

**A REPORT ON THE BUCKLAND RIVER  
CATCHMENT  
(POREPUNKAH WATER SUPPLY SCHEME)**

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

by

**A ARCH**  
Conservation Officer

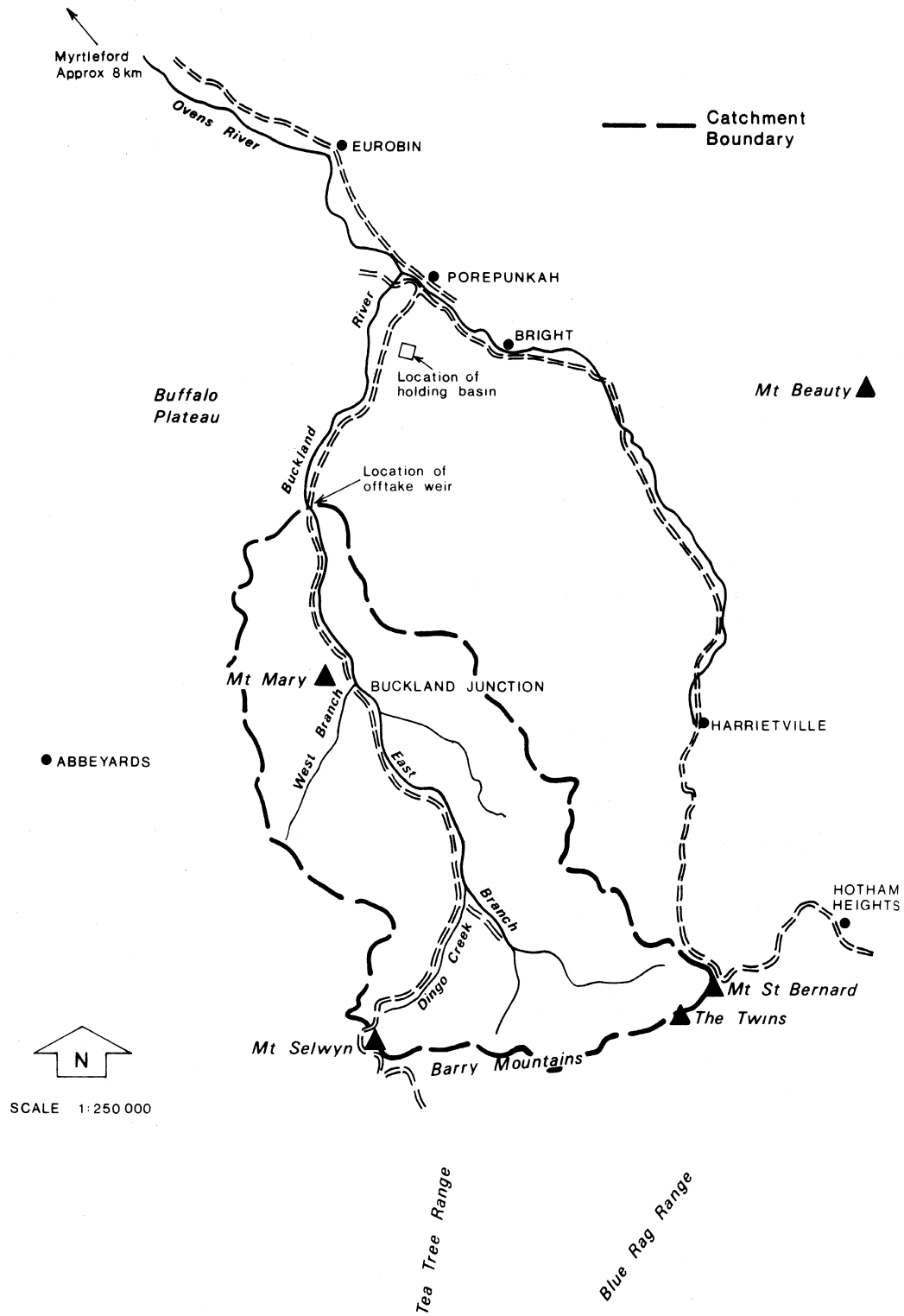
and

**R. McLENNAN**  
Catchments Investigation Officer

**December 1978**

**SOIL CONSERVATION AUTHORITY  
378 Cotham Road KEW VICTORIA 3101**

# MAP - FIGURE 1 - LOCALITY PLAN



## INTRODUCTION

A system to supply Porepukah with reticulated domestic water is due for completion in 1979/80. The system will draw water from the Buckland River above the Buckland Bridge.

The Land Conservation Council, in its Final Recommendations for the North-Eastern Study Area, Districts 3, 4 and 5, considers that:

“Where a number of other products are required from a catchment supplying water used for domestic, industrial, or irrigation purposes, the catchment should be proclaimed under section 22(1) of the *Soil Conservation and Land Utilisation Act 1958* and also under Section 5(1) (b) of the *Land Conservation Act 1970*.”

The Buckland River Catchment falls within this study area but was not specifically mentioned in these recommendations.

This report presents information about the catchment area to the Porepukah township water supply off-take on the Buckland River, and recommends that the Buckland River catchment be proclaimed.

## WATER SUPPLY SYSTEM

The Bright Waterworks Trust supplies water to all the area within the Bright Urban District (715 ha) and recently has been granted an extension to include the Porepukah urban District, an area of approximately 132 ha.

To date, the township of Porepukah has had no reticulated water supply; each residence or commercial enterprise obtained its own supply from wells or from the Ovens River. The new scheme, which is due for completion in 1979/80, will provide an assured reticulated water supply to the township.

The water supply scheme being constructed for Porepukah<sup>1</sup> will include a low off-take weir across the Buckland River some 120 m upstream of the Buckland Bridge. a supply main, 12.3 km in length, will take water from the weir to a service basin, an earthen tank of 4.5 ML capacity, and will provide a static head of about 34 m to the town.

The figures for Porepukah in the table below, show that although the present population of permanent residents is only 350 persons, allowance has been made in the design of the supply system for a significant expansion in both the permanent and tourist populations.

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<sup>1</sup> From a report to the Trust by John Scroggie consulting Engineers Pty. Ltd. (August 1977)

<b>POPULATION OF POREPUNKAH AND ESTIMATED WATER USAGE 1</b>					
	Population	Max. Daily Demand (ML/d)		Annual Demand (ML)	
	Present Design	Present Design		Present Design	
Permanent Residents	350	0.38		41	
	600	0.68		74	
Campers	1100	0.15		8	
	2000	0.28		14	
Totals		0.53	0.96	49	88

The mean annual flow in the Buckland River is in the order of 300,000 ML. Diversions to the Porepunkah system, up to a maximum of 88 ML a year, has been approved by State Rivers and Water Supply Commission. This represents approximately 0.03% of the mean annual river flow.

## **WATER QUALITY AND TREATMENT**

No routine samples for water analysis have been taken from the river at the off-take point to date; however on completion of the Porepunkah water supply scheme it is proposed to carry out regular sampling and analysis for monitoring water quality.

It is expected that the turbidity of the water will be satisfactory as the water appears clear most of the year round; also, salinity level of the Ovens River decreases between Bright and Myrtleford after being joined by the Buckland River, indicating that dilution occurs with the better quality water from this source.

The Trust intends to chlorinate the water prior to consumption. This is considered necessary because of the possibility of contamination arising from either human or stock activities especially in and about the river and streams. There is no intensive farming, e.g. tobacco cropping, in the catchment to the off-take.

## **CATCHMENT DESCRIPTION**

### ***General***

The Buckland River, a major tributary of the Ovens River, rises in the Barry Mountains and flows north until it joins the Ovens immediately downstream of Porepunkah.

The catchment area to the off-take weir at the Buckland Bridge is approximately 322 km<sup>2</sup>. It is about 13 km wide by 31 km long, with the longer axis lying approximately north-south.

The whole catchment is within the Shire of Bright and the Parishes of Buckland, Coolungubra, Harrierville, Maharatta, Morockdong, Panbullu and Towamba of the County of Delatite.

## ***Physiography***

The catchment lies on the northern slopes of the Great Divide, and ranges in elevation from 350 m at the off-take to 1703 m at The Twins. Most of the catchment is steep to very steep being the foothills of the Victorian Alps. There is an over-all similarity of hill slopes in an area of physiographically massive rocks.

Along the Buckland River rolling to hilly valley slopes prevail with narrow terraces and a narrow flood plain present in the lower reaches.

## ***Geology***

The major part of the catchment consists of generally fine grained felspathic sandstone beds up to 1 m thick interbedded with dark grey shale and siltstone of Middle to Upper Ordovician age.

There is a small area of intrusive rock of Devonian age consisting of granite and granodiorite near Paddy Hill and a larger area of similar material of Silurian age at Mt. Selwyn.

Along the middle reaches of the Buckland River there are alluvial and colluvial deposits of Pleistocene age consisting of clay, silt, sand, gravel and conglomerate. Recent deposits of alluvium with a similar composition extend along the river channel for about 2.5 km upstream of the Buckland Bridge.

## ***Climate***

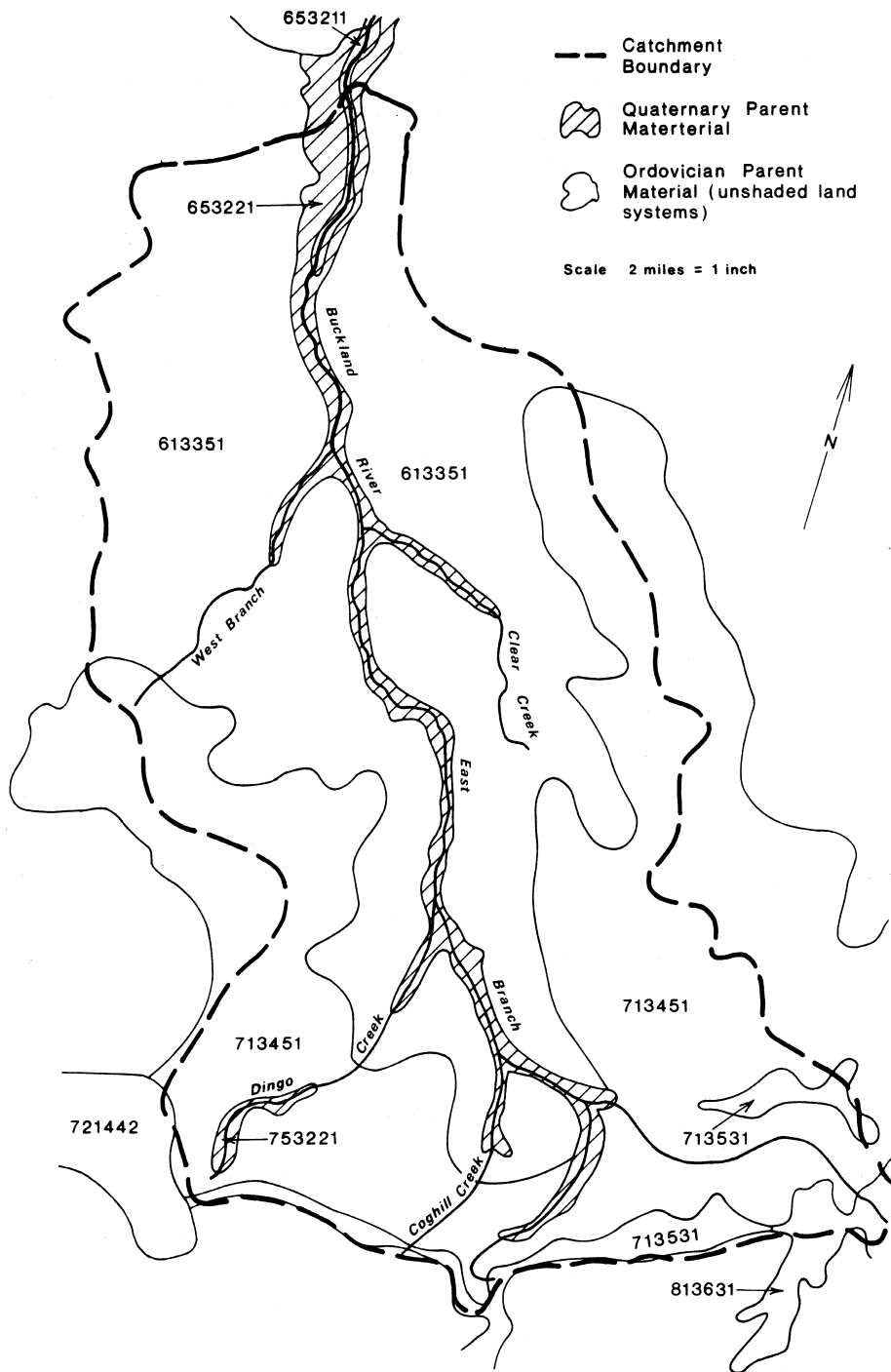
As there are no stations recording climatic conditions within the catchment it is possible only to extrapolate from nearby recording stations located outside the catchment.

The figures that have been compiled in Appendix 1 show that rainfall can be expected to increase from around 1100 mm to 1640 mm due to the influence of elevation and topography as one ascends the catchment. A change to a more even distribution of precipitation throughout the year will also occur as the elevation increases. During the winter months most of the catchment with elevations above 1500 m receives its precipitation as snow, and in a normal winter, snow accumulates from June until September.

Temperatures are influenced greatly by elevation (Appendix 1). It can be expected that conditions at the head of the catchment will approximate to Hotham Heights, while the lower catchment will show a bias towards conditions at Myrtleford. Hotham Heights averages 168 severe frosts (min. screen temp. 0°C) while Myrtleford averages only 46 per annum.

Throughout the catchment both summer drought and winter cold limit plant growth. The degree, each affects growing conditions varies from the Alpine to the valley environments as illustrated in the situations at Hotham heights and Myrtleford. At Hotham Heights moisture throughout the year is considered to be non limiting but low temperatures between March and November limit the growing season to about 5 months. Myrtleford on the other hand experiences periods of summer drought and winter cold and has a growing season for about 7 months principally during Autumn and Spring.

# MAP - FIGURE 2 - LAND SYSTEMS PLAN



## **Land Systems and Soil**

Although no detailed study of this area has been made, broad scale mapping for Victoria carried out by the Soil Conservation Authority has identified seven separate Land Systems represented in the catchment. Three of these occur on sediments of Quaternary age, and four on sediments of Ordovician age.

The three land systems delineated on the Quaternary alluvial and colluvial deposits are designated as Land Systems 653221, 653211 and 753221, and are located along the main drainage line, Figure 2. The soils of these land systems comprise: uniform types of fine sandy loams or gravelly sandy loams along the stream flats and lower terraces; and elsewhere gradational types. These change from yellow/brown to red/brown through to a friable red with accompanying changes in surface texture from gravelly or sandy loam to clay loam as the distance increases from the stream channel up the valley slopes.

The Land Systems on the consolidated sediments of Ordovician age form the mountains and ridge tops in the catchment. These are designated Land Systems 613351, 713451, 713431 and 813631.

Soils in the southern valleys are friable red gradational types with loam 'A' horizons changing on the northern slopes to stony gradational soils and on the southern slopes to friable brown gradational soils and on the southern slopes to friable brown gradational soils. Soils on the crests are shallow stony loams with a gravelly loam texture throughout.

The northern mountains below 1400 m have mostly friable brown gradational soils with a loam surface texture becoming shallower on the crests and as the elevation increases. Soils on the slopes and crests between 1400 m and 1500 m are shallow friable brown gradational types with a gravelly loam texture.

The slopes and crests of the Barry Mountains above 1500 m in the south of the catchment have stony loam soils of uniform texture with a gravelly loam surface. The slopes around the Twins and Mount St. Bernard have developed, uniform organic loam soils.

## **Vegetation**

At the lower end of the catchment the vegetation units are principally open forests of narrow-leaf peppermint (*Eucalyptus radiata*) and broad-leaf peppermint (*E. dives*).

Open forest of narrow-leaf peppermint requires moderately high moisture levels throughout the year and as a result tend to be restricted to flowlines and lower slopes, particularly at the lower elevation where rainfall is lower. This forest type is found throughout the catchment at elevations ranging from 350 m to 1100 m. It would probably comprise about 70% of the vegetation in the catchment.



Open forest of broad-leaf peppermint occurs on drier sites where shallower poorer soils predominate such as on ridges and higher portions of slopes. It is commonly associated with red stringybark (*E. macrorrhyncha*) and extends up to the edge of the snow-gum country. It is typically replaced by narrow-leaf peppermint on deeper soils and in sheltered aspects at lower elevations, and by alpine ash (*E. delegatensis*) at higher elevations. This forest type might comprise 20% of the catchment's vegetation.

In sheltered sites at elevation of about 1000 - 1400 m, open forests with stands of virtually pure alpine ash are found. In some situations along the ridge forming the western boundary to the catchment there are patches of candlebark (*E. rubida*) snow-gum (*E. pauciflora*) open forest.

The sub alpine to montane form of forest with mountain gum (*E. dalrympleana*) and snow-gum as the major species form a couple of minor vegetation units at the upper end of the catchment abutting areas of alpine ash regrowth.

Snow-gum sub-alpine woodland generally occurs above 1200 m amongst exposed rocky outcrops or as a grassy woodland on flatter areas where it extends across the open plains. It occurs mainly along the ridge of the Barry Mountains forming the boundary to the southern end of the catchment.

A small area of alpine open area complex occurs near The Twins.

Appendix II sets out the major species and associated tree species of the vegetation units described above.

## **LAND TENURE AND LAND USE**

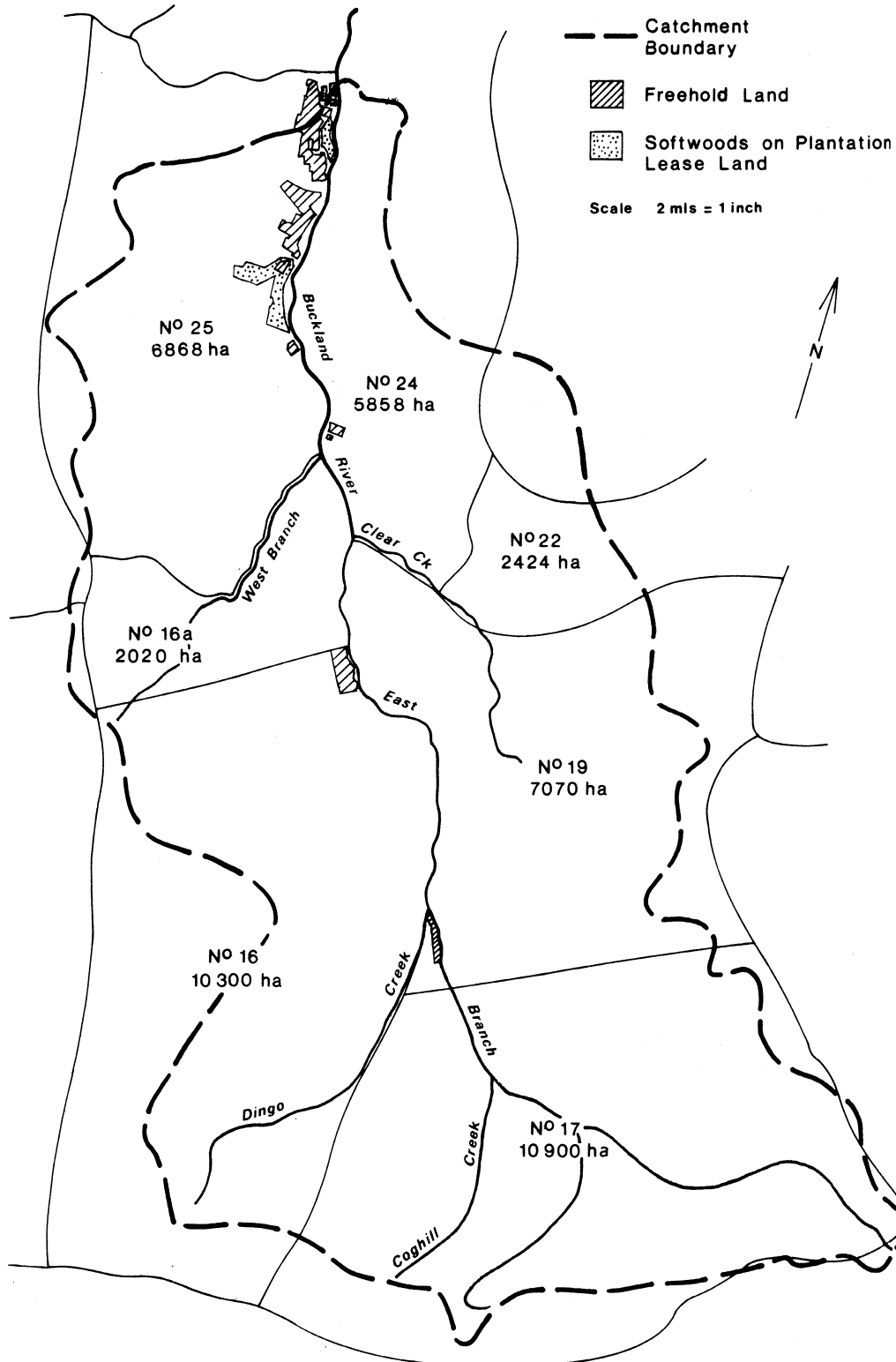
The catchment area of 322 km<sup>2</sup> consists mainly of Crown land covered with native forest. Only 437 ha adjacent to the Buckland River at the northern end of the catchment is freehold land.

### ***Public Land***

The entire catchment, other than that held as freehold, is subject to grazing licence. There are seven major grazing licences held in the catchment ranging in size from 2020 ha to 10 908 ha. These are shown on Figure 3.

An area (Fig. 3) of about 158 ha of land, held under lease by Selwyn Timbers Pty Ltd of Porepunkah, has been planted to softwoods. Granted in 1961 under the provisions of Division 9A - Plantation Areas, Section 151E of the *Land Act*, the lease, upon expiration in the year 2021, contains no right to freehold.

# MAP - FIGURE 3 - GRAZING LICENSES



Hardwood logging operations are not being carried out in the catchment at present, though roads in the catchment are being used as main access routes to logging operations being carried out in the Tea Tree Range, south of the Barry Mountains. Logging will occur in the catchment in future years. This will be reported upon in more detail at the stage of the Land Use Determination.

The lower reaches of the Buckland River below Buckland Junction were extensively mined during the gold rush era of the last century. However, the detrimental effect of these activities on water quality has disappeared in the intervening years, largely as a result of natural regrowth.

The Land Conservation Council has made recommendations for all public land within the catchment and these are shown in Figure 4. The lower catchment is located within the North Eastern Study Area Districts 3, 4 and 5, for which final recommendations have been published; the upper catchment is located within the Alpine Study Area for which proposed recommendations have been published.

### ***Freehold Land***

Freehold land comprises 1.3% (437 ha) of the catchment and most of this is used for grazing. Orchards once were a major feature of the area and, although many trees still remain, none of these areas are now in production. There are fourteen landholders with holdings ranging in size from 0.2 ha to 94 ha. Most of this land is cleared and used for grazing.

### ***Recreation***

The catchment satisfied a high requirement for recreation, with fishing, deerstalking, recreational touring, picnicking and camping all placing demands upon its uses.

The alpine walking track passes across the head of the catchment and is frequently used by bushwalkers, and many of the old gold areas are still panned by fossickers.

## **HAZARDS TO THE WATER SUPPLY**

The erosion hazard in the catchment ranges from a low to moderate sheet erosion hazard on slopes at lower elevations, to areas of high wind and water erosion hazard on the alpine ridges.

The more immediate problems affecting water supply probably arise from the quality of roading in the area and the unrestricted access by cattle to the river and tributaries from the leased areas. The latter has led the Water Trust to provide for chlorination of the water supply.

Operations within the softwood plantations could pose a hazard to water quality when harvesting commences in about fifteen years, particularly within those planted between the road and the river adjacent to the off-take; however, the total area of these plantations is relatively small, being only 158 ha.

## **LAND CONSERVATION COUNCIL RECOMMENDATIONS FOR WATER PRODUCTION**

The Final Recommendations for the North Eastern Study Area districts 3, 4 and 5 states:-

“..... that all domestic water supply catchments within the study districts should be investigated by the Soil Conservation Authority and, where appropriate,

recommended for proclamation by the Land Conservation Council, in order to ensure a uniform procedure for land use planning within these areas”.

The report states further that within catchments yet to be land use determined:

“the present tenure and management of public land continue for the time being and that once a land use determination has been made, the following areas:

- (i) the storage areas
- (ii) diversion works
- (iii) associated facilities
- (iv) the buffer strips around diversion works and storages, as defined in the land use determination
- (v) any other allotment as specified

be used for

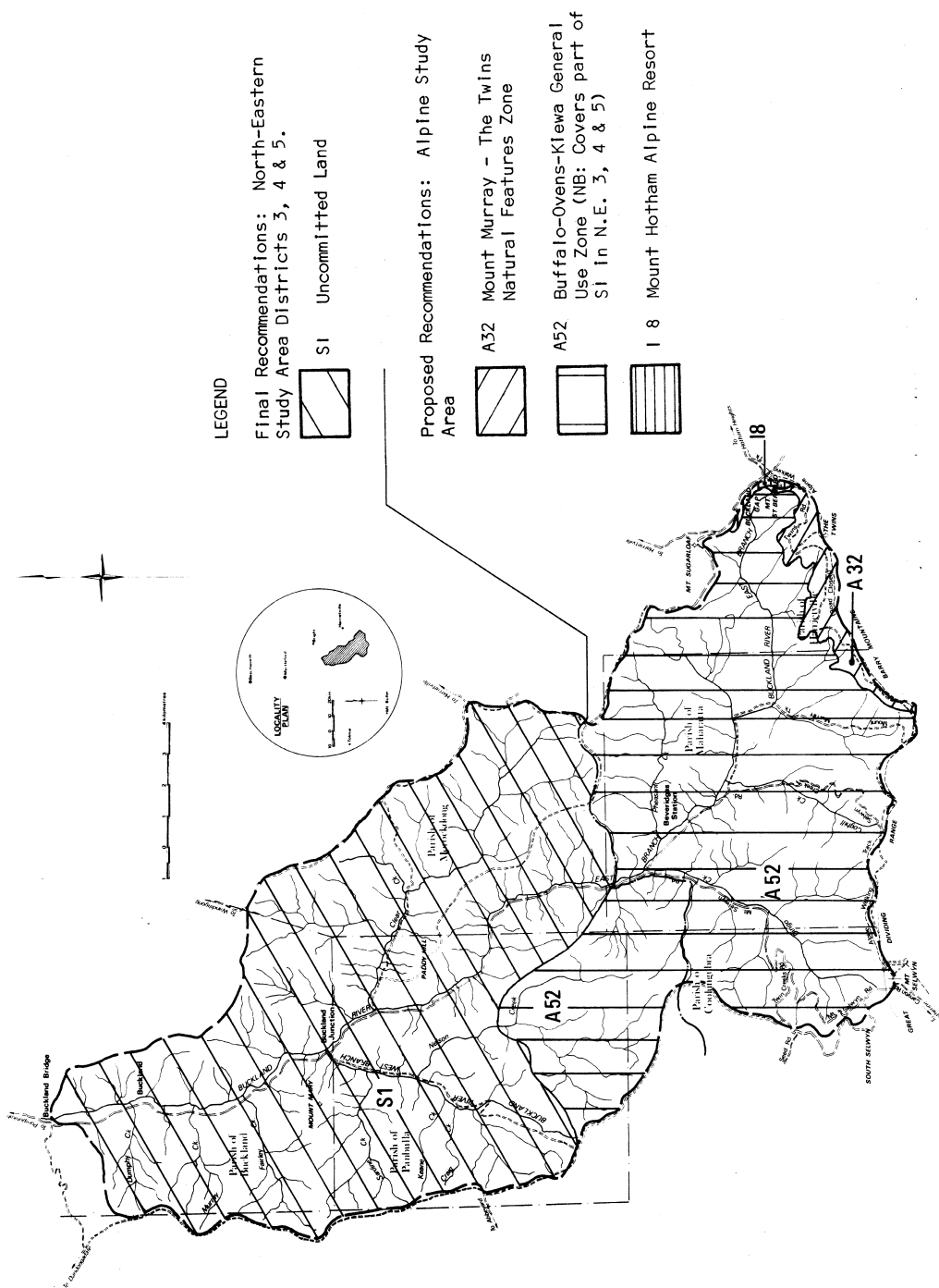
- (a) water supply purposes
- (b) other activities permitted by the water supply authority after consultation with the Soil Conservation Authority and the Environment Protection Authority

and that these areas be permanently reserved under Section 14 of the *Land act 1958* for water supply purposes and be managed by the water supply authority named.”

This catchment was not referred to in the recommendations as proposals for the Porepunkah Water Supply system were not finalised at that time.

In the near future water from the Buckland River will be used for domestic supply. It is appropriate therefore that the catchment to this supply be given multiple-use status and considered on a similar basis to other catchments supplying water for domestic purposes.

MAP - FIGURE 4 - PUBLIC LAND (LCC RECOMMENDATIONS)

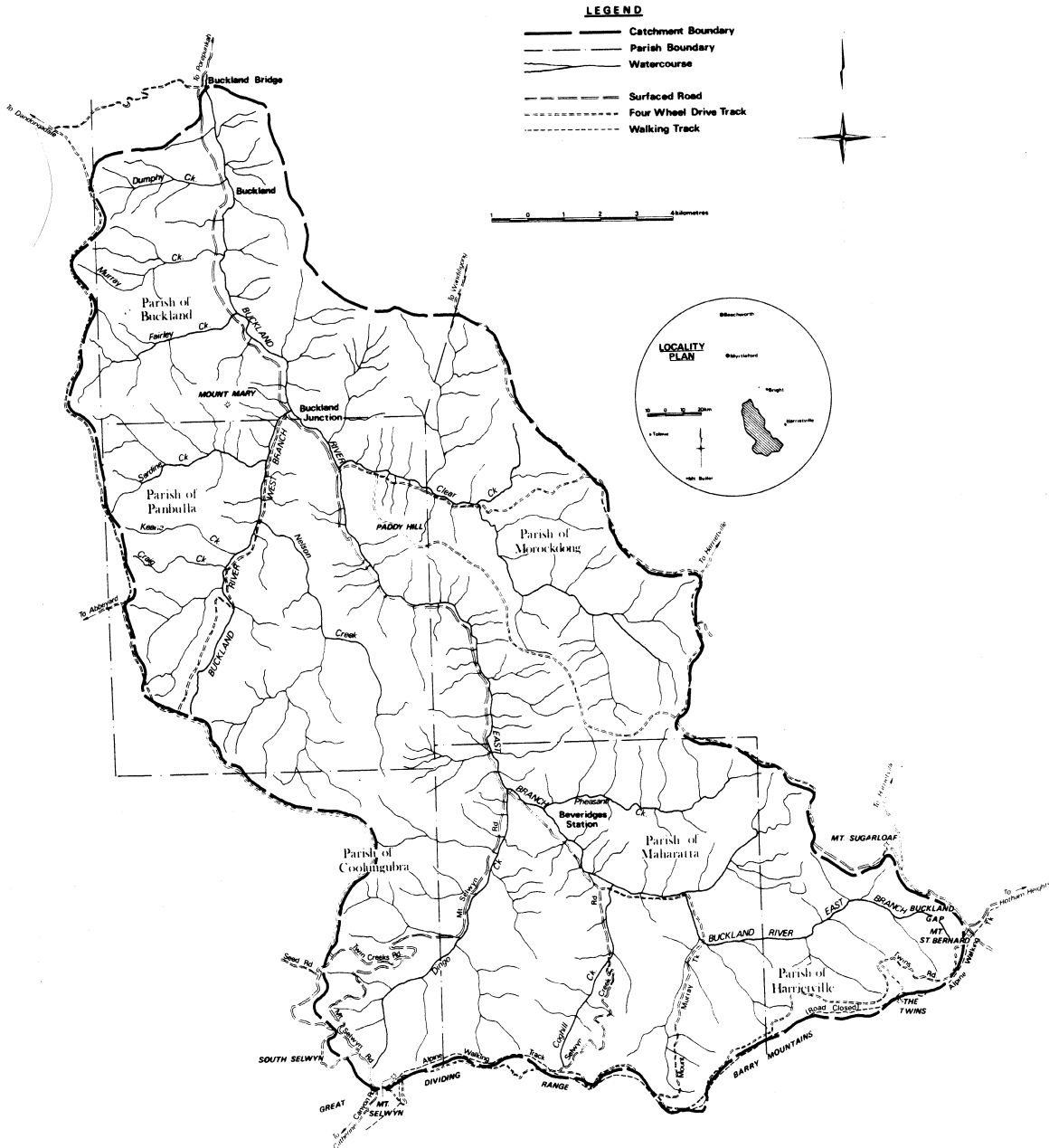


## RECOMMENDATIONS

1. That the Soil Conservation Authority approves this 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 Buckland River Water Supply Catchment, as shown on Plan No. S-752 (Fig. 5) be proclaimed under Section 5(1) (b) of the *Soil Conservation and Land Utilisation Act 1958*.

**MAP - FIG 5 CATCHMENT PLAN No S-752**  
**Buckland River Catchment**

**BUCKLAND RIVER CATCHMENT**





## APPENDIX 1 - CLIMATOLOGICAL DATA FOR BUCKLAND RIVER AREA

Station	Years of Record	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
<b>Average Monthly Rainfall (millimetres)</b>														
Eurobin ( 278m asl)	48	53	58	69	83	108	123	143	136	102	104	77	62	1118
Bright ( 305m asl)	87	53	52	68	71	102	132	126	124	104	107	74	70	1083
Abbeyards ( 320m asl)	5	62	76	134	145	147	191	208	293	140	148	119	91	1664
Harrietville ( 996m asl)	70	66	72	77	91	134	166	173	179	140	139	96	87	1411
Mt. St Bernard (1433m asl)	16	93	71	121	151	132	257	140	159	163	141	98	112	1638
Hotham Heights (1755m asl)	23	85	86	107	127	129	157	141	166	155	152	121	106	1532

### Frequency of Rainfall greater than or equal to the Effective Amount

Bright (%)	44	45	68	77	93	100	100	100	97	98	92	73	67	
Harrietville (%)	63	68	73	87	97	100	100	100	99	100	96	87	78	

### Average monthly maximum, minimum and mean temperatures (°C)

Myrtleford (222m asl) Max	26	30.8	30.0	27.3	21.8	17.	13.5	12.6	14.5	17.9	20.9	24.5	28.5	
Min		11.7	11.8	9.3	6.0	4.1	2.4	2.1	2.8	3.8	6.0	8.0	10.1	
Ave		21.3	20.9	18.3	13.9	10.	8.0	7.4	8.7	10.9	13.5	16.3	19.3	14.1
						6								
Hotham Heights Max	18	15.9	15.4	13.4	8.4	4.7	1.7	0.2	1.1	3.6	7.3	11.1	14.1	
Min		6.6	6.8	5.6	1.6	-0.7	-3.2	-4.2	-3.8	-2.1	0.4	2.9	5.3	
Ave		11.3	11.1	9.5	5.0	2.0	-0.7	-2.0	-1.3	0.8	3.9	7.0	9.7	3.9

Source: Land Conservation Council Report for North-Eastern Study Area Districts 3,4 and 5 Alpine Study Area.

## APPENDIX II - Vegetation Units within Buckland River Catchment

Vegetation Units within Buckland River Catchment *		
Structural Form	Major species of tallest stratum	Associated tree species
Alpine open area complex	Silver ewartia, hoary sunray, snow heath, snow grass	
Sub-alpine woodland Open forest I	Snow gum	Black mallee, ash-mallee spinning gum, mountain gum, candlebark
Sub-alpine to montane Open forest II	Mountain gum Snow gum	Candlebark, broad-leaf peppermint
Open forest IV	Alpine ash	Candlebark, snowgum, bogong gum, narrow-leaf peppermint
Open forest II	Broad-leaf peppermint	Candlebark, red stringy-bark, blue gum, narrow-leaf peppermint, long-leaf box, brittle gum
Open forest III	Narrow-leaf peppermint	Manna gum, candlebark, brittle gum, broad-leaf peppermint, red stringybark

\* Classification system is that used by the Land Conservation Council of Victoria in its North Eastern and Alpine Study Area Reports.