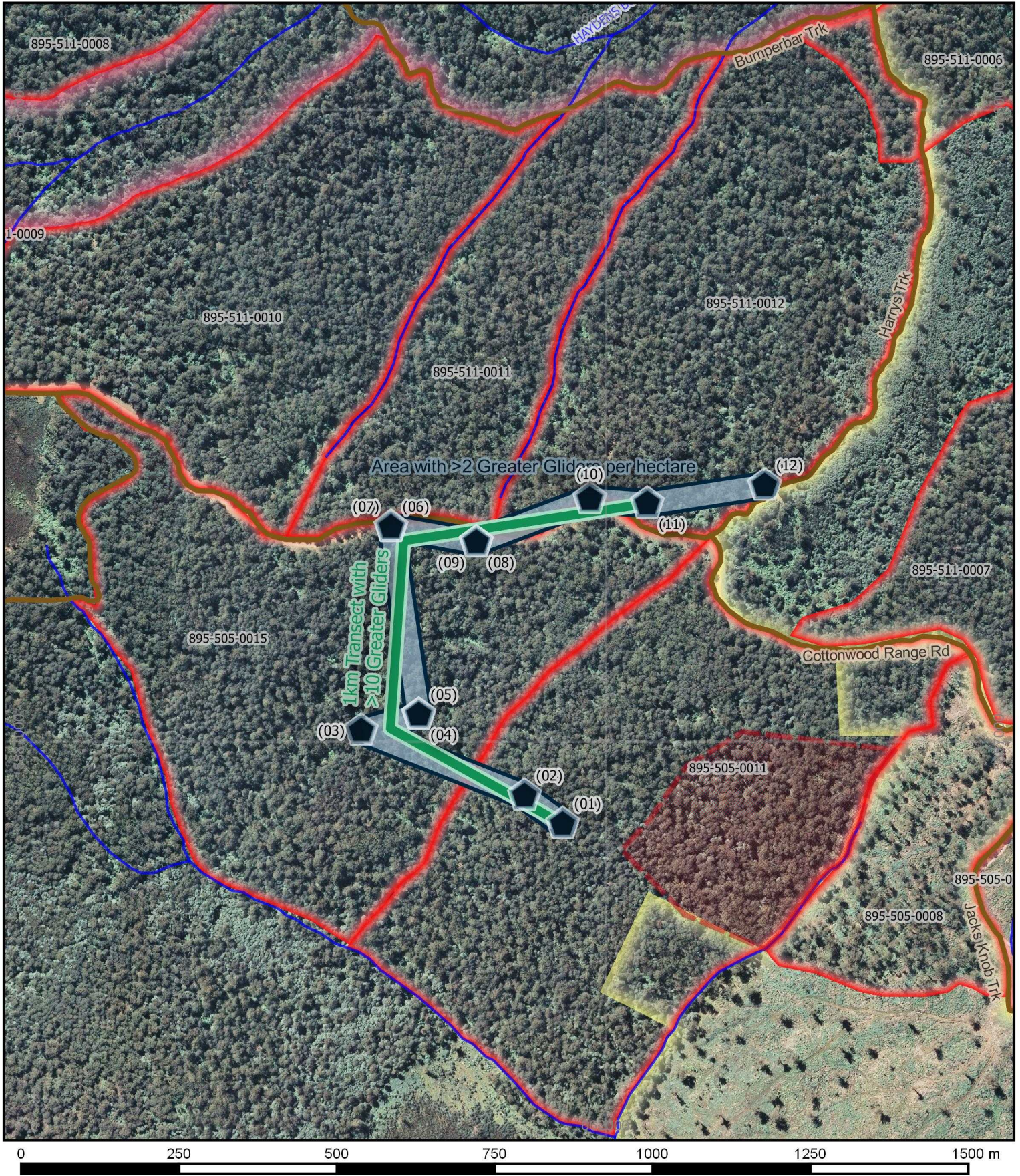
Table 4. 19-20 July 2016_Greater Glider Detections_Cottonwood Range Road #3

Time	Waypoint	Recording Location	Species	Common Name	Type	Bearing	Distance	Animal Location (projected)	Unique Individuals (Cumulative Tally)
23:16	834	55 H 662216 5886839	<i>Petauroides volans</i>	Greater Glider	Visual	120°	50m	55 H 662260 5886813	(1)
23:21	GG2	55 H 662172 5886810	<i>Petauroides volans</i>	Greater Glider	Visual	240°	50m	55 H 662128 5886785	(2)
00:59	GG3	55 H 662296 5886892	<i>Petauroides volans</i>	Greater Glider	Visual	2°	30m	55 H 662298 5886922	(3)
01:15	GG4	55 H 662401 5886917	<i>Petauroides volans</i>	Greater Glider	Visual	0°	5m	55 H 662401 5886922	(4)
01:32	GG5	55 H 662530 5887072	<i>Petauroides volans</i>	Greater Glider	Visual	340°	10m	55 H 662527 5887081	(5)
01:50	GG6	55 H 662517 5887145	<i>Petauroides volans</i>	Greater Glider	Visual	150°	15m	55 H 662525 5887131	(6)








Table 5. 16 July 2016_Greater Glider Detections_Cottonwood Range Road #3

Time	Waypoint	Recording Location	Species	Common Name	Type	Bearing	Distance	Animal Location (projected)	Unique Individuals (Cumulative Tally)
21:02	GG1	55 H 662447 5887141	<i>Petauroides volans</i>	Greater Glider	Visual	170°	15m	55 H 662450 5887126	(1)
21:25	GG2	55 H 662528 5887074	<i>Petauroides volans</i>	Greater Glider	Visual	240°	50m	55 H 662484 5887049	(2)
22:09	GG3	55 H 662206 5886751	<i>Petauroides volans</i>	Greater Glider	Visual	120°	20m	55 H 662224 5886740	(3)
22:28	GG4	55 H 662401 5886916	<i>Petauroides volans</i>	Greater Glider	Visual	340°	10m	55 H 662398 5886926	(4)

Figure 1. Cottonwood Range Road; Greater Glider records; High Density Greater Glider Areas and Transect; Forest Management Zoning [DEPI, June, 2014]; Scheduled Logging Coupes [TRP]; Disturbance (July-August 2016); Aerial Imagery



Legend

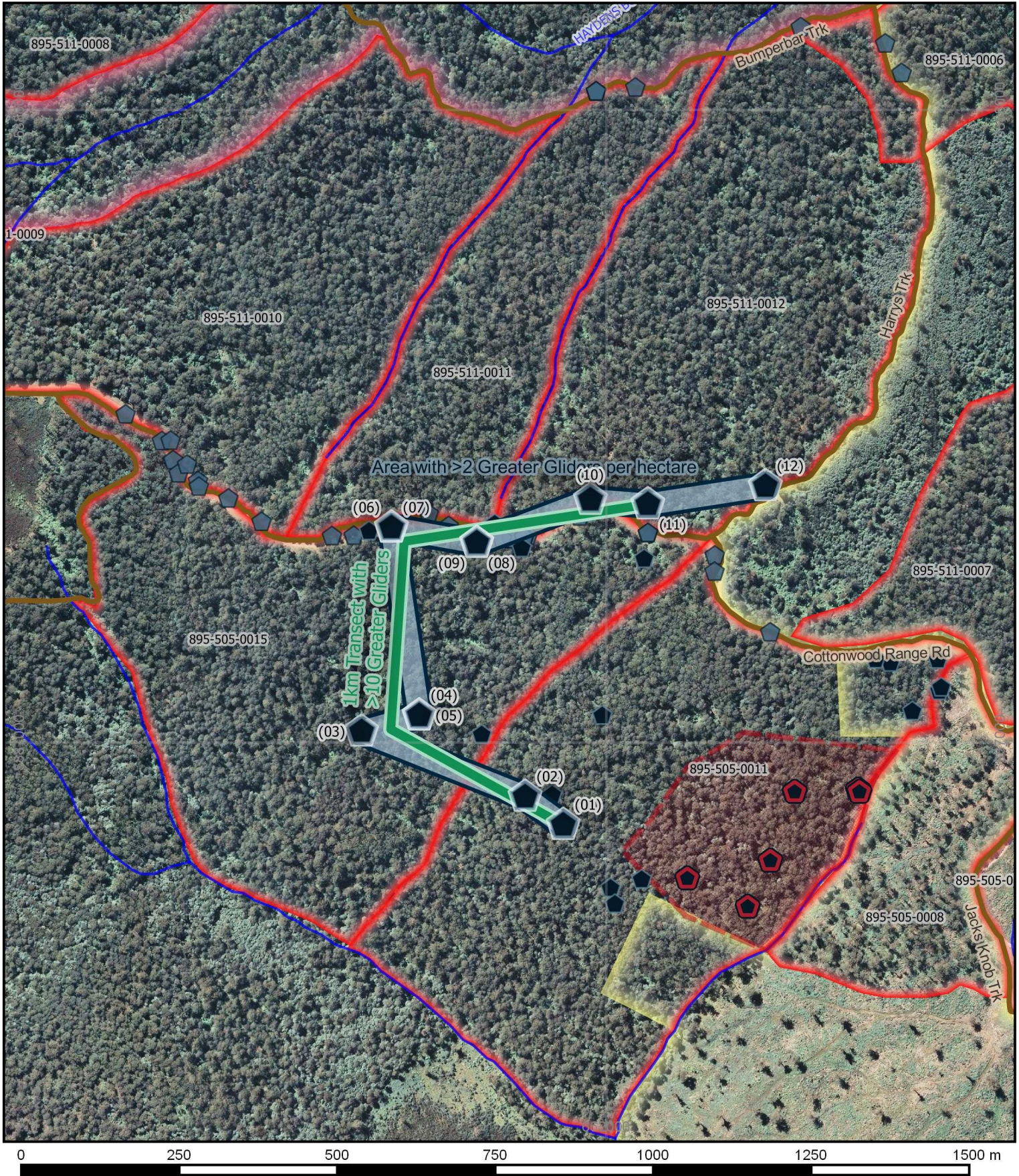
-  Greater Glider Records [06-07 August Survey (Labelled 01-12)]
-  1km Transect with >10 Greater Gliders
-  Roads
-  Watercourses
-  High Density Greater Glider Area (12 GG's in 5.46ha @ 2.20 GG's p/ha)
-  Approximate logged area of coupe 895-505-0011 (as at 07/08/16)
-  Scheduled logging Coupes Timber Release plan (TRP) [VicForests: August 2015]

GDA94/MGA Zone 55
[EPSG: 28355]

Map Scale:
1:8,000



Figure 2. Cottonwood Range Road; Greater Glider records; High Density Greater Glider Areas and Transect; Forest Management Zoning [DEPI, June, 2014]; Scheduled Logging Coupes [TRP]; Disturbance (July-August 2016); Aerial Imagery



Legend

- | | | | | | |
|--|------------------------------------------------------------------------|--|-----------------------------------------------------------------------|--|------------------------------------------------------------------------------|
| | Greater Glider Records [06-07 August Survey (Labelled 01-12)] | | Greater Glider Records [September-October 2015 - various surveys] | | Scheduled logging Coupes Timber Release plan (TRP) [VicForests: August 2015] |
| | Greater Glider Records [July-August 2016 - various surveys] | | High Density Greater Glider Area (12 GG's in 5.46ha @ 2.20 GG's p/ha) | | Roads |
| | Greater Glider Records [July 2016 - various surveys (Area now logged)] | | 1km Transect with >10 Greater Gliders | | Watercourses |
| | | | Approximate logged area of coupe 895-505-0011 (as at 07/08/16) | | |

GDA94/MGA Zone 55 [EPSG: 28355]

Map Scale: 1:8,000



Results 3. - Figure 3.1 - Greater Glider's photographed 06-07/08/2016



a) Location: 55 H 661615 5887346 Time: 21:39



b) Location: 55H 661619 5886999 Time: 23:21



c) Location: 55H 661704 5887043 Time: 23:45



d) Location: 55H 661795 5887316 Time: 01:10



e) Location: 55H 661975 5887384 Time: 01:26



f) Location: 55H 662042 5887358 Time: 01:55



g) Location: 55H 662255 5887386 Time: 02:12



h) Ring Tail Possum observed on survey transect

Figure 3.2 - Greater Glider's photographed 05-06/08/2016



a) Location: 55 H 661615 5887346 Time: 22:09



b) Location: 55 H 661818 5887332 Time: 22:22



c) Location: 55 H 661874 5887326 Time: 22:28



d) Location: 55 H 661963 5887365 Time: 22:35



e) Location: 55 H 662061 5887340 Time: 22:43



f) Location: 55 H 661979 5887043 Time: 23:59



g) Location: 55 H 661919 5886918 Time: 01:13



h) Location: 55 H 662036 5886784 Time: 02:21

Figure 3.3 - Greater Gliders photographed July 16th, 19th/20th and 28th



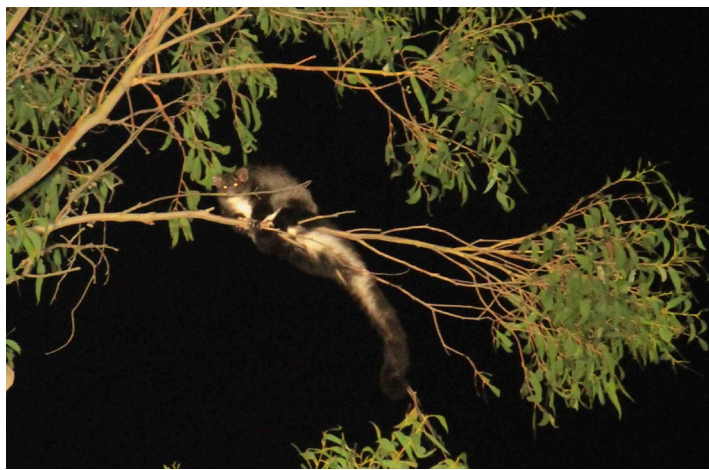
a) Location: 55 H 662398 5886926 Time: 22:28 Date: 16/7/16



b) Location: 55 H 662260 5886813 Time: 23:16 Date: 19/0716



c) Location: 55 H 662401 5886922 Time: 1:15 Date: 20/08/16



d) Location: 55 H 662530 5887072 Time: 1:32 Date: 20/0716



e) Location: 55 H 662427 5887136 Time: 12:34 Date: 28/07/16



f) Location: 55 H 662539 5887082 Time: 21:56 Date: 28/07/16



g) Location: 55 H 662012 5886783 Time: 22:53 Date: 28/07/16



h) Location: 55 H 662004 5886773 Time: 23:04 Date: 28/07/16-

Summary/Conclusions/Discussion

High-density of Greater Gliders (*Petauroides volans*)

1. Within and adjacent to VicForests scheduled logging coupes 895-505-0011, 895-505-0015, 895-511-0011, and 895-511-0012 high numbers of Greater Gliders (*Petauroides volans*) were observed and recorded within multiple nocturnal fauna spotlighting survey transects on the evenings of 16/07/2016; 19-20/07/2016; 28/07/2016; 05-06/08/2016; 06-07/08/2016. These record locations are displayed in the Tables and Maps of Results 1. as the “pentagon” shaped points.
2. Both the “*Management Standards and Procedures for timber harvesting operations in Victoria’s State forests 2014*” (Department of Environment and Primary Industries, The State of Victoria, 2014) through its “*Planning Standards for timber harvesting operations in Victoria’s State forests 2014, Appendix 5 to the Management Standards and Procedures for timber harvesting operations in Victoria’s State forests 2014*” and the Forest Management Plan For The East Gippsland Forest Management Area (Victorian Department of Conservation and Natural Resources, East Melbourne, December 1995) require that an SPZ (Special Protection Zone) of approximately 100ha of suitable habitat be established for records of > 2 individual Greater Gliders per hectare of spotlighting.
3. The 12 cumulatively labelled "large dark blue white outlined pentagons" Greater Glider records shown in the maps of Results 1. falling within the corresponding 5.46 hectare “dark blue solid outlined and light grey filled” polygon labelled "Area with >2 Greater Gliders per hectare", recorded these 12 Greater Glider individuals present at densities of approximately 2.20 Greater Gliders per hectare.
4. The first 11 cumulatively labelled "large dark blue white outlined pentagons" Greater Glider records shown in the maps of Results 1. along the 1 kilometre "green and white outlined" line labelled "1km Transect with >10 Greater Gliders" shows the presence of 11 Greater Glider individuals at densities of >10 (11) Greater Gliders per kilometre.
5. Each of the two configurations of 12 and 11 Greater Gliders described above constitutes a "High-density of Greater Gliders" according to the density and frequency triggers contained within the relevant sections of the regulatory framework.
6. In order to meet the requirements of the High Density of Greater Glider prescriptions contained within the regulatory framework governing logging operations in Victoria's State Forests, Special Protection Zones to protect these Greater Glider configurations must be created and fully implemented prior to any further logging operations within this area.
7. In order to ascertain the full extent and density of Greater Glider occupancy all areas of forest that are, and are adjacent to, forest scheduled for logging within the Cottonwood Range forests, must be thoroughly surveyed for Greater Glider presence. The results of this investigation, considered in conjunction with prior investigations, demonstrate that large areas of forest within and surrounding the specific area surveyed contain High-densities of Greater Gliders that must be adequately protected through the implementation of appropriately designed Special Protection Zones.
8. VicForests must refrain from and The Department of Environment, Land, Water and Planning must restrain VicForests from logging within any of the forest areas scheduled for logging displayed in the maps of Results 1. until all areas have been adequately surveyed with any "High Density" areas included in the Special Protection Zone.