

**MT ARTHUR ENVIRONMENT
MANAGEMENT GROUP INC.**

ENVIRONMENTAL IMPACT STUDY

**A COMMUNITY BASED AUDIT
of
FORESTRY OPERATIONS
in the
MT ARTHUR UPPER CATCHMENT**

COMPLETED June 2001

DECLARATION

The MAEMG wish to make it clear that the intention of this report is to present the community with the facts and evidence surrounding the forest operations in Coupe LI 126C and surrounding areas, as they impact on the environmental aspects identified herein. MAEMG is a non-political, broad based community group primarily concerned with the upper water catchment area of Mt Arthur. Any conclusions drawn are made in good faith with the sole purpose of informing the community, and are not made with the intention to embarrass or attack any corporation, Government agency or individual.

TABLE OF CONTENTS

	Page no.
SECTION ONE:	6
<u>BACKGROUND</u>	
Introduction	6
Context	6
Statement of the issue	6
Biophysical Capability	7
- <u>General area</u>	
Water Flow; Soils; Flora and Fauna	
- <u>Coupe LI 126C</u>	
Methods Used to Gather Data	8
Parameters of Investigation	8
Environmental Aspects and Significant Impacts	
Forestry Practices	
Forestry Tasmania Management Performance	
Related Issues	
SECTION TWO:	10
<u>ENVIRONMENTAL ASPECTS AND SIGNIFICANT IMPACTS</u>	
Hydrology	10
Assessment of impacts of forestry operations on water yield and quality; classification of streams; absence of machinery exclusion zones; inadequate buffer zones	
Scenic Values	12
Inadequate provision for scenic protection	
Soil	12
Erodibility	
Permeability	
Fertility: suitability for plantation establishment	
Fauna	13
Mt Arthur Burrowing Crayfish;	13
North East Forest Snail;	19
Wedge Tailed Eagle	19
Cultural Heritage	19

SECTION THREE:	21
<u>FORESTRY OPERATIONS</u>	
Forest Practices	21
Water courses; Landings; Snig Tracks; Marking of boundaries; Streamside reserves.	
Site Preparation Procedures; Windrows; Cultivation	
Machinery	25
Poorly maintained; Proximity of Fuel Tanker/refuelling station to streams	
Fuel/oil contamination of soil and water	
Roading	26
Cultural Heritage	
Inadequate drainage	
Whose responsibility?	
 SECTION FOUR:	 29
<u>FORESTRY TASMANIA'S MANAGEMENT PERFORMANCE</u>	
 Planning	 29
Assessment of the Area	29
Definition of the coupe	30
Application for variation of FPP	31
Supervision of Operations	32
Community Consultation	33
 SECTION FIVE:	 34
<u>RELATED ISSUES</u>	
 Mt Arthur and Eaglehawk Tier Reserves:	 34
Discrepancy between boundaries as mapped in the Tasmanian Regional Forest Agreement and as subsequently gazetted	
Risks associated with application of chemicals	34
Bureaucratic Disregard of Broad-based community concerns	34

SECTION SIX:	35
<u>FINDINGS AND CONCLUSIONS</u>	
In conclusion	35
Mt Arthur: Where to from here?	36
<u>List of Appendices</u>	38
<u>List of Photographs</u>	38
<u>List of Tapes/videos</u>	39
<u>Bibliography</u>	39

SECTION ONE

BACKGROUND

INTRODUCTION

The area shown in appendix 1 (Forest Coupe LI 126C and surrounding areas, including the variation to Coupe LI 126C, and Coupes LI 126A and LI 127C) has been extensively clearfelled and prepared for plantation establishment by Forestry Tasmania (FT). This area forms part of the upper catchment for the City of Launceston, and townships of Lilydale, Patersonia and Wyena. The Mt Arthur Environment Management Group inc. (MAEMG) was formed when harvesting was noticed in the area known as “the variation to Coupe LI 126C”. Group members held concerns for the impact of logging and plantation establishment on the local environment, particularly water.

Dialogue and correspondence with Forestry Tasmania failed to reveal an adequate risk assessment for the coupe. The MAEMG then began an audit process similar to that reported in *Upper Catchment Issues Tasmania, Vol. 1. No. 1*¹ to independently evaluate the risk associated with forestry operations in the Mt Arthur catchment area. This audit brought together local knowledge of the Coupe and surrounding areas, as well as other knowledge generated by experts from a range of scientific disciplines. An independent assessment of the issues surrounding the planning, supervision and monitoring of harvesting operations was then initiated by the local community through the Mount Arthur Environment Management Group Inc.

CONTEXT

The area referred to as Coupe LI 126C is situated on the north-eastern slope of Mt Arthur in the North East of Tasmania at an elevation between 550 and 700m. It adjoins the extensive “production forest” plantation estate known as Lisle and can be located on Mapsheet LISLE 5243 at grid reference E 525519, N 5431804.

Coupe LI 126C is divided by the Mt Arthur Road, which runs from Lilydale to Patersonia. The area includes many steep valleys and is a significant catchment for the Patersonia Rivulet (tributary to the St Patrick’s River), Shepherd’s Rivulet and Lisle Creek (which are tributaries to the Little Forester River).

STATEMENT OF THE ISSUE

Despite assurances by FT to Mr. S. Wearne in March 2000 and Mrs. F. Withopf in April and November 2000, that harvesting in the area above the Mt Arthur Road was unlikely (and that if it proceeded it would do so only after further community consultation), local residents confirmed that harvesting was occurring on the mountain side of Mt Arthur Road on 27/2/01. A group of 30 concerned residents met with FT on site for an initial briefing on 6/3/01. This was followed by correspondence between FT and the MAEMG,

¹ Community Based Risk Assessment Group of Tasmania, *Upper Catchment Issues Tasmania* Vol. 1, No. 1

between 7/3/01 and 27/3/01. Analysis of FT's management plan for the coupe suggested that an adequate risk assessment had not been done as to the environmental aspects and potential impacts of forestry operations. MAEMG therefore commenced an investigation into, and risk assessment of, forestry operations in the coupe, with particular reference to the area to the South-West of Mt Arthur road described in the variation to the original Forest Practices Plan no. MJS 0106 (FPP). The FPP, Forest Practices Codes (FPC's 2000 and 1993), Forest Practices Act, Forestry Act and the Tasmanian Regional Forest Agreement (RFA) were used to assess Forestry Operations, while reports (scientific and other) were sourced and documented and compared with FT's management plan, the FPP.

BIOPHYSICAL CAPABILITY

General Area

Water Flow The existing forest systems of the area have served to moderate run-off in the higher rainfall periods, affording continuous recharge of river systems. Based on Launceston Weather Services (information 30th May, 2001: Targa Weatherstation 1259mm/p.a. to Diddleum Plains 1554mm./p.a) the average rainfall for this area is around 1500mm/pa.

Soils The soils in the greater part of Coupe LI 126C are derived from bedrock known to geologists as "Mathinna beds" (sedimentary rocks such as mudstone, siltstone, sandstone, etc) while soils in the area defined by the variation to the FPP are derived from bedrock of Jurassic Dolerite.

Flora and Fauna The flora of the catchment includes many rainforest species, as well as eucalypts in varying concentrations in forest communities. Forest cover is classified as mixed with some rainforest. Fauna known to exist in the Coupe include the threatened species *Engaeus orramakunna* (Mt Arthur Burrowing Crayfish), *Anoglypyta launcestonensis* (Northeast Forest Snail), as well as the more widely distributed marsupials, birds, insects and invertebrates associated with wet forest communities of northeastern Tasmania.

Coupe LI 126C

Coupe LI 126C the primary area under study consists of 204 hectares defined by the original Forest Practices Plan (FPP) no. MJS 0106, plus a further 46 hectares covered by the subsequent application for variation of the FPP; 250ha in total. This coupe is part of the Mt. Arthur upper water catchment, aspects of which cannot be assessed in isolation (such as treatment of streams and threatened fauna that cross coupe boundaries) and therefore the study includes some areas adjacent to this coupe, particularly those defined as coupes LI 126A and LI 127C.

METHODS USED TO GATHER DATA

The research methodology used in this investigation was based on planning, action and reflection involving members of the local community and independent specialist consultants. Initial on-site field observations by members of the community with local knowledge were compared with FT's assertions and claims sourced through the FPP. Questions raised by this process were referred back to FT by MAEMG for further clarification with face to face interviews and letters. MAEMG then sought advice from Philip Tattersall (Community Based Risk Assessment Consultant), and consulted the *Journal of The Community Based Risk Assessment Group of Tasmania, Vol. 1 No.1*. Mismatches between community observations and FT assertions were then checked against the expert specialist opinions of Assoc. Prof. Brian Finlayson (Centre for Environmental Applied Hydrology, School of Anthropology, Geography and Environmental Studies, The University of Melbourne), Mr Frank Strie (Private Forestry Consultant), Dr Owen Ingles (Soil Engineering & Risk Management Consultant), and Mr Jim Nelson (Engaeus Project Officer for Launceston Environment Centre). Where these mismatches were verified by the commissioned reports, photos and videos were taken and in some cases, the matter referred to the relevant authority. Where mismatches in hypotheses emerged, they were tested with ongoing returns to the field, and further questioning. In some cases, conclusions were made and recommendations were made to FT for alternative management strategies.

PARAMETERS OF INVESTIGATION

Identified breaches of the FPC by contractors were referred to the Forest Practices Board (FPB) for investigation, along with some concerns regarding FT management of operations (see appendices 17 and 18).

The following areas of concern were identified for investigation in a community based audit:

1. ENVIRONMENTAL ASPECTS: SIGNIFICANT IMPACTS of CLEARFELLING AND PLANTATION ESTABLISHMENT
 - Hydrology: interference with water movement including yield and quality (turbidity and chemical contamination).
 - Soils: erodibility, permeability and fertility
 - Flora and Fauna: further threatening species already rare or endangered
 - Visual impact: effects of clearfelling on local tourist operators and recreational users.
 - Cultural Heritage
2. FORESTRY OPERATIONS
 - **non**-adherence to the FPP and FPC during harvesting
 - **non**-adherence to the FPP and/or FPC during ground preparation and establishment of plantation.
3. FORESTRY TASMANIA'S MANAGEMENT PERFORMANCE
 - FT's assessment of the area, and subsequent definition of Coupe
 - FT's design of the Forest Practices Plan

- FT's supervision of the operations
- FT's community consultation

4. RELATED ISSUES

- Mt Arthur and Eaglehawk Tier Reserves: Discrepancy between boundaries as mapped in the Tasmanian R.F.A., and as subsequently gazetted
- Risks associated with application of chemicals in the upper catchment
- Bureaucratic disregard of broad based Community Concerns

SECTION TWO

ENVIRONMENTAL ASPECTS AND SIGNIFICANT IMPACTS

HYDROLOGY

According to FT,

“class 1,2 and 3 streams were classified by defining their catchment area on the 1:25000 contour map. The final classification for all streams including class 4 streams is made by the Forest Practices Officer, Planning, in preparing the FPP.” (appendix 2)

On this basis, 1 x class 2, 2 x class 3 streams and 7 x class 4 streams were identified on the plan and attached map. No streams of any nature were identified in the application for variation to the FPP. The FPP (D.6) states

“Some of the Coupe is within the catchment of the St Patricks River which provides water for the City of Launceston. Appropriate prescriptions are contained within the FPP to protect this value.” (appendix 3)

Mismatches with MAEMG Audit

The MAEMG sought the advice of Associate Professor Brian Finlayson regarding hydrology of the area. Due to lack of relevant data, he said the effect of conversion of such large tracts of land in the upper catchment was unknown. He said that any claims by FT that water yield and quality would not be adversely affected could not be verified on the basis of scientific research. However, on the basis of the only available data, (smaller scale clearing of similar, but significantly different eucalypt forests in central Victoria) Assoc. Prof. Finlayson made the following predictions:

- There would most likely be a reduction in water yield, as a consequence of the conversion of an old growth established forest to a young, actively growing plantation. The magnitude of this effect would change through time as the plantation matures but the harvesting of the plantation would continually rejuvenate the forest and maintain the effects in the long term.
- Water quality would be impacted with increased turbidity due to clearfelling which removes the humus layer from the forest soils and the deep ripping up and down the slopes causing increased run-off in peak rainfall events. This effect would be irreversible. There were also inadequate drains in the roading which would cause ongoing high turbidity and sediment yield.
- It was likely that water would suffer chemical contamination, given the permeability of the soils, the presence of conduits and macropores in the soils and that streams had not been adequately identified, classified, or afforded adequate buffer zones. (appendix 4)

Assoc. Prof. Finlayson concluded that there had been

1. Inadequate assessment of impacts of forestry operations on water yield and quality
2. Incorrect classification of streams The FPC January 1993 states
 - *“All watercourses require protection during forest harvesting operations. The type of protection required depends on the nature of the catchment, size and permanence of the watercourse and the volume of water carried...”*

- *Streamside reserves consisting of all land within the minimum widths on each side from the streambank as shown in the following table will be excluded from clear felling.*" (p38-39)

- (i) in the area defined by the variation to the FPP Using topographical survey, Assoc. Prof. Finlayson found that the catchment area for the two headwater tributaries to Shepherd's Rivulet identified them as class 3 watercourses (appendix 5) although FT had classified both as class 4. Assoc. Prof. Finlayson identified several small permanent running streams across an area extensively harvested on the top side of Mt Arthur Road, with catchment areas ranging from 13ha to 44ha (appendix 5). Photographic evidence was taken (appendix P, photos 1, 2, 3, 4). Although these streams had minimal evidence of defined banks and boundaries Assoc. Prof. Finlayson stated that topographical survey was sometimes inadequate for identification of these types of streams typical of upper catchments. He pointed to the vegetation cover as an indicator of this type of stream stating *"That they existed, should have been evident by the vegetation, which was rainforest with no eucalypts"* (appendix 4). Both aerial photography (used by FT to determine forest type - see appendix 6) and on site survey revealed this difference in flora (the stumps in this section of the harvested area are all of rainforest species, differing from surrounding vegetation - appendix P, photo 5) but had been ignored by FT in classifying streams. MAEMG identified 11 streams/springs in this area.
- (ii) in the area defined by the original FPP. According to the 18/5/01 FPB report :

"One stream ... was classified as a class 4 stream within the variation to the FPP, but its reserve was upgraded in the field. An upgrade was appropriate given the incised nature of the channel and the large water flow." (see appendix 7) Using these same criteria, a tributary to Patersonia Rivulet in another section of the original coupe should have been upgraded to a class 3 at least, because of the incised nature of its channel and its quantity of water flow (appendix P photo 6). This same watercourse in the neighbouring coupe LI126A was treated as a class 4 for much of its length, but according to Assoc. Prof. Finlayson, its catchment area was 57.7ha, making it a class 3 (appendix 4)

3. Absence of Machinery Exclusion Zones in the Variation

- MAEMG found evidence of bogged machinery in variation topside of Mt Arthur road, due to harvesting as though there were no streams (appendix P., photos 1, 2).

4. Insufficient Buffer Zones to afford adequate protection of water from contamination

- No streams identified in the area described by the variation to the Coupe, therefore absolutely no protection for the water emanating from this area.
- Assoc. Prof. Finlayson identified another creek (referred to in point 2 above) extending beyond the boundary of Coupe LI 126C, into Coupe LI 126A, which had not been afforded an adequate buffer zone, even as a class 4, yet because of the catchment area, the incised nature of the channel, and the amount of water flow it should also have been upgraded in classification.

Identified on the Coupe map (appendix 8) as a class 4 stream, its reserve had been clear-felled for a distance of several hundred meters, and machinery had entered the streamside reserve. (appendix P, photo 6)

SCENIC VALUES

According to the FPC Jan 1993, section C 6.2.6 Special Values a) Landscape point 4 states: *"District Planners will consider, to a distance of up to 25kms, the visual effects of harvesting on the viewfields of specific identified view points in remote natural bushwalking areas." When planning individual logging coupes, visual management of an entire viewshed should be considered."*

According to the FPP, appropriate Landscape Management states

"Coupe boundary will be marked in the field to exclude area of skyline visibility." (appendix 3)

Mismatches with MAEMG Audit: Within 25km of logging operations on Mt Arthur, there has been Inadequate Provision for Scenic Protection.

- The Mount Arthur Road is frequently used as a scenic drive close to Launceston. Clear-felling of the areas adjacent to the road has ruined the scenic values. (see appendix P, photo 7)
- Jan Hardy's and Bert Elson's *50 Family Walks Around Launceston and Northeast Tasmania* (Hillside Publishing 1992, p38), the walk to the summit of Mt Arthur is described as *"A beautiful forest climb on a well-graded track, followed by a rather rougher scramble on a marked route up on to the summit ridge. A very satisfying climb, rewarded by excellent views"*. (see appendix P, photo 8)
- The visual impact from Bridestowe Lavender Farm is significant. (appendix 9)

SOIL

Mr Peter Bird (Acting Forest Manager) advised MAEMG regarding Erodibility and Soil Type in Coupe LI 126C via letter (15/3/01) that:

"The soils in LI 126C were mapped as part of the 'soils of Tasmanian State Forests, Pipers Sheet, 1995.' By Mike Laffan, John Grant and Reece Hill. The mapping indicates that the soils in LI126C are derived from Silurian - Devonian mudstones and sandstones ("Mathinna Beds") and are of low erodibility. The soils in the extension area are derived from Jurassic Dolerite and are also of low erodibility." (see appendix 2).

Mismatches with MAEMG Audit:

1. Erodibility

MAEMG sought advice from Dr Owen Ingles (see appendix 10) who affirmed that the soils of the area were derived from "Mathinna Beds". However, Dr Ingles also refers to two Government studies that contradict the above scientific opinion regarding the soils' erodibility. He states:

"I have to conclude that the Government's own experts (other than Forestry ones) recognise a serious erosion problem ...if such an area is clearfelled, especially at the wrong time of year." (appendix 10)

In areas adjoining Coupe LI 126C, where clearing and plantation establishment had occurred 12 months before, erosion is already evident. This is most graphic on the steep slopes where deep ripping of the ground runs up and down the slope (appendix

P photo 9). In certain places, the erosion channels are over 30cm deep and 80cm wide (appendix P photo10) Assoc. Prof. Finlayson concluded that the ground preparation including deep ripping of soils up and down the slopes in adjacent coupes was tantamount to artificially creating a myriad of class 4 streams, which in wet conditions would pick up the loose soil and small particles and deposit them directly in the stream at the bottom of the gully "*contributing significantly to a deterioration in water quality*" (appendix 4).

2. Permeability

Dr Ingles expressed concern regarding the carriage of highly soluble chemicals associated with plantation establishment, in this soil type. He states:

"...I would have some concerns (as a chemist) about the use of 1080 on such soils. 1080 is highly soluble, and very toxic to humans as well as animals. If any were to enter the soil and the soil water..., then as little as 2 to 10 milligrams per kilogram body weight is lethal" (appendix 10). Assoc. Prof. Finlayson concurs with this opinion that poisons would enter the water if applied on this soil (appendix 4).

3. Fertility: Soil Suitability for Plantation Establishment

Dr Ingles cites The Department of Primary Industry, Tasmania, 1991 publication "Pipers Land Capability Survey" describing the areas' soils as:

" 'infertile, strongly leached, and require high fertiliser inputs to maintain good pastures for grazing... poor soil structure, low fertility soils and steepness of slope make these areas more suited to a forest cover...' " (see appendix 10) MAEMG contends that tree-cropping on such leached, infertile soils will result in poor growth rates. NB tree-monocultures are not "forests" in that there is little return of humus and nutrients to the soil, unlike the native forest.

Although the area is a high rainfall area, the effects of prolonged heavy rain cannot yet be fully ascertained, given the ongoing dry conditions. On the basis of the above advice, MAEMG is gravely concerned that in periods of heavy rain, the clearfelled areas on steep slopes will substantially erode and the watercourses will suffer severe siltation.

FAUNA

Mt Arthur Burrowing Crayfish

Within undisturbed rainforest sections of Coupe LI 126C the burrows of threatened species of burrowing crayfish "Engaeus orramakunna" are easy to locate. Although occurring in other nearby locations, Mt Arthur is considered to be prime habitat at the centre of its very limited distribution.²

According to both the FPC January 1993 and FPC 2000, it is the responsibility of the Forest Practices Officer (FPO) to consult appropriate texts to ascertain whether threatened species are likely to exist in the area planned for operations. The FPC January 1993 section D2.1 states:

- *"a register of Tasmanian rare or endangered fauna species is maintained by the Department of Parks, Wildlife and Heritage."*

² Bryant S., and Jackson J., *Tasmania's Threatened Fauna Handbook: What, Where and How to Protect Tasmania's Threatened Animals* Threatened Species Unit, PWS Tasmania 1999, p314

- *During planning at this level, areas proposed for logging will be checked against the register for rare and endangered species, known to depend on the site and documented in the relevant planning document.*
- *If rare and endangered species are known to depend on the site, the basic approach in Section 3 (page 57) must be followed.*" (See also FPC 2000, section D3.3).

If it is found that a threatened species is likely to exist in the planned coupe, the following procedure must be followed according to the particular FPC:

a. According to FPC 1993, p57

- *"...the Forest Practices Officer will contact the Chief Forest Practices Officer*
- *The Chief Forest Practices Officer in consultation with the Department of Parks, Wildlife and Heritage will then consider:*
 - (a) *The management prescription to apply to provide appropriate protection;*
 - (b) *Recommendations on reservation"*

Or, according to the FPC 2000, p64;

"notify the appropriate specialist within the Forest Practices Board... obtain an endorsed management prescription for the operational area and incorporate this prescription into the FPP. This may involve further consultation between the FPO... and specialists within the FPB and DPIWE."

The FPB's report regarding the presence of *Engaeus orramakunna* in Coupe LI 126C (including the area described by the variation to the FPP) states:

"The district planner correctly identified habitat for the Mt Arthur burrowing crayfish. Notifications were sent to the Forest Practices Board. Management provisions endorsed by the Threatened Species Unit of DPIWE were contained within the Forest Practices Plan. The provisions have been fully complied with." (see appendix 7)

Mismatches with MAEMG Audit:

Inspection of the Coupe, in particular the top side of Mt Arthur Road, defined by the variation to the FPP, revealed approx 20ha that had been clearfelled, which contained many unidentified streams, springs and permanent wet areas. These areas were identified as *E. orramakunna* sites, or potential habitat (appendix 11).

The questions MAEMG therefore ask are:

1. **Were the appropriate procedures for dealing with threatened species in planning for Coupe LI 126 C (particularly the variation) fully followed?**

Given the FPC Jan 1999 prescriptions, page 55 *" During planning at this level, areas proposed for logging will be checked against the register for rare and endangered species, known to depend on the site..."* the appropriate register, current at the time of planning for coupe LI 126C was the Forest Practices Board publication *Threatened Fauna Manual for production forests in Tasmania* 1998. According to this manual, the procedure for dealing with threatened species is as follows:

- a. *"Look up the relevant 1:25000 mapsheet in Part 1 of the Manual..."*

- b. *"If the plan area includes a known locality of a threatened species, consult the information on management recommendations for the species concerned (Part 2 of the manual) and then notify the FPB Senior Zoologist using the notification form.*
 - c. *If the plan area includes listings of habitats that may contain threatened species, check the habitat descriptions in Part 2 of the manual and assess the coupe for potential habitat. If there is potential habitat, notify the FPB Senior Zoologist.*
 - d. *After notification of a known locality ...a decision will be made by the FPB Senior Zoologist in consultation with the Parks and Wildlife Service on the specific action required, following the procedures outlined on page 57 of the FPC...."*
 - e. *...The latest recommendations should be incorporated into any operation. Please seek advice on the currency of recommendations prior to operations."*³
- Step a. involves consulting the Lisle Mapsheet in the FPB's *Threatened Fauna Manual* (appendix 11) which clearly lists 8 sites where *E. orramakunna* has been found in the Coupe, 2 within the original coupe boundary, and 6 in the variation. The mapsheet also lists one site of the NE Forest Snail in the variation, and states the area to be potential habitat for the Wedge Tailed eagle.⁴

However, the FPP section D.2 states:

- "Coupe may contain habitat for the Mt Arthur Burrowing Crayfish. Reservation of streamside reserves and wildlife habitat strip should provide sufficient habitat protection."* (appendix 3). According to the FPP, the district planner did not identify that *E. orramakunna* was present in the coupe, only that the coupe *"...may contain habitat for the Mt Arthur Burrowing Crayfish..."* (appendix 3) MAEMG concludes that the mapsheet was either not consulted, or if consulted, was disregarded.
- Having established that a threatened species is known to exist on the site, step b. involves consulting the information on management recommendations for the species concerned (Part 2 of the manual) and then notifying the FPB Senior Zoologist. According to the report by FPB, notification was sent to the FPB, presumably that the coupe contained likely habitat for *E. orramakunna* (as this is all the plan states). MAEMG therefore requests to see the documentation as proof that this step was taken.
 - In Step d. the FPB Senior Zoologist in consultation with the Parks and Wildlife Service will consider *"the management prescription to apply to provide appropriate protection"* and *"recommendations on reservation"*. ie endorse the specific action required, to be outlined in the FPP.

Although the FPB report states that *"Management provisions endorsed by the Threatened Species Unit of DPIWE were contained within the Forest Practices Plan"*(appendix 7) this statement mismatches with MAEMG findings, because the

³*Threatened Fauna Manual* for production forests in Tasmania, FPB, 1998, p9

⁴ *ibid*, page 87-88.

latest recommendations prescribed for management of *E. orramakunna* in this area were not adhered to (see following dot point). This is verified by Mr J. Nelson (Engaeus Project Officer with Launceston Environment Centre) who expressed dismay in a letter to FT 15/5/01, that proper protection for *E. orramakunna* did not occur in Coupe LI 126C (appendix 12). He suggested that because the operations within the area defined by the variation to the FPP were so destructive of *E. orramakunna* habitat, the correct (current) planning procedures (which refer to current prescriptions for the species) had not been adhered to. In a letter 22/5/01 to Mr R. Brereton (Threatened Species Unit, DPIWE) Mr Nelson claimed that the FPB's statement that "*the provisions (for E. orramakunna) have been fully complied with*" (appendix 7) was "*very much a half truth*" (appendix 13) ie although there had been some compliance (recognition of potential habitat of *E. orramakunna*) obligatory current prescriptions for the species had not been implemented indicating that the Board's statement "*Management provisions endorsed by the Threatened Species Unit of DPIWE were contained within the Forest Practices Plan*" (appendix 7) was untrue.

- Step e. involves seeking advice on the currency of recommendations prior to operations and then incorporating these latest recommendations into the operation. According to *Tasmania's Threatened Fauna Handbook What, Where and How to Protect Tasmania's Threatened Animals* (1999) the 1999 specifications for *E. orramakunna* include:
 - *"Maintain water availability (especially in seepages)*
 - *Maintain or improve water quality (against pollutants, pesticides, etc.)*
 - *Retain native vegetation throughout the habitat (particularly native riparian vegetation)*
 - *Prevent burning of vegetation especially during the breeding season when crayfish are near the surface...etc."*⁵ (appendix 14)

In direct contrast to these specifications, MAEMG noted that the FPP attached map had two landings over known *E. orramakunna* sites (appendix 15). Given (a) the destruction of known sites and widespread disturbance to habitat of *E. orramakunna* within the area defined by the variation to the FPP, and (b) the current prescriptions for management of *E. orramakunna*, MAEMG concludes that the management prescriptions incorporated into the FPP were not "current" (as of October 1999) and therefore the management prescription contained in the FPP should not have been endorsed by the FPB Senior Zoologist or by the Threatened Species Unit of DPIWE.

MAEMG therefore contends that FT failed to adequately plan and provide for *E. orramakunna*, particularly in the area described by the variation to the FPP because due process does not appear to have been followed.

⁵ Bryant S and Jackson J. *Tasmania's threatened Fauna Handbook What, Where and How to Protect Tasmania's Threatened Animals* Threatened Species Unit, Parks and Wildlife Service Tasmania, 1999, p315-317

2. **Were the provisions contained within the FPP adhered to?**
- According to the variation to the FPP, “*No new special values exist in this area*” (appendix 3) Therefore, there were no provisions made for additional protection of areas known to contain E. orramakunna, as described in appendix 14. As such, the only protection afforded E. orramakunna were the streamside reserves.
 - Yet, as there were no streams (as identified by Assoc. Prof. Finlayson, appendix 5) on the variation to the FPP, there were no machinery exclusion zones, no riparian vegetation retained in the harvested areas for the protection of E. orramakunna known to be in the area. As a consequence, significant disturbance/destruction of E. orramakunna burrows and habitat occurred.
3. **Was the species placed under further threat due to the operation?**
- According to *Tasmania’s Threatened Fauna Handbook* 1999 (DPIWE) key threats to the Engaeus species
- “primarily relate to changes in water availability and quality*
- *Any changes in drainage or stream channel which affect the water table*
 - *Water pollution, especially chemical sprays or toxic leaching*
 - *Clearing of vegetation, exposing burrows, changing hydrology and causing drying out of sites...*
 - *Fire resulting in the loss of forest or stream vegetation”* (appendix 14)

MAEMG Findings:

Reserved habitat

Actual Damage

- Even though some streamside reserves in the original coupe (along Mt Arthur Road) afforded some habitat protection for E. orramakunna, habitat was damaged due to disturbance to water flow caused through harvesting upstream (in area defined by the variation to FPP).
- Contamination of reserved habitat occurred because of sedimentation of streams from harvesting operations upstream (in the area defined by the variation to the FPP) and poor roading practices (appendix 4).
- Burning of streamside reserves was observed in areas adjacent to the coupe. (see appendix P, photos 11)

Potential Damage

- Chemical contamination. The greater part of Coupe LI 126C was sprayed with herbicides on 20/4/01 (appendix 16). Both Dr Ingles (appendix 10) and Assoc. Prof. Finlayson (appendix 4) confirm the likely contamination of water through chemical application and soil permeability. This will further threaten the colonies of E. orramakunna within streamside reserves. Also the issue of spray drift is not addressed in the FPP and no assessment of the spread of drift has been made. Consequently the negative impacts off-site of spray drift into neighbouring reserved areas of E. orramakunna habitat are unknown.

Unreserved habitat

Actual damage

- Disturbance of unreserved habitat through harvesting, including compaction of soil through machinery, disturbance to water flow and loss of forest shade cover.
- Placement of landings over known *E. orramakunna* sites and potential habitat (see appendix 15, and appendix P, photo 12)
- Disturbance of unreserved habitat and known sites through burning bark/wastewood heaps within the area defined by the variation to the FPP (see appendix P, photo 13).

Potential damage

- Contamination of water with chemicals associated with plantation establishment, including herbicides sprayed across coupe 20/4/01, and laying of 1080 baits (see appendices 4,10).
- Contamination of water with fuel and oil associated with faulty, or leaking machinery (appendix P, photos 14 and 15) and situating of re-fuelling stations within 100m of streamside reserves (appendix P, photo 7 and 16)

As well as the above, there are serious questions surrounding the boundaries of the two reserves on Mt Arthur listed in the Regional Forest Agreement (RFA). The Mt Arthur reserve, as listed in the RFA, includes the area above the Mt Arthur Road, defined by the variation to the FPP. The management prescriptions for *E. orramakunna* were established with the understanding that this area would be subsequently gazetted by the State Government, and therefore much of *E. orramakunna* habitat would be afforded protection from forestry operations (see appendix 13). The gazetted reserve was in fact 200 ha smaller, losing the area known as prime crayfish habitat (this issue is further considered in section 5). MAEMG repeats Dr. N. Doran, (quoted in Mr. Nelson's letter 22/5/01 to Mr. Brereton of the Threatened Species Unit, DPIWE) who says:

"...If the current operations are now eating into the Mt Arthur MDC zone, then there are certainly grounds for increased concern over the future of E. orramakunna, and for the management of threatened species in any such zones in future." (appendix 13)

and further repeats Mr. Nelson who concluded:

"...that the protection measures taken ...were inadequate and that FT did not meet its proper obligations to the species E. orramakunna." (appendix 12)

Given the listed key threats to *E. orramakunna*, and given that the area within the variation to the FPP was considered integral to the species' ongoing viability, MAEMG concludes that the future of *E. orramakunna* has been further threatened due to logging operations on Mt Arthur. The consequences for the species' ongoing survival warrant further investigation, with probable revision of the species' threatened status both in Tasmania and nationally.

Northeast Forest Snail

As above, the Threatened Fauna Manual Lisle Mapsheet identifies an actual site for the NE forest snail within the area defined by the variation to the FPP. As with *E. orramakunna*, non-identification of streams within the area defined by the variation has placed this species under further threat. The provisions in the FPC, and FPP based on the Threatened Fauna Manual's prescription for the species were inadequate, because the streams were not identified, and therefore not protected.

Wedge Tailed Eagle

The FPP states;

"Potential exists for Eagle nests to occur in this area. Forestry Tasmania staff has carried out a search of the area. No nests were found.. If an eagle nest is found during the course of the operation, the tree shall not be felled and all operations shall cease within 250 metres of the tree. A Forest Practices Officer shall be notified immediately (that day)."(appendix 3)

Mismatches with MAEMG audit:

- The *Threatened Fauna Manual for production forests in Tasmania*, Forest Practices Board, 1998 states: "If a nest is found during roading or logging in the breeding season (August to January), **immediately** cease all forestry activity within **500m** of the nest...and notify the FPB Senior Zoologist, so that appropriate further action can be determined as soon as possible..."⁶ The FPP did not therefore comply with the prescription mandated by the Threatened Fauna Manual in an area known for Wedge Tailed Eagles.
- Although the FPP correctly identifies that the area contains suitable habitat for nesting eagles, members of MAEMG have sighted and photographed eagles within the coupe (see appendix P, photo no. 17) This alerts MAEMG that nests within the area are likely. MAEMG therefore questions the thoroughness of the survey conducted by FT and asks for clarification as to when, how, and for how long was it undertaken?

MAEMG therefore concludes that yet another threatened species habitat was likely destroyed, diminished or disturbed due to harvesting operations on Mt Arthur.

CULTURAL HERITAGE

MAEMG contends that the upper catchment area of Mt Arthur is of unusually high significance, due to the interplay of so many cultural and environmental aspects unique to this area. Not only has the area been

- accessed for decades as a place of spectacular beauty and panoramic views within a half hour drive from Launceston city
- an important source of water for the Launceston and local communities
- a unique habitat for threatened fauna, known only in the immediate vicinity
- the closest extensive rainforest to Launceston
- the source of timber for local sawmills

⁶Jackson J and Munks S., *Threatened Fauna Manual for production forests in Tasmania* Forest Practices Board, 1998 p174

- the backdrop for many tourist operators in the North East

but also, the rich mining history of the Mt Arthur/Lisle area makes the Mountain of particular cultural significance to many people living within the local community who are directly connected with this pioneering past. Coupe LI 126C with its known archeological sites is of particular significance. MAEMG acknowledges this cultural heritage value of the area and has therefore commenced a detailed audit of the impacts of forestry operations on this specific aspect. Of particular interest to MAEMG are the general principles outlined in the FPC Jan 1993, which state that

- *"The cultural heritage of all ethnic groups (Aboriginal and non-Aboriginal) will be considered in all stages of forest management*
- *Protection of or minimising impact on the cultural heritage should be achieved through identification, recording and assessment and subsequent management by prescription or reservation of significant sites.*
- *The need for consultation with special interest groups is acknowledged.*
- *Assessment of cultural significance and management prescriptions should involve cultural heritage expertise."* (p60)

In the light of these stated objectives, this forthcoming audit will assess the planning and research of cultural heritage sites within the coupe, and the management prescriptions in place to protect the integrity of this value. The results of this forthcoming investigation will be published in the public domain within 60 days of the release of this preliminary audit.

Mismatches with MAEMG audit

Contrary to the stated principles above, throughout all stages of forest management of the area within Coupe LI 126C, members of the local community had declared their special interest in the area, and requested to be consulted. Yet, despite two independent meetings by Mr. S. Wearne (March 2000) and Mrs. F. Withopf (April 2000) with the FT senior planner for Bass District (where the unique cultural significance of the Mountain was outlined) the importance of these values was neither acknowledged in the planning process nor addressed during the operations. Each time a representation was made by members of the local community (Mrs. Withopf made a second approach to FT in November 2000), the verbal assurance was given that the integrity of the Mountain, with its unique blend of ecological and cultural values would be protected and that the clearing of the rainforest would not extend to Mt Arthur Road. Thirty members of the community met with Mr. P. Rosevear on the 6th of March 2001, reiterating the significance of the Mountain to the community. Mr. Rosevear accepted that these aspects had been overlooked in planning, and that this was "regrettable".

The level of community involvement and interest increased through 2001, culminating in both a community forum of over 300 people, and the unanimous Launceston City Council, each requesting an immediate cease to all forestry activities in the Mt. Arthur upper catchment. These, and further requests for consultation regarding aerial spraying by Mrs. Withopf (appendix 21), were ignored. Harvesting in the Coupe LI 126C did cease in late March due to the first significant rain event although plantation establishment proceeded.

SECTION THREE

FORESTRY OPERATIONS

FOREST PRACTICES

Initial inspection of operations matched with relevant sections of the FPP and FPC revealed breaches. A list of these breaches was drawn up, photographic and video evidence taken, and FT contacted. A meeting was convened between Forestry Tasmania officers, Forest Practices Board officers and MAEMG on site on 15/3/01. A letter confirming resolutions of this meeting, and detailing MAEMG requests for documentation supporting FT's risk assessment for the Coupe, monthly audits of operations, FPP's for coupes adjacent to LI 126C and information concerning training of Forestry Officers and Contractors in FPC 2000 was sent to the FPB on 16/3/01 (appendix 17). A letter of complaint was sent by MAEMG to the Acting Chief Forest Practices Officer, Forest Practices Board, on 18/3/01, listing several identified breaches (appendix 18).

In response MAEMG received a letter from FT (Brian Farmer) dated 27/3/01, saying that they were unable to provide most of the requested information, but offering to meet with MAEMG to concur on what information would be available (appendix 19). Despite a further request for information at a meeting on the 9/4/01 by MAEMG, no further information was forthcoming.

The investigative report into operations in the coupe was faxed to MAEMG by FPB on Friday, May 18, 2001. (appendix 7)

This report stated that:

"In general, a reasonable standard of forest practices has been achieved within the coupe. There is no evidence of undue environmental harm. The majority of alleged breaches of the Code are unsubstantiated."(appendix 7)

Mismatches with MAEMG audit:

1. Watercourses: According to the FPC (2000 and Jan 1993), class 4 streams are defined as *"All other watercourses carrying water for part or all of the year for most years."* (see FPC 2000 p 56, FPC 1993 p39). Under this definition, much of the harvested areas on the Mountain side of Mt Arthur Road (area described in variation to FPP) should have been identified as containing class 4 streams because of evidence of running water through many channels, even at the end of the extreme dry summer of 2000-1.
 - (a) Inadequate classification of streams. No streams were identified by FT on the mountain side of Mt Arthur Road, in the area defined by the variation to the FPP either in the FPP itself or during subsequent harvesting operations, although MAEMG surveyed the area and identified 11 small streams crossing Mt Arthur road at approximately 200m, 330m, 400m 420-440m, 480m, 1000m, 1100m, 1175m, 1280m, 1300m and 1400m from the coupe boundary Lilydale end. Each of these streams originated from permanent springs further up the hill, which

flowed both across the surface and underground down the slope to each road crossing .

- (b) Inadequate protection of streams and springs. According to the FPC
- *Wider streamside reserves, including reserves on class 4 watercourses, should be specified in Forest Practices Plans where necessary to protect:*
 - *significant recreational, water supply, landscape, habitat or conservation values (in particular threatened aquatic species, ...)* (FPC 2000 p 57, and FPC 1993 p39)
 - *"Machines will not be taken within 10 metres of the border of any swamp or area with obvious surface seepage, except at properly corded crossing points."* (FPC Jan 1993, p43). *"Significant springs will be treated as Class 3 or 4 watercourses..."* (see FPC 2000 p 57)

The significance of these watercourses and springs to domestic water supply and to habitat for the threatened species *Engaeus orramakunna* should have ensured that they were afforded even wider streamside reserves than class 4 protection. They had no protection. Several watercourses have been clear-felled and the logging equipment has dragged/skidded logs along in the streams. Despite the drought conditions wheel ruts run up & down and crisscross with water flowing a distance of some 50m. This has created short and long term damage to the soil and increased the potential for erosion, greatly disturbed colonies of *E. orramakunna* significant to the species population, and interfered significantly with water flow (appendix P, photo 23)

(b) Inadequate distance between refuelling, storage of fuel tankers and watercourses. The FPP section 5 I. states: *"Due to proximity of town water supply...no servicing or refuelling of equipment, or storage of fuel tankers closer than 100m to streams."* (appendix 3). Refuelling and storage of fuel occurred within 100m of streamside reserves (see appendix P, photos 7, 16)

2. Landings: According to the FPC, section C3.3 states *"Landings (including harvesting/logging debris) should be kept as far as practicable from watercourses. Landings will not be permitted within 40m from the boundary/of a streamside reserve and/or a Class 4 stream/machinery exclusion zone ..."* (FPC 2000 p42, FPC 1993 p35)
Also, *"Landings will be located so that mud and slush from them does not enter water courses"* (FPC 1993 p35).
The report from the FPB states that *"Landings within the coupe are generally well located"* (see appendix 7).

MAEMG observed landings along Mt Arthur Road that breached the FPC and the FPP because they were located within 40 m of watercourses (appendix P photo 23a) and some were even directly over unclassified streams: (video available)

3. Snig Tracks: According to the FPC, *"Snigging will not be conducted along drainage depressions in native forests."* (FPC 2000, p36) *"No watercourse bed or drainage line will be used for snigging along"*. (FPC 1993 p30) The MAEMG found that Drainage Depressions were used as Snig Tracks. At least two drainage depressions (classified by Assoc. Prof. Finlayson as class 4 watercourses - appendix 4) had been

used as snig tracks for a distance of 160m in the area to the North East of Mt Arthur Road, contained within the area defined by the variation to the FPP. (appendix P photos 19, 20) Also on top side of Mt Arthur Road unmarked streams were used as snig tracks causing ruts for a distance of approx 50m (see video).

Stream Crossings. The FPC states *"The number of crossings of Class 3 and 4 watercourses will be minimised and restricted to clearly marked crossing points. Dry Class 4 water courses may be crossed without log crossings and culverts..."* (FPC 1993 p30 or see FPC 2000 section C3.1 p 36). Due to no streams being marked in area defined by variation to FPP, streams had been severely damaged through repeated crossing by machinery up and down streams where clear-felling had occurred (appendix P photos 1,2,3,4, 23, 23a). In other parts of the area defined by the variation to the FPP snig tracks had been pushed through water-courses carrying water, without marking crossings (see appendix P photo no. 18)

4. Marking of roadside landings, coupe boundaries:

On 11/2/01 Frank and Karin Strie

observed *"No blue boundary tape visible...Neither on trees next to any streamside reserves, any of the roadside landings close or on top of water drainage lines, or on the road edges along the boundaries on the southern and northern ends of the coupe."* (appendix 20) MAEMG observed no marking of roadside landings that came closer than 40m to a streamside reserve and or drainage depression.

5. Tree Felling in streamside reserves: In the coupe LI126C as well as adjacent Coupes LI 126A and LI 127C the rainforest in the deep gully of one designated class 4 streamside reserve (actually class 3 for some of its length above where FT marked it according to catchment area - appendix 5) had been harvested of almost all trees (cull-felled) for a distance of several hundred metres while another had been clear-felled. (see appendix P photo 6, 26) Here, the intermittent remnant of streamside vegetation (some 300m below the road) contains many fallen trees. According to Mr Strie, the remnant standing trees appear sick most likely due to the herbicide spray drift and the sudden exposure to sun and wind.

(Most of the above breaches occurred because the area in the Southern end of the coupe was not properly assessed in the planning stage. To comply with the FPC would have been unworkable, due to the number of subterranean streams, springs and watercourses typical of the upper catchments. MAEMG therefore concludes that due to inadequate planning, the contractor was directed to operate and consequently set an extremely difficult task to comply with the FPC in an area that should not have been clearfelled.)

6. Site Preparation Procedures:

(a) Windrows.

- Windrows/slash pushed into streamside reserves: *"Logging slash will not be pushed into streamside reserves."* (FPC 1993 p40) *"Harvesting slash will not be pushed into streamside reserves (including machinery exclusion zones on Class 4 watercourses), and slash heaps should be sufficiently separated from reserves to reduce the risk of burning the reserves."* (FPC2000 section C4.1)

MAEMG noted slash/wood-waste pushed directly into streamside reserves. Below the remaining "Pan shaped" Myrtle forest (the flattest area in the region) there is a underground stream of water running in the southern direction (in line with Mount Barrow) the obvious surface depression (~300m) was ignored and the natural vegetation pushed into windrows. Above the emerging stream-conduit, (class 3) some trees were left standing (sassafras & myrtle). There is considerable build up of silt banking against manfern-stems that had been pushed over. Some trees have clear signs (imprints) of the machine pushing them into the streamside reserve (appendix P, photo 21). On the eastern side of the few remnants, the logging debris has been pushed against the reserve (see appendix P photo 22).

- Windrows pushed into drainage channels and springs: According to the FPP section E(1) "*Windrows shall not be pushed into watercourses, channels or streamside reserves*". MAEMG observed windrows across drainage channels, and over watercourses (springs, underground streams) (appendix P photos 22)
- Windrows burned after planting: Contravening FPP section E (2) which states "*Windrows be burnt prior to planting*" MAEMG observed windrows fired after establishment of plantation in parts of the coupe around 13/4/01 (appendix P photo 24)
- Windrows not following contours of hillsides According to the FPC 2000, section E1.2.2, table 10, for soils of low erodibility, on slopes >15 degrees, all windrowing should only be along the contours but when the erodibility rating of soils increases, the acceptable slope gradient for windrowing and cultivation other than along the contours, decreases. In the 1993 FPC, the same principle applies (see p 71). According to the FPP section E1.2 for Coupe LI 126C, "*On slopes over 14 degrees windrow direction should be along the contour...*"(appendix 3) In contrast to this, MAEMG observed windrows running vertically down very steep hillsides in neighboring coupe LI 126A (see appendix P photos 9). MAEMG estimates the slope gradient in this area to be around 35 degrees (using 1:25000 contour map), and further, disputes FT's claim that the soil is of low erodibility (see appendix 10).

(b) Cultivation:

- Drainage lines Contravening FPP section E1, which states "*Drainage lines shall not be cultivated*", MAEMG observed cultivation in drainage channels. (appendix P photo 25)
- Significant springs The FPC 2000 section D 2.1, (p 57) "*Significant springs will be treated as Class 3 or 4 watercourses. Subsurface conduits emerging as springs may require extra protection upslope e.g. extension of machinery exclusion zones.*" Also the FPC Jan 1993 states that "*Machines will not be taken within 10 metres of the border of any swamp or area with obvious surface seepage...*" Contravening this, several examples of significant springs were not afforded adequate protection within the variation, and in one case, a spring was cultivated as well as windrowed over in the area defined by the original FPP, although it is noted that this probably occurred before 1/1/01 (see photos, 22,25).

MACHINERY

According to the FPP section 5, *“Due to the proximity of the town water supply, the following will apply:*

I. No servicing or refueling of equipment or storage of fuel tankers closer than 100m to streams.

II Any significant spillage (100L or more) of any fuel, petroleum product, or any other likely contaminants to be reported IMMEDIATELY to Forestry Tasmania at Scottsdale. Action shall be taken by the contractor immediately to restrict any spillage as soon as it becomes known.” (appendix 3)

According to the FPB report (18/5/01), the expressed concerns about leaking hydraulic fluid from excavators was insignificant stating *“...the hydraulic fluid leakage from the excavator has not caused any significant environmental harm.”* (appendix 7)

Mismatches with MAEMG audit:

Machinery Poorly Maintained

- Throughout February and during repeated visits to the area, until official complaints made to FT and the FPB, MAEMG observed that (at least some of) the logging machines had not been appropriately maintained.

-Some track-plates of the Excavator were missing/ broken away.

-The excavators had leaks on the hydraulic system: inside the machine (dripping out underneath), on couplings of the hydraulic hoses on the boom and stick and leaking from the main hydraulic ram (appendix P photo 28).

The supervisor should have picked this up and should have required the contractor to fix the problems. MAEMG suggests that the FPB investigate how much hydraulic oil was delivered to the logging site during the 3 month of operations. This would determine the amount that had actually been lost in the sensitive water protection zones (within 100m of a streamside protection zone).

- On 16/3/01 Ass. Prof. Brian Finlayson and Frank Strie observed that one Excavator working on a landing below the Mount Arthur Road approx 30m away from a streamside reserve did not have the appropriate fuel cap. Instead a cloth / rug was pushed into the opening and as the machine was turning during operation (on the sloping terrain) diesel fuel was running on the outside wall of the tank on to the ground. This was rectified a few days later, when a new diesel fuel cap was fitted.

Proximity of Fuel Tanker/re-fuelling station to streams The MAEMG observed the re-fuelling tanker situated 30m away from water courses; both identified streams on the Eastern side of Mt Arthur Road and those not identified on the mountain side of Mt Arthur Road contravening FPP section 5 I (see appendix P, photo 7)

Fuel/oil contamination of soil and water. MAEMG also found evidence of significant diesel/oil spills

- along Mt Arthur Road (see appendix P photos 14, 15). According to the FPB report *“the contractor...alleged that only a minor amount (one cup full) of fuel had been spilled and this was cleaned up.”* Evidence of soil movements and heavy machinery blade and track marks indicated that the cleanup consisted of scraping a large amount

of the road surface into a mound inconsistent with treatment of such a small spillage. When investigated by the FPB it was found that *"the residual levels do not pose any significant risk of environmental harm and further cleanup of the area is not required"* (appendix 7)

- on the cable landing at highest point in the far east of the neighbouring coupe LI 124B there is an obvious large scale oil change dump. MAEMG suggests that excavations would confirm this.

ROADING

The Mount Arthur Road is regularly used by members of the community for both access and recreation. The impacts of forestry operations on the Mount Arthur Road that MAEMG sees as significant are: Firstly, the loss of the historic nature of the road including its role in the overall cultural heritage of the area, secondly FT's non-compliance with the code regarding road maintenance and construction prior to commencement of operations in order to protect significant aspects such as water, soil, landscape and fauna and thirdly the ownership and responsibility of the road including the scant regard paid to the community by FT regarding use of this public road for during forestry operations from January - March 2001. During this period of operations, FT workers and contractors frequently used Doaks/Mt Arthur Road to gain access to the coupe and to load logs from roadside landings.

1. Cultural Heritage As well as its contemporary use (vehicular and pedestrian) Mount Arthur Road is an historic landmark of the area, being a vital supply link to the Lisle Goldfields and linking the townships of Lilydale and Patersonia for nearly a century. The heritage value of this road⁷ was greatly diminished due to forestry operations.
2. Road Maintenance and Construction The FPC Jan 1993 states that *"Upgrading of existing roads and tracks to Forest Practices Code standards will only be required if carting is likely to cause or has caused unacceptable soil erosion or has an unacceptable effect on water quality."* (p 19) and that the planner will
 - *Plan for dry season construction*
 - *Carefully consider the use of appropriate equipment, make sure operators know what is required and ensure proper supervision*
 - *Local Government will be consulted where construction of new or substantial upgrading of existing access onto municipal roads is required*
 - *Interference to natural drainage should be minimised."* (p 10-11)

Mismatches with MAEMG audit

Before the commencement of operations, FT had failed to bring the road up to the required standard for a class 3 all weather road, violating FPC Jan 1993 section B1 and B2. Forestry operations within the area defined by the variation to the FPP, including carting, together with the first major rain event on 16th March 2001, caused unacceptable effect on a) the road itself, and b) water quality as Assoc. Prof. Finlayson's predictions that *"much of the disturbed soil and rock*

⁷ Coroneos C., *An Archeological Survey of the Lisle Denison Goldfields*. Forestry Commission Tasmania, July 1993

...from road surfaces will be picked up and washed into the streams causing ongoing sedimentation and increased turbidity..." (appendix 4) came to pass.

- Dispersement of Water In order to protect water courses from contamination, water should be diverted from table drains into native vegetation during the last 50m before the road crosses a watercourse, to enable silt and sediment to be deposited before the water reaches the watercourse (FPC 1993, p17). In contrast, Assoc. Prof. Finlayson found that throughout the coupe constructed roads had inadequate provision for the dispersement of water. He states "*The Mt Arthur Road was not adequately constructed, being flat with no table drains. Existing culverts had been damaged and/or covered...There were insufficient exits and undisturbed patches of vegetation, to enable adequate protection for streams. Instead, all run-off water would be expected to build up on road edges, collecting at the lowest points (where there were depressions and streams), and flow directly into the stream systems.*" (appendix 4)
- Table Drains "*Table drains should be dish-shaped and constructed to a minimum depth of 300mm below the level of the top of the formation at the outer edge of the shoulder*" (FPC Jan 1993, p 17) Along Mt Arthur Road, during the period of operations, Jan - March 01 there were no table drains constructed. (appendix P photo 27) Due to operations, the existing culverts and road edges were damaged.

These observations were affirmed by three representatives from the Launceston City Council in a report following a visit to the area on the 19th of March 2001 (appendix 22)

- Protection of Myrtle. FPC Jan. 1993 Page 16, FPC 2000, Page 13 state: "*Where roads are constructed through areas containing myrtle, myrtle wilt disease is a risk. Machine and falling damage to the adjacent myrtle stands and heaping of debris into the undisturbed myrtle area should be avoided.*" Obviously the same disease risk applies where huge amounts of logging waste is created and in LI 126C there are numerous situations both along roads and elsewhere, where such slash has been deposited very close to remnant rainforest. (appendix P photo 21)

MAEMG contends that FT failed its obligations under the FPC Jan 1993 for road construction and maintenance.

3. Mt Arthur Road: Whose responsibility?

According to the FPB report (18/5/01) "*The section of (Mt Arthur) road passing through the State forest operations is being progressively upgraded to an appropriate standard that will minimise environmental harm. Of more concern is the original section of privately maintained road beyond the forestry operation, which remains in very poor condition and is almost certainly contributing to turbid run-off.*"(appendix 7)

On the 9th of April three members of MAEMG met with Mr. Farmer at Bass District Office where the issue of Mt Arthur Road was discussed. At this meeting, Mr. Farmer asserted that after FT operations had ceased in the area, it

was his desire to "put it (the road) to bed", which was understood by the MAEMG members present, that FT wanted to close off the road altogether.

Mismatches with MAEMG audit

Following exhaustive inquiries to both Launceston City Council and Dorset Council as well as inquiries to the Lands and Titles Office it has been determined that responsibility for the maintenance of the road which runs for 15.98 km from Patersonia Rd. Patersonia, to Main Rd (Golconda Rd) Lilydale, is as follows:

LCC 5.92 km from Patersonia Rd.

FT 3.5 km (approx.) passing Lone Star Rd junction towards Lilydale and ending at the private land boundary of Buchinger/Withopf property.

Private Road for 1.5 km towards Lilydale.

LCC 4.58 km (or 5.88km) from end of Private Rd to Lilydale Main Rd. This section is subject to some interpretation by LCC and landowners and is still to be officially agreed. Currently the LCC maintains approx. 5.88 km of road from the Lilydale main Rd. although officially a 4.58 km section is referred to.

Given the above, MAEMG notes that FT is not only responsible for Mt Arthur Road within the Coupe LI 126C, but also for the section of road that the FPB mistakenly claims is private road beyond the forestry operation "*which remains in very poor condition and is almost certainly contributing to turbid run-off*" (appendix 7)

Further, Mr. Farmer's stated desire to close the road to public access after operations in the coupe had ceased was totally unacceptable to MAEMG due to the fact that the road has been a link road between two townships for nearly a century, is frequently used by local residents and the broader community, and that there had been no public consultation.

On two occasions MAEMG noted an absence of warning signs at the Patersonia end of the coupe, that forest operations were occurring along Mt Arthur Road (see appendix 20). At no time were signs posted either at Lilydale or Patersonia to indicate that the road could be impassable due to harvesting or loading of logs, despite this being a public through road.

MAEMG concludes that the nature of forestry operations along Mt Arthur (and Lone Star Ridge Road) was invasive, non-selective and negatively impacted the heritage significance of the area. The damage to the existing road caused sediment and slush to be deposited in watercourses. The subsequent post-operations upgrading of the Mount Arthur Road, although addressing some of the environmental impacts, caused further demise of the cultural heritage value of the area.

SECTION FOUR

FORESTRY TASMANIA'S MANAGEMENT PERFORMANCE

PLANNING

According to the FPC January 1993

- *"...the Forest Practices Officer will apply the forest practice principles in this code. The Forest Practices Officer will seek advice and information from other people as required..."* (introduction)
- *"Soils, water quality and flow, site productivity, biodiversity, landscape, archeology and landforms are potentially affected by forest operations and will be considered at the planning stage. Specialists are available to provide advice to land managers and Forest Practices Officers.*
- *Planning will involve the collection of site information and consultation with relevant persons and organisations."* (p 1)

Assessment of the Area

MAEMG were advised by FT 15/3/01 (appendix 2) that assessment of vegetation type, hydration and soil type had occurred through consultation with relevant maps, although the planner had visited the coupe, and had *"realised that there were patches of rainforest within the coupe"* (presumably not identified on the map) estimated to be around 20 ha (appendix 2). Classification of class 1, 2 and 3 streams occurred by defining their catchment on the 1:25000 contour map. *"The final classification for all streams including class 4 streams is made by the Forest Practice Officer, Planning in preparing the FPP."* (appendix 2)

MAEMG were also advised that proper assessment of fauna including threatened species had occurred. (appendix 2)

Mismatches with MAEMG audit:

- No streams had been identified in the area defined by the variation to the FPP either in the FPP or during subsequent harvesting operations, although MAEMG surveyed the area and identified 10 small streams crossing Mt Arthur road at approximately 200m, 330m, 400m 420-440m, 480m, 1000m, 1100m, 1175m, 1280m, 1300m and 1400m from the coupe boundary Lilydale end. Each of these streams originated from springs further up the hill, which flowed both across the surface and underground down the slope to each road crossing. One of these streams had been identified by Assoc. Prof. Finlayson as having a catchment area of 44ha (see appendix 5). As well, 6 small streams/springs were diverted around the large landing opposite Lone Star Ridge Road turnoff. In the greater part of coupe LI 126C, one stream running into the neighbouring coupe had been classified as a class 4 despite having a strong water flow, an incised channel, and catchment area of 57.7 ha. (covered in detail above in Section 2, Hydrology 2,ii).
- Sighting of juvenile Wedge Tailed Eagle on 15/4/01 suggested nesting sites could exist within the coupe. (see section 2, Fauna), and management prescriptions in the

FPP did not reflect the prescriptions outlined for the species in the FPB's *Threatened Fauna Manual*.

- There was a N.E. forest snail site contained within the area defined by the variation to the FPP and two sites outside the coupe boundary (appendices 11 and 15)
- There was no recognition of known E. orramakunna sites within the coupe or in the area defined by the variation, and no recognition of potential habitat in the area defined by the variation to the FPP.

There is strong evidence of inadequate assessment of the coupe in the planning process, particularly in relation to threatened fauna and stream classification within the area defined by the variation to the FPP. Although the area defined by the variation was assessed as having "no new special values" (appendix 3), and was originally assessed as appropriate for plantation establishment, the revegetation plan has subsequently been changed to "reforest this section of the coupe by natural regeneration processes" (appendix 7) Although MAEMG welcomes this change to the plan, it sees it as proof that the area was inadequately assessed in the first place, being quite unsuitable for clearfell harvesting, and plantation establishment.

Definition of the Coupe

According to the FPC January 1993, section C. *HARVESTING of TIMBER 1.1 Dispersed Harvesting Design for Large Areas of Native Forest* in keeping with dispersement principles, the maximum coupe size for clear-felling native forest should not exceed 100 ha. (p23)

Mismatch with MAEMG audit:

- Coupe LI 126C including the variation is 250 ha. (see appendix 3) The size of the variation was subsequently alluded to by the Forest Practices Board as being "unusually large" (appendix 7) and changes to planning suggested for the future. However, this did not address the large size of the area described by the original plan. The subsequent decision by FT to regenerate parts of the coupe back into native forest, bring it under the minimum standard guidelines as quoted above. The coupe size was arguably too large by 150ha.
- Adjoining coupes LI 126A and LI 127C, and nearby coupe LI 124B have all been clearfelled since 1999. The total area of these coupes is not known by MAEMG but is estimated to be around 130ha, making an unbroken clearfelled coupe of around 400ha, with another Coupe LI124A (approx. 90ha) scheduled (appendix 1). These nearby coupes are judged by MAEMG to be "steep country coupes" "with more than 50 percent of area on slopes greater than 20 degrees" FPC Jan 1993, p86. According to the FPC Jan 1993, Section C 6.2.2, steep country "clearfall coupes should be dispersed by separating cut coupes with areas of uncut forest of similar size. These uncut areas will be excluded from logging until a dominant regeneration height of 5m is achieved at an acceptable stocking standard." (FPC Jan 1993, p49) The clearfelling of these adjoining coupes was in direct contravention of the FPC.
- The harvesting boundary on the western side of a deep drainage gully within the area defined by the variation to the FPP (below Mt Arthur Road) was marked approx. 90m too far to the Northwest. The forest officer should have marked the boundary on the eastern side of the gully, as the terrain of the gully was inappropriate for clearfelling

(according to the FPC Jan 1993, p 30) and/or subsequent plantation development (according to FPB report 18/5/01 - appendix 7).

Application for variation to the FPP

On the morning of 27/2/01 Mr. S. Wearne (current member MAEMG) approached the contractor who was harvesting on the topside of Mt Arthur Road and asked to see the FPP. The contractor did not have it. FT was contacted, and FT officer Mr. T. Houghton was unable to locate the plan in the Bass District office. In the afternoon, Mr. Houghton approached the contractor also finding that he was operating without a FPP. Operations were then suspended in the area above Mt. Arthur Road until the plan was produced which took three days. When produced, the application for variation to the FPP, had not been signed by the contractor or the timber processor. The variation to the plan had no attached map and did not define or describe any features specific to the site, such as threatened fauna sites or potential habitat, or streams (appendix 3). Despite several approaches by MAEMG to FT for further documentation in regards to this variation to the FPP no additional paperwork was ever produced for MAEMG.

Mismatch with MAEMG audit:

- Serious doubts as to the validity of the variation to the Forest Practices Plan exist, due to
 - the application for variation being unsigned by the contractor
 - the delay before the application could be "found" by FT and produced for inspection
 - there being no attached map to the application although the variation involved nearly 50 ha of new land
 - there being no mention of further threatened species assessment
 - there being no identified streams

- If the contractor has not signed the application for variation to the FPP, and is not referring to it or relevant map on site, serious environmental harm may (and in this case did) result. MAEMG audit revealed that due to lack of classification, many small streams had been completely ignored, cleared of vegetation, violated by machinery, causing significant interference with water flow and quality. This had destroyed known sites of E. orramakunna, and NE Forest Snail and large areas of their habitat within the area known as the variation.

Questions asked by MAEMG

Was the intended area defined by the variation to the FPP for coupe LI 126C listed in FT's 3 year plan, and the relevant authorities/local governments appropriately notified as per Forest Practices Act 1985 (No. 48 of 1985) Part III Plans Division 2, 3 year Plans, section 27.6?

SUPERVISION OF OPERATIONS

Implementation of the FPC and FPP

a. FT Personnel responsible for adherence to the Forest Practices Code and Forest Practices Plan

Forestry Tasmania is the agency charged with overseeing all forestry operations in our State Forests. The FPB's report states *"not all contractors carry and refer to an up to date copy of the FPP and map. Often this arises because forest workers may rely upon day to day direction from a supervising forest officer employed by Forestry Tasmania or a forest company. Nevertheless, although not legally required, good practice dictates that a sound working knowledge of the relevant sections of the plan and map should be held by all persons associated with the operation."* (appendix 7) As the contractor was found operating without a plan while harvesting, it is concluded that he was "relying upon the day to day direction from a supervising forest officer employed by FT."

Mismatches with MAEMG Audit:

(i) If the contractor was relying on the day to day direction from a supervising forest officer, then why wasn't the contractor advised by officers of FT to withdraw from the area above the Mt Arthur Road, after harvesting operations had revealed significant springs and watercourses?

(ii) Lack of working knowledge of the Code exhibited by FT personnel

Questioning of Forestry Tasmania Personnel throughout MAEMG audit revealed a lack of knowledge of both FPC 2000 and January 1993

This was admitted to in separate interviews by

- Paul Rosevear (Planning Officer) interview with MAEMG 6/3/01.
- Kim Creak (State Operations Manager FT) in his submission to Launceston City Council 26/3/01 where he stated *"I'm no expert in the FPC; my Forest Practices Officers and Forest Planning Officers are far more expert than I am on that."*

(iii) Lack of Training of Contractors

All contractors should be familiar with the Forest Practices Code if they can reasonably be expected to comply with it during operations. According to Forestry Tasmania's schedule (printed in the Examiner Tuesday 6/3/01) although there were 13 scheduled training courses (of 2 days duration) for the year covering Forest Practices Code: Introduction, Harvesting, Roding and Site Preparation for new entrants, there were no training days offered for existing contractors, even though the new code became operational as of 1/1/01. After MAEMG raised this issue with FT, the contractors on the coupe were offered a training session in mid March - nearly three months after implementation of the new Code, and from when they had begun harvesting operations in the coupe area defined by the variation to the FPP.

MAEMG contends that neither the contractor, or FT personnel had "a sound working knowledge of the relevant sections of the plan and map".

COMMUNITY CONSULTATION

Community consultation has been variable throughout operations in the area. It is noted that Forestry Tasmania did provide group members with some information via correspondence and face to face interviews, in response to MAEMG requests. However, having expressed interest in the future of the area (in particular the area defined by the variation to the FPP) two members of MAEMG were (despite assurances to the contrary) not notified that harvesting had commenced.

The FPC Jan 1993 section F 3 states *"Interested parties, particularly owners of adjoining properties should be kept fully informed of any proposed aerial spraying operations"* (p 82)

Mismatches with MAEMG audit

In direct contravention to this, the closest neighbour Mrs. F Withopf was not fully informed regarding the commencement of aerial spraying of herbicides. Mrs. Withopf contacted Mr. B Farmer (FT Bass District Office) personally by telephone on the 18th April 2001, two days before spraying commenced (see appendix 16). She questioned whether aerial spraying was likely to commence on the coupe LI 126C. Mr. Farmer affirmed the likelihood of this happening. She asked when this would occur and was told that it could be in the next few days. She then specifically requested that she would be notified. Although Mr. Farmer agreed to this request, neither Mrs. Withopf, nor any other member of MAEMG was notified that helicopter spraying would commence on the 20th of April 2001 (see appendix 21). Mrs. Withopf, alerted by the presence of a helicopter, telephoned Mr. Farmer on the 20th April and was advised that Forestry Tasmania had made a conscious decision to aerial spray without consulting her because *"after talking to the operations supervisor about the spraying of the coupe we decided that ... you should not be informed"* (appendix 21). Mrs. Withopf was also advised that the chemical used in the spraying was *"safer than drinking seawater"*, and *"safe to shower with"*, by a senior Forestry supervisor (appendix 21).

SECTION FIVE

RELATED ISSUES / FURTHER INVESTIGATIONS

MT ARTHUR AND EAGLEHAWK TIER RESERVES:

DISCREPANCY BETWEEN BOUNDARIES AS MAPPED IN THE TASMANIAN REGIONAL FOREST AGREEMENT, AND AS SUBSEQUENTLY GAZETTED.

Serious doubts have arisen as to the legality of the reserves as gazetted post signing of the RFA. A separate report has been commissioned by MAEMG into the boundaries of the two reserves on Mt Arthur, which form part of the informal reserve system listed in the Tasmanian RFA.

IMPACTS ASSOCIATED WITH APPLICATION OF HERBICIDES AND/OR OTHER CHEMICALS IN THE UPPER CATCHMENTS.

MAEMG has expressed concerns about the spraying of herbicides and laying of poison in the upper water catchment, and the mismatch of evidence between FT's claims and MAEMG's independent risk assessment. Consequently, a further audit of the effects of chemical application within the catchment has been commissioned by MAEMG, the results of which will be released within 60 days of this audit report.

BUREAUCRATIC DISREGARD OF BROAD-BASED COMMUNITY CONCERNS.

Throughout the investigation by MAEMG into upper catchment issues on Mt Arthur, there have been numerous instances of bureaucratic disregard of community concerns, ranging from

- Non-response to letters
- Non compliance with the FPC Jan 1993 regarding community consultation
- Non-resposne to community requests for information
- Inaction in response to specific community requests regarding health and safety issues.

MAEMG is currently compiling a report into these issues, the results of which will be released within 60 days of this audit report.

SECTION SIX

FINDINGS AND CONCLUSIONS

IN CONCLUSION: After exhaustive investigation, based on the findings listed throughout this audit, the MAEMG makes the following conclusions:

1. There were numerous, serious mismatches between statements expressed by FT and the FPB and events as observed and photographed by MAEMG during forestry operations in the Mt Arthur upper water catchment, including Coupe LI 126C. These include:

A. Inadequate risk assessment, poor planning and inadequate site supervision by Forestry Tasmania.

B. The breaching of the Forest Practices Code (January 1993 ed.) (and similar breaches of the FPC 2000) during harvesting operations and site preparation including sections

- B Roading (section 3 p26-28 of this audit)
- C Harvesting (section 3 p21-26 of this audit)
- D Conservation of other values (sections 2 and 3 of this audit)
- E Establishing Forests (section 3 p21-24 of this audit)
- F Maintenance of Forests (section 4 p33 of this audit)

C. The breaching of the Forest Practices Plan No. MJS 0106 (appendix 3) during harvesting operations and site preparation including sections

- C 1.1 (landings)
- C 2.3 (snig tracks)
- C 3.3 (falling into streamside reserves)
- C 5.5 (fuel and water courses)
- D 2 (fauna)
- E 1.4, 1.10 (site preparation)
- E 2.1 (burning windrows)

D. The findings and conclusions of the FPB in relation to their investigation into Forest Practices on Mt Arthur Coupe LI 126C (appendix 7) do not match the overwhelming evidence presented in this audit.

2. Forestry Operations within the upper catchment of Mt Arthur have caused Significant Environmental Harm, to soil, water, fauna, and scenic values.

3. The best management practices together with full compliance with the FPC may not be enough to adequately protect identified aspects from the impacts of forestry operations in areas of great sensitivity (such as the Mt. Arthur upper catchment). The hypothesis that emerges from this audit is that some areas currently outside designated reserves should be avoided altogether when planning forestry operations.

MT ARTHUR: WHERE TO FROM HERE?

The Mount Arthur Environment Management Group inc. was formed in February 2001, comprising people with an affiliation with Mt Arthur and/or an interest in eco-forestry. It was formed with the joint aims of protecting and rehabilitating the Mt Arthur upper catchment environment, and of researching and promoting ecologically sustainable harvesting and management of Tasmania's extensive Native Forest resource. Mount Arthur is the centre of a district with a rich forestry history and several MAEMG members have an employment history within the forest industries in Tasmania. MAEMG is committed to ecologically sustainable forest management both on a statewide level *as well as at the specific site level*. MAEMG has gathered much scientific data that contradicts the Tasmanian Forest Industries' claims regarding the ongoing yield benefits of short cycle harvesting of single species eucalypt plantations, and the effects of clearfelling/plantation establishment on water yield and quality. MAEMG is therefore alarmed at the widespread practice of replacing Tasmania's native forest resource with monoculture plantations on the vast scale that is currently occurring in the north-east, and is concerned for the long term effects on other industries and rural communities. MAEMG recommends further reading on alternative forest management practices provided as the final appendix to this audit (appendix 23).

MAEMG seeks to collaborate with FT regarding the regenerating of coupe LI 126C into native forest. It is anticipated that this area will in time revert to rainforest and MAEMG's ongoing role will be to assist this process by spot planting with species indigenous to the site, and weed management. MAEMG continues to call for a cease to all further FT forestry operations planned within the coupe and surrounding upper catchment area. An extensive area in the centre of the coupe remains harvested but not clearfelled, an area that is rich with cultural heritage values as well as being the source of four significant streams, and primarily rainforest. MAEMG therefore insists that no further currently planned harvesting occur, and that the area be rehabilitated as above.

MAEMG seeks to have a full scientific assessment of Engaeus orramakunna in the wake of forestry operations, with a view to possible listing on the national register.

MAEMG seeks ongoing development of the site as

- an example of how community controlled eco-forestry can and does work
- a place of beauty, recreation and hope for the community
- a place for education in local history, flora and fauna.

MAEMG calls on the Tasmanian Government to honour it's commitment to the Tasmanian people, and give back the reserved areas on Mt Arthur as intended in the RFA.

The tragedy of Mt Arthur is that the legitimate voice of the community (as proved by this audit) has been treated with contempt and utter disrespect. If the community is entitled to expect of the FPB and FT (and Minister Lennon the Minister responsible) the same

standard of care expected of an executor and trustee of a public or private estate then the standards demonstrated, as evidenced by this audit, in the management of Mt Arthur were grossly inept, and worse still, were secretive and misleading. Hopefully, if nothing else, this audit will give rise to a public accountability enquiry into the objectivity and practices of the FPB and FT.

LIST OF APPENDICES

1. FT Mapsheet Lisle 5243, Map no 8, 1999,2000 3 Year Plan
2. Letter from FT signed by Peter Bird 15/3/01
3. Forest Practices Plan No. MJS0106, Coupe LI 126C
4. Assoc. Prof. Finlayson Hydrology Report: Effects of clearing native forest and replacing with plantation on Mt Arthur. 1/6/01
5. Assoc. Prof. Finlayson Watercourse classification email 1/6/01
6. FT aerial photo of coupe area (1956) (attached to letter from Peter Bird, 15/3/01)
7. Forest Practices Board Report 18/5/01
8. FT Map of LI 126C (attached to letter from Peter Bird, 9/3/01)
9. Letter from Bridestowe Estates Pty. Ltd. Lavender Farm (30/5/01)
10. Owen Ingles Pty Ltd. Soil Consultant Report (24/5/01)
11. Lisle 5243 threatened fauna mapsheet, extract from *Threatened Fauna Manual, for production forests in Tasmania* FPB 1998, p87
12. Jim Nelson, Project Officer E. orramakunna, letter to Brian Farmer FT (15/5/01)
13. Jim Nelson, Project Officer E. orramakunna, letter to Raymond Brereton (Threatened Species Unit, DPIWE) 22/5/01
14. Extract from Tasmania's Threatened Fauna Handbook (DPIWE), p 313 - 317
15. Coupe LI 126C FPP no MJS0106 Mapsheet Lisle 5243 showing known threatened species habitat sites within coupe LI 126C (as listed in Threatened Fauna Manual for production forests FPB 1998, p87-88) as well as proposed landings positions
16. Chronology of Events Prior to spraying in Coupe LI 126C, (MAEMG)
17. MAEMG letter to FPB record of 15/3/01 meeting (16/3/01)
18. MAEMG letter to FPB Chris Mitchell 18/3/01
19. FT letter from Brian Farmer (27/3/01)
20. Statement from Frank and Karin Strie observations of Coupe LI 126C (11/2/01)
21. Record of Conversation between F Withopf and FT 18/4/01 and 20/4/01.
22. Launceston City Council: Steve Ratcliffe, Water and Catchment Manager, Memorandum to Mayor, 20/3/01
23. Toward a Code of Practice for Eco-Forestry Paper by F.Strie (2000)

P. LIST OF PHOTOGRAPHS

1. (19/3) Unidentified, unprotected stream in "variation" to FPP, violated by machinery
2. (19/3) As above
3. (6/3) Unidentified harvested stream, "variation"
4. (6/3) Unidentified stream in "variation", running water at end of prolonged extremely dry summer 2000 -01
5. (6/3) Myrtle tree stumps in "variation" indicating springs and underground streams
6. (15/4) Extensive harvesting of classified class 4 stream, Coupes 126C, 127C and 126A, Should have been upgraded to class 3.
7. (27/2) View from Lone Star Ridge turn-off. Landings over recognised E. orramakunna site, re-fuelling station within metres of streamside reserve.
8. (mid April) View from Mt Arthur Summit, shows visual impact of operations

9. (End of March 01) Vertical windrows, deep ripping of steep gully, coupe LI 126A
10. (27/5/01) Erosion channels in vertical deep ripping (as above)
11. (13/4) Burning of streamside reserves Coupe LI 124B
12. (29/3) Landings constructed over known E. orramakunna site.
13. Burning landing constructed near unmarked stream, Mt Arthur Road, "variation" LI 126C.
14. (March 01) Fuel spill Mt Arthur Road, LI 126C
15. Fuel spill detail (above) LI 126C
16. (6/3/01) Refuelling station next to streamside reserve, Mt Arthur Road.
17. (15/4) Eagle above Lone Star Ridge turn-off
18. (25/3) Unmarked Snig track crossing unidentified stream, top side of Mt Arthur Road, "variation"
19. (May 01) Drainage depression used as snig track, bottom side of Mt Arthur Road, "variation"
20. (May 01) 2nd Drainage depression used as above
21. (27/5/01) felled tree pushed into streamside reserve Coupe LI 126C
22. (27/5/01) Slash / windrow pushed into streamside reserve Coupe LI 126C
23. (May 01) wheel ruts (50m total length) from snigging logs within a water course top side of road, LI 126C (detail of 23a)
- 23a (March 01) Landing within 40m of a watercourse (seen in detail in 23)
24. (13/4/01) Burning of windrows after planting. Observe withered seedling foreground Coupe LI 126C
25. (March 01) Drainage depression / underground stream cultivated before March 01
26. (March 01) Tree felled over running stream (classified class 4, should have been upgraded to class 3)
27. (25/3/01) Mt Arthur Road, no table drains
28. (25/3/01) Excavator, note leaking hydraulic fluid, and rag used to absorb spillage.

LIST OF TAPES/VIDEOS

1. Tape of Kim Creak (FT) submission to LCC, 28/3/01
2. Video 1 of Mt Arthur Coupe LI 126C

BIBLIOGRAPHY

1. Bryant S and Jackson J. *Tasmania's threatened Fauna Handbook What, Where and How to Protect Tasmania's Threatened Animals* Threatened Species Unit, Parks and Wildlife Service Tasmania, 1999
2. Jackson J and Munks S., *Threatened Fauna Manual for production forests in Tasmania* Forest Practices Board, 1998
3. Coroneos C., *An Archeological Survey of the Lisle Denison Goldfields* Forestry Commission Tasmania, July 1993
4. Community Based Risk Assessment Group of Tasmania, *Upper Catchment Issues Tasmania* Vol. 1, No. 1
5. *Forest Practices Code January, 1993*, Forestry Commission, Hobart Tasmania 1993
6. *Forest Practices Code, 2000*, Forest Practices Board, Hobart, Tasmania