BELOKA LAND SYSTEM

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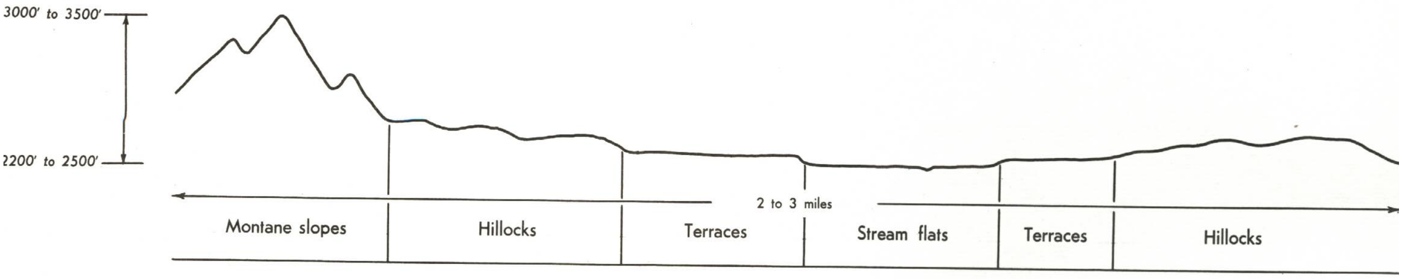
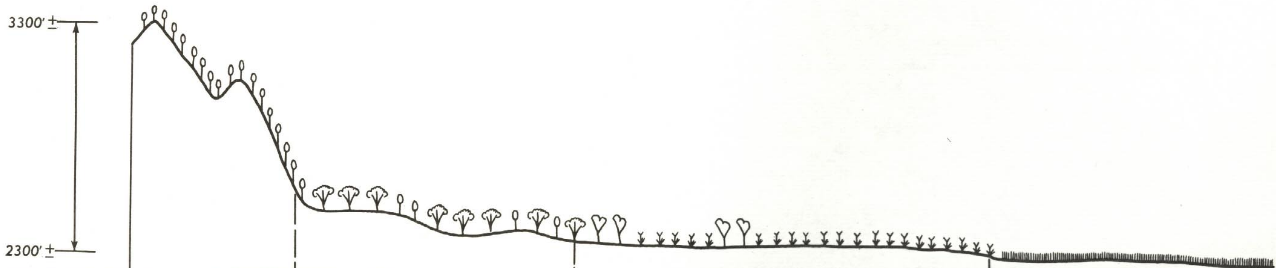
Area: 144 square miles 3·7% of catchment

(a) Distribution of land forms



(b) Land system diagram



Climate	Average annual rainfall 25 in. to 45 in. Summers warm to hot, winters cold with occasional snow			
Geology	Mainly schists or Ordovician shales and mudstones		Alluvium of Pleistocene and Regent age	Recent alluvium
Topography	Steep to very steep	Rolling to hilly	Flat to undulating	Flat to undulating
Land Form	Montane slopes	Hillocks	Terraces	Stream flats and lagoons
Soil Groups	Leptopodzols ; some regosols and lithosols	Leptopodzols ; some regosols	Prairie soils and chernozemic soils	Gleyed stream regosols. Gley podzolics
Vegetation Structure	Wet sclerophyll forest, tending to dry sclerophyll forest	Savannah woodland tending to tall woodland	Wet tussock grassland. Tall woodland	Fen
Vegetation Floristics	*E. radiata–E. rubida–E. dives* alliance	*E. rubida–E. pauceflora* alliance	*Poa australis* alliance. *E. camphora–E. stellulata* alliance	*Carex gaudichaudiana* alliance. (*Eleocharis sphacelata* association)
Present Land-use	Forestry—little if any utilization	Grazing sheep for wool and beef cattle	Grazing beef cattle, some sheep grazing when flats are dry	
Potential Land-use	Forestry for catchment protection	Pasture improvement and good management could raise the productivity of this country considerably		Limited cattle grazing. Water-fowl breeding and sanctuary
Hazards	Moderate to severe sheet erosion where ground cover is poor The erosion hazard is higher on coarse-textured soils and in the lower rainfall areas	Moderate to severe sheet and gully erosion	Waterlogging	Some stream-bank erosion. Flooding, waterlogging
Problems	Fire protection and access. Prevention of road erosion. Maintenance of ground cover	Cold winters. Economics and methods of pasture improvement	Cold winters. Drainage. Economics and methods of pasture improvement	Permanent wetness. Cold winters

Fig. 33 – Beloka Land System

The Beloke land system is in the south-eastern part of the catchment. It consists of the valleys of the Benambra Creek and Morass Creek and extends through a low divide into the upper valley of the Buenba River.

Plate 37. Beloke land system in lower half of plate and the Lake Omeo basin in the Hinno Munjie land system in the middle distance.
The dark strip across the centre is the fen vegetation of Morass Creek.

The majority of the unit is freehold land, however there are some large areas of Crown land, mainly at the north-eastern end of the land system and on steep and rocky areas along the Dividing Range. There is also an area of Permanent Forest in the east of the land system, just to the west of Mt. Leinster.

The area of the land system is 144 square miles, which is a little more than 3½ per cent of the total area of the catchment. It is made up of stream flats, which represent about 10 per cent of its area, higher terraces and fans (30 per cent), hillocks (50 per cent) and montane slopes (10 per cent) (Figure 33). This pattern of land forms represents the whole of the valley from one side to the other. The floor of the valley is at an elevation of about 2,200 feet to 2,500 feet, and the ridge-top elevations are up to about 3,000 feet to 3,500 feet. The broad, flat Morass Creek valley has been preserved from stream entrenchment and dissection by a basalt flow which blocked the valley at the north-western end of the land system (Plate 37). The basalt is in the Mowamba land system.

The material which makes up the alluvial flats and terraces has been derived from country which has the greatest diversity of rock types of any part of the catchment. Ordovician sediments, grey granite, schist, syenite and trachyte and some Devonian sediments have all contributed to the alluvial deposits. The petrology of the other land forms is equally diverse although schists and Ordovician mudstones and shales are the more abundant.

Although the land system has a moderately high elevation, it is on the eastern edge of the rain shadow which affects the Omeo and Benambra country. Average annual rainfall of from about 25 inches near Benambra, to about 45 inches in the east, may be expected. The seasonal distribution is fairly uniform, but the summer rain is usually associated with thunder-storms with high-intensity rain, whereas the winter rainfall has lower intensities. Light snowfalls may occur during winter. Frosts occur from about mid-March through to early November, and are severe in low-lying areas. Summer maximum temperatures are not high and nights are usually cool. Winter temperatures are generally low.

The most common soils on the montane slopes and hillocks are leptopodzols. Occasionally these soils overlie an horizon of heavy, reddish-brown clay which has a coarse angular-blocky structure. The peds of the buried layer may have thick bluish-grey clay-skins and are often stained black. This is a remnant of an earlier soil which was partly eroded during one of the more recent periods of landscape instability. These clay horizons are sometimes found within a few inches of the surface but are usually much deeper. The soils of the steepest northern slopes and the narrow ridge tops are generally lithosols. The terraces have prairie soils overlying a clay horizon in which calcium carbonate concretions may be present in the lower part of the profile. These appear to be two distinct soil layers. Some of the prairie soils are silty, but they are generally clays. The soils of the permanently wet and swampy areas adjacent to the Morass Creek are grey silty minimal soils, minimal podzolic or meadow soils.

On the moister but well-drained parts of the landscape, away from frosty areas, the vegetation is dry sclerophyll forest tending to wet sclerophyll forest of the *E. radiata-E. rubida-E. dives* alliance. The gentle slopes, where accumulation of cold air may be an important climatic feature, have savannah woodland tending to tall woodland of the *E. rubida-E. pauciflora* alliance. Much of the original vegetation remains in the eastern and north-eastern parts of the land system. The terraces and alluvial flats have a wet tussock grassland of *Poa australis* with *E. camphora* and *E. stellulata* occurring as occasional woodland-form trees. *E. stellulata* occurs on the better-drained sites. The permanently wet areas, along the lower reaches of the Morass Creek within the land system, support a fen in which *Eleocharis sphacelata is* dominant with other hygrophilous plants.

Occasional deep gullies and some areas of moderate sheet erosion occur in this land system. However, because the stream flows through an extensive area of fen and swamp, probably none of the erosion products reaches the Mitta Mitta River or Lake Hume. Nevertheless, control of the gullies is desirable because they are subdividing and wasting good agricultural land, and the sheet erosion is lowering the fertility of the areas in which it occurs. Mechanical works, perhaps even concrete structures, may be necessary to control some of the gullies. Pasture improvement, where the land is not steep, and better control of grazing in both steep and less-steep country, would help to restore the sheet-eroded country and raise productivity.

Sheep grazing for wool is the main form of land-use on the hillocks and steeper land, although beef cattle grazing is also popular. Cattle are grazed on the wetter terraces and flats. Prior to the introduction of the subsidy on superphosphate in 1963, top-dressing with superphosphate was carried out by relatively few farmers in the area, and the dressings were rarely heavy and continuous, so that there was a tendency to maintain the native perennial pastures. The use of superphosphate has increased in recent years. A good deal of the hillock country could be sown to improve pasture species. A greater knowledge of the best species, fertilizer treatments and management practices would be needed for large-scale improvement of the country.

An important problem associated with improvement of this country appears to be its distance from a rail-head, the nearest being Bruthen, about 80 miles to the south. Transport costs of both inward and outward produce are relatively high. The coldness of the winter is also a disadvantage, but it should be possible to overcome any problems associated with this by adopting special management techniques. The winter is not as severe as that experienced in many agricultural areas in the northern hemisphere.

The permanently wet area of the lower Morass Creek in this land system provides excellent waterfowl refuge and should be retained in its present state for that purpose. Some of the terrace country however is excessively wet, and would probably benefit from drainage.

Because of the high delivery cost of fertilisers, and high costs of transporting stock and wool to markets, the economics of pasture improvement in this area should be examined. Improvement of pastures as an aid to reducing siltation of streams and of Lake Hume, is perhaps not as important in this land system as it is in others, because of the filtering effect of the swamps and fens. However, the maintenance of the fen for a waterfowl refuge, and the prevention of siltation and flooding of the stream channels within the land system are important enough to warrant considerable improvement in catchment conditions. Furthermore, loss of productivity through erosion must be considerable.

Some areas of Crown land, particularly in the Buenba River area would probably be suitable for agricultural development except for two of the factors discussed above, namely, the cold winters and isolation.