BULLER LAND SYSTEM

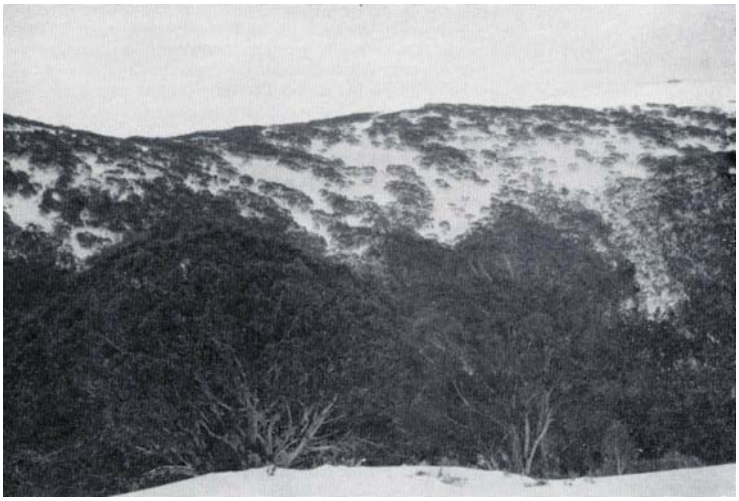


Plate 27 – Sub-alpine woodlands of snow gum are a feature of the Buller land system

The Buller land system consists of alpine and sub-alpine land. The main area is around the north-eastern peaks from Mount Stirling to Mount Howitt and Mount Skene, separate areas are in the southern and eastern run namely, Mount Selma, Mount Matlock, Lake Mountain, Mount Torbreck and Mount Terrible. The land system thus occupies the high altitude peaks and ridges above 1350 metres, many of which are plateau remnants.

The climate is severe, with heavy snow and cold winter winds. Total precipitation is approximately 1800 millimetres a year, with snow from June to October. The land system, though small in total area, is one of the important sources of water in the catchment, contributing an estimated one-tenth of the total inflow and much of the summer flow.

The vegetative communities are specialised and varied. Sub-alpine woodland predominates. This is associated with alpine herbfields and grasslands in frost pockets or higher area, and peat bogs in drainage lines. On the lower fringe, there are tall woodlands of mountain gum and snow gum whilst on the highest peaks are grassland, alpine herb field and fjeldmark formations. Details of the communities are:

(i) *Snow Gum-Mountain Gum Tall Woodland*:- At about 1350 metres altitude, the alpine ash forest normally gives way to a sub-alpine woodland of snow gum. However, even at lower altitudes, the alpine ash may not become established if the position is exposed and the precipitation less than 1400 millimetres. In such places, typically the lower ridges between 1200 metres and 1350 metres, snow gum and mountain gum are found in tall woodland or open forest formation.

Thus at the northern end of Mount Terrible, the forest of broad-leaved peppermint and gums gives way directly to snow gum and mountain gum on the lower flanks, there being insufficient precipitation to support wither a forest or narrow-leaved peppermint and gums or a forest of alpine ash below the snow gum. On Mount Singleton and Mount Stander, snow gum is present in forest formation at just under 1200 metres along the ridge tops.

(ii) ***Snow Gum-alpine Woodland***:- The higher area above about 1600 metres were originally occupied by shorter, more widely branched and open-crowned trees in sub-alpine woodland form. Over much of the high country in the catchment, burning has altered these woodlands to a dense, low coppice of mallee proportions, as a result of vigorous regrowth from the lignotubers of the earlier large trees. A few isolated areas remain in an approximate original state, showing the woodland of snow gum with a grassy understorey. Nevertheless, even in the original condition, the vegetation of rocky ridges may well have been a mallee-heath-woodland. The dense shrub or heath layer, which is found under the coppice and often surrounding it for a short distance, is composed mainly of alpine oxylobium (*Oxylobium alpestre*) at lower levels, shaggy peas (*Hovea longifolia)* at higher levels and mountain pepper (*Drimys lanceolata*) in moister places. Although these woody shrubs are small, ring counts

show that most date from the 1939 fires. The shrub layer in climax conditions is more open, and the floor carries a dense sward of *Poa spp*. grasses.

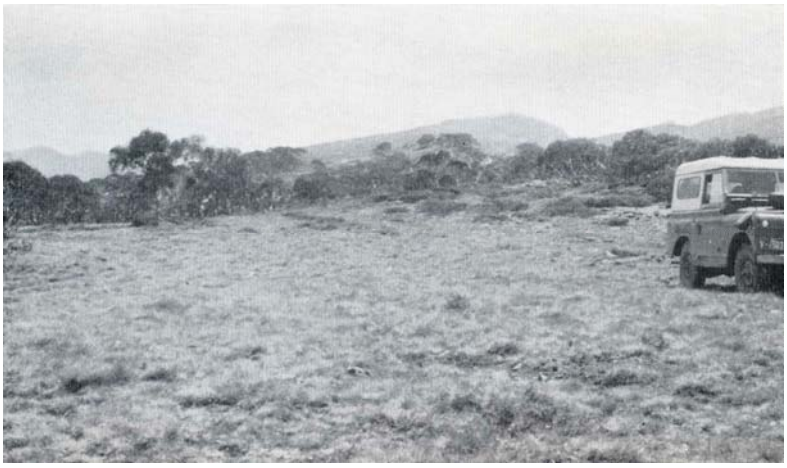


Plate 28 – Grassy plains are found in the Buller land system where cold air drainage is ponded and prevents the establishment of snow gums

(iii) ***Alpine grasslands and Herbfields***:- Sod-tussock grasslands, dominated by interlacing tussocks of snowgrass (Poa *Australis* sp. agg.), are found in cold air drainage basins at altitudes as low as 1000 metres but more commonly above 1600 metres, occupying slopes between snow gum sub-alpine woodlands and peat bogs in the depressions. They extend also above the limit of snow gum at 1900 metres. The grasslands are closely associated above 1600 metres with alpine herbfields, which are communities dominated by snow grass and by forbs, especially snow daisy (*Celmisia longifolia),* to form a closed sward. As a result of fires and selective grazing, these communities have mostly been opened up and changed in composition. In many places, shrubs have invaded the community, chiefly purple flowered shaggy peas (*Hovea longifolia*) and alpine orites (*Orite lancifolia),* a small proteaceous shrub with creamy white flowers. Inter-tussock spaces, which have developed in many areas, are subject to severe frost action. They are recolonised each season by introduced sorrell (*Rumex acetosella*) and dandelions (*Taraxacum officinale*).

The distinction between herbfield and grassland is no longer clear in the Buller land system. Much of the area gives the appearance of grassland, but in similar places where grazing is limited on the Bogong High Plains, herbs are increasing. Most of the grassland in the Buller land system could be herbfield under climax conditions. Sod-tussock grassland, as a stable community dominated by *Poa spp.*, seems to be limited t local small valleys subject to wetter soil conditions and to cold sir drainage. Apart from the slightly lower altitudes, these two communities are directly comparable with the alpine grasslands and alpine herbfields in the Australian Alps generally and detailed studies by Costin (1954) and by Carr and Turner (1959) are applicable.

(iv) ***Other Alpine Communities***:- some of the higher peaks have specialised snow patch communities on eastern and southern sides, and there are still occasional valley bogs of *Sphagnum cristatum* with associated hygrophytes. Most of the bogs have long since deteriorated by gullying, the flanks have been colonised by shrubs, and their original nature is obscure.

Shrub and heath communities are dominated by shaggy peas (*Hovea longifolia*), with alpine orites (*Orites lancifolia*) and mint bush (*Prostanthera cuneata*), probably confirmed naturally to rocky prominences, exposed steep slopes and to the understorey of the mallee snow gums on ridges. They still occupy the narrow zone of humified peats between grassland and peat bogs. These communities of shrub and heath are now more widespread as a result of fire and grazing, and commonly extend beyond the snow gum on the grassy plains. Fjeldmark is found in occasional exposed positions, to represent the extreme condition of severity.

The soils of the land system appear relatively uniform in spite of varied parent materials. Alpine humus soils predominate, interspersed with skeletal soils in rocky positions and peats in depressions.

Chemical properties however, may vary according to parent material, as shown by the higher pH value and calcium content of alpine humus soils developed from basalt.

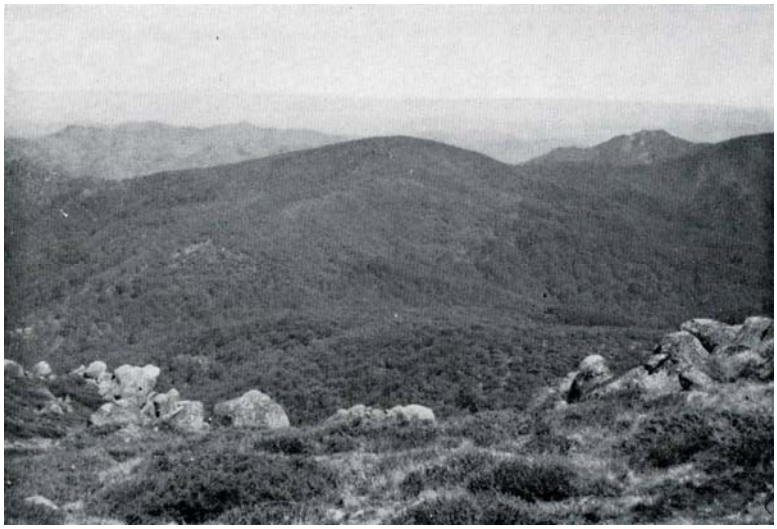


Plate 29 – The highest parts and exposed sites of the Buller land system extend into the treeless alpine zone, as in the foreground

In undisturbed conditions, the incidence of erosion is slight, being confined to areas of fjeldmark. Because of the severe climate however, the erosion hazard is very severe. Frost action on exposed soil causes needle ice to detach the fine structural units, which are then eroded by wind or water. Thus re-establishment of vegetation on bare areas is difficult. Even when established, the vegetation makes such slow growth that the recovery process is long and hazardous. The risk of damage is least in the lower snow gum sub-alpine woodlands.

Both the soil and the vegetation are subject to damage from fire, grazing and trampling by stock and from roading, building and other engineering operations. The value of the area as a water supply catchment declines with cover, replacement of grass by shrubs, increasing bare soil and rock areas, and destruction of bogs and dense drainage line vegetation all reduce retention of snow-melt and rain. This results in increased peak flows and reduced summer flow to Lake Eildon.

Although the Buller land system covers only about one-thirtieth of the catchment, it has the highest precipitation. Of this an estimated eighty per cent reaches the rivers, contribution about one-ninth of the inflow to Lake Eildon. As a water source, it is the most efficient land system and the summer delivery is appreciable.

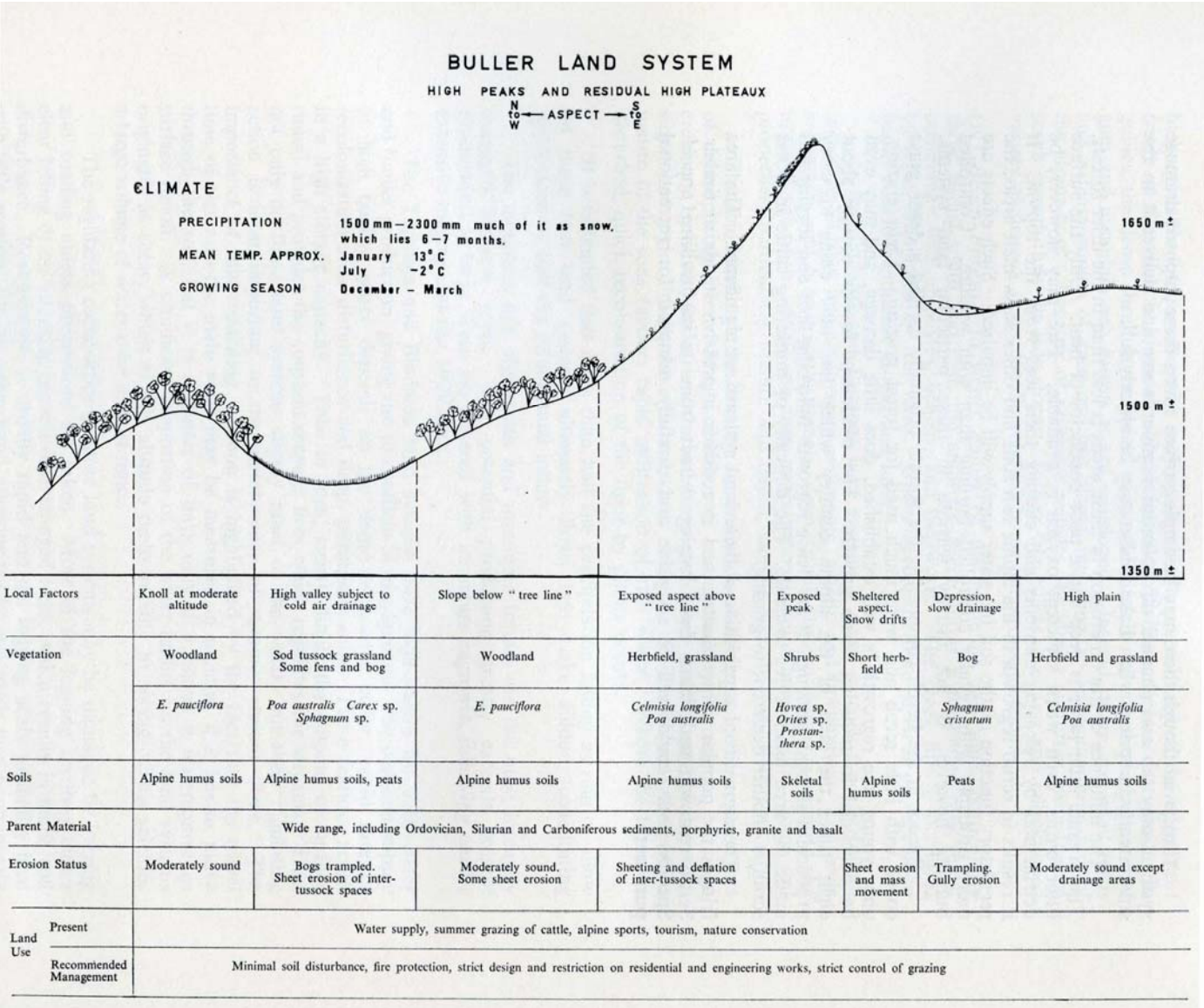
There are no commercial grades of timber in the land system. Each summer, the area is grazed by cattle. Recreation is an important use – snow sports in the winter, tourism at all seasons-and values as parkland are high. Such use is likely to increase substantially.

To formulate a sound management policy for this important area, the problems, hazards and benefits of the other forms of land use should be considered, in relation to the water which the area yields to Lake Eildon, in terms of quantity and sustained flow in summer.

Cattle grazing in the Buller land system is difficult to isolate from general forest grazing, as grazing runs usually include lower areas. The forest grazing industry in the area provides an important source of Victorian breeding and store stock. Damage to vegetation and soils has been caused by grazing in sensitive areas. Regulation of grazing pressure, including in some instances total exclusion from sensitive areas, is necessary to allow recovery or to prevent further damage.

Large and increasing numbers of visitors, especially during the winter, pose special problems. The most critical are the provision of roads, access tracks, buildings, water and disposal of sewage and sullage. In view of the environmental hazards, the limited feasibility, and the high cost of providing

these amenities above the tree line, it may well be advisable to keep further developments below this line, possibly in the adjacent lower Bindaree land system.



Local Factors	Knoll at moderate altitude	High valley subject to cold air drainage	Slope below "tree line"	Exposed aspect above "tree line"	Exposed peak	Sheltered aspect. Snow drifts	Depression, slow drainage	High plain
Vegetation	Woodland	Sod tussock grassland Some fens and bog	Woodland	Herbfield, grassland	Shrubs	Short herb-field	Bog	Herbfield and grassland
	E. pauciflora	*Poa australis Carex* sp. *Sphagnum* sp.	*E. pauciflora*	*Celmisia longifolia Poa australis*	*Hovea* sp. *Orites* sp. *Prostan-thera* sp.		*Sphagnum cristatum*	*Celmisia longifolia Poa australis*
Soils	Alpine humus soils	Alpine humus soils, peats	Alpine humus soils	Alpine humus soils	Skeletal soils	Alpine humus soils	Peats	Alpine humus soils
Parent Material	Wide range, including Ordovician, Silurian and Carboniferous sediments, porphyries, granite and basalt							
Erosion Status	Moderately sound	Bogs trampled. Sheet erosion of inter-tussock spaces	Moderately sound. Some sheet erosion	Sheeting and deflation of inter-tussock spaces		Sheet erosion and mass movement	Trampling. Gully erosion	Moderately sound except drainage areas
Land Use – Present	Water supply, summer grazing of cattle, alpine sports, tourism, nature conservation							
Land Use – Recommended Management	Minimal soil disturbance, fire protection, strict design and restriction on residential and engineering works, strict control of grazing							

Figure 23 – Buller land system