

## 19. WILLAURA LAND-SYSTEM

The undulating basaltic plains in the south-eastern and southern parts of the survey have been mapped as two land-systems. The separation of the two mapping units was based on their land-forms and drainage systems. Dunkeld land-system has stony rises, an open drainage system and no swamps whereas Willaura land-system has no stony rises and an internal drainage system with swamps.

Willaura land-system covers 59 square miles, mainly in the parishes of Willaura and Kiora, and it continues to the east outside the boundary of the survey. The diagrams in Figure 23 illustrate the land-forms and show their features of environment and land-use.

The soils on the undulating plain are brown solodic soils with a loam in the A horizon overlying a clay B horizon which typically has a severely undulating surface. The undulations are usually 12 to 24 inches across and up to 10 inches in depth, giving a range of depths to the clay of 5 to 15 inches. Associated with this feature are large amounts of fine buckshot in the A, horizon, particularly in the depressions formed by the undulating surface of the clay. These two features distinguish these soils from the solodic soils elsewhere in the survey except for those in the neighbouring Stavelly land-unit of the Parrie Yalloak land-system where the features are also present but not to the same degree.

The land-system has many small swamps which together account for 10 per cent. of the area. Some of the swamps are permanently wet and may or may not have red gums or swamp gums. Others are reclaimed and have grey heavy clays used for stock grazing.

Around the eastern margins of some swamps are red solodic soils differing markedly from the brown solodics of the plain. They have reddish brown A horizons and red B horizons. Also, the surface of the clay subsoil is not undulating but flat and there is less buckshot in the A, horizon. The ground rises sharply from the eastern edge of the swamp and then very gently slopes down towards the east as illustrated in the second undulating plain in Figure 23 (i). The surface of the land shows no more than a slight superficial resemblance to a lunette. However the characteristic soil and its restriction to the eastern side of the swamp strongly suggest that at least the mechanism of lunette formation has occurred to a limited degree.

Other swamps in the land-system are as shown in the diagram under Figure 23 (i). That is, the slope into the eastern side of the swamp is shorter and the land continues upward to the crest of the undulating plain. The soil on the short, steep slope around the eastern side of the swamp is a brown solodic like those on the undulating plain.

There are no indigenous trees in the land-system except for red gums or swamp gums in some of the swamps. Shelter belts of sugar gums (*E. Cladocalyx*) and pines (*Pinus radiata*) have been established by most landholders. The grassland of wallaby, brome and kangaroo grasses is thought to be a natural sub-formation although more evidence is required from the history of settlement to establish this point.

Both wool growing and wheat growing are important forms of primary production. Willaura is noted for its fine wool. Merinos graze introduced pastures of perennial ryegrass and Mt. Barker and Bacchus Marsh varieties of subterranean clover. Phalaris is also in common use. Many properties carry large numbers of beef cattle which form an important secondary source of income.

Wheat is grown in sufficient quantities to warrant a storage silo at the Willaura railway yards and this is so for a number of other centres in this part of the Western District. This area is actually a small section of the Victorian wheat belt which is separate from, and to the south of, the main wheat areas of the State. Wheat growing on such a scale in the land-system is made possible by the comparatively low rainfall of 21 inches and also by the arable soils which are loams rather than clays and are free of basalt boulders. The land-system is in a rain shadow which lies to the east of the Grampians and this explains the low rainfall.

Protein analyses of the Victorian wheat crops over the years have shown that the wheat grown in the Willaura area has a consistently high protein content (greater than 10 per cent.) and sometimes it is the highest in the State (Moss and Mander 1959). This is achieved by a clover-Icy system in which there are relatively long periods of legume pastures. That is, wheat is grown less intensively here than in the other parts of the wheat belt.

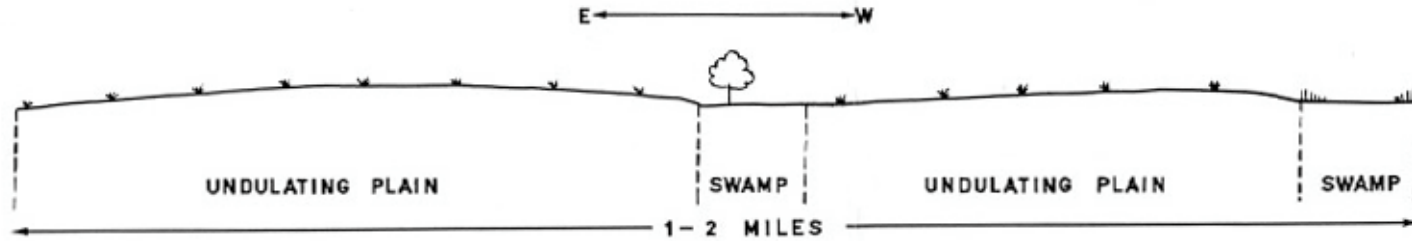
Two problems of land-use arise from the closed systems of drainage over the basalt plain. Water draining to the swamps causes waterlogging and even shallow flooding over substantial areas in winter and spring. In addition, some of these areas are affected by a rise in the levels of salt in the soil. In those sites where waterlogging and salting are not too serious, a productive pasture can be obtained with Palestine strawberry clover and Yarloop subterranean

clover. However, where the problems are acute, more comprehensive schemes including drainage works are needed to reclaim the areas for production.

Both the erosion hazard and the incidence of erosion are negligible throughout most of the land-system because of the gentle slopes and lengthy periods under pasture. However sheet erosion and rilling will occur on the steepest slopes if heavy rains are received while they are under fallow.

### WILLAURA LAND SYSTEM

(i) Distribution of land-forms



(ii) Land-system diagram

Climate		Average annual rainfall 21-23 inches : growing season April to October	
Land-Form		Undulating plain	Swamp
Geology		Pleistocene basalt	Basaltic alluvium
Topography		Long, gentle slopes of 1-2%	Flat
Soil		Brown solodic soils (dominant), red solodic soils (minor)	Grey heavy clay in reclaimed swamps
Land Class		2A	3 (reclaimed swamps)
Land Use	Present	Fine wool grown on introduced pastures and wheat growing	
	Problems	Waterlogging and salting on lower slopes	
Water Erosion	Hazard	Low	None
	Actual	Negligible	None
Native Vegetation	Structure	Grassland	Remnants of a woodland
	Species	Wallaby grasses, brome grasses, spear grasses	Red gum, swamp gum

*Figure 23 – Willaura Land System*