

**INVESTIGATION REPORT**  
**COOL TEMPERATE RAINFOREST & MIXED FOREST**  
**RAINFOREST SITE OF SIGNIFICANCE**  
(EG85 - Hensleigh - Far Creek)

**COAST RANGE ROAD**  
**VicForests Logging coupe 886-509-0012**

**Abstract**

Sections of VicForests scheduled logging coupe 886-509-0012 were investigated to assess the presence and extent of Cool Temperate Rainforest and Cool Temperate Mixed Forest communities.

Areas of Cool Temperate Rainforest were identified within coupe 886-509-0012. These areas of the study location were readily identified by the presence of *rainforest* character species and the comparative structural composition of these stands to those expected to be found in mature *rainforest*.

Cool Temperate Mixed Forest (Mixed Forest) areas of the study location within coupe 886-509-0012 were identified by noting the presence of characteristic Mixed Forest species including in their formation of a multi-layer structured community comprised of Mixed Forest character species of an advanced age class, the presence of cool temperate rainforest character and differential species, and the topographic contiguity and relative proximity between the Mixed Forest areas within coupe 886-509-0012 and the extant Mixed Forest clearly identifiable in the adjacent forest areas immediately to the north of coupe 886-509-0012 across Coast Range Road in the Errinundra National Park.

This investigation also notes that coupe 886-509-0012 is located within a “Rainforest Site of Significance” (EG85 - Hensleigh - Far Creek).

Recommendations are made to the Department of Environment, Land, Water and Planning (DELWP) and to VicForests to ensure that all areas of Cool Temperate Rainforest and Mixed Forest are excluded from logging and that no further logging is undertaken within the “Rainforest Site of Significance”.

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
- Department of Environment, Land, Water and Planning (DELWP)

**Status of Site**

Coupe 886-509-0012 is scheduled for logging

**Date of Investigation**

04/05/2015, 07/05/2015,  
08/06/2015

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**Date of report**

09/08/2015



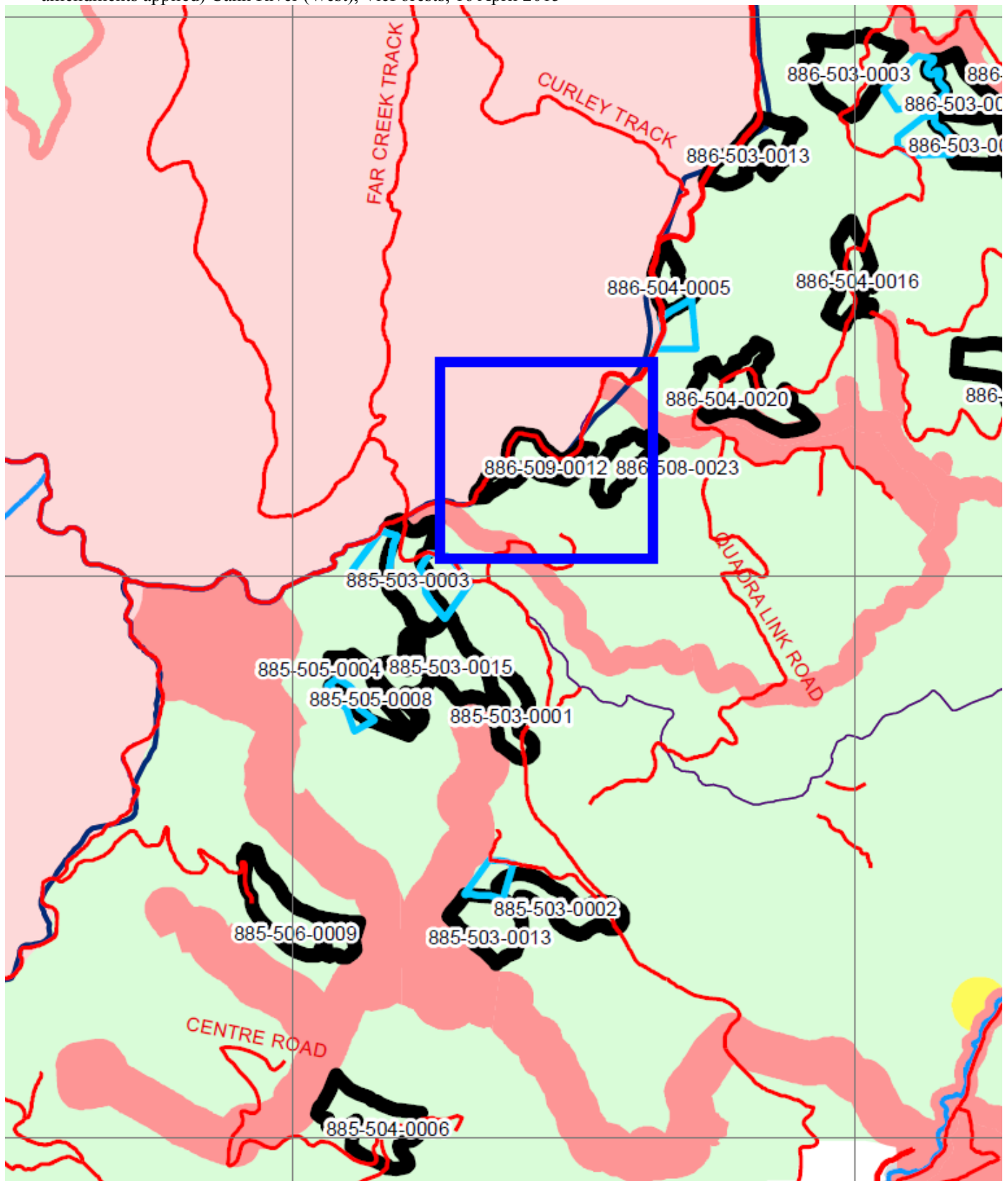




## Study Location Overview

Within VicForests scheduled logging coupe 886-509-0012 off Coast Range Road in the Quadra Forest Block of East Gippsland forming part of the south-eastern flank of the Errinundra Plateau National Park.

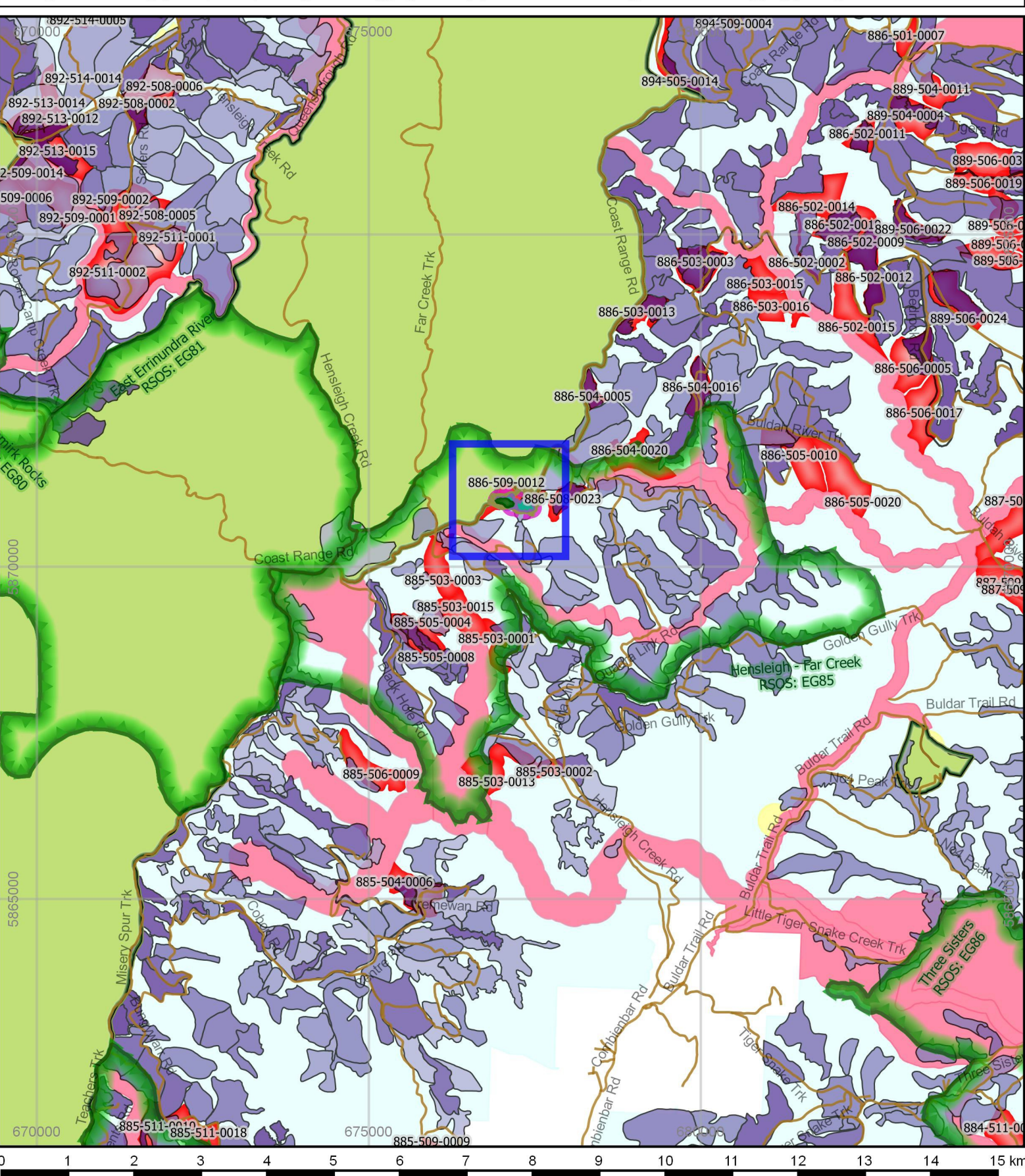
Figure A(i). Detail from: "Approved Timber Release Plan 2013 - 2016 Change Map; April 2015 (with all approved amendments applied) Cann River (West), VicForests, 16 April 2015



\*Investigation location within blue box



Figure A(ii). Study Location Overview - Coast Range Road - Quadra Forest Block; Rainforest Sites of Significance [RSOS100]; Forest Management Zoning [DEPI, June, 2014]; Prior Logging History [2015: LASTLOG25]; Scheduled Logging [TRP]; Roads



**Legend**

Cool Temperate Rainforest core zone	Cool Temperate Mixed Forest (modelled) ecotone	Parks & Reserves [PARKRES]
40m Buffer on CTRF core zone	Rainforest Site of Significance	Timber Release Plan (VicForests) [Approved TRP_April2015]
CTRF & Mixed Forest patches	Conservation Parks and Reserves	
Cool Temperate Mixed Forest core zone	Special Protection Zone	
100m Buffer on Cool Temperate Mixed Forest core zone	Special Management Zone	
	General Management Zone	

**LASTLOG25**

196970
197980
198990
199900
200910
201011
201112
201213
201314

**Projection:** EPSG: 28355 GDA94/MGA Zone 55

**Map Scale:** 1:75,000



## Method 1a (Identification of Cool Temperate Rainforest and Mixed Forest), & Results 1 (Summary)

### Identification methodologies and resources:

- Cameron, D., *A Field Guide to Rainforest Identification in Victoria: Differential species keys for the delineation of rainforest boundaries*, Victorian Government Department of Sustainability and Environment, Melbourne, 2008
- Peel, B., *Rainforest and Cool Temperate Mixed Forest of Victoria*, Department of Natural Resources and Environment, Melbourne, 1999
- Cheal, D., et. al., *The Vegetation of East Gippsland – III*, Arthur Rylah Institute for Environmental Research, Department of Sustainability and Environment, Heidelberg, 2011
- DELWP, “[Combined] EVC Benchmarks: “East Gippsland Uplands” & “Highlands - Far East” bioregions”, <http://www.depi.vic.gov.au/environment-and-wildlife/biodiversity/evc-benchmarks>, accessed May 2015
- Figure B. (below): Schematic Representation of Cool Temperate Rainforest and Cool Temperate Mixed Forest Zones and their Composition [this report]
- Table 1. (below): *East Gippsland Cool Temperate Rainforest and Cool Temperate Mixed Forest Character species and Cool Temperate Forest Differential Species Lists* [this report]

Figure B. Schematic Representation of Cool Temperate Rainforest and Cool Temperate Mixed Forest Zones and their Composition and Minimum Vegetative Buffer Provisions

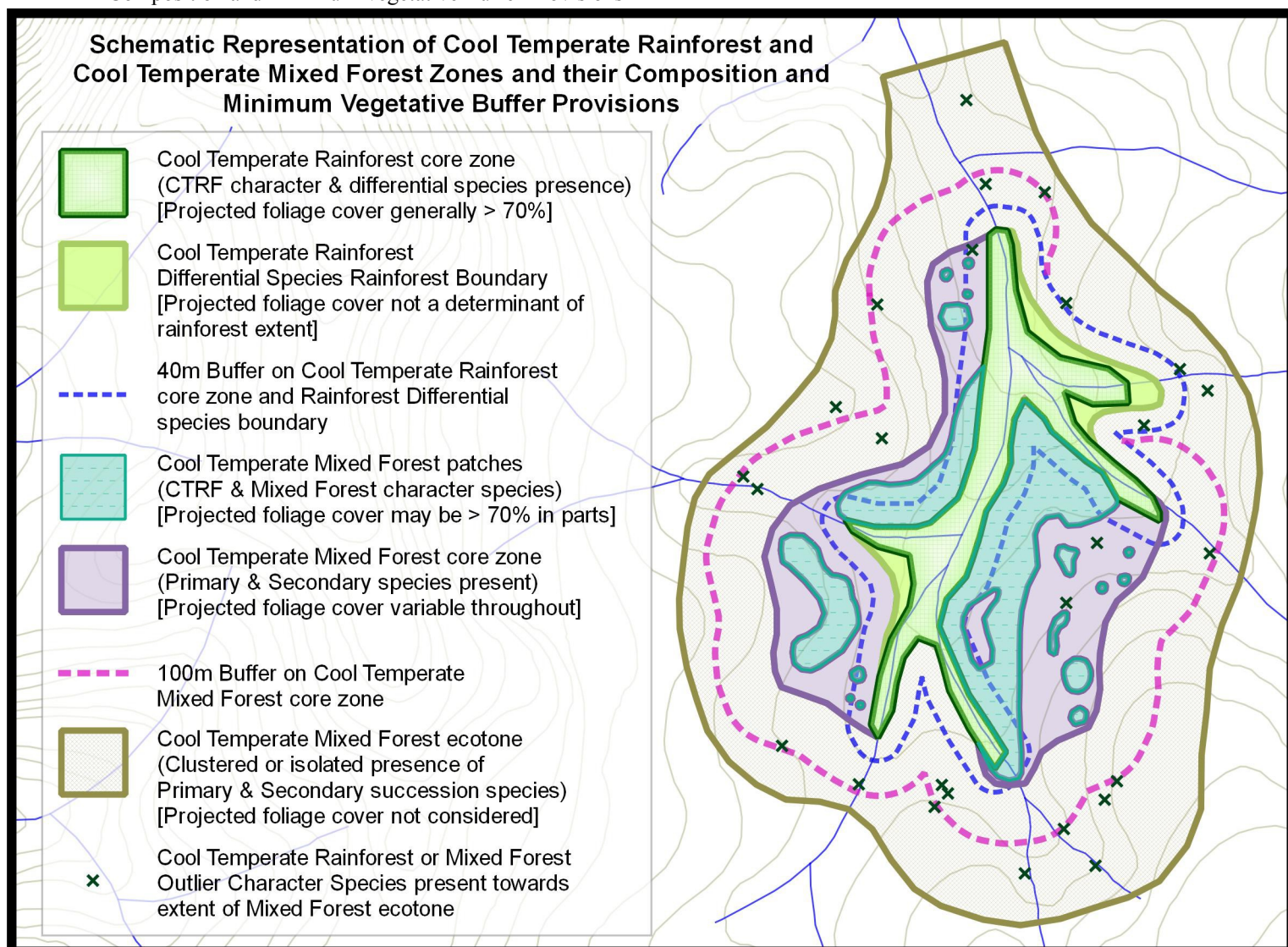




Table 1. East Gippsland Cool Temperate Rainforest and Cool Temperate Mixed Forest Character species and Cool Temperate Forest Differential Species Lists

Differential-Character-Typical-Common- <b>Distinguishing</b> Species		CAMERON (CTRF Differential)	PEEL (CT Rainforest)	BENCHMARK (CT Rainforest)	CHEAL (CT Rainforest)	PEEL (CT Mixed Forest)	CHEAL (CT Mixed Forest)	CHEAL (Wet Forest)	BENCHMARK (Wet Forest)	CHEAL (Montane Wet Forest)	BENCHMARK (Montane Wet Forest)	CAMERON (Sclerophyll Differential)	Abb.	Common Name
1	<i>Crepidomanes venosum</i>	CTRF	CTRF	CTRF	CTRF								Cv	Veined Bristle-fern
2	<i>Hymenophyllum flabellatum</i>	CTRF	CTRF	CTRF	CTRF								Hf	Shiny Filmy-fern
3	<i>Blechnum fluviatile</i>	CTRF	CTRF		CTRF								Bf	Ray Water-fern
4	<i>Libertia pulchella</i>	CTRF		CTRF									Lp	Pretty Grass-flag
5	<i>Leptospermum grandifolium</i>	CTRF											Lg	Mountain Tea-tree
6	<i>Carex appressa</i>	CTRF											Cap	Tall Sedge
7	<i>Microsorium pustulatum</i>		CTRF		CTRF								Mp	Kangaroo Fern
8	<i>Blechnum patersonii</i>		CTRF		CTRF								Bp	Strap Water-fern
9	<i>Deyeuxia rodwayi</i>				CTRF								Dr	Tasman Bent-grass
10	<i>Grammitis billardieri</i>	CTRF	CTRF	CTRF	CTRF	CTMF	CTMF						Gb	Common Finger-fern
11	<i>Atherosperma moschatum</i>	CTRF	CTRF	CTRF	CTRF	CTMF	CTMF						Amo	Southern Sassafras
12	<i>Uncinia nemoralis</i>	CTRF	CTRF	CTRF			CTMF						Un	River Hook-sedge
13	<i>Uncinia tenella</i>	CTRF	CTRF		CTRF	CTMF	CTMF						Ut	Delicate Hook-sedge
14	<i>Podocarpus aff. Lawrencei</i>	CTRF					CTMF						Pal	Errinundra Plum-pine
15	<i>Urtica incisa</i>			CTRF			CTMF						Ui	Scrub Nettle
16	<i>Leucopogon maccraei</i>			CTRF			CTMF						Lm	Subalpine Beard-heath
17	<i>Asplenium bulbiferum ssp. gracillimum</i>	CTRF	CTRF	CTRF	CTRF				WF				Abu	Mother Spleenw ort
18	<i>Australina pusilla ssp. muelleri</i>	CTRF	CTRF	CTRF	CTRF		CTMF	WF					Apu	Shade Nettle
19	<i>Parsonsia brownii</i>	CTRF	CTRF	CTRF	CTRF	CTMF		WF					Pbr	Tw ining Silpod
20	<i>Fieldia australis</i>	CTRF	CTRF	CTRF	CTRF			WF	WF				Fa	Fieldia
21	<i>Hedycarya angustifolia</i>		CTRF		CTRF			WF					Ha	Austral Mulberry
22	<i>Pittosporum bicolor</i>	CTRF	CTRF	CTRF	CTRF	CTMF	CTMF	WF		MMF			Pbi	Banyalla
23	<b>Notelaea ligustrina</b>			CTRF		CTMF	CTMF			MMF			<b>NI</b>	<b>Privet Mock-olive</b>
24	<i>Sambucus gaudichaudiana</i>		CTRF	CTRF	CTRF			WF	WF		MMF		Sg	White Elderberry
25	<i>Elaeocarpus holopetalus</i>		CTRF	CTRF	CTRF	CTMF	CTMF	WF		MMF	MMF		Eh	Black Oliveberry
26	<b>Tasmania xerophila ssp. Robusta</b>					CTMF	CTMF						<b>Txr</b>	<b>Errinundra Pepper</b>
27	<i>Tasmania lanceolata</i>		CTRF	CTRF	CTRF	CTMF	CTMF		WF	MMF	MMF		Tl	Mountain Pepper
28	<i>Polystichum proliferum</i>		CTRF	CTRF	CTRF	CTMF	CTMF	WF	WF		MMF		Pp	Mother Shield-fern
29	<i>Coprosma quadrifida</i>		CTRF	CTRF	CTRF		CTMF	WF	WF		MMF		Cq	Prickly Currant-bush
30	<i>Dicksonia antarctica</i>		CTRF	CTRF	CTRF	CTMF	CTMF	WF	WF	MMF	MMF		Da	Soft Tree-fern
31	<i>Viola hederacea sensu Willis (1972)</i>		CTRF	CTRF	CTRF	CTMF	CTMF	WF	WF	MMF	MMF		Vh	Ivy-leaf Violet
32	<i>Telopea oreades</i>		CTRF	CTRF	CTRF	CTMF	CTMF	WF	WF	MMF	MMF		To	Gippsland Waratah
33	<i>Blechnum wattsii</i>		CTRF	CTRF	CTRF	CTMF	CTMF	WF	WF	MMF	MMF		Bw	Hard Water-fern
34	<i>Clematis aristata</i>		CTRF	CTRF	CTRF	CTMF	CTMF	WF	WF	MMF	MMF		Car	Mountain Clematis
35	<i>Histiopteris incisa</i>		CTRF	CTRF	CTRF	CTMF	CTMF	WF	WF	MMF	MMF		Hi	Bat's Wing Fern
36	<i>Stellaria flaccida</i>		CTRF	CTRF	CTRF	CTMF	CTMF	WF	WF	MMF	MMF		Sf	Forest Starw ort
37	<i>Eucalyptus denticulata</i>		CTRF			CTMF	CTMF		WF	MMF			Ed	Errinundra Shining Gum
38	<i>Acacia frigeszens</i>		CTRF		CTRF	CTMF		WF	WF	MMF	MMF		Af	Frosted Wattle
39	<i>Smilax australis</i>			CTRF				WF	WF				Sa	Austral Sarsaparilla
40	<i>Cyathea australis</i>			CTRF				WF	WF				Cau	Rough Tree-fern
41	<i>Olearia argophylla</i>		CTRF		CTRF			WF	WF			CTSF	Oa	Musk Daisy-bush
42	<i>Acacia dealbata</i>		CTRF			CTMF	CTMF	WF	WF	MMF	MMF	CTSF	Ad	Silver Wattle
43	<b>Dianella tasmanica</b>			CTRF		CTMF	CTMF	WF	WF	MMF	MMF	CTSF	<b>Dt</b>	<b>Tasman Flax-lily</b>
44	<b>Lomatia fraseri</b>					CTMF	CTMF			MMF			<b>Lf</b>	<b>Tree Lomatia</b>
45	<i>Acacia melanoxylon</i>						CTMF		WF				Ama	Blackw ood
46	<b>Eucalyptus obliqua</b>					CTMF		WF	WF				<b>Eo</b>	<b>Messmate Stringybark</b>
47	<b>Gahnia sieberiana</b>					CTMF				MMF	MMF		<b>Gs</b>	<b>Red-fruit Saw-sedge</b>
48	<b>Personia silvatica</b>					CTMF	CTMF			MMF		CTSF	<b>Psi</b>	<b>Forest Geebung</b>
49	<i>Olearia phlogopappa</i>						CTMF			MMF		CTSF	Op	Dusty Daisy-bush
50	<i>Eucalyptus fastigata</i>						CTMF	WF	WF			CTSF	Ef	Cut-tail
51	<b>Prostanthera lasianthos</b>					CTMF	CTMF	WF	WF	MMF	MMF	CTSF	<b>Pla</b>	<b>Victorian Christmas-bush</b>
52	<b>Polyscias sambucifolia</b>					CTMF		WF	WF	MMF	MMF	CTSF	<b>Psa</b>	<b>Elderberry Panax</b>
53	<i>Poa ensiformis</i>						CTMF	WF	WF	MMF	MMF	CTSF	Pen	Sw ord Tussock-grass
54	<i>Eucalyptus regnans</i>								WF				Er	Mountain Ash
55	<i>Eucalyptus viminalis</i>								WF				Ev	Manna Gum
56	<i>Tylophora barbata</i>								WF				Tb	Bearded Tylophora
57	<i>Olearia lirata</i>							WF					Oi	Snow y Daisy-bush
58	<i>Pomaderris aspera</i>							WF					Pa	Hazel Pomaderis
59	<i>Acaena novae-zelandiae</i>									MMF			An	Bidgee-w idgee
60	<i>Eucalyptus delegatensis ssp. delegatensis</i>									MMF	MMF		Edd	Alpine Ash
61	<i>Coprosma hirtella</i>									MMF	MMF		Ch	Rough Coprosma
62	<i>Pimelea axiflora</i>							WF	WF				Pa	Bootlace Bush
63	<i>Hierochloa rariflora</i>								WF		MMF		Hr	Cane Holy-grass
64	<i>Tetrarrhena juncea</i>							WF	WF		MMF		Tj	Forest Wire-grass
65	<i>Lagenophora stipitata</i>											CTSF	Ls	Common Lagenophora
66	<i>Leptinella filicula</i>											CTSF	Lf	Mountain Cotula
67	<i>Cassinia aculeata</i>							WF				CTSF	Cac	Common Cassinia
68	<i>Hydrocotyle hirta</i>							WF				CTSF	Hh	Hairy Penny-w ort
69	<i>Bedfordia arborescens</i>							WF	WF			CTSF	Ba	Blanket-leaf
70	<i>Geranium potentilloides</i>							WF	WF			CTSF	Gp	Cinquefoil Cranesbill
71	<i>Pteridium esculentum</i>							WF	WF		MMF	CTSF	Pes	Austral Bracken



#### Identification of Cool Temperate Rainforest stands

##### ***Cool Temperate Rainforest Core Zone***

1. The presence of a stand of Cool Temperate Rainforest, extending easterly from Coast Range Road in the west of coupe 886-509-0012 was observed.
2. This Cool Temperate Rainforest stand exhibited a typical multi-layered “rainforest” structure and was comprised of many of the East Gippsland Cool Temperate Rainforest character (and/or “common”) species listed in Peel and Cheal and the “differential species” listed in Cameron. This stand was dominated by large characteristic rainforest canopy species, such as Southern Sassafras and Black Olive-berry, as well as many rainforest understorey species such as Mother Spleenwort, Shade Nettle, Ray Water-fern, Fieldia, Common Finger-fern, Shiny Filmy-fern, Kangaroo Fern, Veined Bristle-fern, River Hook-sedge and Delicate Hook-sedge.
3. The boundary of this stand of Cool Temperate Rainforest, shown in Figure 2. as the “green outlined and cross-hatched” polygon, has been mapped according to its obvious spatial distribution demonstrable on satellite imagery (See Figure 3.), as well as by identification along its northern and eastern edge by following the directions set out in “A Field Guide to Rainforest Identification in Victoria: Differential species keys for the delineation of rainforest boundaries”<sup>1</sup>, in particular the section dealing with “East Gippsland Cool Temperate Forest Floristic Field Identification Key” (the “differential species approach”). Species listed as either “Differential Species for East Gippsland Cool Temperate Rainforest”(CTRF) or species listed as “Differential Species for East Gippsland Montane Wet Sclerophyll Forest”(MWSF) were searched for on the topographical contour around the identified rainforest stand.
4. This stand of Cool Temperate Rainforest was found to be approximately 0.9 hectares. See Results 3. Figure 2. for further details of this areas spatial distribution.

#### Identification of Cool Temperate Mixed Forest

5. In addition to the Cool Temperate Rainforest stand discussed above, areas of Cool Temperate Mixed Forest were also encountered. These areas were encountered both as *zones* generally juxtaposed with the identified Cool Temperate Rainforest stand and as *patches* distinguishable from yet with close affinities to Cool Temperate Rainforest.
6. The extent (or limit) of each of the Cool Temperate Rainforest and Mixed Forest components of the site can be broadly described by reference to two main observable disturbance sources and intensities. One is the presence of a high intensity prior logging operation, likely in combination with a natural or artificial fire event. The other limit on the extent of the Cool Temperate Rainforest or Mixed Forest components is a result of a lower intensity fire event and other forms of localised disturbance such as wind-throw.

##### ***Mixed Forest Patches***

7. The distinct *patches* of Mixed Forest with strong affinities to Cool Temperate Rainforest at this location were identified via the increased frequency of canopy forming species not usually comprising Cool Temperate Rainforest but otherwise functioning in similar ways regarding multi-layered forest structure and through the provision of micro-climatic

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<sup>1</sup> Cameron, D., 2008



conditions necessary for the presence of characteristic Rainforest or Mixed Forest species such as many of the epiphytes, ferns and forbes.

8. These additional Mixed Forest canopy forming species (growing in this context as arborescent dominants, co-dominants or understorey trees) are long lived specimens and include:
  - *Pittosporum bicolor*
  - *Tasmania lanceolata*
  - *Lomatia fraseri*
  - *Telopea oreades*
  - *Personia silvatica*
  - *Notelaea ligustrina*
  - *Polyscias sambucifolia*
  - *Olearia argophylla*
  - *Bedfordia arborescens*
  - *Acacia melanoxylon*
9. These small trees or large arborescent shrubs also supported rainforest character species dependant on protected shaded environments and/or appropriate substrates for epiphitic growth (i.e. *Crepidomanes venosum*, *Microsorium pustulatum*, *Grammitis billardierei*, *Uncinia tenella*, *Fieldia australis*)
10. In these *patches* of Mixed Forest with strong affinities to Cool Temperate Rainforest it is not appropriate, at least by direct application, to use the “differential species approach” as many species which are listed as sclerophyll differentials are also character species for Mixed Forest. Indeed, according to Peel, some of the sclerophyll “differential species” are “distinguishing” species for Mixed Forest (4 of 9). (See Table 1. for a list of these species)

#### ***Mixed Forest Core Zone***

11. Beyond both the Cool Temperate Rainforest *core zone* and the Mixed Forests *patches* with close affinities to Cool Temperate Rainforest is the Mixed Forest *core zone*.
12. Within the present study location this area has apparently been impacted by lower intensities of fire, some logging disturbance, wind-throw and senescence of eucalyts and some large rainforest canopy species such as Southern Sassafras and Black Olive-berry. In other parts the Mixed Forest *core zone* has suffered heavier disturbance from prior logging or fire resulting in a stronger dominance of disclimax secondary succession species.
13. Despite these disturbances, this Mixed Forest *core zone*, shown in Figure 2. as within the “purple outlined and purple shaded” polygon, contains representative examples of many of the Mixed Forest character species, including distinguishing and canopy species.
14. The Mixed Forest *core zone* occupies a broader area than the Mixed Forest *patches* described above and is encompassing of these *patches*. These patches are varied in their size and dispersal throughout the Mixed Forest *core zone* where they are variously clustered together or more widely dispersed. The broader Mixed Forest *core zone* contains isolated examples of individual Cool Temperate Rainforest and Mixed Forest canopy species (or the long lived arborescent shrubs listed above), as well as small clusterings of these species.
15. The Mixed Forest *core zone* supports a greater presence of the other Mixed Forest character

species (as listed in Table 1.) including additional canopy or structural contributions from those species listed as participating in the Mixed Forest *patches* above as well as the following species:

- *Dicksonia antarctica*
- *Eucalyptus obliqua*
- *Eucalyptus fastigata*
- *Acacia frigescens*
- *Acacia dealbata*
- *Prostanthera lasianthos*

16. Across the Mixed Forest *core zone* there is a reduction in the presence and abundance of Cool Temperate Rainforest differential species dependent on the protected and shaded micro-climatic niches provided by the larger Mixed Forest *patches* or Cool Temperate Rainforest *core zones*. These species are generally epiphytes and small shade tolerant species that do however persist in pockets providing appropriate substrates and conditions.
17. The Mixed Forest *core zone* also supports a greater diversity of Mixed Forest character species that may also be associated with the Wet or Montane Wet forest elements of the ecological continua under consideration in this investigation. The additional species encountered that can be categorised in this way include:
  - *Leucopogon maccraei*
  - *Dianella tasmanica*
  - *Olearia phlogopappa*
  - *Histiopteris incisa*
  - *Blechnum watsii*
  - *Coprosma quadrifida*
18. The Mixed Forest *core zone* is interspersed with small or large gaps where light dependent species not qualifying as character species for Mixed Forest add to the floristic composition of the site. Some of these species identified as present were:
  - *Coprosma hirtella*
  - *Pimelea axiflora*
  - *Leptinella filicula*

### ***Mixed Forest Ecotone***

19. The Mixed Forest *ecotone* is a broader and largely inferred extent within the study location and the results presented in Figure 2. Within coupe 886-509-0012 off Coast Range Road the forest within this *ecotone* is the most heavily disturbed element of the Mixed Forest areas present.
20. This area can generally be considered a regenerative expansion zone of the Cool Temperate Mixed Forest and the surrounding Wet or Montane Wet Forest where its particular floristic composition at a given time is a product of the time elapsed since the last major disturbance event in conjunction with its potential to progress to a more advanced Mixed Forest or Cool Temperate Rainforest community where this potentiality is a product of its location within a conducive geographic location and topographical configuration.
21. The Mixed Forest *ecotone* present at the study location is both heavily disturbed from logging and generally situated within a topographic “saddle” that connects the Cool Temperate Rainforest *core zones* and the Mixed Forest *patches* and *core zones* within coupe



886-509-0012 and the extensive *stands* of Cool Temperate Rainforest and Mixed Forest immediately to the north of coupe 886-509-0012 across Coast Range Road in the Errinundra National Park.

22. Within coupe 886-509-0012 this area is characterised by a strong presence of Wet or Montane Wet Forest character species and disclimax or secondary Mixed Forest character species, likely originating from the last logging and/or fire disturbance, with isolated pockets, either clustered or as isolated individuals, of remnant primary Cool Temperate Rainforest or Mixed Forest character species not generally found outside of the protected niches described above.





## Results 2 – Mixed Forest Character Species; Figures 1(a-f).

Figure 1(a). *Notelaea ligustrina* (Privet Mock-olive) [including a specimen measured at 62.1cm DBH]



Figure 1(b). *Bedfordia arborescens* (Blanket Leaf) [including a specimen measured at 46.5cm DBH]





Figure 1(c). *Olearia argophylla* (Musk Daisy-bush) [33cm DBH]



Figure 1(d). *Pittosporum bicolor* (Banyalla) [17cm DBH]



Figure 1(e). *Telopea oreades* (Gippsland Waratah) [inc. at 32.8cm DBH]

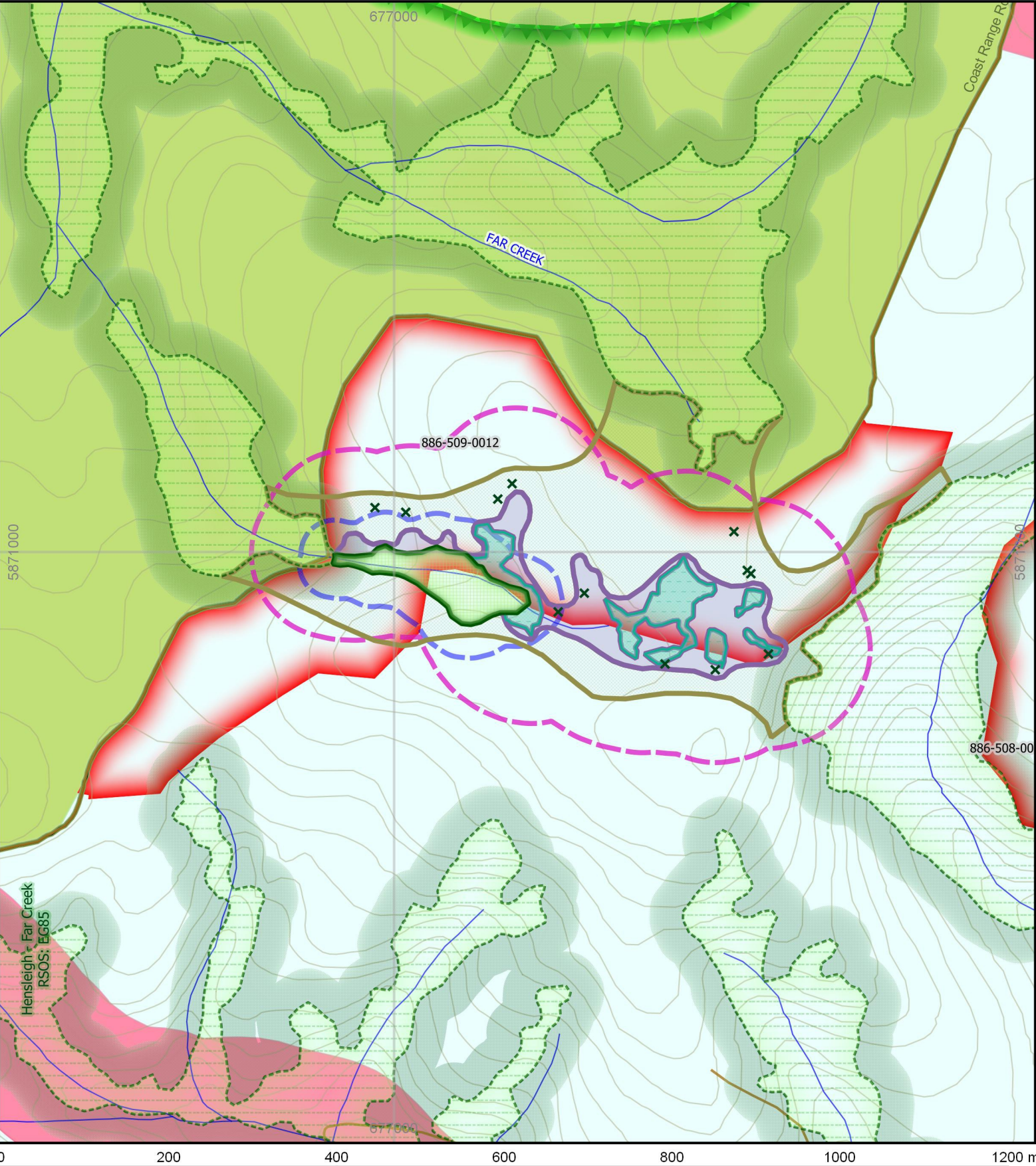


Figure 1(f). *Polyscias sambucifolia* (Elderberry Panax) [25.5cm DBH]





Results 3. Figure 2. Coast Range Road - Quadra Forest Block; Cool Temperate Rainforest & Cool Temperate Mixed Forest extent and protective buffers; RSOS; Forest Management Zoning [DEPI, June, 2014]; Scheduled Logging [TRP]; Roads, Watercourses, Contours



**Legend**

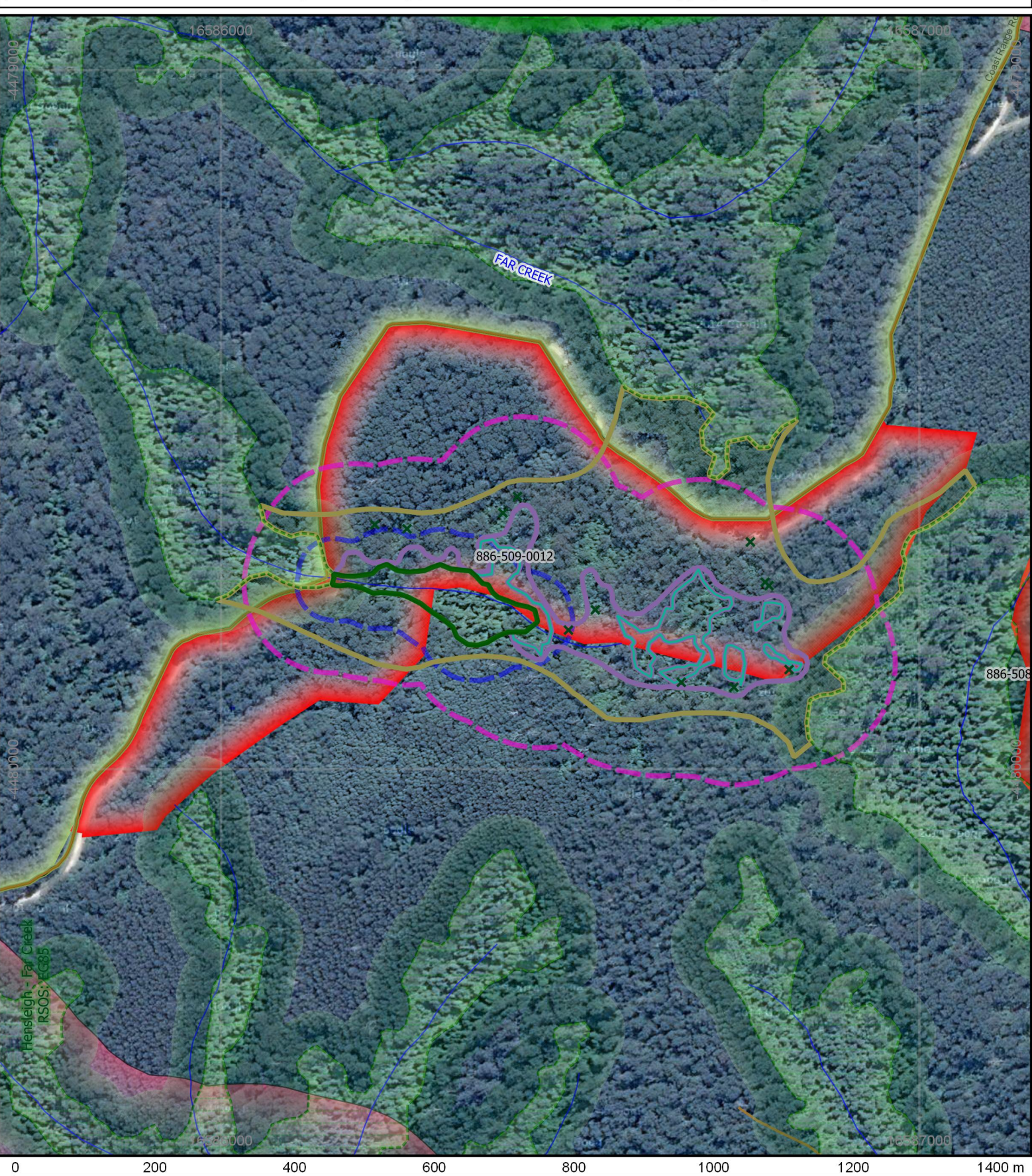
<ul style="list-style-type: none"> <li>Cool Temperate Rainforest core zone</li> <li>40m Buffer on CTRF core zone</li> <li>Cool Temperate Mixed Forest patches</li> <li>Cool Temperate Mixed Forest core zone</li> <li>100m Buffer on Cool Temperate Mixed Forest core zone</li> <li>Cool Temperate Mixed Forest (modelled) ecotone</li> </ul>	<ul style="list-style-type: none"> <li>Selected CTRF &amp; Mixed Forest outlier or clustered charcter species</li> <li>Minimum expected Cool Temperate Rainforest extent in surrounding forest (modelled from satellite imagery)</li> <li>40m Buffer on modelled CTRF extent</li> <li>Rainforest Site of Significance</li> <li>Conservation Parks and Reserves</li> <li>Special Protection Zone</li> </ul>	<ul style="list-style-type: none"> <li>General Management Zone</li> <li>Parks &amp; Reserves [PARKRES]</li> <li>Timber Release Plan (VicForests) [Approved_TRP_April2015]</li> <li>Roads</li> <li>Watercourses</li> <li>Contours</li> </ul>
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Projection: EPSG: 28355  
GDA94/MGA Zone 55

Map Scale:  
1:6,000



Results 3. Figure 3. Coast Range Road - Quadra Forest Block; Cool Temperate Rainforest & Cool Temperate Mixed Forest extent and protective buffers; RSOS; Forest Management Zoning [DEPI, June, 2014]; Scheduled Logging [TRP]; Roads, Watercourses, Satellite



**Legend**

Cool Temperate Rainforest core zone

40m Buffer on CTRF core zone

Cool Temperate Mixed Forest patches

Cool Temperate Mixed Forest core zone

100m Buffer on CT Mixed Forest core zone

Cool Temperate Mixed Forest (modelled) ecotone

Selected CTRF & Mixed Forest outlier or clustered charcter species

Minimum expected Cool Temperate Rainforest extent in surrounding forest (modelled from satellite imagery)

40m Buffer on modelled CTRF extent

Rainforest Site of Significance

Conservation Parks and Reserves

Special Protection Zone

General Management Zone

Parks & Reserves [PARKRES]

Timber Release Plan (VicForests) [Approved\_TRP\_April2015]

5.0 - 6.0

Watercourses

Projection: EPSG: 3857  
WGS 84 Pseudo Mercator

Map Scale:  
1:7,179

N



*Considering the following regulatory provisions:*

Excerpts from: “Code of Practice for Timber Production 2014, Department of Environment and Primary Industries, The State of Victoria, 2014”

**Mandatory Actions**

**Addressing biodiversity conservation risks considering scientific knowledge**

2.2.2.2 The **precautionary principle** must be applied to the conservation of biodiversity values. The application of the precautionary principle will be consistent with relevant monitoring and research that has improved the understanding of the effects of forest management on forest ecology and conservation values.

2.2.2.3 The advice of relevant experts and relevant research in conservation biology and flora and fauna management must be considered when planning and conducting timber harvesting operations.

**2.2.2.7 Rainforest communities must not be harvested.**

**Glossary**

‘**rainforest**’ means closed (>70 per cent projected foliage cover) broadleaved **forest** vegetation with a more or less continuous rainforest tree **canopy** of variable height, and with a characteristic composition of species and life forms, of at least 0.1 ha in area and 20 metres width. Rainforest includes closed transitional and seral communities, with emergent eucalypts, that are of similar botanical composition to mature rainforests in which eucalypts are absent.

‘**precautionary principle**’ means when contemplating decisions that will affect the environment, careful evaluation of management options be undertaken to wherever practical avoid serious or irreversible damage to the environment; and to properly assess the risk-weighted consequences of various options. When dealing with threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.<sup>2</sup>

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

**Glossary**

‘**mixed forest**’, means a structurally complex **forest** community characterised by an emergent **overstorey** of eucalypts with a 10–50% eucalypt cover (Radice et al. 1985) above an **understorey** of rainforest species. It is recognised as a distinct community from rainforest. Typical overstorey species are Mountain Ash (*Eucalyptus regnans*), Errinundra Shining Gum (*Eucalyptus denticulata*), Shining Gum (*Eucalyptus nitens*), Tingaringy Gum (*Eucalyptus glaucescens*) and, occasionally, Acacia species above an (often patchy), understorey of long-lived, fire-sensitive rainforest species, such as Myrtle Beech (*Nothofagus cunninghamii*), Southern Sassafras (*Atherosperma moschatum*), Blackwood (*Acacia melanoxylon*), Black Oliveberry (*Elaeocarpus holopetalus*) and Silver Wattle (*Acacia dealbata*) that often form a closed **canopy**. The composition of mixed forest varies across Victoria from east to west with a change in both the rainforest species and the eucalypt overstorey. In the east the rainforest species include Oliveberry and Southern Sassafras. To the west the composition changes: Oliveberry is found in East Gippsland only, Southern Sassafras extends from East Gippsland to the Central Highlands and Myrtle Beech from the Central Highlands to the Otway Ranges. A similar pattern is seen in the eucalypt species with Cut-Tail Ash (*E. fastigata*) only in East Gippsland, Errinundra Shining Gum, Shining Gum and Tingaringy Gum (*Eucalyptus glaucescens*) from East Gippsland to the Central Highlands, and Mountain Ash from Gippsland to the Otway Ranges.

‘**rainforest**’ as per Code definition. It is recognised as a distinct community from **mixed forest**.

‘**Sites of Significance for Rainforest**’ means areas depicted by DEPI in a corporate spatial layer which includes the most significant rainforest stands defined as Sites of Significance for Rainforest.

<sup>2</sup> Code of Practice for Timber Production 2014, pp. 11, 21, 23, 31-32, 34-35



## 4.4 Vegetation communities

### 4.4.7 Rainforest canopy species

4.4.7.1 **Rainforest** canopy species are defined as shade tolerant tree and vine species which are able to regenerate below an undisturbed canopy, or in small canopy gaps resulting from locally recurring minor disturbances, such as isolated windthrow or lightning strike, which are part of the **rainforest** ecosystem. Such species are not dependent on fire for their **regeneration**. 4.4.7.2 In East Gippsland, Warm Temperate Rainforest **canopy** species are: Lilly Pilly (*Acmena smithii*), Kanuka (*Tristania laurina*), Sweet Pittosporum (*Pittosporum undulatum*), Blackwood (*Acacia melanoxylon*), Blue Olive-berry (*Elaeocarpus reticulatus*), Muttonwood (*Myrsine howittiana*), Jungle Grape (*Cissus hypoglauca*), Boobialla (*Myoporum insulare*) and Yellow-wood (*Acronychia Ablogifolia*).

4.4.7.3 In East Gippsland, Cool Temperate Rainforest canopy species are: Southern Sassafras (*Atherosperma moschatum*), Black Olive-berry (*Elaeocarpus holopetalus*), Blackwood (*Acacia melanoxylon*), Gippsland Waratah (*Telopea oreades*), Privet Mock-olive (*Notelaea ligustrina*), Banyalla (*Pittosporum bicolor*), Goonmirk Rocks Errinundra Plum Pine (*Podocarpus sp. aff. Lawrencei*) and Errinundra Pepper (*Tasmannia xerophila subsp. Robusta*).

4.4.7.7 In all areas, forest **stands** that are dominated by single (contain over 50%), nondiverse stands of the following species and which contain few other rainforest characteristics, are not considered rainforest: Blackwood (*Acacia melanoxylon*), Mountain Teatree (*Leptospermum grandifolium*), Sweet Pittosporum (*Pittosporum undulatum*), Errinundra Pepper (*Tasmannia xerophila subsp. robusta*) or Mountain Pepper (*Tasmannia lanceolata*).

4.4.7.8 Eucalypts are not classified as broad-leaved rainforest species and therefore Eucalypts do not contribute to the projected foliage cover. Therefore **mixed forest** is not considered to be rainforest.

### 4.4.8 Rainforest field recognition and delineation

4.4.8.1 **Rainforest** is recognised in the field as forest where the projected foliage cover of the broadleaved tree **canopy** is greater than 70 % and is contributed by 1 or more of the canopy tree species listed above in sections 4.4.6.2 to 4.4.6.6 and where section 4.4.6.7 is not met.

4.4.8.2 Projected foliage cover is the proportion of ground covered by the vertical projection of foliage and branches from rainforest canopy trees. Any potential contribution of **understorey** species such as tree ferns is not counted toward assessment of projected foliage cover.

4.4.8.3 Linear **stands** are defined as stands of rainforest which are elongated and which are between 20m and 40 m wide. Linear stands of rainforest usually occur along **drainage lines** or small streams. Linear stands may be “overshadowed” by eucalypts from the adjoining eucalypt forest.

4.4.8.4 The minimum area for recognition of a rainforest stand is 0.1 ha and the minimum narrowest width is 20 m. (i.e. 20 m by 50 m).

4.4.8.5 Special care is required when assessing the presence and extent of rainforest where disturbance such as fire has temporarily removed the rainforest canopy or has created temporary canopy gaps. In cases where the canopy disturbance is less than ten years old<sup>3</sup> and further guidance as to the boundary of rainforest is required, the ‘differential species approach’ is to be used (Differential species keys for the delineation of rainforest boundaries can provide reference photos)<sup>4</sup>.

<sup>3</sup> While the rainforest might not have recovered sufficiently to meet the >70% projected foliage cover criterion within 10 years of disturbance, there will be sufficient evidence to indicate whether rainforest canopy species are regenerating in a manner likely to result in the re-establishment of rainforest as they mature. In cases where rainforest is likely to re-establish the differential species approach should be used to identify the boundary with the adjoining forest and the stand should be protected as if it were rainforest.

<sup>4</sup> Cameron D. (2011) A Field Guide to Rainforest identification in Victoria. Department of Sustainability and Environment.

4.4.8.6 Where the rainforest canopy is absent and there is little or no evidence of the **regeneration** of a rainforest canopy after 10 years following disturbance the ‘differential species approach’ should not be used to identify rainforest and the stand should no longer be considered to be rainforest.

4.4.8.7 Where the ‘differential species approach’ is utilised, the rainforest boundary is the point where the number of rainforest species equals the number of eucalypt forest species i.e. the line along which the **floristic** signals are of equal strength. This approach would be used where the rainforest canopy tree cover reduces gradually from 70% projected foliage cover. (gradual transition is a transition from 70% rainforest species projected foliage cover to 70% nonrainforest species projected foliage cover over a distance greater than approximately 10 meters).

#### 4.4.9 Rainforest protection measures

4.4.9.1 Protect all rainforest from **timber harvesting operations** as follows:

- (a) Exclude non linear **stands** that are 0.1 ha or more in size but less than 0.4 ha from **timber harvesting operations**. These stands do not require a **buffer**.
- (b) Exclude linear stands that are at least 0.1 ha but are less than 0.2 ha from timber harvesting operations. These stands do not require a buffer.
- (c) Exclude linear stands that are at least 0.2 ha but are less than 0.4 ha from timber harvesting operations. Protect these stands with a 20 m buffer.
- (d) Exclude all **rainforest** stands (including linear stands) equal to or exceeding 0.4 ha from timber harvesting operations. Protect these stands with a 40 m buffer except for rainforest stands in the **Central Highlands FMAs** and the **Gippsland FMAs** where 3.4.8.2 below must be complied with.
- (e) Distribute slash away from retained rainforest stands or buffers.

4.4.9.2 In areas categorised as being of National, State or Regional significance in the Sites of Significance for Rainforest spatial layer where evidence of rainforest is found in the field and it isn’t already classified as SPZ, application must be made to the Secretary or delegate prior to commencement of the timber harvesting operation to create a SPZ in accordance with table 6 in Appendix 5 the Planning Standards.<sup>5</sup>

Excerpts 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”

Table 6 Buffer widths for Rainforest Sites of Significance by category and priority.

Site of Significance category	Priority			
	1	2	3	4
National	See 4.6.1.1	100 m	60 m	60 m
State	60 m	60 m	40 m	40 m
Regional	40 m	40 m	40 m	40 m

Note: Priority areas are identified in the Sites of Significance for Rainforest spatial layer.<sup>6</sup>

<sup>5</sup> *Management Standards*, p. 40

<sup>6</sup> *Planning Standards*, p. 114



**CONSERVATION GUIDELINE - Representative conservation of Ecological Vegetation Classes**

The following proportion of each EVC will be included in the SPZ and conservation reserves:

- 30% of EVCs that occupy more than 1% of the FMA (approximately 10 000 ha).
- between 30 and 90% of EVCs that occupy between 0.1% (approximately 1000 ha) and 1% of the FMA, depending on the extent of the particular EVC.
- 90% of EVCs that occupy less than 0.1% of the FMA.

**Mixed Forest**

Mixed forests occur within the Wet Forest EVC in situations where the eucalypt canopy is emergent above an understorey of rainforest species. Radic et al. (1985) mapped approximately 470 ha of Mixed Forest on Errinundra Plateau, the only place where substantial areas are likely to occur in East Gippsland. According to the criteria used for determining suitable levels of EVC representation (see previous section), Mixed Forest is rare, occupying less than 0.1% of public land in the FMA. Accordingly, at least 90% of Mixed Forest should be protected within conservation reserves or the Special Protection Zone. The scenic quality and ecological importance of Mixed Forests were major reasons for creation of the Errinundra National Park (LCC 1986). The Park includes about 300 ha (63 %) of the Mixed Forest mapped by Radic et al. (1985). An additional 30 ha (7%) has been included in the SPZ. The remaining 140 ha (30%) is in areas currently mapped as GMZ or SMZ and is scattered in small stands mostly less than 10 ha. Many are in gullies and are consequently protected by prescription. There may however be some stands that would remain accessible for harvesting, and given their rarity, these too, warrant protection.

**ACTION:**

Suitable prescriptions will be developed to ensure that at least 90% of the Mixed Forest vegetation class is protected.<sup>7</sup>



<sup>7</sup> Forest Management Plan For The East Gippsland Forest Management Area, Victoria Department of Conservation and Natural Resources, East Melbourne, December 1995, p. 14-15, 18

## Summary/Conclusions/Discussion

### *Study location overview and the effects of prior logging and fire disturbance*

The study location under consideration within this investigation centres on VicForests' 21.4ha scheduled logging coupe 886-509-0012 and surrounding areas.

This area is situated entirely within a Rainforest Site of Significance (Hensleigh – Far Creek: RSOS-EG85) supporting extensive areas of Cool Temperate Rainforest and Cool Temperate Mixed Forest (“Mixed Forest”) existing in forms spanning the range of these communities transitional and seral developmental stages.

Victorian government Geographic Information System databases (including: spatial datasets “LASTLOG25” and “FIRE\_HISTORY”) indicate that parts of coupe 886-509-0012 were logged in 1982-83 and that this area was subject to wildfire events in 1983. However, while signs of both logging and fire is evidenced within the study location of coupe 886-509-0012, the spatial distribution of the observable disturbances do not necessarily correlate with those areas set out in the spatial datasets.

Throughout the study location varying interactions between the Mixed Forest Community and the influence of historical disturbance were observed. These included areas of the site where intense logging and/or fire disturbance was observable up to and forming the boundary of the Mixed Forest *core zone* (where the advanced structural elements of long lived Mixed Forest character species *patches* existed amongst areas with more isolated Cool Temperate Rainforest and Mixed Forest character species and gaps dominated by species with closer affinities to Wet or Montane Wet Forest), and areas of the site where such an abrupt disturbance “line” was not readily observable.

Areas where these logging and fire disturbances were most intense were in part dominated by secondary succession species included many that are Cool Temperate Mixed Forest character species such as Elderberry *Panax*, Musk Daisy-bush, Victorian Christmas-bush and Blanket Leaf that at other locations within the Mixed Forest areas were present as large long-lived arborescent shrubs.

### Cool Temperate Rainforest

1. Within and adjacent to VicForests scheduled logging coupe 886-509-0012 an area of Cool Temperate Rainforest of at least 0.9 hectares was identified. This area is displayed in Results 3. Figure 2. as the “solid green outlined” polygon in the central western section of the coupe.
2. Scheduled logging coupe 886-509-0012 is located within a Regional Rainforest Site of Significance. As such the rainforest stand identified within this report must be protected with a 40m buffer and application must be made to the Secretary or delegate prior to commencement of the timber harvesting operation to include this area in the SPZ scheme.
3. The requisite 40m protected vegetative buffer to be placed around the Cool Temperate Rainforest Stand identified within coupe 886-509-0012 is shown in Results 3 Figure 2. as the “dashed blue” polygon.
4. VicForests must refrain from and The Department of Environment, Land, Water and Planning must restrain VicForests from logging within this 40m vegetative buffer and ensure that this area is protected from the effects of logging including “regeneration” burns.
5. Results 3. Figure 2. also shows various large “dotted green outlined and horizontally dotted” polygons. These areas are modelled, largely from satellite imagery, areas of Cool Temperate Rainforest and/or Cool Temperate Mixed Forest.
6. These areas are also shown with indicative 40m vegetative buffers that must be respected should ground verification confirm these areas as Rainforest. Note: These modelled areas are considered only as expected minimum Rainforest extent and do not take into account where the actual “rainforest boundary” will be located in the field using the “differential species approach” or the presence of as yet unidentified Cool Temperate Mixed Forest areas.



### Cool Temperate Mixed Forest

7. Within VicForests scheduled logging coupe 886-509-0012 a Cool Temperate Mixed Forest *core zone* of 3.49 hectares was identified. This area is displayed in Results 3. Figure 2. as the “solid purple outlined and purple shaded” polygon.
8. Within this area 4 Cool Temperate Mixed Forest *patches* were identified. These areas comprised 1.07 hectares of the 3.49ha Mixed Forest *core zone*. These areas are displayed in Results 3. Figure 2. as the “solid dark cyan [“green-blue”] outlined and light cyan horizontally dashed” polygons.
9. A 100m protected vegetative buffer to be placed around the Cool Temperate Mixed Forest *core zone* identified within coupe 886-509-0012 is shown in Results 3 Figure 2. as the “dashed pink” polygon.
10. Results 3. Figure 2. also shows the Cool Temperate Mixed Forest *ecotone* as a “light brown cross-hatched” polygon encompassing the Cool Temperate Mixed Forest areas and Cool Temperate Rainforest *core zone*. This area is an inferred *ecotone* assumed on the basis of rainforest and mixed forest character species and topographic contiguity with nearby rainforest and mixed forest stands. Logging should be excluded from the Cool Temperate Mixed Forest *ecotone* in order that all *transitional* or *seral* stages of the rainforest are permitted the potential for successional development.

### Rainforest Sites of Significance

11. As stated above, scheduled logging coupe 886-509-0012 is located within a Rainforest Site of Significance (Hensleigh Creek – Far Creek, RSOS: EG85).
12. The designation of these sites of significance is based on the identification for protection of rainforest stands, and the sub-catchments which they are contained within, that support the best examples of extant rainforest throughout Victoria's distinct management regions.
13. Many of these Rainforest Sites of Significance have experienced high levels of disturbance from logging prior to their designation as well as after their recognition as been of such high conservation value to be signalled out from all other stands of rare and threatened rainforest.
14. According to the LASTLOG25 spatial dataset (current to the beginning of 2014) the 2,622 hectare Rainforest Site of Significance (Hensleigh Creek – Far Creek, RSOS: EG85) has historically had logging in 40% of its catchment area from ~100 logging coupes. A further ~145ha of logging are planned (with some already undertaken) on the current VicForests Timber Release Plan within this RSOS. The result of this logging will leave at least 45% of the Rainforest Site of Significance degraded and fragmented from logging (this figure does not necessarily take into account the fragmentary impacts of already existent roads or the edge effects of prior or planned logging operations or historic or future fire events).
15. The remainder of Hensleigh Creek – Far Creek, RSOS: EG85, as well as all of Victoria's 432 RSOS's, should be fully protected from future planned disturbance by the exclusion of any future logging operations including those of scheduled logging coupe 886-509-0012.

The following sections, after consideration of Departmental comments on the subject, will set out (expanding on the methodology employed and conclusions reached within this investigation), minimum conditions for the development of a methodology for the identification and protection of the Cool Temperate Mixed Forest community.

## Criticism of DELWP's recent comments regarding Cool Temperate Mixed Forest

It is sometimes argued by DELWP that given they sometimes take the view that there are contradictions within the regulatory framework regarding the description and categorisation of Cool Temperate Mixed Forest (principally concerning whether the community is considered rainforest, whether its structure and floristic composition is distinct and whether the community has been defined for operational purposes) it is difficult to protect this community.

The position DELWP take is said to rest on the proposition that Cool Temperate Mixed Forest's ecological status is somewhat ambiguous as to its relation to Cool Temperate Rainforest and Wet or Montane Wet Forest or whether it is a distinct community (and/or ecological vegetation class (EVC)).<sup>8</sup>

Whether one or a combination of the potential perspectives on this questions is taken by DELWP, or whether one can ultimately place a boundary on this ecological continua or resolve scientific contemplation is not a reason to postpone measures to protect Cool Temperate Mixed Forest.

Indeed, the '*precautionary principle*' as it is expressed in the current *Code of Practice for Timber Production*, which must be adhered to as a mandatory requirement specifically states:

*“When dealing with threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.”<sup>9</sup>*

The publication of the East Gippsland Forest Management Plan in 1995 concluded its consideration of Cool Temperate Mixed Forest by promising that “suitable prescriptions will be developed to ensure that at least 90% of the Mixed Forest vegetation class is protected.”<sup>10</sup>

20 years later, in 2015, this has still not occurred<sup>11</sup> while extensive high intensity logging operations have continued in areas of forest on the Errinundra Plateau in East Gippsland that were highly likely to have sustained suitable conditions for this community.

It is clear that Cool Temperate Mixed Forest is an extremely restricted community that remains subject to real and present threats. As such the alleged regulatory gap concerning this situation can and must be rectified as a matter of urgency and can be done so much simpler then the Department has foreshadowed.<sup>12</sup>

This report provides a methodology for identifying and protecting Cool Temperate Mixed Forest whether DELWP considers it a subset of Cool Temperate Rainforest or of Wet or Montane Wet Forest or as a distinct ecological community or vegetation class in its own right.

Detailed below are some key minimum requirements that must be incorporated into the regulatory framework as contributions to prescriptions for identifying and protecting Cool Temperate Mixed Forest throughout its transitional and seral developments.

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8 NB: This report considers Cool Temperate Mixed Forest to be a distinctly identifiable ecological vegetation class able to be identified and protected by prescription unencumbered by varying contemplations as to its classification or categorisation and that the regulatory framework at least from 1995 to the present has demanded this approach.

9 *Code of Practice for Timber Production 2014*, pp. 11, 21, 23, 31-32, 34-35

10 Forest Management Plan For The East Gippsland Forest Management Area, Victoria Department of Conservation and Natural Resources, East Melbourne, December 1995, p. 14-15, 18

11 DELWP, “Attachment 2 DELWP planning report\_Redacted: *Planning and regulatory issues associated with Cool Temperate Mixed Forest and Old Growth in East Gippsland*”, Melbourne, July 2015 [pers. Comm.], p. 4

12 DELWP, “Attachment 2 DELWP planning report\_Redacted: *Planning and regulatory issues associated with Cool Temperate Mixed Forest and Old Growth in East Gippsland*”, Melbourne, July 2015 [pers. Comm.], p. 6



## Recommendations

### Methodological notes for adoption in Cool Temperate Mixed Forest regulatory prescriptions

#### Identification of Cool Temperate Mixed Forest

The following floristic, structural and spatial features should be simultaneously and cumulatively considered for identifying each of the varying configurations of the Cool Temperate Mixed Forest stand (not listed in order of diagnostic weight):

1. The investigation location (logging coupe or forest area under consideration) is within the broad geographic range where the interaction of Cool Temperate Rainforest and Wet or Montane Wet Forest interact with the potential of supporting the development of Mixed Forest given necessary conditional variables such as the presence of character species from each community and appropriate intervals between fire and other disturbance (see below).
2. The investigation location (logging coupe or forest area under consideration) is situated within topographic configurations conducive to the development of Cool Temperate Mixed Forest such as “saddles” between catchments or extant rainforest stands, protected slopes or plateaus of undulating formations (see below)
3. There is an isolated or clustered presence of Cool Temperate Rainforest or Cool Temperate Mixed Forest character species.
4. There is an isolated or clustered presence of Cool Temperate Mixed Forest Character species (including the “distinguishing species” identified by Peel – see Table 1. above) including existing in an advanced, long-lived and/or arborescent form not usually reached in Wet or Montane Wet Forest community settings.
5. There is a presence of pockets of micro-climatic niches supporting rainforest character species dependant on protected shaded environments and/or appropriate substrates for epiphytic growth (i.e. *Crepidomanes venosum*, *Microsorium pustulatum*, *Grammitis billardierei*, *Uncinia tenella*), such as on or under Soft Tree Ferns and persistent logs on the forest floor.
6. There is a presence of isolated or clustered rainforest character and/or differential species able to persist throughout the broad Mixed Forest ecotone due to appropriate general geographic site conditions such as the combination of the climatic and altitudinal spectrum necessary for the presence of Mixed Forest in a given region (for East Gippsland: ~650-~1270m above sea level and a mean annual rainfall between ~1341-1750mm)<sup>13</sup>.
  - (a) Contributing to these favourable general geographic conditions at a specific site are the formations of wet climate refuges maintaining high moisture levels and appropriate topographic configurations of a specific site, such as a south facing slope, montane plateaus or saddles between two protected gully configurations.  
(The combination of these geographic factors replicates, at least in part, the micro-climatic conditions created by the presence of Rainforest or Mixed Forest canopy species or other protected niches such as on or beneath Tree-fern caudices or fallen logs etc.).

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<sup>13</sup> Peel, 1999, p. 75

7. The investigation location (logging coupe or forest area under consideration) is characterised by the interspersed presence of Rainforest, Mixed Forest or Wet/Montane Wet forest species in transitional interactions, whether in observable dynamic relation or as a comparatively stable sere, such that given sufficient time scales and fire intervals the floristic and/or ecological composition of the site may progress from Wet or Montane Wet Forest through to either Cool Temperate Mixed Forest or Cool Temperate Rainforest.
8. The investigation location may or may not be characterised by the presence, entirely or as in *patches*, of a more or less closed canopy in small or large areas that may be contiguous, clustered or variously dispersed, but that such areas of closed canopy are not necessary for the designated presence of Cool Temperate Mixed Forest.
  - (a) Structure: These contributing variables can result in a height density and composition that may range from continuous or *patchy* areas of closed projected foliage cover > 70% through to “open woodland”?<sup>14</sup>
9. The investigation location may display signs of prior disturbance of varying age cohorts from either human or natural events (or a combination of the two) on either or a combination of minor, stochastic or entire stand replacing scales that have impacted on the floristic and/or structural elements of the site such that there is a temporary absence of certain features of Cool Temperate Mixed Forest elements pending future potential replacement of these features given the absence of future disturbance events within temporal periods necessary for the regeneration of Cool Temperate Mixed Forest (i.e. from ~50-250<sup>+</sup> years)<sup>15</sup>.
10. The investigation location may have a variable Eucalypt overstorey canopy of varying age classes that is dependant on the age and nature of prior disturbance. The proportion of overstorey canopy cover that this component contributes to Cool Temperate Mixed Forest areas varies according to the spatial distribution of Mixed Forest *patches* within the Mixed Forest *core zone*.

“Victorian Cool Temperate Mixed Forest is structurally complex, having patchy areas with a closed canopy of rainforest species beneath an overstorey of eucalypts or, rarely, an emergent layer of acacias. The ecological vegetation class is floristically diverse, containing elements of both Wet Forest and Cool Temperate Rainforest and is likely to be stable for considerable periods of time, with fire intervals between 250 (Jackson 1968) and 300-400 years (the age of the emergent eucalypts) Burgman and Ferguson (1995). In Victoria, recent work on the Errinundra Plateau by Chesterfield (1996) indicates that intervals between fires of an unspecified intensity can be as little as 50-90 years. ...

“Generally <70% cover of rainforest canopy trees in combination with a number of species not commonly found in the adjacent rainforest community. The multi-layered canopy and overstorey generally has several of the following:

Silver Wattle *Acacia dealbata*, Frosted Wattle *Acacia frutescens*, Black Olive-berry *Eleocarpus holopetalus*, Errinundra Shining Gum *r Eucalyptus denticulata* and Messmate *Eucalyptus obliqua*, It often, but not always, occurs in association with Wet Forest and Cool Temperate Rainforest where it can occupy a topographically intermediate position between the two. Distinguishing species are:  
 Tasman Flax-lilly *Dianella tasmanica*, Messmate *Eucalyptus obliqua*, Red-fruit Saw sedge *Gahnia sieberiana*, Tree Lomatia *Lomatia fraseri*, Privet Mock-olive *Notelaea ligustrina*, Forest Geebung *r Persoonia silvatica*, Broad-leaved Elderberry *Polyscias sambucifolia* ssp. A, Victorian Christmas-bush *Prostanthera lasianthos* and Errinundra Pepper *Tasmannia xerophila* ssp. *Robusta*.”<sup>16</sup>

14 Cheal, *The Vegetation of East Gippsland – III*, p. 116 “[Mixed Forest] **Structural Type:** Closed-scrub / Closed-forest thru Tall Open-forest to Tall Open-woodland”

15 Peel, 1999, p. 69

16 Peel, 1999, p. 69 and 71 respectively



### **Mixed Forest Patches**

Cool Temperate Mixed Forest *patches* have strong affinities to Cool Temperate Rainforest *core zones* with a more or less closed canopy interspersed with canopy gaps of varying size depending on site specific conditions such as prior disturbance and topography. Mixed Forest *patches* are comprised of primary and secondary succession species that include Cool Temperate Rainforest character species as well as the distinguishing species *Notelaea ligustrina*, *Tasmannia xerophila* ssp. *Robusta*, *Dianella tasmanica*, *Lomatia fraseri*, *Eucalyptus obliqua*, *Gahnia sieberiana*, *Personia silvatica*, *Prostanthera lasianthos* and *Polyscias sambucifolia* among other additional character species (see Table 1. & Figure B.).

### **Mixed Forest Core Zone**

The Cool Temperate Mixed Forest *core zone* occupies a broader area than the Mixed Forest *patches* described above and is encompassing of these *patches*. These patches are varied in their size and dispersal throughout the Mixed Forest *core zone* where they are variously clustered together or more widely dispersed. The broader Mixed Forest *core zone* contains isolated examples of individual Cool Temperate Rainforest and Mixed Forest canopy species (or the long lived arborescent shrubs listed above), as well as small clusterings of these species. The Mixed Forest *core zone* contains *gaps* of varying sizes amongst the isolated or clustered presence of Rainforest or Mixed Forest character species where species representative of the Wet or Montane Wet Forest component of the Mixed Forest stand may dominate. These *gaps* may support species such as the following trees or shrubs: *Dicksonia antarctica*, *Eucalyptus obliqua*, *Eucalyptus fastigata*, *Acacia frutescens*, *Acacia dealbata* and *Prostanthera lasianthos*, and/or those such as the following understorey species: *Leucopogon macraei*, *Dianella tasmanica*, *Olearia phlogopappa*, *Histiopteris incisa*, *Blechnum wattsii*, *Coprosma quadrifida*, *Coprosma hirtella*, *Pimelea axiflora* and *Leptinella filicula* (see Table 1. & Figure B.).

### **Mixed Forest Ecotone**

The Mixed Forest *ecotone* extends from the centre of the Cool Temperate Rainforest *core zone* (if it is present at the particular location) passing through the Mixed Forest *core zone*, encompassing Mixed Forest *patches*, out to the extremity of the persistence of Rainforest and Mixed Forest character species in conjunction with the geographic and topographic conditions necessary for the development of Cool Temperate Mixed Forest. The Mixed Forest *ecotone* can generally be considered a regenerative expansion zone involving the interaction between Cool Temperate Mixed Forest and the surrounding Wet or Montane Wet Forest where its particular floristic composition at a given time is a product of the time elapsed since the last major disturbance event in conjunction with its potential to progress to a more advanced Mixed Forest or Cool Temperate Rainforest community where this potentiality is a product of its location within a conducive geographic location and topographical configuration. The Mixed Forest *ecotone* is characterised by a stronger presence of Wet or Montane Wet Forest character species and disclimax or secondary Mixed Forest character species, likely originating from the last major disturbance. Isolated pockets, either clustered or as isolated individuals, of remnant primary Cool Temperate Rainforest or Mixed Forest character species not generally found outside of the protected niches described above may also be present (see Table 1. & Figure B.).

## Protection of Cool Temperate Mixed Forest

### Preliminary Comments

Prescriptions for the minimum protection of Cool Temperate Mixed Forest must not be designed on the basis of minimum projected foliage cover requirements such as the Department seeks to do through general rainforest management prescriptions (where even in that context such a reduction is inappropriately conceived and a deliberate distortion of the stated intent of general rainforest management prescriptions).

This is because the projected foliage cover found throughout the Mixed Forest *core zone* (as discussed extensively above) is highly variable containing sometimes only *patches* of closed canopy that are not necessarily and need not be contiguous.

So, instead of using the indistinct variable of projected foliage cover to assess the presence and extent of Cool Temperate Mixed Forest areas, the presence of particular floristic components (including taxa from both the Rainforest and Cool Temperate Mixed Forest lists) needs to be considered in conjunction with these taxa contributing to a variable structural configuration and an assessment of geographic and topographic features conducive to the presence of a Cool Temperate Mixed Forest community (as elaborated above).

### Additional Things The Department Must Not Do In Developing Protection Measures for Mixed Forest:

1. Consider Mixed Forest *patches* or *stands* only on the basis of Cool Temperate Rainforest *core zones* as many of the species that comprise even the Mixed Forest *patches*, which have affinities to Cool Temperate Rainforest, are actually made up of canopy participant species not included as canopy participants of Cool Temperate Rainforest *core zones*.
2. Aggregate Mixed Forest *patches* in a similar way to how the Department seeks to do so with minimum distance or size requirements with Cool Temperate Rainforest *core zone* prescriptions as Mixed Forest *core zones* may contain only *patchy* areas of dense canopy forming configurations and these *patches* are variably dispersed, sometimes in clumps and sometimes further apart, throughout the Mixed Forest *core zone*.
3. Attempt to protect parts of the Mixed Forest areas through protective buffers surrounding Cool Temperate Rainforest *core zones*, as these may not necessarily be adjacent to the Mixed Forest *patches* or *stands* and the Mixed Forest areas may be larger than the 20 or 40m buffers applied by prescription to areas of Cool Temperate Rainforest.
4. Only begin searching for Cool Temperate Mixed Forest when Cool Temperate Rainforest *core zones* are encountered.
5. Fail to consider Cool Temperate Mixed Forest as an “Ecological Vegetation Class (EVC)” requiring the minimum representative protection set out in the East Gippsland Forest Management Plan because it was omitted from a particular consideration of EVC description in an earlier iteration of the Departments survey of extant EVC's within East Gippsland (Cool Temperate Mixed Forest is consistently referred to as an EVC or distinct identifiable ecological continua by the relevant literature).
6. Fail to consider that *gaps* in both the closed canopy *patches* and broader Mixed Forest *core zone* of Cool Temperate Mixed Forest are an essential feature of this community that together with other elements of structural diversity distinguish this community from both Cool Temperate Rainforest and Wet or Montane Wet Forest.



## Prescriptions for the Protection of Cool Temperate Mixed Forest

### **Prescription 1** Protection of 90% of the Mixed Forest EVC

Until at least 90% of Cool Temperate Mixed Forest is protected from the impacts of logging and other forms of avoidable disturbance, all stands of Cool Temperate Mixed Forest must be protected from the impacts of logging through the application of minimum 40m vegetative buffers extending out radially from the Cool Temperate Mixed Forest *ecotone*.

### **Prescription 2** Sub-catchment Protection

In addition to providing whole of EVC protection measures, and/or short of providing dissected protective measures based on the various areas identifiable within the Cool Temperate Mixed Forest stand, the most effective and simplest approach to protective measures with the greatest fidelity to the demands of the precautionary principle is to provide sub-catchment protection (generally) up hill from the identified presence of the Cool Temperate Mixed Forest *ecotone*. Where the *ecotone* is situated close to a sub-catchment watershed a vegetative buffer of a minimum of 40m is to extend radially from the Cool Temperate Mixed Forest *ecotone*.

### **Prescription 3** Dissected Protection Measures

#### **(a) Mixed Forest Ecotone**

A minimum 40m vegetative buffer excluding all logging operations must be placed, extending radially from the Cool Temperate Mixed Forest *ecotone* identified according to the topographic extent of the *ecotone* identified at a particular location.

#### **(b) Mixed Forest Core Zone (containing Mixed Forest Patches)**

A minimum 100m vegetative buffer from which all logging operations is excluded must extend radially from the Cool Temperate Mixed Forest *core zone* identified according to the topographic extent of the *core zone* identified at a particular location.

#### *Guidance on Identification and Protection:*

- i. The Cool Temperate Mixed Forest *core zone* and *ecotone* boundaries are located along the topographic contour, or radial contour extending outwards from the centre of the Cool Temperate Mixed Forest *stand*, where the existence of features typical of the Cool Temperate Mixed Forest *core zone* or *ecotone* are no longer encountered at a particular point along the topographic or radial contour of the investigation location. Protective buffers on each of these Cool Temperate Mixed Forest components must begin from these boundaries.
- ii. When searching for features typical of the Cool Temperate Mixed Forest *core zone* or *ecotone* a wide area of search must be conducted relative to the particular expected distribution of the Cool Temperate Mixed Forest *core zone* or *ecotone* as determined by the topographic configuration of the particular investigation location.
- iii. Special care must be taken to identify the extent and boundaries of the Cool Temperate Mixed Forest *core zone* and *ecotone* where previous disturbance events have impacted on the floristic composition or structure of the Cool Temperate Mixed Forest *stand* with particular consideration as to whether the prior disturbance event was major, i.e. stand replacing, or minor, i.e. from wind-throw or senescence.