INVESTIGATION REPORT

DETECTION OF
ORBOST SPINY CRAYFISH
(Euastacus diversus)

Cattle Yard Track - Saint Patricks River Catchment
Rich Forest Block – East Gippsland
VicForests Logging Coupes: 842-511-0004 & 842-511-0020

Abstract
This investigation report details the detection of the endangered Orbost Spiny Crayfish (*Euastacus diversus*) encountered during an investigation of threatened species values within VicForests scheduled logging coupes 842-511-0004 & 842-511-0020.

The regulatory framework governing logging operations in Victoria, through the 'Code of Practice for Timber Production 2014' and its incorporated documents require that for records of *Euastacus diversus* (Orbost Spiny Crayfish), an "SPZ extending 100m from each bank for 1 km upstream and 1 km downstream" must be established within which all logging must be excluded.

Relevant Legislation

- 'Code of Practice for Timber Production 2014', Department of Environment and Primary Industries, The State of Victoria, 2014

  Incorporated documents:
- '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

Status of Site: Logging:

Vicforests clear-fell logging coupes 842-511-0004 & 842-511-0020 are currently **Approved** on Vicforests Timber Release Plans**.** Vicforests logging coupes covers a combined area of approximately ~81.93 hectares, and is situated in Ellery State Forest, in the Orbost district.

Status of Site: Threatened Species, Modelling HCV/EVC, Reserves & Zoning

Listed Values	Within Proximity To Coupe	Within Catchment
(*Euastacus diversus*) Records (VBA25)	Null	Null
(*Euastacus diversus*) Records (VBA100)	Null	Null
Modelling: Old Growth (MOG03, MOG09)	~4.6 (MOG09)	MOG09
Recent Logging History:	VicForest 2008-09	VicForest 2008-2016
Management Zones: SMZ, SPZ	Linear Reserve-Saint Patricks River	Special Management Zone, Special Protection Zone Linear Reserve
Modelling: Ecological Vegetation Class	Riparian Forest (EVC18), Shrubby Dry Forest (EVC21), Damp Forest (EVC29), Wet Forest (EVC30).	Riparian Forest (EVC18), Shrubby Dry Forest (EVC21), Damp Forest (EVC29), Wet Forest (EVC30). Cool Temperate Rainforest (EVC31), Warm Temperate Rainforest (EVC32), Cool Temperate Rainforest/Warm Temperate Rainforest Overlap (EVC33)
On Site Assessment / Observations	Crayfish habitat, Hollow bearing trees, Rainforests, Old Growth areas	Crayfish habitat, Hollow bearing trees, Rainforests, Old Growth.
State Forest, Parks, Reserves & Zoning	Ellery Creek State Forest	Ellery Creek State Forest

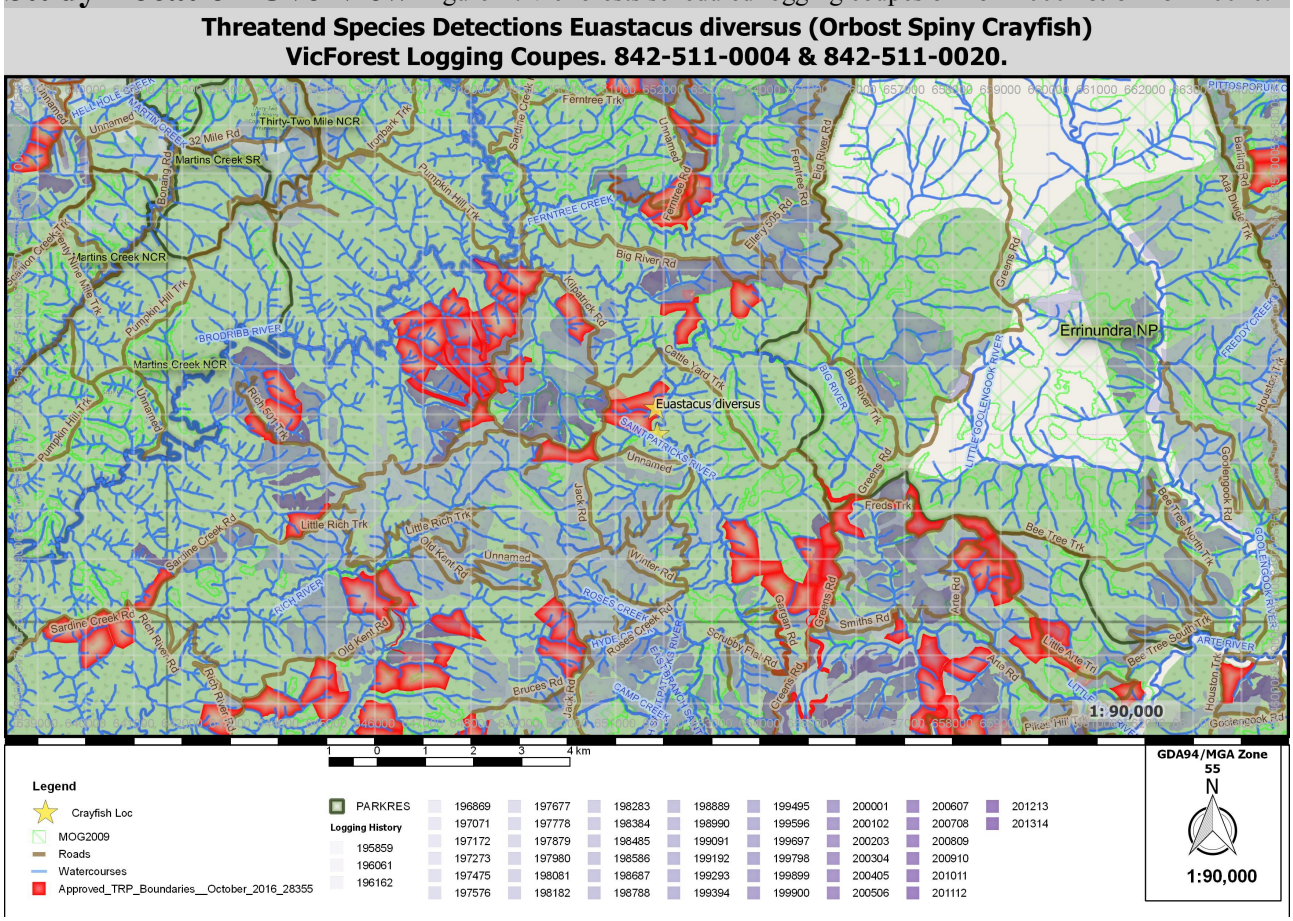
Date of Investigation:
19-01-19
Date of report:
13-02-19

Surveyors:
Owen Hanson

Author: Owen Hanson

Organisations Associated:
Goongerah Environment Centre Office. geco.media@gmail.com

Study Location Overview Figure A. VicForests scheduled logging coupes 842-511-0004 & 842-511-0020.



Old Growth Forest within VicForest logging coupe 842-511-0004

Method Used and Results Summary

Equipment Used

- Digital Camera
- Head torch
- Global Positioning System (GPS) [Garmin GPSMAP 64s]

Method used/Results Summary: 19/01/2019
Riparian Search, walking night spotlight search/inspection of creeks for Aquatic fauna.

VicForest coupe 842-511-0004 & 842-511-0020

1. On the 19th of January 2019, surveyors conducted a nocturnal active riparian search covering sections of the watercourses on the boundaries within and adjacent to VicForests logging coupes 842-511-0004 & 842-511-0020 . Suitable habitat was found in the tributaries that were explored during surveys, this consisted of areas with small stream flow and rocky pools along length of tributarys.

2. At ~3:11pm on the 19th at approximately 55 H 651841 5852115 (location 01), a young crayfish individual was observed within the a pool on the boundaries of coupe 842-511-0004 & 842-511-0020. The crayfish was formally identified to be *Euastacus diversus.* Photographs and location were taken of crayfish individual & location recorded.

3. At ~5:04pm at approximately 55 H 651868 5851579 (location 02), a crayfish individual was observed within the stream on the southern boundary of coupe 842-511-0020. The crayfish was formally identified to be *Euastacus diversus.* Photographs and location were taken of crayfish individual & location recorded.

4. Photographs taken of the *Euastacus diversus* individuals at location 01 & 02 were used to identify individuals to the East Gippsland Spiny Cray Group (EGSCGroup) as per the Victorian Government Department of Environment, Land, Water and Plannings' survey standards "10-Spiny-Cray-Euastacus-spp-Survey-Standards-FINALv1.0_2MAY11" as published on their website.[1] Identification to species is derived from Euastacus spp. distributions spatially delineated within the Victorian Biodiversity Atlas' spatial dataset (VBA-25) records within catchment, and with reference to "A Guide to Australia's Spiny Freshwater Crayfish" (McCormack, R. B., 2012).[2]

5. Photographs of Orbost Spiny Crayfish (*Euastacus diversus*) encountered are provided in the Results 2. section as Figures 1 & Figures 2. Further location details are provided in the maps of Results 2. below.

6. Throughout the two tributaries suitable habituate such as small flowing streams and pools, as well as singes of habitation in the form of crayfish burrows were observed and locations recorded. See maps of Results 2

Results 1 (Table of Detections)

Riparian Search, walking night spotlight search/inspection of creeks for Aquatic fauna on the 19/01/19.
VicForest coupes 842-511-0004 & 842-511-0020

Time/Date:	Location: UTM/UPS:	Species:	Number of Individual/s: Condition :	Male: Female: Unknown:	Waterway Class[1st,2nd,3rd.; Stream/Pool:	Photograph Taken: Y/N	Identifying Features:	Distinguishing Features: Y/N	Identification Confirmed: Y/N
3:11pm-19/01/19	Loc.1 55 H 651841 5852115	Euastacus diversus	1 Mature	Male	1st order/ Pool	Y	6\6	N	Y
5:04 pm-19/01/19	Loc.2 55 H 651868 5851579	Euastacus diversus	1 Young	Male	1st order/ Pool	Y	5\6	Y	Y

1 "Survey Standard: Spiny Crayfish, Euastacus spp. (including the Orbost Spiny Crayfish)" The Department of Sustainability and Environment Approved Survey Standards: Spiny Crayfish *Euastacus diversus.*, v.1.0, 2 May 2011

2 McKormack, R. B., A Guide to Australia's Spiny Freshwater Crayfish, CSIRO Publishing, Melbourne, 2012

Results 2 (Photos and location details)

Photos taken of Euastacus diversus during nocturnal active-riparian search on 19/01/19 along western boundary of VicForest logging coupe 842-511-0004 & 842-511-0020, as identified in Figure B. See map below.

Euastacus diversus found at location 01 (55 H 651841 5852115 GDA94 UTM)

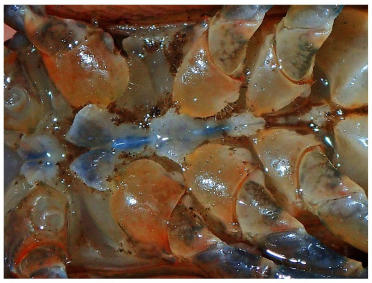


Figure 1(a). Male Cuticle Partition

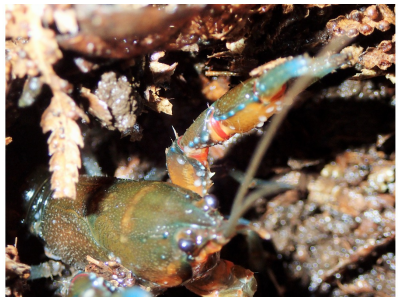


Figure 1(b). Mesial Carpal Spines, Ventral Carpal & Ventromesial Carpal Spines (left claw)

Figure 1(c). Mesial Carpal Spines, Ventral Carpal & Ventromesial Carpal Spines (right claw)

Figure 1(d). Euastacus diversus (location 01)

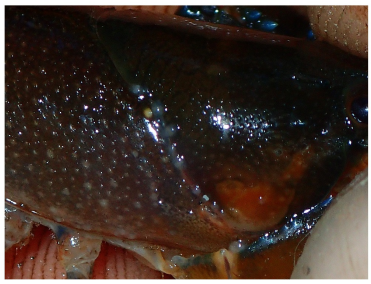


Figure 1(e). Dorsal Thoracic Spines (partly formed)

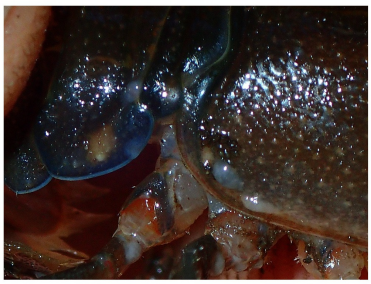


Figure 1(f). Abdominal Spines (partly formed)

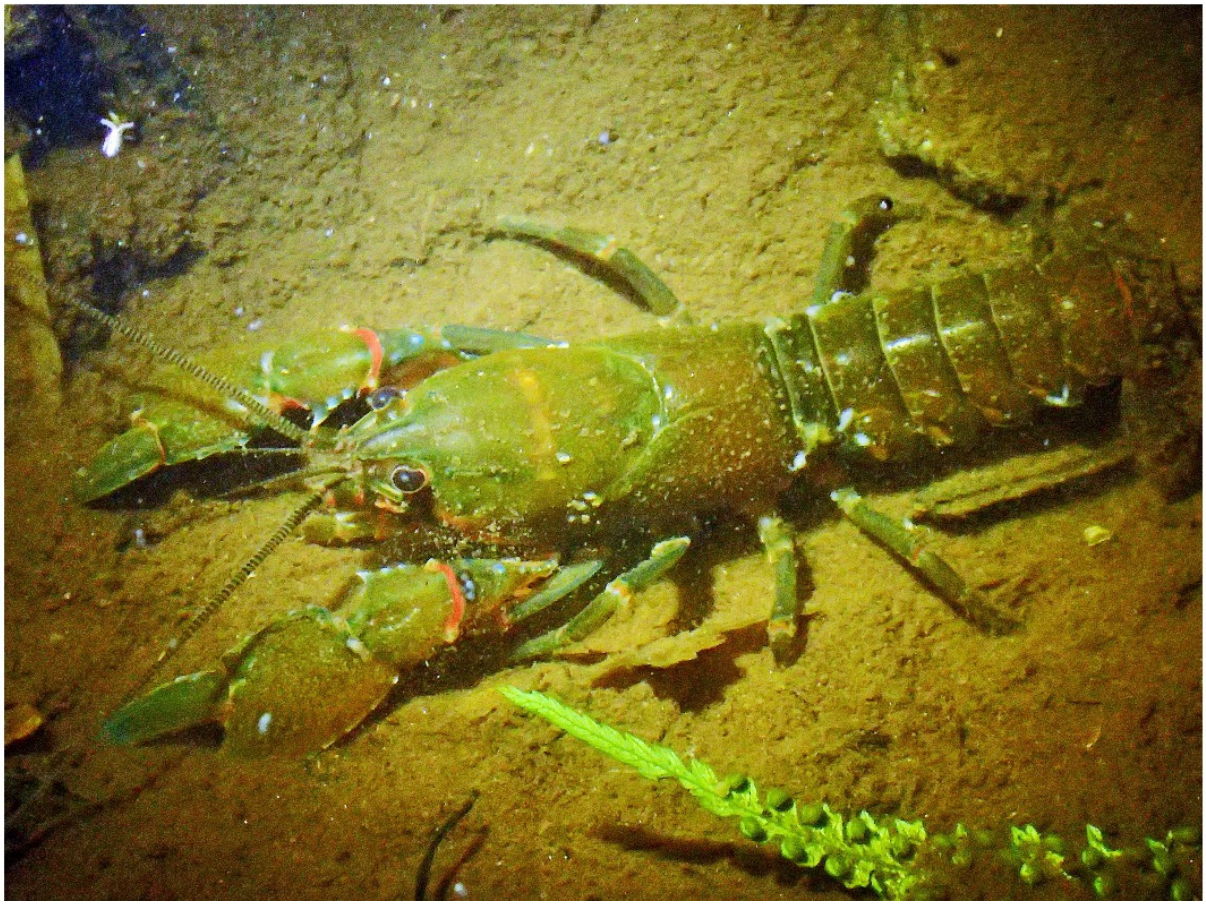


Figure 1(g). Euastacus diversus (55 H 651841 5852115)

Results 2 (Photos and location details) continued

Euastacus diversus found at location 02 (55 H 651868 5851579 GDA94 UTM)

Figure 2(a). Male Cuticle Partition

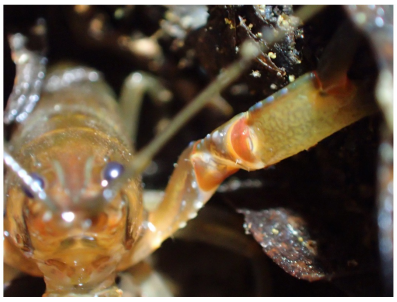


Figure 2(b). Mesial Carpal Spines, Ventral Carpal & Ventromesial Carpal Spines(partly formed) (left claw)

Figure 2(c). Mesial Carpal Spines, Ventral Carpal & Ventromesial Carpal Spines(partly formed) (right claw)

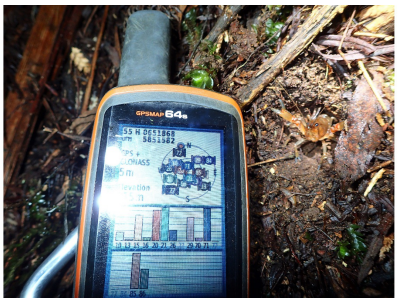


Figure 2(d). Euastacus diversus (location 02)

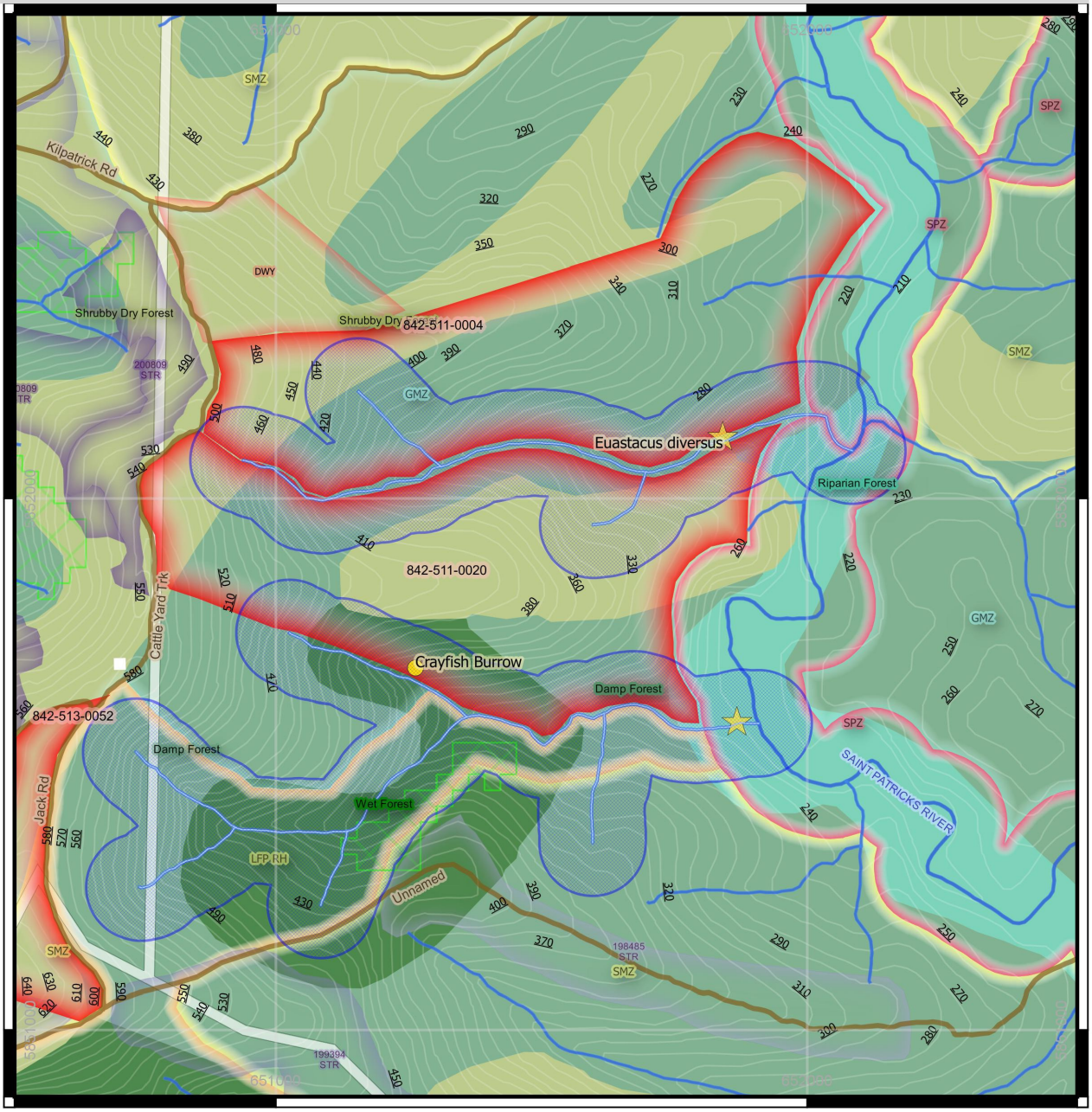
Figure 2(e). Dorsal Thoracic Spines (partly formed)

Figure 2(f). Abdominal Spines (not formed)

Figure 2(g). Euastacus diversus (55 H 651868 5851579)

Results 2 Figure B. Saint Patricks River - *Euastacus diversus* records and Recommended 100m Buffers.

Threatend Species Detections Euastacus diversus (Orbost Spiny Crayfish)
& Required Protective Buffers.
VicForest Logging Coupes. 842-511-0004 & 842-511-0020. Saint Patricks River, Rich Forest Block, Ellery State Forest.



0 100 200 300 400 500 m

Legend

- Crayfish Loc
- Crayfish burrow
- Crayfish Protective Buffer
- Roads
- Watercourses
- CONTOUR
- Approved_TRP_Boundaries__January_2017

Logging History

- 198485
- 198687
- 199192
- 199394
- 199495
- 199697
- 200607
- 200809
- MOG2009

EVC-NV2005

- Damp Forest
- Riparian Forest
- Shrubby Dry Forest
- Wet Forest

GDA94/MGA Zone 55

N

1:10,000

Results 3 Analysis & Recommendations

Excerpts from: "*Code of Practice for Timber Production 2014, Department of Environment and Primary Industries, The State of Victoria, 2014***"**[3]

1 General - 1.2 The Code of Practice for Timber Production

1.2.6 Compliance on State forest

Under the *Sustainable Forests (Timber) Act 2004*, compliance with this Code is mandatory for any person planning for or conducting a timber harvesting operation on **State forest**. Penalties for non-compliance may apply if timber harvesting operations on State forest are not in accordance with the Code.

The Code is a prescribed legislative instrument made and enforced under relevant law listed in the *Conservation, Forests and Lands Act 1987*. For the purposes of each relevant law the **Secretary** is an **authorised officer** and is therefore responsible for ensuring compliance with the Code on State forest. Compliance is also monitored by other authorised officers appointed by the Secretary pursuant to the *Conservation, Forests and Lands Act 1987*.

2 Code Application – State Forests - 2.2 Environmental Values in State forests

Timber harvesting operations in native forests may have local impacts on environmental values such as water quality and **biodiversity**. Appropriate planning and management through the lifecycle of the timber harvesting operation can minimise these impacts. This section includes requirements that must be observed during planning, roading, harvesting, tending and regeneration of native forests.

2.2.2 Conservation of Biodiversity

Operational Goal **Timber harvesting operations** in **State forests** specifically address **biodiversity** conservation risks and consider relevant scientific knowledge at all stages of planning and management.

Mandatory Actions ***Addressing biodiversity conservation risks considering scientific knowledge***

2.2.2.1 Planning and management of timber harvesting operations must comply with relevant biodiversity conservation measures specified within the **Management Standards and Procedures**.

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.

2.2.2.4 During planning identify biodiversity values listed in the Management Standards and Procedures prior to roading, harvesting, **tending** and **regeneration**. Address risks to these values through management actions consistent with the Management Standards and Procedures such as appropriate location of **coupe infrastructure**, **buffers**, **exclusion areas**, modified harvest timing, modified silvicultural techniques or retention of specific structural attributes.

2.2.2.5 Protect areas excluded from harvesting from the impacts of timber harvesting operations.

2.2.2.6 Perpetuating the biodiversity of harvested native forests

2.2.2.8 Long-term (strategic) **forest** management planning must incorporate **wildlife corridors**, comprising appropriate widths of retained forest, to facilitate animal movement between patches of forest of varying ages and stages of development, and contribute to a linked system of reserves.

Glossary '**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.

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*"[4]

"**4. Biodiversity - 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 5 Detection based FMZ rules for fauna.[5]

FMA	Common name	Scientific name	Zoning management actions	Management actions	Review
East Gippsland	Orbost Spiny Crayfish	Euastacu diversus	**Establish a SPZ extending 100 m from each bank for 1 km upstream and 1 km downstream of verified detection sites.**	**Avoid constructing new roads and stream crossings within the SPZ. Manage nearby regeneration burns to ensure the SPZ is not burnt.**	Review this strategy when 20 sites are established.

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

4 *Planning Standards*, p. 36

5 *Planning Standards*, "Table 4 Detection based FMZ rules for fauna", p. 45

Discussion, Conclusions & Recommendations

Euastacus diversus (Orbost Spiny Crayfish)

1. *Euastacus diversus* (Orbost Spiny Crayfish) were recorded and identified from planned logging coupes 842-511-0004 & 842-511-0020, at the locations displayed as the "yellow star" symbol; for Euastacus crayfish recorded but not identified their locations are displayed as the "yellow circle", in Figure A and B. of Results 2 above.

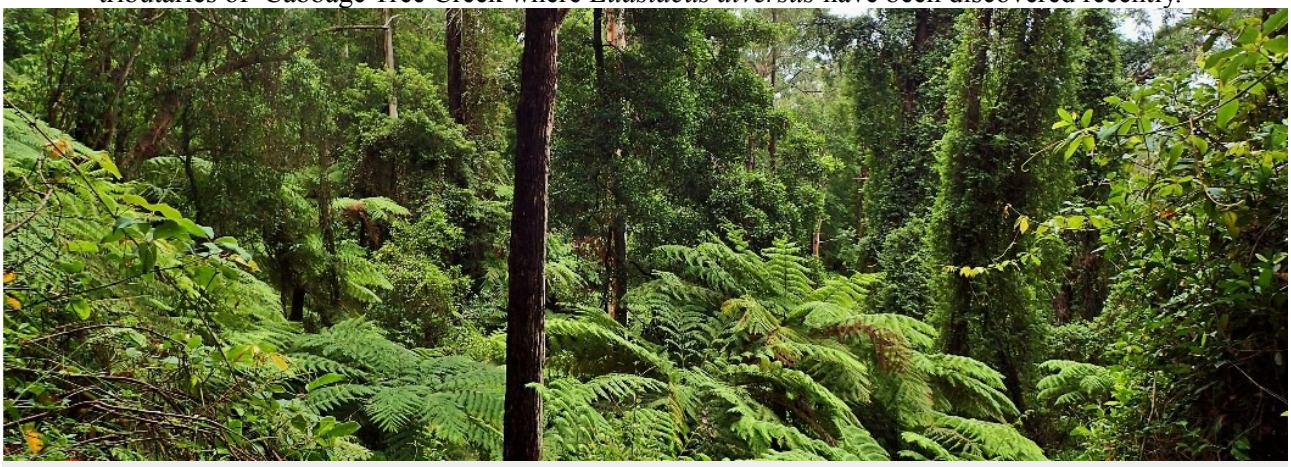
2. The management prescriptions relevant to the Orbost Spiny Crayfish in the “Planning Standards for timber harvesting operations in Victoria’s State forests 2014, Appendix 5 to the Management Standards and Procedures for timber harvesting operations in Victoria’s State forests 2014”, section 4.3.1.1-2, requires that for all verified records of *Euastacus diversus* (Orbost Spiny Crayfish) the “FMZ amendments in accordance with Table 4” must be applied. Table 4 requires that for records of *Euastacus diversus* (Orbost Spiny Crayfish), a SPZ extending 100m from each bank for 1 km upstream and 1 km downstream must be established.

3. As a regulator of operations within Victoria's State Forests DELWP must ensure VicForests and their logging contractors abide by these prescriptions including applying the minimum 100m Special Protection Zone (displayed in Results 2. Figure B.) for the *Euastacus diversus* (Orbost Spiny Crayfish) locations displayed and any others found within 1000m along a watercourse of VicForests' scheduled logging coupes. The purpose of this legislative prescription is the protection species and of the waterways against the effects of logging.

4. A thorough search for the presence of and evaluation of the extent and health of *Euastacus diversus* (Orbost Spiny Crayfish) population must be undertaken within this catchment any further areas where VicForests intends to log and the species' presence is possible.

5. Protection mush be afforded to threatened species and their habitat, this includes protection through the precautionary principle (as described in the code). If Vicforest **fail** to implement precautionary measures and subsequently **fail** to conduct a**dequate** and **thorough** surveys in a manner to suit the particulars of species across suitable habitat & range, to ensure that threatened species are identified and then afforded protection by prescription.
6. Then DELWP must restrain VicForests from logging in the areas of these *Euastacus diversus* (Orbost Spiny Crayfish) records including within coupe 842-511-0004 & 842-511-0020 as well as any additional surrounding areas where the species is may be present.

7. The map of Results 2. Figure B. shows that logging is planned by Vicforest along sections of the tributaries of Cabbage Tree Creek where *Euastacus diversus* have been discovered recently.



Rainforest edge within coupe 842-511-0004