KUM Kumorna Land System

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

Gently undulating plains and dunefields west and south of Tintinara

Area: 408.2 km²

Annual rainfall: 470 – 520 mm average

Geology: The System is underlain by sandy clays and limestones of the Padthaway Formation, calcreted

at the surface. These are extensively overlain by Molineaux Sands which have been reworked into jumbled dunes. Thick sandy surfaces on many flats may be Molineaux Sand, or may be

derived by clay leaching from sandier parent sediments.

Saline groundwater tables are rising and are commonly within two metres of the surface on the flats. There are minor swampy areas where the water table is at the surface, although this is more a characteristic of the adjacent Richards, Lake Ellen, Monkoora and McNamara Land

Systems.

Topography: The System is a flat to gently undulating plain. Most relief is attributable to variable

thicknesses of sand, as high jumbled sand dunes through to very low sandy (or occasionally stony) rises. Minor swampy depressions are the only other prominent land surface features.

Elevation: 10 - 30 m

Relief: Up to 10 m

Soils: The soils on the flats include several sandy to loamy sand types, either with clayey subsoils, or

formed over calcrete at shallow depth. Deep sandy soils dominate the rises. Wet saline sandy

to clay loamy soils characterize poorly drained flats.

Main soils

Rises

H3 Deep bleached sand

G2 Sand grading to sandy clay loam

Flats

B7 Sand over friable brown sandy clay on calcrete

G3 Thick sand over brown sandy clay

Minor soils

Stony flats and rises

B3 Shallow stony loamy sand over calcrete.

Poorly drained and swampy depressions

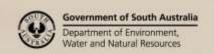
N2/G4 Sand over yellow and grey saline waterlogged clay

N2 Wet highly saline grey clay

Main features: The Kumorna Land System is characterized by sandy surfaced soils either on dunes (deep

sands) or flats (sand over clay). Fertility is very low to moderately low and wind erosion potential is very high to moderate, depending on landscape position. Although in their natural state, most soils are well drained and non saline, rising saline groundwater tables are posing a threat to most of the lower lying ground, with limited areas already affected, and likely to

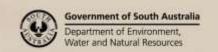
increase.





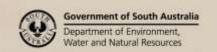
Soil Landscape Unit summary: 20 Soil Landscape Units (SLUs) mapped in the Kumorna Land System:

| SLU | % of area | Main features # | | | |
|-----|-----------|--|---|--|--|
| MJB | 0.1 | | ormed on calcarenite, partially overlain by windblown sand. There is variable | | |
| | | · · | ending on the thickness of the sand cover). | | |
| | | MJB Gentle lower | | | |
| | | _ | m over red sandy clay on calcrete - B6 (V), with loamy sand over brown sandy | | |
| | | <u>clay on calcrete</u> - B7 (E) on thin sand spreads, and <u>sand over sandy clay</u> - G2 (M) and <u>de bleached sand</u> - H3 (M) on sand hills. | | | |
| | | Key properties: | | | |
| | | Drainage: | Well to rapidly drained. | | |
| | | Fertility: | Low (stony soils) to very low (deep sands). | | |
| | | Physical condition: AWHC: | There are no soil physical limitations to root growth. | | |
| | | Salinity: | Moderately low to low. | | |
| | | Erosion potential: | Low. Water: Moderately low (MIC, MJC and MJY) to moderate (MJD). | | |
| | | Liosion potential. | Wind: Low (stony soils), moderate (shallower sands) to high/very high (sand dunes). | | |
| | | Water repellence: | Moderate to high on sandy soils. | | |
| | | Rockiness: | Up to 20% surface calcrete with occasional outcropping reefs. No surface stone on sand dunes. | | |
| | | - | es are dominated by moderately shallow to shallow soils of marginal fertility | | |
| | | _ | ce stone and some outcrop, restricting cultivation. Associated sandy soils are | | |
| NAA | 5.5 | infertile, water repellent and prone to wind erosion. | | | |
| NAD | 8.2 | | very low sandy or stony rises formed on calcreted sediments of the Padthaway rater tables are within two metres of the surface. | | |
| NAF | 2.1 | | minor low sandy and stony rises. | | |
| NAP | 4.4 | | plains and about 30% low sandy (occasionally stony) rises. | | |
| NAa | 3.3 | • | minor poorly drained and saline depressions. | | |
| NAd | 2.8 | ' ' | | | |
| | | NAa Plains as for NAA, but marginally saline. | | | |
| | | NAd Complex as for NAD, but with marginally saline flats. | | | |
| | | Main soils: | 5 , | | |
| | | Flats | Sand over friable brown sandy clay on calcrete - B7 (E-V) Thick sand over | | |
| | | | <u>brown sandy clay</u> - G3 (L) | | |
| | | | Shallow stony loamy sand over calcrete - B3 (L) | | |
| | | Rises | <u>Deep bleached sand</u> - H3 (M-L) | | |
| | | | Sand grading to sandy clay loam - G2 (M-L). | | |
| | | Poorly drained flats | Sand over yellow / grey saline waterlogged clay - N2/G4 (M) Wet highly | | |
| | | 17 | saline grey clay - N2 (M). | | |
| | | Key properties: | Mall to an administrative well during a deflate and administrative and area and area and area. | | |
| | | Drainage: | Well to moderately well drained (flats), rapidly drained (rises) and imperfectly | | |
| | | Fortility: | to poorly drained (swampy depressions). | | |
| | | Fertility: Physical condition: | Moderately low (flats) to low (rises). There are no significant surface or subsurface soil structure impediments to | | |
| | | Friysical Condition. | root growth. | | |
| | | AWHC: | Moderately low to moderate (flats). Moderately low (rises). | | |
| | | Salinity: | Flats Low in surface to moderate in subsoil. | | |
| | | - Caminey. | Moderate to high in NAa and NAd . | | |
| | | | Rises Low. | | |
| | | | Depressions High to very high due to shallow saline watertable. | | |
| | | | This land is being increasingly affected by rising saline groundwater tables. | | |
| | | Erosion potential: | Water: Low. | | |
| | | | Wind: Moderate to moderately low on flats. High on rises. | | |
| | | Water repellence: | Moderate on flats. High on rises. | | |





| h | | | | | | |
|---------------|------|--|--|--|--|--|
| | | Rockiness: Up to 5% surface calcrete stone on flats with heavier patches. | | | | |
| | | <u>Summary</u> : Slightly to moderately saline flats dominated by soils with sandy surfaces over clayey | | | | |
| | | subsoils usually at shallow depth. Drainage is generally moderate to good, fertility is moderately | | | | |
| | | low. Rising saline groundwater tables have the potential to cause substantial loss of productivity. | | | | |
| NGA | 6.6 | Flat to gently undulating plains formed on sandy Padthaway Formation sediments, partly overlain | | | | |
| NGD | 10.6 | by Molineaux Sands. | | | | |
| NGF | 0.4 | NGA Flats with minor low sandy rises. | | | | |
| NGG | 0.1 | NGD Gently undulating land comprising a complex of flats, sandy rises, some stony rises and | | | | |
| | | minor depressions. | | | | |
| | | NGF Flats as for NGA but with up to 10% swampy depressions. | | | | |
| | | NGG Gently undulating land as for NGD, but with swampy depressions. | | | | |
| | | Main soils: thick sand over brown sandy clay - G3 (E-V) on flats, sand over friable brown sandy clay | | | | |
| | | on calcrete - B7 (C) and shallow stony loamy sand over calcrete - B3 (M) on flats and stony | | | | |
| | | and deep bleached sand - H3 (M-L) with sand grading to sandy clay loam - G2 (M) on deeper | | | | |
| | | sand rises. Sand over yellow and grey saline waterlogged clay - N2/G4 (M) and wet highly saline grey clay - N2 (M) occur in swampy depressions. | | | | |
| | | Key properties: | | | | |
| | | Drainage: Well to rapidly drained (flats and rises). Imperfectly to poorly drained | | | | |
| | | (swampy depressions). | | | | |
| | | Fertility: Low. | | | | |
| | | Physical condition: No significant physical limitations to root growth. | | | | |
| | | AWHC: Low to moderately low. Solicity: Moderately low on flate although moderate to high in subsoils. Very low on | | | | |
| | | Salinity: Moderately low on flats, although moderate to high in subsoils. Very low on rises. Moderately high to very high in swampy depressions. Rising saline | | | | |
| | | groundwater tables are a threat. | | | | |
| | | Erosion potential: Water: Low. | | | | |
| | | Wind: Moderate to moderately low on flats. High on rises. | | | | |
| | | Water repellence: Moderate (flats) to high (rises). | | | | |
| | | Rockiness: Less than 2% surface calcrete stone. | | | | |
| | | Summary: Generally well drained and non saline deep soils, but low fertility, water repellence and | | | | |
| | | wind erosion potential limit productivity. Rising saline groundwater tables have potential to | | | | |
| | | significantly reduce productivity. | | | | |
| O-B | 3.6 | Gently to strongly undulating jumbled dunefields of Molineaux Sand, superimposed over the main | | | | |
| OAE | 10.7 | landscape. Mapping units are determined by combinations of dune size and frequency, and | | | | |
| OAF | 16.8 | occurrence of saline swales. | | | | |
| OAI | 1.8 | O-B Isolated moderate to high dunes. | | | | |
| OAJ | 17.5 | OAE 60-90% high dunes. | | | | |
| OA | 1.7 | OAF 60-90% moderate dunes. | | | | |
| M | 3.4 | OAI 30-60% moderate dunes. | | | | |
| OAQ | | OAJ 30-60% low dunes. OAM 60-90% moderate dunes with up to 10% saline swampy swales. | | | | |
| | | OAQ 30-60% low dunes with up to 10% saline swampy swales. | | | | |
| | | Main soils: <u>deep bleached sand</u> - H3 (V-E) on sandhills with <u>sand grading to sandy clay loam</u> - G2 | | | | |
| | | (L-E) and thick sand over brown sandy clay - G3 (M-C) on lower slopes and in swales and flats. | | | | |
| | | Sand over yellow and grey saline waterlogged clay - N2/G4 (M) and wet highly saline grey clay - | | | | |
| | | N2 (M) occur in swampy swales. | | | | |
| | | Key properties: | | | | |
| | | Drainage: Rapidly drained (dunes). Well to moderately well drained (swales and flats). | | | | |
| | | Poorly drained (swampy depressions). | | | | |
| | | Fertility: Very low (dunes). Low to moderately low (swales and flats). | | | | |
| | | Physical condition: No physical impediments to root growth. | | | | |
| | | AWHC: Moderately low. | | | | |
| | | Salinity: Low (dunes). Moderately low (swales and flats). High to very high (swampy swales). | | | | |
| | | swaics). | | | | |





| | | Erosion potential: Water repellence: Rockiness: | Water: Low. Wind: Very high (dunes) to moderately high (swales). Strongly to moderately repellent. Nil. | | |
|-----|-----|---|--|--|--|
| | | Summary: The dunefields are characterized by well drained and non saline soils with moderate thigh limitations due to wind erosion potential and low fertility. | | | |
| ZS- | 0.2 | Saline swamps, usually water filled. | | | |
| ZnJ | 0.2 | sediments of the Pac groundwater tables. | with occasional small (unmappable) swamps formed on clayey and limestone dthaway Formation. The land is seasonally waterlogged and affected by saline r yellow and grey saline waterlogged clay - N2/G4 (E) and wet highly saline | | |
| | | Key features: | | | |
| | | Drainage: | Imperfectly to poorly drained, due to shallow water tables and dispersive clay subsoils. | | |
| | | Fertility: | Moderately low. | | |
| | | Physical condition: | Surface soil is not limiting. Dispersive subsoils prevent satisfactory root growth. | | |
| | | AWHC: | Moderate. | | |
| | | Salinity: Erosion potential: | High to very high. This land is influenced by rising saline ground watertables. Water: Low | | |
| | | | Wind: Low. | | |
| | | Water repellence: | Nil. | | |
| | | Rockiness: | Nil. | | |
| | | _ | n poorly drained saline soils requiring salt tolerant species for productive lovers and conventional perennial grasses will not persist on most of this | | |

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:

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.

G2 Sand grading to sandy clay loam (Mesotrophic, Yellow Kandosol)

Thick bleached sand, organically darkened at surface, over a yellow and red friable massive sandy clay loam.

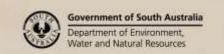
Flats

B7 Sand over friable brown sandy clay over calcrete (Petrocalcic, Brown Chromosol)

Medium thickness sand overlying a brown friable sandy clay loam to sandy clay on limestone or calcreted sandy clay within 50 cm.

G3 Thick sand over brown sandy clay (Calcic, Brown Chromosol)

Thick sand with a bleached A2 layer abruptly overlying a brown sandy clay, slightly calcareous with depth.





Stony flats and rises

B3 Shallow stony loamy sand over calcrete (Petrocalcic, Leptic Tenosol)

Medium thickness loamy sand to sandy loam overlying a layer of mixed calcrete rubble and pockets of brown sandy clay grading to calcreted lagoonal sediments.

Poorly drained and swampy depressions

N2/G4 Sand over yellow and grey saline waterlogged clay (Sodosolic Hypersalic Hydrosol OR 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 and a saline water table within 100 cm.

N2 Wet highly saline grey clay (Dermosolic, Hypersalic Hydrosol)

Medium thickness dark grey to black clay loam to clay grading to a well structured dark grey clay with minor carbonates and a water table within 50 cm.

Further information: <u>DEWNR Soil and Land Program</u>

