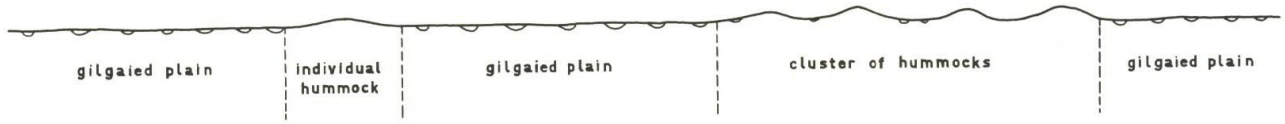
Culgoa Land System

Fig. 20 – Culgoa Land System

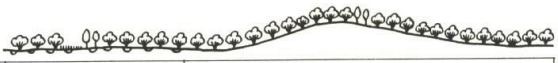
CULGOA LAND SYSTEM

(a) Distribution of land forms



(b) Land system diagram

AVERAGE ANNUAL RAINFALL: 12″–14″; mainly 13″–14″
LAND USE: Cropping and grazing



LAND FORM	Type	Plain	Hummock	
	Approx. percentage of land system	75	25	
	Approx. cross-section	Several miles	50 yards–½ mile	
PARENT MATERIAL		Parna	Parna (on gentle slopes generally towards base)	Coarse saltation material and parna
NATIVE VEGETATION		Mallee Occasional grasslands and woodlands of pine and buloke with belar in north	Mallee Occasional woodland of pine and buloke with belar in north	
SOIL	Textural group	Light clays	Light clays	Sandy loams
	Morphological group	Light clays	Light clays	Group A / Group B
	Proportion on land form	Dominant	Codominant	
	Moisture characteristics	Poor	Poor	Moderate
	Fertility reserves	High	High	Moderate
LAND USE	Most suitable form	> 13″ cropping and grazing < 13″ grazing	> 13″ cropping and grazing < 13″ grazing	Cropping and grazing
	Nutrients required in fertilizers	P	P	P, (N > 13″ ?)
	Recommended pastures	Barrel medic, Wimmera ryegrass	Barrel medic, Wimmera ryegrass	Barrel medic, Wimmera ryegrass > 13″ lucerne
	Land use class	> 13″ 1 < 13″ 3	> 13″ 1 < 13″ 3	2 (*a*)
WIND EROSION HAZARD		Slight	slight ← easterly — lower — heavier soils	westerly — higher → severe lighter soils
OTHER HAZARDS		Dry land salting Channel seepage salting		

As settlement in Victoria spread northwards and westwards during the last century it was halted by the dense thickets of mallee. However, towards the close of the century when it was decided to clear and bum the mallee to make way for farms, the Culgoa land system was one of the first areas to be opened up. It has remained one of the most productive and stable areas within the region. The land system occurs in a broad sweep of some 900 square miles of country extending from Beulah through Culgoa to Swan Hill.

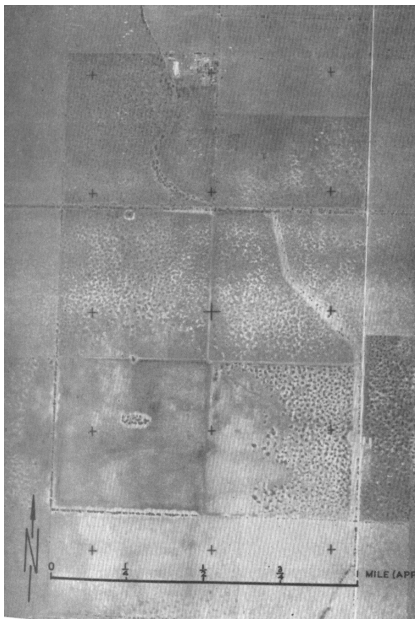


Plate 22 – Aerial photograph of part of the Culgoa land system.
The stipling is caused by gilgais which occur chiefly on the plains. In the lower half of the photo, to the left of centre, there is a cluster of hummocks with a clump of trees towards its centre.

The landscape is relatively simple, consisting of plains on which there are scattered low hummocks (Fig. 20). The latter usually occur in clusters of variable size ranging up to about 2 miles across (Plate 22) but they can also occur as individual, simple hummocks. The country forms the eastern and south-eastern boundary to the surveyed area except in the south-eastern corner where it gives way to the Tyrrell Creek and Wycheproof land systems. Although the latter consist of plains they do not contain hummocks. The north-western boundary of the land system is formed mainly by the Hopetoun land system which contains a well-developed system of ridges and a weak array of dunes. Part of the north-western boundary is formed by the Boigbeat land system which contains dense hummocks with a relatively small proportion of plains.

The simple landscape gives rise to a relatively narrow range of soils. Gilgaied light clays are by far the most widespread soils, occupying the plains (Plate 23) and also portion of the hummocks, generally the lower, gentler, westerly slopes. Sandy loams of Group B predominate on the higher, steeper, easterly slopes whilst in intermediate positions sandy loams of Group A are usually found.

Mallee is the most widespread native vegetation. There are scattered remnants of pine and buloke woodland in the south and pine, belar, buloke woodland in the north. Big mallee and grassland have been observed on the plains but their original density cannot be gauged because of the closely-settled nature of the country.

Plate 23 – Gilgaied light clay plains in the Culgoa land system near Culgoa

The average annual rainfall increases from 12 inches in the north to 14 inches in the south and agricultural production increases markedly in this direction. The increased production is most marked on the predominant heavy gilgaied soils which with their unfavourable moisture characteristics, are most sensitive to changes in rainfall. The 13 inch isohyet marks the approximate northern limit to the suitability of these soils for cropping and introduced pastures. To the north of this line good crops may be obtained in favourable seasons but the average over the years is low. Investigations are required into the most satisfactory form of land use on the light clays in these northern areas. This may be the grazing of perennial native grasses such as wallaby grass.

In the more extensive 13 to 14 inch rainfall zone the light clays have been intensively cropped for some 70 years and yet there appears to be no sign that the fertility has fallen to a level low enough to reduce yields. By contrast, the fertility decline which must have occurred has probably contributed to increased yields following a reduction in vegetative growth of cereals to levels which can be more readily maintained in the spring. The most suitable management of these soils for cropping requires investigation. Although barrel medic makes excellent growth and provides a valuable fodder reserve in the form of burrs there is a danger that, being a legume, it will raise the nitrogen status to too high a level and that on these heavy textured soils "burning off" of crops will occur more severely. Non-legumes may well be more suitable species with which to spell the land.

The lighter-textured soils of the hummocks, with their more suitable moisture characteristics, have been suitable for cropping, and introduced pastures throughout the land system. However, crop yields have declined with declining fertility brought about by intensive cropping and erosion. Symptoms of nitrogen deficiency in cereals on these soils are more marked in the southern parts of this and the Hopetoun land system than in any other parts of the region. In these areas relatively long periods under a legume are required and lucerne would perhaps be the most suitable species. In the north where the fertility decline is less serious and where the rainfall may be insufficient to support lucerne on the sandy loams, barrel medic may well be the most suitable pasture species.

The erosion hazard is less than that in any other large land system. The predominant light clays will drift significantly only under very poor management, for example when fallows are prepared too finely or where there is severe overgrazing, accompanied by trampling of the surface into a powdery state. The hazard on the less widespread sandy loams is greater and it varies with position on the hummocks. The western faces have the greatest stripping hazard whilst the relatively small amounts of drift are deposited on the eastern faces. Although severe erosion has occurred on the hummocks, its extent has been greatly reduced in recent years by the use of cultivation techniques in which the surface is left rough or protected by stubble and by an increase in the area covered by pasture.

The potential for increased production within the land system is limited by the preponderance of the light clays. There appears to be little scope for increasing crop yields by raising the fertility of these soils and where the rainfall is too low for cropping they will remain of low grazing value. By comparison production can be raised considerably on the sandy loams by increasing still further the area sown to barrel medic and lucerne, thereby increasing the amount of feed available, reducing the erosion risk on the hummocks and rebuilding the fertility of the soils for cereal crops. However, even when their fertility is restored the sandy loams will not stand cropping as frequently as the light clays. The two kinds of soil require differential treatment. and, because of the relatively simple soils pattern, the reorganization of paddock units to achieve this end is less difficult than in most other farming areas.