MRN Marne Land System

Marne River Valley from the ranges to the River Murray

Area: 63.8 km^2

Annual rainfall: 270 – 390 mm average

Geology: The System includes three distinctive geological materials. The oldest occur in the eastern half of the System where deeply dissected slopes characterize the landscape. Tertiary sediments (limestones, clayey sands, sandy clays) predominate, capped by younger Blanchetown Clay in areas of minimal dissection. Woorinen Formation carbonates form a veneer over all of these sediments. Downcutting by the river has exposed the sediments to varying degrees. In the western half, the flats and terraces of the river are predominant. Sediments are medium to coarse grained, with gravel and stone beds nearer the ranges. Overlying the flats, terraces and gentle slopes are deposits of reworked drift sand of variable depth.

Topography: The Land System includes the part of the Marne River valley on the Murray Plains. In the west where the River flows out from the ranges, the valley is shallow lying between 10 and 20 m below the surrounding plains. The System here comprises a river flat, adjacent slightly higher elevation terraces and gentle slopes grading to the plains. These slopes are partially covered by drift sand. In the eastern half the valley becomes increasingly deeply dissected and is about 50 m below the plains by the time it joins the Murray River valley. The slopes here are steep with short incised watercourses running into the main channel.

Elevation: 190 m at the base of the ranges in the west to 10 m where the Marne joins the Murray River

Relief: 10 m in the west to 50 m in the east

Soils: Calcareous sandy loams are the most common soil, with deep sands and deep sandy loams

Main soils

Flats

M1 Deep sandy loam

Dissected slopes

A4a Deep calcareous sandy loam

A4b Rubbly calcareous sandy loam

B2 Shallow rubbly calcareous sandy loam

Gentle slopes and flats

H2a Deep calcareous sand

H2b Deep non-calcareous sand

Minor soils

Gentle slopes and flats

M3 Stony sandy loam

Main features: The Marne Land System is a river valley in two parts. In the western section the watercourse occupies a shallow valley with gentle slopes. The Main soils: deep sandy loams on flats and deep sands on slopes. These are potentially productive although the sandy types are infertile and excessively drained. In the east the valley becomes deeply dissected. Moderately steep to steep slopes predominate. Soils here are mainly calcareous sandy loams with variable rubble, formed over highly calcareous materials. Although there are some gentle slopes, the main limitation is the steepness and unevenness of the terrain. Erosion potential is high and significant areas are uncleared.

Soil Landscape Unit summary: 8 Soil Landscape Units (SLUs) mapped in the Marne Land System:

SLU	% of area	Main features #
SMB SMH SMI SMII	10.0 13.2 3.4 17.6	Gentle to steep slopes created by the downcutting of the River Marne. Up to 30% of the gentle and moderate slopes are mantled by sand spreads. **SMB** Gently inclined upper slopes, underlain by Blanchetown Clay. **SMH** Moderate slopes with eroded watercourses. **SMI** Moderately steep slopes with eroded watercourses. **SMII** Steep slopes with moderate to severe gully erosion. Includes the river channel which is too narrow to map out. SMH, SMI and SMII are underlain by variably dissected Tertiary sediments. Main soils: deep calcareous sandy loam - **A4a** (E), rubbly calcareous sandy loam - **A4b** (E), and shallow rubbly calcareous sandy loam - **B2** (C), with deep calcareous sand - **H2a** (L) and non calcareous sand - **H2b** (L) on sand spreads. No soils data for the river flats. The soils are generally moderately deep and moderately fertile, but landscape conditions determine agricultural potential. The gently inclined upper slopes are fully arable, with few limitations to productivity. The moderate and moderately steep slopes are marginal for cropping due to the risk of erosion, but are suitable for appropriately managed perennial crops. The gullied slopes of SMII are highly degraded and fragile areas with limited potential, and usually in need of protection and / or restoration.
UWK	25.1	Gentle slopes in the upper reaches of the System. Main soils: deep non calcareous sand - **H2b** (E), deep calcareous sand - **H2a** (E) and deep loamy sand - **M1** (E). These soils are deep and well drained, but of low fertility due to their high sand content. They are well suited to irrigation, but prone to wind erosion if not managed correctly.
XHJ XHT XJS	11.0 1.6 18.1	Creek flats, terraces and outwash fans formed on alluvium. **XHJ** Terraces. **XHT** Flats and fans with some steep banks and eroded watercourses. **XJS** Creek flats. Main soils: deep loamy sand - **M1** (V) on flats and terraces, with deep non calcareous sand - **H2b** (C) on terraces and stony sandy loam - **M3** (M) on fans adjacent to the ranges to the west. These soils are deep and moderately (loamy soils) to marginally (sandy soils) fertile. They are well, even excessively, drained. There is no apparent natural salinity, but salt levels may build up under irrigation. Watercourse erosion is a risk - appropriate soil conservation measures are needed.

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

(D) Dominant in extent (>90% of SLU)
(V) Very extensive in extent (60–90% of SLU)
(E) Extensive in extent (30–60% of SLU)
(C) Common in extent (20–30% of SLU)
(L) Limited in extent (10–20% of SLU)
(M) Minor in extent (<10% of SLU)

Detailed soil profile descriptions:

A4a Deep calcareous sandy loam (Regolithic, Calcic / Hypercalcic Calcarosol)
Medium thickness calcareous loamy sand to sandy loam becoming more clayey and calcareous with depth over a very highly calcareous and slightly rubbly sandy clay loam, overlying Tertiary clay at variable depths below 100 cm.

A4b Rubbly calcareous sandy loam (Regolithic, Supracalcic Calcarosol)
Medium thickness calcareous loamy sand to sandy loam over a Class IIIB rubble layer grading to a very highly calcareous sandy clay loam with decreasing rubble.

B2 Shallow rubbly calcareous sandy loam (Petrocalcic Calcarosol)
Calcareous sandy loam over sheet calcrete at depths of between 20 and 30 cm.

H2a Deep calcareous sand (Hypocalcic Calcarosol)
Very thick moderately calcareous sand, generally overlying more clayey and calcareous material below 100 cm.

H2b Deep non calcareous sand (Basic, Arenic, Brown-Orthic/Red-Orthic Tenosol)
Very thick brownish sand becoming paler with depth and continuing below 100 cm.

M1 Deep sandy loam (Basic, Regolithic, Brown-Orthic Tenosol / Brown Kandosol)
Thick to very thick dark brown fine sandy loam, paler coloured with depth grading to a dark brown fine sandy loam to fine sandy clay loam continuing below 100 cm.

M3 Stony sandy loam (Clastic Rudosol)
Thick sandy loam with more than 50% gravel and stones.

Further information: DEWNR Soil and Land Program