SESL AUSTRALIA
Environment & Soil Sciences

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
Mailing Address: PO Box 357, Pennant Hills NSW 1715
Tel: 1300 30 40 80
Fax: 1300 64 46 89
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 39177 **Sample N°: 2** **Date Received: 25/5/16** **Report Status:** ○ Draft ◉ Final

Client Name:	**Gecko Clan - Landcare Australia**	Project Name:	**Farming Practices for soil, water, catchments & climate resilience**
Client Contact:	**Damien Gerrants**		
Client Job N°:		SESL Quote N°:	
Client Order N°:		Sample Name:	**BP2 - Sheep Paddock**
Address:	**208 James Road Warrenbayne VIC 3670**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

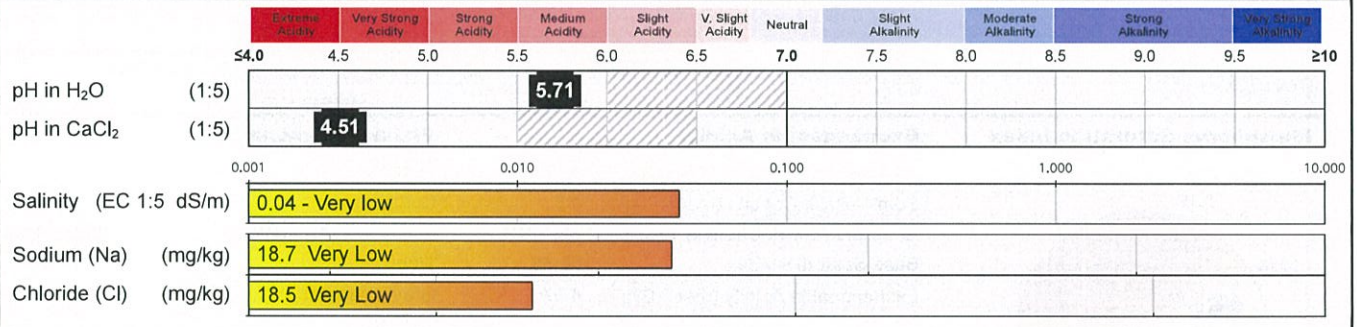
RECOMMENDATIONS

Key Observations.
This soil is is very strongly acidic in CaCl2 and has desirably low salinity levels. The cation exchange is dominated by hydrogen which explains the acidity. The effective cation exchange capacity (eCEC) is low indicating a poor nutrient holding capacity. Nutrients are deficient to adequate, and will need boosting. Organic matter = 6.34% (high).

Amendment Strategy
We recommend boosting the pH through an application of lime at 1 t/ha and dolomite at 1.5 t/ha. This will also increase calcium and magnesium levels. A multi-purpose NPK + traces fertiliser will improve nutrient levels.

SOIL SAMPLE DEPTH (mm): ◉ 100 ○ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

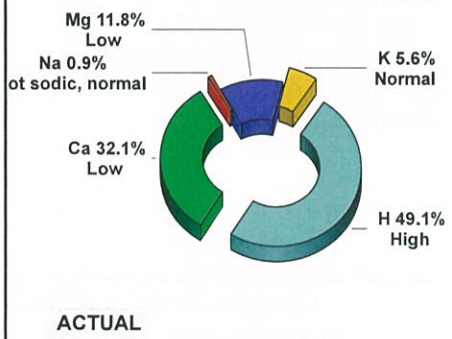
pH and ELECTRICAL CONDUCTIVITY



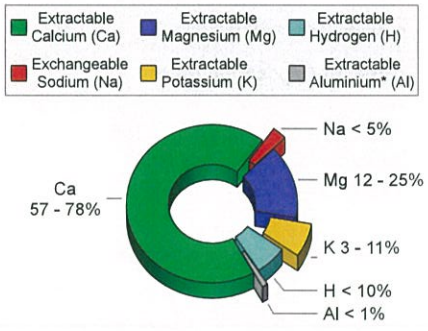
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in $CaCl_2$ ≤ 5.5
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**2.7**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**2.1**	2.6 – 5.0
Comment: Magnesium low		
K/(Ca+Mg)	**0.13**	< 0.07
Comment: High		
K:Na	**6.3**	N/A

Sodium Absorption Ratio: D.N.T.

EXCHANGEABLE CATIONS (meq/100g)

Na:	K:	Ca:	Mg:	H:	Al:
0.08	0.50	2.86	1.05	4.37	0.00

SOLUBLE CATIONS (meq/100g)

Na:	K:	Ca:	Mg:

ASPAC

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PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	10.7		1.4	4	2.6
Phosphate-P (PO_4)	31.1		4.1	8.4	4.3
Potassium (K) †	196		26.1	29.3	3.2
Sulphate-S (SO_4)	13		1.7	9	7.3
Calcium (Ca) †	574		76.3	208.3	132
Magnesium (Mg) †	128		17	21.7	4.7
Iron (Fe)	378		50.3	73.4	23.1
Manganese (Mn) †	38		5.1	5.9	0.8
Zinc (Zn) †	2.6		0.3	0.7	0.4
Copper (Cu)	<0.64		0.1	0.8	0.7
Boron (B) †	<0.1		0	0.4	0.4

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

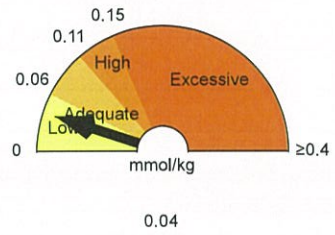
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



0.04

Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**7.3**
Sum of Base Cations (meq/100g^{-1}):	**4.5**
Eff. Cation Exch. Capacity (eCEC):	**8.9**
Base Saturation (%):	**50.56**
Exchangeable Acidity (meq/100g^{-1}):	**4.37**
Exchangeable Acidity (%):	**49.1**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**230**
– to neutralise Al (g/sqm):	**0**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **0**

The CGAR is corrected for a soil depth of 100mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	-
Colour:	-
Estimated clay content:	**Did not test**
Size:	-
Gravel content:	-
Aggregate strength:	-
Structural unit:	**Did not test**
Potential infiltration rate:	**Did Not Test**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	-

Requires EC and Soil Texture result.

Organic Carbon (OC%)†: **2.88 – Very high**
Organic Matter (OM%): **6.34**
Additional comments:

Consultant: Chantal Milner

Authorised Signatory: Alisa Bryce

Date Report Generated 3/06/2016

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

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Client Name:	**Gecko Clan - Landcare Australia**	Project Name:	**Farming Practices for soil, water, catchments & climate resilience**
Client Contact:	**Damien Gerrants**		
Client Job N°:		SESL Quote N°:	
Client Order N°:		Sample Name:	**BP5 - Carrot Paddock**
Address:	**208 James Road Warrenbayne VIC 3670**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

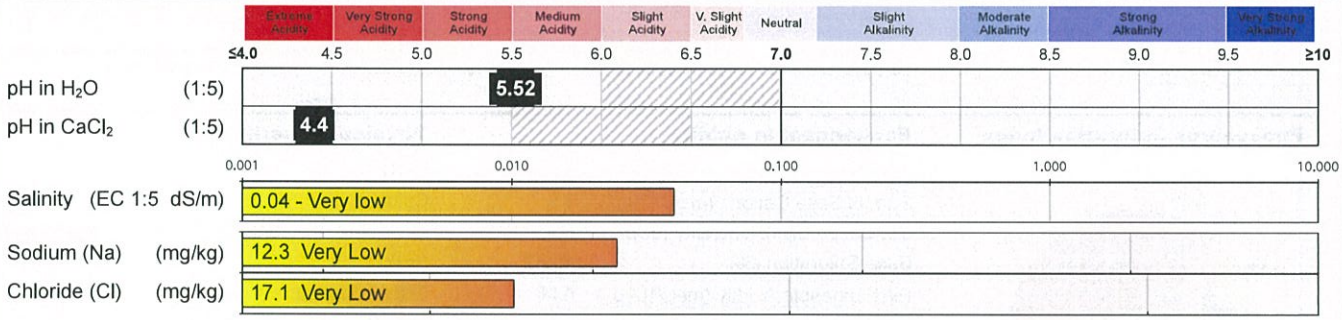
RECOMMENDATIONS

Key Observations.
This soil is is extrememly acidic in CaCl2 and has desirably low salinity levels. The cation exchange is dominated by hydrogen which explains the acidity. The effective cation exchange capacity (eCEC) is low indicating poor nutrient retention and holding capacity. Nutrients are deficient to adequate and will need boosting. Organic matter = 6.93% (very high).

Amendment Strategy
We recommend raising the pH through an application of lime at 2 t/ha and dolomite at 1 t/ha. This will also increase calcium and magnesium levels. A multi-purpose NPK + traces fertiliser will improve nutrient levels.

SOIL SAMPLE DEPTH (mm): ◉ 100 ○ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

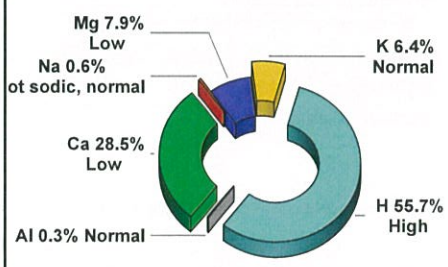
pH and ELECTRICAL CONDUCTIVITY



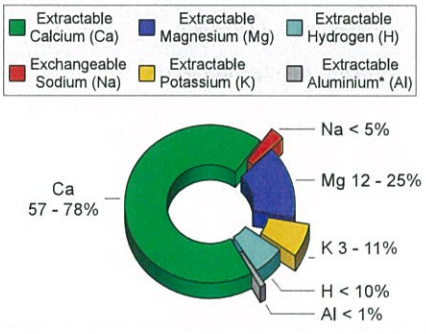
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in $CaCl_2$ ≤ 5.5
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**3.6**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**1.2**	2.6 – 5.0
Comment: Magnesium low		
K/(Ca+Mg)	**0.18**	< 0.07
Comment: High		
K:Na	**11.4**	N/A

Sodium Absorption Ratio: D.N.T.

EXCHANGEABLE CATIONS (meq/100g)

Na:	K:	Ca:	Mg:	H:	Al:
0.05	0.57	2.54	0.70	4.96	0.03

SOLUBLE CATIONS (meq/100g)

Na:	K:	Ca:	Mg:

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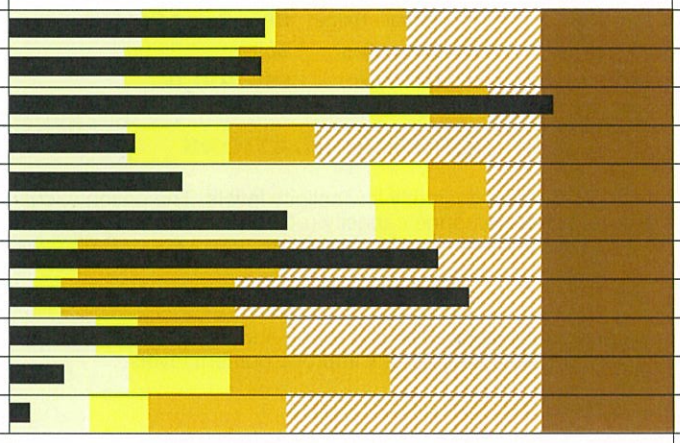
Nitrate-N (NO_3)	10.1		1.3	4	2.7
Phosphate-P (PO_4)	30.8		4.1	8.4	4.3
Potassium (K) †	225		29.9	29.3	Drawdown
Sulphate-S (SO_4)	16		2.1	9	6.9
Calcium (Ca) †	508		67.6	208.3	140.7
Magnesium (Mg) †	85		11.3	21.7	10.4
Iron (Fe)	445		59.2	73.4	14.2
Manganese (Mn) †	38		5.1	5.9	0.8
Zinc (Zn) †	2.2		0.3	0.7	0.4
Copper (Cu)	<0.64		0.1	0.8	0.7
Boron (B) †	<0.1		0	0.4	0.4



Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
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Adequate
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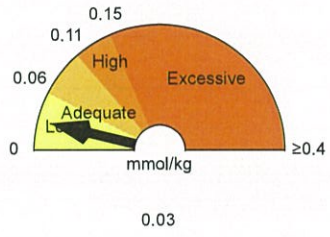
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



0.03

Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**7.2**
Sum of Base Cations (meq/100g^{-1}):	**3.9**
Eff. Cation Exch. Capacity (eCEC):	**8.9**
Base Saturation (%):	**43.82**
Exchangeable Acidity (meq/100g^{-1}):	**4.96**
Exchangeable Acidity (%):	**55.73**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**305**
– to neutralise Al (g/sqm):	**3**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm):	**0**

The CGAR is corrected for a soil depth of 100mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	-
Colour:	-
Estimated clay content:	**Did not test**
Size:	-
Gravel content:	-
Aggregate strength:	-
Structural unit:	**Did not test**
Potential infiltration rate:	**Did Not Test**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	-

Requires EC and Soil Texture result.

Organic Carbon (OC%)†: **3.15 – Very high**
Organic Matter (OM%): **6.93**
Additional comments:

Consultant: Chantal Milner

Authorised Signatory: Alisa Bryce

Date Report Generated 3/06/2016

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