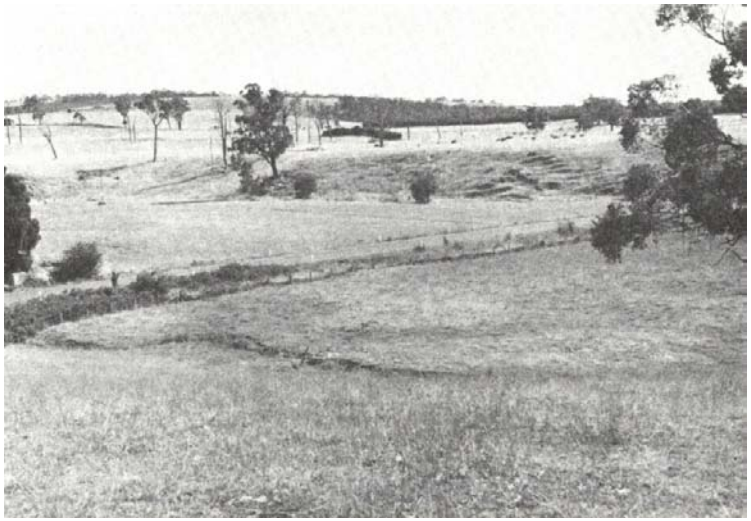
7.12 Carlisle Land System

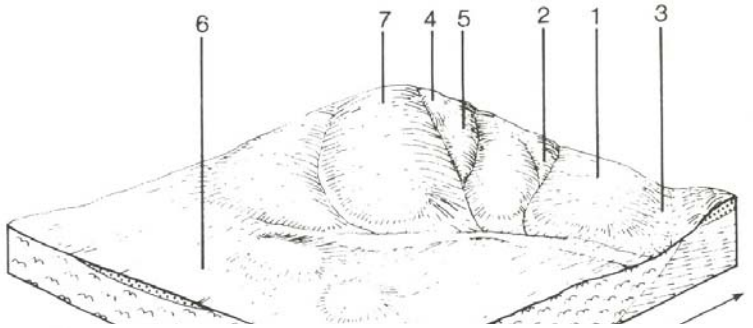
High-level river terrace systems have developed along the Gellibrand River valley at Carlisle River, Gellibrand and Chapple Vale. Up to four different levels can be found, and mild dissection on the upper levels in quite complicated landscapes.

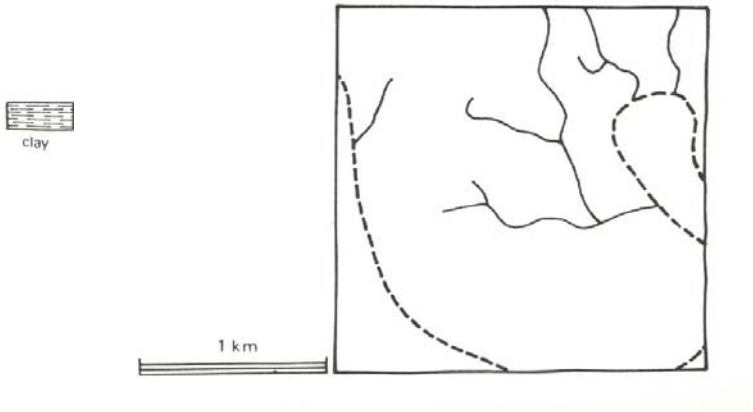
The alluvial material varies from coarse sands and gravels to silts and clays and a variety of soils is found at different levels. Redistribution of sand over some areas has resulted in polygenetic soils with hardpan development. This further complicates the soil and vegetation pattern.

Most of these terrace systems have been cleared, dairying being the major land use. Seasonal waterlogging is common and soil compaction may result from cattle grazing these areas in wet conditions.



Several levels can be found in this land system, with the highest levels being somewhat dissected.





CARLISLE Area: 19 km^2	Component and its proportion of land system						
	1 10%	2 10%	3 10%	4 10%	5 15%	6 25%	7 20%
CLIMATE Rainfall, mm Temperature, 0^{o}C Seasonal growth limitations	**Annual**: 1,000 – 1,150, lowest January (45), highest August (130) **Annual**: 13, lowest July (8), highest February (18) **Temperature**: less than 10^{o}C (av.) June – September **Precipitation**: less than potential evapotranspiration mid November – late March						
GEOLOGY Age, lithology	Recent alluvial clay, silt and sand shallowly overlying unconsolidated Palaeocene sand with some clay and silt.						
TOPOGRAPHY Landscape Elevation, m Local relief, m Drainage pattern Drainage density, km/km^2	Elevated and, in parts, uplifted and dissected system of ancient cut and depositional terraces of the Gellibrand River. 30 – 180 20 Dendritic pattern in dissected areas; internal drainage elsewhere 1.2						
Land form Land form element Slope (and range), % Slope shape	Alluvial terrace Low level 30 (0-8) Linear	Scarp - 25 915-40) Linear	Valley floor - 0 (0-1) Linear	Scarp - 15 (3-35) Convex	Mildly dissected alluvial terrace Middle level 5 (0-9) Linear	 3 (0-5) Linear	 High level 7 (1-10) Convex
NATIVE VEGETATION Structure Dominant species	Open forest *E. obliqua, E. ovata*	Open forest *E. obliqua, E. viminalis*	Tall open forest *E. viminalis, E. obliqua, Acacia melanoxylon, E. ovata*	Woodland *E. radiata, E. nitida, E. baxteri, E. viminalis*	Low open woodland *E. nitida, E. radiata, E. baxteri*	Open forest *E. aromaphloia, E. radiata, E. ovata*	Open forest *E. obliqua, E. radiata, E. baxteri*
SOIL Parent material Description Surface texture Permeability Depth, m	Alluvial clay, silt , some sand Yellow-brown gradational soils, coarse structure Fine sandy loam Low >2	Sand, silt and clay Yellow gradational soils, weak structure Sandy loam High >2	Alluvial clay, silt and sand Grey gradational soils Sandy clay loam Low >2	Sand Grey sand soils, uniform texture Loamy sand Very high >2	Sand Grey sand soils with hardpans, uniform texture Silty loam Very low 0.6	Alluvial clay, silt with sand underlay Grey sand soils, structured clay underlay Sandy loam Low >2	Alluvial clay, silt Mottled yellow and red gradational soils Sandy loam Moderate >2
LAND USE	**Cleared areas**: Dairy farming; beef cattle grazing; open-range pig fattening; residential; water supply. **Uncleared areas**: Sand and gravel extraction; water supply; minor forest produce						
SOIL DETERIORATION HAZARD Critical land features, processes, forms	Low permeability and high rainfall lead to seasonally high water tables with resulting waterlogging and soil compaction.	Low inherent fertility and high permeability lead to leaching of nutrients. Weakly structured surface soils on the steepest slopes are prone to sheet erosion. Saturation of clay subsoils on steep slopes leads to landslips.	Flooding and seasonal water table development lead to waterlogging, soil compaction and siltation.	Very low inherent fertility and high permeability lead to nutrient decline. Steeper slopes with compacted soils of low water-holding capacity are prone to sheet erosion.	Very low inherent fertility with leaching of permeable acidic surfaces leads to nutrient decline. Hardpans restrict drainage, leading to seasonal waterlogging.	Low inherent fertility with leaching permeable surface horizons leads to nutrient decline. Low profile permeability and perched seasonal water tables lead to waterlogging.	Low inherent fertility and phosphorus fixation lead to nutrient decline.