

21. DUNDAS LAND-SYSTEM

The Dundas land-system forms the eastern extremity of the Dundas Tablelands which are a clearly defined physiographic region in western Victoria between the Grampians and the South Australian border. Most of the Dundas Tablelands have been mapped and described as the Glenelg, Casterton and Dundas land-systems by Gibbons and Downes (1964) in a survey similar to the one reported here. Within their area of survey the features of the tableland are developed to the greatest degree. That is, the streams have reached their greatest degree of erosive activity so that the valleys are deep and wide and the flat tableland has been cut back to mere remnants of the original surface. The two authors mapped the tableland surface as the Dundas land-system and the valleys as the Glenelg and Casterton land-systems.



Plate 34 – Two of the land units in Dundas land system. The flat tableland along the skyline is in Cavendish land-unit, and the gentle slopes forming the zone of creek dissection are part of Stapylton land unit. The remnant of a red gum woodland covers the entire landscape

The small section of the Dundas Tablelands within the Grampians, survey has not been dissected to the same extent, because it is nearer to the source of the dissecting streams. The valleys are not as deep nor as wide, and the areas of the tableland surface are more extensive. This section of the Tablelands is located along the central-western boundary of the Grampians survey area and it has been mapped as the Dundas land-system. Also there is a small area on the eastern side of the Grampians in the parish of Watgania. The total area of the land-system is 309 square miles and the diagram in Figure 25 illustrates the tableland land-form and gives its features of environment and land-use.

The Dundas land-system differs from the land-system of the same name described by Gibbons and Downes in that it includes the valleys within its boundary as well as the surface of the tableland. However, the valleys are still separated as land-units on the land-system map which accompanies this report.

The surface of the tableland is flat to slightly undulating with slopes less than 2 per cent. It is composed of a hard capping of lateritized Tertiary sediments overlying a core of Palaeozoic basement rocks. The laterite is sometimes exposed in road cuttings along the escarpment which separates the surface of the tableland from the valleys. In these situations, a zone of massive or indurated ironstone overlies a zone of clay with mottled colours of red and white. In a few cases the lowest zone of white or "pallid" clay is also visible.

The soils of the tableland surface are mainly yellow solodic soils, although in some parts red and brown solodic soils are also common. The A₁ horizon is a fine sandy loam or gritty fine sandy loam and the A₂ horizon is a gravelly fine sandy loam with considerable amounts of small buckshot. The yellowish clay of the B horizon is usually between eight and twelve inches below the surface and is not tough and tenacious but breaks easily in an auger. A minor soil type found on outcrops of lateritic ironstone consists of a chocolate-brown gritty loam at the surface, changing gradually with depth to a reddish gravelly clay loam and further to a red light clay. Around Cavendish and also in the parish of Watgania, a further soil type is found at the bases of long, gentle slopes, namely, gilgaied brown. solodic soils. Both puff and shelf have a loam or clay loam at the surface that becomes a heavy clay within nine inches.

The valleys are less than half a mile in width, except along the Glenelg River, and their steepest slopes are about five per cent. Most valleys are shallow and the streams have not cut below the laterite. However, along the Glenelg and Wannon Rivers and in some of their larger tributaries, the valleys are deeper and granites, diabases and trachytes which form the core of basement rocks are exposed underneath the laterite. On the sides and floors of the valleys, yellow and brown solodic soils occur which differ from the tableland soils in having much less buckshot grit and gravel and being deeper to the clay.

Savannah woodlands and tall woodlands occur throughout the land-system but the associations of species vary. Red gum savannah woodlands are most widespread and are situated along the eastern, southern, western and north-western margins of the land-system at all positions on the landscape. There are also scattered patches of swamp gum and apple box on the escarpment of the tableland. In the vicinity of Rocklands Reservoir, in the central and

northern parts of the land-system, tall woodlands of red gum and yellow box are confined to the creek lines whereas on the surface of the tableland and on the sides of the valleys there are woodlands of yellow box, yellow gum, apple box, long leaf box and messmate with black wattles, sheokes and yaccas as sub-dominant species.

For many years the land-system proved to be well suited to the production of fine wool on native pastures. However the average annual rainfall of 24 to 26 inches favoured introduced pastures and there has been an accompanying increase in the numbers of beef cattle.

At the present time, the introduced pastures are commonly made up of Mt. Barker and Bacchus Marsh subterranean clovers and perennial ryegrass. However the comparatively high average rainfall allows a wider choice of varieties and species such as Tallarook subterranean clover and phalaris over the broad acres with Yarloop subterranean clover and Palestine strawberry clover in wet sites. In most parts of the land-system, superphosphate alone is needed to give vigorous pastures although recently, in some localities, deficiencies of molybdenum have been detected.

High quality meadow hay is produced on many properties as a means of building up fodder reserves. This is in contrast to the areas of lower rainfall further north where oaten hay, lucerne and cereal grain are the common fodder materials.

The invasion of the introduced pastures by species of low food value is a particular problem. Capeweed, Scotch thistle, barley grass and sterile brome appear after the soil fertility has been raised by the clovers. If weeds such as these are unchecked they can weaken the clovers and lower the carrying capacity of the paddocks. At this stage cropping serves the dual purpose of using the high fertility and removing the unwanted species. After the crop has been harvested for grain or hay, the pasture usually re-establishes itself from seed remaining in the soil. Sometimes a light sowing of about half a pound per acre for subterranean clover is useful to ensure a good re-establishment.

The main form of deterioration of the land is catchment salting which is more widespread and more severe in this land-system than in any other mapping unit in the survey. This situation has been developed by a combination of the climate, dissected tableland topography, solodic soils, excessive clearing of the timber and over grazing.

Areas affected by accumulations of salt are found along most creeks and drainage lines. Some of the salt pans cover several acres and many of them have reached the hardpan stage at which all vegetation is killed and a crust of salt covers the ground (Cope 1958). The hardpans are starting points for sheet erosion and gulying and the most severe examples of these forms of water erosion in the land-system are associated with the hardpans.

The reclamation of salted areas is a difficult and slow task, particularly on the hardpans where any attempt to re-establish a plant cover must contend with the very high levels of salt (up to one per cent. soluble salt) and the hard and structureless surface soil which quickly re-seals after cultivation. The reclamation of salted areas is a two-fold operation involving treatment of the catchments and treatment of the affected areas into which the catchments direct water. Pasture improvement over the catchments together with a programme of re-planting red gums are two measures intended to increase the uptake of water and so to reduce the volume of water and salt reaching the salted areas. Treatment of the salted areas includes sowing or planting species that show some degree of tolerance to high levels of salt, and adding heavy applications of superphosphate and a nitrogen fertilizer to assist their growth. Further assistance is given by a covering of straw or hay mulch to reduce evaporation, and by fencing out stock and rabbits to prevent grazing until the plants have reached a stage of sufficient vigour and density.

Some salted areas do not respond to expensive and prolonged treatment and in these cases it is probably better to spend money on improving the catchments as much as possible and raising their carrying capacity rather than spending the same amount on a relatively small area of the farm for no monetary return.

The parishes where salting is widespread and serious are Balmoral, Yat Nat, Yarramylyup, Pendyk Pendyk, Wookurkook, Bear and Mooralla. Neighbouring parishes to the west within the survey area of Gibbons and Downes are affected to the same degree. The problem is so serious that the saline waters reaching the Glenelg River from properties below Rocklands dam are lowering the quality of the Glenelg water. The State Rivers and Water Supply Commission has found it necessary to release water from the reservoir more frequently than desired in order to dilute the salt content of the river water.

The inherent tendency of the valleys to become salted has been demonstrated by a study of the land-system in the parishes of Yat Nat and Tyar where uncleared woodlands in reserved forests still remain. Here the timber has been partly removed by timber cutters and the ground cover is thinned and weakened by uncontrolled rabbit grazing and light stock grazing. These forms of land-use are less exploitative than the widespread clearing and heavy grazing in

the alienated areas of the land-system, and yet within the forests, incipient salting is occurring in the shallow zones of creek dissection.



Plate 35 – Most creeks and drainage lines in Dundas land system are salted as shown in this aerial photography of part of Skeleton Creek in the parish of Mooralla.

Soil erosion is not serious in Dundas land-system apart from the examples associated with salting. Sheet erosion under native pastures has developed to some degree on the sides of the valleys but on the surface of the tableland, erosion is very limited in its extent and severity.

Forestry is another form of land-use of some importance. Reserved Forest covers 15 per cent. of the land-system in the northern parts around Rocklands Reservoir. In the parish of Woohlpooer the Forests Commission is managing an extensive woodland of young red gum that will be of great commercial value in the future.

The Reserved Forest in the parishes of Yat Nat and Tyar consists mostly of poor to medium quality woodlands of yellow box, yellow gum, long leaf box and apple box. Stands of red gum are restricted to creek lines in the shallow valleys and to wet depressions in the surface of the tableland. The only attempts to use the area commercially are limited to light forest grazing under licence and the removal of firewood, fence posts and railway sleepers by timber cutters. This area of Reserved Forest could be developed into successful sheep properties but it has a frontage to Rocklands Reservoir and forms most of the shoreline of that body of water. It is considered that the risk of contaminating the reservoir with saline water should not be taken, particularly in view of the incipient salting already in evidence within the forest, and the serious salting throughout the pastoral areas of the Tablelands.

Land-Units

Five land-units are included within the land-system and they are separated from each other by the degree of dissection of the tableland, that is, by the depth and size of the valleys, and also by the composition of the woodlands. They are Cavendish, Chetwynd, Stapylton, Glenelg and Tyar land-units. The first three were named and described by Gibbons and Downes (1964) in their neighbouring survey area and have been continued into the Grampians survey area to maintain continuity. It should be noted, however, that Gibbons and Downes mapped Chetwynd and Stapylton land-units as part of their Glenelg land-system which incorporates many of the valleys, and placed Cavendish land-unit in their Dundas land-system which covers the undissected tableland areas. Glenelg land-unit was named and mapped by Blackburn and Gibbons (1956) in their survey of the Shire of Kowree and that part of it within the parish of Yat Nat is included within the boundary of the Grampians survey.

Cavendish land-unit is the most extensive land-unit and it includes all the undissected tableland areas south of Rocklands Reservoir together with the shallowest of the valleys, which, in general, means those valleys which have not yet penetrated through the laterite capping. The slopes into the valleys are shorter and less steep than those elsewhere in the land-system and salting along the creeks is not very serious. Savannah woodlands of red gum cover most of the land-unit, and in the areas near Rocklands Reservoir, this species is one of a number of eucalypts which also includes messmate, apple box and yellow box.

Stapylton land-unit includes deeper valleys which have cut through the laterite but have not, at this stage, continued much further. The larger tributaries of the Glenelg and Wannon Rivers are included in the land-unit, and along the valley bottoms hardpan salting is widespread. This has resulted from a combination of catchment salting along the creeks as already described and another form of salting called hillside seepage where salt patches develop on the sides

of the valleys at a point below the laterite capping. The salting is at its worst wherever the floor of the valley is not far below the base of the laterite because, where this occurs, the two forms of salting augment one another.

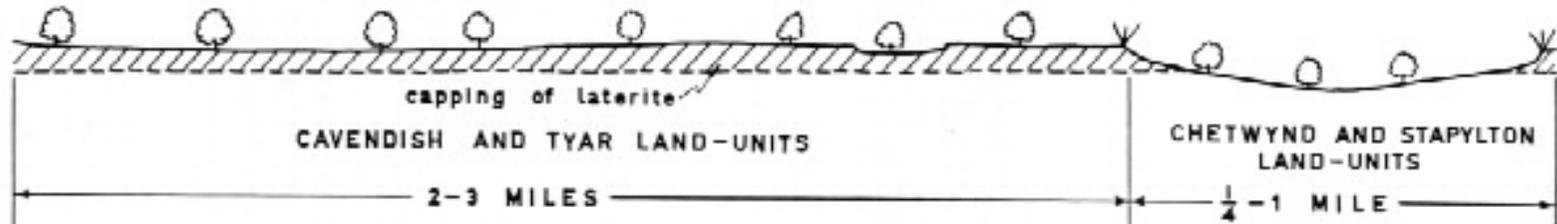
Chetwynd land-unit is confined to that section of the Glenelg River valley downstream from Balmoral where dissection is at its greatest and the valleys have steep, long sides with a definite hazard of sheet erosion and gullying. Both hillside seepage and hardpan salting are present but they are separated from each other by the sides of the valleys. Individual salted areas may not be as severe as in Stapylton land-unit although the problem in aggregate throughout the land-unit is still a serious one.

Glenelg land-unit also has serious examples of salting. The area is deeply dissected with few areas of tableland surface remaining, and the valleys could be included within Stapylton land-unit.

Tyar land-unit is on the north side of Rocklands Reservoir within the Reserved Forest in the parishes of Tyar and Yat Nat. It has been described in earlier paragraphs as having woodlands of yellow box, yellow gum, apple box and long leaf box, and of having shallow, narrow valleys which indicate very slight dissection.

To summarize the Dundas land-system, it can be said that this land-system has the environment to support high levels of wool and beef production on introduced pastures. The most serious problem is catchment salting which is limiting the productivity of the land and polluting the water in the Glenelg River.

DUNDAS LAND SYSTEM



Climate		Average annual rainfall 24-26 inches: growing season April to October	
Land Form		Dissected tableland	
Geology		Lateritized Pliocene sediments over a core of Palaeozoic basement rocks	
Topography		Flat and gentle slopes up to 2%	Gentle to steep slopes 2-10%
Soil		Yellow and brown solodic soils (dominant), gilgaied solodic (minor), gravelly reddish loams (minor)	
Land Class		2A (occasional cropping with a broad rotation of mainly pasture)	2B and 4A
Land Use	Present	Wool growing and beef production on native and introduced pastures, making of meadow hay	
	Problems	Pasture renovation and control of pasture weeds	
Water Erosion	Hazard	Low	Moderate
	Actual	None	Salting, sheet erosion, gullying
Native Vegetation	Structure	Savannah woodland	Tall woodland
	Species	Red gum (dominant), swamp gum and apple box (minor)	Yellow box, yellow gum, apple box (dominant), red gum, long leaf box (minor)

Figure 25 – Dundas Land System