

Report on a Land Use Determination for the Painkalac Creek Water Supply Catchment

Prepared for consideration by the
Soil Conservation Authority and
the Land Conservation Council

by

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I INTRODUCTION

(i) Proclamation

The Catchment of the Painkalac Creek, upstream of the new dam constructed by the Aireys Inlet Waterworks Trust, was proclaimed under the provisions of the *Soil Conservation and Land Utilisation Act 1958* and the *Land Conservation Council Act* on the 16th May, 1979. The Proclamation was published in the Victoria Government Gazette No. 47 dated the 13th June, 1979.

This report now proposes a land use determination for the Painkalac Creek Catchment and recommends the form which the various categories of the determination should take. It is presented after detailed field work and discussions with individual landholders, representatives of the Forests Commission, Shire of Barrabool, Shire of Winchelsea and the Aireys Inlet Waterworks Trust.

(ii) Water Supply Problems

The Aireys Inlet Waterworks Trust was established in 1975 to supply reticulated water to the townships of Aireys Inlet and Fairhaven. The Trust has recently completed the construction of a 409 megalitre capacity dam on the Painkalac Creek 5 kilometres north-west of Aireys Inlet. The bank has a volume 46,000 cubic metres and is constructed of clay fill with rock beaching. Maximum water depth will be 7.1 metres and the area inundated at full supply level is 12.5 hectares. This area and the area within 20 metres of full supply level has been cleared.

The water supply system comprising the above dam, main pipeline, service reservoir, a pumping station, distributory pipe and reticulation system should be operational by mid 1981.

The storage and reticulation system has been designed to meet the unrestricted demands of some 700 houses (400 existing houses). The anticipated annual consumption of 177 megalitres is 43 percent of the storage capacity.

(iii) Streamflow

The average annual stream flow (9 years records) is eleven times the capacity of the dam, while total summer flow is approximately 86% of the storage capacity.

Stream flow must be maintained by water release during the months of November to February to provide for downstream users and to maintain in ecological balance the "wetland" area at Airey's Inlet.

As the proposed service basin has a small capacity of 2.25 ML (2 days supply with average consumption), sediment arising from works within the catchment, particularly after summer storms, could result in some water quality problems.

(iv) Water Quality

Basic water quality tests have been carried out at the dam site at monthly intervals by the SR&WSC. Total dissolved salts are well within W.H.O standards as are the pH and dissolved oxygen figures.

Turbidity figures measured prior to the commencement of the dam construction were low and satisfactory. Higher figures recorded during construction should decline as works are completed and as detention time within the storage is achieved.

Tests for *Escherichia coli* have not yet been made at the dam site but will commence when the town supply is connected. Counts taken at monthly intervals downstream of the dam, in the vicinity of Aireys Inlet, have been very high, ranging from 0 – 560 organisms per 100 ml. The source of these is probably from animals on grazing land downstream of the dam.

The Trust, in designing the system, has provided for the installation of a chlorinated plant should high counts be measured at the dam. This is considered unlikely at this stage, as is any other form of treatment.

II CATCHMENT DESCRIPTION

(i) General

The storage dam is situated on the Painkalac Creek, 5 kilometres north-west of Aireys Inlet. The catchment to the dam extends in a westerly direction for approximately 11 kilometres. It averages 3 kilometres in width and has a total area of 3420 hectares.

The catchment is bordered by several dry-weather-only roads; to the north, from Lookout Hill to Peters Hill, by the Bambra Road; to the west by the Seaview and Boonah roads; and to the south by the Gentle Annie track.

Catchment elevation varies from 430 metres above sea level at the corner of Seaview Road and Gentle Annie track, to 23 metres above sea level at the dam site.

(ii) Climate

The catchment is at the north-eastern edge of a high rainfall region influenced by the Otway Ranges. Forty year rainfall records are available from two meteorological stations close to the catchment.

Benwerrin, on the main ridge, has an average annual rainfall of 1122 mm, with twin peaks in June and August. The mean rainfall for the months May – September averages 2.4 times the mean precipitation for the summer months, which illustrates the marked seasonal nature of the rainfall.

Eastern View, situated on the coast to the south of the catchment, has a more evenly distributed rainfall with an average annual total of 729 mm.

Eastern View on average has 154 wet days each year while the figure at Benwerrin is 128 days.

Heavy summer storms are common. The highest one-day rainfall at Eastern View of 170 mm, was recorded in February 1954.

Light snow falls are recorded at the western end of the catchment, one every second year on average.

Monthly figures for mean daily temperatures are estimated to be from 7°C in July to 18°C in January, with cooler conditions towards the west of the catchment and milder temperatures near the coast. Because of temperatures below 10°C plant growth at the western end of the

catchment is usually restricted during June, July and August. To the east, growth may be restricted during January and February due to the lack of “effective” rainfall.

There are few frost records, but the upper parts of the catchment receive 10 – 15 light frosts each year. The lower reaches of the catchment would have fewer frosts, being closer to the sea.

(iii) Geology – Physiography

The Painkalac Creek catchment is at the north-eastern end of the Otway Ranges, which are derived from Lower Cretaceous felspathic sandstone and mudstone parent material. At least two stages of weathering have occurred, resulting in the present landforms in the western half of the catchment.

There is a small area of rolling hills, possibly the remnant of an old plateau surface, where Gentle Annie track leaves Seaview Road. Uplift of this surface and renewed dissection probably resulted in other landforms on the lower cretaceous sediments, namely the deeply-dissected hills forming the headwaters on the catchment.

Tertiary era sedimentation occurred in several phases in the Otways. Two phases are represented in the eastern half of the Painkalac Creek catchment. Both have unconsolidated sediments as parent material, which after weathering have resulted in deeply dissected hills.

One group comprises gravel, sands, and silts and the other, more common in this catchment, consists of finer sediments, sands, silts and clays.

(iv) Soils and Vegetation

On the lower Cretaceous rock two main soils have developed. On gentler slopes along the catchment boundary, and steep southern and eastern slopes, there is usually a brown gradational soil. This has a loam or clay loam surface texture grading to a clay in the subsoil. This soil is well structured, comparatively fertile, from 1 – 2 m deep, and carries a tall open forest of mountain grey gum (*Eucalyptus cypellocarpa*), messmate (*E obliqua*), southern blue gum (*E globulus*) with some swamp gum (*E ovata*).

On the drier, more exposed north and west-facing steep slopes, a brown duplex soil is the most common type. Profiles have approximately 40 cm of loam over silty clay. The soil profile is up to a meter deep, and carries an open forest of messmate, narrow leaf peppermint (*E. radiata*), mountain grey gum, southern blue gum and small areas of almost pure red ironbark (*E. sideroxylon*).

The Tertiary deposits have formed a wide variety of soils, depending on the coarseness of the sediments and the prevailing weathering and leaching conditions.

Red-yellow duplex soils are commonly found on the finer Tertiary deposits. This soil has a fine sandy loam topsoil over clay, and averages two metres in depth. Another soil type, found on the fine and parts of the coarser sediments, is the weakly structured yellow gradational soil. This has a sandy loam surface horizon, the profile also being about two metres deep. Elsewhere on coarse sediments a range of deep uniform-textured sand soils are found. An impermeable hardpan is sometimes present, but fertility is always low.

Tree species on the soils on Tertiary sediments vary with landforms and nutrient availability. The red-yellow duplex soils supports either an open forest of messmate and mountain grey gum on south and east slopes, or a woodland of narrow leaf peppermint, messmate, brown

stringybark (*E.baxter*) and some red ironbark, on drier slopes. On lower slopes where yellow gradational soils occur, there is usually an open forest of mountain grey gum, messmate, brown stringybark, or red ironbark, (on the finer Tertiary sediments), and a poorer open forest of low messmate and shining peppermint (*E.nitida*) (on soils on the coarser sediments).

The uniform sand soils support either a scrub of prickly and woolly tea tree (*Leptospermum juniperinum* and *L. lanigerum* respectively) together with prickly moses (*Acacia verticillata*) or on the hardpan areas, a heath of austral grass tree (*Xanthorrhoea australis*), dwarf she-oak (*Casuarina pusilla*) and silky tea tree (*L. myrsinides*). Sparse stands of shining peppermint are common on the margins of sand soil areas.

(v) **Land Classification**

A land system study of the Otway Range and adjacent plains was carried out by Mr A Pitt of the Soil Conservation Authority. This study included the Painkalac Creek Catchment where four distinct land systems were identified and documented (Appendix I). Much of the information presented in this report has been obtained from that study.

(vi) **Land Tenure**

Land in the catchment is divided into the following categories:

	Area (ha)	Percentage of Total Area
State Forest	3272	95.7
Freehold	140	4.1
Aireys Inlet Waterworks Trust	8	0.2
Total	3420	100

III LAND USE AND HAZARDS TO WATER SUPPLY

Even under natural conditions the steep Lower Cretaceous based soils are prone to landslips. This hazard is accentuated when timber is removed prior to the establishment of shallow rooted pasture species.

(i) **Forestry**

Approximately 96% of the catchment is forested land under the control of the Forest Commission of Victoria.

The LCC Corangamite Final Recommendations include 37% of this area within the Angahook – Lorne State Park (Recommendation A4).

The balance of the area within the Boonah Forest has been recommended for Hardwood Production (Recommendation E1).

Selective logging, poles and minor produce will be obtained on a continuing basis from within area E1. On the basis of current markets and wood availability there seems little immediate likelihood of fully integrated sawlog/pulpwood clear fillings.

Subject to other priorities and the availability of finance, regeneration of understocked areas will be carried out. Fuel reduction burning will be carried out to protect the State Park, visitors and the coastal settlement.

Within the proposed Angahook – Lorne State Park, harvesting will be limited to light selection of “sanitation” fellings where necessary to maintain the health and vigour of the red ironbark forest in particular.

Operations will be carried out in accordance with the Commissions’ Standing Instruction M-102 “Control of Forest Operations in Relation to Soil Erosion and the Protection of Water Quality and Stream Environment” until such time as the Commission and the Authority prepare specific management prescription for the catchment.

Generally the determination and the prescriptions are likely to have only a minor effect on the extent of the forest land being utilised or proposed for utilisation in the catchment. The total amount of timber is not likely to be reduced significantly, but the conditions management apply may require modification.

(ii) Recreation

The demand for forest recreation in the Otway Range is generally rising due to population growth and improved access. This catchment with its attractive scenery and ironbark forests will come under increasing pressure, particularly as the parks proposed by the LCC are developed.

Scout groups have been regularly using an area on Painkalac Creek, from the Duck Ponds Track, for camps. The forest attracts walkers, picnickers pleasure drivers, and the tracks have been used by motorised recreation vehicles.

The LCC recommendation A4 (d) states that:-

“the purity and quality of domestic water supplied by the Erksline and St. George River Catchments be a major constraint on the development of facilities for public access and recreational activities.”

This recommendation would also be appropriate to the Painkalac Creek Catchment.

Because of the vulnerable nature of the soils, use of recreation vehicles within the catchment should be controlled, and proposed development for recreation should be thoroughly examined at the planning stages before approval.

(iii) Agriculture

Of the 140 hectares of freehold land at the headwaters of the catchment approximately 50% has been cleared. The land is divided between 5 owners with property sizes ranging from 19 to 52 hectares.

It is unlikely that any of these properties will be intensively developed for agriculture. Recreation and light grazing would appear to be favoured uses.

(iv) Roading

The roads forming the boundary of the catchment are in reasonable condition and their use is self-limiting: grades along Gentle Annie track are too steep for two wheel drive vehicles, and the Bambra Road is clearly signposted “Dry weather road only.” Sections of these roads have recently been upgraded by the Forests Commission.

Of greater hazard to the water supply are the internal tracks which cross drainage lines and traverse very steep country. Motorised recreation vehicles have caused vegetation damage and soil erosion of some of these tracks.

To effect restoration works and prevent further damage the Forests Commission, in accordance with its powers under Section 21 (1) (ea) of the *Forests Act* 1958, has implemented the following temporary road closures.

Ironbark Spur Track:	to December 1981
Ironbark Spur Track eastern link:	to December 1981
Renwick Track:	to December 1981
Duck Pond Track:	during the winter period

The gates and signs erected on these tracks have effectively stopped four wheel drive access, however continued use by trail bikes is of concern.

Further inspection and discussion with the Commission will be necessary to determine the future of these tracks in relation to closure, upgrading, maintenance and restoration works.

(v) ***Extractive Industries***

An existing stone quarry adjacent to the Bambra – Aireys Inlet Road, is operated under licence to produce small quantities of ornamental stone. It is expected to continue to operate at its present level of production (LCC Melbourne Study Area final recommendation A2 (d)).

(vi) ***Planning Controls***

Most of the catchment is in the Shire of Winchelsea, and the freehold blocks along Seaview and Bonnah Roads are covered by the Shire's Interim Development Order. This order requires Council approval for subdivision of land and sets a minimum subdivision size of 40 hectares.

The dam site is in the Shire of Barrabool. The Waterworks Trust has purchased the small area of freehold land within the catchment in this Shire.

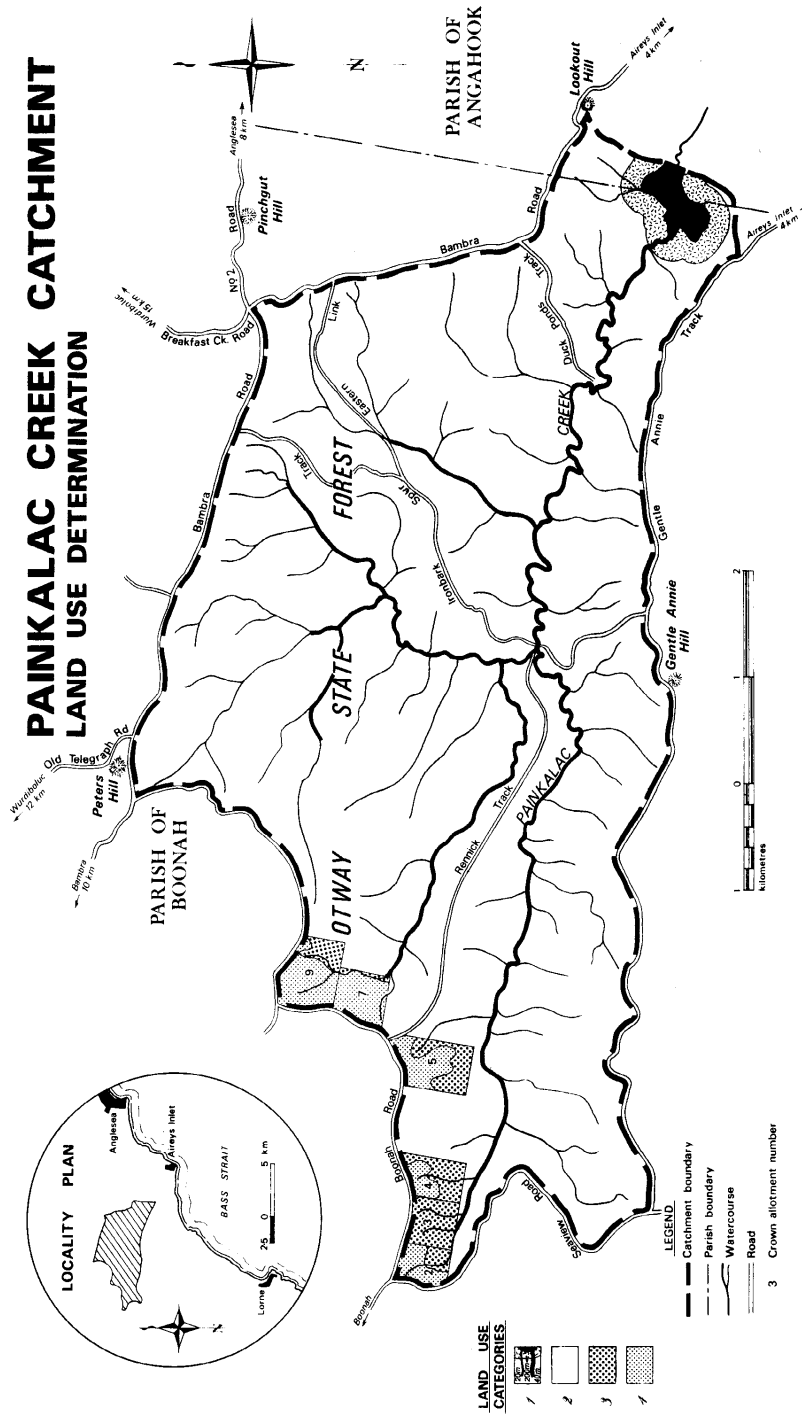
(vii) ***LCC Recommendations***

LCC Recommendations divide the catchment into two areas, Boonah Forest and Angahook – Lorne State Park (Refer Appendix II).

Hardwood production is one of the designated land uses in Boonah Forest. Other forms of land use include water production, recreation and gravel extraction. Angahook – Lorne State Park will provide opportunities for conservation and recreation with due consideration being given to protection to the water supply.

The LCC final recommendations for this area have been accepted by the Government and are in the process of being implemented.

Figure 2 - Painkalac Creek Catchment - Land Use Determination



V. LAND USE AND DETERMINATION CATEGORIES

The provision of individual land use categories are set out below and should be read in conjunction with the Determination plan.





Category Number	Land Category	Provision of Category
1	Land to be used for the protection of streams, watercourses and the reservoir – within 200 metres of full supply level of the reservoir. within 40 metres of the banks of stream shown by heavy line on Plan No. S-789 within 20 metres of the banks or other streams shown on Plan No. S-789	Disturbance of soils and vegetation should be avoided on land in this category. Consultation with the SCA is required before the commencement of: clearing or cultivation operations; earthworks associated with construction of buildings, dams, stream crossings or roads; or other earthworks
2	Land to be retained as forest	Forest operations are to be carried out in accordance with management prescriptions made or approved by the SCA. Consultation with SCA is required before the commencement of roadworks or the development of areas for recreation.
3	Land best suited to forest, but parts of which may be used for grazing or cropping	Consultation with SCA is required before the commencement of logging, clearing or cultivation operations. Where necessary the Authority may specify by conditions areas which may be developed, or areas which are to remain forested.
4	Land suitable for grazing, parts of which may be suitable for cropping	Where necessary the Authority may specify conditions relating to cultivation or soil conservation measures.

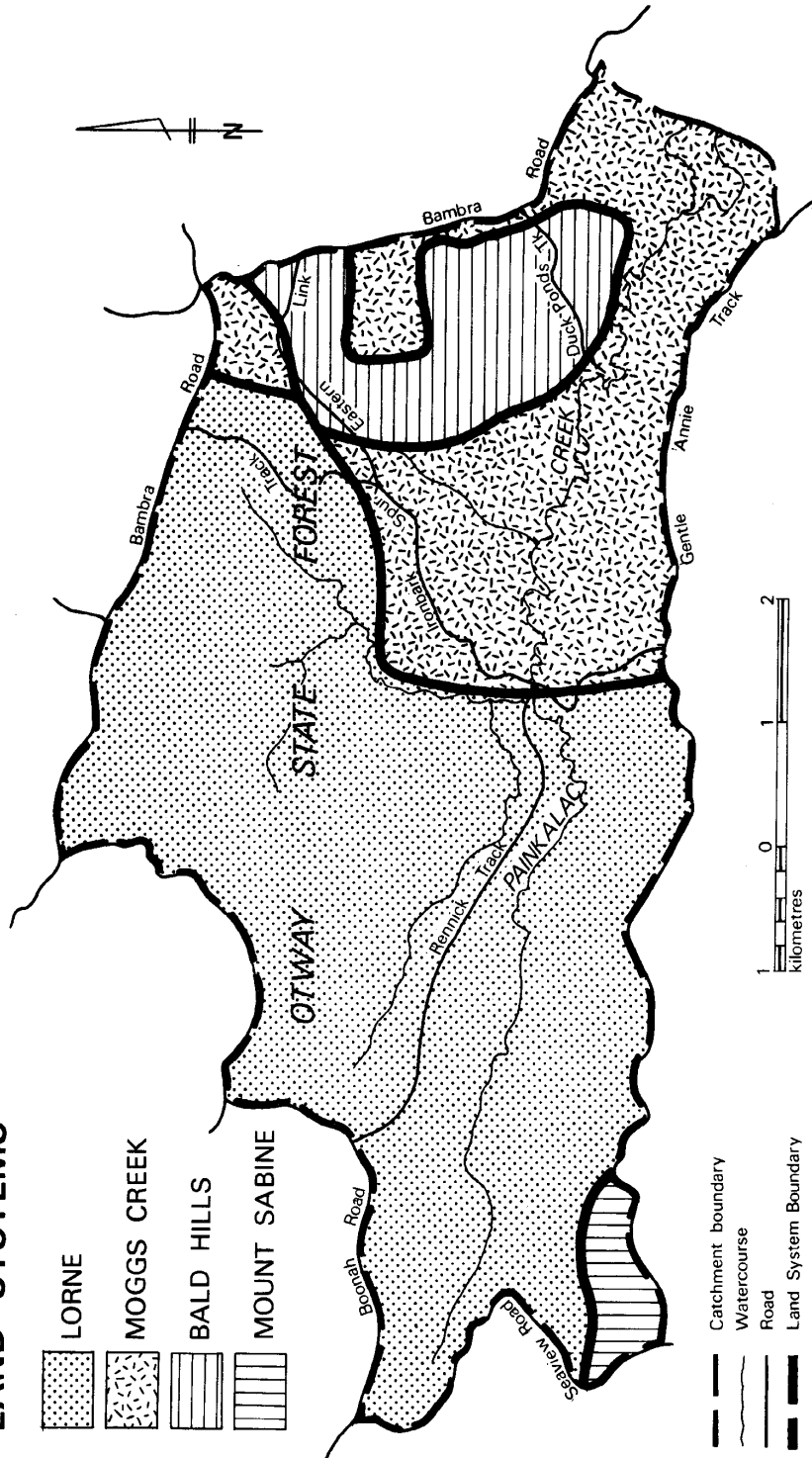
General Provisions Applying to All Categories:


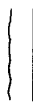


Proposals for new roadworks, gravel removal, extractive industries, mining operations and recreational developments, any of which may result in disturbance of soils or vegetation, require prior assessment by the Soil Conservation Authority.

Where necessary, conditions will be specified to ensure that any such disturbance does not cause erosion or otherwise present a risk to water supply interests.

**PAINKALAC CREEK CATCHMENT
LAND SYSTEMS**

-  LORNE
-  MOGGS CREEK
-  BALD HILLS
-  MOUNT SABINE



-  Catchment boundary
-  Watercourse
-  Road
-  Land System Boundary

APPENDIX I (II) - LAND SYSTEMS DESCRIPTION

Land System	% of Total Area	Structure	Relief	Parent Material	Soils	Characteristic Vegetation	Land Deterioration if Cleared
LORNE	62%	S. & E. Slopes Tall Open Forest	Deeply dissected hills	Lower cretaceous felspathic sandstone and mudstone	Brown gradational soils	<i>E. cypellocarpa</i> <i>E. obliqua</i> <i>E. ovata</i> <i>E. globulus</i>	Severe sheet erosion and mass movement
		----- N. & W. Slopes Open Forest			Brown duplex soils	as above plus <i>E. radiata</i> <i>E. sideroxylon</i>	Minor nutrient deficiencies
Moggs Creek	26%	S. & E. Slopes Open Forest	Deeply dissected hills	Palaeocene sediments – unconsolidated clays, silts and sands and some silica-cemented quartzitic sandstones and siltstones	Red yellow duplex soils	<i>E. obliqua</i> <i>E. cypellocarpa</i>	Moderate sheet and rill erosion Slight mass movement
		----- N. & W Slopes Low Woodland			----- Stony yellow gradational soils	----- <i>E. nitida</i> <i>E. obliqua</i> <i>Casuarina littorails</i>	----- Severe sheet and rill erosion Moderate mass movement
Bald Hills	10%	Heathland to Low Open Woodland	Deeply dissected hills	Palaeocene sediments – unconsolidated clays, silts and sands	Grey sand soils, with some hardpan areas	<i>Xanthorrhoea australis</i> <i>Casuarina pusilla</i> <i>Platylobium obtusangulum</i> <i>Leptospermum myrsinoides</i> <i>E. nitida</i>	High sheet, rill and gully erosion Severe leaching and nutrient deficiency
		----- Lower Slopes Open Forest			----- Yellow gradational soils, weak structure	----- <i>E. obliqua</i> <i>E. nitida</i>	
Mount Sabine	2%	Tall Open Forest	Rolling Hills	Lower Cretaceous felspathic sandstones and mudstones	Brown gradational soils	<i>E. obliqua</i> <i>E. cypellocarpa</i> <i>E. regnans</i> <i>Acacia melanoxyton</i>	Moderate sheet erosion when soil is disturbed

Source – “A STUDY OF THE LAND IN THE OTWAY RANGE AND ADJACENT PLAIN”
A. Pitt SCA (in press)

APPENDIX II

(i) LCC Final Recommendations

Final recommendations for the Corangamite and Melbourne study areas affecting the catchment are shown in figure 2 and described below.

(E1 Corangamite) Boonah Forest

- (a) primarily to produce hardwood timber in a manner having due regard for landscape values as seen from the main roads outside the forest

that

- (b) major secondary uses to:
 - (i) provide opportunities for open-scape recreation and education
 - (ii) conserve native plants and animals, and provide opportunities for the development of wildlife conservation techniques
 - (iii) produce honey, forage, gravel, sand and other forest produce as defined in the *Forests Act 1958*
- (c) water production values to be recognised and protected
- (d) particular value as listed below be protected by means of reserves under Section 50 of the *Forest Act 1958*, or by management prescriptions prepared (in the case of fauna) in consultation with the Fisheries and Wildlife Division and that the areas remain or become reserved forest under the provisions of the *Forests Act 1958* and be managed by the forests Commission.

(A4 Corangamite, A2 Melbourne) Angahook – Lorne State Park

That the area shown on the map be used to:

- (a) provide opportunities for recreation and education associated with the enjoyment and understanding of natural environments
- (b) conserve and protect natural ecosystems.
- (c) supply water and protect catchments

that

- (d) the purity and quality of the domestic water supplied by the Erskine and St George River Catchments be a major constraint on the development of facilities for public access and recreation activities (Section D of Final Recommendations: Water Production – reserves around storage's)
- (e) the strategic location of the park with respect to fire protection around the various nearby seaside resorts be recognised in management and that it be permanently reserved under Section 14 of the *Land Act (1958)* and managed by the Forest Commission.

