

Comparative Soil Characterisation – Mount Charles

General Description: Gray sand over light clay and lime grading to yellowish brown sand. **Watertable at 70cms**

Landform: Plain, lower slope, dunefield in distance

Substrate: Molineaux sand over Padthaway formation (old coastal lagoons with deposits of clays, sands and limestone)

Vegetation: Tall wheat grass, phalaris and lucerne

Land use: grazing – near weather station



Site Details:	Site No:	3	Easting:	0418607
	Hundred:	Laffer	Northing:	6010299
	Sampling date:	9/7/21	Annual rainfall:	450 mm

Soil Description

Depth (cm)	Horizon	Description
0-15	A1	Very dark gray loamy sand. Abrupt to:
15-30	A2	Brown slightly calcareous fine sandy light clay. Clear to:
30-70	B2	Pinkish white very highly calcareous coarse loamy sand. Gradual to:
70-110	B21	Light yellowish-brown sand. Sharp to:
110-120	B22K	Light gray light clay coarse sand. 10-20% segregations.



Summary of Properties

Drainage: imperfectly drained, due to shallow clay and underlying watertable at 70cms

Fertility: moderately low

pH: alkaline surface to strongly alkaline in subsoil

Rooting depth: 30cms

Barriers to root growth

Physical: sodic clay at 15cm with some dispersion

Chemical: high Boron at 15cm, toxic salt and chloride at 30cms

Water holding capacity: top 30cms would have around 35 mm, with salt tolerant vegetation will increase

Seedling emergence: slightly water repellence in surface

Workability: easily worked

Erosion potential

Water: very low

Wind: low

Laboratory Data

Depth (cm)	pH H ₂ O	pH CaCl ₂	NO ₃ mg/kg	EC 1:5 dS/m	ECe	OC %	PBI	Colwell		Boron mg/kg	SO ₄ -S mg/kg	Trace Elements mg/kg (DPTA)			
								Avail. P mg/kg	Avail. K mg/kg			Cu	Zn	Fe	Mn
0-15	8.4	7.9	6.2	0.11	2	1.11	15	24	140	2.2	8.9	0.12	0.4	2.6	1.3
15-30	9.5	8.8	<1	0.57	5	0.43	88	12	610	20	36	0.19	0.26	10	0.5
30-70	9.3	8.8	<1	2.5	38	0.26	210	5	300	16	190	0.15	0.14	6.5	0.4
70-110	9.0	8.6	<1	1.4	21	0.06	23	<5	120	1.8	110	0.09	0.31	2.5	0.5
110-120	8.8	8.4	<1	1.8	27	0.08	223	<5	150	1.8	150	0.21	0.47	5.2	0.5
Critical / Ideal values	6-8	5-7	-	<0.7	<4	S: 0.5-1.0 SL: 0.7-1.4 L: 0.9-1.8 CL/C: 1.2-2.0	20-120	25-30	100	<15	>6-8	0.3	0.5		1

Depth (cm)	Cl mg/kg	Sum cations cmol (+)/kg	Exchangeable cations cmol (+)/kg				ESP	Dispersion		Calcium carbonate Equiv %
			Ca	Mg	Na	K		2 hrs	20 hrs	
0-15	14	8.5	6.59	1.65	0.0	0.21	0	0	0	1.7
15-30	270	9.6	3.71	3.73	1.33	0.80	14	2	2	<0.4
30-70	3200	14.2	6.42	6.23	0.99	0.57	7	0	0	21
70-110	2100	4.5	2.32	1.98	0.07	0.17	2	0	0	1.8
110-120	2500	8.2	3.93	3.81	0.18	0.27	2	0	0	9.5
Critical / Ideal values	S: <120 L: <200 C: <300	15	75% of CEC	20% of CEC	<6% of CEC	5% of CEC	<6			

General Description: Sand over clay with increasing lime over deeper sandy deposits

Landform: Plain, slight rise, good area

Substrate: Molineaux sand over Padthaway formation (old coastal lagoons with deposits of clays, sands and limestone)

Vegetation: Lucerne, annual grasses

Land use: grazing



Site Details:	Site No:	4	Easting:	0418617
	Hundred:	Laffer	Northing:	6010304
	Sampling date:	9/7/21	Annual rainfall:	450 mm

Soil Description

Depth (cm)	Horizon	Description
0-10	A1	Brown loamy sand. Clear to:
10-19	A2	Bleached light brownish gray sand. Sharp to:
19-32	B21	Light yellowish brown highly calcareous sandy light clay. Clear to:
32-48	B22	Reddish yellow very highly calcareous light clayey sand. 2-10% calcareous segregations, 6-20 mm in size. Clear to:
48-90	B23K	Light gray very highly calcareous coarse clayey sand. 10-20% nodules, >60 mm in size. Clear to:
90-105	C1	Light yellowish-brown loamy sand. Gradual to:
105-120	C2	Light yellowish-brown sand.



Summary of Properties

Drainage: Well drained
Fertility: very low inherent fertility in topsoil layers with low CEC values
pH: alkaline surface to strongly alkaline at depth
Rooting depth: 32cm before salinity becomes high

Barriers to root growth

Physical: some root restrictions due to bleached A2 and B horizon, high ESP/dispersion at 19cms

Chemical: high Boron, pH at 19cms, high salinity and chloride at 32cms

Water holding capacity: using 32cm WHC is 33.4 mm, salt tolerant plants will go deeper

Seedling emergence: water repellent surface

Workability: easily worked

Erosion potential

Water: very low

Wind: low

Laboratory Data

Depth (cm)	pH H ₂ O	pH CaCl ₂	NO ₃ mg/kg	EC 1:5 dS/m	Ece	OC %	PBI	Colwell		Boron mg/kg	SO ₄ -S mg/kg	Trace Elements mg/kg (DPTA)			
								Avail. P mg/kg	Avail. K mg/kg			Cu	Zn	Fe	Mn
0-10	8.1	7.5	12	0.14	2	1.02	11	11	58	1.2	10	0.19	0.95	6.2	1.1
10-19	9.0	8.3	1.4	0.094	1	0.16	5	<5	45	0.83	5.6	0.1	0.14	1.6	<0.3
19-32	9.6	9.0	1.8	0.83	7	0.35	120	<5	480	25	41	0.19	0.1	11	<0.3
32-48	9.4	8.9	3	2.1	32	0.37	324	8	380	28	190	0.15	0.09	6.1	0.3
48-90	9.2	8.8	4.2	2.1	32	0.22	178	5	240	9.6	180	0.12	0.08	3.9	<0.3
90-105	8.9	8.6	3.2	1.7	26	0.1	19	<5	210	3	110	0.11	<0.08	3.6	<0.3
105-120	9.0	8.7	1.8	1.6	24	0.08	11	<5	130	2.1	110	<0.08	<0.08	2	<0.3
Critical / Ideal values	6-8	5-7	-	<0.7	<4	S: 0.5-1.0 SL: 0.7-1.4 L: 0.9-1.8 CL/C: 1.2-2.0	20-120	25-30	100	<15	>6-8	0.3	0.5		1

Depth (cm)	Cl mg/k	Sum cations cmol (+)/kg	Exchangeable cations cmol (+)/kg				ESP	Dispersion		Calcium carbonate Equiv %
			Ca	Mg	Na	K		2 hrs	20 hrs	
0-10	46	4.9	3.73	1.07	0.00	0.08	0	0	0	<0.4
10-19	58	1.4	0.85	0.50	0.00	0.07	0	0	0	<0.4
19-32	430	12.5	4.61	5.37	1.58	0.89	13	2	3	4.8
32-48	2500	19.1	7.71	8.52	2.00	0.82	10	0	0	28
48-90	2600	12.5	6.05	5.18	0.73	0.49	6	0	0	17
90-105	2200	5.4	1.60	3.06	0.33	0.43	6	0	0	<0.4
105-120	2200	3.6	1.08	2.23	0.10	0.21	3	0	0	<0.4
Critical / Ideal values	S: <120 L: <200 C: <300	15	75% of CEC	20% of CEC	<6% of CEC	5% of CEC	<6			

General Description: Saline black clay over calcrete overlying deeper sandy and calcareous sediments

Landform: Plain, hollow within saline area

Substrate: Molineaux sand over Padthaway formation (old coastal lagoons with deposits of clays, sands and limestone)

Vegetation: Sea barley grass, edge of bare area

Land use: grazing



Site Details:	Site No:	5	Easting:	0418567
	Hundred:	Laffer	Northing:	6010293
	Sampling date:	9/7/21	Annual rainfall:	450 mm

Soil Description

Depth (cm)	Horizon	Description
0-10	A1	Black highly calcareous light clay
10-20	B1k	Light brown very highly calcareous coarse sandy clay. 20-50% calcareous segregations, 2-6 mm in size.
20-28	B2k	Light grey very highly calcareous coarse sand. 20-50% calcareous segregations, 6-20 mm in size.
28-55	2B1	Gray sand.
55-70	2B22	Pinkish gray sand.
70-78	2B23	Grayish brown fine sandy light clay.
78-100	2B24K	Reddish yellow moderately calcareous coarse light clay. 20-50% calcareous segregations, <2 mm in size.
100-120	2B25K	Pinkish gray highly calcareous coarse light clay. 10-20% calcareous segregations, 2-6 mm in size.



Summary of Properties

Drainage: imperfectly drained, water table at 50cms
Fertility: high CEC, organic carbon and nutrients levels however salinity issue at surface
pH: strongly alkaline to alkaline throughout
Rooting depth: salt tolerant species could possibly get to watertable at 50cm

Barriers to root growth

Physical: shallow watertable, high ESP although did not disperse due to salinity which overrides

Chemical: saline and high Boron on surface, high Chloride at 10cms

Water holding capacity: not relevant

Seedling emergence: Ok if not saline

Workability: not relevant

Erosion potential

Water: moderate near drainage line

Wind: Low

Laboratory Data

Depth (cm)	pH H ₂ O	pH CaCl ₂	NO ₃ mg/kg	EC 1:5 dS/m	ECe	OC %	PBI	Colwell		Boron mg/kg	SO ₄ -S mg/kg	DPTA Trace Elements mg/kg			
								Avail. P mg/kg	Avail. K mg/kg			Cu	Zn	Fe	Mn
0-10	9.2	8.5	5.4	0.82	7	3.99	274	120	570	47	110	0.42	0.56	3.3	4.4
10-20	9.6	8.7	1.5	0.84	7	1.05	336	17	220	29	110	0.21	0.16	1.7	1.5
20-28	9.6	8.7	1.3	0.85	13	0.52	418	5	160	16	110	0.1	0.1	1.9	0.5
28-55	9.7	9.0	<1	0.78	12	0.06	28	<5	160	5.4	81	<0.08	<0.08	3.1	<0.3
55-70	9.3	8.9	<1	0.76	11	<0.05	11	<5	110	3.1	54	<0.08	<0.08	1.2	<0.3
70-78	9.1	8.5	<1	1.3	10	0.06	31	<5	490	8.5	120	0.12	0.08	5.7	<0.3
78-100	9.0	8.4	<1	1.8	14	0.15	160	<5	390	6.3	150	0.51	0.11	4.2	<0.3
110-120	8.8	8.3	1.1	2.6	21	0.15	131	<5	480	6.7	280	0.67	0.14	4.8	<0.3
Critical / Ideal values	6-8	5-7	-	<0.7	<4	S: 0.5-1.0 SL: 0.7-1.4 L: 0.9-1.8 CL/C: 1.2-2.0	20-120	25-30	100	<15	>6-8	0.3	0.5		1

Depth (cm)	Cl mg/kg	Sum cations cmol (+)/kg	Pre-wash Exchangeable cations cmol (+)/kg				ESP	Dispersion		Calcium carbonate Equiv %
			Ca	Mg	Na	K		2 hrs	20 hrs	
0-10	210	30.3	13.3	11.5	1.3	4.21	14	0	0	37
10-20	340	15.9	7.81	5.26	0.42	2.42	15	0	0	77
20-28	540	12.5	6.38	4.23	0.28	1.59	13	1	1	62
28-55	770	3.9	1.85	1.69	0.24	0.09	2	0	0	0.8
55-70	880	2.5	1.04	1.24	0.15	0.03	1	0	0	<0.4
70-78	1600	10.3	2.58	5.41	0.94	1.33	13	0	0	3.6
78-100	2300	18.3	5.32	9.13	0.86	3.03	17	0	0	57
110-120	3100	23.2	5.89	11.5	1.2	4.65	20	0	0	39
Critical / Ideal values	S: <120 L: <200 C: <300	15	75% of CEC	20% of CEC	<6% of CEC	5% of CEC	<6			

SALINITY AT 10cm INTERVALS – Site 3 weather station, site 4 uphill, site 5 salt area

