THE ENVIRONMENT OF THE CATCHMENT

GEOLOGY AND GEOMORPHOLOGY

The Lake Eildon catchment may be divided into a number of morphologically distinct areas with boundaries which may have been structurally determined. These areas are:

1. The Strathbogie Ranges
2. The Tolmie-Wellington highlands (including the Mansfield Plain)
3. The Howqua-Rose "high"
4. The Cerberean Ranges
5. The Upper Goulburn Valley

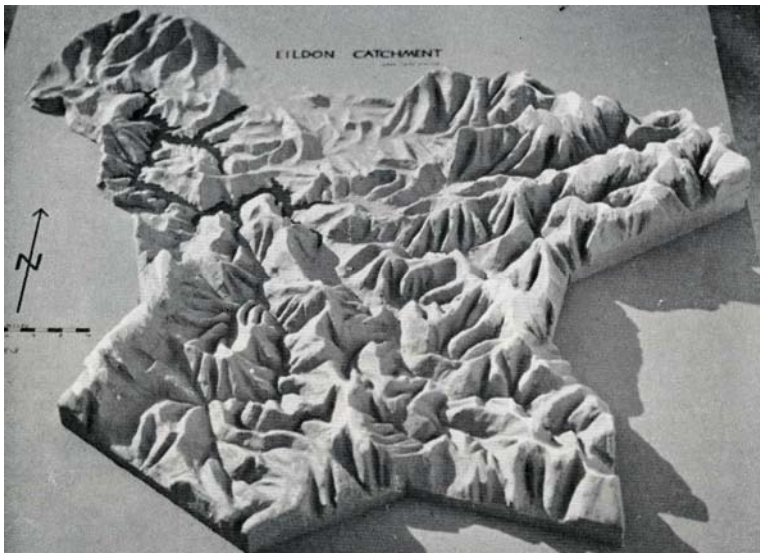


Plate 3 – Model showing topography of the Eildon Catchment

Each area is characterised by distinctive rock associations and internal geological structures which have strongly influenced its geomorphic evolution and that of the catchment as a whole. The stratigraphic sequence and main structural features are summarised in Table 1.

1. ***The Strathbogie Ranges:*** These consists of a granite mass which stradles the north-western section of the catchment boundary. This unit is essentially a dissected, high level erosion surface, remnants of which now lie between 450 and 600 metres above sea level. The southern boundary of the granite is remarkably straight and was probably controlled by pre-granite faulting.

2. ***The Tolmie-Wellington Highlands*****:** This is a complex area consisting of Upper Devonian and Lower Carboniferous conglomerate, sandstone, siltstone and some rhyodacite. The rocks are generally flat-lying, except along the boundary faults, where they upturned, sometimes forming prominent ranges such as the South Blue Range near Mansfield (rhyodacite and conglomerate). The flat to undulating area around Mansfield occupies part of a broadly synclinal basin, known as the Mansfield Plain. To the east and south the country is more deeply dissected and plateau, cuesta and hogback forms are common. The type of form depends upon degree of inclination of the strata.

Table 1 – Stratigraphy and Structure of Lake Eildon Catchment

Age		Rock Type	Structure	Distribution
Quaternary		Clay and rock fragments; talus	Hill wash and fans	Sides and floors of present river valleys
		Gravel, sand and silt	Alluvial flats	
		Gravel, sand and clay	Alluvial terraces	
Tertiary (Early)		Basalt	Residuals with some sub-basaltic sediments	Remnants on and neat catchment rim in S.
Mesozoic				
Permian				
Carboniferous	Late	Conglomerate and sandstone	Gentle dips except at boundary faults	Tolmie-Wellington highlands
	Early	Porphyritic granite	Batholic pluton	Strathbogie Ranges
Devonian	Late	Acid volcanics, sandstone and conglomerate; minor basic volcanics	Cauldron complexes	Cerberean Ranges Tolmie highlands
		Granodioraite porphyrite	Ring dyke	Peripheral to Cerberean cauldron
	Mid	Diorite and lamprophyre	Dyke swarn trending NNW intruding Siluro-Devonian sediments	Belt extending from Eildon to Beyond Woods Point
			Orogeny	
	Early	Mudstone and sandstone; some conglomerate and lenticular limestone	Folded, trending NNW	Central belt between the Tolmie-Wellington highlands and the Cereberean Ranges. Possible occurrence in Howqua-Rose "high"
Silurian		Mudstone and sandstone	Sharp, close folds with NNW trending antoclinoria and synclinoria	
Ordovician		Interbedded sandstone, mudstone and shale	As above, exposed along N plunging antoclinorial axes	Enochs Point to Mt. Matlock. Along Mt. Useful axis (far SE of catchment and Phosphate Hill). In the Howqua-Rose "high".
Cambrian		Black slate, altered tuffed, diabase ("greenstone:")	In narrow belts associated with large scale faulting and complicated by intense folding and shearing	In the Howqua-Rose "high"

(Based on Thomas (1947) and Marsden (1973)

3. **The Howqua-Rose "High":** this is a triangular area of Cambrian, Lower Ordovician and possibly Silurian rocks which breaks the continuity of the Tolmie-Wellington highlands in the vicinity of the Howqua and Jamieson Rivers, hence the alternative name Howqua-Jamieson horst (Thomas 1947). The boundaries are faulted, possibly with recurrent movements extending into the late Tertiary. The block is also intensely faulted internally and is deeply dissected.

4. ***The Cerberean Ranges:*** The south-western section of the catchment boundary runs through the Cerberean Ranges. The main mountainous mass is a complex of acid volcanic rocks, with a basal conglomerate exposed at the edges in places. The central complex is surrounded, at a distance of up to five kilometres from its edge, by a granodiorite porphyrite ring dyke which forms part of the ancient Baw Baw erosion surface. The highest point is Mount Torbreck (1500 m) and much of the area lies between 1200 metres and 1400 metres.

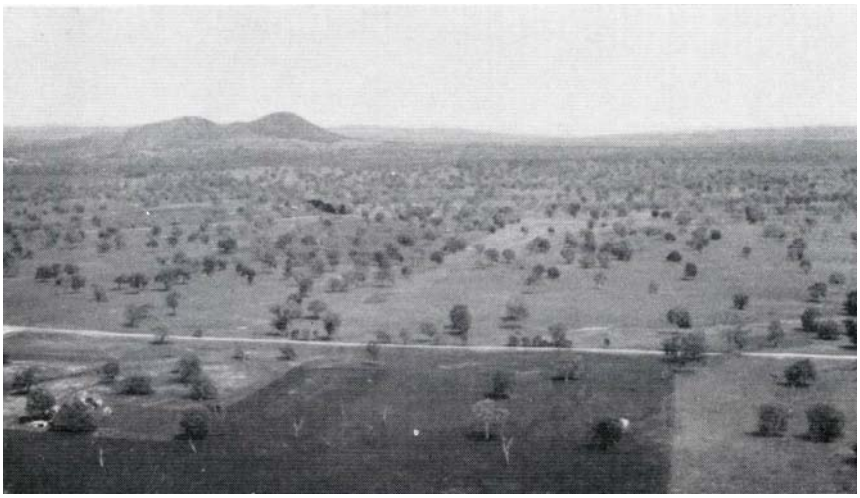
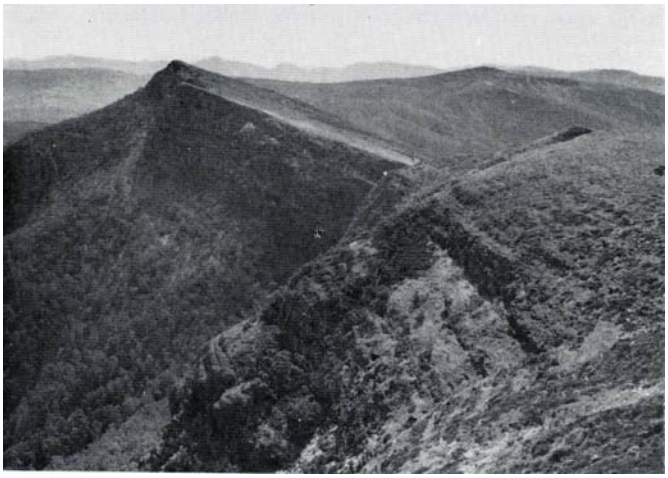


Plate 4 – The Mansfield Plain

5. ***The Upper Goulburn Valley:*** Most of the Upper Goulburn Valley is underlain by complexly folded Ordovician, Silurian and Lower Devonian sandstone, mudstone and shale. It is generally lower than the areas of Upper Devonian and Carboniferous igneous and sedimentary rocks between which it lies. Accordance of summits indicates that the area is a dissected, but tilted, erosion surface (part of the Kinglake surface). The dissection of this surface is least intense in the northern part of the valley around Lake Eildon and the Puzzle Range but it increases upstream, towards the Great Divide.



Plates 5 and 6 – Steep, rugged country characterises much of the Eildon catchment

Drainage

In the upper part of the catchment the valleys of the Goulburn and Big Rivers follow the structural grain of the country. However, at its junction with the Howqua River, the Goulburn swings west across the structural axis. Fenner (1914) suggested that the Goulburn originally continued on a northerly course through the Barjarg Gap but that tilting and headward erosion by a west-slowing stream caused the capture of the Goulburn headwaters.

Structural control of drainage is also conspicuous in the higher country. In the Cerberean Ranges the drainage is radial, but the north-flowing streams are parallel to the major point directions in the volcanics and, in the case of Snobs Creek, to a fault.

The westerly trend of the Jamieson, Howqua and Delatite Rivers is probably the result of the tilting to the west of the Upper Devonian and Carboniferous block. At the western edge of the block, tilting was towards the east but it was insufficient to deflect the streams, which kept on downcutting as the hills gradually rose.

Faulting is thought to have influenced the Goulburn River near its junction with the Howqua, with the uplift on the west side causing the river to cut down deeply on its original course. East-west faulting on the Delatite and Howqua rivers has resulted in steep north banks, with gently sloping banks.

Terrace-like flats on opposing spurs, which occur throughout the area, attest to repeated rejuvenation of the streams, as do the alluvial terraces flanking the Goulburn River.