JAF Jaffray Land System

Area: 20 km^2

Annual rainfall: 550 – 575 mm average

Geology: The Jaffray Land System is underlain by clayey sediments of the Pleistocene Padthaway Formation.

Topography: The Jaffray Land System is a NNW-SSE trending flat (inter-dune corridor) to the west of the Marcollat and Desert Camp Land Systems. The land system is bordered to the west by the most eastern of the ancient coastal dunes of the Peacock land system. The corridor has an imperceptible fall to the north. Surface drains have been installed to assist the flow of the surface water in a northerly direction through the watercourse system. There is also a fall to the west causing water to pond against the western range. There is a saline watertable within a metre of the surface over the flats and above the surface in the swamps for most of the year. The land system is characteristically marginally to highly saline. Low scattered rises across the flats are less than 10 m high and are generally lunettes and rises associated with the swamps. There are small areas of higher dunes that may be remnants of the Peacock Land System.

Elevation: 30 - 40 m

Relief: Maximum relief 5 - 10 m

Soils:

Sandy soils (dunes, rises and flats)

H3 Bleached siliceous sand
G2 Bleached sand grading to sandy clay loam
G3 Thick sand over clay
G4 Sand over poorly structured clay

Stony soils (rises)

B2 Shallow calcareous loam on calcrete
B3 Shallow sandy loam on calcrete
B4 Shallow red loam on calcrete
B6 Shallow loam over red-brown clay on calcrete
B7 Shallow sand over clay on calcrete
RR Limestone outcrop

Other soils

F2 Sandy loam over poorly structured brown or dark clay
N2 Saline soil

Main features: The Jaffray Land System consists of three distinct elements; the flats, swamps and rises. The flats are generally poorly drained with saline water tables within a metre or two of the surface. The soils are typically sandy surfaces and mottled clayey subsoils which impede drainage and root growth. Fertility is moderate to moderately low. The main limitations to productivity are waterlogging and salinity. Generally the flats are too saline for clovers or conventional perennial grasses to persist. The swamps are very poorly drained and almost permanently inundated. There is no productivity off the swamps and lagoons. The rises are deep sandy soils with moderately low to low fertility, are well drained, water repellent, prone to water erosion but are not saline.

Soil Landscape Unit summary: 16 Soil Landscape Units (SLUs) mapped in Jaffray Land System:

SLU	% of area	Main features #
MRB MRb	2.6 9.4	Undulating rises that have relief of about 10 m. Rises formed on calcreted calcarenites of ancient coastal dunes, partially overlain by Molineaux Sands. **MRB** Gently sloping undulating rises **MRb** Gently sloping undulating rises with less than 10% marginally saline land Main soils: bleached siliceous sand - **H3** (E), sand grading to sandy clay loam - **G2** (C), thick sand over clay - **G3** (L) and sand over poorly structured clay - **G4** (M). These soils are deep with low fertility, moderate water holding capacity and rapid drainage. Severe water repellence and soil acidity are limitations for pasture and crop growth and is susceptible to wind erosion. There is a slight limitation to root growth due to dispersive subsoil clays. Shallow soils include: shallow loam over red-brown clay on calcrete - **B6,** shallow sandy loam on calcrete - **B3**, shallow red loam on limestone - **B4**, shallow sand over clay on calcrete - **B7** and shallow calcareous loam on calcrete - **B2**. Land is semi-arable as these soils are very shallow and/or stony (variable to 50%, usually less than 20%) and have moderately low to low water holding capacity and fertility.
NSG	0.95	Closed drainage depression within the undulating rises to rolling hills formed on calcreted calcarenite. There can be up to 30 m relief. Groundwater tables are often within two metres of the surface. Main soils: ***Depressions:*** Thick sand over clay - **G3**, sand over poorly structured clay - **G4** and shallow dark clay loam on limestone - **B5**. These soils are deep, have moderately low fertility and high water holding capacity. Drainage is imperfect to poor. The flats are dominated by soils with sandy surfaces and dispersive subsoil clays that are a slight limitation to root growth. The heavier clay loam surfaces are slightly more fertile however moderately low water-holding capacity. ***Sandy rises:*** Bleached siliceous sand - **H3**, sand grading to sandy clay loam - **G2** and thick sand over clay - **G3**.
Xd-A	3.05	Low lunettes that are found surrounding the eastern side of the wetlands with variable salinity. Main soils: shallow loam over red-brown clay on calcrete - **B6** (E), thick sand over clay - **G3** (E), shallow sandy loam on calcrete - **B3** (L) and shallow sand over clay on calcrete - **B7** (L). These soils are shallow to moderately deep, have moderate to high fertility, moderate water holding capacity and are well drained. There is some subsoil carbonate and a slight limitation with surface rocks.
XqD	1.0	Black Cocky swamp. Main soil: saline soil - **N2** (D). The swamp is almost permanently inundated with moderate salinity levels.
Xw-	10.3	Wetlands of variable salinity, including Bimbimbi, Reedy, The Bullocky and The Muddies swamps. Main soil: saline soil - **N2** (D).
ZLxA	4.0	Low lunettes that are found to the east of saline swamps and plains. Main soils: shallow loam over red-brown clay on calcrete - **B6** (E), thick sand over clay - **G3** (E), shallow sandy loam on calcrete - **B3** (L) and shallow sand over clay on calcrete - **B7** (L). These soils are shallow to moderately deep, have moderate to high fertility, moderate water holding capacity and are well drained. There is some subsoil carbonates and a slight limitation with surface rocks.
ZS-	7.8	Saline swamps formed on calcareous clays and marls. These are natural features, representing the lowest points in the local landscape. They are seasonally inundated. Vegetation is commonly a reflection of the level of salinity. Cutting grass is common on moderately saline land, tea tree and samphire on highly saline land, while extremely saline land is usually bare. Main soil: saline soil - **N2** (D). These soils are very poorly drained with high to extreme salinity and are seasonally inundated. The swamps are too saline for any production other than opportunistic light

		grazing, but protection of halophytic vegetation must be considered.
ZT- ZTk ZTs	3.2 1.06 0.94	Complex of saline and marginally saline land. **ZT-** Saline swamp **ZTk** Plains with 10-50% saline swamps and 0-10% sandy rises **ZTs** Plains with 10-50% saline swamps and 10-30% sandy rises The plain and swamp soils are sand over poorly structured clay - **G4** (C) and saline soil - **N2** (V). These soils are deep, have moderately low to low fertility, moderate to high water holding capacity. There is a moderate to high limitation to root growth due to the dispersive subsoil clay. The drainage is poor to very poor, there is moderately high to very high salinity and the land is seasonally inundated. The majority of the area has only salt tolerant species present. The productive potential is very low. Sandy rise soils: thick sand over clay - **G3** (M), bleached siliceous sand - **H3** (M) and sand grading to sandy clay loam - **G2** (M). These soils are deep with low fertility, moderate water holding capacity and are well drained. Moderate water repellence and the susceptibility to wind erosion are limitations.
ZU-	7.3	Water filled lagoons with 0-10% sandy rises around the verges of the lagoon. The swamp is almost permanently inundated with high salinity levels. Main soil: saline soil - **N2** (D). When not inundated there would be a moderate limitation to root growth due to the dispersive subsoil clays. Sandy rise soils: sand grading to sandy clay loam - **G2** (M), bleached siliceous sand - **H3** (M) and thick sand over clay - **G3** (M). These soils are deep with low fertility, moderate water holding capacity and are well drained. Moderate water repellence and the susceptibility to wind erosion are limitations.
ZX-	2.2	Complex of saline swamps (greater than 60%) and 20-30% lunettes. The lunettes are usually found on the eastern side of the swamps. The swamp is almost permanently inundated with high salinity levels. Main soil: saline soil - **N2** (D). When not inundated there would be a moderate limitation to root growth due to the dispersive subsoil clays. Lunette soils: shallow loam over red-brown clay on calcrete - **B6** (E), thick sand over clay - **G3** (E), shallow sandy loam on calcrete - **B3** (L) and shallow sand over clay on calcrete - **B7** (L).
Zpd Zpf Zpk	20.1 4.6 21.6	Plains with extensive swamps and up to 10% sandy rises formed on calcreted sediments of the Padthaway formation. **Zpd** Plain with noticeable salinity and 0-10% sandy rises **Zpf** Plains with 10-50% saline swamps **Zpk** Plains with 10-50% saline swamps with 0-10% sandy rises Main soils: sand over poorly structured clay - **G4** (C), saline soil - **N2** (V), and sandy loam over poorly structured brown or dark clay - **F2** (M). These soils are deep, have moderately low to low fertility, moderate to high water holding capacity. There is a moderate to severe limitation to root growth due to the dispersive subsoil clay. The drainage is poor to very poor, there is moderately high to very high salinity and the land is seasonally inundated. The majority of the area has only salt tolerant species present. The productive potential is very low. In swamps the main soil is saline soil - **N2** (D). Sandy rise soils: thick sand over clay - **G3** (M), bleached siliceous sand - **H3** (M) and sand grading to sandy clay loam - **G2** (M). These soils are deep with low fertility, moderate water holding capacity and are well drained. Moderate water repellence and the susceptibility to wind erosion are limitations.

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:

B6 Sandy loam over red sandy clay on calcrete (Petrocalcic, Red Kandosol)
Medium thickness loamy sand with slight ironstone gravel overlying a weakly structured reddish brown sandy clay on calcarenite within 50 cm.

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

G2 Sand grading to sandy clay loam (Mesotrophic, Yellow Kandosol)
Thick bleached sand, organically darkened at surface, grading to a yellow and red friable massive sandy clay loam.

G3 Thick sand over clay (Eutrophic / Calcic, Brown Chromosol)
Thick to very thick bleached sand to loamy sand with an organically darkened surface abruptly overlying a friable yellowish brown and red sandy clay.

G4 Sand over dispersive brown clay (Hypercalcic, Brown Sodosol)
Thin to medium thickness sand sharply overlying a brown and yellow or grey mottled dispersive clay with strong columnar structure, calcareous with depth.

H3 Bleached siliceous sand (Bleached-Orthic, Argic Tenosol)
Medium thickness organically darkened sandy surface over thick bleached sand over yellow sand continuing below 100 cm

N2c Wet saline clay loam (Dermosolic, Salic Hydrosol)
Medium thickness dark grey to black clay loam to clay grading to well-structured dark grey clay with minor carbonates and a water table within 100 cm.

WW Water

(Grouped on landscape position)

Sandy soils (dunes, rises and flats)

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

G2 Bleached sand grading to sandy clay loam (Sandy Petrocalcic, Brown Chromosol-Kandosol)
Medium to thick sand with a bleached A2 layer abruptly overlying a brownish friable light sandy clay loam to sandy clay over calcreted calcarenite.

G3 Thick sand over clay (Mesotrophic, Brown Chromosol/Sodosol)
Thick to very thick sand with a pale sand layer directly overlying a brownish clay

G4 Sand over poorly structured clay (Mesonatric, Black/Grey Sodosol)
Thin to medium surface sand, organically stained over a thin A2 sand, directly overlying a columnar grey/black clay with calcareous clayey layers with depth.

Stony soils (rises)

B2 Shallow calcareous loam on calcrete (Petrocalcic Calcarosol)
Up to 40 cm calcareous loam with variable calcrete rubble overlying calcreted calcarenite - rises.

B3 Shallow sandy loam on calcrete (Petrocalcic, Orthic Tenosol)
Loamy sand to loam with variable rubble and slight clay increase with depth overlying calcreted calcarenite shallower than 50 cm. Extensive on stony rises.

B4 Red loam over calcrete (Petrocalcic, Red Dermosol)
Medium thickness red loam grading to friable red clay loam over calcreted calcarenite within 50 cm - rises.

B6 Shallow loam over red-brown clay on calcrete (Petrocalcic, Red Kandosol)
Medium thickness sandy loam with slight ironstone gravel overlying a weakly structured reddish brown sandy clay on calcarenite within 50 cm - rises.

B7 Shallow sand over clay on calcrete (Petrocalcic, Yellow/Brown Chromosol)
Medium thickness sand overlying yellow friable clay on limestone or calcreted sandy clay within 50 cm.

RR Limestone outcrop (Petrocalcic, Leptic Rudosol)
Organically stained sandy to loamy sand surface over a sandy sub-soil with very little development on limestone or calcrete.

Other soils

F2 Sandy loam over poorly structured brown or dark clay (Mesotrophic, Mottled-Mesonatric Brown/Black Sodosol)
Thin to medium sandy loam surface over a loamy sand layer sharply overlying a brown and yellow dispersive mottled clay with strong columnar structure. With depth the clay grades to a yellow sandy clay.

N2 Saline soil (Calcarosolic, Hypersalic Hydrosol)
Grey very highly calcareous loam grading to a pale grey clay loam over a white very highly calcareous silty clay loam by about 30 cm, with a water table within 100 cm.

Further information: DEWNR Soil and Land Program