SPE Spence Land System

Area: 37,742 ha

Annual rainfall: 525 - 650 mm average

Geology: The land system is underlain by sediments of the Padthaway Formation, which includes clays and inter-bedded sands and limestones or dolomites, deposited in coastal lagoons. Protruding through the Padthaway sediments are scattered calcarenites, probably islands in the old lagoons. The rises are variably covered by deposits of Molineaux Sand.

Topography: The Spence Land System is an interdune corridor plain that is bound to the west of Stewarts Range and to the east of Bakers Range. There are sporadic sand and stony rises and low dunes with a NNW-SSE orientation. There are extensive low lying areas and minor salinity in the northern part of the land system. Groundwater tables are rising and are within two metres of the surface at some time of the year.

Elevation: 40 – 50 m

Relief: Less than 10m

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
G5 Sand over acidic clay
I1 Highly leached sand
I2 Wet highly leached sand

Stony soils (rises and flats)

B2 Shallow calcareous loam on calcrete
B3 Shallow sandy loam on calcrete
B4 Shallow red loam on calcrete
B5 Shallow dark clay loam on limestone
B6 Shallow loam over red-brown clay on calcrete
B7 Shallow sand over clay on calcrete
B8 Shallow sand on calcrete
B9 Shallow clay loam over brown or dark clay on calcrete
RR Limestone outcrop

Heavy soils

F1 Loam over brown or dark clay
F2 Sandy loam over poorly structured brown or dark clay
E1 Black cracking clay
M2 Deep friable gradational clay loam
M4 Deep hard gradational sandy loam

Other soils

N1 Peat
N2 Saline soil
N3 Wet soil (non to moderately saline)
A6 Gradational calcareous clay loam
A7 Calcareous clay loam on marl

Main features: The Spence Land System is a plain, which is characterised by imperfect to poorly drained sand over clay soils with moderately low fertility surface soils. Water repellence and surface soil acidity are limitations. They are susceptible to seasonal waterlogging. Minor heavy soils with better fertility occur in the lower lying areas and are more susceptible to seasonal water logging. There are common deep sandy rises which are infertile, prone to water repellence, soil acidity and wind erosion. There are minor low shallow stony rises that have moderate fertility.

Soil Landscape Unit summary: 82 Soil Landscape Units (SLUs) mapped in the Spence Land System:

SLU	% of area	Main features
MEB	0.05	Small isolated undulating rise formed on calcreted calcarenites of ancient coastal dunes within the NNW-SSE trending flat. There are extensive sandy and shallow stony soils within the range. Sandy soils: bleached siliceous sand - **H3**, sand grading to sandy clay loam - **G2** and thick sand over clay - **G3**. Soils are deep with moderately low to very low fertility, moderate waterholding capacity and rapid drainage. Severe water repellence and the susceptibility to wind and water erosion are limitations. Shallow stony soils: shallow sandy loam on calcrete - **B3**, shallow calcareous loam on calcrete - **B2**, shallow sand on calcrete - **B8** and shallow loam over red-brown clay on calcrete - **B6**. These soils are very shallow, have moderate to moderately low fertility and very low holding capacity. They are very well drained. Surface rockiness may be a limitation.
MHC	0.45	Isolated dune range formed on calcreted calcarenites of ancient coastal dunes, partially overlain by Molineaux Sands. Main soils: bleached siliceous sand - **H3**, shallow sand on calcrete - **B8**, limestone outcrop - **RR**, shallow sandy loam on calcrete - **B3** and wet highly leached sand - **I2**. These soils vary from deep to very shallow, have low to moderate fertility, moderate to low waterholding capacity and rapid drainage. Water repellence, surface rockiness and the susceptibility to wind and water erosion are limitations.
MRB	0.04	Small isolated undulating rise formed on calcreted calcarenites of ancient coastal dunes within the NNW-SSE trending flat. There are extensive loamy and shallow stony soils within the range. Main soils: shallow loam over red-brown clay on calcrete - **B6**, shallow red loam on limestone - **B4**, shallow calcareous loam on calcrete - **B2** and shallow sandy loam on calcrete - **B3**. The loamy rise soils are moderate in depth, have high fertility and moderate waterholding capacity. The stony soils are shallow, have moderate fertility and moderately low waterholding capacity. Overall there is the susceptibility to wind and water erosion and surface rockiness may be a limitation.
MYA	0.06	Small isolated elevated plain to low rise. Main soils: thick sand over clay - **G3**, bleached siliceous sand - **H3**, sand over poorly structured clay - **G4**, shallow loam over red-brown clay on calcrete - **B6** and shallow red loam on limestone - **B4**. The sandy soils are deep, have moderately low fertility and moderate waterholding capacity. The soils are rapidly drained. Water repellence, soil acidity and the susceptibility to wind erosion are limitations. Loamy soils: shallow to moderate in depth, have high fertility and moderately low waterholding capacity. The soils are rapidly drained. Surface rockiness may be a slight limitation.
NlA NlP NlT	1.59 0.11 3.86	Deeper sandy texture contrast plains with up to 30% swamps and 20% sandy rises formed on calcreted sediments of the Padthaway Formation. **NlA** Plain with 0-10% swamps **NlP** Plain with 10-20% sandy rises and 0-10% swamps **NlT** Stony plain with 20-30% swamp and 10-20% sandy rises Main soils: thick sand over clay - **G3**, sand over poorly structured clay - **G4** and bleached siliceous sand - **H3**.

		Soils on the plains: moderately deep to deep, have moderately low fertility and moderate waterholding capacity. Drainage is imperfect. There is a slight to moderate limitation to root growth due to the dispersive subsoil clays. The swamps are similar to the plains but drainage is imperfect to poor and there is moderate salinity. There may be salt tolerant species evident. The sand rises have similar soils although there is some deep sand and the soils are deep with slightly imperfect drainage. Water repellence, soil acidity and the susceptibility to wind erosion are limitations.
NJD NJF NJG	1.12 5.76 0.23	Flat plains with occasional swamps and minor sandy rises formed on calcreted sediments of the Padthaway Formation. **NJD** Plain with 0-10% sandy rises and 0-10% swamps **NJF** Plains with 30-40% swamps **NJG** Depression Plain and swamp/depression soils: deep friable gradational clay loam - **M2**, sandy loam over poorly structured brown or dark clay - **F2**, loam over brown or dark clay - **F1**, gradational calcareous clay loam - **A6**, thick sand over clay - **G3**, sand over poorly structured clay - **G4** and wet soil - **N3**. These soils are deep, have moderate fertility and high waterholding capacity. Drainage is imperfect on the plains and poor to very poor in the swamps and depressions. There is a slight to moderate limitation to root growth due to the dispersive subsoil clays on the plains and swamps respectively. Sandy rise soils: thick sand over clay - **G3**, sand over poorly structured clay - **G4**, bleached siliceous sand - **H3** and wet highly leached sand - **I2**. These soils are deep, have moderately low to low fertility, moderate waterholding capacity and are well to rapidly drained. Water repellence, soil acidity and the susceptibility to wind erosion are limitations.
NMG NMV NMv	8.09 1.28 1.06	Flat texture contrast plains with occasional very low sandy rises and up to 50% swamps formed on calcreted sediments of the Padthaway formation. Groundwater tables are within two metres of the surface. **NMG** Broad depression **NMV** Plains with 30-40% swamps and 10-20% sandy and 10-20% stony rises **NMv** Undulating plains with 10-20% saline swamps Main soils: shallow sand over clay on calcrete - **B7**, thick sand over clay - **G3**, sand over poorly structured clay - **G4**, shallow dark clay loam on limestone - **B5**, deep friable gradational clay loam - **M2**, saline soil - **N2** and wet soil - **N3**. These soils are shallow to moderately deep, have moderate fertility and moderately low waterholding capacity. Drainage is imperfect on the plains, imperfect to poor in the swamps and very poor in the saline swamps. There is a slight to moderate limitation for root growth due to the dispersive subsoil clays. The saline swamps have high salinity and the associated flats have only subsoil salinity due to rising saline groundwater tables. Sandy rise soils: bleached siliceous sand - **H3**, thick sand over clay - **G3** and sand over poorly structured clay - **G4**. These soils are deep with low fertility, moderate waterholding capacity and rapid drainage. Moderate water repellence and the susceptibility to wind erosion are limitations. Stony rise soils: **B7**, shallow loam over red-brown clay on calcrete - **B6**, shallow sandy loam on calcrete - **B3**, shallow calcareous loam on calcrete - **B2** and limestone outcrop - **RR**. These soils are very shallow, have moderately low fertility and low to very low holding capacity. They are slightly imperfectly drained. Surface rockiness may be a limitation.
NNF	0.08	Dark heavy plain with 30-40% swamps formed on calcreted sediments of the Padthaway Formation. Main soils: deep friable gradational clay loam - **M2**, sandy loam over poorly structured brown or dark clay - **F2**, shallow dark clay loam on limestone - **B5** and wet soil - **N3**. These soils are moderately deep, have high fertility and waterholding capacity. Drainage is imperfect on the plains and poor in the swamps. There is a slight limitation for root growth due to the dispersive subsoil clays.
NSA NSF NSG NSK NSP	0.11 1.09 0.32 2.9 1.54	Flat deeper sandy surfaces plains with occasional very low sandy rises and up to 30% heavier swamps formed on calcreted sediments of the Padthaway formation. Groundwater tables are often within two metres of the surface. wet soil - **N3** (E) **NSA** Level plain with 0-10% swamps **NSF** Plain with 30-40% swamps

NSS NSf NSs	9.3 0.62 2.91	**NSG** Drainage depression **NSK** Plains with 10-20% swamps and 0-10% sandy rises **NSP** Plains with 20-30% sandy rises and 0-10% swamps **NSS** Plains with 20-30% swamps and 20-30% sandy rises **NSf** Plains with 20-30% saline swamps **NSs** Plains with 20-30% saline swamps and 20-30% sandy rises Main soils on the plains: thick sand over clay - **G3** (E), sand over poorly structured clay - **G4**, shallow dark clay loam on limestone - **B5** (C), shallow sand over clay on calcrete – **B7** and hard gradational sandy loam - **M4**. These soils are deep, have moderately low to moderate fertility and moderate waterholding capacity. Drainage is imperfect. There is a slight limitation to root growth due to the dispersive subsoil clays. The swamps and depressions have the above soils but also include saline soil - **N2**, wet soil - **N3**, black cracking clay - **E1** and shallow clay loam over brown or dark clay on calcrete - **B9**. The heavier sandy loam surfaces are deep, have moderately .low fertility and high waterholding capacity. Drainage is poor and there is a slight limitation to root growth due to the dispersive subsoil clays. The swamps may have subsoil salinity but the saline swamps have high salinity and the associated plains slight to moderate. Sandy rise soils: **G3**, **G4**, bleached siliceous sand - **H3** and wet highly leached sand - **I2**. These soils are deep, have moderately low fertility, moderate waterholding capacity and are well drained. Water repellence, soil acidity and the susceptibility to wind erosion are limitations.
NTA NTC NTF NTG NTP NTv	3.16 0.33 0.08 1.45 9.96 1.34	Small flat deeper sandy surfaces plain with 30-50% swamps and 20-30% sandy rises formed on calcreted sediments of the Padthaway Formation.. **NTA** Plain with 0-10% swamps **NTC** Plain with 0-10% stony rises **NTD** Plain with 0-10% swamps and 0-10% sandy rises **NTF** Plain with 30-40% swamps **NTG** Depression **NTP** Plains with 20-30% sandy rises and 0-10% swamps **NTv** Undulating plain with 10-20% saline swamps Plain soils: thick sand over clay - **G3**, hard gradational sandy loam - **M4**, shallow dark clay loam on limestone - **B5** and wet highly leached sand - **I2**. These soils are deep, have moderately low fertility and imperfect drainage. There is a slight limitation to root growth due to the dispersive subsoil clays. Swampy soils: include those above and sand over poorly structured clay - **G4**, wet soil - **N3**, sandy loam over poorly structured brown or dark clay - **F2** and saline soil - **N2**. These soils are deep, have moderately low fertility and high waterholding capacity. Drainage is poor. There is a slight limitation to root growth due to the dispersive subsoil clays. The saline swamps have high salinity and the associated plains have moderate to high due to rising groundwater tables. The sandy rise soils are similar to those in **NSK** landscape unit and are deep with moderately low to low fertility, moderate waterholding capacity and are well drained. Water repellence, soil acidity and the susceptibility to wind erosion are limitations. The stony rise soils are the same as **NMV** landscape unit and are very shallow, have moderately low fertility and moderately low to low holding capacity. They are slightly imperfectly drained. Surface rockiness may be a limitation.
NUA NUC NUG NUM NUO NUR	0.78 0.09 0.02 0.12 4.74 0.28	Small flat deeper sandy surfaces plain with 10-20% sandy rises and 0-10% swamps formed on calcreted sediments of the Padthaway Formation. **NUA** Plain **NUC** Plain with 0-10% stony rises **NUG** Depression **NUM** Plain with 30-35% stony rise and 0-10% swamps **NUO** Plain with 10-20% stony rises, 10-20% sandy rises and 0-10% swamps **NUR** Plain with 10-20% sandy rise and 0-10% stony rises Main soils: thick sand over clay - **G3** (E), loam over brown or dark clay - **F1**, sand over poorly structured clay - **G4**, shallow sand over clay on calcrete - **B7**, shallow sandy loam on calcrete - **B3**, deep hard gradational sandy loam - **M4** and wet soil - **N3**. These soils are deep with moderately low to moderate fertility, high waterholding capacity and

		imperfect to poorly drained on the plains and swamps respectively. Soil acidity and dispersive subsoil clays are a slight limitation to root growth. The sandy rise soils are similar to those in **NSK** landscape unit (highly leached sand - **I1** instead of **I2**) and are deep with moderately low to low fertility, moderate waterholding capacity and are well drained. Water repellence, soil acidity and the susceptibility to wind erosion are limitations. The stony rise soils are the same as **NMV** landscape unit and are very shallow, have moderately low fertility and moderately low to low holding capacity. They are slightly imperfectly drained. Surface rockiness may be a limitation.
NZA NZD NZF NZL NZO NZP NZS NZV	2.27 0.27 1.04 0.76 2.39 0.32 0.67 4.24	Flat plains with occasional very low stony and sandy rises and swamps formed on calcreted sediments of the Padthaway formation. Groundwater tables are within two metres of the surface. **NZA** Level plain with 0-10% swamps **NZD** Plains with 0-10% swamps and 0-10% sandy rises **NZF** Plains with 20-30% swamps **NZL** Plains with 20-30% swamps, 0-10% sandy rises and 0-10% stony rises **NZO** Plains with 20-30% sandy rises, 10-20% stony rises and 0-10% swamps **NZP** Plains with 10-20% sandy rises **NZS** Plains with 20-30% sandy rises and 0-10% swamps **NZV** Plains with 10-20% swamps, 10-20% sandy rises and 10-20% stony rises Main plains soils: sand over poorly structured clay - **G4** (M), thick sand over clay - **G3** (M) and shallow dark clay loam on limestone - **B5**. These soils are moderate to deep, have moderate fertility and moderate to moderately low waterholding capacity. Drainage is imperfect. There is a moderate limitation to root growth due to the dispersive subsoil clays. Swampy soils include those above and sandy loam over poorly structured brown or dark clay - **F2**, wet soil - **N3** and deep friable gradational clay loam - **M2**. These soils are moderate in depth, have moderate fertility and waterholding capacity. Drainage is poor to very poor and the watertable can be above the surface for greater than 3 months.. There is a slight limitation to root growth due to the dispersive subsoil clays. Sandy soils on the rising ground: bleached siliceous sand - **H3** (L), **G3, G4**, sand over acidic clay - **G5** and wet highly leached sand - **I2**. These soils are deep with moderately low fertility, moderate waterholding capacity and imperfectly drained. Water repellence, soil acidity and the susceptibility to wind erosion are limitations. There is also a nil to slight limitation to root growth due to the dispersive subsoil clays. The stony rise soils are the same as **NMV** landscape unit and are very shallow, have moderately low fertility and moderately low to low holding capacity. They are slightly imperfectly drained. Surface rockiness may be a limitation.
NjA	1.23	Flat texture contrast plains with 0-10% swamps formed on calcreted sediments of the Padthaway Formation. Main soils: sand over poorly structured clay – **G4**, shallow sand over clay on calcrete - **B7**, sandy loam over poorly structured brown or dark clay - **F2**, wet soil - **N3** and deep gradational clay loam – **M2**. These soils are moderate to deep, have moderate to high fertility and moderate to moderately low waterholding capacity. Drainage is imperfect on the plains and poor in the swamps. There is a slight limitation to root growth due to the dispersive subsoil clay.
NyM	0.09	Flat heavy clayey plains with 0-10% swamps and 10-20% stony rises formed on calcreted sediments of the Padthaway formation. Main soils: shallow dark clay loam on limestone - **B5**, deep gradational clay loam – **M2** and wet soil - **N3**. The plain and swamp soils are deep, have high fertility and moderate to high waterholding capacity. Drainage is imperfect to poor. There is a slight limitation to root growth due to the dispersive subsoil clays. The stony rise soils are the same as **NMV** landscape unit and are very shallow, have moderately low fertility and moderately low to low holding capacity. They are slightly imperfectly drained. Surface rockiness may be a limitation.
OFB OFC OFD OFM	0.39 1.08 1.07 0.26	Isolated dune rises formed on calcreted calcarenite of ancient coastal dunes within the interdunal corridor. **OFB** Single high dune with greater than 90% sand dune coverage **OFC** Dune with greater than 90% sand dune coverage

OFN OFW OFo	0.13 0.11 0.04	**OFD** Low dune with greater than 90% sand dune coverage **OFM** Dune with 60-90% sand dune coverage and 0-10% saline swamps **OFN** Low dune with 60-90% sand dune coverage and 0-10% saline swamps **OFW** Dune with 60-90% sand dune coverage and 20-30% saline flat **OFo** High dune with 60-90% sand dune coverage and 10-20% wet swale Main soils: highly leached sand - **I1**, wet highly leached sand - **I2**, bleached siliceous sand - **H3**, sand grading to sandy clay loam - **G2** (L), thick sand over clay - **G3**, sand over acidic clay - **G5**, shallow sand over clay on calcrete - **B7** and shallow loam over red-brown clay on calcrete - **B6**. The sandy soils are deep with low to very low fertility, moderate waterholding capacity and rapid drainage. Water repellence, soil acidity and the susceptibility to wind erosion are limitations. Swale/flat soils: wet soil - **N3** (M), and saline soil - **N2** (M) and are deep with moderate fertility, high waterholding capacity and very poor drainage. There is a slight limitation to root growth due to the dispersive subsoil clays. Salinity levels are high. Productivity potential is reduced on this land as salt tolerant species are evident.
OHG	0.20	Isolated dune rise with 60-90% sand dune coverage with 10-20% swales formed on calcreted calcarenite of ancient coastal dunes within the interdunal corridor. Main soils: highly leached sand - **I1** (E) and bleached siliceous sand - **H3**. These soils are deep with very low fertility, moderate waterholding capacity and rapid drainage. Water repellence, soil acidity and the susceptibility to wind erosion are limitations. Soils in swales: thick sand over clay - **G3**, wet soil - **N3** (M) and shallow sand over clay on calcrete - **B7**. These soils are deep, have moderately low fertility and are poorly drained and seasonally inundated for up to 3 months. There is a slight limitation to root growth due to the dispersive subsoil clays and to wind erosion.
OND ONG ONP	0.05 0.33 0.22	Isolated dune rises formed on calcreted calcarenite of ancient coastal dunes within the interdunal corridor. **OND** Low dune with greater than 90% sand dune coverage and 10-20% stony rises **ONG** Low dune with 60-90% sand dune coverage, 10-20% stony rises and 10-20% swales **ONP** Dune with 30-60% sand dune coverage with 0-10% marginally saline depression Main soils: thick sand over clay - **G3**, bleached siliceous sand - **H3**, highly leached sand - **I1**, sand over poorly structured clay – **G4** and wet highly leached sand - **I2**. These soils are deep, have low to moderately low fertility, moderate waterholding capacity and are well drained. There may be a slight limitation to root growth due to the dispersive subsoil clays. Water repellence, soil acidity and the susceptibility to wind erosion are limitations. There are limited stony rises and the soils are the same as found in the **NMV** landscape unit and are very shallow, have moderately low fertility and moderately low to low holding capacity. They are slightly imperfectly drained. Surface rockiness may be a limitation. Soils of depressions: sandy loam over poorly structured brown or dark clay - **F2**, wet soil - **N3** and **G4**. These soils are similar in characteristics to the sandy rises however drainage is poor and there is no water repellence or soil acidity.
OPD OPG OPJ OPK OPt	0.13 0.13 0.88 0.58 0.36	Isolated dune rises formed on calcreted calcarenite of ancient coastal dunes within the interdunal corridor. **OPD** Low dune with greater than 60% sand dune coverage and 30-40% sand spreads **OPG** Low dune with 60-90% sand dune coverage with 20-30% swales **OPJ** Low dune with 30-60% sand dune coverage and 30-40% sand plain **OPK** Sand spread with 0-10% low sand dunes **OPt** Low dune with 30-60% sand dune coverage with 10-20% non saline wet swamp Main soils: thick sand over clay - **G3**, bleached siliceous sand - **H3**, highly leached sand - **I1**, sand over poorly structured clay – **G4**, sand grading to sandy clay loam - **G2** (L) and wet highly leached sand - **I2**. These soils are deep, have low to moderately low fertility, moderate waterholding capacity and are well drained. There may be a slight limitation to root growth due to the dispersive subsoil clays. Water repellence, soil acidity and the susceptibility to wind erosion are limitations. Minor swamps: sandy loam over poorly structured brown or dark clay - **F2**, thick sand over clay - **G3** and sand over poorly structured clay - **G4** and are similar in characteristics to the sandy rises but have imperfect to poor drainage and a moderate limitation to root growth due to the dispersive

		subsoil clays. There are no water repellent and acidic soils.
OQC OQD OQF OQG OQI OQJ OQs OQt	0.27 0.52 1.36 1.85 0.60 0.33 2.12 2.67	Isolated dune rises formed on calcreted calcarenite of ancient coastal dunes within the interdunal corridor. **OQC** Dune with greater than 90% sand dune coverage **OQD** Low dune with greater than 90% sand dune coverage **OQF** Dune with 60-90% sand dune coverage, 10-20% stony rises and 0-10% flats **OQG** Low dune with 60-90% sand dune coverage and 20-30% flats **OQI** Dune with 30-60% sand dune coverage and 30-50% sandy rises **OQJ** Low dune with 30-60% sand dune coverage, 30-50% sandy rises and plains **OQs** Dune with 30-60% sand dune coverage, sandy rises and 0-10% depressions **OQt** Low dune with 30-60% sand dune coverage with 10-20% non saline depression Main soils: bleached siliceous sand - **H3**, thick sand over clay - **G3**, highly leached sand - **I1**, sand grading to sandy clay loam - **G2** (L) sand over poorly structured clay – **G4** and wet highly leached sand - **I2**. These sandy rises are deep, have low fertility, moderate waterholding capacity and are well drained. The sandy flats have high waterholding capacity, moderately low fertility and imperfect drainage. There may be a slight limitation to root growth due to the dispersive subsoil clays, especially on the flats. Severe water repellence, soil acidity and the susceptibility to wind and water (especially on the high dunes) erosion are limitations. Water repellence and soil acidity are not problems on the flats. Depressions: sandy loam over poorly structured brown or dark clay - **F2**, wet soil - **N3**, thick sand over clay - **G3** and sand over poorly structured clay - **G4** and are similar in characteristics to the sandy rises but have imperfect to poor drainage and a moderate limitation to root growth due to the dispersive subsoil clays. There is no water repellent and acidic soils.
PTA	0.57	Small sand plain with deeper and shallow sands. Main soils: thick sand over clay - **G3**, bleached siliceous sand - **H3**, shallow sand over clay on calcrete - **B7**, shallow calcareous loam on calcrete - **B2** and limestone outcrop - **RR**. These soils are generally deep, have moderately low fertility, moderate waterholding capacity and are imperfectly drained. Water repellence is a limitation. The shallow soils are minor.
XRC	0.07	Heavy swamp with the main soil being wet soil - **N3** (D). Soils are not suitable for agriculture as drainage is very poor and under water for up to 3 months. Opportunistic grazing is a possibility.
Xl-	0.75	Fresh water lake.
Xq- Xqn	1.23 0.80	Fresh to marginally saline swamps, at least seasonally inundated. **Xq-** Seasonally inundated swamp **Xqn** Swamp with 0-10% sandy rises and 0-10% lunettes Main soils: peat - **N1**, wet soil - **N3** and wet highly leached sand – **I2**. These soils are deep, have moderate to moderately low fertility and moderate waterholding capacity. Drainage is poor to very poor. The swamps are underwater for greater than 3 months. The soils are acidic. Sandy rise soils: highly leached sand – **I1**, **I2**, bleached siliceous sand - **H3** and sand grading to sandy clay loam - **G2** (L). They have similar fertility and waterholding capacity to the swamps but they are well drained. Lunette soils: thick sand over clay - **G3**, **G2**,, shallow sandy loam on calcrete - **B3**, shallow calcareous loam on calcrete - **B2** and rubbly calcareous loam on clay - **A5**. These soils are deep to shallow, have moderate fertility and waterholding capacity and are rapidly drained. The soil is alkaline and calcareous at depth.
Xu- XuC	0.39 0.4	Non-saline wet swamps. **Xu-** Non-saline wet swamp **XuC** Non-saline wet swampy swamp Main soils: wet soil - **N3** (V) and peat - **N1**. These soils are deep, have moderate fertility and high waterholding capacity. Drainage is very poor. The swamps are underwater for greater than 3 months.
Xw- XwC	0.59 0.40	Wetland of variable salinity **Xw-** Swamp **XwC** Marginally saline swamp Main soils: wet soil - **N3** (V), saline soil - **N2** and sand grading to sandy clay loam - **G2**.

		These soils are deep, have moderate fertility and high waterholding capacity. Drainage is very poor. There is a slight limitation to root growth due to the dispersive subsoil clays. The swamps are underwater for greater than 3 months. Salinity levels are moderately high with **XwC** having 2-10% patches of high to extreme salinity.
ZD-	0.19	Salt lakes that are seasonally or usually filled formed on calcareous clays and marls. 0-10% lunettes. Main soil: saline soil - **N2** (D) which is deep, has poor fertility and high waterholding capacity. Salinity levels are very high and the watertable is at the surface for 3-10 months. The swamps are too saline for any production other than opportunistic light grazing, but protection of halophytic vegetation must be considered. Lunette soils: gradational calcareous clay loam - **A6** (M), shallow calcareous loam on calcrete - **B2** (M) and shallow dark clay loam on limestone - **B5** (M). They are very shallow to moderately deep, have moderate fertility, low waterholding capacity and rapid drainage. The soils are calcareous throughout and rockiness may be a limitation with up to 50% rock. Moderately high salinity levels may pose problems on really low rises.
ZQ-	0.06	Marginally saline swamps formed on calcareous clays and marls. Main soil: wet soil - **N3** (E). These soils are deep, have moderately low fertility, high waterholding capacity and poor to very poor drainage. There is a slight to moderate limitation to root growth due to the dispersive subsoil clays. Salinity is high due to the water table seasonally above the surface for over 3 months. Salt tolerant species is evident and production from the swamps is only from opportunistic light grazing,
Zn-	0.05	Swampy flat formed on calcreted sediments of the Padthaway formation. Main soils: saline soil - **N2** (V) and thick sand over clay – **G3** (C). These soils are deep, have moderately low fertility and high waterholding capacity. Drainage is poor and there is high salinity. The majority of the area has only salt tolerant species present. The productive potential is very low.
Zy-	0.65	Swamps with 10-20% lunettes and 0-10% permanently inundated lakes. Main soils: wet soil - **N3**, saline soil - **N2** (V), deep hard gradational sandy loam - **M4**, calcareous clay loam on marl - **A7**. These soils are deep and have high fertility and waterholding capacity. Drainage is poor, land is inundated for 3-10 months and there is high salinity. The majority of the area has only salt tolerant species present. The productive potential is very low. Lunette soils: shallow dark clay loam on limestone - **B5**, shallow clay loam over brown or dark clay on calcrete - **B9**, shallow sandy loam on calcrete - **B3** and shallow calcareous loam on calcrete - **B2**. Soils are very shallow, have high fertility, low waterholding capacity and rapidly drained. They are calcareous throughout and moderately high salinity levels may pose problems on really low rises.

Detailed soil profile descriptions

(In alphabetic order)

A6 Gradational calcareous clay loam (Pedal Hypercalcic-Lithocalcic Calcarosol on clayey subsoil)
Calcareous loams to clay loams grading into brown-red clay. Often rubbly.

B2 Shallow calcareous loam on calcrete (Petrocalcic, Supracalcic Calcarosol)
Dark coloured clay loam over a structured dark clay directly overlying calcrete or calcarenite within 30 cm.

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 Shallow red loam on calcrete (Haplic, Petrocalcic, Red Dermosol)
Medium thickness red loam to clay loam over a red structured clay directly overlying calcarenite within 50 cm.

B5 Shallow dark clay loam on limestone (Haplic, Petrocalcic, Black Dermosol)
Thin to medium thickness black clay loam grading to black well structured clay directly overlying calcrete within 50 cm.

B6 Shallow loam over red-brown clay on calcrete (Haplic Petrocalcic, Red Chromosol)
Thin to medium thickness brownish sandy loam to loam over a well structured red to red-brown clay loam to clay on calcrete or calcarenite within 50 cm.

B7 Shallow sand over clay on calcrete (Petrocalcic, Yellow/Brown/Grey Sodosol)
Medium thickness sand overlying poorly structured clay on limestone or calcreted sandy clay within 50 cm.

B8 Shallow sand on calcrete (Bleached-Leptic Tenosol)
Thin to medium organically darkened sand over bleached sand over calcarenite within 50 cm.

B9 Shallow clay loam over brown or dark clay on calcrete (Petrocalcic, Mesonatric Brown Sodosol)
Thin brown to dark sandy loam to clay loam over a sodic brown poorly structured clay directly overlying calcrete within 50 cm.

F1 Loam over brown or dark clay (Melanic, Hypercalcic, Black/Brown Chromosol)
Medium thickness dark brown sandy loam over a thin to medium sand layer over a structured brown to black clay grading to a brown mottled clay with limestone segregations at depth.

F2 Sandy loam over brown or dark poorly structured clay (Mottled, Mesonatric, Grey/Black Sodosol)
Medium thickness brown sandy loam over a thin to medium thickness pale sand layer over a columnar structured dispersive grey to black clay grading to brown mottled clay with depth.

G2 Bleached sand over sandy clay loam (Mesotrophic, Haplic, Kandosol/Chromosol)
Medium to thick loose non-calcareous grey sand with a bleached A2 layer grading to yellowish sand, clear change, overlying an orange/brown sandy clay loam.

G3 Thick sand over clay (Subnatric, Brown Sodosol/Chromosol)
Thick sand with a bleached A2 layer, clearly overlying a weak to moderate structured brown clay to sandy clay.

G4 Sand over poorly structured clay (Subnatric, Brown Sodosol)
Medium sand with a bleached A2 layer clearly overlying a hard columnar structured dispersive brown mottled clay.

G5 Sand over acidic clay (Sandy Brown Kurosol)
Sandy texture contrast soil with a friable brown strongly acidic clayey to clay loamy subsoil. Very acidic soil; incipient Bh horizons; moderate depth topsoils. Some with ironstone.

H3 Bleached siliceous sand (Arenic, Bleached-Orthic Tenosol)
Thick to very thick bleached sand, organically darkened at the surface over yellow sand continuing below 150 cm. Common on rises.

I1 Highly leached sand (Fragic, Pipey, Aeric Podosol)
Grey sand with a very thick bleached A2 layer, over dark brown and yellow massive soft to semi-hard clayey sand (coffee rock), grading to softer yellow and brown sand to sandy clay loam from about 80 cm.

I2 Wet highly leached sand (Fragic, Humic, Aquic Podosol)
Grey sand with a thick bleached A2 horizon, overlying a thin to thick layer of coffee rock, grading to pale brown sand sharply overlying a grey, brown and yellow mottled sandy clay loam to light clay.

M2 Deep friable gradational clay loam (Red-Brown-Grey- Black Dermosol)
Deep well structured red clay loamy soil.

M4 Deep hard gradational sandy loam (Hard Brown-Dark Kandosol- Dermosol)
Deep dark brown loamy to clay loamy soil grading to clay at depth. Hardsetting surface often with prismatic structures in the subsoil.

N2 Saline soil (Calcarosolic, Salic 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.

N3 Wet soil (non to moderately saline) (Sodosolic, Eutrophic Hydrosol)
Organically stained sandy surface over a pale brown sand overlying a yellowish brown sandy clay on calcrete.

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.

WW Water.

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, Mesonatric, Brown Chromosol/Sodosol)
Thick to very thick sand over a pale sand layer directly overlying a brown friable clay that grades to yellowish brown clay at depth.

G4 Sand over poorly structured clay (Mesonatric, Brown/Grey Sodosol)
Thick organically stained sandy surface overlying a pale sand layer overlying a brown poorly structured clay grading to yellowish brown clay with some calcareous rubble within 100 cm.

I1 Highly leached sand (Fragic, Humic, Aeric Podosol)
Medium thickness organically stained sand over a bleached sand grading to yellowish brown sand, containing minor percentages of ironstone.

I2 Wet highly leached sand (Humeosesquic, Semiaquic Podosol)
Organically darkened sand to loamy sand grading to greyish sand overlying dark sands with organic-aluminium compounds that are saturated for a short term.

Stony soils (rises and plains)

B2 Shallow calcareous loam on calcrete (Petrocalcic, Supracalcic Calcarosol)
Dark coloured clay loam over a structured dark clay directly overlying calcrete or calcarenite within 30 cm.

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 Shallow red loam on calcrete (Haplic, Petrocalcic, Red Dermosol)
Medium thickness red loam to clay loam over a red structured clay directly overlying calcarenite within 50 cm.

B5 Shallow dark clay loam on limestone (Haplic, Petrocalcic, Black Dermosol)
Thin to medium thickness black clay loam grading to black well structured clay directly overlying calcrete within 50 cm.

B6 Shallow loam over red-brown clay on calcrete (Haplic Petrocalcic, Red Chromosol)
Thin to medium thickness brownish sandy loam to loam over a well structured red to red-brown clay loam to clay on calcrete or calcarenite within 50 cm.

B7 Shallow sand over clay on calcrete (Petrocalcic, Yellow/Brown/Grey Sodosol)
Medium thickness sand overlying poorly structured clay on limestone or calcreted sandy clay within 50 cm.

B8 Shallow sand on calcrete (Bleached-Leptic Tenosol)
Thin to medium organically darkened sand over bleached sand over calcarenite within 50 cm.

B9 Shallow clay loam over brown or dark clay on calcrete (Petrocalcic, Mesonatric Brown Sodosol)

Thin brown to dark sandy loam to clay loam over a sodic brown poorly structured clay directly overlying calcrete 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

M2 Deep friable gradational clay loam (Calcic, Grey Dermosol)
Dark grey clay loam to light clay overlying a blocky structured greyish brown medium clay grading to yellowish brown clay at depth.

M4 Deep hard gradational sandy loam (Sodic, Brown Dermosol)
Deep brown sandy loam grading to a poorly structured brown clay loam to clay at depth.

N2 Saline soil (Calcarosolic, Salic 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.

N3 Wet soil (non to moderately saline) (Sodosolic, Eutrophic Hydrosol)
Organically stained sandy surface over a pale brown sand overlying a yellowish brown sandy clay on calcrete.

Further information: DEWNR Soil and Land Program