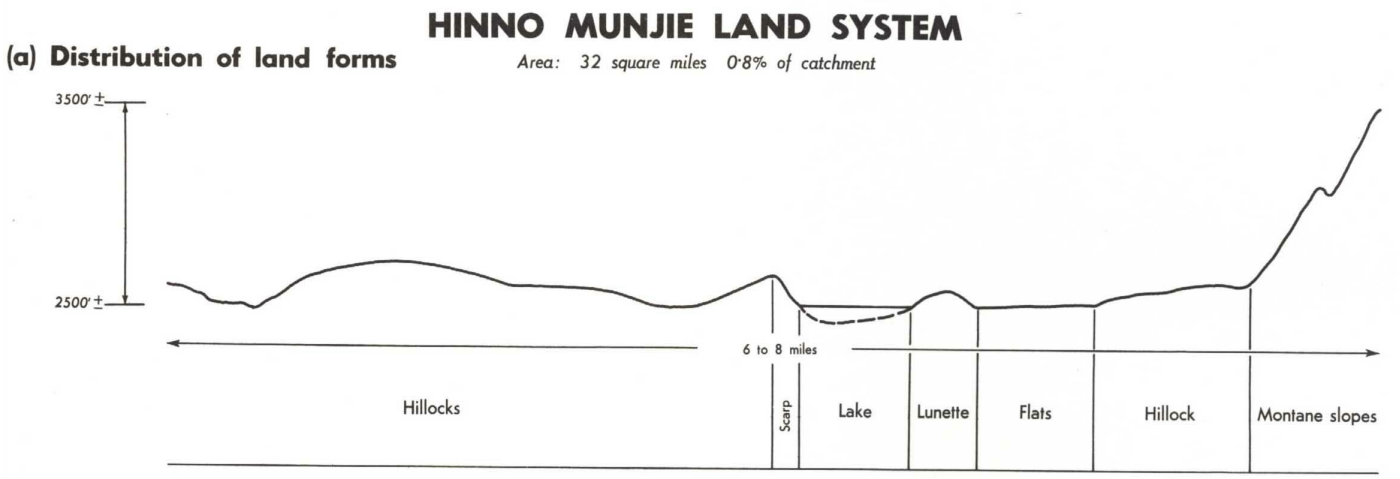
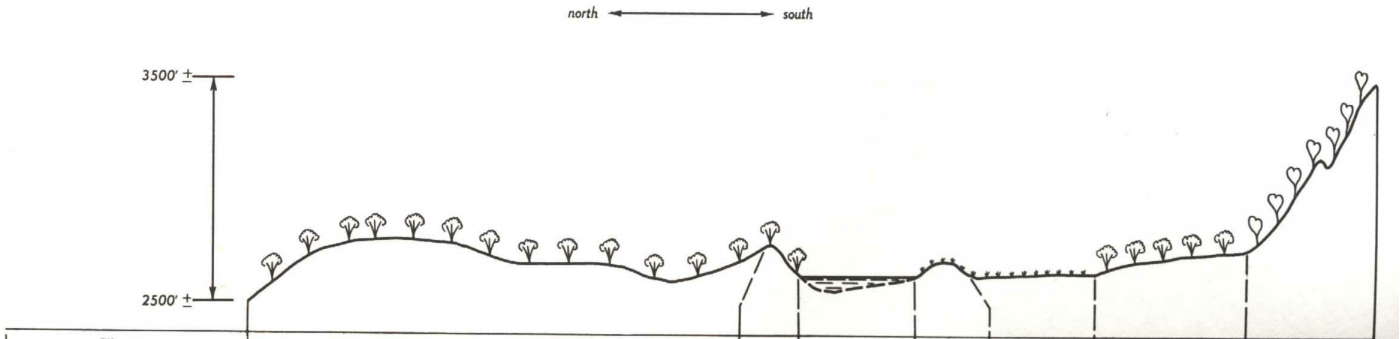
HINNO MUNJIE LAND SYSTEM



(b) Land system diagram



Climate	Average annual rainfall 25 in. to 30 in. Summers mild, winters cold, usually with some snow						
Geology	Schists and Ordovician mudstones and shales	Granite	Lacustrine deposits	Parna	Lacustrine and alluvial deposits	Schists and Ordovician shales	Quartz porphyry
Topography	Rolling to hilly	Steep	Shallow, gently sloping floor	Hilly	Undulating to level	Rolling to hilly	Steep to very steep
Land Form	Hillocks	Scarp	Lake	Lunette	Flats	Hillocks	Montane slopes
Soil Groups	Leptopodzols, occasional solodic soils	Lithosols Regosols		Chernozemic soils		Leptopodzols, some solodic soils	Lithosols Rock faces
Vegetation Structure	Savannah woodland			Grassland		Savannah woodland	Tall woodland tending to scrub
Vegetation Floristics	*E. rubida–E. pauciflora* alliance			*Themeda australis* and *Danthonia spp.*		*E. rubida–E. pauciflora* alliance	*E. rubida–E. pauciflora* alliance
Present Land-use	Grazing sheep for wool and beef cattle	Grazing of lands bordering the lake by cattle. Small plantations of *Pinus radiata* around lake margins			Fodder crops. Grazing sheep and beef cattle		Protection forestry
			Recreation	Road reserve			
Potential Land-use	The environment is suited to the present forms of land-use. With improved pastures and water conservation, carrying capacity could be considerably improved	Protective management	Water sports Fish culture Wildlife reserve	Road reserve	More intensive use of flats for fodder crops or pastures	Permanent improved pasture	Protection forestry
Hazards	Sheet erosion and severe gully erosion in drainage lines	Mass movement	No erosion hazard		Waterlogging	Sheet erosion and severe gullying of drainage lines	Severe sheet erosion
Problems	Methods and economics of pasture improvement Subdivisional fencing to control grazing stock Provision of stock water away from drainage lines and erosion-prone areas		Great fluctuations in water level Salinity Pollution of water by cattle and water-birds		Water logging in winter Cracking and drying of soil in summer	Methods and economics of pasture improvement Subdivisional fencing to control grazing Provision of stock water	Fire protection Maintaining good ground cover

Fig. 34 – Hinno Munjie Land System

The Hinno Munjie land system occupies a relatively small area around Lake Omeo in the south of the catchment. The township of Benambra is on the eastern edge of the land system, and the Dividing Range, on which The Sisters are prominent, forms the southern boundary. It occupies about 32 square miles, which is a little less than one per cent. of the total catchment. The land system is all freehold land except for a very small area of Crown land on steep country around The Sisters and the common land around Lake Omeo.

The area is composed largely of the hillock land form with some steep montane slopes in the south on the Dividing Range (Figure 34). Elevations range from about 2,200 feet to 2,700 feet up to a maximum of about 4,000 feet in the south on The Sisters. The Lake Omeo basin is of special interest in this land system (Plate 37). It is an area of entirely internal drainage, apparently formed by block faulting, with a steep scarp about 50 feet high marking the northern edge of the down-thrown side of the block. The basin so formed has been filled to a considerable depth with alluvium, and fairly extensive alluvial flats now exist to the south of the lake. A lunette has formed along the south-eastern shore line of the lake, and a low rise, parallel to the lunette further south, appears to have been an earlier lunette that did not develop for very long.

The lake is shallow and the water level varies considerably with the seasons and from year to year. It occasionally dries up completely.

The rocks of the land system are largely Ordovician shales and mudstones, but schists and phyllites occur on the western side. The Sisters, on the southern boundary, consist of quartz porphyry. The alluvium of the lake basin is largely lacustrine and probably of post-Pliocene origin.

Climatically the land system is of interest because of the relatively low average annual rainfall, about 25 inches to 30 inches, at such an elevation. Severe summer storms occur at times. The seasonal distribution of rainfall is fairly uniform because the typically higher winter rainfall, characteristic of other parts of the catchment, is reduced by the high Mt. Hotham and Mt. Bogong country to the west and north-west. The elevation results in summer temperatures which are below those of areas of comparable rainfall in the north, and winters which are cold with occasional falls of snow. This results in lower evapo-transpiration in the drier months, so that if only 5 inches of stored soil moisture is available to plants, soil moisture does not become limiting for plant growth. The climate strongly influences the form of land-use practised, and must also be carefully considered when recommending species for improved pastures.

The soils of the freely-drained country are mostly leptopodzols. In some rolling country, mostly north of the lake, the soil is basically a solodic soil on which about four inches of reddish loam has been deposited. The boundary between the A1-horizon, of the solodic soil and the upper depositional layer is usually quite distinct. The soils of the alluvial flats are black, calcareous, silty or clayey soils, which appear to be similar to the Wimmera chernozemic soils. On the lunette where drainage is good, the soil is a brown chernozemic. A deposit of deep sand occurs in the north-eastern corner of the lake. This was apparently deposited by the stream which enters from the north, when the lake was at higher levels.

The indigenous vegetation over much of the northern part of the land system is probably still in near climax condition. It is a savannah woodland of the *E. rubida-E. pauciflora* alliance with *Themeda australis* as the dominant ground-flora species.

The steep montane slopes of the Dividing Range have a scrubby form of the *E. rubida-E. pauciflora* alliance with *Leptospermum ericoides* as an understorey. It is doubtful if the treeless plains of the alluvial flats ever supported a tree vegetation. Grassland of *Themeda australis* and *Danthonia* spp. was probably the climax vegetation.

Some large and active gullies and some sheet-eroded areas occur in this land system. The southern part of the land system is not a part of the catchment to Lake Hume, because it is an internal-drainage basin and none of its drainage enters the reservoir, except by seepage to adjacent streams. Erosion in that part of the land system has no effect on the reservoir, however as an indication of bad land management it is of concern in this survey.

The erosion hazard is moderately high on the sloping country because of the low annual rainfall and cold winters, during which plant growth is slow.

In general, little pasture improvement, other than light dressings of superphosphate, has been undertaken. However, the Federal subsidy on superphosphate, introduced in 1963, greatly increased its use in this area (R. E. Kelly, priv. comm). The native pastures are used as grazing for sheep for wool, and breeding and fattening beef cattle is a major enterprise. Some of the alluvial flats have been used for fodder crops.

Considerable improvement in carrying capacity and in vegetative ground cover could be achieved by more intensive pasture improvement. The contention that high transport costs make large-scale use of fertilisers uneconomic may be well founded but should be studied. Topdressed strips on otherwise unimproved hillsides indicate that considerably improved growth can be expected. Sown pasture, probably based on varieties of subterranean clover, Wimmera rye grass and Phalaris could be sown over most of the land system. Well planned subdivisional fencing would assist farmers in the control of grazing which is so essential for successful pasture management, and for the maintenance of effective ground cover.

Excessive wetness of the alluvial flats in winter is a problem which could probably be overcome by drainage.

The waters of Lake Omeo are saline and the levels fluctuate considerably. Waterfowl and cattle puddle and foul the waters around the lake margin. Attempts have been made to stock the lake with trout, but its shallowness and low water levels in summer combined to make the waters too warm for the trout to survive. Furthermore, the lake dries up completely from time to time. Establishment of a water plant which does not spread rapidly may provide sufficient protection and oxygenation of the waters for trout to persist, even when the lake is low. Such a plant may also bring about some dissipation of the wave energy which tends to keep the waters turbid. Any attempts to improve the usefulness of the lake will be futile however, if it cannot be supplied with water in dry seasons to prevent it drying up. The nearby Morass Creek is less than 10 feet below the lake bed, and it would be a useful water source.