FIS Fisk Land System

(Based on the description by A. K. McCord in "A Description of Land in the Southern Mallee of South Australia")

Sandplains in the southern part of Hundred of Fisk, and northern parts of Hundreds of Makin and McCallum.

Area: 179.1 km^2

Annual rainfall: 380 – 440 mm average

Geology: The land system is underlain by massive sandy to sandy clay Tertiary sediments (Parilla Sand), partially covered by a veneer of heavier clay (Blanchetown Clay equivalent). Windblown calcareous materials have leached into the upper layers of these materials resulting in subsoil accumulations of soft carbonates. Aeolian Molineaux Sands blanket most of the landscape, and there has been reworking of the sand into low sand dunes.

Topography: The Fisk Land System is a flat to gently undulating plain characterized by extensive low to moderate jumbled to parabolic sand ridges. The flats between the sand ridges are generally sandy, but some heavier flats occur where Blanchetown Clay equivalent is near the surface.

Elevation: 110 - 130 m

Relief: Up to 10 m

Soils: Sandy soils, with or without clayey subsoils are typical. Loamy texture contrast soils are distinctive on flats.

Main soils
G3 Thick sand over brown clay. Extensive on flats
H3 Deep siliceous sand. Extensive on sand ridges

Minor soils
D3 Sandy loam over sodic red clay. Minor on flats

Main features: The Fisk Land System consists of predominantly sand over clay or deep sand soils. Low fertility, wind erosion potential and water repellence are the main limitations to agriculture, and most of the land is uncleared. The isolated heavier flats however have few limitations for cropping. Most of the land (except for loamy flats with heavy clay close to the surface, and the highest sand dunes), have good potential for irrigated horticulture.

Soil Landscape Unit summary: 10 Soil Landscape Units (SLUs) mapped in the Fisk Land System:

SLU	% of area	Main features #
GkA	3.9	Depressions and flats formed on Tertiary sands and clays with less than 10% low sandy ridges. Main soils: thick sand over brown clay - **G3** (V) and sandy loam over sodic red clay - **D3** (L) with deep siliceous sand - **H3** (M) on sand ridges. Key properties: Drainage: Well drained (sandy) to moderately well drained (loamy). Fertility: Low to moderate. Physical condition: Surface soils generally not limiting. Subsoil clays can restrict root growth. AWHC: Moderately low to moderate. Salinity: Low, but often moderate at depth in loamy soils. Erosion potential: Water: Low Wind: Moderate (sands) to low (loams). Water repellence: Moderate to high (sands) to nil (loams) Rockiness: Nil. Summary: The predominantly sandy soils have low fertility and are susceptible to wind erosion and water repellence. The limited loamy soils are potentially productive.
GlA	7.1	Depressions formed on Tertiary sands and clays with 10-30% low sandy ridges. Main soils: thick sand over brown clay - **G3** (V) and sandy loam over sodic red clay - **D3** (L), with deep siliceous sand - **H3** (C) on sand ridges. Key properties: Drainage: Well drained (sandy flats), moderately well drained (loamy flats) and rapidly drained (sand rises). Fertility: Low to moderate. Very low on sand rises. Physical condition: Surface soils generally not limiting. Subsoil clays can restrict root growth. No limitations on sandy rises. AWHC: Moderately low to moderate. Salinity: Low, but often moderate at depth in loamy soils. Erosion potential: Water: Low. Wind: Moderate (sands), low (loams), moderately high (sand rises). Water repellence: Moderate to high (sands) to nil (loams) Rockiness: Nil. Summary: The predominantly sandy soils have low fertility and are susceptible to wind erosion and water repellence. The sand ridges are particularly at risk if exposed. Loamy flats are potentially productive.
HkA	1.1	Depressions formed on Tertiary clays with less than 10% low sandy ridges. Main soils: sandy loam over sodic red clay - **D3** (E) with thick sand over brown clay - **G3** (C) on flats and deep siliceous sand - **H3** (M) on sandy rises. Key properties: Drainage: Moderate. Fertility: Moderate. Physical condition: Firm surface with minor workability limitations. Hard subsoil with some root growth restrictions. AWHC: Moderate. Salinity: Low at surface, moderate at depth. Erosion potential: Water: Low. Wind: Low. Water repellence: Low. Rockiness: Nil. Summary: The heavier soils are more fertile and less prone to erosion and water repellence than the sandy soils of the rest of the Land System. Limitations to cropping are minor.
O-A	4.8	Large jumbled sand ridges with less than 10% swales. Main soil is deep siliceous sand - **H3** (D). Key properties:

		Drainage: Rapid. Fertility: Very low. Physical condition: No limitations. AWHC: Moderately low. Salinity: Low. Erosion potential: Water: Nil. Wind: Moderately high to high. Water repellence: Strongly repellent. Rockiness: Nil. Summary: The ridges are generally too infertile and fragile for sustainable agricultural uses. They are highly susceptible to wind erosion if exposed and surface soils are usually strongly water repellent.
OAE OAF OAG OAJ OAt	11.0 20.4 44.9 2.4 2.4	Dunefields with sand ridges formed on Molineaux Sand overlying Tertiary sediments. **OAE** 60-90% large sand ridges. **OAF** 60-90% moderate sand ridges. **OAG** 60-90% low sand ridges. **OAJ** 30-60% low sand ridges. **OAt** 30-60% low sand ridges with up to 10% of flats prone to seepage. Main soils: deep siliceous sand - **H3** (V) on ridges, and thick sand over brown clay - **G3** (C) with sandy loam over sodic red clay - **D3** (M) on flats. Key properties: Drainage: Rapidly drained (sand rises), well drained (sandy flats) and moderately well drained (loamy flats). Drainage is imperfect to poor in minor flats prone to seepage. Fertility: Very low on sand rises. Low to moderate on flats. Physical condition: No limitations on sandy rises. On flats, surface soils generally not limiting but subsoil clays can restrict root growth. AWHC: Moderately low to moderate. Salinity: Low, but often moderate at depth in loamy soils on flats. Some salt accumulation also likely on wet flats. Erosion potential: Water: Low. Wind: Moderately high (sand rises), moderate (sands), low (loams). Water repellence: Strong to moderate (sands), to nil (loams). Rockiness: Nil. Summary: The sandy ridges are too infertile and susceptible to wind erosion and water repellence for sustainable cropping, but the flats have some potential, particularly where surfaces are loamier. However, potential productivity on the predominant sand over clay soils is limited by low fertility, water repellence and wind erosion potential.
OCI	2.0	Very gently undulating flats formed on Tertiary clays overlain by 30-60% moderate jumbled sand ridges. Main soils: sandy loam over sodic red clay - **D3** (E) with thick sand over brown clay - **G3** (C) on flats and deep siliceous sand - **H3** (E) on sandy rises. Key properties: Drainage: Rapid to well drained. Fertility: Very low to moderately low. Physical condition: Good. AWHC: Low to moderately low. Salinity: Low. Erosion potential: Water: Low. Wind: Moderate to high. Water repellence: High. Rockiness: Up to 2% ironstone gravel. Summary: The heavier flats are well suited to cropping, but the sandier flats have lower fertility and are susceptible to water repellence and wind erosion.

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:

D3 Sandy loam over sodic red clay (Eutrophic, Mesonatric, Red Sodosol)
Medium thickness light sandy loam to light sandy clay loam abruptly overlying a red coarsely columnar structured sandy clay to clay, with little if any soft carbonate at depth, grading to Blanchetown Clay equivalent at between 50 and 100 cm.

G3 Thick sand over brown clay (Hypocalcic, Brown Chromosol)
Thick sand with a bleached A2 layer abruptly overlying a moderately to well structured brown sandy clay to clay with minor soft carbonate from about 75 cm, grading to clayey sand or sandy clay (Parilla Sand) or heavy clay (Blanchetown Clay equivalent) within 100 cm. Very extensive (on flats).

H3 Deep siliceous sand (Basic, Arenic, Bleached-Orthic / Yellow-Orthic Tenosol)
Thick to very thick loose sand, usually with a bleached or paler coloured A2 layer, grading to a yellow sand with no carbonate continuing below 200 cm. Extensive (on sand ridges).

Further information: DEWNR Soil and Land Program