

**A REPORT ON THE
PENNYROYAL MATTHEWS & GOSLING CREEKS
CATCHMENT**

**A PROPOSAL FOR PROCLAMATION
PREPARED FOR CONSIDERATION BY THE
LAND CONSERVATION COUNCIL**

By

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**SOIL CONSERVATION AUTHORITY
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A REPORT ON THE PENNYROYAL, MATTHEWS AND GOSLING CREEKS WATER SUPPLY CATCHMENTS

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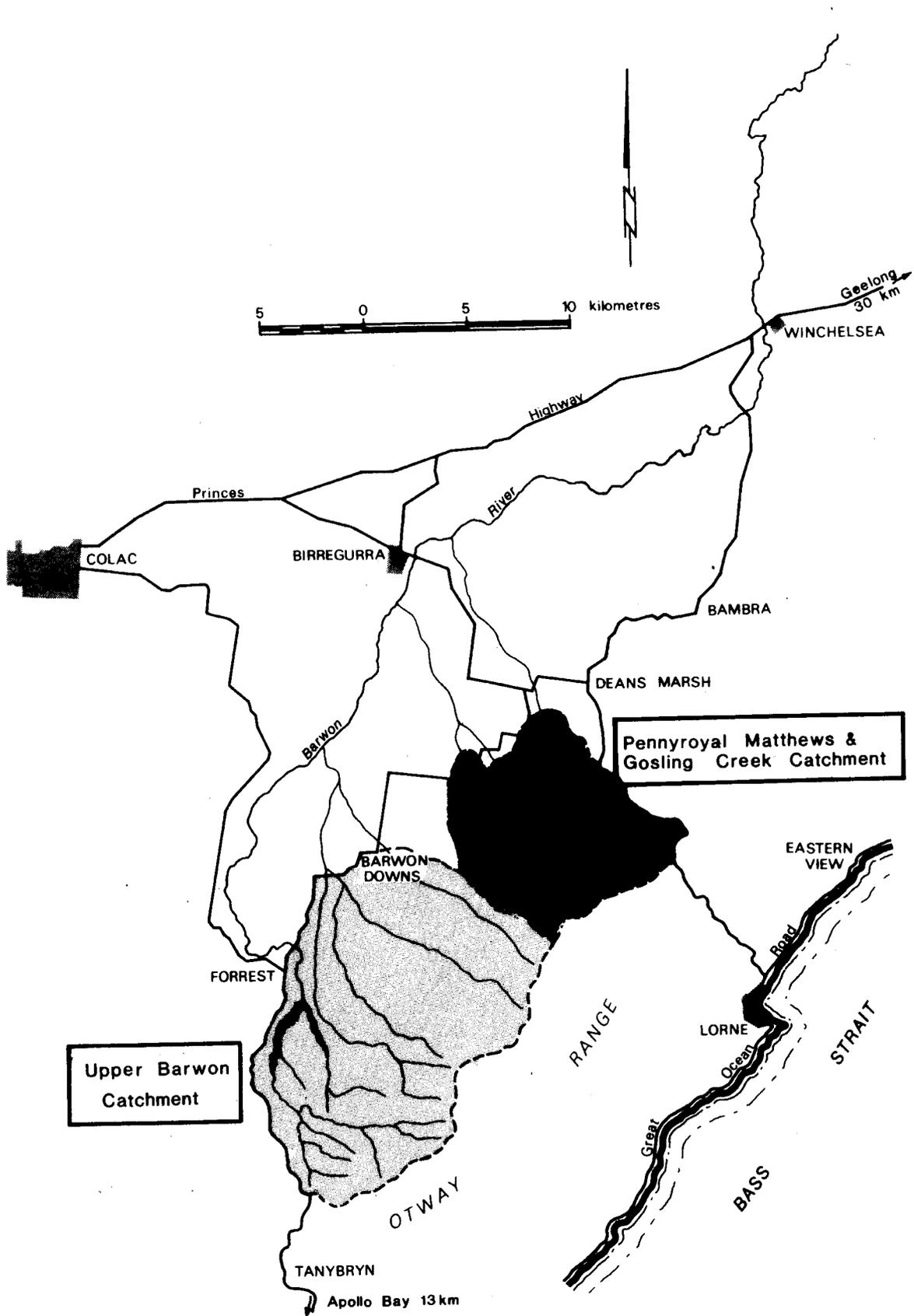
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INTRODUCTION

During the 1968 drought, the Geelong Waterworks and Sewerage Trust (GWST) reopened the Pennyroyal, Matthews and Gosling Creek Diversions, which had originally formed part of the Barwon River-Wurdee Boluc inlet channel system. The diversions had subsequently been taken out of use and their catchment was not included in the proclamation or 1963 Land Use Determination for the Upper Barwon catchment.

The initial restoration was seen as a temporary measure in order to compensate for the drought, and so the works were designed for only a three-year period.

However, success of the diversions led to the decision for a more permanent operation. In April 1971, the Soil Conservation Authority was requested by the GWST to Proclaim the Pennyroyal, Matthews and Gosling Creeks Catchment, and to prepare a Land Use Determination¹. A renewed request by the GWST was made in November, 1977².

This Proclamation report, prepared for consideration by the Land Conservation Council, is the first stage of investigation into the study area and should be succeeded by a Land Use Determination Study.'

Following Council's policy with regard to multiple use catchments³, it is recommended that the Pennyroyal, Matthews and Gosling Creeks Water Supply Catchment, as shown on Plan No. S-855, be Proclaimed under section 5(1)(b) of the *Land Conservation Act* 1970 and section 22(1) of the *Soil Conservation and Land Utilization Act* 1958.

WATER RESOURCES

1 *Water Supply*⁴

The GWST collects water for its supply system from both the Barwon and Moorabool Rives. The Moorabool system has been described in the Proclamation reports for the Moorabool River (Sheoaks) and Stony Creek Reservoirs water supply catchments (1978).

At present there are two major storages in the Barwon system - West Barwon Dam (21,000 ML) and Wurdee Boluc Reservoir (19,000 ML) (Figure 2).

Water released from the West Barwon Dam, and water obtained from diversion works on the East Barwon River, Callaghans Creek and Dewings Creek follows the Wurdee Boluc Inlet Channel to Wurdeel Buloc Reservoir. The catchment to these works has been Proclaimed, and a Land Determination Use made.

The creeks under consideration - Pennyroyal, Matthews and Gosling - also feed into the Inlet Channel. Their channel easements and diversion sites were originally owned by the State Rivers and Water Supply Commission. In 1967-68, the land was leased by Geelong Waterworks and Sewerage Trust for five years in response to drought conditions, and eventually bought in 1972-73 when more permanent works were started.

Concrete lining of the Matthews Creek offtake channel is now finished; Pennyroyal Creek is almost complete; and since Gosling Creek near the offtake I on-grade no concreting was found to be necessary.

When required, water from the three subcatchments is fed into the main supply channel which has a capacity of 250 ML per day. GWST flow recorders at Pennyroyal and Matthews Creeks have only been installed for about 12 months; meaningful readings are not yet available, however, the largest flows in the creeks occurred in August.

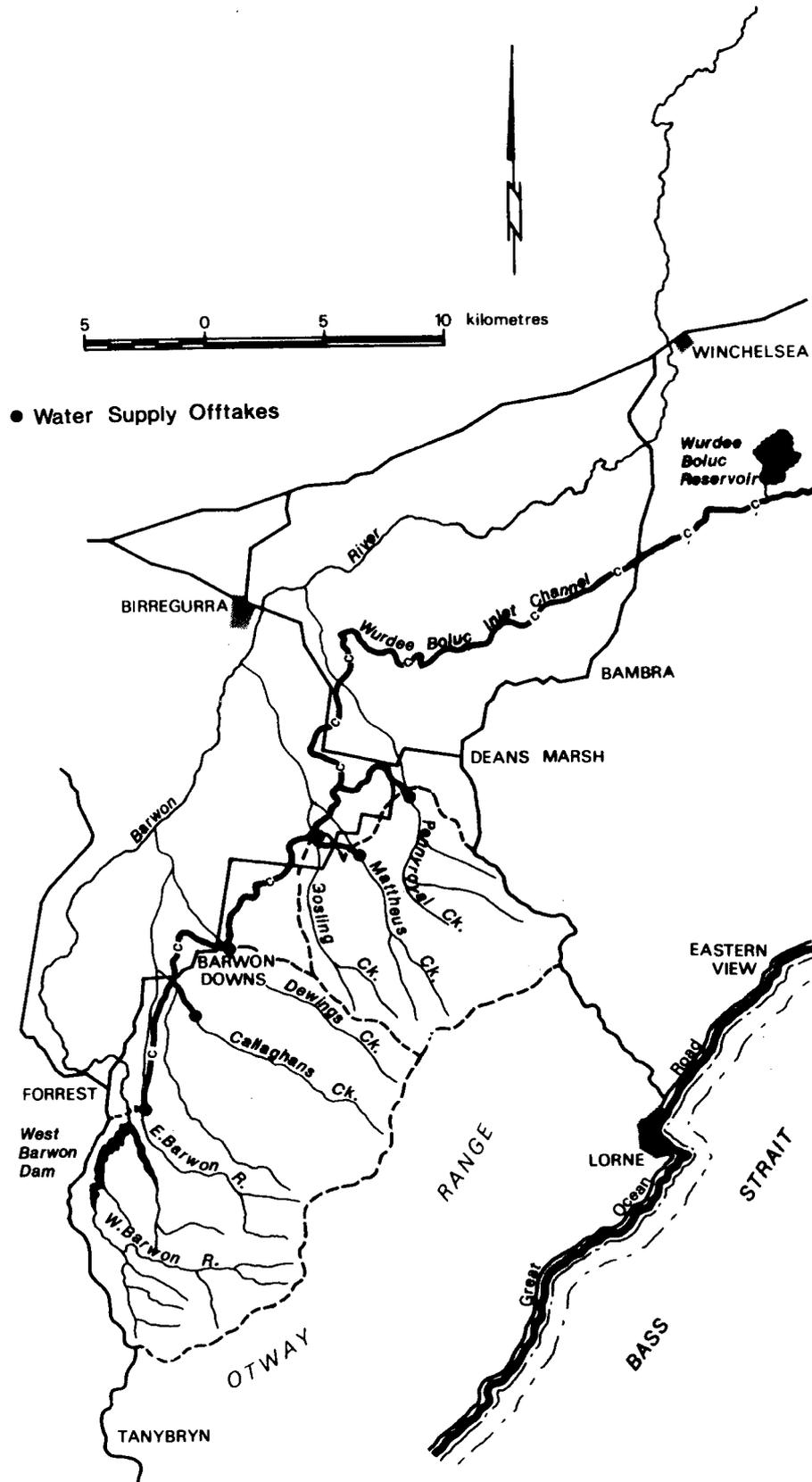
Over summer, flow in the Barwon's tributaries is not harvested, and so water is released to Geelong from Wurdee Buloc Reservoir. Maintenance of the diversion works is done at this time on an annual basis, and also sporadically during the year to remove silt after a flood or water surge.

2 *Potential Harvesting*

"Forward planning in the area of water resources is necessitated by the continuous emergence of new needs, problems and opportunities relating to water resources, and by the physical limitations of water availability".⁵

The "Barwon River Water Management Study", a report prepared by a firm of consultant engineers, on behalf of Geelong Waterworks and Sewerage Trust in conjunction with the Geelong Regional Commission, discusses ways of meeting Geelong's predicted water requirements after 1987. The major proposal in this report is for a dam on the Gellibrand River, with a diversion to Wurdeel Boluc Reservoir. Development of the water resources of the Gellibrand River catchment is the subject of public enquiry being conducted by the Parliamentary Public Works Committee at the present time.

Figure 2 Geelong Water & Sewerage Trust Barwon River System



Among the preferred, short-term schemes suggested to meet requirements before the Gellibrand Dam or alternative scheme is developed, is the building of small dams on tributaries such as Pennyroyal Creek. Sites on Matthews and Gosling Creeks were considered as being less economic propositions.

3 Water Quality

With increased development, the quality of water in the Barwon River has deteriorated, but most of the problems, such as salinity, are not significant in the upper reaches.

It is difficult to assess the extent to which Pennyroyal, Matthews and Gosling Creeks have contributed contaminants. The GWST has water analysis figures from only July, 1979 for Pennyroyal and Matthews Creeks. A selection of categories is shown in Table 1.

These early results indicate higher than recommended levels for colour, turbidity and salt. For example, Total Dissolved Salts range from 215 to 695 milligrams sodium chloride per litre; the GWST has set a desirable maximum level of 200 mg/litre.

The Barwon River near Forrest has a fairly constant reading of 74 - 80 mg/litre with an average yield of 26,800 megalitres per annum. When we compare this with the estimated Pennyroyal, Matthews and Gosling yields of 1,870, 1,280 and 770 megalitres per annum respectively, assuming storage works are to be realised, then adequate dilution seems likely.⁵

PLANNING CONTROLS⁶

The catchment area is within the Shire of Winchelsea. Freehold land is covered by the Shire's Interim Development Order (*Town and Country Planning Act 1961*) which provides broad policies for future planning and development. Council approval is required for subdivision which has a 40 hectare minimum in the rural zone.

Shire policies for land use will be more clearly defined when a detailed Planning Scheme is produced.

The Council of the Shire of Winchelsea has shown appreciation of the problems concerning water supply quality. A letter was sent in June, 1979 to GWST asking for definition of catchment areas and to comment on the types of development considered critical, requiring prior notification to the Trust.

Planning controls concerning public land are discussed in the Land Conservation Council's Final Recommendations (see page 25).

THE CATCHMENT

1. General Description

The Pennyroyal, Matthews and Gosling Creeks Catchment is located in the north-east section of the Otway Range. The area consists of forested upper reaches with lower slopes affected by uplift of the range, falling to a gently undulating plain.

Bordering the catchment to the north-west is the abandoned Birregurra-Forrest railway line. On the east side, the boundary follows the Lorne Road, then turns south-west to Neck Track and continues back to the railway.

The subcatchments are divided up as follows:

Pennyroyal Creek	3,720 hectares
Matthews Creek	1,820 hectares
Gosling Creek	1,860 hectares

The entire 7,400 hectares of catchment is within the Shire of Winchelsea and in the Parishes of Bambra, Barwon Downs, Lorne and Murroon, Country of Polwarth.

To locate areas mentioned, refer to the locality plan (page iv), and the Proclamation plan (end of report).

2. Physiography⁷

The study area includes parts of two of the major physiographic divisions of Victoria as described by Hills (1940): Otway Range (Southern Uplands) and Barwon Plain (Western District Plains).

Uplifted sedimentary rocks form the youthful, rugged terrain of the Otway Range. This uplift took place near the close of Tertiary period as evidenced by the youthful physiography, high rank of Benwerrin brown coals, and control by the fold and fault pattern of the coastline from Lorne to Apollo Bay.⁷

Deep dissection of the range by numerous creeks has formed a drainage pattern which flows north-west to join the Barwon or Gellibrand Rivers or south-east into Bass Strait. The stream pattern is generally parallel, reflecting the pronounced elongated-dome structure of the range. The three creeks making up the catchment drain into the Barwon River.

The Barwon Plain is a flat to undulating surface to the north of the Otway Range. It is an inland extension of the coastal plains to the south-west, and has been mildly dissected by the Barwon River. Some lateritic remnants occur as a result of widespread laterization in the Pliocene epoch.

Altitude in the catchment rises as high as 500 metres above sea level along the Benwerrin Road, down to about 160 metres above sea level at Murrone.

3. ***Geology***^{7,8}

The Otway Range, consisting almost entirely of Lower Cretaceous Otway Group Sediments, is elongated north-easterly and ascends steeply from beneath the surrounding Tertiary sediments. The faulted and gently folded strata comprise felspathic sandstone, siltstone, mudstone and shale with thin conglomerate and coal layers.

Running centrally through the catchment and parallel to the main ridge is a prominent geological feature, the Boonah Anticline, which plunges to the north-east.

The Barwon Plain consists of ferruginous and calcareous sand, sandy limestone deposits known as Moorabool Viaduct Formation. About 25 metres thick, these Pliocene-derived strata were deposited over an older Tertiary base in a marine environment.

Remnants of Eastern View Formation are exposed in the north-eastern extremity of the Otway Range. These deposits are of quartz sand and gravel, carbonaceous clay and brown coal.

A small deposit of Lower Tertiary brown coal was worked until the 1950s at Benwerrin. Coal has also been recorded at Murrone. Minor down-faulting is responsible for the preservation of these Tertiary strata.

4. ***Land Systems - Soil and Vegetation***⁹

Landsystem mapping of the Otway Range and adjoining coastal plains, carried out by Mr. A. Pitt of the SCA, has been used in this report to describe vegetation and soil distribution.

Below is a percentage breakdown of the six land systems covering the catchment:

Mt Sabine	8.6
Aire	16.5
Forrest	46.9
Pennyroyal	18.2
Deepdene	3.5
Barwon River	6.3
	<hr/>
	100%

(a) *Mt Sabine Land System*

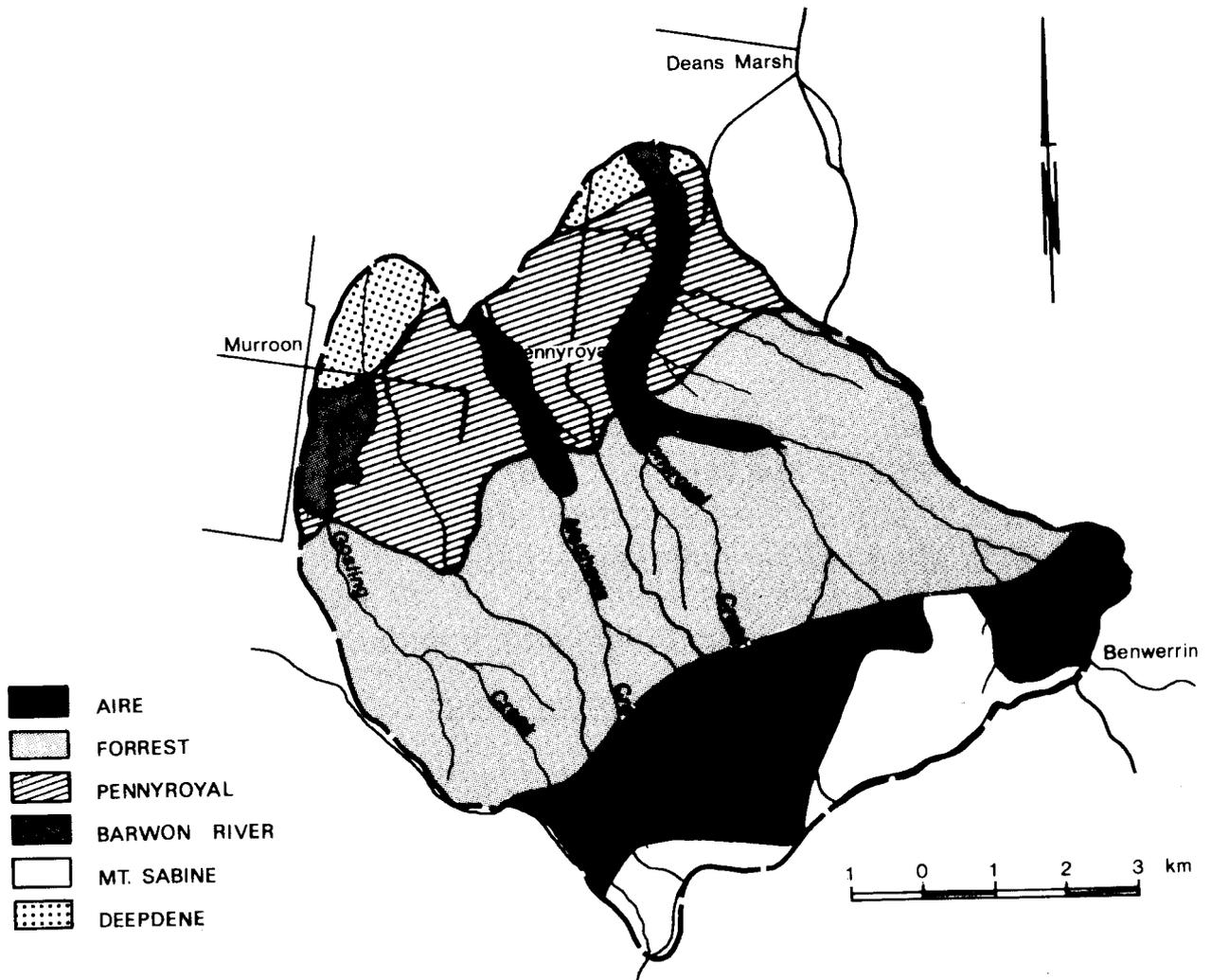
Extending through the highest reaches of the study area, these "disconnected remnants of an undulating plain" support tall open forests on well-structured moderately fertile soils formed on Lower Cretaceous sediments. Some sections had previously been alienated and cleared for agriculture but subsequently abandoned due to remoteness and difficulty of land management.

Well drained, gradational soils vary from brown friable loams and clay loams on the upper slopes (15°), to dark brown loams on lower slopes (9°).

Profiles are moderate to deep, ranging from 1-2 metres, and stability is generally good providing adequate vegetative cover is maintained.

The natural vegetation, which includes tall open forests of high quality timber, is primarily Messmate (*Eucalyptus obliqua*), Mountain Grey Gum (*E. cypellocarp*), Mountain Ash (*E. regnans*), Blackwood (*Acacia melanoxylon*) and Otway Messmate (*E. obliqua* - *E. regnans* hybrid).

Figure 3 Land Systems



(b) *Aire Land Systems*

A significant contributor to the catchment, this heavily dissected landscape was formed by rapid downcutting of streams into the Lower Cretaceous parent material, following uplift of the range near the end of Tertiary.

The soils are moderately fertile with brown gradational profiles. Average depths vary from 1.2 metres to greater than 2 metres, and surface texture is usually a loam.

Landslips and sheet erosion, together with nutrient loss, are common following clearing.

Tall open and closed forests included populations of Mountain Ash, Messmate and Mountain Grey Gum.

(b) *Forrest Land System*

Almost half of the study area consists of the "steep spurs and ridges with long straight slopes and narrow valleys" of the Forrest Land System, also formed on Lower Cretaceous Sediments. Generally occurring at lower elevations, Forrest receives less rainfall than the Aire and Mt Sabine Systems, and the vegetation reflects this change.

Soils range from brown duplex on the drier north and west slopes through to brown gradational soils on those facing south and east. Profiles tend to be relatively shallow, 0.5 - 0.9 metres, having loamy texture of moderate fertility.

Messmate and Mountain Grey Gum are predominant at higher elevations, with Blue Gum (*E. globulus*) making an appearance on crests, and with Narrow leaf Peppermint (*E. radiata*) becoming a principal species at lower elevations.

To the north-west, some areas have been cleared for grazing and softwood production, but the majority of land still supports natural forest. Landslips and sheet erosion, accompanied by gullying in lower areas as a result of rapid runoff, are dominant hazards caused by soil disturbance.

(d) *Pennyroyal Land System*

The inland border of the Forrest Land System marks the northern boundary of Lower Cretaceous outcrop. Overlying this base is the Pennyroyal Land System, formed on Tertiary sediments. The landform consists of broad, flat-topped foothills to the Otway Range. Steep slopes exposing the underlying cretaceous material work their way down into wide valleys.

Tertiary-based soils vary from yellow gradational on upper slopes, to yellow-brown duplex profiles of coarse structure on gentler slopes; both soils have sandy loam surface textures. Because of the terrain and sandy nature of the soils, permeability and drainage are generally high, though adequate fertility can be achieved only through the application of potassium and super-phosphate fertilizers.

Where Cretaceous parent material is exposed on the steep lower slopes, brown duplex soils are found. In the valley floors grey gradational soils have formed on recent alluvium.

Extensive areas of this land system were cleared in the past for grazing. Consequently there is little of the natural open forest remaining, consisting of Messmate, Narrowleaf Peppermint, Swamp Gum, Blue Gum and Mountain Grey Gum.

Soils based on the Tertiary sediments in particular are prone to rilling and gullying.

(e) *Deepdene Land System*

A minor component of the catchment occurring in the north-east and north-west corners, Deepdene Land System contains remnants of lateritic plateau which has been dissected by the Barwon River and its tributaries. The topography is flat to gently undulating, falling away to alluvial plains in the north.

The main soil types are mottled yellow and red, and yellow-brown duplex soils with sandy loam surface textures, and average profile depths greater than 2 metres.

Natural vegetation includes Messmate, Manna Gum (*E. viminalis*), and occasionally Narrow leaf Peppermint.

Problems associated with clearing for grazing include landslips, gully erosion and soil salting.

(f) *Barwon River Land System*

Tongues of alluvial plain and river terraces extend through the north of the study area, making up 6.3%.

Derived from Lower Cretaceous material eroded from the Otway Range, these distinctive terraces have brown uniform-textures soils on the rises, and grey gradational profiles in the flat plain.

The generally good permeability and fertility of the soils makes them potentially valuable for agriculture, but annual flooding of the Barwon River limits use to perennial pasture for grazing.

Blackwood, Manna and Swamp Gum are predominant local species.

5. *Climate*

(a) *Rainfall*

i) Average Annual Rainfall

Of the eight rainfall stations examined, only two are located in the catchment - Benwerrin and Pennyroyal. Stations in adjacent regions have been used to give a more accurate description of rainfall trends.

Recordings illustrate the marked variation in annual rainfall. The most obvious feature of distribution is a rapid increase with proximity to the Otway Range. The main ridge at Benwerrin, some 500 metres above sea level, average 1122 millimetres annually but with a drop in elevation to 180 metres, only 9 kilometres away at Pennyroyal, the rainfall average is 795 millimetres. There is also a tendency for rainfall to decrease in a northerly direction.

Table 2 lists the rainfall figures: where available the records extend to 1978 inclusive.

ii) Seasonal Rainfall

The general seasonal pattern shows a rainfall peak in winter, the wettest months occurring from June to September, although at Benwerrin and Tanybryn the highest figure is for the month of June.

The driest period coincides with summer, January having the minimum reading.

ii) An adequate study of rainfall intensity is not possible due to the lack of records, but from a few selected stations it appears that maximum rainfall in 24 hours tend to occur in the summer months. This may very likely coincide with the ability of warm air to hold more moisture and hence the occurrence of quite heavy summer storms.⁹

(b) *Temperature*

The number of climatological stations in the area recording daily temperatures is very poor indeed. Only records obtained at two stations, Lorne (Pierhead) and Forrest, were particularly valuable. (See Table 3).

When a number of stations in the general region are examined we see the depressing influence of elevation on mean temperatures and the moderating effects of proximity to the sea, especially on minimums.

In brief, the catchment is subject to a temperate climate, experiencing warm, dry summers and cooler, wet winters.

(c) *Frost*

Minimum temperatures may be used as a basis upon which to predict frost hazards; temperatures below 0°C indicate severe frosts, and those above 0°C but lower than 2°C, suggest light frost potential.⁹

While coastal areas are virtually frost free, the frequency rapidly increases inland; higher altitudes are also more frost-prone.

(d) *Growing Season*

Satisfactory growth results when "effective" rainfall is combined with moderate temperatures, and thus reliable conditions tend to be limited to the cooler months.

In the Otway Range, a growing season from March to December would be interrupted by restrictive temperatures (below 10°C reduced growth of temperate species, below 5°C growth stopped⁹) during winter. Deep-rooted species do not normally suffer water stress in the deeper, moist soils of the range.⁹

Further north in the catchment, although rainfall is lower, soils do tend to hold water effectively. The growing season is, however, shortened by relatively dry summers.

6. *Land Tenure*

Land in the catchment is divided into the following categories:

Reserved Forest	3400	45.9
Crown Land	400	5.4
Freehold	3600	48.6
	7400 hectares	100%

The GWST owns 8 ha of channel easements and headworks.

LAND USE AND HAZARDS TO THE WATE SUPPLY

When clearing activities are carried out and the natural vegetation is replaced by shallow-rooted pasture species or crops, the normally sensitive Lower Cretaceous-based soils on steep slopes become even more prone to landslips and sheet erosion.¹⁰

Perhaps of more importance in the catchment is disturbance of soils based on Tertiary sediments, which can rapidly lead to slumping of slopes and batters, and rill erosion.

Although water detention in the Wurdee Boluc Reservoir tends to reduce the high turbidity incurred as a result of eroded and transported material, there is a limit to this clarification ability, and excessive soil disturbance should be avoided by ensuring careful planning of works in the catchment area.

1. *Forestry*¹¹

Originally, there were two main uses made of forest area in the catchment. Early this century, settlement resulted in partial clearing of blocks along the Benwerrin Road. Most of this land has since been purchased by the Government, and over the past fifteen years the Forests Commission has sought to regenerate the area. Hardwood logging has also been carried out on a low-intensity basis for the last fifty years, followed up by some silvicultural work to encourage regrowth.

This low-intensity logging is continuing at present. Small areas of high site quality are being clear-felled with retention of seed/habitat trees.

As a result of the continuing need for hardwood and declaration of other parts of the Otway Range as Parks, it is likely that forest management for timber production will become more intensive. Some pulpwood may also be obtained as a market eventuates.

2. *Agriculture*

The majority of freehold land, which composes 48.6% of the catchment, is used for agricultural enterprises. There are about 40 landholders with properties ranging from small farms of around 10 hectares to larger holdings of 250 hectares, with an average of 100 hectares.

Activities in the area are predominantly grazing of beef and dairy cattle plus limited grazing of sheep. Stock access to streams appears minimal; flows are generally intermittent and therefore most properties have alternate watering facilities.

As there is little intensive cropping, problems associated with fertilizer and pesticide run-off are not significant at present.

Most of the freehold sector has already been cleared, hence future clearing operations will not pose much of a threat to the water supply.

Present erosion hazards range from low on the better-structured soils on Lower Cretaceous sediments, to very high on some profiles on Tertiary sediments, especially those on steeper slopes.

Of the three creeks, Pennyroyal shows more symptoms of disturbance. Active erosion is apparent on the silty flats upstream of the offtake. This is possibly due to both the nature of the soil combined with increased run-off caused by past clearing.

3. *Recreation*

The natural beauty and accessibility of the Otways is attracting greater numbers of tourists each year. The Benwerrin Road in particular is used by many coming from Lorne on sightseeing trips.

Pressure on the catchment area from recreational activities, although not significant at present, must nonetheless be considered if we are not to sacrifice water quality or the balance of the Otways' unique ecosystems.

The catchment has no tracks which cross major drainage lines, therefore 4-wheel drive vehicle damage is minimised. There is some fishing, camping and bushwalking in the area.

The only established recreational facility is a riding holiday camp in Pennyroyal Valley, situated near the creek itself. Developments of this type need to be planned with care in order to avoid reducing water quality.

It has been suggested that there should be a co-ordinated plan for activity in the Otway Range due to the conservation and recreational value placed upon the area.

4. *Roading*

The Benwerrin Road, bordering the catchment in the south-east, is adequately surfaced for the amount of traffic normally using it, although not sealed.

The Lorne Road on the east side of the catchment is sealed, and there is a section of sealed road at Murroon.

Of the five tracks which are located along ridge lines running north-west, Pennyroyal Track is clearly marked "Dry Weather Only" and is a no-through road; Dunse, Wickham and Norman Tracks are suitable only for 4-wheel drive vehicles, although the latter could be negotiated by 2-wheel drive in dry conditions only.

As noted previously, there are no tracks which cross drainage lines, hence hazards associated with surface run-off, interception and soil displacement are minimal.

Road construction through Tertiary sediments is a problem; slumping of batters is common and therefore a source of easily transported material. The Deans march-Lorne Road crosses a hilltop outcrop of Tertiary sediments near Benwerrin, where slumping of cut and fill batters is a continuous problem for the Shire.

5. *Other Uses*

(a) Lorne to Colac Subtransmission Line^{12, 13}

In order to augment and secure a reliable electricity supply to the general Lorne area, the SEC is constructing a 66/22 kilovolt subtransmission line from Colac to Lorne. Works began in late 1979 despite some opposition by interested groups and individuals, and is expected to be completed this year. Major considerations involved in building the line are visual impact, conservation, and effects of the installation works and maintenance-track location on water quality in steep areas.

Although the SEC has published a tree-clearing policy in the "Environmental Effects Statement" for this line¹², inspection of cleared sites has shown that prescriptions have not been carefully followed. However, significant increase in water turbidity due to soil disturbance is not expected to last, since clearing is basically confined to ridges, and water courses are buffered by forested areas.

(b) Rubbish Tip

The Winchelsea Shire Council has applied for approval to use 5 hectares in the south-eastern corner of allotment 46C, Parish of Bambra, as a garbage depot. In relation to water quality, there appear to be no foreseeable problems as the site is flat and sandy, but it hoped that the LCC recommendation suggesting adequate native cover from the road is undertaken.

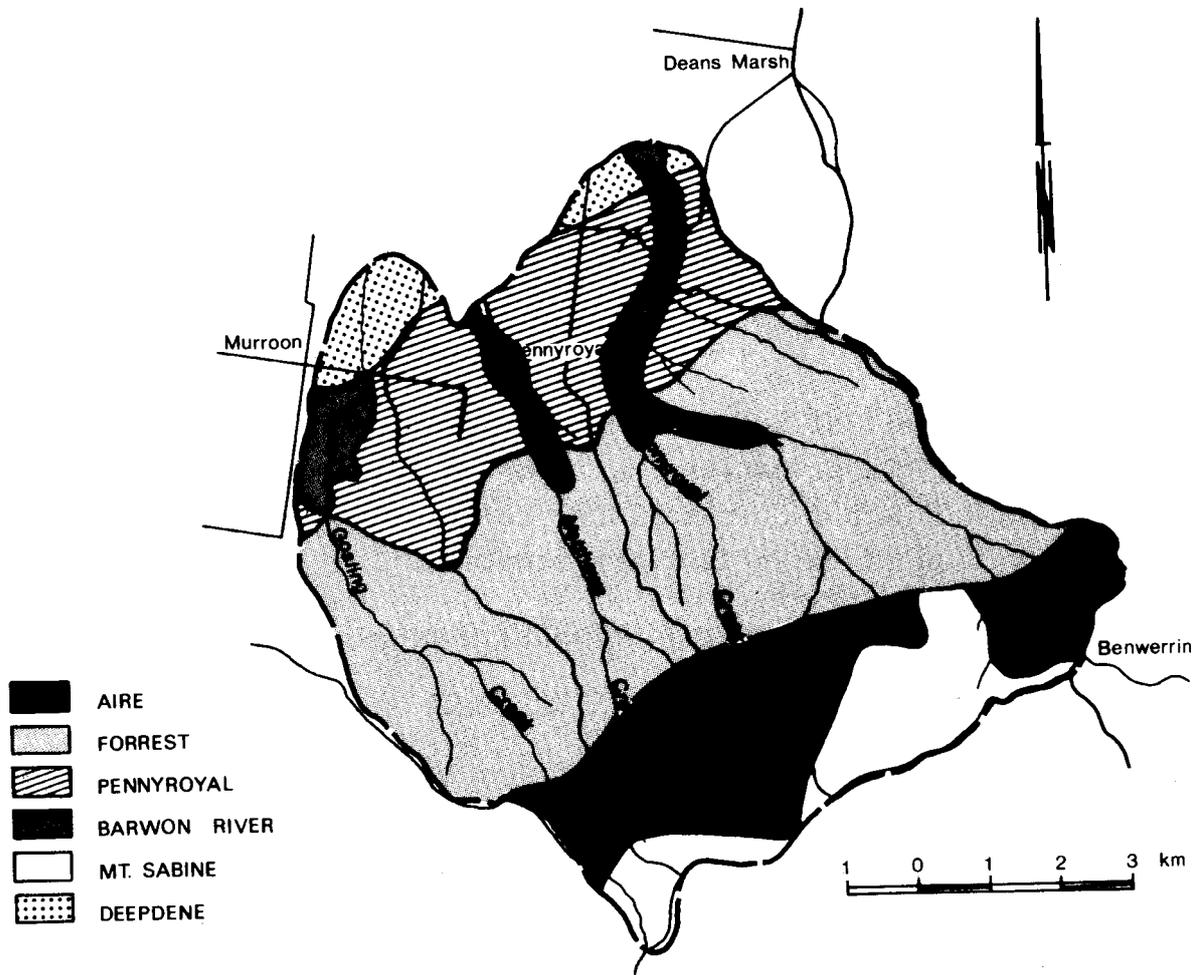
(c) Pine Plantations

An area of 220 hectares of freehold land has been purchased by timber companies and planted to softwoods; a section of about 180 hectares south-east of Murroon, and 40 hectares in the northern tip of the catchment.

Operations may constitute a hazard to water quality, particularly during future harvesting and replanting.

The larger allotment occurs on steep slopes with sparsely vegetated gullies; the smaller plot is on moderately steep land adjacent to Pennyroyal Creek, upstream from the offtake.

Figure 4 LCC Final Recommendations



LCC RECOMMENDATIONS³

After consideration of 220 submissions commenting on original proposals, final recommendations for the Corangamite Study Area were published in September, 1978. Those recommendations, shown in Figure 4, have been accepted by the Government and are in the process of being implemented.

1. *Boonah Forest; E1*

This section of 14,000 hectares is specified as being primarily for hardwood production. Other values, including landscape quality and water harvesting, are recognised as important considerations of any operation.

Major secondary uses encompass recreation, conservation of flora and fauna, and the production of forest produce as defined in the *Forests Act* 1958.

The area is to remain as reserved forest under the provisions of the *Forests Act* 1958, and be managed by the Forests Commission.

2. *Bushland Reserve; I7*

The major purpose of a bushland reserve is to maintain the distinctive Australian character of the countryside, and to provide diversity in the landscape. They may also offer some opportunities for passive recreation in relatively natural surroundings. The 12 hectare allotment is to be managed by the Department of Crown Lands and Survey.

3. *Water Production; D16, D17, D18 and D47*

The Otway Range is a significant contributor in terms of water harvesting, and although there is no specific mention of the Pennyroyal, Matthews and Gosling Creeks Catchment, the LCC report does state: "The Council maintains that the Soil Conservation Authority should investigate all domestic water supply catchments within the study area and, where appropriate, these will be recommended for proclamation by the Land Conservation Council, in order to ensure a uniform procedure for land use planning within these areas".

The LCC recognises that water supply catchments are often situated in areas which provide attractions for recreation and favours multiple use of such catchments wherever possible, water values are, however, of major importance.

- (a) *Gosling Creek Diversion; D16*
Matthews Creek Diversion; D17
Pennyroyal Creek Diversion; D18

After a land use determination is made, these areas are to be permanently reserved under section 14 of the *Land Act* 1958 for water supply purposes and managed by the Geelong Waterworks and Sewerage Trust. Other activities may be permitted after consultation with the Soil Conservation Authority and Environment Protection Authority.

- (c) *Watering Pont; D47*

This 7 hectare location is recommended for use as a watering point for stock, to be reserved under section 14 of the *Land Act* 1958 and managed by the Department of Crown Lands.

4. *Utilities and Survey; S10*

This area of 5 hectares is to be used as a garbage depot; the Shire of Winchelsea is still awaiting approval by the Commission of Public Health for use of the site. The report suggests that adequate native vegetation should be retained in order to screen the depot from adjacent land.

5. *Uncommitted Land; U1*

In order to allow for flexibility with regard to any changes in land requirements, the LCC considers that this area, as Crown Land, should be withheld from sale and be protected forest under the provisions of the *Forests Act* 1958

The land may be used to produce goods and services, such as forest produce and grazing, on the condition that the land's capability is maintained.

SUMMARY AND RECOMMENDATIONS

The Pennyroyal, Matthews and Gosling Creeks Catchment provides additional water to the Barwon River-Wurdee Boluc inlet channel system, one of Geelong's two water courses.

Located in the north-east section of the Otway Range, the area consists of forested upper reaches, and lower slopes falling to a gently undulating plain. The climate is temperate with warm, dry summers and cool, wet winters; rainfall ranges from high to moderate; and the growing season extends for seven months.

Where land on steep slopes of the Lower Cretaceous parent material has been cleared, the hazards of sheet erosion and landslips increase. Disturbance of soils based on Tertiary sediments can rapidly lead to rill erosion on slopes, and slumping of batters.

Poor management of much of the land in these catchments, whether used for agriculture, hardwood or softwood forestry, or recreation, can lead to erosion of the soil types represented and hence create problems with regard to the water supply.

This report therefore recommends proclamation of these catchments, and careful planning of future operations to reduce their impact on the water supply system, and the future productivity of the land.

RECOMMENDATIONS

1. That the Authority approves this proclamation report and forwards it to the Land Conservation Council for consideration.
2. That the Land Conservation Council recommends to the Governor-in-Council that the Pennyroyal, Matthews and Gosling Creek Water Supply Catchment, as shown in Plan No. S-855, be proclaimed under section 5(1)(b) of the *Land Conservation Act* and section 22(1) of the *Soil Conservation and Land Utilities Act 1958*.

REFERENCES

1. Letter from GWSTs Engineer-in-Chief to Secretary SCA - 21st April, 1971.
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8. "Resources Survey, Barwon Region", Central Planning Authority in collaboration with the Barwon Regional Committee, 1971.
9. From "A Study of the Land in the Catchments of the Otway Range and Adjacent Plain", Pitt, A. (in press).
10. "A Report on the Painkalac Creek Catchment", Forsyth, D. A., and Ranome, S.W. - November, 1978.
11. Letter from District Forester, Mr R. J. C. Stone, to Mr D. A. Forsyth, SCA Project Officer - 1st February, 1980.
12. "Environmental Effects Statement, 66KV Subtransmission Line, Colac to Lorne", State Electricity Commission (1978).
13. "Assessment of Environmental Effects Statement", Ministry for Conservation, Victoria - October, 1978.

Table 1 - Water Quality* - 1978

	Pennyroyal Creek					Matthews Creek				
	July	Aug	Sept	Oct	Nov	July	Aug	Sept	Oct	Nov
Total Solids (mg/l)	886	742	614			1507	528	444		
Colour (Pt. Co.)	22	140	65	130	55	32	170	165	150	50
Turbidity (NTU)	6.5	53	33	34	10	10	59	58	51	9.5
Total Dissolved Solids as NaCl (mg/l)	695	530	435	250	455	640	390	265	215	590

* Figures obtained from GWST

Table 2 Long Term Average Rainfall

Station	Month												Year Total
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
Barwon Downs	35	32	45	59	71	79	81	88	77	70	54	48	740
Benwerrin*	48	54	70	90	123	141	119	125	128	98	66	60	1122
Birregurra	29	38	42	49	66	65	72	80	69	65	55	43	673
Eastern View	31	44	48	57	70	70	79	86	76	68	58	43	730
Forrest	41	51	59	82	102	111	119	127	106	97	78	58	1031
Lorne (PO)**	39	49	55	70	87	100	105	107	99	91	65	53	920
Lorne (Pierhead)***	44	49	60	65	77	80	89	97	91	85	81	53	871
Pennyroyal Creek	36	41	48	63	80	88	85	92	81	75	58	48	795
Tanybryn	93	93	93	147	167	231	169	196	163	157	138	97	1744

* Figures from 1911 to 1926

** Figures from 1927 to 1969

*** Figures from 1970 to 1978

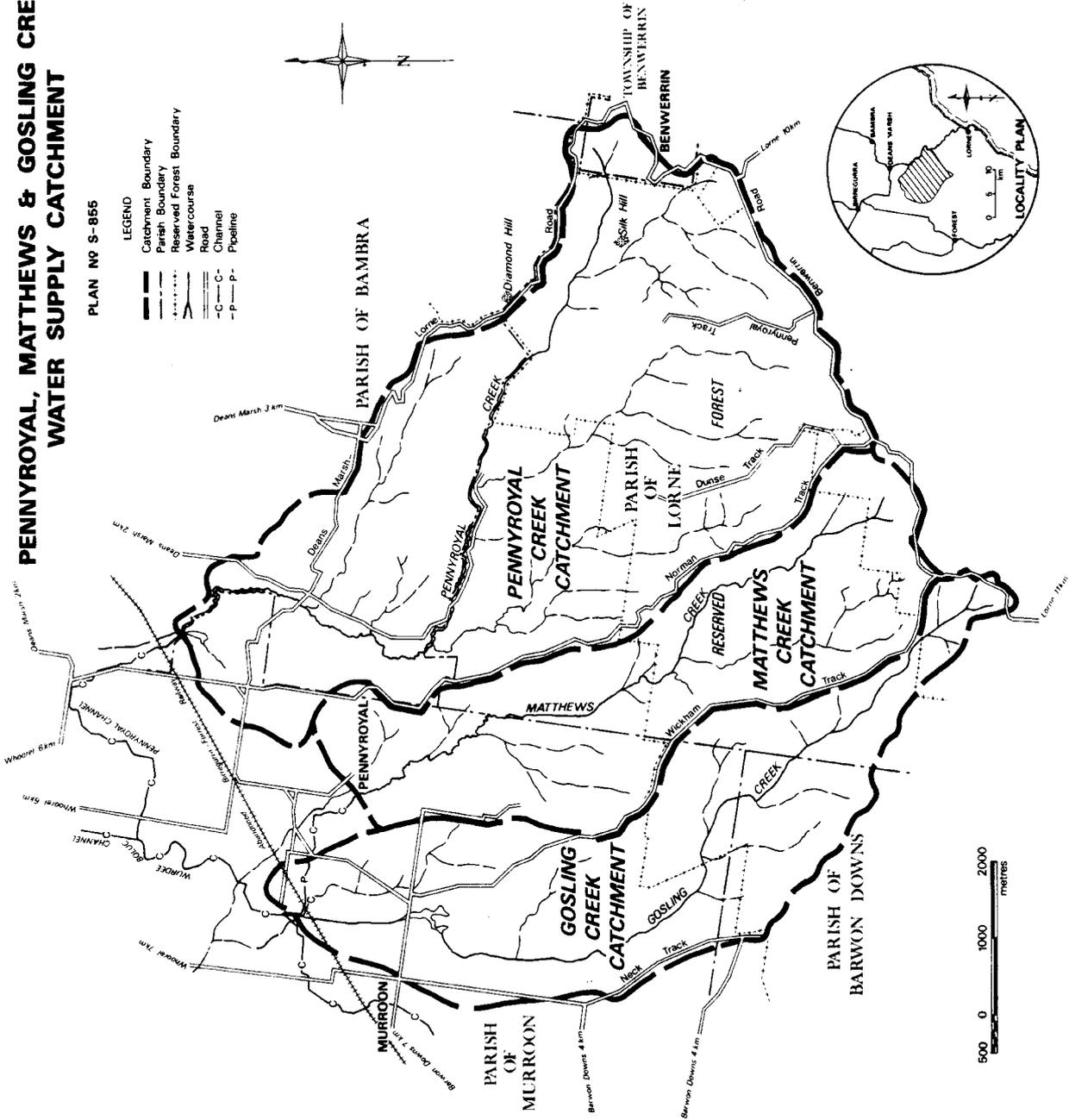
Other Stations - Figures from 1927 to 1979

Table 3 - Average Daily Temperature

Station	Month											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Lorne (Pierhead)												
Mean max.	23	24	22	20	17	14	14	14	16	18	19	21
Mean min.	15	15	14	13	10	9	8	8	9	10	11	12
Forrest												
Mean max.	25	25	22	19	15	12	11	13	14	18	19	22
Mean min.	11	12	10	8	6	3	3	4	5	6	8	9

PENNYROYAL, MATTHEWS & GOSLING CREEKS WATER SUPPLY CATCHMENT

PLAN NO S-855



- LEGEND**
- Catchment Boundary
 - - - Parish Boundary
 - Reserved Forest Boundary
 - Watercourse
 - Road
 - C- Channel
 - P- Pipeline