MES Messent Land System

Flats and low rises in the north of the Hundred of Messent

Area: 63.5 km^2

Annual rainfall: 515 – 540 mm average

Geology: The flats are underlain by calcareous sandy clays and limestones of the Padthaway Formation, and more recent swamp bed deposits in low lying depressions. Scattered across the flats are remnant calcarenites of ancient coastal dunes (Bridgewater Formation) and Recent Molineaux Sand deposits.

Topography: The Messent Land System is the natural discharge area for a major inter-dune corridor. The major part of the landscape is a low lying (about 10 m above sea level) flat with numerous old swamp beds. Although these are discharge flats, they do not appear to have been inundated for some time (possibly a result of drainage schemes further south, redirecting water westwards to the sea). However, this situation may be reversing as increasing volumes of water are moving northwards. The flats are broken up by a mosaic of low sandy and sometimes stony rises less than 10 m high.

Elevation: 10 - 20 m

Relief: 10 m

Soils: The soils are mainly sandy, with variable subsoils ranging from sandy clay loam to clay, calcreted limestone and thick sand. Calcareous loamy soils are common in old swamp beds.

Main soils

Soils on flats

H3/G2 Very thick sand over sandy clay loam
A4 Calcareous sandy loam
N2/G4 Sand over mottled saline waterlogged clay
B7 Sand over brown clay on calcrete

Minor soils

Soils on rises

H3 Deep bleached sand
B3 Shallow stony loamy sand over calcrete
G2 Sand over light sandy clay loam
G3 Loamy sand over sandy clay loam

Main features: The Messent Land System comprises low fertility flats under threat of salinization and waterlogging, and rises characterized by mainly very low fertility sands prone to water repellence and erosion. The northern section is contained within the Messent Conservation Park. Productive potential of the southern parts is dependent on either control of overland flow of water and salinity mitigation, with establishment of waterlogging and salt tolerant pastures.

Soil Landscape Unit summary: 4 Soil Landscape Units (SLUs) mapped in the Messent Land System:

SLU	% of area	Main features #
MJn	21.5	Complex of low sandy and stony rises, with 10-20% swampy depressions. Main soils: deep bleached sand - **H3** (C), sand over light sandy clay loam - **G2** (L) and loamy sand over sandy clay loam - **G3** (M) on sandy rises, with shallow stony loamy sand on calcrete - **B3** (C) and sand over brown clay on calcrete - **B7** (L) on stony rises and depressions, and calcareous sandy loam - **A4** (L) in swampy depressions. Key properties: Drainage: Well drained (poorly drained in depressions). Fertility: Low. Physical condition: No physical limitations. AWHC: Moderately low. Salinity: Low (high in depressions). Erosion potential: Water: Low. Wind: Moderate. Water repellence: Moderate. Rockiness: Up to 20% surface stone and outcropping calcrete in places. Summary: Most of the land is well drained and at no risk of salinization. However, soils are either low fertility sands prone to water repellence and erosion, or shallow and stony.
NEA	21.1	Flats formed on calcified sediments of the Padthaway Formation. The flats are at the extreme northern limit of the corridor, only about 10 m above sea level. Although they may have been inundated in the past, they have very rarely been flooded in recent times. They are at risk from rising saline groundwater tables. Main soils: sand over brown clay on calcrete - **B7** (E) and very thick sand over sandy clay loam - **H3/G2** (E), with calcareous sandy loam - **A4** (L) in old swamp beds. Key properties: Drainage: Moderately well to imperfect. Fertility: Low. Physical condition: No physical restrictions to root growth. AWHC: Moderately low to moderate. Salinity: Moderate. Erosion potential: Water: Low. Wind: Low to moderate. Water repellence: Moderate to low. Rockiness: Nil. Summary: Low fertility flats at risk of salinization from rising ground water tables. They are entirely within the Messent Conservation Park.
NEF	45.6	Flats with 10-20% swamps formed on sediments of the Padthaway Formation. There are minor low stony and sandy rises. Most of the area is only about 10 m above sea level, so water tables are likely to be close to the surface. Main soils: very thick sand over sandy clay loam - **H3/G2** (E) and sand over brown clay on calcrete - **B7** (C), with calcareous sandy loam - **A4** (C) in old swamp beds, and sand over mottled saline waterlogged clay - **N2/G4** (L) in wetter depressions. Key properties: Drainage: Moderately well to poor. Fertility: Low. Physical condition: No surface restrictions, but dispersive subsoils impede root growth. AWHC: Moderate to moderately high. Salinity: Moderate on flats, moderately high to high in depressions. Erosion potential: Water: Low. Wind: Low to moderate. Water repellence: Moderate. Rockiness: Nil. Summary: Mainly deep soils although with low fertility. Main limitation is the threat of salinity and waterlogging from rising saline ground watertables and increased flooding.

OEK	11.8	Low sandy rises with sporadic stony outcrops. Main soils: deep bleached sand - **H3** (E), sand over light sandy clay loam - **G2** (C); loamy sand over sandy clay loam - **G3** (L), with shallow stony loamy sand over calcrete - **B3** (L) on stony outcrops. Key properties: Drainage: Rapidly to well drained. Fertility: Low to moderately low. Physical condition: No limitations. AWHC: Moderate to low. Salinity: Low. Erosion potential: Water: Low. Wind: Moderately low to moderately high. Water repellence: Moderate to high. Rockiness: Mostly nil but up to 20% surface calcrete on stony outcrops. Summary: Well drained and not at risk of salinization, but low fertility, water repellence and erosion potential limit production.

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:

Soils on flats

H3/G2 Very thick sand over sandy clay loam (Brown Chromosol)
Thick to very thick (may be more than 100 cm) sand with a bleached A2 layer abruptly overlying a brown sandy clay loam with soft to rubbly carbonate at depth.

A4 Calcareous sandy loam (Supracalcic Calcarosol)
Calcareous sandy loam grading to a grey highly calcareous sandy clay loam over rubbly calcrete within 60 cm.

N2/G4 Sand over mottled saline waterlogged clay (Hypercalcic / Lithocalcic, Grey Sodosol)
Medium thickness loamy sand abruptly overlying a grey and yellow brown mottled clay (seasonally saturated), with rubbly to soft carbonate at depth.

B7 Sand over brown clay on calcrete (Petrocalcic, Brown Chromosol)
Medium thickness sand overlying yellowish brown firm to friable clay on limestone or calcreted sandy clay within 50 cm.

Soils on rises

H3 Deep bleached sand (Basic, Arenic, Bleached-Orthic Tenosol)
Thick to very thick bleached sand, organically darkened at the surface over yellow sand continuing below 100 cm.

B3 Shallow stony loamy sand over calcrete (Petrocalcic, Leptic Tenosol)
Loamy sand to loam with variable rubble and slight clay increase with depth overlying calcreted calcarenite shallower than 50 cm.

G2 Sand over light sandy clay loam (Petrocalcic, Yellow Kandosol)
Thick sand with a bleached A2 layer overlying a yellow light sandy clay loam with calcrete at variable depth.

G3 Loamy sand over sandy clay loam (Petrocalcic, Brown Chromosol)
Medium to thick brown sand with a bleached A2 layer abruptly overlying a brownish weakly structured friable sandy clay loam to sandy clay over calcreted calcarenite.

Further information: DEWNR Soil and Land Program