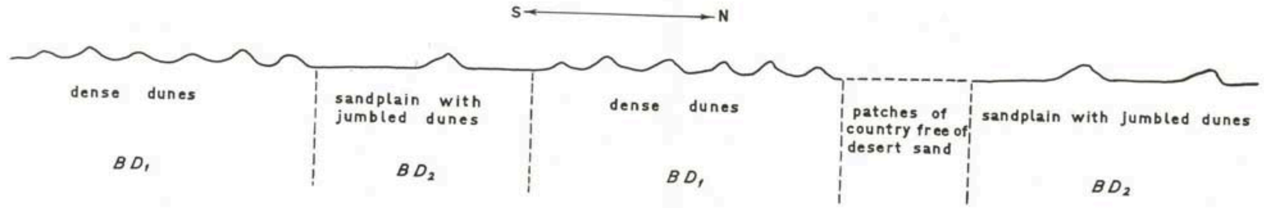
Big Desert Land System

Fig. 17 – Big Desert Land System

BIG DESERT LAND SYSTEM

(a) Distribution of land forms



(b) Land system diagram

AVERAGE ANNUAL RAINFALL: Mainly between $12\frac{1}{2}''$ & $13\frac{1}{2}''$; higher in extreme southwest
LAND USE: Uncleared Crown land, sparsely grazed

LAND FORM	Type	Jumbled dune and dune	Sandplain	
	Approx. percentage of land system	65	35	
	Approx. cross-section	4–10 chains	20 yards–½ mile	
PARENT MATERIAL		Coarse saltation material		
NATIVE VEGETATION		Heath Mallee heath Scrub mallee	Heath Mallee heath Scrub mallee	Mallee heath Scrub Mallee
SOIL	Textural group	Sands		
	Morphological group	White deep sands	White deep sands	White sands of Group D
	Proportion on land form	Dominant	Dominant	Subdominant
	Moisture characteristics	Good for deep-rooted species		
	Fertility reserves	Very low		
LAND USE	Most suitable form	Probably retention under timber Unsuitable for regular cropping and doubtfully suitable for grazing at present		
	Nutrients required in fertilizers	P, N, Cu ? Zn ?		
	Land use class	6		
WIND EROSION HAZARD		Very Severe	Severe	

The Ouyen-Murrayville settlement gives way abruptly in the south to a vast area of uninhabited country known as the "Big Desert". It is by no means a true desert, however, being densely covered with scrub. It is thus largely inaccessible, and to the west of Outlet Creek, there is only one safe track which enters the scrub to the south of Murrayville and finally emerges to the north of Nhill in the Wimmera.

The Big Desert within the surveyed area covers some 2,060 square miles and it is the north-eastern extremity of a much larger area of infertile sands which extend southwards into the Wimmera and westwards into South Australia where they form the "Ninety-mile Plain". The sands are also contiguous with those of the Little Desert in the Wimmera. The origin of this vast belt of sands is by no means clear. Crocker (1946) suggested that they have been blown eastwards from the coast whereas Blackburn (unpublished data) suggests that, at least in the Little Desert, a large proportion of the sands are derived in situ from sandstones. Another possibility is that the sands, and particularly those towards the north, have accumulated from originally heavier materials by wind winnowing in which the finer particles have been removed.

In the Big Desert of north-western Victoria the landscape has been fashioned by wind into a complex array of east-west trending dunes, more impressive jumbled dunes and intervening sandplains (Fig. 17). Hummocks of variable dimensions also occur sporadically, the larger examples being over 70 feet high.

White deep sands predominate on all parts of the landscape with smaller areas of white sands of Group D in the lowest sites. By comparison with other soils of the region both types of sand are of extremely low fertility as reflected by the low values for all nutrients tested in the laboratory (exchangeable metal cations, nitrogen, potassium). The pH of surface horizons is approximately neutral. In occasional low sites strata of clay or sandy clay occur close to or at the surface.

As there are no rainfall stations within the land system the precipitation can be estimated only from records kept in adjacent cleared country. This can be done with any degree of certainty only along the northern and eastern margins of the land system where the rainfall averages 12½ to 13 inches per annum. In the isolated south-western parts the rainfall is higher, probably mainly between 13 and 14 inches.

Plate 18 – Heath on a relatively large sandplain in the Big Desert land system south of Murrayville.
Jumbled dunes occur on the horizon. Typical of the BD_2 area on the map.

The native vegetation is mainly heath (Plate 18), mallee heath and scrub mallee (Plate 13) each of which occurs on all landscape positions. The heath and mallee heath contain a wide variety of shrubs prominent among which are honeysuckle, scrub pine, tea tree, blackboy, sheoke and heath. The more prominent shrubs in the scrub mallee formation are tea tree, scrub pine, broom-heath myrtle and broombush. Heath and mallee heath do not occur north of approximately the 13 inch isohyet where scrub mallee blankets the entire landscape. Further south the distribution of the three communities appears to be largely random with respect to topography and soils except that heath is confined to the deep sands. Their random distribution may be largely the effect of scattered fires which produce a complex pattern which can be detected on aerial photomaps. There are occasional stands of mallee in low sites where heavy strata occur close to the surface. Scattered brown stringybarks occur on or towards the crests of high jumbled dunes from approximately the 13 inch isohyet southwards, and this line represents the northernmost and driest extent of the species in Victoria.

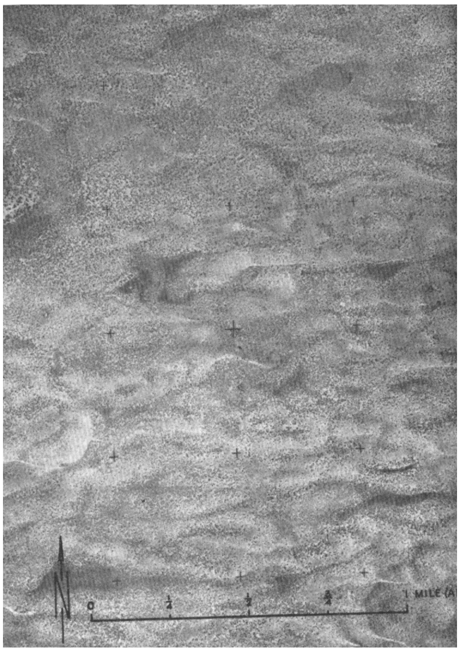


Plate 19 – Aerial photograph of part of the Big Desert land system, containing dense dunes with narrow sandplain corridors (BD_1 on map).
The lighter shading occurs mainly on the crests of the dunes.

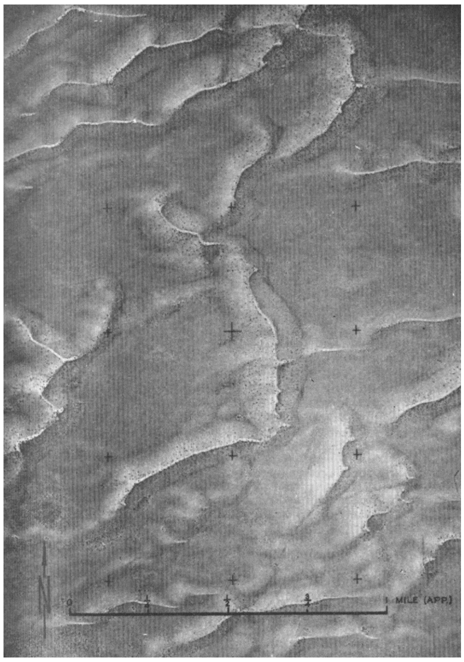


Plate 20 – Aerial photograph of part of the Big Desert land system, containing jumbled dunes with large areas of sandplain (BD_2 on map).
The jumbled dunes have sharp crests, or "razorbacks". The vegetation is mainly heath. The markedly stippled areas carry mallee heath.

Together with the Berrook land system further to the north, the Big Desert land system has a higher erosion hazard than any other country within the region. The dunes and jumbled dunes are extremely unstable when cleared and although the hazard on the intervening sandplains is lower it is nevertheless severe. At present the native vegetation provides complete protection from the wind except along the very crests of the highest jumbled dunes where there is some sand movement. When fires sweep through the scrub not a great deal of drift follows owing to the wind-breaking effect of the remaining stalks of the shrubs and mallees and also because of the presence of a resistant surface seal developed by raindrop impact combined with the binding effect of mosses and lichens. During a fire this seal is baked hard. Thus, although strong winds move sand across the surface following a fire, the crust is sufficiently tough to protect the soil until subsequent regrowth occurs, provided, of course, that there is no trampling by livestock.

Ecological studies indicate that the potential of the Big Desert land system for crops and pastures is low and furthermore that, under present conditions, settlement would most likely be accompanied by instability. Because of their low fertility reserves the prevalent white sands are not suitable for regular cropping. Successful settlement could be based only on vigorous perennial pastures which would protect the soil at all times. Local interest has been shown in developing the area for grazing, prompted largely by the establishment of farms along the southern margins of the Big Desert in the Wimmera.

The Wimmera settlements have been established in the most favourable environment afforded by the Big Desert. They have proceeded only after the completion of a comprehensive series of pasture trials which indicated that a dense cover of pasture could be maintained to protect the unstable soils and at the same time to provide sufficient income to offset the high developmental costs. Settlement has been confined to country in which the rainfall exceeds an average of 16 inches per annum and to large sandplains which have clay strata close to the surface, not exceeding a depth of about 4 feet. Dunes and jumbled dunes have been left uncleared. The main pasture species are subterranean clover, Wimmera ryegrass and phalaris, whilst heavy dressings of superphosphate are required with the addition of the trace elements copper and zinc.

In the northern parts of the Big Desert the climate, soils and topography are much less favourable. The climate is more arid with an average annual rainfall between 12½ and 14 inches per annum. The soils are mainly deep sands with smaller areas of white sands of Group D and the proportion of country in which heavy strata occur close to the surface is negligible. From the point of view of settlement there are two contrasting types of topography. The first, shown as BD_1 on the map and covering about 1,180 squara miles, consists of dense dunes, with narrow corridors which comprise only about 25 per cent of the landscape (Plate 19). 'This country is clearly unsuitable for settlement. The second type of topography, shown as BD, on the map and covering some 880 square miles, contains jumbled dunes with a larger area of sand plain amounting to about 50 per cent. of the landscape (Plate 20). Individual sandplains vary greatly in area and the largest occupies some 3 square miles. If settlement were to occur the greatest chances of success would be in the BD_2 area, with pasture development on the sandplains and with the native vegetation retained on the interlacing network of jumbled dunes.

Before settlement is contemplated there should be a comprehensive series of pasture and grazing trials to determine whether pasture can be economically and safely produced. As the area in which clay occurs close to the surface of the sands is negligible, moisture would penetrate deeply and deep-rooted perennials would be required rather than shallow-rooted annuals. In addition perennials would provide cover at all times of the year. The extremely low nitrogen levels of the sands indicate that legumes would be needed. The most suitable species available which meets all these requirements is lucerne. Heavy applications of superphosphate would be needed, with the probable addition of copper and zinc, whilst lime may be necessary for lucerne establishment. The extremely low values of both exchangeable and total potassium. and the general absence of potassium-rich clay subsoils indicate that applications of this nutrient may be needed, not perhaps in the pasture establishment stage, but some years later when there has been a significant drain on nutrients, particularly where pasture is cut for fodder conservation. The carrying capacity of the pasture would need to be high enough to offset the considerable developmental costs of which some of the main items would be for clearing, fencing and providing fertilizers, seeds, machinery, houses, sheds and a bore water supply.

If the pasture experiments were promising and if settlement were decided upon, a survey would be required to delineate the areas most suitable topographically. Assuming the areas chosen were scattered within the BD_2 area, isolation would bring significant problems not the least of which would be the need to erect expensive boundary fences to keep out the emus and kangaroos which abound in the scrub.

Around the margins of the land system the infertile white sands have occasionally been cleared, particularly where they occur scattered on farms which have been developed on pockets of more fertile country which penetrate the land system boundary. With great care in management some conservation-minded farmers have maintained the stability of the infertile sands with pastures such as evening primose *(Oenothera odorata)* and perennial veldt grass *(Ehrharta calycina)* which can grow well on sands of low fertility. However, the carrying capacity is low and the white sands are being "carried" by the more fertile soils of the farm which are typical of adjacent land systems. More generally, the cleared Big Desert sands have become unmanageable with the dunes drifting and the lower sites supporting either regenerating scrub or weeds tolerant of low fertility. The white sand horizons of the dunes have generally been removed to expose the more compact yellow subsoils. The condition of this country provides a warning of the general instability which could occur if large settlements were to be opened up within the land system.