3. GENERAL DESCRIPTION OF THE ENVIRONMENT

An understanding of the physical environment is fundamental to a consideration of land capability. Within this study the physical environment has effectively been 'packaged' into a number of discrete mapping units of facilitate land description and evaluation. In areas of freehold land the intensity of existing and likely future land use warrants detailed description and capability assessment of mapping unit. In the remaining areas of public land within the catchment, the physical environment has been described in less detail where no assessment of land capability was required.

The mapping units for areas of freehold land are described and assessed in section 4 in terms of their observed characteristic features and those parameters which will affect land capability. The majority of these parameters relate to the nature of the landform and soils. Major emphasis has therefore been placed on those factors during the land inventory or description process. However, because this study needs to provide an understanding of the nature of all land within the catchment, the description of the environment extends beyond that for the basic mapping units. Descriptions of broad-scale map units (called land systems) extending over the complete catchment are therefore also included in section 4 and other features of the catchment environment are discussed below.

3.1 General locality description

The upper reaches of the Tanjil River Catchment are within the Baw Baw Plateau some 40 km north of Moe in Central Gippsland (Figure 1). The catchment covers an area of approximately 509 sq km, and extends generally southwards from the mountain plateau through steep mountains and hill terrain and then progressively more gentle foothills to the edge of the La Trobe Valley floor where it meets the Lat Trobe River immediately upstream of the Yallourn Storage Dam. For the purposes of this study the basal point catchment is defined as the offtake point for the Moe city water supply. This is located near the intersection of the Moe-Willow Grove, and Moe-Walhalla roads some 4 km north of Moe (Figure 1).

Two major tributaries, the east and west branches of the Tanjil River, originate on the south-western side of the plateau at an elevation of around 1200 m. These tributaries flow west for a short distance and then run south and link up to form the Tanjil River at Tanjil Junction approximately 4 km north east of the township of Hill End. From here the river flows southwards through the Old Tanjil settlement site to Willow Grove, where it enters the areas of freehold land in the catchment. From Willow Grove, it forms in a generally south-easterly direction through undulating farming country, past Tanjil south and on to the alluvial plains that form part of the La Trobe Valley floor just north of Yaalourn Storage Dam. Two major tributaries which join the river in its lower reaches are Bull Beef and Serpentine Creeks.

3.2. Climate

The climate of the major part of the catchment, excluding the mountain plateau, can be described as temperate. Although temperature data are available from only one recording station and rainfall data from only five stations within the catchment, it is possible to use this data and that from nearby areas of similar elevation to make limited statements about the climate.

(a) Rainfall

Region	Approximate mean annual rainfall (mm)	Approximate mean annual number of rainy days
Northern extremities (Baw Baw Plateau)	1800	195
Southern extremities (La Trobe Valley Plain)	950	145

An extended wet period occurs from May through to November with the highest intensity storms occurring late in that period.

(b) Temperature

Region	Winter		Summer		Annual Mean	
	Min ° C	Max ° C	Min ° C	Max ° C	Min ° C	Max ° C
Upper Catchment (Tanjil Bren)	1	11	8	24	5.6	15.9
Mid Catchment (Estimate for Fumina Sth based on Erica)	4	12	11	24	8.2	17.2

(c) Snow

Regular snowfalls are expected above 950 m elevation from June through to October and persistent snow may lie for most of this time on the Baw Baw plateau.

Further discussion of climatic factors operating within the catchment are given in the "Background Report to the Land Use Determination for the Tanjil River Catchment" by L.D. Russel, Soil Conservation Authority (report in preparation).

3.3 Landform, geology and soils

From its headwaters on the Baw Baw plateau to its lower reaches just north of Moe the Tanjil River catchment extends over a variety of landform, geology and soil types. The highest point in the catchment is at approximately 1500 m elevation and the lowest at 60 m elevation. Two broad physiographic zones are represented, the Eastern Highlands and the Gippsland Sunklands. The former is part of the Great Dividing Range of Victoria and the latter forms part of the lowland area known as the La Trobe Valley. Within these zones there are broad relationships between landform, geology and soils which can be best explained in a discussion based on the land systems and geology, as mapped in figures 3 and 4 and described in adjacent tables. More comprehensive descriptions and mapping of the land systems are given in section 4 of this volume and within volume2, the map atlas. Detailed descriptions of soil types occurring on freehold land are provided in Appendix 2.

The dominant feature of the catchment is the Mt Baw Baw massif which, together with the adjacent Toorongo plateau, forms a rim of Devonian granite and granodiorite along the upper northern edge of the catchment. Baw Baw, Cascade and Toorongo land systems are represented at these high elevations. This group of land systems extends over approximately 40 sq km or 8 per cent of the catchment. Baw Baw and Cascade land systems have dominantly shallow to moderately deep friable earths with occasional Alpine Humus and Peat soils, whilst Toorong land system has deeper soils which are more brown or red in colour and gradational in texture trend. An interesting feature of the area is the pronounced rectangular pattern of shallow valleys that have formed along joint planes in the upper Devonian granodiorite of the plateau.

Beneath the plateau the terrain of the northern catchment region consists of a steep mountainous ridge and ravine complex with s dense dendritic drainage pattern. Dominantly shallow to moderately deep friable brown soils occur here. This strongly dissected terrain (Kirchubel land system) occurs on the upper Devonian granodiorite and associated metamorphosed sediments. It occupies approximately 85 sq kn or 16.7 per cent of the catchment area.

The steep mountainous terrain fall rapidly to a general level of 500 – 600 m and then more gradually to around 300 m. This more subdued ridge and ravine topography occurs on the Devonian metamorphics and belongs to the Tanjil land system. Within this region, relatively broad flat remnants of a previous land surface occur. These have been mapped as Wellington land system. Deep gradational brown, red and, less commonly, yellow soils occur in both these land systems which occupy approximately 100 sq km or 20 per cent of the catchment area.

Table 3 Land Systems of the Tanjil Catchment

Land System	Geology	Elevation Range (m)	Topography	Dominant Soils	% of Catchment Area
Baw Baw (Bb)	Upper Devonian granodiorite	1220 – 1560	Hilly terrain on mountain plateau	Alpine humus soils and shallow friable brown earths	5.1
Cascade (Cc)	Upper Devonian granodiorite	1100 – 1220	Moderately hilly terrain flanking plateau	Friable brown earths	0.8
Toorongo (To)	Upper Devonian granodiorite	900 – 1100	Hilly to undulating plateau remnants	Gradational brown and red earths, humic grey	2.0
Kirchubel (Kl)	Upper Devonian granodiorite and associated metamorphosed sediments	380 – 900	Steep mountainous 'ridge and ravine' terrain	Gradational red and brown earths	16.7
Wellington (Wn)	Metamorphoed Devonian sediments	540 – 620	Hilly to undulating plateau remnants	Gradational red and brown earths	2.6
Tanjil (Tj)	Metamorphoed Devonian sediments	260 – 700	Hilly terrain	Gradational red, brown and yellow earths	17.1
La Trobe (Le) and Buln Buln (Bu)	Lower Devonian mudstones, sandstones, siltstones and shales	80 – 610	Steep hilly terrain	Gradational grey and yellow earths	32.9 0.3
Neerim (Nm)	Tertiary volcanics, olivine basalt	80 – 680	Hilly to gently undulating terrain	Gradational red earth, strongly structured	4.4
Stewart (Sw)	Tertiary and lower Devonian siltstones and mudstones	120 – 220	Rounded hills and gently undulating terrain	Gradational and duplex yellow soils, yellow podzolics and yellow earths; dispersible	3.6
Anderson (An) and Westbury (Wy)	Tertiary gravel, sand and clays	60 – 220	Hilly to undulating terrain	Duplex and gradational yellow soils	11.6 0.8
Moe (Mo)	Quaternary, Recent alluvial terrace deposits	55 – 75	Broad, almost flat alluvial plains	Gradational grey or grey brown earths and uniform sandy soils	0.8
Traralgon (Tg)	Quaternary, Recent stream alluvium	50 – 110	Incised drainage floors and flood plains	Friable loams and gradational grey brown earths	1.5

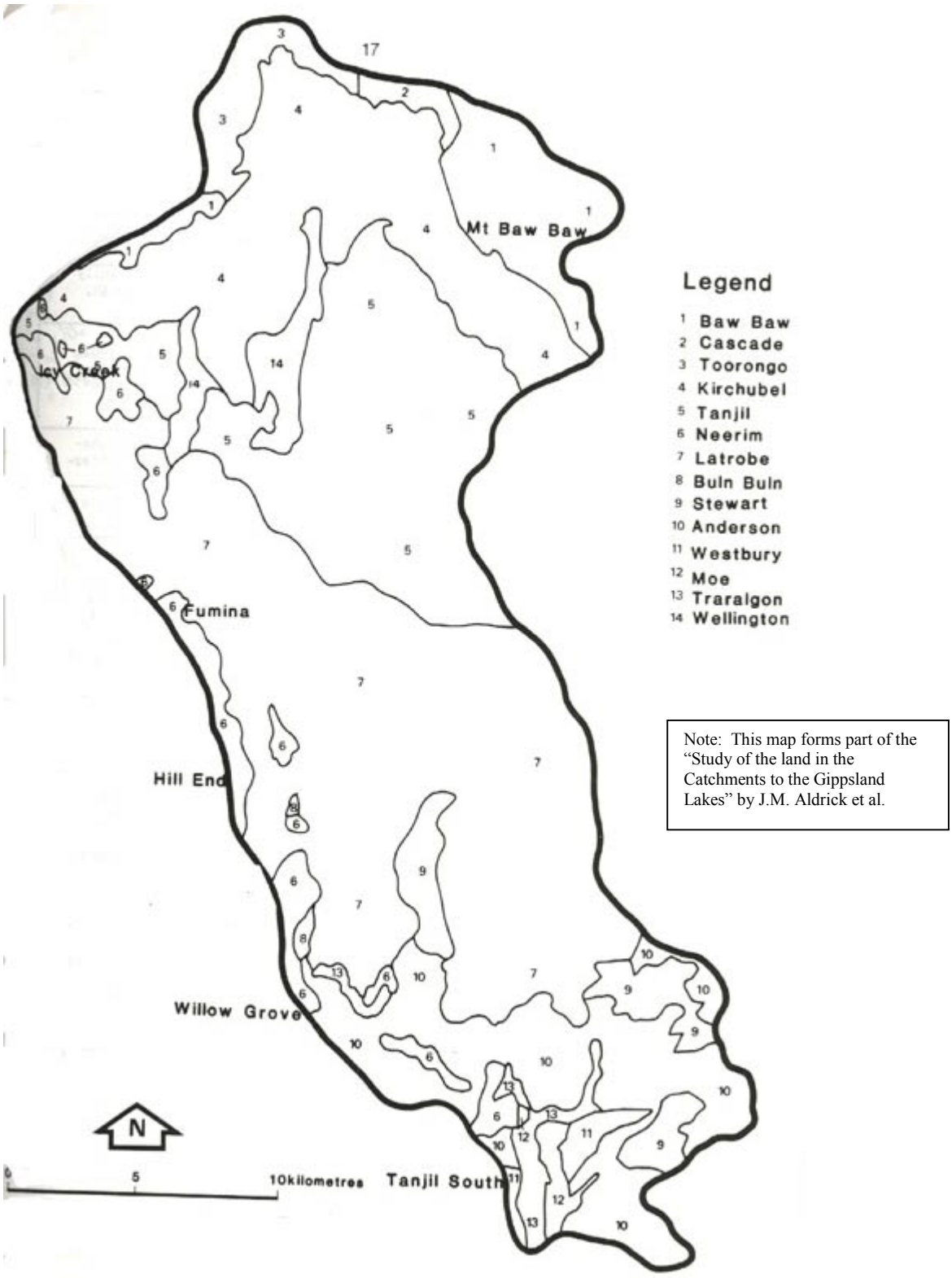

Fig 3 – Land Systems of the Tanjil Catchment

Table 4 Geology of the Tanjil River Catchment

Age	Period	Sediment-ary	Igneous	Meta-morphic	Description
QUATERNARY	Recent	QRA			Stream alluvium, floodplain and very low terrace deposits; sand, silt, clay, gravel.
		QRT			Alluvial terrace deposits; brown-grey clay, silt, sand, minor gravel.
		QRC			Scree and fan deposits; 'gully' alluvium; gravel, sand, silt, often ill sorted.
TERTIARY	Pliocene	TG or TPH or TEC			Undifferentiated gravel, sand, silt, clay, carbonaceous rare brown coal; includes Haunted Hill Gravels, Childers Formation and equivalents.
	Miocene-Oligocene		TVT or TVO		Basalt, olivine basalt, nephelinite, minor tuff; with interbedded sandstone, silcrete.
	Oligocene-Eocne	TE			Gravel, sand, clay, quartzite; sub-Older Basalt Sediments.
DEVONIAN	Upper		DGT		Tanjil Bren Area: - granite, porphyrite, coarse-grained Mt Toorongo Area; - granodiorite, medium, even grained hornblende-bearing.
			DGA		Baw Baw granodiorite, medium, even-grained, hornblende-bearing.
				m	Metamorphic aureoles; hornfels, spotted sediments; schistose and gneissic volcanics.
	Middle-Lower	DLT or DLN			Undifferentiated sandstone, siltstone, rare conglomerate, sandstone often thick massive and interbedded with thin siltstone and claystone.
		DLG			Black shale, laminated, fissile, contains graptolites.
	Lower	DLO			Siltsonte; grey and brown; well bedded t structureless, abundant bioturbation; quartz rich and chert bearing sandstone and conglomerate more common to the east.
		DLW			Sitlstone; grey to yellow colour; laminated, thinly bedded fine sandstone.
SILURIAN	Upper	SUS			Sandstone; grey, fine grained, graded; interbedded laminated grey siltstone containing graplolites.
	Middle	SMB			Siltstone; grey-yellow, massive to laminated; thinly bedded fine sandstone.

NOTE: Where alternative geological symbols are used, the latter refers to the older terminology used on the 1:250 000 sheets, and the former refers to the map opposite the newer terminology on suspending 1:50 00 sheets.

Hilly terrain in the centre of the catchment represents the foothill regions of the Eastern Highlands. This region has a general elevation of 250 – 350 m and has been mapped as La Trobe land system. Hill slopes become gradually less steep to the south and west of Tanjil Junction and broad ridges and moderately sloping spurs (Buln Buln land system) may occur. Steeper areas occur near river or creek systems and in the south east around Mt. Tanjil and Mt. Carmel. The basement rocks of the catchment area, lower Devonian mudstones, sandstones, siltstones and shale, outcrop extensively in the foothills.

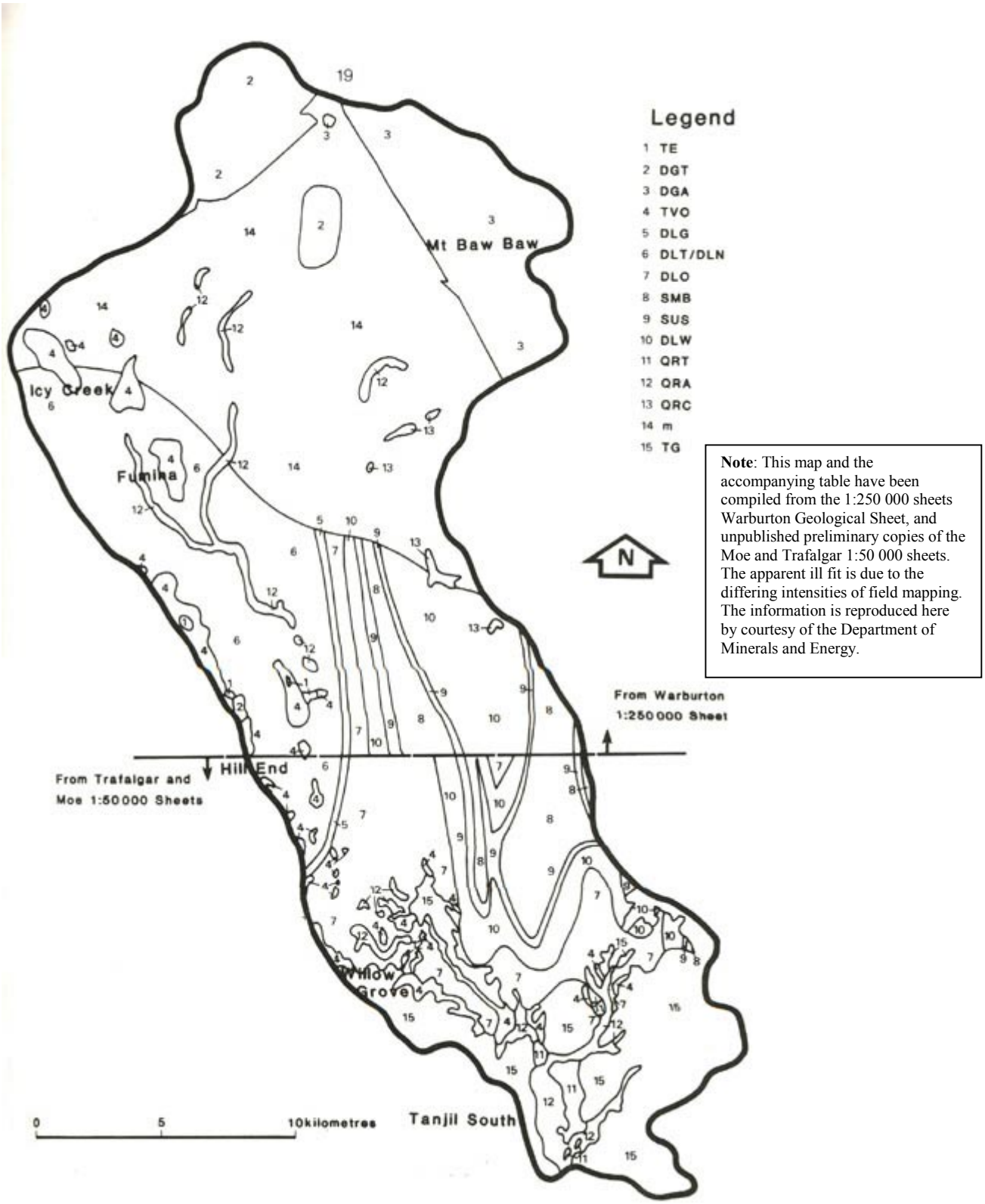

Fig 4 – Tanjil River Catchment - Geology

Within La Trobe and Buln Buln land systems the donimant soils are gradational grey or yellow earths which are frequently only shallow to moderately deep. However in areas where there is a predominance of siltstone and mudstone parent material, deeper, siltier, more dispersible grey soils, either duplex or gradational in nature have developed. In these areas, mapped as Stewart land system, the topography tends to be more rounded and less dissected.

Stewart land system occupies approximately 18 sq km or 3.6 per cent of the catchment.

In the southern catchment region, below La Trobe land system, the lower Devonian sediments are extensively overlain by Tertiary basalts, sand and gravel. Tertiary basalt residuals, mapped as Neerim land system occur on rounded crests in scattered areas along the western margin of the catchment. This land system is characterised by deep well drained, strongly structured red 'krasnozemic' soils on undulating terrain. Freehold farming are concentrated on these areas along the western margin of the catchment. Neerim land system occupies approximately 22 sq kn or 4.4 per cent of the catchment.

Areas with Tertiary gravel, sand or clay parent materials have been mapped as Anderson and Westbury land systems. Variable duplex and gradational yellow soils occur most commonly. These land systems occupy approximately 63 sq km or 12.4 per cent of the catchment. The areas are moderately dissected, Anderson more so than Westbury, and exhibit an undulating terrain which merges gradually into the flat alluvial plain to the north of Moe at approximately 60 m elevation.

The lower reaches of the Tanjil River merge into the Moe alluvial plain which in turn forms part of the physiographic zone known as the Gippsland Sunklands. Two land systems have been mapped on the Quaternary alluvial deposit areas. Generally broad higher level alluvial terraces, most extensive on the eastern side of the river, have been mapped as Moe land system. Moderately well drained gradational grey or grey brown earths and some uniform sandy soils occur here. The lower level drainage floors has been mapped as Traralgon land system. These latter areas occur on Recent alluvial deposits and have less well drained friable loams and gradational grey brown earths. The generally flat alluvial areas of the lower catchment occupy approximately 11.5 sq km or 2.3 per cent of the total area

3.4 Existing Vegetation

The major part of the freehold land in the catchment has been cleared of the native forest for either cultivation, grazing or residential purposes.

A simplified vegetation map of public land in the catchment, adapted from the Melbourne Study Area Land Conservation Council report, is presented in figure 5. Brief descriptions of the vegetation types mapped are given in the adjacent table. In addition, descriptions of the vegetation recorded in each of the catchment land systems are given in section 4 of this volume.

Further consideration of the catchment vegetation and its effect on catchment management is given in the "Background Report to the Tanjil River Catchment Land Use Determination" by L.D. Russel.

3.5 Land Tenure and Use

Freehold land covers approximately 110 sq km or 22 per cent of the catchment area. It occurs mainly in the southern region and along the western margin of the catchment between Fumina South and Tanjil South. Small fragmented areas also occur in the north-western portion of the catchment round Icy Creek, Fumina and Simpson's Farm. For the purpose of this study the remaining 400 sq kn or 78 per cent of the catchment can be regarded as public.

Within public land in the northern and eastern parts of the catchment, there are considerable areas of reserved forest which have been logged periodically. Substantial use is made of the river and its catchment area for recreation purposes including hunting, fishing, bushwalking, picnicing and fossicking. With respect to the latter, areas around Old Tanjil, the site of gold mining operations of the last century, are of particular interest. The summit areas of Mt Baw Baw are used intensively for cross country and downhill skiing in winter and for bushwalking in the summer.

Freehold land in the lower foothills and on alluvial river flats supports a variety of agricultural pursuits in addition to the small townships of Willow Grove, Hill End and Tanjil South. Most of the agricultural land is currently being used for grazing of either beef or dairy herds, but land development for rural residential and hobby farm uses is steadily increasing throughout

the area. Freehold land in the north also supports grazing with some cropping activities near small township of Icy Creek.

Construction of the 200, 000 megalitre Blue Rock dam is currently underway on the Tanjil River some 4 km east south of Willow Grove. When filled, the surface area will be approximately 8.7 sq km. Water from the storage will be used for industrial and other purposes in the La Trobe Valley.

A comprehensive study of land tenure and land use is included in the "Background Report to the Tanjil River Catchment Land Use Determination" by L.D. Russell. Readers are referred to that SCA report for further information on these topics.

3.6 Existing Erosion

There is relatively little obvious erosion of the soils within the areas of freehold land in the catchment. The major reasons for this are the predominance of good ground cover on areas which carry pasture and the siting of major roads along crests.

There are, however, areas that warrant attention. Minor slumping of batters and silting of tables drains occur in areas of (i) dispersible soils on Tertiary sediments south of Willow Grove and (ii) in some of the Tertiary basalt areas high in the catchment near Icy Creek. In addition, landslips and mass movement have occurred on steep areas on Tertiary basalt, particularly near the river to the north of Tanjil South.

Moderately sever gully and sheet erosion has occurred on some areas of public land with soils derived from very silty parent materials. The most notable examples occur on tracks leading into the old Tanjil site some 2 km north of Willow Grove. Such soils occur in some areas of La Trobe and more commonly in Stewart land systems. There is some evidence of erosion on steep hills slopes in the catchment that have been subjected to logging operations.

Table 5 Vegetation of the Tanjil River Catchment

General Area	Structural Form	Major Species
Plateau above 1200 m	1. Sub-alpine complex of woodland – low open forest (<15m) heaths, herbfield, grassland and sedgefield	Snow gum, Alpine heath, Tussock grass, Sphagnum sp.
Hilly to mountain terrain, 370 – 1200 m	2. Tall open forest (>40 m)	Above 950 m; Alpine Ash Below 950 m; Mountain Ash, also Messate, Mountain Grey Gum.
Hilly terrain below 320 m	3. Open forest (28 – 40 m)	On favourable sites; Mountain Grey Gum, Messmate, Stringybark, Narrow-leaf Peppermint. On less favourable sites; Silvertop, Brown Stringybark, Messmate, Yertchuk, White Stringybark.
Low elevation ridge tops and dry aspects	4. Low open forest (15 – 28 m)	Messmate, Narrow-leaf Peppermint, Silvertop, some Manna Gum.
Areas with low rounded hills on silty soil parent materials	5. Woodland with scrub understorey	Yertchuk, Silver-leaf Stringybark, Melaleuca.

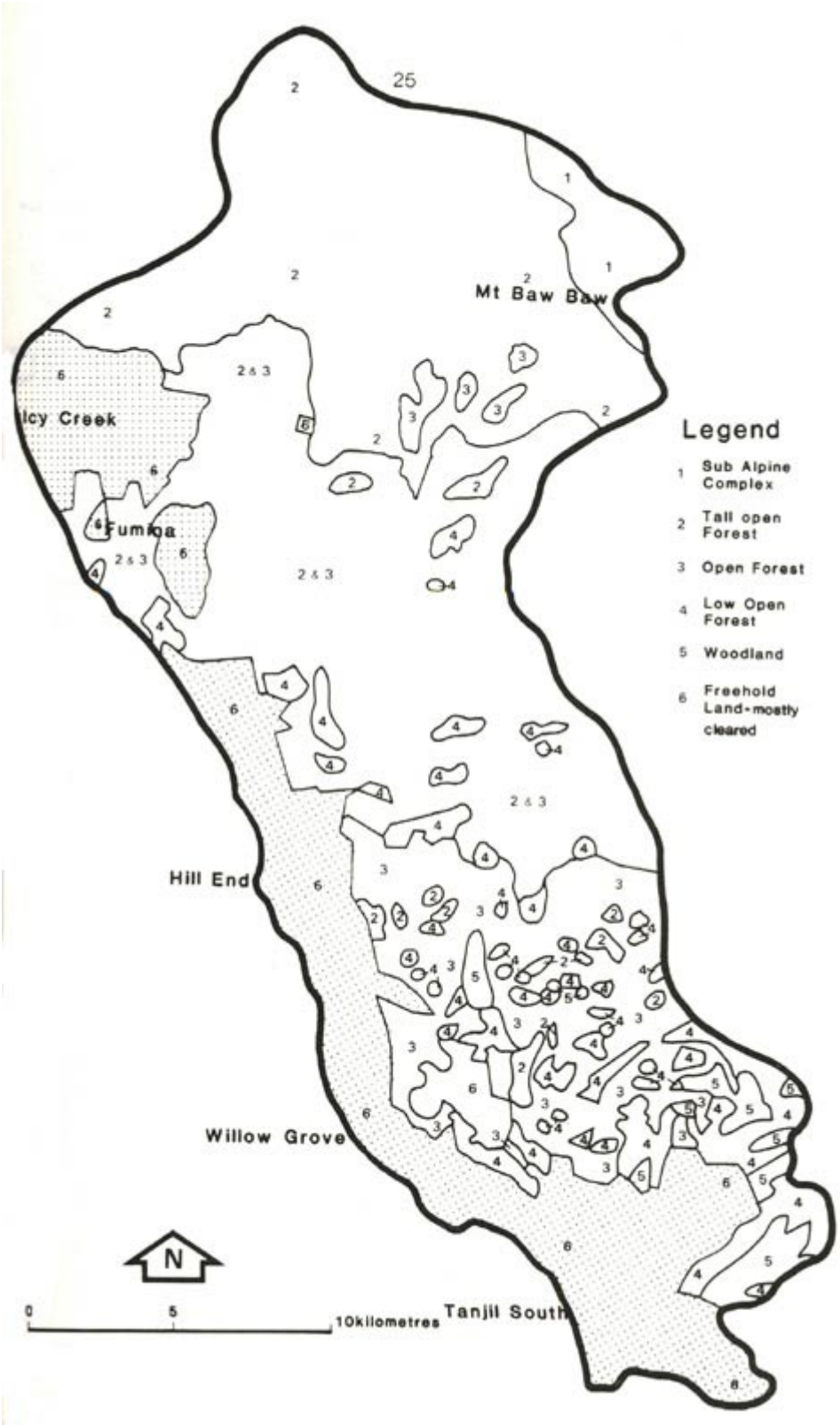

Fig 5 – Vegetation of the Tanjil River Catchment