Timber Workers For Forests

# BIODIVERSITY IMPACTS and SUSTAINABILITY IMPLICATIONS of CLEARFELL LOGGING in the WELD VALLEY, TASMANIA


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March 2004


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**A Timber Workers for Forests publication**



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**Funded by the Mullum Trust**

# Executive Summary

This study was undertaken in the Weld River Valley, an area of largely pristine forest located in Tasmania's southern forests just north of the Tahune Airwalk tourism venture. The study was conducted in order to compare and contrast the botanical diversity, soil ecology, invertebrate biodiversity and timber values of old growth forest in the valley with a nearby forest coupe that was clearfelled in the 1980s.

The findings of the study are used to give an independent critique of the scientific basis used to justify the 'clearfell, burn and sow' silvicultural system which dominates forestry in Tasmania today.

The study demonstrated that logging old growth forest in the Weld Valley significantly alters the diversity and abundance of plants and invertebrates. Poor soil structure and lack of soil humus following the clearfell burn and sow treatment appears to adversely affect forest health and its ability to produce good timber. In sites regenerated following clearfelling there was significant root and crown competition resulting in slow and poor tree growth.

A key measure of sustainability is that no species are lost from an ecosystem. The claim that 'no species are known to have been driven to extinction by forestry practices in Tasmania' heavily relies on the lack of knowledge about the species which live in Tasmania's native forests, and the fact that we know little about the long-term effects of forest fragmentation and conversion to plantations of exotic species.

The sampling of nocturnal insects at old-growth and regrowth study sites in the Weld Valley highlighted the stark differences in the diversity of animals present. Using native moths as an indicator of biodiversity it was revealed that:

- old growth forest supported many more species (81 versus 39)
- old growth forest supported a higher proportion of species endemic to Tasmania (22% versus 6%)
- old growth forest had a high proportion of species which rely on fungi, leaf litter and decaying wood
- regrowth forest had fewer species, but some were extremely abundant, indicative of pest status
- regrowth forest had some species which have adapted to live on weeds.

Native forests managed on short rotation cycles will never reproduce the diverse micro-habitats which characterise old forests.

This study brings in to question whether the forests allocated for timber production under the Regional Forest Agreement (RFA) have been managed in an ecologically sustainable way, that is, in a way that maintains species diversity, water resources, and soil structure and quality.

Forest health, and the ability of the forest to continue to produce healthy timber in perpetuity, is intimately linked to the maintenance of biodiversity and soil health. If biodiversity is compromised, then timber production areas will become more degraded with each clearfell

rotation. This has serious implications, not just for forest ecology and biodiversity, but also for a suite of social and economic values such as: future timber quality, aesthetics, ecotourism opportunity, beekeeping and pollination services, and water supply.

The scientific basis for clearfelling derived from research undertaken in the 1950s must now come under question and should now be critically reviewed in light of the biodiversity implications highlighted in this study.

The study has provided a strong case for a moratorium on logging in the Weld Valley which is an area that has been identified for its high conservation values and significant ecotourism potential. The case for a moratorium on logging is strengthened in light of the current sawlog oversupply and a glut in specialty timbers.

## Acknowledgements

We are grateful to the Mullum Trust for funding this study.

Many people assisted with fieldwork, collection of data and photography, especially Wally Herrmann, members of TWFF, Adam Burling, Neil Sorensen and Janet Dyment.

Matt Dell is thanked for preparation of maps of the Weld Valley.

Benedict Bartl, Liam Mulchay & Phil Pullinger are thanked for supplying background material about the Weld Valley in their document ‘Expanding the Airwalk Experience - a proposal for the Huon Valley Council’.

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# 1.0 Introduction

This study was undertaken in the Weld River Valley, an area of largely pristine forest located on the eastern fringe of the Tasmanian Wilderness World Heritage Area, approximately 60 km west-south-west of Hobart, just to the north of the Tahune Airwalk tourism venture.

The primary intention of this study was to categorise the biodiversity of an old growth forest coupe (called WR17B by Forestry Tasmania) prior to logging, which is due for commencement in March 2004. The study will provide a benchmark from which to gauge the impact of logging on the long-term biodiversity of the site.

The other primary intention of this study was to compare and contrast the botanical diversity, soil ecology, invertebrate biodiversity and timber values of the old growth forest in WR17B with a nearby forest coupe regenerated following clearfelling in the 1980s.

The findings of the study are used to give an independent critique of the scientific basis for the 'clearfell, burn and sow' silvicultural system which is the dominant harvesting and regeneration system in Tasmania today. 'Science' is frequently used as the basis for justifying logging practices in Tasmania. Opponents of industrialised forestry, which is characterised by clearfelling, are frequently criticised for being irrational, emotional or 'ignoring the facts' or 'ignoring the science'.

The scientific justification for the 'clearfell, burn and sow' silvicultural system arose from a University thesis written by John Gilbert in 1958[1]. At the time Gilbert acknowledged that his methodology was efficient for regenerating Eucalypts but conceded that there were other ecological shortcomings. Nearly 50 years on, the silvicultural system proposed in Gilbert's thesis is still being used unquestioningly despite significant community concern over the impacts of the 'clearfell, burn and sow' system.

Tasmania's RFA (Regional Forest Agreement) has also been much touted as being 'scientifically based'. While it is true that teams of scientists were engaged in a flurry of activity to identify a comprehensive and adequate reserve system for Tasmania's major vegetation communities, six years on there remains conjecture as to whether the reservation targets have actually been met.

The findings of this study are used to assess whether logging by clearfelling and associated logging treatments can be sustained in the forests of the Weld Valley and whether the scientific basis of modern day forestry can still be justified.

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[1] Gilbert, J. (1958). Eucalypt-rainforest relationships and the regeneration of eucalypts. PhD thesis, Botany Department, University of Tasmania.

## 2.0 Background to the Weld Valley

The Weld River Valley is located adjacent to the Tasmanian Wilderness World Heritage Area, about 60 km west-south-west of Hobart. The Weld River has a length of 50 km [2] and its catchment 'contains one of the largest karst areas in Tasmania, including Australia's deepest cave, a natural river arch and gorges'[3]. The altitudinal range of the valley is less than 100 m to over 1300 m above sea level. The area displays varied topography associated with a complex geological history of block faulting, folding and other geomorphic processes such as erosion and deposition brought about by glaciation and fluvial action[4].

The Weld Valley has a diverse range of vegetation influenced by the varied topography and associated range of microclimates. These variables result in a rich mosaic of vegetation consisting of button grass moorlands, lowland heath and sedgeland, dry sclerophyll forest, wet sclerophyll forest, mixed forest, rainforest through to alpine heath and alpine rainforest. 'Tall Eucalypt forest' defined in broader terms as 'wet sclerophyll forest' dominates the area providing a niche for some of the world's tallest flowering plants. A diverse range of vegetation provides multiple habitats vital to the survival of many native animal species. For example, the eastern pigmy possum, sugar glider, yellow-tailed black cockatoo, white goshawk and the endangered wedge-tailed eagle utilize holes and hollows in mature Eucalypt species as nesting sites. The preservation of these trees is vital to the long-term sustainability of these native animals[5].

The Weld River according to *Tasmanian Fishing News* remains one of the finest trout fisheries in the State[6]. The fish found in the Weld include native fish species—*Galaxias truttaceus* (mountain galaxias), *G. brevipinnis* (climbing galaxias) and *Anguilla australis* (shortfin eel) as well as the introduced brown trout (*Salmo trutta*), *Pseudaphritis urvillii* (the sandy), *Prototroctes maraena* (grayling) and *Geotria australis* (lamprey) as well as rainbow trout, Atlantic salmon and *Gadopsis marmoratus* (river blackfish)[7]. Platypus are also frequently observed[8] and the crayfish *Astacopsis franklinii* has also been recorded in the Weld[9].

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[2] Tasmanian National Parks and Wildlife Service, Huon-Weld Catchment, South West Tasmania Resources Survey, Working Paper No. 13, p81

[3] Final Submission, Combined Environment Groups, World Heritage Values of Qualifying Areas, 1 *Australian Commission of Inquiry into the Lemonthyme and Southern Forests Exhibits.*

[4] Associated rock types include Jurassic dolerite, Precambrian quartzite, dolomite, slate and phyllite together with Permo-Carboniferous sedimentary rocks of the Parmeener Supergroup (mudstone, siltstone, sandstone, tillite, and conglomerate) and limestone forming extensive karst systems.

[5] For example wedge-tailed eagles build their nests in eucalypts requiring shelter from adjacent trees for successful breeding. Clearfelling close up to these trees usually results in permanent desertion, and drives a further nail in the coffin of this endangered species.

[6] According to Tasmanian Fishing News, the Weld River is 'perhaps one of the better fast water fisheries in the State ... and is unique in that wild rainbows dominate it' December/January 2001-2002, Tasmanian Fishing News.

[7] As found in the TasForestry Booklet produced by Forestry Tasmania. Can also be accessed at www.forestrytas.com.au/forestrytas/tasfor/tasforest_double_issue/101_108.pdf

[8] For example, a Journalist who visited the Weld River last Summer noticed a Platypus. As found at http://www.thepaper.org.au/issues/032/032my_journey_to_the_wild_weld.html

[9] Ibid.

Aboriginal occupation of the Weld Valley is at least 20 000 years old with archaeological cave evidence pointing to hunting, fishing and gathering in the area, 'which is the southern-most dated evidence for ice-age man in the world'[10].

Over the past 150 years, white explorers and prospectors have traversed the Weld Valley. In 1886, adventurer and mineral excavator Charles Glover described the Weld River as 'one of the prettiest streams south',[11] and the now legendary Denison King made numerous trips in the area commenting that there was some 'magnificent bush scenery'[12] and also providing evidence of the existence of Tasmanian tigers:[13]

## 3.0 Study sites and methodology

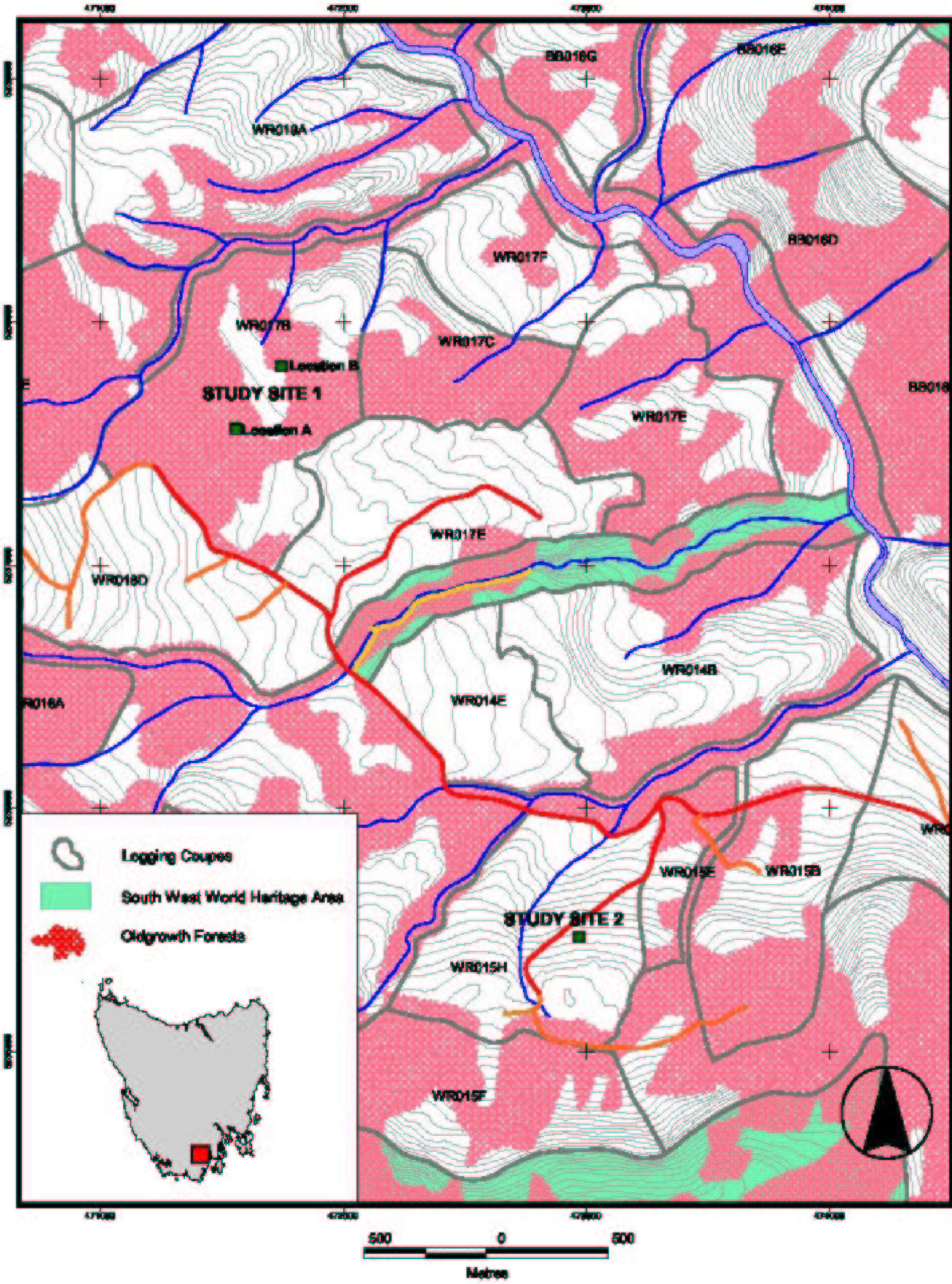
The field work component of the study was undertaken between September 2003 and November 2003 in the Weld River Valley, part of Tasmania's Huon Forest District. Two sites (one old growth and one regrowth) three kilometres apart were chosen in order to compare and contrast the ecological impacts of clearfell logging:

- WR17B (grid 471450E 5237550N) - a coupe comprising old growth forest due to be logged in March 2004;
- WR15H (grid 472900E 5235400N) - a regrowth coupe logged by clearfelling in the 1980s

The location of the study sites is given in **Figure 1**.

[10] Submission 34, Albert Goede, Senior Lecturer, Department of Geology, Karst Geomorphology and related topics of the Southern Forests, 2 *Australian Commission of Inquiry into the Lemonthyme and Southern Forests Exhibits*, p. 2
[11] Submission 68, Australian Heritage Commission, Submission to the Commission of Inquiry into the Lemonthyme and Southern Forests, 3 *Australian Commission of Inquiry into the Lemonthyme and Southern Forests Exhibits*, p. 5
[12] D King, The Weld River Caves' p. 14
[13] *Ibid.*

**Figure 1: Map of the Weld Valley depicting the study sites**



### 3.1 Methods

Tree heights were calculated using the 2-sine method[14] using sign conventions of +ve for angles of elevation above horizontal, and –ve for declinations below horizontal, enables the vertical height (h) to be always calculated as h = (a.Sin • – b.Sin•), irrespective of whether observations are taken from levels above or below the base of the tree.

Distances to tops and bases of trees were measured by hand held Bushnell Yardage Pro Scout laser rangefinder, with rated accuracy of ±1 metre at up to 600 m range on reflective targets. Angles of elevation to tops and elevation or declination to bases of trees were measured by a hand-held clinometer, Suunto PM-5/360 PC, graduated in degrees and readable to 0.2º precision with a hand rest; accuracy probably ~0.5º.

Girths were measured to accuracy of 0.1 m with a fibre-glass tape measure, approximately horizontally at breast height above natural ground on the up-slope sides of trees. The stem volume estimates were calculated by the formula Volume in m3 ‰ 0.38875 x height in metres x (girth in metres/p) to power of 1.37987. This formula is based on the relationship between "model" volumes, heights and girths deduced from the data in Forestry Tasmania's website list of "Ten most massive giants" for *E. regnans*. Those (FT website) model volumes are apparently based on growth rates for young *E. regnans* and probably provide under-estimates of stem volume, when applied to *E. obliqua* and *E. delegatensis*, as at WR17B.

Botanical surveys were undertaken by conducting 100 m transects at each study site.

Invertebrate surveys were conducted at night using mercury vapour lights to attract insects to settle on white sheets. Insects were collected and stored in sample jars for later identification.

[14] Goodwin, A. (2001). Heighting tall trees from the ground: Forestry Tasmania, Hobart, p24.

# 4.0 Botany and soil ecology

## *4.1 Study site one – old growth forest WR17B*

Two sections of the old-growth forest coupe WR17B were visually assessed during a visit to the area in October 2003. A total of 34 vascular plants were listed between the two locations.

**Location a:** (see Figure 1)

This is an area of old growth Eucalypt forest. A further classification would describe this as Thamnic rain-forest with a tall, open upper storey of Eucalyptus of a predominantly single species, i.e. *Eucalyptus obliqua* (stringy bark) with heights up to 80 metres and an estimated age of between 250–300 years.

The tall understorey is composed of typical wet forest species of *Nothofagus cunninghamii*, myrtle beech, *Eucryphia lucida*, (leatherwood), *Phyllocladus aspleniifolius*, (celery-top pine) and *Atherosperma moschatum*, (sassafras). These four species were well dispersed throughout but with a larger proportion of *Atherosperma*, with *Eucryphia*, *Phyllocladus* and *Nothofagus* next in probable order of frequency. Isolated small trees of *Pittosporum bicolor*, (tallow-wood) and *Acacia melanoxylon*, (blackwood) were also noted. Below this secondary layer *Anodopetalum biglandulosum*, (horizontal) forms locally distributed thickets, with *Cenarrhenes nitida*, (native plum) and *Anopterus glandulosus*, (native laurel), well scattered throughout.

In more extensive openings in the canopy *Nematolepis squamea*, (lancewood) (syn: *Phebalium*) occurs in small groups.

The following species are present in the sparse shrub vegetation: *Trochocarpa gunnii* (a fleshy fruited Epacrid), *Monotoca glauca*, (forest broom-heath), *Aristotelia peduncularis*, (heart berry), *Orites diversifolia*, (forest orites), *Cyathodes glauca*, (cheese berry), *Coprosma quadrifida*, (native currant), *Pimelea drupacea*, (rice flower), *Leptecophylla juniperina*, (pink berry) (syn: *Cyathodes*) and *Olearia argophylla*, (musk daisy-bush), the latter six of these species are mostly found as isolated specimens, well dispersed throughout the study area.

Many of the Eucalypt trunks are host to the epiphyte *Prionotes cerinthoides*, (climbing heath).

Two monocot's were noted, i.e. *Drymophila cyanocarpa*, (turquoise berry) and *Gahnia grandis*, (cutting grass), the latter large, tufted plant being fairly common especially in larger openings and edges.

The fern flora consists of approximately ten species with *Dicksonia antarctica*, (tree fern), sporadic but not over common and host to some other species of fern including *Hymenophyllum rarum,* (narrow filmy-fern), *Hymenophyllum flabellatum,* (shiny filmy fern) and *Tmesipteris obliqua*, (fork fern). *Grammitis billardierei*, (finger fern), *Rumohra adiantiformis,* (shield fern) and *Phymatosorus pustulatus*, (kangaroo fern) occur on fallen logs, tree trunks and on the *Dicksonia* butts. Two terrestrials, *Blechnum wattsii,* (hard water-fern) and *Histiopteris incisa*, (bat's wing fer) are found in small colonies.

The Bryophytes, (mosses and liverworts) occur in profusion on the ground, fallen logs, rocks and tree trunks. As well there is a prodigious lichen flora, commensurate with the ecology of these forest types. Large numbers of micro and macro-fungi occur throughout.

**Location b:** Approximately 500 metres down slope (see Figure 1)

This is essentially similar to *Location a* in species composition, the most significant differences being as follows:

- The climbing heath, *Prionotes cerinthoides* was not observed.
- The tangled thickets of *Anodopetalum biglandulosum* are more extensive than in Location A.
- Some differences in the frequencies of *Eucryphia*, *Nothofagus* and *Phyllocladus* are apparent.
- The shrub *Orites diversifolia* is more frequent and of larger stature, some specimens were noted to have flowered and fruited over the past year.
- Two species were encountered which were not seen at Location A, these being *Trochocarpa disticha*, (fan trochocarpa) and the fern *Sticherus tener*, (silky fan-fern).

Both *Location a* and *Location b* were seen as areas of healthy, native old-growth Eucalypt forest.

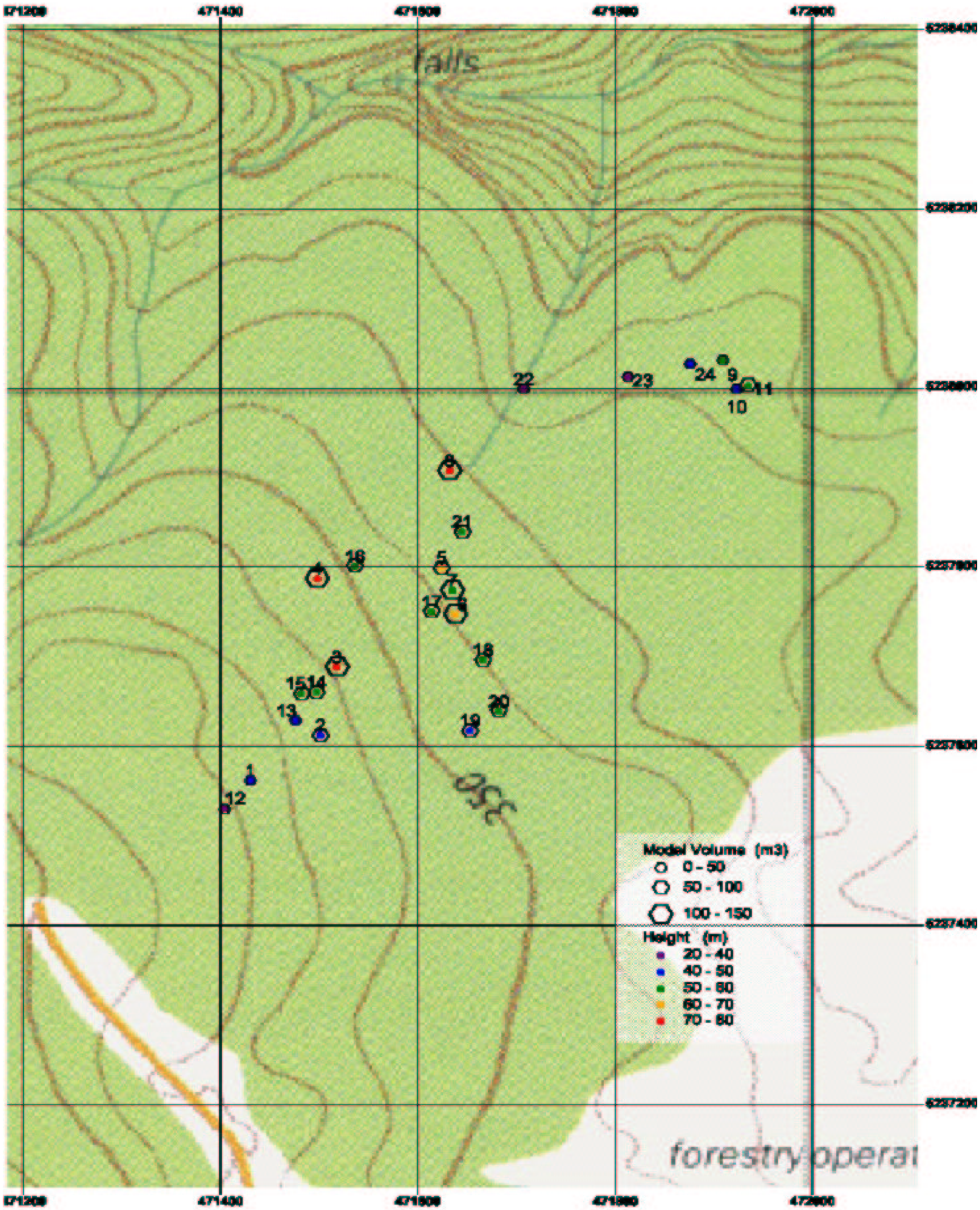
### 4.1.1 Floristic structure

WR17B is dominated by tall *Eucalyptus obliqua* (stringybark) trees over a rainforest understorey. The tallest tree measured in the study was 74 m and the largest volume 137 $m^3$ (**Table 1** and **Figure 2**).

**Table 1:** Structure of forest canopy in coupe WR17B – Weld Valley

*Location of trees is given in **Figure 2**

| Tree number | Easting | Northing | Species | Date | Height m | Girth m | Volume. m3 |
|---|---|---|---|---|---|---|---|
| 1 | 471430 | 5237561 | *Eucalyptus obliqua* | 8/10/03 | 46 | 5.7 | 41 |
| 2 | 471501 | 5237612 | *Eucalyptus delegatensis* | 8/10/03 | 48 | 7.3 | 60 |
| 3 | 471518 | 5237688 | *E. obliqua* | 8/10/03 | 74 | 9.3 | 128 |
| 4 | 471498 | 5237787 | *E. obliqua* | 8/10/03 | 71 | 9.3 | 124 |
| 5 | 471624 | 5237799 | *E. obliqua* | 8/10/03 | 62 | 8.1 | 88 |
| 6 | 471638 | 5237747 | *E. obliqua* | 8/10/03 | 66 | 8.9 | 108 |
| 7 | 471635 | 5237774 | *E. obliqua* | 8/10/03 | 59 | 11.4 | 137 |
| 8 | 471632 | 5237907 | *E. obliqua* | 8/10/03 | 74 | 9 | 122 |
| 9 | 471909 | 5238030 | *E. obliqua* | 8/10/03 | 52 | 5.3 | 42 |
| 10 | 471923 | 5237998 | *E. obliqua* | 8/10/03 | 49 | 5.9 | 46 |
| 11 | 471935 | 5238003 | *E. obliqua* | 8/10/03 | 53 | 6.1 | 51 |
| 12 | 471404 | 5237530 | *E. obliqua* | 8/10/03 | 26 | 3.6 | 12 |
| 13 | 471476 | 5237628 | *E. obliqua* | 8/10/03 | 45 | 5.7 | 40 |
| 14 | 471497 | 5237660 | *E. obliqua* | 8/10/03 | 52 | 7.6 | 69 |
| 15 | 471482 | 5237659 | *E. obliqua* | 8/10/03 | 58 | 7.9 | 81 |
| 16 | 471536 | 5237801 | *E. obliqua* | 8/10/03 | 52 | 7.3 | 65 |
| 17 | 471614 | 5237750 | *E. obliqua* | 8/10/03 | 52 | 7.2 | 63 |
| 18 | 471666 | 5237696 | *E. obliqua* | 8/10/03 | 56 | 8.6 | 87 |
| 19 | 471653 | 5237617 | *E. obliqua* | 8/10/03 | 49 | 6.8 | 56 |
| 20 | 471682 | 5237639 | *E. obliqua* | 8/10/03 | 55 | 7.2 | 67 |
| 21 | 471645 | 5237839 | *E. obliqua* | 8/10/03 | 56 | 9.3 | 98 |
| 22 | 471707 | 5237998 | *E. obliqua* | 8/10/03 | 39 | 4.7 | 26 |
| 23 | 471813 | 5238012 | Celery top pine | 8/10/03 | 23 | 2.5 | 6 |
| 24 | 471876 | 5238026 | *E. obliqua* | 8/10/03 | 47 | 5 | 35 |




REPRESENTATIVE EUCALYPTS: SOUTH WELD, COUPE WR17B
1:5000 SCALE AUGUST 2003

***Figure 2***

### *4.2 Study site two – regrowth forest WR015H*

At Study site 2 (**Figure 1**) regrowth forest was estimated at approximately 20 years of age comprised of Eucalypt species, *Eucalyptus obliqua* (stringy bark) with some *Eucalyptus regnans*, (swamp gum) and a few saplings of *Eucalyptus delegatensis,* (gum-topped stringy bark).

The regrowth Eucalypts were thickly dispersed, and measured to be in excess of 80 stems per 5m x 5m plot. The size of the regrowth trees ranged from 1.5 – 5 metres high by approximately 2 – 15 cm in diameter. The regrowth forest was characterised by profound root and crown competition resulting in slow and poor growth increment.

The natural soil and humus layers have been burnt away totally at the site with only mineral earth remaining. There was an almost total absence of Bryophytes, lichen and fungi. Little humus accumulation was evident.

An assessment of the "minor" species which have managed to colonise this area* reveals the following species, none of which are present in large numbers, or as mature 'contributively' reproductive specimens[15].

- *Nematolepis squamea* (syn: *Phebalium*) Lancewood
- *Acacia verticillata* Prickly moses
- *Cassinia aculeata* Dolly bush*
- *Pomaderris apetala* Dog wood*
- *Leptospermum scoparium* Tea tree
- *Prostanthera lasianthos* Mint bush*
- *Gahnia grandis* Cutting grass
- *Histiopteris incisa* Bat's wing fern
- *Cyathodes glauca* Cheese berry

* Only at "edges" i.e. roadsides, not inside "forest".

[15] Recruitment of non-Eucalypt species is from random external sources and not from the scattered sources within the regrowth vegetation.

# 5.0 Invertebrate ecology

A key measure of sustainability is that no species are lost from an ecosystem. The carefully worded claim that "no species are known to have been driven to extinction by forestry practices in Tasmania" heavily relies on the lack of knowledge about the species which live in Tasmania's native forests, and the fact that we know little about the long-term effects of forest fragmentation and conversion to plantations of exotic species.

The sampling of nocturnal insects at the regrowth site (WR15H) and the nearby old growth forest (WR17B) in the Weld Valley highlighted the stark differences in the diversity of animals present. Using native moths as an indicator of biodiversity it was revealed that:

- old growth forest supported many more species (81 versus 39)
- old growth forest supported a higher proportion of species endemic to Tasmania (22% versus 6%)
- old growth forest had a high proportion of species which rely on fungi, leaf litter and decaying wood
- regrowth forest had fewer species, but some were extremely abundant, indicative of pest status
- regrowth forest had some species which have adapted to live on weeds.

What is clear from this study is the importance of a moist microclimate in the old growth forest for promoting a diverse array of small habitats within the forest. Many species of insects rely on fungi, leaf litter and decaying wood for food and are important in recycling the nutrients in the forest ecosystem. Native forests managed on short rotation cycles will never reproduce the diverse micro-habitats which characterise old forests.

The regrowth forest was poor in moth species reliant on dead wood: such as the genus *Barea*. Moss feeders (e.g. the genus *Eudonia*) were also scarce. Regrowth forest was typified by a low diversity of species, some of which were extremely common due to the abundance of a narrower range of resources. For example, the emperor gum moth (*Opodiphthera helena*) was very abundant along with a large root-feeding moth *Abantiades*. The common tiger moth *Spilosoma glatignyi* has caterpillars which can survive on weeds which invade from the edges of disturbed sites. A full species list of invertebrates identified in the study is given in APPENDIX A.

The fact that several common species have not been scientifically described highlights the poor state of knowledge of the fauna. The Tasmanian moth fauna may approach 2000 species and is a jewel in the State's biodiversity crown. An up to date inventory is not available, yet several are already entered on the State's Threatened Species list.

# 6.0 Conclusion

The findings of this study demonstrate that logging old growth forest in the Weld Valley significantly alters soil ecology and the diversity and abundance of plants and invertebrates. It is clear that clearfelling in old growth forests produces permanent change and results in conversion to ecosystems that do not reflect natural conditions.

The prognosis for healthy timber regeneration following clearfelling is not promising. The study provided evidence that it is unlikely regenerated areas will produce any commercially viable timber for a significant length of time. There is profound root and crown competition resulting in slow and poor growth increment and significant inputs of energy are required in order to thin the regrowth. Poor soil structure and lack of humus component will adversely affect forest health and ability to produce good timber.

The study has provided a case for a moratorium on logging in the Weld Valley based upon scientific argument. There are two other factors that strengthen the argument for a moratorium – sawlog oversupply and a glut in specialty timbers.

## *6.1 Sawlog oversupply*

Harvesting Eucalypt sawlogs from WR17B and other high conservation value coupes in the Weld Valley is not necessary in the current climate where there is a sawlog oversupply at times resulting in quality timber being woodchipped. The Forestry Tasmania document called Sawlog Management Update, November 2003, revealed:

- Surplus saw log supplies, running at 70% of annual requirements already cut: in other words the forests have been over-cut.
- Forestry instructed workers to cease segregation of 3 categories of quality sawlogs that will instead be woodchipped. Desegregation of sawlogs means they are no longer reliably distinguished from lesser quality logs such those destined for woodchipping.

## *6.2 Glut of Specialty timbers*

Harvesting specialty timbers from WR17B and other high conservation value coupes in the Weld Valley cannot be justified in the current climate of oversupply of specialty timbers, particularly myrtle, celery-top pine and sassafras. For example the Huon District Forest Manager recently said that Island Specialty Timbers was ‘holding a record level of timber - at Geeveston there is a heap of it’[16]. In February-March 2004, over 200 tonnes of specialty timbers were offered for tender through Island Specialty Timbers. Additionally, massive wastage of specialty timbers, through physical damage, burying and burning, is observed in almost all mixed wet forest coupes

[16] ‘A treasure trove to tempt timber lovers’ Mercury article, 13/8/2003, p3.

following clearfelling. In one such coupe, which was studied in detail, 660 tonnes of specialty timbers per hectare was left following harvesting[17].

### 6.3 Question marks over the scientific basis of clearfelling

Currently around 15 000 hectares of State forest is logged annually, approximately 50% of which is by clearfelling[18]. The forest practices system in Tasmania is underpinned by the assumption that clearfelling mimics natural wildfires and that the forests in which clearfelling is conducted are naturally even aged. The scientific basis for clearfelling derived from research undertaken in the 1950s[19] must now come under question and should now be critically reviewed in light of the biodiversity implications highlighted in this study.

This study brings in to question whether the forests allocated for timber production under the Regional Forest Agreement (RFA) have been managed in an ecologically sustainable way, that is, in a way that maintains species diversity, water resources, and soil structure and quality.

Forest health, and the ability of the forest to continue to produce healthy timber in perpetuity, is intimately linked to the maintenance of biodiversity and soil health. If biodiversity is compromised, then timber production areas will become more degraded with each clearfell rotation. This has serious implications, not just for forest ecology and biodiversity, but also for a suite of social and economic values such as: future timber quality, aesthetics, ecotourism opportunity, beekeeping and pollination services, and water supply.

[17] Green, G. (2002). Logging coupe inventory, Esperence 74D. Timber Workers for Forests publication.
[18] Forest Practices Board Annual Reports – 8070 hectares of State forest clearfelled in 2001-2001, 8150 hectares clearfelled in 2002-2003.
[19] Gilbert, J. (1958). Eucalypt-rainforest relationships and the regeneration of eucalypts. PhD thesis, Botany Department, University of Tasmania.

# APPENDIX A – Moth species identified in the Weld Valley

| | Weld Valley: Old Growth forest | Weld Valley: Regrowth forest |
|---|---|---|
| **Moth family** | **Moth species** | **Moth species** |
| **HEPIALIDAE** | *Abantiades latipennis* Tindale, 1932 | *Abantiades latipennis* Tindale, 1932 |
| **NEPTICULIDAE** | *Stigmella* new species | |
| **PALAEPHATIDAE** | *Ptyssoptera phaeochrysa* (Turner, 1926) | |
| **PSYCHIDAE** | *Lepidoscia adelopis* (Meyrick, 1893) | |
| **TINEIDAE** | *Dryadaula glycinopa* Meyrick, 1893 | *Opogona omoscopa* (Meyrick, 1893) |
| **ROESLERSTAMMIIDAE** | *Amphithera heteromorpha* Meyrick, 1893 | |
| | *Chalcoteuches phlogera* Turner, 1927 | |
| **YPONOMEUTIDAE** | | |
| | *Zelleria malacodes* Turner, 1939 | |
| | *Zelleria cynetica* Meyrick, 1893 | |
| | *Phalangitis crymorrhoa* Meyrick, 1907 | |
| **GLYPHIPTERIGIDAE** | *Glyphipterix meteora* (Meyrick, 1880) | |
| **OECOPHORIDAE** | *Eochrois callianassa* (Meyrick, 1883) | *Wingia aurata* (Walker, 1864) |
| | *Cosmaresta hyphanta* (Turner, 1927) | *Wingia lambertella* (Wing, [1850]) |
| | *Heteroteucha ophthalmica* (Meyrick, 1884) | *Garrha ocellifera* (Meyrick, 1883) |
| | *Tortricopsis euryphanella* (Meyrick, 1883) | *Thema chlorochyta* (Meyrick, 1884) |
| | *Hemibela heliotricha* (Lower, 1904) | *Barea melanodelta* (Meyrick, 1883) |
| | *Oxythecta nephelonota* Meyrick, 1885 | |
| | *Ioptera aristogona* Meyrick, 1883 | |
| | *Pantogymna themeropis* (Meyrick, 1884) | |
| | *Eulechria lissopolia* (Turner, 1927) | |
| | *Ischnomorpha charierga* (Meyrick, 1889) | |
| | *Barea codrella* (R. Felder & Rogenhofer, 1875) | |
| | *Barea acalles* (Turner, 1927) | |
| | *Barea helica* (Meyrick, 1883) | |
| | *Barea psologramma* Turner, 1916 | |
| | *Barea turbatella* (Walker, 1864) | |
| | *Barea psathyropa* (Meyrick, 1927) | |
| **DEPRESSARIIDAE** | "Cryptolechia" sp. | |
| **GELECHIIDAE** | | *Megacraspedus sclerotricha* Meyrick, 1904 |
| **TORTRICIDAE** | *Peraglyphis anaptis* (Meyrick, 1910) | *Acropolitis ergophora* Meyrick, 1910 |
| | *Meritastis lythrodana* (Meyrick, 1881) | *Merophyas immersana* (Walker, 1863) |
| | *Isochorista panaeolana* Meyrick, 1881 | |
| | *Epiphyas xylodes* (Meyrick, 1910) | |
| | *Epiphyas cerussata* (Meyrick, 1910) | |
| **CARPOSINIDAE** | *Bondia nigella* Newman, 1856 | |
| | *Sosineura mimica* (Lower, 1893) | |
| **PTEROPHORIDAE** | | *Stenoptilia zophodactylus* (Duponchel, [1840]) |
| **PYRALIDAE** | *Spectrotrota fimbrialis* Warren, 1891 | *Spectrotrota fimbrialis* Warren, 1891 |
| | *Stericta carbonalis* (Guenée, 1854) | *Hednota bivittella* (Donovan, 1805) |
| | *Glaucocharis ochracealis* (Walker, [1866]) | *Scoparia anthracias* Meyrick, 1884 |
| | *Musotima ochropteralis* (Guenée, 1854) | *Nacoleia rhoeoalis* (Walker, 1859) |
| | *Scoparia anaplecta* Meyrick, 1884 | |
| | *Scoparia gomphota* Meyrick, 1884 | |
| | *Scoparia meyrickii* (Butler, 1882) | |
| | *Scoparia syntaracta* Meyrick, 1884 | |

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| | *Scopula cleodoralis* (Walker, 1859) | |
| **GEOMETRIDAE** | *Authaemon stenonipha* Turner, 1919 | *Chlenias zonaea* Guest, 1887 |
| | *Amelora zophopasta* Turner, 1919 | *Thalaina selenaea* (Doubleday, 1845) |
| | *Furcatrox crenulata* Turner, 1926 | *Idiodes apicata* Guenée, 1857 |
| | *Drymoptila temenitis* (Guest, 1887) | *Casbia melanops* Rosenstock, 1885 |
| | *Plesanemma altafucata* McQuillan, 1984 | *Dissomorphia australiaria* (Guenée, 1857) |
| | *Thalaina selenaea* (Doubleday, 1845) | *Circopetes obtusata* (Walker, 1860) |
| | *Idiodes tenuicorpis* L.B. Prout, 1916 | *Taxeotis anthracopa* Meyrick, 1890 |
| | *Boarmia' epiconia* (Turner, 1926) | *Epidesmia hypenaria* (Guenée, 1857) |
| | *Thallogama corticola* (Goldfinch, 1944) | *Dichromodes confluaria* (Guenée, 1857) |
| | *Psilosticha mactaria* (Guenée, 1857) | *Hypobapta percomptaria* (Guenée, 1857) |
| | *Scioglyptis loxographa* (Turner, 1917) | *Chlorocoma dichloraria* (Guenée, 1857) |
| | *Neritodes verrucata* Guenée, 1857 | *Scopula liotis* (Meyrick, 1888) |
| | *Oenochroma vinaria* Guenée, 1857 | *Epyaxa subidaria* (Guenée, 1857) |
| | *Circopetes obtusata* (Walker, 1860) | *Chloroclystis filata* (Guenée, 1857) |
| | *Epidesmia hypenaria* (Guenée, 1857) | |
| | *Hypobapta percomptaria* (Guenée, 1857) | |
| | *Prasinocyma semicrocea* (Walker, 1861) | |
| | *Euloxia leucochorda* (Meyrick, 1888) | |
| | *Idaea halmaea* (Meyrick, 1888) | |
| | *Acodia chytrodes* (Turner, 1926) | |
| | *Melitulias glandulata* (Guenée, 1857) | |
| | *Chloroclystis filata* (Guenée, 1857) | |
| | *Microdes squamulata* Guenée, 1857 | |
| | *Poecilasthena urarcha* (Meyrick, 1891) | |
| | *Eccymatoge morphna* Turner, 1922 | |
| | plus one new species unidentified | |
| **LASIOCAMPIDAE** | *Pararguda rufescens* (Walker, 1855) | *Pararguda rufescens* (Walker, 1855) |
| **ANTHELIDAE** | *Anthela connexa* (Walker, 1855) | *Anthela connexa* (Walker, 1855) |
| | | *Anthela acuta* (Walker, 1855) |
| **NOTODONTIDAE** | *Aglaosoma periblepta* (Turner, 1922) | *Sorama bicolor* Walker, 1855 |
| | *Gallaba eugraphes* Turner, 1922 | |
| **SATURNIIDAE** | | *Opodiphthera helena* (White, 1843) |
| **SPHINGIDAE** | | *Hippotion scrofa* (Boisduval, 1832) |
| **ARCTIIDAE** | *Philenora undulosa* (Walker, 1858) | *Spilosoma glatignyi* (Le Guillou, 1841) |
| | *Thallarcha epiostola* Turner, 1926 | |
| | *Calamidia hirta* (Walker, 1854) | |
| **NOCTUIDAE** | *Praxis aterrima* (Walker, 1856) | *Pantydia sparsa* Guenée, 1852 |
| | *Rhapsa eretmophora* Turner, 1932 | *Persectania ewingii* (Westwood, 1839) |
| | *Rhapsa suscitatalis* (Walker, [1859]) | *Agrotis munda* Walker, [1857] |
| | *Nola tholera* (Turner, 1926) | |
| | *Agrotis munda* Walker, [1857] | |