



Western Enviro - Agricultural Laboratory Association
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December 2006 Round Robin Results - Soil Salinity by Saturated Paste

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WEALA Round Robin Report for December 2006
Soil Analysis - Salinity via Saturated Paste
SAMPLE 106

Analytical Parameter	Units	Reference Method	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Mean	Stddev	CV(%)	95% Conf.		99% Conf.	
			1	3	4	6	7	8	9	10	11	12	13	14				-2xStd	+2xStd	-3xStd	+3xStd
			106	106	106	106	106	106	106	106	106	106	106	106				106			
pH (sat. paste)		McKeague 4.13	7.4	7.0	7.14	7.10	7.20	7.64	7.24	7.39	7.20	7.64	7.44		7.3	0.2	2.9	6.9	7.7	6.7	7.9
Conductivity (sat. paste)	mS/cm	McKeague 4.13	19.70	24.70		23.4	20.5	27.8	32.2	19.80	27.6	26.5	27.8		25.0	4.1	16.6	16.7	33.3	12.6	37.4
Calcium	mg/L (ppm)	McKeague 3.21	1890.0	1719.4		1890	2060	3800	7326.0	1750	2120		1661		2111.3	700.9	33.2	709.4	3513.2	8.5	4214.1
Magnesium	mg/L (ppm)	McKeague 3.21	226.0	176.3		195.0	217.0	449.0	384.0	202	236.0		186.6		227.9	66.2	29.1	95.5	360.3	29.2	426.5
Potassium	mg/L (ppm)	McKeague 3.21	39.0	64.5		24	32	62	176.0	27	29		30.96		38.5	15.8	41.1	6.9	70.2	-9.0	86.1
Sodium	mg/L (ppm)	McKeague 3.21	4310.0	5517.6		3980	4560	9700.0	3248	4120	4920		4049		4338.1	679.0	15.7	2980.0	5696.1	2301.0	6375.1
Bicarbonate	mg/L (ppm)	McKeague 3.21	162.0	353.9		226	-	-	-	440			270		290.4	108.9	37.5	72.5	508.2	-36.4	617.2
Chloride	mg/L (ppm)	McKeague 3.21	4960.0	5069.8		4790	5230	62.6	-	5100	6860		5202		5316.0	697.0	13.1	3921.9	6710.0	3224.9	7407.0
Nitrate	mg/L (ppm)	McKeague 3.21	111.0	108.6		125	-	154	63.70	105	144		654.7		115.9	29.6	25.5	56.8	175.0	27.2	204.6
Sulphate	mg/L (ppm)	McKeague 3.21	2310.0	5811.7		6070	6670	5640	-	6040	6870		5632		5630.5	1416.1	25.1	2798.4	8462.6	1382.3	9878.6
Calcium	meq/L	McKeague 3.21	94.6	85.8		94.2	102.6	189.62	365.6	87.3	105.8		82.89		105.4	35.0	33.2	35.4	175.3	0.4	210.3
Magnesium	meq/L	McKeague 3.21	18.7	14.5		16.0	17.8	36.94	31.6	16.6	19.4		15.4		20.8	7.9	38.1	4.9	36.6	-3.0	44.5
Potassium	meq/L	McKeague 3.21	1.0	1.7		0.6	0.8	1.6	4.5	0.69	0.7		0.79		1.0	0.4	41.3	0.2	1.8	-0.2	2.2
Sodium	meq/L	McKeague 3.21	187.0	240.0		173.1	198.3	421.9	141.3	179.2	214.0		176.13		188.6	29.5	15.7	129.6	247.7	100.0	277.2
Bicarbonate	meq/L	McKeague 3.21	2.7	5.8		3.7	-	-	-	7.21			4.43		4.8	1.8	37.5	1.2	8.3	-0.6	10.1
Chloride	meq/L	McKeague 3.21	140.0	143.0		135.0	147.4	312.4	-	143.85	193.5		146.74		149.9	19.7	13.1	110.6	189.3	90.9	208.9
Nitrate	meq/L	McKeague 3.21	8.0	7.8		8.9	-	7.68	4.55	7.5	10.3		10.56		8.1	1.9	23.1	4.4	11.9	2.5	13.8
Sulphate	meq/L	McKeague 3.21	144.0	121.00		126.4	138.8	281.4	-	125.75	143.0		117.26		130.9	10.9	8.3	109.1	152.7	98.2	163.6
Sodium Adsorption Ratio		McKeague 3.26	24.9	33.9		23	25.6	39.6	-	24.9	27.04818		25.13		26.4	3.5	13.2	19.4	33.4	15.9	36.9
Saturation	%	McKeague 3.21	50.0	45.5		45.4	45.2	30.1	-	45.2	53.8	39.0			46.8	4.5	9.6	37.8	55.8	33.3	60.3
CEC (Cation Exchange Capacity)	cmol/kg		26.3	33.0		0.4	-	-	22.8	51.0					26.2	32.9	26.6	16.4	61.5	-6.1	59.4
Calcium (Exchangeable)	cmol/kg		39.4	41.6		662.0	-	-	-	-					33.1	35.3	38.0	4.4	11.6	29.3	46.8
Magnesium (Exchangeable)	cmol/kg		3.07	3.28		15.6	-	-	-	-					2.59	3.02	3.0	0.4	11.9	2.3	3.7
Sodium (Exchangeable)	cmol/kg		14.10	13.00		195.0	-	-	-	-					11.14	13.5	12.7	1.5	11.7	9.8	15.7
Potassium (Exchangeable)	cmol/kg		0.50	0.56		15.1	-	-	-	-					0.39	0.49	0.5	0.1	17.8	0.3	0.7
TEXTURE: Sand	%		52.0	46		45	53	54	53	45		53	49		50.0	3.7	7.4	42.6	57.4	38.9	61.1
Silt	%		28.4	31		36	27	26	25	40		14	22		27.8	7.6	27.3	12.6	42.9	5.1	50.5
Clay	%		19.6	23		19	20	20	22	15		33	29		22.3	5.6	25.0	11.1	33.4	5.6	39.0
CEC by Summation of Cations	cmol/kg												47								

47 = Outlier @ 5% critical value (Grubs Test) - Not included in Statistical analysis

WEALA Round Robin Report for December 2006
Soil Analysis - Salinity via Saturated Paste

SAMPLE 106 - Statistical Outlier Data

Analytical Parameter	If Calculated T > T from Table - Data point outlier				T Values from Table		
	Calculated T value				n= (#data points - 1)		
	Min	Max	T _{min}	T _{max}	5%	1%	# Data Points
pH (sat. paste)	7.0	7.6	1.390	1.582	2.18	2.41	11
Conductivity (sat. paste)	19.7	32.2	1.279	1.737	2.11	2.32	10
Calcium	1661.0	7326.0	0.554	2.495	2.03	2.22	9
Magnesium	176.3	449.0	0.791	2.042	2.03	2.22	9
Potassium	24.0	176.0	0.619	2.537	2.03	2.22	9
Sodium	3248.0	9700.0	0.889	2.513	2.03	2.22	9
Bicarbonate	162.0	440.0	1.179	1.374	1.46	1.49	5
Chloride	62.6	6860.0	2.338	1.119	1.94	2.10	8
Nitrate	63.7	654.7	0.621	2.450	1.94	2.10	8
Sulphate	2310.0	6870.0	2.345	0.875	1.94	2.10	8
Calcium	82.9	365.6	0.554	2.495	2.03	2.22	9
Magnesium	14.5	36.9	0.793	2.042	2.03	2.22	9
Potassium	0.6	4.5	0.629	2.537	2.03	2.22	9
Sodium	141.3	421.9	0.888	2.513	2.03	2.22	9
Bicarbonate	2.7	7.2	1.177	1.374	1.46	1.49	5
Chloride	135.0	312.4	0.585	2.359	1.94	2.10	8
Nitrate	4.6	10.6	1.914	1.283	1.94	2.10	8
Sulphate	117.3	281.4	0.599	2.432	1.94	2.10	8
Sodium Adsorption Ratio	23.3	39.6	0.836	2.035	1.94	2.10	8
Saturation	30.1	53.8	2.127	1.267	2.03	2.22	9
CEC (Cation Exchange Capacity)	0.4	51.0	1.604	1.490	1.67	1.75	6
Calcium (Exchangeable)	33.1	662.0	0.516	1.500	1.15	1.15	4
Magnesium (Exchangeable)	2.6	15.6	0.561	1.498	1.15	1.15	4
Sodium (Exchangeable)	11.1	195.0	0.518	1.500	1.15	1.15	4
Potassium (Exchangeable)	0.4	15.1	0.513	1.500	1.15	1.15	4
TEXTURE: Sand	45.0	54.0	1.344	1.086	2.03	2.22	9
Silt	14.0	40.0	1.818	1.618	2.03	2.22	9
Clay	15.0	33.3	1.305	1.982	2.03	2.22	9

min, max values from before outliers removed

[Blue shaded cell] = Outlier @ 5% critical value - Not included in Statistical analysis

Calculated T = $|X_{\text{mean}} - X_i| / s$

where X_i = suspect outlier, s = Standard Deviation

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SAMPLE 106

Analytical Parameter	Units	Reference Method	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Mean	Stddev	CV(%)	95% Conf.		99% Conf.		
			1	3	4	6	7	8	9	10	11	12	13	14				-2xStd	+2xStd	-3xStd	+3xStd	
			106	106	106	106	106	106	106	106	106	106	106	106				106				
pH (sat. paste)		McKeague 4.13	7.4	7.0	7.14	7.10	7.20	7.64	7.24	7.39	7.20	7.64	7.44		7.3	0.2	2.9	6.9	7.7	6.7	7.9	
Conductivity (sat. paste)	mS/cm	McKeague 4.13	19.70	24.70		23.4	20.5	27.8	32.2	19.80	27.6	26.5	27.8		25.0	4.1	16.6	16.7	33.3	12.6	37.4	
Calcium	mg/L (ppm)	McKeague 3.21	1890.0	1719.4		1890	2060	3800	7326.0	1750	2120		1661		2690.7	1857.8	69.0	-1024.8	6406.3	-2882.6	8264.1	
Magnesium	mg/L (ppm)	McKeague 3.21	226.0	176.3		195.0	217.0	449.0	384.0	202	236.0		186.6		252.4	96.3	38.1	59.9	445.0	-36.4	541.3	
Potassium	mg/L (ppm)	McKeague 3.21	39.0	64.5		24	32	62	176.0	27	29		30.96		53.8	48.2	89.5	-42.5	150.1	-90.6	198.3	
Sodium	mg/L (ppm)	McKeague 3.21	4310.0	5517.6		3980	4560	9700.0	3248	4120	4920		4049		4933.8	1896.8	38.4	1140.2	8727.5	-756.6	10624.3	
Bicarbonate	mg/L (ppm)	McKeague 3.21	162.0	353.9		226	-	-	-	440			270		290.4	108.9	37.5	72.5	508.2	-36.4	617.2	
Chloride	mg/L (ppm)	McKeague 3.21	4960.0	5069.8		4790	5230	62.6	-	5100	6860		5202		4659.3	1966.3	42.2	726.8	8591.8	-1239.5	10558.1	
Nitrate	mg/L (ppm)	McKeague 3.21	111.0	108.6		125	-	154	63.70	105	144		654.7		183.3	192.4	105.0	-201.6	568.2	-394.1	760.6	
Sulphate	mg/L (ppm)	McKeague 3.21	2310.0	5811.7		6070	6670	5640	-	6040	6870		5632		5630.5	1416.1	25.1	2798.4	8462.6	1382.3	9878.6	
Calcium	meq/L	McKeague 3.21	94.6	85.8		94.2	102.6	189.62	365.6	87.3	105.8		82.89		134.3	92.7	69.0	-51.1	319.7	-143.8	412.4	
Magnesium	meq/L	McKeague 3.21	18.7	14.5		16.0	17.8	36.94	31.6	16.6	19.4		15.4		20.8	7.9	38.1	4.9	36.6	-3.0	44.5	
Potassium	meq/L	McKeague 3.21	1.0	1.7		0.6	0.8	1.6	4.5	0.69	0.7		0.79		1.4	1.2	89.6	-1.1	3.8	-2.3	5.1	
Sodium	meq/L	McKeague 3.21	187.0	240.0		173.1	198.3	421.9	141.3	179.2	214.0		176.13		214.5	82.5	38.5	49.5	379.6	-33.0	462.1	
Bicarbonate	meq/L	McKeague 3.21	2.7	5.8		3.7	-	-	-	7.21			4.43		4.8	1.8	37.5	1.2	8.3	-0.6	10.1	
Chloride	meq/L	McKeague 3.21	140.0	143.0		135.0	147.4	312.4	-	143.85	193.5		146.74		170.2	60.3	35.4	49.7	290.7	-10.5	351.0	
Nitrate	meq/L	McKeague 3.21	8.0	7.8		8.9	-	7.68	4.55	7.5	10.3		10.56		8.1	1.9	23.1	4.4	11.9	2.5	13.8	
Sulphate	meq/L	McKeague 3.21	144.0	121.00		126.4	138.8	281.4	-	125.75	143.0		117.26		149.7	54.2	36.2	41.4	258.1	-12.8	312.2	
Sodium Adsorption Ratio		McKeague 3.26	24.9	33.9		23	25.6	39.6	-	24.9	27.04818		25.13		28.0	5.7	20.2	16.7	39.4	11.0	45.1	
Saturation	%	McKeague 3.21	50.0	45.5		45.4	45.2	30.1	-	45.2	53.8	39.0		50.4		45.0	7.0	15.5	31.0	58.9	24.0	65.9
CEC (Cation Exchange Capacity)	cmol/kg		26.3	33.0		0.4	-	-	22.8	51.0				26.2	32.9	26.6	16.4	61.5	-6.1	59.4	-22.5	75.7
Calcium (Exchangeable)	cmol/kg		39.4	41.6		662.0	-	-	-	-				33.1	35.3	194.0	312.0	160.8	-430.0	818.0	-742.0	1130.0
Magnesium (Exchangeable)	cmol/kg		3.07	3.28		15.6	-	-	-	-				2.59	3.02	6.1	6.3	103.0	-6.5	18.8	-12.8	25.1
Sodium (Exchangeable)	cmol/kg		14.10	13.00		195.0	-	-	-	-				11.14	13.5	58.3	91.1	156.3	-124.0	240.6	-215.1	331.7
Potassium (Exchangeable)	cmol/kg		0.50	0.56		15.1	-	-	-	-				0.39	0.49	4.1	7.3	176.6	-10.5	18.8	-17.8	26.1
TEXTURE: Sand	%		52.0	46		45	53	54	53	45		53	49		50.0	3.7	7.4	42.6	57.4	38.9	61.1	
Silt	%		28.4	31		36	27	26	25	40		14	22		27.8	7.6	27.3	12.6	42.9	5.1	50.5	
Clay	%		19.6	23		19	20	20	22	15		33	29		22.3	5.6	25.0	11.1	33.4	5.6	39.0	
CEC by Summation of Cations	cmol/kg												47									

47 = Outlier @ 5% critical value (Grubs Test) - Not included in Statistical analysis

WEALA Round Robin Report for December 2006
Soil Analysis - Salinity via Saturated Paste
SAMPLE 206

Analytical Parameter	Units	Reference Method	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Mean	Stddev	CV(%)	95% Conf.		99% Conf.	
			1	3	4	6	7	8	9	10	11	12	13	14				-2xStd	+2xStd	-3xStd	+3xStd
			206	206	206	206	206	206	206	206	206	206	206	206				206			
pH (sat. paste)		McKeague 4.13	7.20	7.08	6.96	7.30	7.20	7.72	7.25	7.21	7.30	7.35	7.38		7.3	0.2	2.6	6.9	7.7	6.7	7.8
Conductivity (sat. paste)	mS/cm	McKeague 4.13	5.80	5.94		6.3	5.13	4.27	6.42	4.83	6	6.9	7.3		5.9	0.9	15.8	4.0	7.8	3.1	8.7
Calcium	mg/L (ppm)	McKeague 3.21	604.0	571.1		578	583	501	5625.0	618	599		550.9		575.6	36.7	6.4	502.3	648.9	465.7	685.6
Magnesium	mg/L (ppm)	McKeague 3.21	333.0	279.6		278.0	290.0	242.0	848.0	291	283.0		251.9		281.1	27.4	9.8	226.2	335.9	198.8	363.3
Potassium	mg/L (ppm)	McKeague 3.21	34.0	50.4		28	33	30	138.0	37	33		33.4		34.8	6.9	19.8	21.0	48.6	14.1	55.5
Sodium	mg/L (ppm)	McKeague 3.21	596.0	588.5		534	556	452	383	534	554		487.8		520.6	68.7	13.2	383.2	658.0	314.5	726.7
Bicarbonate	mg/L (ppm)	McKeague 3.21	136.0	299.0		217	-	-	-	153			165		167.8	34.9	20.8	97.9	237.6	63.0	272.5
Chloride	mg/L (ppm)	McKeague 3.21	682.0	570.8		706	700	457		484	696		562.6		607.3	102.1	16.8	403.2	811.4	301.1	913.5
Nitrate	mg/L (ppm)	McKeague 3.21	<5	0.4		7.6	-	13.82	5.80	8.5	14.5		56.7		8.4	5.2	62.2	-2.1	18.9	-7.3	24.2
Sulphate	mg/L (ppm)	McKeague 3.21	926.0	2603.3		2470	2420	2177		2750	2570		2509		2499.9	177.8	7.1	2144.2	2855.6	1966.4	3033.4
Calcium	meq/L	McKeague 3.21	30.2	28.5		28.8	29.1	25.00	280.7	30.8	29.9		27.49		28.7	1.8	6.4	25.1	32.4	23.2	34.2
Magnesium	meq/L	McKeague 3.21	27.5	23.0		22.8	23.8	19.91	69.8	23.9	23.3		20.7		23.1	2.3	9.9	18.5	27.7	16.3	30.0
Potassium	meq/L	McKeague 3.21	0.9	1.3		0.7	0.8	0.8	3.5	0.95	0.8		0.85		0.9	0.2	20.1	0.5	1.2	0.4	1.4
Sodium	meq/L	McKeague 3.21	25.9	25.6		23.2	24.2	19.7	16.7	23.2	24.1		21.22		22.6	3.0	13.2	16.7	28.6	13.7	31.6
Bicarbonate	meq/L	McKeague 3.21	2.2	4.9		3.6	-	-	-	2.51			2.7		2.8	0.6	21.5	1.6	3.9	1.0	4.5
Chloride	meq/L	McKeague 3.21	19.2	16.1		19.9	19.7	11.69		13.65	19.6		15.7		16.9	3.2	18.6	10.6	23.2	7.5	26.4
Nitrate	meq/L	McKeague 3.21	<0.4	0.03		0.5		0.35	0.41	0.6	1.0		0.91		0.5	0.3	62.2	-0.1	1.2	-0.5	1.6
Sulphate	meq/L	McKeague 3.21	57.9	54.20		51.5	50.3	55.68		57.25	53.5		52.24		54.1	2.7	5.0	48.6	59.5	45.9	62.2
Sodium Adsorption Ratio		McKeague 3.26	4.80	5.04		4.60	4.70	4.15		4.40	4.67		4.32		4.6	0.3	6.2	4.0	5.2	3.7	5.4
Saturation	%	McKeague 3.21	40.0	42.7		37.4	38.9	31.1	42.5	46.2	38.0		45.7		40.3	4.7	11.6	30.9	49.6	26.2	54.3
CEC (Cation Exchange Capacity)	cmol/kg		13.2	13.9		0.2	-	-	11.5	18.0			15.4	19.1	14.4	2.4	17.0	9.5	19.3	7.0	21.7
Calcium (Exchangeable)	cmol/kg		24.3	27.0		222.0	-	-					17.3	23.1	22.9	5.0	21.8	12.9	32.9	7.9	37.9
Magnesium (Exchangeable)	cmol/kg		5.71	6.92		22.4	-	-					4.84	6.58	5.8	1.0	17.9	3.7	7.9	2.7	9.0
Sodium (Exchangeable)	cmol/kg		1.64	1.59		17.4	-	-					1.33	1.50	1.5	0.2	10.9	1.2	1.9	1.0	2.0
Potassium (Exchangeable)	cmol/kg		0.40	0.39		9.4	-	-					0.33	0.35	0.4	0.04	10.1	0.3	0.4	0.3	0.5
TEXTURE: Sand	%		48.0	44		43	45	46	50	44			42	46	45.5	2.4	5.3	40.6	50.3	38.2	52.7
Silt	%		29.0	33		30	33	32	26	37			24	29	30.3	3.9	12.8	22.6	38.1	18.7	42.0
Clay	%		23.0	23		27	22	22	24	19			33	25	24.2	4.0	16.6	16.2	32.3	12.1	36.3
CEC by Summation of Cations	cmol/kg												24								

24 = Outlier @ 5% critical value (Grubs Test) - Not included in Statistical analysis

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SAMPLE 206 - Statistical Outlier Data

Analytical Parameter	If Calculated T > T from Table - Data point outlier				T Values from Table		
	Calculated T value				n=8		
	Min	Max	T _{min}	T _{max}	5%	1%	
pH (sat. paste)	7.0	7.7	1.605	2.353	2.18	2.41	11
Conductivity (sat. paste)	4.3	7.3	1.738	1.515	2.11	2.32	10
Calcium	5.0	5625.0	0.628	2.650	2.03	2.22	9
Magnesium	24.2	848.0	1.361	2.431	2.03	2.22	9
Potassium	28.0	138.0	0.522	2.621	2.03	2.22	9
Sodium	383.0	596.0	2.003	1.098	2.03	2.22	9
Bicarbonate	136.0	299.0	0.878	1.590	1.46	1.49	5
Chloride	457.0	706.0	1.473	0.967	1.94	2.10	8
Nitrate	0.4	56.7	0.791	2.194	1.94	2.10	7
Sulphate	926.0	2750.0	2.373	0.770	1.94	2.10	8
Calcium	25.0	280.7	0.378	2.666	2.03	2.22	9
Magnesium	19.9	69.8	0.535	2.642	2.03	2.22	9
Potassium	0.7	3.5	0.538	2.620	2.03	2.22	9
Sodium	16.7	25.9	2.004	1.094	2.03	2.22	9
Bicarbonate	2.2	4.9	0.881	1.577	1.46	1.49	5
Chloride	11.7	19.9	1.670	0.937	1.94	2.10	8
Nitrate	0.0	1.0	1.521	1.423	1.94	2.10	7
Sulphate	50.3	57.9	1.381	1.407	1.94	2.10	8
Sodium Adsorption Ratio	4.2	5.0	1.528	1.595	1.94	2.10	8
Saturation	31.1	46.2	1.963	1.266	2.03	2.22	9
EC (Cation Exchange Capacity)	0.2	18.0	1.910	0.963	1.67	1.75	6
Calcium (Exchangeable)	17.3	222.0	0.555	1.499	1.15	1.15	4
Magnesium (Exchangeable)	4.8	22.4	0.615	1.492	1.15	1.15	4
Sodium (Exchangeable)	1.3	17.4	0.524	1.500	1.15	1.15	4
Potassium (Exchangeable)	0.3	9.4	0.510	1.500	1.15	1.15	4
TEXTURE: Sand	42.4	50.0	1.264	1.880	2.03	2.22	9
Silt	24.4	37.0	1.527	1.721	2.03	2.22	9
Clay	19.0	33.3	1.297	2.255	2.03	2.22	9

min, max values from before outliers removed

Outlier @ 5% critical value - Not included in Statistical analysis

$$\text{Calculated } T = |X_{\text{mean}} - X_i|/s$$

where X_i = suspect outlier, s = Standard Deviation

WEALA Round Robin Report for December 2006
Soil Analysis - Salinity via Saturated Paste
SAMPLE 206

Analytical Parameter	Units	Reference Method	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Lab I.D.	Mean	Stddev	CV(%)	95% Conf.		99% Conf.	
			1	3	4	6	7	8	9	10	11	12	13	14				-2xStd	+2xStd	-3xStd	+3xStd
			206	206	206	206	206	206	206	206	206	206	206	206				206			
pH (sat. paste)		McKeague 4.13	7.20	7.08	6.96	7.30	7.20	7.72	7.25	7.21	7.30	7.35	7.38		7.3	0.2	2.6	6.9	7.7	6.7	7.8
Conductivity (sat. paste)	mS/cm	McKeague 4.13	5.80	5.94		6.3	5.13	4.27	6.42	4.83	6	6.9	7.3		5.9	0.9	15.8	4.0	7.8	3.1	8.7
Calcium	mg/L (ppm)	McKeague 3.21	604.0	571.1		578	583	501	5625.0	618	599		550.9		1136.7	1683.5	148.1	-2230.3	4503.6	-3913.7	6187.1
Magnesium	mg/L (ppm)	McKeague 3.21	333.0	279.6		278.0	290.0	242.0	848.0	291	283.0		251.9		344.1	190.7	55.4	-37.4	725.5	-228.1	916.2
Potassium	mg/L (ppm)	McKeague 3.21	34.0	50.4		28	33	30	138.0	37	33		33.4		46.3	35.0	75.6	-23.7	116.3	-58.7	151.3
Sodium	mg/L (ppm)	McKeague 3.21	596.0	588.5		534	556	452	383	534	554		487.8		520.6	68.7	13.2	383.2	658.0	314.5	726.7
Bicarbonate	mg/L (ppm)	McKeague 3.21	136.0	299.0		217	-	-	-	153			165		194.0	66.0	34.0	61.9	326.0	-4.1	392.1
Chloride	mg/L (ppm)	McKeague 3.21	682.0	570.8		706	700	457		484	696		562.6		607.3	102.1	16.8	403.2	811.4	301.1	913.5
Nitrate	mg/L (ppm)	McKeague 3.21	<5	0.4		7.6	-	13.82	5.80	8.5	14.5		56.7		15.3	18.9	123.0	-22.4	53.1	-41.3	71.9
Sulphate	mg/L (ppm)	McKeague 3.21	926.0	2603.3		2470	2420	2177		2750	2570		2509		2303.2	580.3	25.2	1142.5	3463.8	562.2	4044.1
Calcium	meq/L	McKeague 3.21	30.2	28.5		28.8	29.1	25.00	280.7	30.8	29.9		27.49		56.7	84.0	148.1	-111.3	224.7	-195.3	308.7
Magnesium	meq/L	McKeague 3.21	27.5	23.0		22.8	23.8	19.91	69.8	23.9	23.3		20.7		28.3	15.7	55.4	-3.1	59.7	-18.8	75.4
Potassium	meq/L	McKeague 3.21	0.9	1.3		0.7	0.8	0.8	3.5	0.95	0.8		0.85		1.2	0.9	75.8	-0.6	3.0	-1.5	3.9
Sodium	meq/L	McKeague 3.21	25.9	25.6		23.2	24.2	19.7	16.7	23.2	24.1		21.22		22.6	3.0	13.2	16.7	28.6	13.7	31.6
Bicarbonate	meq/L	McKeague 3.21	2.2	4.9		3.6	-	-	-	2.51			2.7		3.2	1.1	34.1	1.0	5.4	-0.1	6.4
Chloride	meq/L	McKeague 3.21	19.2	16.1		19.9	19.7	11.69		13.65	19.6		15.7		16.9	3.2	18.6	10.6	23.2	7.5	26.4
Nitrate	meq/L	McKeague 3.21	<0.4	0.0		0.5		0.35	0.41	0.6	1.0		0.91		0.5	0.3	62.2	-0.1	1.2	-0.5	1.6
Sulphate	meq/L	McKeague 3.21	57.9	54.20		51.5	50.3	55.68		57.25	53.5		52.24		54.1	2.7	5.0	48.6	59.5	45.9	62.2
Sodium Adsorption Ratio		McKeague 3.26	4.80	5.04		4.60	4.70	4.15		4.40	4.67		4.32		4.6	0.3	6.2	4.0	5.2	3.7	5.4
Saturation	%	McKeague 3.21	40.0	42.7		37.4	38.9	31.1	42.5	46.2	38.0		45.7		40.3	4.7	11.6	30.9	49.6	26.2	54.3
CEC (Cation Exchange Capacity)	cmol/kg		13.2	13.9		0.2	-	-	11.5	18.0			15.4	19.1	12.0	6.2	51.7	-0.4	24.4	-6.6	30.6
Calcium (Exchangeable)	cmol/kg		24.3	27.0		222.0	-	-					17.3	23.1	72.7	99.6	137.2	-126.6	271.9	-226.3	371.6
Magnesium (Exchangeable)	cmol/kg		5.71	6.92		22.4	-	-					4.84	6.58	10.0	8.3	83.6	-6.7	26.6	-15.0	35.0
Sodium (Exchangeable)	cmol/kg		1.64	1.59		17.4	-	-					1.33	1.50	5.5	7.9	144.6	-10.4	21.4	-18.3	29.3
Potassium (Exchangeable)	cmol/kg		0.40	0.39		9.4	-	-					0.33	0.35	2.6	4.5	171.6	-6.4	11.6	-10.9	16.1
TEXTURE: Sand	%		48.0	44		43	45	46	50	44			42	46	45.5	2.4	5.3	40.6	50.3	38.2	52.7
Silt	%		29.0	33		30	33	32	26	37			24	29	30.3	3.9	12.8	22.6	38.1	18.7	42.0
Clay	%		23.0	23		27	22	22	24	19			33	25	24.2	4.0	16.6	16.2	32.3	12.1	36.3
CEC by Summation of Cations	cmol/kg												24								

24 = Outlier @ 5% critical value (Grubs Test) - Not included in Statistical analysis

WEALA Fall 2006 Round Robin Methodology Questionnaire Summary - Saturated Paste Extraction

It was decided at the November WEALA meeting that participating labs would voluntarily include information about procedures in order to better qualify the data and any abnormalities in the data and possibly identify any trends which may be method related.

The data and information provided will remain anonymous

Saturated Paste Procedure Information	Lab 1	Lab 3	Lab 4	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10	Lab 11	Lab 12	Lab 13	Lab 14
Method for recovering Sat Paste Extract:												
Filter by Vacuum	X			X	X		X	X	X			
Filter by Gravity												
Filter press used		X				X				X	X	
Other												
Sat Paste Extract: Duration												
The saturated paste was left for (hours):	6	16-20	1.5	18	16	3.15	4	4	2	4	5	
The saturated paste was filtered for (minutes):	30	5-10		15-20	4	10-12	60	10	60	5	5-10	
Filter medium												
pore size: (µm)	8	2.7		11	8	?	?	?	8	2-3	2.7	
speed or filter paper # (Whatman):	#40	#50equiv		#1	#40	#2	#42	#113	#40	EN8700	EN8700	
filter paper diameter: (cm)	7	7.5		9	7	9	9	?	9	7.5	7.5	
Sat Paste Extract: preservative												
A preservative was used for the extract after filtering	No	No		No**	No	No	?	Yes	No	No	No	
If Yes what was the preservative?								*				
CEC and Exchangeable Procedure Information												
Method Reference:	#1	#1		#2			?	#3			#3	#2
Extraction Solution used:	A	A					C	D			E	C
Method of analysis of Exch Cations:	?	ICP-OES		?			ICP				ICP-OES	ICP-OES
Method of analysis for CEC (NH3)	?	ISE		Colorimetric, Phenate			?	ICP/OES			Automated phenate	ISE

* - 0.1% sodium hexametaphosphate

** - 0.1 % (NaPO₃) added, not preservative

Method References: #1 - J.A. McKeague. Manual on Soil Sampling and Methods of Analysis, Canadian Society of Soil Science 1978. Method 3.32

#2 - Method Manual for Forest Soil and Plant Analysis, Y.P. Kalra and D.G. Maynard, Forestry Canada, Northern Forestry Centre, Edmonton, Alberta, 1991, Chapter 15

#3 - Carter, Martin R., Soil Sampling and Methods of Analysis, Canadian Society of Soil Science, 1993 - Method 19.2

Extraction Solutions: A - 1M Ammonium Acetate ; 1M Sodium Chloride and 85% Ethanol

B - 1.0 N NH₄OAc, alcohol Denatured (85% C₂H₆O, 15% CH₃OH) and 1.5 N NaCl

C - 1.0 M NH₄Cl

D - Barium Chloride

E - 1N ammonium acetate, pH 7

Footnotes: ? = Not Specified by Lab

ICP - Inductively Coupled Plasma

ISE = Ion Selective Electrode