7.16 Knowsley land system (Ky)

This land system occurs to the north and west of Heathcote on gently undulating Permian glacial sediments preserved by down-faulting.

Mottled yellow sodic duplex soils predominate on the crests, slopes and drainage depressions. The heavy clay B horizons have a characteristic bright yellowish brown colour; however, on some better-drained areas the upper B horizons are red.

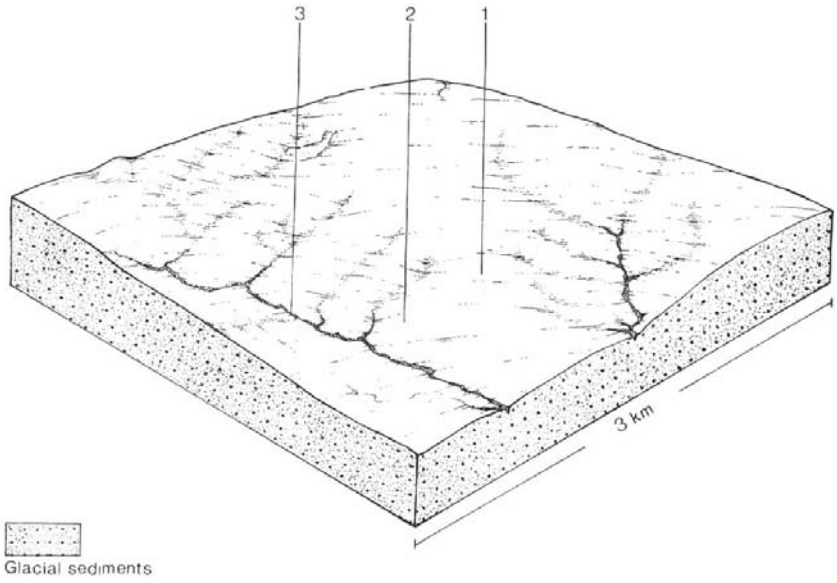
E. microcarpa and *E. albens* are found in all landscape positions except the alluvial terraces, where *E. camaldulensis* and *E. melliodora* predominate. *E. melliodora* and *Casuarina luehmannii* also occur on the slopes. Most of the original vegetation has been cleared, the predominant use is grazing on native and introduced pastures. There is some cereal-cropping on the lower slopes.

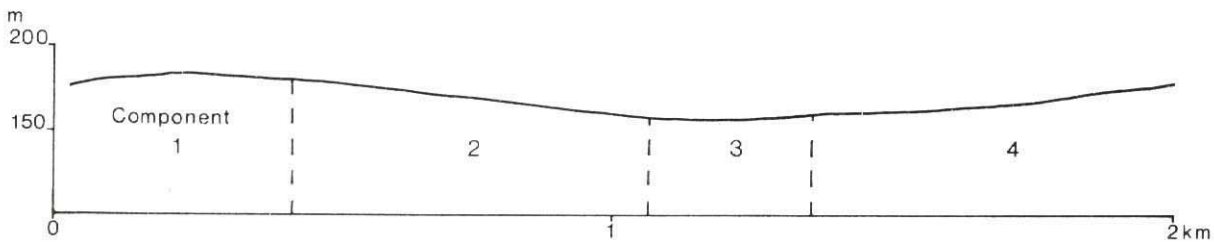
The loamy topsoils are readily compacted. The drainage depressions are particularly prone to erosion and a network of gullies has developed. Dryland salting is common and severe in many of the drainage depressions.

Only remnants of the original eucalypt open forest remain in this landscape of gently undulating plains.

Sparse vegetative ground cover (combined with relatively impermeable subsoils) leads to increased run-off.

This granitic terrain (The Stranger) is a reminder of the glacial origin of the Knowsley land system





KNOWSLEY LAND SYSTEM (Ky) Area 100 km^2 2.5% of catchment

CLIMATE			
Rainfall, mean (mm)	Annual, 500-600; lowest January (30-35), highest June (60-65)		
Temperature, mean (°C)	Annual, 14; lowest July (8), highest February (22)		
Seasonal growth limitations	Temperature less than 10°C (av.): May - August Rainfall less than potential evapotranspiration: late September-early April		
GEOLOGY			
Age, rock type	Permian, glacial sediments - tillite, conglomerate, sandstone		
PHYSIOGRAPHY			
Landform pattern	Gently undulating rises		
Elevation range (m)	180-310		
Relative relief (m)	15		
Drainage pattern	Moderate		
Channel spacing			
LAND COMPONENT			
Number	1	2	3
Percentage of land system	20	70	10
PHYSIOGRAPHY			
Landform element	Gentle crest	Gentle slope	Broad drainage depression
Slope; modal, range	2,14	3,1-8	1,0-2
Site drainage	Well drained	Well drained	Somewhat poorly drained
SOIL	Glacial sediments	Glacial sediments	Alluvium
Parent material	Mottled yellow duplex soils with bleached A2 horizons, often with large amounts of buckshot and quartz gravel; the B horizons are characteristically bright yellowish brown and often red in the upper part	Mottled yellow duplex soils with bleached A2 horizons, often with large amounts of buckshot and quartz gravel; the B horizons are characteristically bright yellowish brown and often red in the upper part	Mottled yellow duplex soils with bleached A2 horizons; loamy soils of uniform texture on recent alluvial deposits
Description			
Classification	Dy3AI, Dr2.41, Dr3.43; minor Dy3.42	Dy3.41, Dr2.41, Dr3.43; minor Dy3.42	Dy3.41, Dy3.42, Um4.23
Surface texture	Loam, fine sandy loam	Loam, fine sandy loam	Loam
Depth to hardpan or bedrock (m)	>2.0	>2.0	>2.0
Nutrient status	Low surface, moderate subsoil	Low surface, moderate subsoil	Moderate surface, moderate subsoil
Available water capacity	Moderate	Moderate	Moderate
Permeability	Moderate to rapid surface, slow subsoil	Moderate to rapid surface, slow subsoil	Moderate; slow for duplex subsoils
Exposed rock/stone	0-10	0-5	0
Sampled site number	723	722	724, 1124
NATIVE VEGETATION			
Structure	Open forest II	Open forest II	Woodland II / open forest II
Characteristic species (+ indicates predominant species)	*E. microcarpa+, E. albens*	*E. microcarpa+, E.melliodora E. albens, Casuarina luehmannii*	*E. microcarpa+, E. albens, E.melliodora; E. camaldulensis, E. melliodora* on recent terraces
PRESENT LAND USE	Grazing on introduced pastures; cereal-cropping	Grazing on introduced pastures; cereal-cropping	Grazing on introduced pastures
OBSERVED SOIL DETERIORATION	Sheet erosion widespread but usually at slow rates	Sheet erosion widespread but usually at slow rates	Gully erosion is common and often severe; salting common

SUSCEPTIBILITY OF LAND TO PROCESSES OF SOIL DETERIORATION – Knowsley

Compt.	Process	Susceptibility	Critical land factors	Off-site effects	Comments
l&2	sheet and rill erosion	low to moderate	• gentle slopes • weakly structured topsoil • summer thunderstorms of high rainfall intensity	• increased run-on • sedimentation	the topsoils, which set hard when dry, resist erosion
	wind erosion	low to moderate	• weakly structured loamy topsoil	• sedimentation	the topsoils, which set hard when dry, resist erosion
	compaction of topsoil	moderate	• loamy texture • low organic matter content • weak soil structure	• increased run-on	-
3	gully erosion	high	• deep accumulations of alluvium • subsoils that slake/disperse	sedimentation • water turbidity	numerous gullies have formed since this land system was cleared last century
	salting	high	• saline groundwater table at shallow depth • sodic subsoils	saline stream • flows	loss of the protective vegetation cover due to salt toxicity can initiate erosion problems
	compaction of topsoil	Moderate to high	• loamy topsoils • weak soil structure • topsoil often moist	• -	-

Salting in the lower parts of the landscape enhances the sheet and gully processes.

When increased run-off is channelled into sodic soils, gully erosion occurs