3. GEOLOGY AND GEOMORPHOLOGY

The geology of the catchment has been mapped by the Geological Survey of Victoria and published at a scale of 1:250 000 on the Wangaratta, Tallangatta and Warburton map sheets (SJ 55-2, SJ 55-3 and SJ 55-6, respectively).

Most of the area of the survey to the east of the Rose River and north of the Cobbler Plateau consists of Middle to Upper Ordovician sedimentary rocks, which range through greywacke, sand-stone, siltstone, mudstone and shale, and which have been subjected to complex folding, faulting and uplift. The principal drainage trend is to the north-north-west, and dissection by the main streams has produced steep mountainous topography and narrow valleys with narrow strips of stream alluvium in the headwaters. However, the topography in the northern half of the study area is more mature and wide valleys with less-steep hilly interfluves predominate.

The main non-sedimentary rocks to the east of the Rose River are the Upper Devonian granite of Mount Buffalo, the Silurian granite of The Pinnacles, and smaller granitic intrusions around Mount Emu, Mount Stanley and Mount Selwyn and at Abbeyard. The Mount Buffalo granite — a large massif with steep rocky escarpments topped by dissected plateaux — dominates the landscape bounded by the lower Buffalo, Ovens and Buckland Rivers. Topographically, the other areas of granite form a complex of small basins and steep slopes with occasional steep rocky escarpments and peaks, although the area north of Mount Selwyn lacks steep escarpments.

To the west of the Rose River, a complex of Lower Carboniferous sediments and Upper Devonian acid lavas extends across the catchment of the upper King River, Boggy Creek, .Fifteen Mile Creek and Middle Creek into the catchments of the Broken and upper Goulburn Rivers. The lavas are predominantly rhyolite and rhyodacite. The Lower Carboniferous sediments, which overlie the lavas, are terrestrial deposits ranging from coarse conglomerate through red sandstone to siltstone and shale.

This area of younger rocks is separated from the older rocks to the east and north by faults. Drag along the fault line on the eastern margin has resulted in steeply dipping Lower Carboniferous rocks forming the Mount Typo-Mount Warrick razorback ridge. The northern delimiting fault extends in a north-westerly direction through the Whitfield and Myrrhee areas.

Outliers of Lower Carboniferous rocks that occur in the Hansonville-Greta area extend into the study area in the north.

Gentle folding of the rocks in the south-western corner of the study area has produced low-angle dips and, where deep dissection has occurred, has resulted in cuesta-form landscapes. This is well illustrated in the Wabonga plateau to the east of the King River and by the Cobbler Plateau, where gentle dip slopes contrast with precipitous scarp slopes.

The sediments thin out to the north and are absent from the narrow plateaux on the divides between the Middle, Fifteen Mile and Boggy Creeks south of Myrrhee.

Thicker beds of Lower Carboniferous sediments in the south of the study area have been deeply dissected to produce steep mountainous terrain, notably in the headwaters of the King River East Branch. The prominent razorback ridge of The Razor is also formed in these rocks.

These Ordovician sedimentary rocks are folded and distorted.

Dissected old fans and terraces make up much of the valley landscape in the north (above). By contrast, steep mountain slopes occupy much of the southern part of the study area (such as those shown below).

Small residuals of Eocene basalt occur around the south-western edge of the catchment in the vicinity of Toombullup, and extend to the north as discrete residuals in the Whitlands area and along the top of the ridges between Middle Creek, Boggy Creek and the King River between Whitfield and Greta South. These residuals usually form plateaux of gently rolling to low hilly topography.

The Mount Stirling granodiorite extends into the upper King catchment and separates the Carboniferous sediments of the Cobbler Plateau from those further to the west.

The valley landscapes, which become broader and more extensive in the north, are largely formed of unconsolidated sediments derived from the adjacent areas of bedrock and therefore show close covariance of lithologies. Although most streams have a set of at least several alluvial terraces, the most widespread sediments are of mixed alluvial and colluvial origin and are stratigraphically complex.

Eight geomorphic zones have been identified and are shown in Figure 4. For presentation on the land systems map, the land systems have been grouped according to geomorphic zone. These zones are briefly described below.

Plateaux higher than 1200 m

Only one area of low relief at this elevation is sufficiently large to be mapped as an entity at the pre-sent scale — the Cobbler Plateau. The form of the plateau is controlled by the dip of the Lower Carboniferous sedimentary rocks on which it is formed.

Plateaux lower than 1200 m

The elevation criterion distinguishing this from the former zone is rather arbitary, but is chosen to separate those areas with a sub-alpine climate from those with a more temperate climate. Plateaux in this zone occur on Lower Carboniferous sediments and the Upper Devonian acid lavas. In both cases the structural control appears to be the dominant influence. However, the Stanley plateau is on Ordovician sedimentary rocks that are highly folded and the plateau surface is presumed to be of erosional origin.

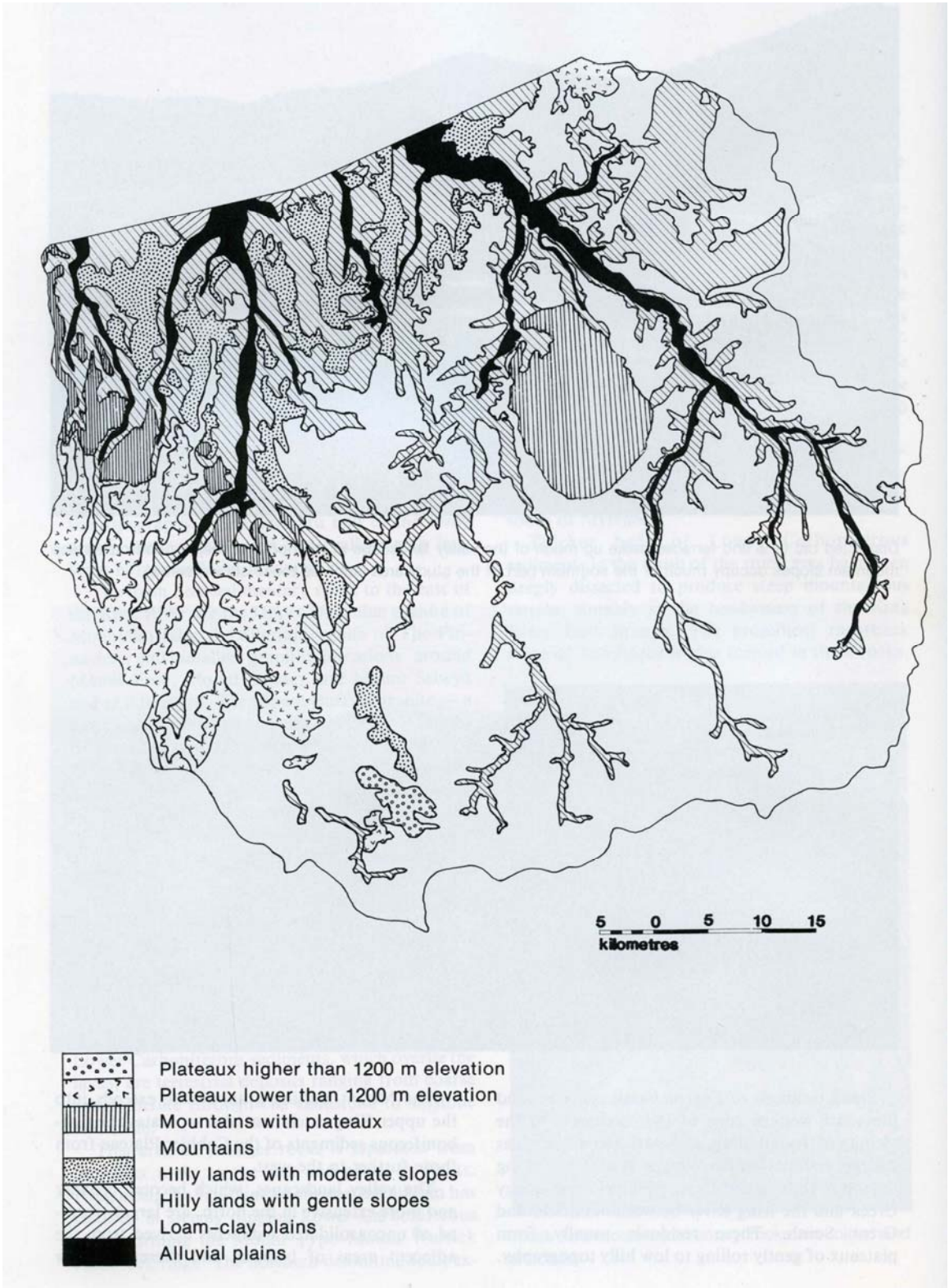

Figure 4 – Geomorphic zones

Mountains with plateaux

Mountains with long steep slopes and narrow valleys but with plateaux and broad ridge crests occur on the granite of Mount Buffalo and the Upper Devonian acid lavas in the west, typified by the Drum Top area. This zone is transitional between the preceding and following zones; it brings together land systems with an intimate association of steep slopes and plateaux that present mapping difficulties at the present scale.

Mountains

Mountains with long steep slopes, narrow valleys and ridges and spurs with narrow crests make up the largest group in the study area. They occur on most of the rock types. Mountains on the Lower Carboniferous sedimentary rocks are often asymmetrical where the bedding is steeply dipping.

Hilly lands with moderate slopes

These land systems occur on the Ordovician sedimentary rocks. They represent a more advanced stage of landscape reduction than the mountains and have a mixture of short steep slopes and less-steep slopes. In the Myrrhee area the hills are capped with remnants of Tertiary basalt, which form broad ridges on small plateaux.

Hilly lands with gentle slopes

Various proportions of low residual hills, alluvial-colluvial fans and terraces are involved in the four land systems distinguished in this zone.

Loam-clay plains

An extensive plain of largely heavy-textured sediments extends from ridges and valleys of the survey area to the north into the Ovens valley. In the survey area the plain is poorly drained.

Alluvial plains

The flood-plain of the present stream system and associated low terraces are included in this zone.