CONDITION OF THE LAND

The chief kinds of land deterioration in the area are erosion, decline in catchment efficiency and decline in site capability for timber production. They are related to each other and to the effects of past events, particularly clearing, grazing, burning, roading and logging. All are described here under the headings of erosion and fire history.

Erosion

Soil movement leads to sedimentation of Lake Eildon, and to general deterioration of the environment.

(i) ***Siltation of Lake Eildon***:- Because all streams carry some suspended material, particularly the Delatite River and Fords Creek, which drain the Mansfield area, and Glen and Dry Creeks, which drain the Strathbogie Ranges; other smaller streams from the settled area in the north and north-west of the catchment also contribute a silt load. The main streams draining the forested area are not contributing an excessive load, even from areas being logged. The Goulburn is characteristically discoloured at high level; the cloudiness can be attributed to sludge from old mines upstream, but the bed load appears to be natural. The Big, Jamieson and Howqua Rivers contribute little sediment. It has been noticed that the Howqua and Delatite Rivers become discoloured after heavy rains if roads from this source is small. The material which makes the Delatite an overloaded stream in its lower reaches, when at high level, is derived almost wholly from the settled areas.

Discoloration normally begins at the edge of the cleared country. Some of the load is derived from direct erosion of its own banks, but much is the result of sheet and gully erosion of the lower catchment. Similar conditions affect Fords Creek. Glen Creel and Dry Creek are badly affected in the lower reaches. Both carry a large bed load, including heavy boulders, because of the high and rapid storm water runoff from the surrounding steep cleared hills.

Thus, in relation to siltation of the weir, the most active erosion areas are in the belt of settled country from Merton to Mansfield, and the Mansfield-Merrijig-Piries area, in all of which the most serious forms of erosion are sheet and gully erosion. Slumping and tunnelling are serious in only two small areas, located at the north shore of the “Island” between the main arms of the weir, and the north-west end of the south Blue Range. Both are on lower Silurian rocks.

As to the rate of sedimentation, it was observed in 1962, six years after the dam has been built, that about 10 centimetres of sediment had been deposited over exposed parts of the lower reaches of the storage. From this, it was estimated that silt was then being deposited in the storage at an average rate of about 193 000 cubic metres (1000 acre-feet) per year, representing a loss of original capital cost at the rate of about $20 000 per year. The present rate of siltation is probably less, the chief source being the gullies in a limited area of 73 000 hectares of settled land. Correct land management could eliminate this source.

Much of the steeply sloping, forested country with limited rainfall (Eildon, Maintongoon and Jamieson land systems) has a high erosion hazard after fire; repeated burning, even controlled burning, may result in the movement of significant amounts of sediments to the streams and eventually to the storage. This danger is the greater because of the large total area of the vulnerable land systems.

(ii) ***General soil Deterioration***:- Sheet erosion, which involves the disruption and movement of the surface layers of soul, may not be contributing a large proportion of the material reaching the streams. It nevertheless causes a loss of hydrologic performance and of primary production. Potential severity is indicated by recent silt beds, several feet thick, which occur along some stream banks in high forested country, probably the result of sheet erosion after the 1939 fires. Northerly slopes are particularly susceptible to sheet erosion, especially after fires, and the tendency to continued instability of the surface retards vegetation recolonisation. Some areas, for example on the northern slopes of Mount Terrible and on Mount clear, are very unstable and large fire-caused movements of soil and rock into the gullies and streams have taken place.

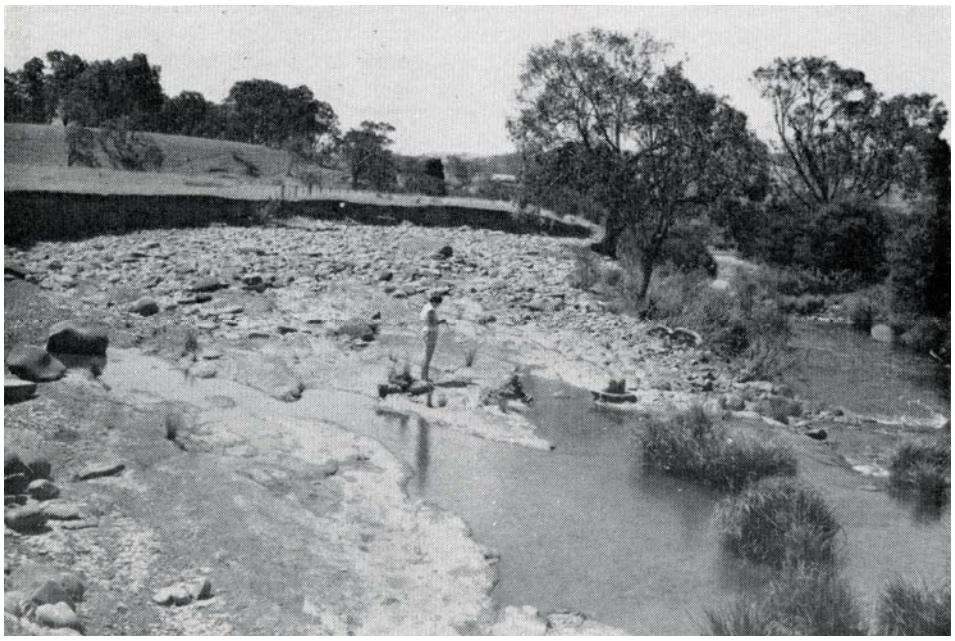
In fact, sheet erosion following fire is a risk in much of the steeply sloping forested country, and further burning, including controlled burning susceptible areas, may result in hydrological deterioration. Such

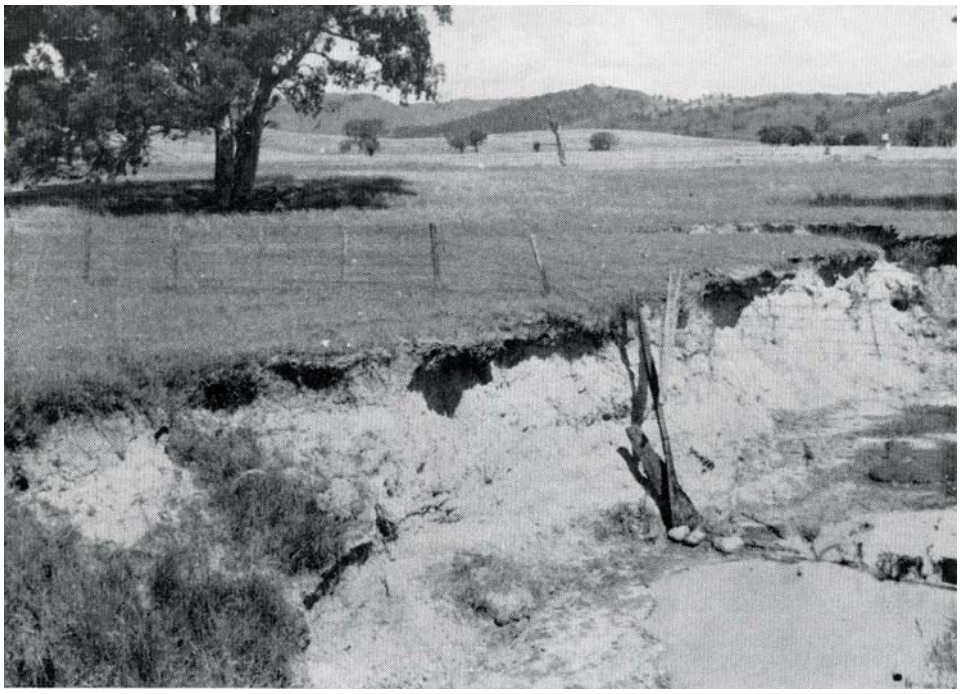
deterioration would be caused by a lowering of total porosity of the topsoil in the process of sheet erosion, plus a lowering of the interceptive storage capacity.

Apart from sheet erosion flowing fires, most of the forested area does not show widespread soil movement. Logging operations and access tracks have resulted in severe local erosion, but the soil does not usually move far and rarely reaches streams in large quantities. More important possibilities are the far of this local movement in reducing the water-retaining ability of the site and on the continued suitability of the site for high quality timber production. More important possibilities are the effect of this local movement of the site for high quality timber production.

Deterioration in the characteristic feature of the topsoil is most evident in the intensively logged and fire regenerated mountain ash areas. However, because of the sixty to eighty year intervals between each log harvesting, it is not known if the fire based regeneration will cause a significant eventual impairment of timber production or of the hydrology of entire sub-catchments. Nevertheless, excessive damage sometimes occurs during timber extraction and forest regeneration works, particularly where there is little supervision of private contractors. It results from the location of snig trails in gullies and from the numerous side-cuts.

A higher erosion hazard exists in the drier peppermint-gum forests (Howqua and Jamieson land systems), where on snigging tracks to individual trees cause longer lasting scars. Supervision of operations is more difficult in this type of country.





Plates 33 and 34 – Stream bank erosion in the Mansfield and Eildon land systems have been a source of silt to Lake Eildon

Fires and local overgrazing in alpine areas result in sheet erosion of exposed alpine humus soils by needle-ice, water and wind. Sever erosion of roadside cuttings by the same agents, and some gullying of dried out bogs in drainage lines are other types of erosion which occur in alpine areas. The areas noticeably affected are comparatively small, but the associated deterioration of cover, porosity and water retention is detrimental to catchment efficiency. The cause of mechanisms, agents and effects of deterioration of the alpine areas have been demonstrated by Costin (1957), who points to the significance of grazing, trampling, vehicles, severe frosts and fire. The impact of grazing cover and topsoil porosity in Victorian alpine areas has been shown by the exclosure plots on the Bogong High Plains (Carr and Turner, 1959) and by botanical work at Hotham (S. Zallar personal communication). The plots now clearly show the beneficial effects on plant cover and soil porosity resulting from restricted grazing. Erosion of alpine areas is not a significant source of siltation to Lake Eildon, but associated soil deterioration causes a loss of hydrologic efficiency, particularly in its effects on the steady summer flow of the streams.

The points still at issue involved the extent of undetected deterioration and of allowable risk on values for various kinds of production.

Fire History

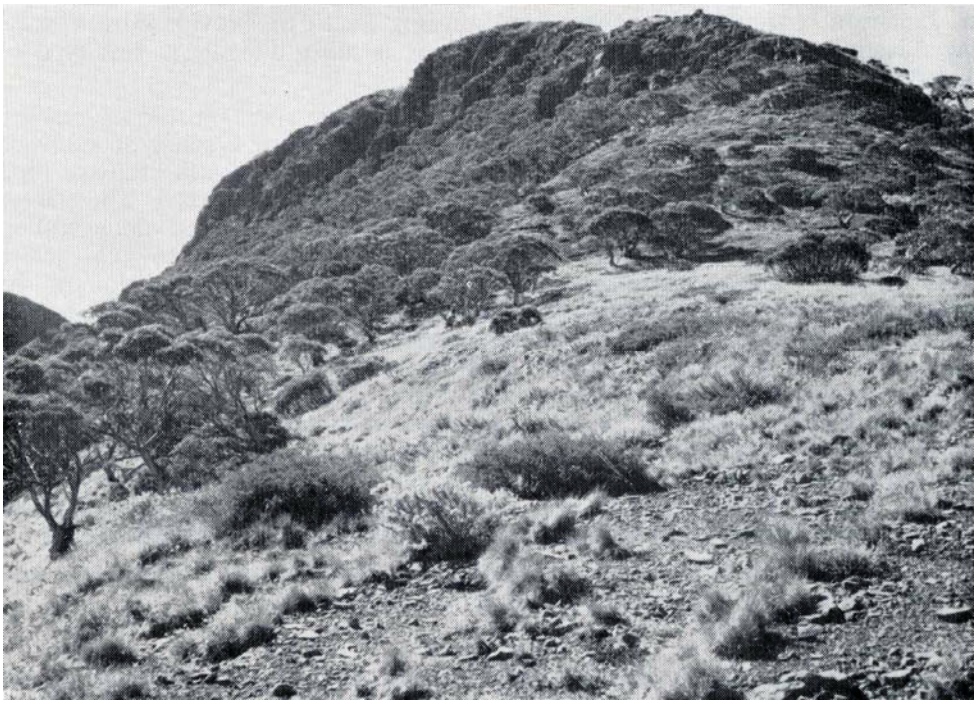
Europeans arrived in north-eastern Victoria in the late 1830s and, in the 1840s, they began penetrating the mountainous areas. In 1861, gold was discovered at Woods Point.

It can be assumed that fires occurred in the catchment area during the recorded bad fire years of 1851, 1886, 1898, 1901, 1914, 1919, and 1923. In 1926, another peak fire year in Victoria, large areas in the catchment, including the Strathbogie Ranges, were burnt. In 1932, the Big River valley was burnt out, and the northern portion of it was burned again in 1936. In 1934, a large portion of the Strathbogie Ranges around Tallangalook was burnt.

The large 1939 fires followed. They swept the southern and eastern parts of the catchment, and only the Strathbogie Ranges, the Lake Eildon area, the Mansfield district and the Delatite valley escaped.

Sine European settlement, the entire catchment has been burnt, and ecological rejuvenation by fire, except for logged ash area, will not be needed for a considerable time. some areas where fuel reduction burning has not been practicable still present a high fire hazard.

Plate 35 – Silt on the bed of Lake Eildon in 1962



Plates 36 and 27 – Sub-alpine and alpine herbfields and grasslands are easily damaged, leading to bare spaces and decline in porosity. Recovery may be slow