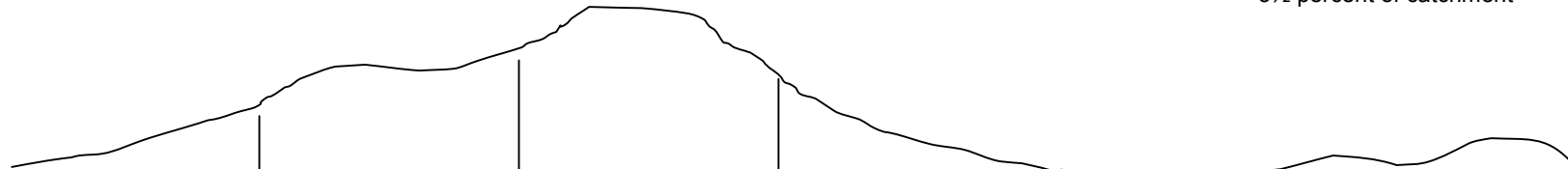


TOLMIE LAND SYSTEM (Figure 24)

Area: 74 square kilometres
3½ percent of catchment



Topography	Side slopes at elevation from about 600 m	Plateaux and broad ridges up to about 900 m elevation.	Questaform ridge top	Rolling, dissected plateau	Drainage line	Dissected plateau
Climate	Average annual rainfall about 1 150 mm. Growing season: October-April. Estimated average temperatures: Jan 18°C; July 4°C; Year 11°C. Estimated evapotranspiration: Jan 110 mm; July 13 mm; Year 560 mm.					
Parent Materials	Carboniferous age sedimentary rocks and materials derived from them.					
	Rock, colluvium and redeposited soil materials.		Rock	Rock, colluvium and redeposited soil material	Alluvium Rock	
Soils	Reddish and yellowish duplex soils; weakly bleached gradational soils.	Reddish and yellow duplex soils.	Stony loams, weakly bleached gradational soils.	Reddish and yellowish duplex soils.	Gleyed grey loams.	Reddish and yellowish duplex soils.
Vegetation	Open forest of broad-leaf peppermint and candlebark gum; transition zone from the box species forests of the adjacent land system.	Open forest of narrow-leaf peppermint and candlebark gum with blackwood and other wattles.	Candlebark gum and broad-leaf peppermint.	Open forest of narrow-leaf peppermint and candlebark gum.	Swamp gum.	Open forest of candlebark gum, broad-leaf and narrow-leaf peppermint.
Land Uses	Largely unused; partly cleared and grazed.	Mostly unused; little clearing.	Unused.	Some clearing: grazing on native pastures.	Unused	Some cleared and grazed.
Erosion Hazard	Moderate because of long slopes.	Moderate to low.		Moderate	Moderate	Moderate to low.
Erosion Status	Sound, with good cover of grasses. Some stream erosion on steep gradients.	Sound, ground cover under forest is very good.	Some sheet erosion.	Some minor erosion; generally good ground cover.	Sound	Sound; good cover of native grasses.
Potential Land Use	This is a useful water-source area. Forested area should be managed for catchment protection, although some timber production should be possible. Cleared land is capable of further improvement with sown pastures but cold winters are a limiting factor for agricultural and pastoral areas. Parts could be useful for fauna and flora conservation.					

TOLMIE LAND SYSTEM

(See Fig. 24)

The hilly to rolling plateau country on Carboniferous Age sediments at elevations of 600 m to 900 m has been defined as the Tolmie land system. This land system includes the side slopes and hills but not the lower slopes or steep creek heads cut in Carboniferous rocks, which are included in the Table-Top or the Cambatong land systems. There are 74 square kilometres of the land system within the Broken River catchment and it extends into the catchment of the upper King River to the east where it has been named the Wabonga land system (R. K. Rowe, in preparation).

The topography consists of rolling, mildly dissected plateaux, broad ridges and a number of questa-form ridge tops. The details of the topography are largely controlled by the outcrop patterns of the gently dipping sedimentary rocks and the boundaries of these beds with either the basalts which overlie them or the acid lavas which underlie them.

The climate is cool and moist with an annual rainfall from about 900 mm to 1250 mm with a pronounced winter incidence. The growing season is October to April. The winter is severe and frosts limit plant growth. Snow may fall in the area several times each winter but does not lie for very long.

The vegetation is open forest of narrow-leaf peppermint and candlebark gum with swamp gum, blackwood and silver wattle along the creek lines. The high proportion of candlebark gum on the flat country as compared with its proportion among the dominant forest species on the slopes is particularly notable. These predominantly gum forests seem to be characteristic of cold frosty locations. The forest is generally fairly open, and the floor is well covered with tussock grasses, herbs and litter. A small proportion of the land system is cleared, although much of the area has been cleared or heavily logged in the past and the forest is now regenerating.

The area is characterized by deep reddish and yellowish duplex soils. The A-horizon is typically thick and the surface is darkened by organic matter. The transition to the clay horizon is more gradual than in the typical duplex soils. Weakly-bleached gradational soils occur along the drainage lines and depressions, and undifferentiated stony loams are found on the ridge tops. The soils of this land system, although not particularly fertile, are physically quite satisfactory for plant growth, and should not limit agricultural development.

Part of the land system is cleared and used for grazing, mainly on pastures of native and volunteer species. There is a little commercial quality timber. The forests of the area are poorly stocked and generally in poor condition, partly because of fire damage and partly because much is regrowth. The erosion hazard is mild, and erosion is currently limited to the steeper ridge tops. Erosion is not significant on an overall catchment basis.

The area has potential for pasture development and timber production. For either purpose it is at the moment largely undeveloped.

Runoff from the area is significant, mainly because of the high winter peak in rainfall, and it should be considered as a fairly important source of water to the Broken River storages. At present it is in sound condition, largely because of the lack of exploitation and the favourable climate. The forest floor in particular is in good hydrologic condition.

For maximum catchment efficiency the area should be maintained in a well vegetated condition, either with well managed pastures of introduced species or with the forest ground cover species in their natural condition. Repeated burning could impair the effectiveness of the ground cover.

CAMBATONG LAND SYSTEM

(See Fig. 25)

The headwaters of the Broken River drain 41 square kilometres of deeply dissected Carboniferous Age sediment, which has been defined as the Cambatong land system. There are similar areas in the Upper King drainage and in many streams in Gippsland which originate in the same sedimentary rocks. Because of the closeness and depth of the dissection the dip of the rocks has had much less effect on the topography than it has elsewhere, and the area has developed a closely spaced drainage pattern, and locally, a rough topography. The central area is at elevations from about 300 m to 460 m and is closely dissected, but the upper end of the catchment is higher, steeper and has much longer slopes.

The climate is variable but mainly fairly wet. Rainfalls are generally between 1000 mm and 1250 mm per annum, with winter the wettest season. The area receives some snow but little persists; there are no major snow areas within the catchment. The growing season is approximately March to May and September to December at lower elevations, but higher up, where soils may stay moist through the summer, it may extend from November to April.

Very little of the land system is cleared and the native vegetation consists of the peppermint gum open forests characteristic of most of the mountainous area. There appears to be a fairly wide climatic range across the land system from west to east, that is,

parallel to the topographic range from the valleys to the headwaters. In the drier areas the forests are mainly of broad-leaf peppermint and candlebark gum, but in the higher rainfall areas these are replaced by narrow-leaf peppermint and candlebark gum with blue gum in the gullies. Swamp gum grows along the streams, and on the moister aspects, messmate occurs with narrow-leaf peppermint and manna gum. In these situations the vegetation structure may be closed forest. The long west-facing slopes of the headwaters carry forests of broad-leaf and narrow-leaf peppermint with some candlebark gum. On the higher ridge tops there is a low open forest to woodland of snow gum.



Plate 19. This gully is being widened by meandering of its stream. It discharges directly into Lake Mokoan.

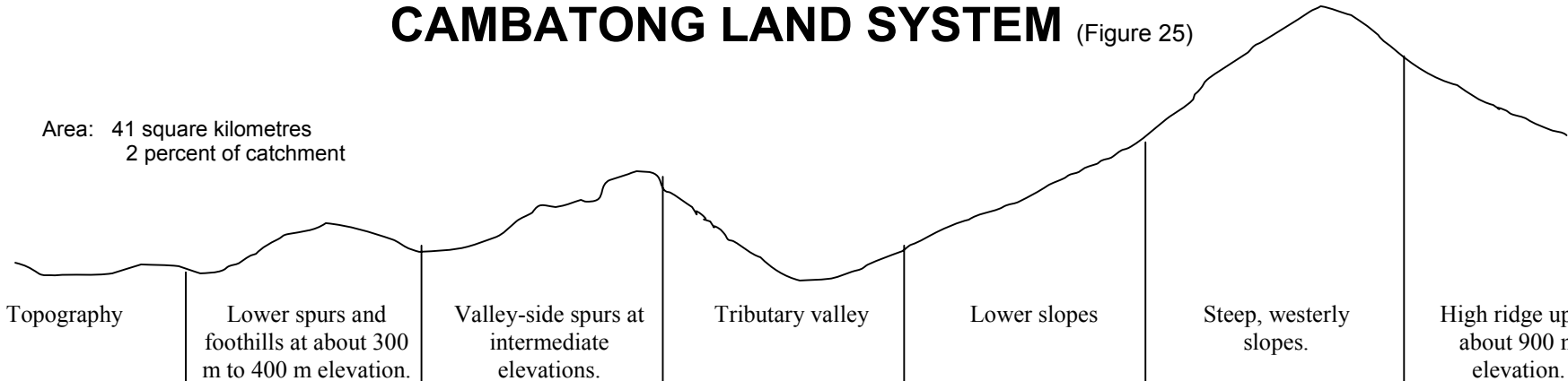
The soils also vary along this climatic sequence and range from weakly-bleached gradational soils in the drier areas to friable brownish gradational soils and friable brown clay loams in the wetter areas, with undifferentiated stony soils and some deep organic loams on the higher ridge tops. In common with other land systems on this rock type the soils are more leached than comparable soils on other rocks, and the weakly-bleached gradational soils penetrate further into the higher rainfall area than is generally typical of the mountains.

At present the area is under forest and is used as wildlife habitat, for protection of the catchment and for limited production of mill logs. Timber production is mainly from the higher rainfall areas in the upper valleys of the tributaries on the northern side of the river. The higher areas, which carry snow gum, and the drier low areas of peppermint-gum forest, do not produce useful timber. Because of the steep slopes and generally rugged terrain the area is not suitable for other forms of development, so that the retention of the area for wildlife habitat, catchment protection and limited timber production are the most suitable forms of land-use.

The area is an important source of water and would contribute substantially to stream flow throughout the year. Management practices should aim at maintaining the area in sound condition for the supply of water.

CAMBATONG LAND SYSTEM (Figure 25)

Area: 41 square kilometres
2 percent of catchment



Topography	Lower spurs and foothills at about 300 m to 400 m elevation.	Valley-side spurs at intermediate elevations.	Tributary valley	Lower slopes	Steep, westerly slopes.	High ridge up to about 900 m elevation.
Climate	Average annual rainfall from about 1 000 mm to 1 250 mm; mainly in winter with occasional snow. Growing season: March-May and September-December at lower elevations. November-April at upper elevations. Estimated average temperature Jan 17°C-21°C; July 3°C-7°C; Year 10°C-14°C. Estimated evapotranspiration: Jan 125 mm; July 13 mm; Year 620-760 mm.					
Parent Materials	Carboniferous age rocks and materials derived from them.					
Soils	Friable brownish gradational soils and friable brownish clay loams, some weakly bleached gradational soils.	Friable brownish gradational soils and friable brownish clay loams, some with thick organic A horizon.	Deep friable brownish clay loams.	Friable brownish clay loams and gradational soils.	Stony loams; friable brownish gradational soils.	Stony loams; deep organic loams.
Vegetation	Open forest of broad-leaf peppermint and candlebark gum.	Open forest of candlebark gum and narrow-leaf peppermint with blue gum in gullies and swamp gum in areas of impeded drainage.	Open forest to closed forest of messmate, narrow-leaf peppermint and manna gum.	Open forest of narrow-leaf peppermint and candlebark gum.	Open forest of broad-leaf narrow-leaf peppermint and candlebark gum.	Woodland to open forest of snow gum.
Land Use	Unused	Mostly unused, some timber production.	Timber production.	Mostly unused.	Unused	Unused.
Erosion Hazard	Moderate to low	Moderate to low	Low	Moderate to high		
Erosion Status	Generally sound	Generally sound	Generally sound	Generally sound		Some sheet erosion.
Potential Land Use	A valuable water supply area which should be managed with maintenance of sound catchment condition as the prime objective; some timber production; wildlife habitat; improved road access; protection from fire.					