Precision SoilTech Soil Monitoring Program

Avon River Basin regional soil acidity monitoring: Narembeen

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BUILDING BETTER SOILS

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Avon River Basin Regional Soil Acidity Monitoring: Narembeen

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Acknowledgements

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Contents

Executive Summary

Soil acidity is one of the most widespread and costly soil constraints to Western Australia's agricultural industry. When soil pH_{Ca} falls below 4.5, aluminium concentration rapidly increases to levels toxic to many crop species resulting in reduced plant growth and productivity. The Avon Catchment Council (ACC) has set soil pH_{Ca} targets of topsoil (0–10 cm) pH_{Ca} 5.5 over a shallow subsurface (10–30 cm) soil pH_{Ca} of 4.8 to ensure losses to agricultural production do not occur when soil pH_{Ca} profiles meet or exceed these targets.

Between February and March 2009, 452 sampling sites across 14 properties in the Narembeen area (Figure 1) were visited as part of an intensive soil acidity monitoring survey. A total of 1045 soil samples from 106 paddocks were collected from the 0–10 cm, 10–20 cm and 20–30 cm layers and soil pH (1:5 0.01M $CaCl_2$) analysis conducted to assess the extent and severity of soil acidity in relation to the ACC targets.

Of the sampling locations visited, 229 had previously been sampled in 1998 or 1999 and changes in soil pH_{Ca} was determined to have increased on average by 0.3 and 0.2 pH_{Ca} units in the 0–10 cm and 10–20 cm soil layers with no difference in the 20–30 cm layer. Soil pH_{Ca} in the 0–10 cm, 10–20 cm and 20–30 cm layers were most commonly found to be 4.8, 4.6 and 4.8 respectively. This confirms that there are widespread, severe acidic soils in the Narembeen region.

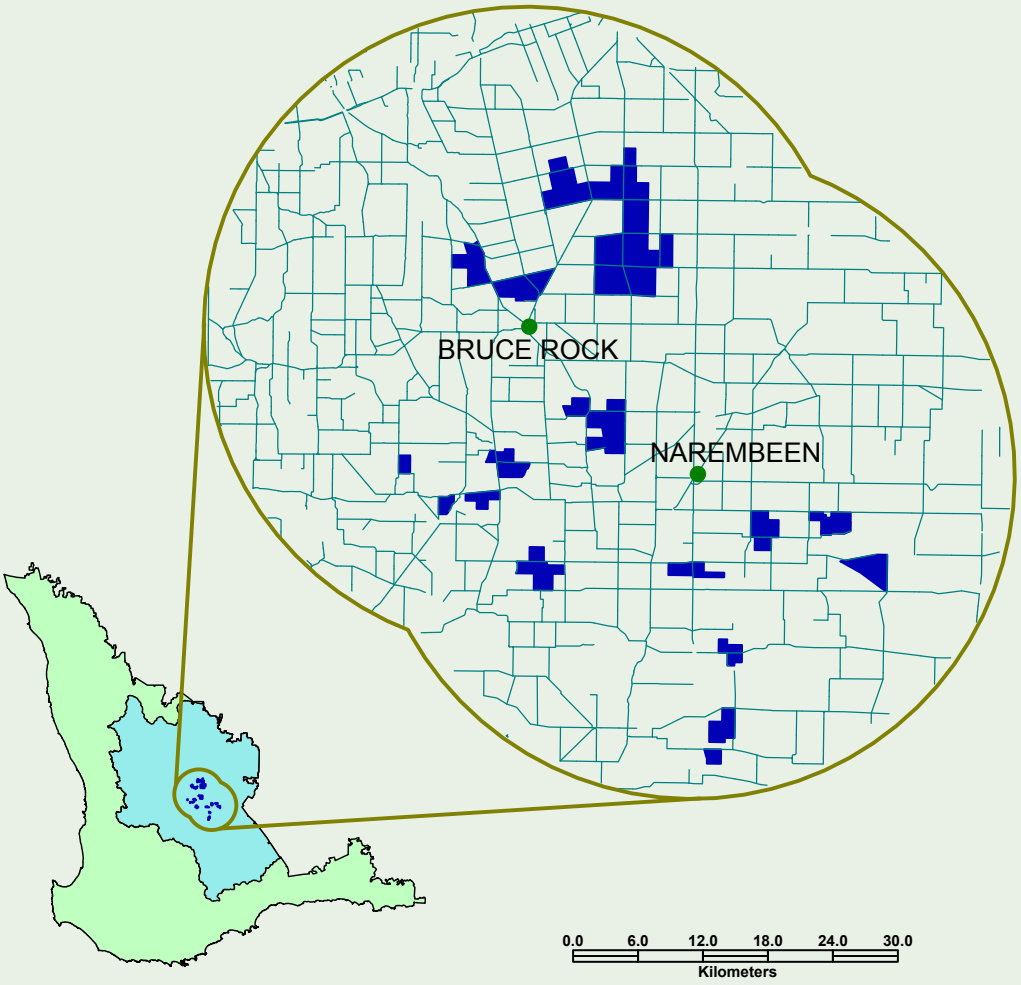


Figure 1: Location of agricultural area in the Avon River Basin (light blue) within the south west of Western Australia. The Narembeen soil acidity project conducted soil sampling within farms highlighted here in dark blue. A total of 1045 soil samples were collected from the 0–10 cm, 10–20 cm and 20–30 cm soil profile layers

Desktop assessment of Precision SoilTech data

Agricultural soil surrounding the central Wheatbelt town of Narembeen was highlighted as a 'soil acidity priority area' based on the outcomes of the soil acidity profile data which was collected as part of the Avon River Basin Soil Acidity Project Report (2009). These data indicated that the topsoil (0–10 cm) and shallow subsurface soil (10–30 cm) in the Bruce Rock and Narembeen shires are severely acidic and suggest that growers in this region are likely to suffer the greatest productivity losses due to acidity of all Avon River Basin (ARB) growers (Figure 1).

Analysis of a soil database held by Precision SoilTech was undertaken to examine a much larger number of soil pH_{Ca} (n >5000) samples collected in the Narembeen region prior to the ARB Soil Acidity Project. This analysis confirmed the findings of the Avon River Basin Soil Acidity Project Report (2009). Further investigation of this database highlighted the potential to examine current soil pH_{Ca} condition and to determine soil pH_{Ca} change over time by resampling historic sampling locations. Similar soil acidity studies undertaken in the Beacon, Wickepin and Gabby Quoi Quoi areas of the Avon River Basin have shown that soil pH_{Ca} is likely to increase with time though dependant on management practice.

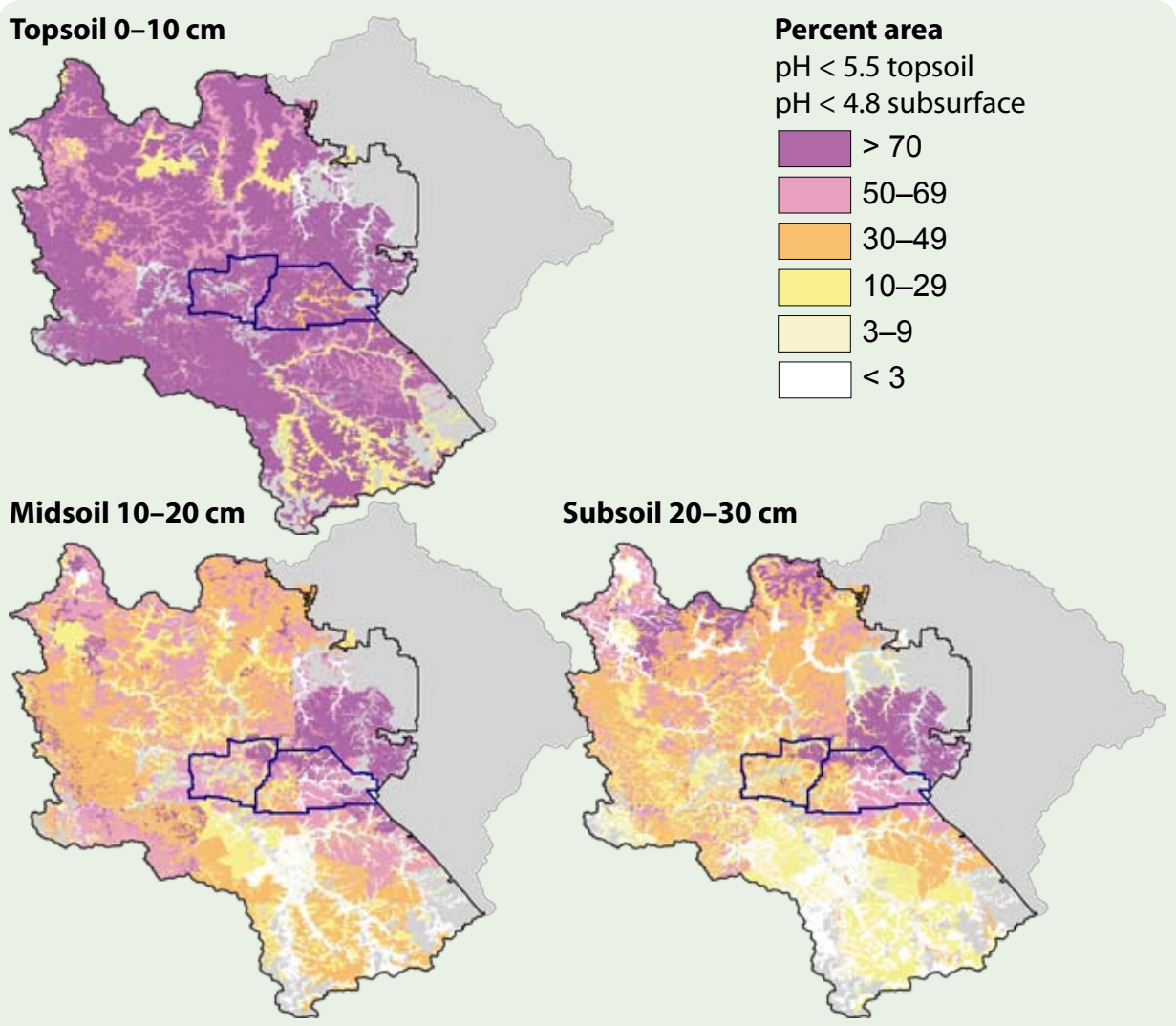


Figure 2: Soil pH_{Ca} distribution maps for the Avon River Basin. Coloured areas indicate percentage of samples within a given area less than pH_{Ca} 5.5 in the topsoil and less than pH_{Ca} 4.8 for the midsoil and subsoil. Blue border represents the shires of Bruce Rock (West) and Narembeen (East)

Database analysis and catchment selection

Analysis of the Precision SoilTech (PST) commercial sampling database provided the basis for this study which was conducted using Geomedia 6 (Intergraph). The database consists of geo-located sampling sites with soil pH_{Ca} attributes collected by Precision SoilTech between 1998 and 2009. Spatial and attribute analysis of this database provided historic sampling locations with associated soil pH_{Ca} data to which current soil pH_{Ca} were compared to determine soil pH_{Ca} change. Only sites which contained topsoil (0–10 cm) and shallow subsurface (10–20 cm) pH_{Ca} data and had been initially sampled in 1998 or 1999 were included in this analysis.

A total of 229 sampling locations were selected from the Narembeen and Bruce Rock shires which had 0–10 cm and 10–20 cm samples collected in either 1998 or 1999 by Precision SoilTech. These samples were located across seven individual grower's properties covering approximately 36,000 ha and represented the dominant soil types of the area. These samples were labelled the 'resample group'. Each soil sampling location was analysed to determine soil type and soil landscape position using Department of Agriculture and Food Western Australia radiometric imagery and Digital Elevation Models (DEMs).

A further 223 sampling locations were selected to match the soil type and landscape position of the 'resample group' and were labelled the 'control group'. Farms adjacent to the 'resample group' growers were analysed to determine if a similar soil type existed on the property using radiometric imagery and DEMs (Figure 3). If a suitable soil type was present, the property owner was formally approached and asked to participate in the project. Seven growers were contacted and all agreed to participate. Aerial photography was then blended with the radiometric imagery to determine appropriate sampling locations within the identified paddocks.

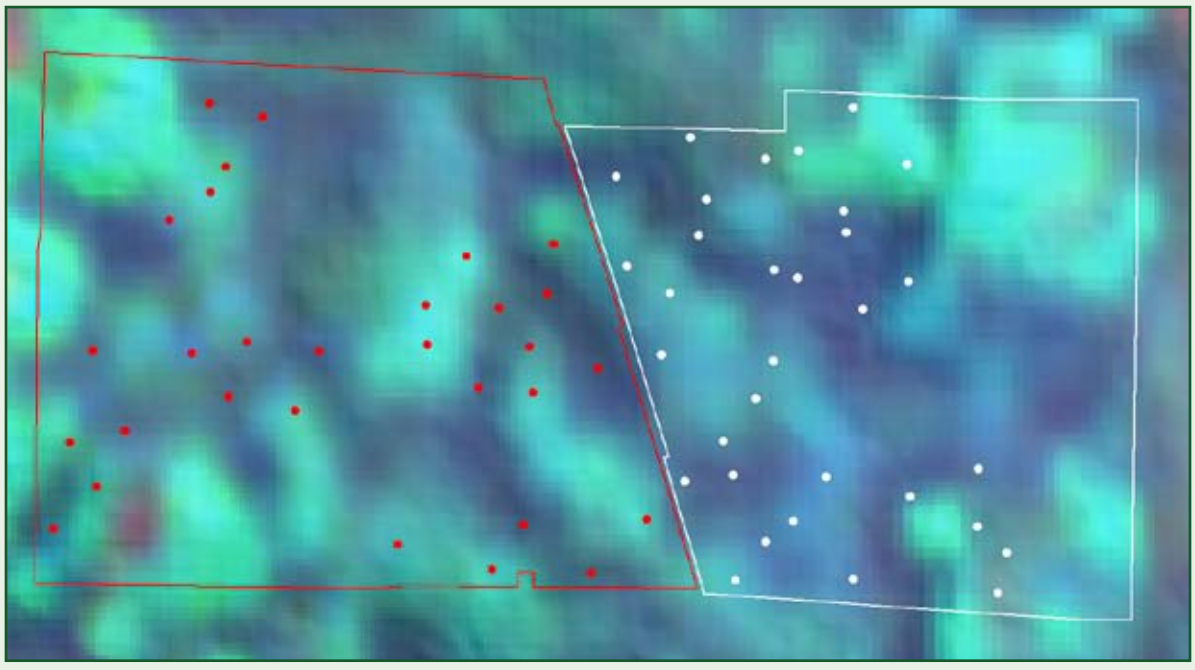


Figure 3: Example of sampling locations from the ARB soil acidity project near Narembeen. White dots on the right represent a grower from the 'Resample' group project over DAFWA Radiometric/DEM imagery. The red dots on the left show a previously non-sampled grower (Control) whose sampling locations have been selected to match soil properties and landscape position of the 'Resample' group grower determined by the colour and slope of the image.

Creation of spatial datasets for sampling

Two sampling datasets were created to undertake the soil sampling of the 'resample' and 'control' groups. As the GPS location of sites in the 'resample group' were previously recorded at initial sampling, Geomedia 6 was used to filter the paddock name, sampling site number and GPS location of the selected sampling locations which were then converted into a sampling file format.

The geolocations of the 'control group' sites were analysed using Geomedia 6 to provide latitude and longitude. Paddock name and site number were inputted manually to develop a 'control group' sampling database. Once this database had been constructed, a similar process was followed to that of the 'control group' to convert into a compatible sampling file format and a sampling job list.

These sites provided a means for soil pH_{Ca} comparison between growers who had previous soil pH_{Ca} data ('resample group'—Precision SoilTech pH_{Ca} report and liming recommendation from initial sampling, refer to Appendix 1) and those who were assumed to not have soil pH_{Ca} information ('Control group').

Soil sample collection and analysis

All growers were contacted in early December and sampling dates were arranged. Soil samples were collected by Precision SoilTech between 19th February and the 17th March 2009. A total of 1045 samples were collected with each sample given a unique barcode which was used to identify the sample throughout the process. The same sampling machinery and collection methods used between 1998 and 1999 were used to collect the samples in 2009. This consists of a utility mounted vacuum drill to lift 10 cores over a 3 m x 10 m area from the soil profile, which are then bulked and sub sampled (Figure 4). Each location was recorded using a Rinex Saturn H Box guidance computer using datum GDA94.

Paddock history for the ten years preceding the study (1998 to 2008) was collected at the time of sampling through a grower completed survey. Cropping (rotation and yield), fertiliser (product and application rate) and liming (source and application rate) data were recorded to enable effects of land management to be assessed.

Topsoil (0–10 cm) samples were analysed for pH (1:5 0.01 $CaCl_2$), nutrients (NO_3^-, NH_4^+, P,

Figure 4: Diagram and photograph of a Precision SoilTech soil sample rig showing the sampling layout (left) and the main features of the machine (right).

K, S) (Table 1) and soil chemical parameters (PBI, EC, texture, colour and gravel content) by CSBP Pty Ltd. Shallow subsurface samples (10–20 cm and 20–30 cm) had pH (1:5 0.01 $CaCl_2$) analysis conducted by Precision SoilTech. Soil pH_{Ca} analysis was performed using the same methodology in both laboratories.

t/ha of lime. Of the 36 paddocks receiving lime, 21 had a single one t/ha application, 14 had two x one t/ha applications and one paddock had three x one t/ha applications.

Overall significant ($p \leq 0.05$) soil pH_{Ca} increases were recorded in the 0–10 cm and 10–20 cm layers with a non-significant

Table 1: Summary of the soil analysis completed on the 452 soil sites sampled in the Narembeen area collected in 2009. Average soil nutrient and soil pHCa, along with maximum and minimum values recorded have been included.

	pH (1:5$CaCl_2$)			NO_3^- (ppm)	NH_4^+ (ppm)	Phos. (ppm)	Potash (ppm)	Sulf. (ppm)	OC (%)	EC (dS/m)
	0–10 cm	10–20 cm	20–30 cm							
Average	5.3	4.8	4.7	15.7	3.7	29.4	173.0	15.7	1.2	0.1
Min	4.0	3.8	3.8	2.0	1.0	13.0	24.0	1.0	0.4	0.0
Max	8.3	8.0	8.4	145.0	28.0	74.0	1581.0	523.0	2.6	3.6

Soil sample and lime application results

Mean soil pH_{Ca} in the area surrounding Narembeen did not exceed the ACC soil pH_{Ca} targets in any depth examined in this survey and was found to be variable and heavily influenced by soil type. Topsoil and shallow subsurface soil pH_{Ca} distributions were positively skewed giving an inflated mean value that does not accurately represent the population. The percentage of samples that fell below the ACC soil pH_{Ca} targets (85% of 0–10 cm and 63% for 10–30 cm samples) gives a better indication of the extent of acidic soil in this region.

Paddock history surveys were returned by only 50% of growers with those that did not return the survey either having inadequate or missing records or simply failing to complete the forms. The returned surveys showed that lime had been applied to 36 of the 54 of the paddocks sampled over the ten year period of the study. Liming products included limesand, limestone and burnt lime. The most common lime application rate was one tonne per hectare with only one of paddock receiving a lower rate of 0.5

increasing trend observed in the 20–30 cm layer over the ten year period of the study. Topsoil pH_{Ca} changed on average by +0.3 pH_{Ca} units though positive and negative changes ranging ± 1.0 pH_{Ca} units were recorded. A smaller average increase in the 10–20 cm soil layer of 0.25 was recorded though positive and negative changes were recorded. An average positive increase of 0.18 pH_{Ca} was observed in the 20–30 cm soil layer though was non-significant and will not be discussed further.

Over 93% of sites sampled in the Narembeen study had topsoil pH_{Ca} below 5.5 in 1998/99 which has been reduced to 85% in 2009 (Figure 4). This indicates that there is still a large proportion of sites that need further liming to meet the target of pH_{Ca} 5.5. Of the 55 sites that were below pH_{Ca} 4.5 in 1998/99, two were below pH_{Ca} 4.0 (extremely acidic) in 2009. In 2009 there are 16 sites with topsoil below pH_{Ca} 4.5 and no sites with topsoil less than pH_{Ca} 4.0 (Figure 5).

Similar changes have occurred in the shallow subsurface (10–30 cm) with a 16% reduction in the number of sites below pH_{Ca} 4.8, though 63% of sites still fell below the subsoil target of pH_{Ca} 4.8. Severely acidic

(pH_{Ca} < 4.0) shallow subsurface soil was recorded at 26 locations. This indicates that a large proportion of the Narembeen area is losing productivity due to acidification.

Significant differences were found to exist between the 'resample' and control' groups when all soil types were included with the 'control group' having a higher average soil pH_{Ca} likely to be caused by a larger number of samples in clay soils.

nutrient recommendations delivered before the end of April 2009.

The Precision SoilTech soil pH_{Ca} report is split into two sections. The first section contains a soil pH_{Ca} report outlining the sampling site information (paddock name, site identifier and GPS co-ordinates) and soil pH_{Ca} results of each sampling depth collected. The second section, the liming recommendation, provides a comprehensive guide indicating

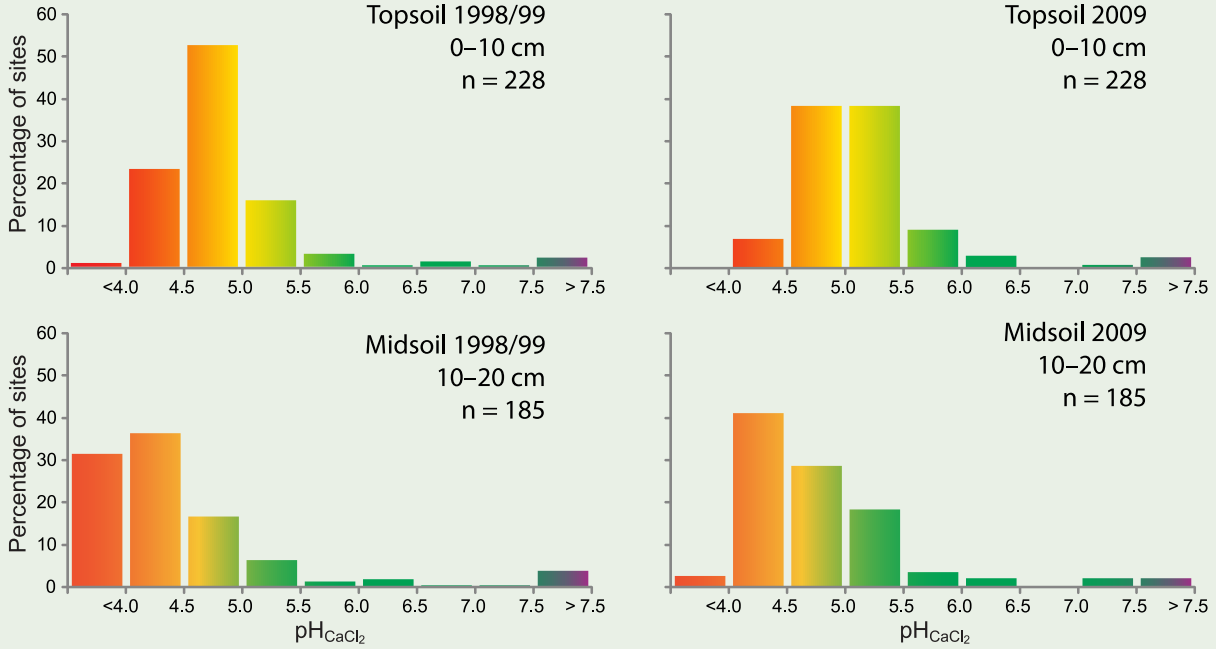


Figure 5: Comparison of the percentage distribution of topsoil (0–10 cm) and shallow subsurface (10–20 cm) pH_{Ca} in the Narembeen area for the time of initial sampling (1998/99) and present (2009) at 0.5 pH_{Ca} unit intervals. Topsoil pH_{Ca} is optimal between 5.5 and 7.5 and is highlighted by the green colouring in the graph. Shallow subsurface soil pH_{Ca} should be maintained above pH_{Ca} 4.8.

Soil test results and recommendations presented to land managers

All growers involved in the soil acidity project received a soil pH_{Ca} lime report and liming recommendation produced by Precision SoilTech and a nutrient requirement recommendation produced by CSBP. Soil pH_{Ca} reports and liming recommendations were returned to the grower within three weeks of sampling and

how much lime is required and when it should be applied over a ten year period. The recommendation is calculated to supply sufficient lime to meet or exceed the Avon Catchment Council's targets of pH_{Ca} 5.5 in the 0–10 cm over pH_{Ca} 4.8 in the shallow subsurface 10–30 cm layers (Figure 6).

Nutrient recommendations were produced and delivered by CSBP Nulogic advisers (Figure 7). Soil chemical analysis results, previous paddock rotation, target yield and budget are taken into consideration when producing these reports. A benefit of the data collected in this study has been that

shallow subsurface soil pH_{Ca}, which is not generally recorded or incorporated into these recommendations was used to derive a more appropriate report. For example, extremely acidic subsoils (< 4.5 pH_{Ca}) limit crop growth irrespective of nutrient application therefore inputs at these sites are reduced limiting nutrient wastage. This management of low productivity zones have both economic and environmental benefits.

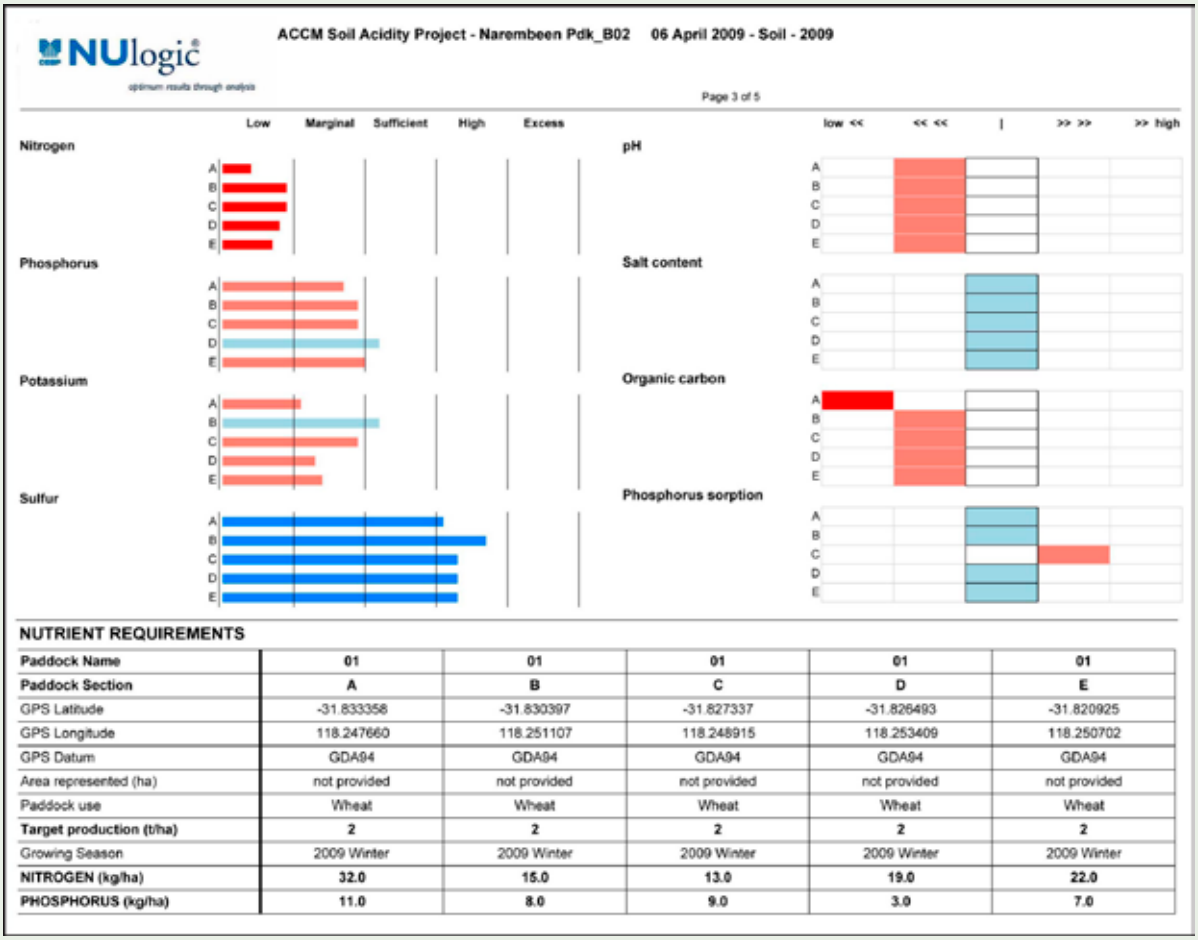
pH Results

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
B02	1	50J	613146	6494039	Sand	4.8	4.3	4.1	5t
B02	2	50J	612677	6493823	Sand	5.2	4.3	4.1	5t
B02	3	50J	612893	6493452	Sand	4.9	4.0	3.9	5t
B02	4	50J	613249	6493315	Sand	4.7	4.0		4t
B02	5	50J	613340	6493002	Sand	4.5	3.9	3.8	6t
B02	6	50J	612911	6492977	Sand	5.2			2-4t
B07	1	50J	613768	6493078	Sand	4.8	4.4	4.8	4t
B07	2	50J	613699	6492698	Sand	4.8	4.0	4.0	4t
B07	3	50J	613806	6492404	Sand	4.9	4.0	4.2	5t
B07	4	50J	613960	6492094	Loamy Clay	6.5	7.0		0t
B07	5	50J	614067	6492446	Sandy Loam	4.8	4.4	4.4	4t
B07	6	50J	613980	6492921	Sandy Loam	4.8	4.1	4.1	4t

Lime Recommendation

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
B02	1	2			2				1			5t
B02	2	2			2				1			5t
B02	3	2			2				1			5t
B02	4	2			1				1			4t
B02	5	2			2				2			6t
B02	6	1			1				1			2-4t
B07	1	2			1				1			4t
B07	2	2			2							4t
B07	3	2			2				1			5t
B07	4											0t
B07	5	1			2				1			4t
B07	6	2			2							4t

Figure 6: Extract from a Precision SoilTech soil pH_{Ca} report and liming recommendation provided to the grower after soil sampling conducted as part of the Avon Soil Acidity project. These paddocks have moderate topsoil acidity and severe shallow subsurface acidity in most sites. Both paddocks have previously received a single one t/ha lime application though this has been insufficient to ameliorate topsoil or shallow subsurface soil acidity.



NUTRIENT REQUIREMENTS

Paddock Name	01	01	01	01	01
Paddock Section	A	B	C	D	E
GPS Latitude	-31.833358	-31.830397	-31.827337	-31.826493	-31.820925
GPS Longitude	118.247660	118.251107	118.248915	118.253409	118.250702
GPS Datum	GDA94	GDA94	GDA94	GDA94	GDA94
Area represented (ha)	not provided	not provided	not provided	not provided	not provided
Paddock use	Wheat	Wheat	Wheat	Wheat	Wheat
Target production (t/ha)	**2**	**2**	**2**	**2**	**2**
Growing Season	2009 Winter	2009 Winter	2009 Winter	2009 Winter	2009 Winter
NITROGEN (kg/ha)	**32.0**	**15.0**	**13.0**	**19.0**	**22.0**
PHOSPHORUS (kg/ha)	**11.0**	**8.0**	**9.0**	**3.0**	**7.0**

Figure 7: Extract of a NUlogic soil report showing nutrient status of sites within a paddock sampled in the Narembeen soil acidity project. Soil pHCa and nutrient management recommendations were discussed with the grower by an accredited advisor.

Soil Acidity Project Summary and Recommendations

This project has confirmed the presence of moderate and severe acid soils in the Narembeen area of the ARB. These mainly lighter textured soils (sand to sandy loam) were found to have an average soil pH_{Ca} profile (0–10 cm, 10–20 cm and 20–30 cm) of 5.3, 4.7 and 4.8. Heavier textured soils (loam to loamy clay) were also sampled in this survey and had higher average soil pH_{Ca} (6.8) though represent a smaller area and do not require amelioration.

Monitoring soil pH_{Ca} in the Narembeen region recorded overall positive soil pH_{Ca} increases over the ten year study period. Both positive and negative pH_{Ca} variations were recorded at individual sites up to a depth of 30 cm. Average topsoil pH_{Ca} increased by 0.3 pH_{Ca} units with average changes of 0.25 and 0.18 pH_{Ca} units in the shallow subsurface (10–20 cm and 20–30 cm) layers respectively.

The improvement in soil pH_{Ca} indicates that the growers near Narembeen are addressing soil acidity through the application of lime though current acidity levels are below the soil pH_{Ca} targets of 5.5 over 4.8 set by the Avon Catchment Council (2005). Future applications of between 2–5 t/ha of lime will be required to increase soil pH in the topsoil and shallow subsoil to reach and maintain the ACC targets. Variable rate applications of lime have been recommended to achieve soil pH increases most efficiently and economically. High lime rates (>4 t/ha) have

been prescribed to areas within paddocks that have severe acidity in the topsoil (0–10 cm) or at depth (10–30 cm), while moderate rates (2–3 t/ha) are recommended for soil profiles with low to moderate levels of acidity. Neutral to alkaline soil profiles (pH_{Ca}) do not require liming though should be resampled periodically to monitor soil pH decline and lime should be applied when appropriate.

Similar outcomes to the Narembeen study were documented in other Avon Catchment Council soil acidity projects conducted at Konnongorring, Beacon and Wickepin (Avon River Basin Soil Acidity Project Report (2009). All three soil acidity monitoring surveys recorded overall positive pH_{Ca} topsoil and midsoil pH changes. Each area also had a similar amount of lime use to that of the Narembeen survey.

This project has highlighted the ability of multiple private industry partners in partnership with government to undertake practical research that has immediate management implications for the grower. A large amount of data has been collected in a relatively short period of time to develop a baseline for paddock monitoring.

Furthermore it is stored on behalf of the grower so that it can be accessed for further research in the future.

Unlike traditional monitoring surveys, this method of sampling and returning data to growers at a site and paddock level may facilitate actual on-farm practice change at the same time as collating changes in soil pH_{Ca}, be it positive, negative or no change. The sampling and data collection methods employed by this survey have, and will, allow soil condition ***and farm management practice*** **change** to be monitored.

References

Avon River Basin Soil Acidity Project Report (2009) Avon Catchment Council http://www.avonnrm.org.au/reports_publications/Soil_Acidity/

Avon Natural Resource Management Strategy: The Regional Natural Resource Management Strategy for the Avon River Basin (2005) Avon Catchment Council http://www.avonnrm.org.au/regional_strategy

Appendix

pH result and lime recommendation reports
(names and addresses have been removed for privacy)
and report interpretation information provided to growers

Lime Recommendation

Prepared by the Building Better Soils professionals:
Helping to ensure the future profitability of your farm.

PRECISION SoilTech

Aglime of Australia

pH Results

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
M 5	1	50J	621002	6494081	Sand	5.3	4.5	4.3	3t
M 5	2	50J	620772	6493973	Sand	5.5	4.5	4.3	3t
M 5	3	50J	620403	6494068	Sand	6.2	5.4	6.0	
M 5	4	50J	620394	6493515	Sand	5.4	4.4	4.4	3t
M 5	5	50J	620710	6493527	Sand	5.4	4.7	5.1	2t
M 5	6	50J	621118	6493505	Sand	5.6	4.6	4.1	3t
M 5	7	50J	621845	6493495	Sand	4.7	4.2	4.1	4t
M 5	8	50J	621858	6493983	Sand	5.7	4.6	4.1	3t
M 5	9	50J	621586	6493984	Sand	5.3	4.4	4.1	3t
M 5	10	50J	621247	6493924	Sand	5.1	4.6	4.7	3t
M 5	11	50J	621250	6493579	Sand	4.7	4.4		3t
M 5	12	50J	621468	6493397	Sand	4.7	5.7	5.5	1t
M 7	1	50J	620997	6493233	Sand	5.7	4.4		3t
M 7	2	50J	620713	6493176	Sand	5.8	4.2		3t
M 7	3	50J	620418	6493268	Sand	5.4	4.1		3t
M 7	4	50J	620326	6492718	Sand	5.6	4.6		3t
M 7	5	50J	620641	6492727	Sand	6.3	4.4	4.4	3t
M 7	6	50J	620992	6492643	Sand	5.3	4.4		3t

Colour key for quick soil acidity assessment

Colour	Soil pH	Acidity Rating	Urgency of these areas requiring lime
	Less than 4.5	Extremely Acid	Very Urgent – This season is highly desirable
	4.6 to 5.2	Moderately Acid	Urgent – Within the next year or two
	5.3 – 5.9	Slightly Acid	Maintenance Liming – Within the next few years
	Above 6.0	Good	Maintenance Liming – Possibly after 5 to 7 years

pH Results (cont.)

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
17	1	50J	618237	6481235	Sandy Loam	5.4	5.2	5.5	1t
17	2	50J	618103	6481820	Sand	4.8	4.1		4t
17	3	50J	618456	6482017	Sand	4.9	4.0	4.0	5t
17	4	50J	618125	6482393	Sand	5.1	4.0	4.0	5t
19	1	50J	618190	6483892	Sandy Loam	5.5	4.3	4.1	5t
19	2	50J	618401	6484269	Sandy Loam	5.3	4.8	4.7	2t
19	3	50J	618194	6484852	Sandy Loam	5.3	4.1		4t
19	4	50J	618595	6484466	Sandy Loam	5.5	4.1	4.0	5t
19	5	50J	619156	6484127	Sand	5.0	4.1	4.0	5t
24	1	50J	627781	6480863	Sandy Loam	5.4			1-3t
24	2	50J	627600	6481164	Sandy Loam	5.6			1-3t
24	3	50J	627569	6481578	Sandy Loam	5.2			2-4t
24	4	50J	627657	6481926	Sandy Loam	5.5			1-3t
24	5	50J	627248	6481667	Sandy Loam	5.8			0-3t
24	6	50J	627190	6481048	Sand	5.4	5.2		1t
25	1	50J	628635	6481161	Sandy Loam	5.1			2-4t
25	2	50J	628479	6481747	Sandy Loam	5.0			1-3t
25	3	50J	628153	6481736	Sandy Loam	5.5	4.3		3t
25	4	50J	627985	6481242	Sandy Loam	5.1			2-4t
25	5	50J	628013	6480883	Sandy Loam	6.0	4.7		1t
25	6	50J	628205	6480914	Sand	5.3	4.5		3t

Lime Recommendation

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
12	1	2				2				1		5t
12	2	2				1				1		4t
12	3	2				1				1		4t
12	4	1				1						2t
12	5	2				1				1		4t
13	1								1			0-3t
13	2	2			2				1			5t
13	3	2			2				1			5t
13	4	2			2				1			5t
13	5	2			1				1			4t
13	6	2			2				1			5t
14	1	2					1					3t
14	2						1					1t
14	3	2					1				1	4t
17	1				1							1t
17	2	2			1				1			4t
17	3	2			2				1			5t
17	4	2			2				1			5t
19	1	2			2				1			5t
19	2				1				1			2t
19	3	2			1				1			4t
19	4	2			2				1			5t
19	5	2			2				1			5t
24	1					1				1		1-3t
24	2					1				1		1-3t
24	3	1				1				1		2-4t
24	4					1				1		1-3t
24	5									1		0-3t
24	6					1						1t

Lime Recommendation (cont.)

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
25	1	1					1				1	2-4t
25	2	1					1				1	1-3t
25	3	2					1					3t
25	4	1					1				1	2-4t
25	5						1					1t
25	6	2					1					3t

Lime Recommendation

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pH Results

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
Chocos	1	50H	596533	6447365	Sand	5.4	5.1	6.1	2t
Chocos	2	50E	596974	3552791	Sand	4.9			2-4t
Hensman	1	50H	591950	6453508	Sand	5.0	5.1	5.8	2t
Hensman	2	50H	592103	6454448	Loam	4.9			2-4t
Hensman	3	50H	591597	6454405	Loam	5.1			2-4t
Hensman	4	50H	591656	6454028	Loam	5.4	4.5	4.9	3t
Joes	1	50H	591514	6452150	Sand	4.8	4.3	4.5	4t
Joes	2	50H	591667	6452567	Sand	4.9			2-4t
Joes	3	50H	592107	6452076	Sand	4.9	4.4	5.1	4t
Joes	4	50H	592172	6453258	Sandy Loam	5.1	5.0		2t
Joes	5	50H	591662	6453237	Sandy Loam	5.1	5.3		2t
Langdons	1	50H	597412	6448658	Sand	4.5	4.4	5.0	4t
Langdons	2	50H	597438	6448303	Sandy Loam	4.7	4.9	4.9	3t
Langdons	3	50H	597451	6447948	Sand	5.1	5.1	4.6	2t
Rons	1	50H	597285	6447445	Sand	5.0	4.8		3t
Rons	2	50H	597573	6447201	Sand	5.1			2-4t

Colour key for quick soil acidity assessment

Colour	Soil pH	Acidity Rating	Urgency of these areas requiring lime
	Less than 4.5	Extremely Acid	Very Urgent – This season is highly desirable
	4.6 to 5.2	Moderately Acid	Urgent – Within the next year or two
	5.3 – 5.9	Slightly Acid	Maintenance Liming – Within the next few years
	Above 6.0	Good	Maintenance Liming – Possibly after 5 to 7 years

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pH Results (cont.)

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
Smiths	1	50H	591174	6453437	Sandy Loam	7.7	7.5	7.7	
Smiths	2	50H	590880	6453634	Sand	5.6	5.5		1t
Smiths	3	50H	590768	6454072	Sand	5.2	5.8		1t
Smiths	4	50H	591188	6454304	Sand	4.8	4.6	4.8	3t
Town	1	50H	597547	6446915	Sandy Loam	5.3	5.4	5.4	2t
Town	2	50H	597412	6446565	Sandy Loam	4.8	5.1	5.3	3t
Town	3	50H	596365	6446489	Sandy Loam	5.0	5.1	5.2	3t
Town	4	50H	596540	6446979	Loam	6.2			0-3t
Windmill	1	50H	590795	6452186	Sand	4.9	4.9	5.3	3t
Windmill	2	50H	591208	6452354	Sand	4.5	4.1	4.5	5t
Windmill	3	50H	591253	6453115	Sand	5.8	5.7		1t
Windmill	4	50H	590859	6453247	Sand	5.3	5.1	5.6	2t
Woodlorn	1	50H	597173	6448683	Sand	5.1	5.1	5.9	2t
Woodlorn	2	50H	597180	6448055	Sand	5.2	4.8	5.0	2t
Woodlorn	3	50H	596324	6447801	Sand	5.3	4.3	4.2	5t
Woodlorn	4	50H	596640	6447898	Sand	5.0	5.3	5.6	1t
Woodlorn	5	50H	596367	6448374	Sand	5.0	5.1	4.6	2t
Woodlorn	6	50H	596833	6448592	Sand	5.2	4.8	4.8	2t

Lime Recommendation

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
Chocos	1				1				1			2t
Chocos	2	1			1				1			2-4t
Hensman	1	1								1		2t
Hensman	2	1				1				1		2-4t
Hensman	3	1				1				1		2-4t
Hensman	4	2								1		3t
Joes	1	2			1				1			4t
Joes	2	1			1				1			2-4t
Joes	3	2			1				1			4t
Joes	4	1							1			2t
Joes	5	1							1			2t
Langdons	1	2			1			1				4t
Langdons	2	2						1				3t
Langdons	3	1						1				2t
Rons	1	1				1				1		3t
Rons	2	1				1				1		2-4t
Smiths	1											
Smiths	2									1		1t
Smiths	3	1										1t
Smiths	4	1				1				1		3t
Town	1				1				1			2t
Town	2	1			1				1			3t
Town	3	1			1				1			3t
Town	4											0-3t
Windmill	1	1			1				1			3t
Windmill	2	2			2				1			5t
Windmill	3								1			1t
Windmill	4				1				1			2t

Lime Recommendation (cont.)

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
Woodlorn	1	1							1			2t
Woodlorn	2	1							1			2t
Woodlorn	3	2			2				1			5t
Woodlorn	4	1							1			1t
Woodlorn	5	1							1			2t
Woodlorn	6	1							1			2t

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pH Results

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
AUSTINS CNR	1	50H	658045	6437999	Sandy Loam	4.4	4.1	4.1	5t
AUSTINS CNR	2	50H	658459	6437684	Sandy Loam	4.6	4.6	4.2	4t
AUSTINS CNR	3	50H	658451	6436865	Sandy Loam	4.5	4.2	4.2	5t
AUSTINS CNR	4	50H	657970	6436924	Sandy Loam	4.9	4.5	4.4	4t
AUSTINS CNR	5	50H	657898	6436281	Sandy Loam	4.5	4.3	4.6	5t
AUSTINS CNR	6	50H	658363	6435815	Sandy Loam	5.1	5.0	5.3	2t
COOPERS CNR	1	50H	658637	6440172	Sandy Loam	4.5	4.2	4.2	5t
COOPERS CNR	2	50H	658063	6440401	Sandy Loam	5.3	5.4	5.8	2t
COOPERS CNR	3	50H	657383	6440208	Sand	5.0	4.9	4.8	2t
FID	1	50H	650015	6443681	Sandy Loam	4.6	4.3	4.5	5t
FID	2	50H	650370	6443851	Sandy Loam	4.5	4.4	4.5	5t
FID	3	50H	650832	6443847	Sandy Loam	4.9	5.5	6.4	1t
FID	4	50H	651471	6443722	Sandy Loam	4.6	4.6	4.4	3t
FID	5	50H	651753	6444263	Sandy Loam	4.9	4.8	5.8	3t

Colour key for quick soil acidity assessment

Colour	Soil pH	Acidity Rating	Urgency of these areas requiring lime
	Less than 4.5	Extremely Acid	Very Urgent – This season is highly desirable
	4.6 to 5.2	Moderately Acid	Urgent – Within the next year or two
	5.3 – 5.9	Slightly Acid	Maintenance Liming – Within the next few years
	Above 6.0	Good	Maintenance Liming – Possibly after 5 to 7 years

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pH Results (cont.)

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
FRIDGE CROSS	1	50H	648052	6446461	Sandy Loam	4.8	4.9	5.0	3t
FRIDGE CROSS	2	50H	648499	6446335	Sandy Loam	5.6	6.1	5.8	1t
FRIDGE CROSS	3	50H	649181	6446260	Sandy Loam	4.5	4.1	4.1	5t
FRIDGE CROSS	4	50H	649564	6446516	Sandy Loam	4.6	4.5	4.4	5t
FRIDGE CROSS	5	50H	649480	6445511	Sandy Loam	5.5	5.0	5.3	1t
FRIDGE CROSS	6	50H	648812	6445815	Sandy Loam	5.0	5.3	5.5	2t
FUSILADE	1	50H	656304	6440409	Sand	4.6	4.4	4.8	4t
FUSILADE	2	50H	655569	6439673	Sand	4.7	4.5	4.8	4t
FUSILADE	3	50H	655220	6439734	Sandy Loam	4.4	4.1	4.1	5t
GULLY	1	50H	656782	6440449	Sand	4.5	4.3	4.5	6t
GULLY	2	50H	656835	6439627	Sand	4.4	4.2	4.1	6t
HOUSE DAM	1	50H	654765	6439587	Sandy Loam	5.0	4.4	4.0	4t
HOUSE DAM	2	50H	654843	6439783	Sandy Loam	4.7	4.3	4.1	5t
HOUSE DAM	3	50H	654510	6439951	Sandy Loam	4.6	4.4	4.4	5t
SALTY DAM	1	50H	658131	6438831	Sandy Loam	4.8	4.6	4.4	4t
SALTY DAM	2	50H	658564	6439285	Sandy Loam	4.6	4.3	4.6	4t

Lime Recommendation

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
AUSTINS CNR	1	2			2				1			5t
AUSTINS CNR	2	2			1				1			4t
AUSTINS CNR	3	2			2				1			5t
AUSTINS CNR	4	2			1				1			4t
AUSTINS CNR	5	2			2				1			5t
AUSTINS CNR	6	1							1			2t
COOPERS CNR	1	2			2					1		5t
COOPERS CNR	2				1					1		2t
COOPERS CNR	3				1					1		2t
FID	1	2			2				1			5t
FID	2	2			2				1			5t
FID	3	1										1t
FID	4	1			1				1			3t
FID	5	1			1				1			3t
FRIDGE CROSS	1	1			1				1			3t
FRIDGE CROSS	2								1			1t
FRIDGE CROSS	3	2			2				1			5t
FRIDGE CROSS	4	2			2				1			5t
FRIDGE CROSS	5								1			1t
FRIDGE CROSS	6				1				1			2t
FUSILADE	1	2			1				1			4t
FUSILADE	2	2			1				1			4t
FUSILADE	3	2			2				1			5t
GULLY	1	2				2				2		6t
GULLY	2	2				2				2		6t
HOUSE DAM	1	2			1				1			4t
HOUSE DAM	2	2			2				1			5t
HOUSE DAM	3	2			2				1			5t
SALTY DAM	1	2			1				1			4t
SALTY DAM	2	2			1				1			4t

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pH Results

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
B 80	1	50H	631749	6438870	Sand	5.0	4.7	4.6	3t
B 80	2	50H	631770	6439277	Sand	4.8	4.3	4.3	5t
B 80	3	50H	632284	6439024	Sand	4.6	4.6	4.3	5t
H 100	1	50H	641043	6444160	Sandy Loam	5.2	4.6	4.6	3t
H 100	2	50H	640334	6444093	Sandy Loam	4.9	4.7	4.6	3t
H 100	3	50H	640755	6444339	Sandy Loam	5.1	4.8	5.0	3t
P 90	1	50H	629309	6438098	Sandy Loam	4.8	4.2	4.7	4t
P 90	2	50H	628810	6438059	Sandy Loam	5.0	4.3	4.1	5t
P 90	3	50H	628468	6438554	Loamy Clay	5.3	4.6	4.7	2t
P 92	1	50H	629549	6438577	Sand	5.4	4.8	4.5	4t
P 92	2	50H	630235	6438019	Sand	5.0	4.4	4.1	5t
P 92	3	50H	630379	6438192	Sand	5.0	4.7	4.6	3t
P 92	4	50H	630369	6438534	Sand	4.6	3.9	4.1	5t

Colour key for quick soil acidity assessment

Colour	Soil pH	Acidity Rating	Urgency of these areas requiring lime
	Less than 4.5	Extremely Acid	Very Urgent – This season is highly desirable
	4.6 to 5.2	Moderately Acid	Urgent – Within the next year or two
	5.3 – 5.9	Slightly Acid	Maintenance Liming – Within the next few years
	Above 6.0	Good	Maintenance Liming – Possibly after 5 to 7 years

pH Results (cont.)

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
R 80	1	50H	641291	6442182	Sandy Loam	4.6	4.5	4.9	4t
R 80	2	50H	641523	6442207	Sandy Loam	4.5	4.5	4.8	5t
R 80	3	50H	641638	6442506	Sandy Loam	4.5	4.1	4.2	5t
R 80	4	50H	641363	6442901	Sandy Loam	4.7	4.9	5.3	3t
R 94	1	50H	642193	6441422	Sandy Loam	4.9	5.1	5.1	3t
R 94	2	50H	641581	6441417	Sandy Loam	5.1	4.6	4.8	3t
R 94	3	50H	641360	6441893	Sandy Loam	5.0	5.0	5.3	3t
T 115	1	50H	640638	6444682	Sandy Loam	4.8	4.4	4.4	5t
T 115	2	50H	639899	6444644	Sandy Loam	5.1	4.9	4.7	2t
T 115	3	50H	639981	6445230	Sandy Loam	5.2	5.2	4.8	2t
T 115	4	50H	640644	6445223	Sandy Loam	6.6	6.6	7.1	

Lime Recommendation

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
B 80	1	1			1				1			3t
B 80	2	2			2				1			5t
B 80	3	2			2				1			5t
H 100	1		1				1				1	3t
H 100	2		1				1				1	3t
H 100	3		1				1				1	3t
P 90	1	2			1				1			4t
P 90	2	2			2				1			5t
P 90	3				1				1			2t
P 92	1	2				1				1		4t
P 92	2	2				2				1		5t
P 92	3	1				1				1		3t
P 92	4	2				2				1		5t
R 80	1	2			1				1			4t
R 80	2	2			2				1			5t
R 80	3	2			2				1			5t
R 80	4	1			1				1			3t
R 94	1		1				1				1	3t
R 94	2		1				1				1	3t
R 94	3		1				1				1	3t
T 115	1	2			2				1			5t
T 115	2				1				1			2t
T 115	3				1				1			2t
T 115	4											

Lime Recommendation

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pH Results

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
HP01	2	50H	610705	6439607	Loam	7.8	4.8		1t
HP01	3	50H	610973	6439414	Sandy Loam	8.0	7.7		
HP01	4	50H	611242	6439377	Loam	7.8	7.5		
HP01	5	50H	611117	6439014	Loam	7.9	7.7		
HP01	6	50H	610696	6439185	Loam	8.2	8.0		
HP01	7	50H	610362	6439267	Loam	8.0			0-3t
HP01	8	50H	610422	6439556	Loam	8.0	7.6	5.9	
HP12	1	50H	609328	6439451	Loam	7.7	7.9	8.2	
HP12	2	50H	609055	6439582	Loam	7.1	7.6	8.1	
HP12	3	50H	609093	6439257	Loam	8.1	8.2		
NB18	1	50H	610103	6440595	Loam	8.0	7.9	7.6	
NB18	2	50H	610406	6440487	Loam	7.0	7.8		
NB18	4	50H	610636	6440925	Loam	8.0	6.3		
NB18	6	50H	610057	6440986	Loam	8.0	6.0	7.4	
NB18	7	50H	610724	6440734	Loam	8.0	7.7		

Colour key for quick soil acidity assessment

Colour	Soil pH	Acidity Rating	Urgency of these areas requiring lime
	Less than 4.5	Extremely Acid	Very Urgent – This season is highly desirable
	4.6 to 5.2	Moderately Acid	Urgent – Within the next year or two
	5.3 – 5.9	Slightly Acid	Maintenance Liming – Within the next few years
	Above 6.0	Good	Maintenance Liming – Possibly after 5 to 7 years

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pH Results (cont.)

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
NB20	1	50H	609576	6441171	Loam	8.0	7.8	7.7	
NB20	2	50H	609340	6441264	Loam	7.9	7.4	7.6	
NB20	3	50H	609019	6441324	Loamy Clay	8.0	7.6		
NB20	4	50H	609104	6441685	Loamy Clay	7.2	8.1		
NB20	5	50H	609392	6441552	Loamy Clay	7.9	7.6		
P04	1	50H	612232	6438548	Sandy Loam	4.9	5.1		2t
P04	2	50H	612558	6438452	Sandy Loam	5.7	7.7		1t
P04	3	50H	612954	6438403	Sandy Loam	5.5	7.3		
P04	5	50H	612610	6438156	Sandy Loam	5.5			1-3t
P04	6	50H	612190	6438209	Sandy Loam	5.9	6.7		
P04	7	50H	611972	6438281	Sandy Loam	6.3	6.0		
P04	8	50H	612983	6438116	Sandy Loam	5.7	7.5		1t
P07	3	50H	611535	6435809	Sandy Loam	5.8	5.6		1t
P07	4	50H	611600	6436071	Loam	6.2	6.9		
P07	5	50H	611980	6435961	Loam	6.3	7.9		

Lime Recommendation

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
HP01	2									1		1t
HP01	3											
HP01	4											
HP01	5											
HP01	6											
HP01	7											0-3t
HP01	8											
HP12	1											
HP12	2											
HP12	3											
NB18	1											
NB18	2											
NB18	4											
NB18	6											
NB18	7											
NB20	1											
NB20	2											
NB20	3											
NB20	4											
NB20	5											
P04	1	1				1						2t
P04	2					1						1t
P04	3											
P04	5					1				1		1-3t
P04	6											
P04	7											
P04	8					1						1t
P07	3								1			1t
P07	4											
P07	5											

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pH Results

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
B02	1	50J	613146	6494039	Sand	4.8	4.3	4.1	5t
B02	2	50J	612677	6493823	Sand	5.2	4.3	4.1	5t
B02	3	50J	612893	6493452	Sand	4.9	4.0	3.9	5t
B02	4	50J	613249	6493315	Sand	4.7	4.0		4t
B02	5	50J	613340	6493002	Sand	4.5	3.9	3.8	6t
B02	6	50J	612911	6492977	Sand	5.2			2-4t
B07	1	50J	613768	6493078	Sand	4.8	4.4	4.8	4t
B07	2	50J	613699	6492698	Sand	4.8	4.0	4.0	4t
B07	3	50J	613806	6492404	Sand	4.9	4.0	4.2	5t
B07	4	50J	613960	6492094	Sand	6.5	7.0		
B07	5	50J	614067	6492446	Sandy Loam	4.8	4.4	4.4	4t
B07	6	50J	613980	6492921	Sandy Loam	4.8	4.1	4.1	4t
B13	1	50J	613220	6490921	Sand	5.5			1-3t
B13	2	50J	612827	6490797	Sand	5.7			1-3t
B13	3	50J	613803	6490874	Sand	5.1			2-4t
B13	4	50J	613503	6491342	Sand	5.9			0-3t
B13	5	50J	613787	6491569	Sand	5.6	5.4		1t
B13	6	50J	613840	6491198	Sand	6.3			0-3t

Colour key for quick soil acidity assessment

Colour	Soil pH	Acidity Rating	Urgency of these areas requiring lime
	Less than 4.5	Extremely Acid	Very Urgent – This season is highly desirable
	4.6 to 5.2	Moderately Acid	Urgent – Within the next year or two
	5.3 – 5.9	Slightly Acid	Maintenance Liming – Within the next few years
	Above 6.0	Good	Maintenance Liming – Possibly after 5 to 7 years

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pH Results (cont.)

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
B16	1	50J	612583	6490175	Loam	5.4			1-3t
B16	2	50J	613050	6490099	Sand	5.4			1-3t
B16	3	50J	612899	6489718	Sandy Loam	5.1			2-4t
B16	4	50J	612412	6489201	Sand	6.1			0-3t
B16	5	50J	612897	6489224	Sand	5.4			1-3t
B16	6	50J	613224	6489624	Sandy Loam	6.2			0-3t
L03	1	50J	613071	6495234	Sandy Loam	5.4	4.5		3t
L03	2	50J	613075	6495462	Sandy Loam	4.8	4.1	4.0	4t
L03	3	50J	613100	6495732	Sand	5.1	4.5		3t
L03	4	50J	613323	6495715	Sand	4.8	3.8	4.0	5t
L03	5	50J	613328	6495394	Sandy Loam	5.1	4.0	3.9	5t
L03	6	50J	613272	6495138	Sand	5.0	4.2	4.2	5t
L07	1	50J	613356	6494979	Sand	4.7	4.3	4.3	5t
L07	2	50J	613435	6494643	Sand	4.9	4.0	4.1	5t
L07	3	50J	613594	6494503	Sand	4.8	4.2	4.3	4t
L07	4	50J	613357	6494264	Sand	5.0	4.3		3t
L07	5	50J	613234	6494430	Sand	5.7	4.6	5.3	2t
L07	6	50J	613176	6494726	Sand	4.6	3.9	4.1	4t

Lime Recommendation

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
B02	1	2			2				1			5t
B02	2	2			2				1			5t
B02	3	2			2				1			5t
B02	4	2			1				1			4t
B02	5	2			2				2			6t
B02	6	1			1				1			2-4t
B07	1	2			1				1			4t
B07	2	2			2							4t
B07	3	2			2				1			5t
B07	4											
B07	5	1			2				1			4t
B07	6	2			2							4t
B13	1					1				1		1-3t
B13	2					1				1		1-3t
B13	3	1				1				1		2-4t
B13	4									1		0-3t
B13	5					1						1t
B13	6											0-3t
B16	1				1				1			1-3t
B16	2				1				1			1-3t
B16	3	1			1				1			2-4t
B16	4								1			0-3t
B16	5				1				1			1-3t
B16	6								1			0-3t
L03	1	2				1						3t
L03	2	2				2						4t
L03	3	2				1						3t
L03	4	2				2				1		5t
L03	5	2				2				1		5t
L03	6	2				2				1		5t

Lime Recommendation (cont.)

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
L07	1	2			2				1			5t
L07	2	2			2				1			5t
L07	3	2			2							4t
L07	4	1			1				1			3t
L07	5				1				1			2t
L07	6	2			2							4t

Lime Recommendation

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pH Results

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
01	1	50J	618369	6478732	Sand	4.5	3.9	4.0	5t
01	2	50J	618618	6478112	Sand	4.6	4.0	4.0	5t
01	3	50J	618395	6477681	Sand	4.8			2-4t
01	4	50J	618065	6477357	Sand	4.6	4.2		4t
01	5	50J	618191	6478023	Sand	4.5	4.0	4.0	5t
04	1	50J	620720	6477237	Sand	4.5	4.3		5t
04	2	50J	621445	6477042	Sand	4.7	4.5		4t
04	3	50J	621685	6477387	Sand	4.6	4.0	4.0	4t
04	4	50J	622207	6477018	Sand	4.9	4.6		3t
04	5	50J	622637	6477430	Sand	4.7	3.9		4t
06	1	50J	620946	6478778	Sand	4.6	4.2		4t
06	2	50J	621340	6478445	Sand	4.6	4.1		4t
06	3	50J	621761	6478409	Sand	4.8	4.4		4t
06	4	50J	622261	6478593	Sand	4.5	4.0	4.0	4t
06	5	50J	621733	6478762	Sand	4.8	4.3		4t

Colour key for quick soil acidity assessment

Colour	Soil pH	Acidity Rating	Urgency of these areas requiring lime
	Less than 4.5	Extremely Acid	Very Urgent – This season is highly desirable
	4.6 to 5.2	Moderately Acid	Urgent – Within the next year or two
	5.3 – 5.9	Slightly Acid	Maintenance Liming – Within the next few years
	Above 6.0	Good	Maintenance Liming – Possibly after 5 to 7 years

pH Results (cont.)

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
07	1	50J	619131	6478711	Sand	4.6	4.6		4t
07	2	50J	619415	6478375	Sand	4.4	4.0		5t
07	3	50J	619930	6478270	Sand	4.5	4.6		4t
07	4	50J	620112	6478729	Sandy Loam	4.5	4.3		5t
07	5	50J	619555	6478798	Sandy Loam	4.5	4.4		5t
08	1	50J	620933	6479081	Sand	4.6	4.2		4t
08	2	50J	621498	6479062	Sand	4.7	4.0	4.0	5t
08	3	50J	621869	6479171	Sand	4.6	4.3	4.5	5t
08	4	50J	621920	6479554	Sand	5.0	4.6		3t
08	5	50J	621247	6479461	Sand	4.7			3-5t
14	1	50J	619267	6480637	Sand	4.5	4.0	4.0	5t
14	2	50J	619676	6480537	Sand	4.8	4.1	4.3	5t
14	3	50J	619394	6480149	Sandy Loam	4.7	4.2		4t
14	4	50J	618958	6479737	Sand	4.7	4.7		3t
14	5	50J	619275	6479953	Sand	4.6	4.3		4t

Lime Recommendation

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
01	1	2			2				1			5t
01	2	2			2				1			5t
01	3	1			1				1			2-4t
01	4	2			1				1			4t
01	5	2			2				1			5t
04	1	2			2				1			5t
04	2	2			1				1			4t
04	3	2			2							4t
04	4	1			1				1			3t
04	5	2			2							4t
06	1	2			1				1			4t
06	2	2			2							4t
06	3	2			1				1			4t
06	4	2			2							4t
06	5	2			1				1			4t
07	1	2			1				1			4t
07	2	2			2				1			5t
07	3	2			1				1			4t
07	4	2			2				1			5t
07	5	2			2				1			5t
08	1	2				1				1		4t
08	2	2				2				1		5t
08	3	2				2				1		5t
08	4	1				1				1		3t
08	5	2				1				1		3-5t
14	1	2			2				1			5t
14	2	2			2				1			5t
14	3	2			1				1			4t
14	4	1			1				1			3t
14	5	2			1				1			4t

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pH Results

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
03	1	50H	636750	6416756	Loamy Clay	4.6	4.1	4.1	5t
03	2	50H	637150	6416694	Loamy Clay	4.8	5.0	5.5	2t
03	3	50H	637335	6416260	Loamy Clay	5.3	6.1	6.5	2t
03	4	50H	636792	6415988	Loamy Clay	4.8	4.8	5.8	3t
04	1	50H	636770	6415732	Loamy Clay	7.0	6.2	5.9	
04	2	50H	637193	6415753	Loamy Clay	4.8	5.4	5.7	2t
04	3	50H	637123	6415364	Sand	4.9	4.9	5.6	3t
04	4	50H	636399	6415349	Sand	4.9	6.0	6.3	2t
07	2	50H	635564	6414942	Sand	5.2	5.5	6.3	2t
07	3	50H	635152	6414656	CLAY	5.1	5.5	6.5	2t
07	4	50H	635295	6415973	Sand	4.7	4.3	4.3	5t
15	1	50H	636710	6418301	Sandy Loam	5.9	6.7		
15	2	50H	636692	6418920	Sandy Loam	7.1	5.2		
15	3	50H	637338	6418579	Sandy Loam	4.6	5.9	4.0	4t
15	4	50H	637228	6419055	CLAY	4.0	6.8	8.0	4t
15	5	50H	637022	6418202	Loamy Clay	5.5	6.5		
15	6	50H	636367	6418939	Loamy Clay	5.1	5.5	6.0	1t

Colour key for quick soil acidity assessment

Colour	Soil pH	Acidity Rating	Urgency of these areas requiring lime
	Less than 4.5	Extremely Acid	Very Urgent – This season is highly desirable
	4.6 to 5.2	Moderately Acid	Urgent – Within the next year or two
	5.3 – 5.9	Slightly Acid	Maintenance Liming – Within the next few years
	Above 6.0	Good	Maintenance Liming – Possibly after 5 to 7 years

pH Results (cont.)

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
20	1	50H	636812	6426882	Sand	4.8	5.7	6.1	2t
20	2	50H	636669	6426506	Sand	4.5	4.4	4.5	5t
20	3	50H	637363	6426386	Sand	4.9	6.8	6.5	2t
20	4	50H	637508	6426723	Sand	4.9	5.0	5.8	3t
24	1	50H	636532	6427182	CLAY	5.5			1-3t
24	2	50H	636743	6427935	CLAY	4.7	4.7	5.0	3t
24	3	50H	637231	6427690	Sand	4.7	4.5	4.9	4t
24	4	50H	637080	6427283	Sand	4.9	5.0	5.1	2t
26	1	50H	635378	6428145	Sand	5.5	6.7	7.2	1t
26	2	50H	635413	6428800	Sand	4.5	4.3	4.2	5t
26	3	50H	636265	6428800	Sandy Loam	5.0	5.4	5.9	2t
26	4	50H	635884	6428542	Sandy Loam	5.3	6.6		1t
26	5	50H	636113	6428169	Sand	4.9	5.0	6.2	3t
28	1	50H	634609	6412310	Sand	5.1	5.3	6.1	2t
28	2	50H	634594	6411831	CLAY	5.2	5.7		2t
28	3	50H	634981	6411689	Sand	5.2	5.4	5.7	2t
28	4	50H	635334	6411847	CLAY	5.1	5.3	5.1	2t
30	1	50H	634385	6413353	CLAY	4.9	5.3	6.2	2t
30	2	50H	633984	6413095	CLAY	5.1	5.4	5.7	2t
30	3	50H	633500	6413394	Sand	5.2	4.9	5.0	2t
30	4	50H	633811	6412517	Sand	5.2	5.5	6.3	2t
30	5	50H	634418	6412714	CLAY	5.5	5.6	6.2	
7	1	50H	635177	6415271	Sandy Loam	4.9			2-4t

Lime Recommendation

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
03	1	2			2				1			5t
03	2	1			1							2t
03	3				1				1			2t
03	4	1			1				1			3t
04	1											
04	2	1								1		2t
04	3	1				1				1		3t
04	4	1								1		2t
07	2					1					1	2t
07	3					1					1	2t
07	4	2				2					1	5t
15	1											
15	2											
15	3	2				1					1	4t
15	4	2				1					1	4t
15	5											
15	6					1						1t
20	1	1								1		2t
20	2	2				2				1		5t
20	3	1								1		2t
20	4	1			1					1		3t
24	1				1				1			1-3t
24	2	2			1							3t
24	3	2			1				1			4t
24	4	1			1							2t
26	1					1						1t
26	2	2				2				1		5t
26	3	1				1						2t
26	4					1						1t
26	5	1				1				1		3t

Lime Recommendation (cont.)

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
28	1		1					1				2t
28	2		1					1				2t
28	3		1					1				2t
28	4		1					1				2t
30	1	1					1					2t
30	2	1					1					2t
30	3	1					1					2t
30	4	1					1					2t
30	5						1					
7	1	1			1				1			2-4t

Lime Recommendation

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pH Results

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
Boggy	1	50J	602262	6478470	Sand	5.2			2-4t
Boggy	2	50J	601987	6478732	Sand	4.8	4.2		4t
Boggy	3	50J	602058	6479189	Sand	5.4	5.2		1t
Boggy	4	50J	602388	6479328	Sand	4.8	4.2		4t
Boggy	5	50J	602487	6479028	Sand	5.0	4.5		4t
Boggy	6	50J	602661	6478717	Sand	5.1	4.5		4t
Dam	1	50J	606118	6477441	Sand	4.5	4.3		5t
Dam	2	50J	605915	6477003	Sand	4.6	4.7		4t
Dam	3	50J	605737	6476695	Sand	4.4	4.3		5t
Dam	4	50J	605425	6476966	Sand	4.5	4.2		5t
Dam	5	50J	605429	6477579	Sand	4.6	4.3		4t
Dam	6	50J	605773	6477891	Sand	4.8	4.5		4t
Dam	7	50J	605574	6477241	Sand	4.4	4.1		5t
Front	1	50J	602432	6481364	Sand	4.6	4.0		5t
Front	2	50J	602110	6481262	Sand	4.9	4.5	4.4	5t
Front	3	50J	601922	6481018	Sand	4.5	4.0		5t
Front	4	50J	602153	6480725	Sand	4.5	4.1		5t
Front	5	50J	602348	6481013	Sand	5.4	5.7		1t

Colour key for quick soil acidity assessment

Colour	Soil pH	Acidity Rating	Urgency of these areas requiring lime
	Less than 4.5	Extremely Acid	Very Urgent – This season is highly desirable
	4.6 to 5.2	Moderately Acid	Urgent – Within the next year or two
	5.3 – 5.9	Slightly Acid	Maintenance Liming – Within the next few years
	Above 6.0	Good	Maintenance Liming – Possibly after 5 to 7 years

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pH Results (cont.)

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
Reserve	1	50J	604997	6478763	Sand	5.2	4.7		2t
Reserve	2	50J	604443	6478585	Sand	5.0			2-4t
Reserve	3	50J	604104	6478469	Sand	4.8	4.7		3t
Reserve	4	50J	604121	6478158	Sand	4.7			3-5t
Reserve	5	50J	604610	6478157	Sand	4.8	4.7		2t
Reserve	6	50J	605016	6478389	Sand	4.8	4.4		4t
Tank	1	50J	606587	6478843	Sand	4.4	3.9	4.0	5t
Tank	2	50J	606522	6478459	Sand	4.7	4.1	4.3	5t
Tank	3	50J	606673	6478117	Sand	4.8	4.8		3t
Tank	4	50J	606887	6478319	Sand	4.7	4.1		4t
Tank	5	50J	606905	6478729	Sand	4.7	4.6	5.1	3t
Tank	6	50J	606853	6479105	Sand	4.5	4.2		4t
Windmill	2	50J	607579	6477783	Sand	4.9	4.0	4.1	5t
Windmill	3	50J	607895	6477942	Sand	4.8			2-4t
Windmill	4	50J	608022	6477523	Sand	5.0	4.6		2t
Windmill	5	50J	607618	6477527	Sand	5.0	4.2	4.3	5t
Windmill	6	50J	607078	6477555	Sand	4.7	4.1		4t
Windmill	7	50J	607160	6477907	Sand	4.7	4.0	3.9	5t

Lime Recommendation

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
Boggy	1	1				1				1		2-4t
Boggy	2	2				1				1		4t
Boggy	3					1						1t
Boggy	4	2				1				1		4t
Boggy	5	2				1				1		4t
Boggy	6	2				1				1		4t
Dam	1	2			2				1			5t
Dam	2	2			1				1			4t
Dam	3	2			2				1			5t
Dam	4	2			2				1			5t
Dam	5	2			1				1			4t
Dam	6	2			1				1			4t
Dam	7	2			2				1			5t
Front	1	2			2				1			5t
Front	2	2			2				1			5t
Front	3	2			2				1			5t
Front	4	2			2				1			5t
Front	5				1							1t
Reserve	1	1				1						2t
Reserve	2	1				1				1		2-4t
Reserve	3	1				1				1		3t
Reserve	4	2				1				1		3-5t
Reserve	5	1				1				1		2t
Reserve	6	2				1				1		4t
Tank	1	2			2				1			5t
Tank	2	2			2				1			5t
Tank	3	1			1				1			3t
Tank	4	2			1				1			4t
Tank	5	1			1				1			3t
Tank	6	2			1				1			4t

Lime Recommendation (cont.)

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
Windmill	2	2			2				1			5t
Windmill	3	1			1				1			2-4t
Windmill	4	1							1			2t
Windmill	5	2			2				1			5t
Windmill	6	2			1				1			4t
Windmill	7	2			2				1			5t

Lime Recommendation

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pH Results

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
M 5	1	50J	621002	6494081	Sand	5.3	4.5	4.3	3t
M 5	2	50J	620772	6493973	Sand	5.5	4.5	4.3	3t
M 5	3	50J	620403	6494068	Sand	6.2	5.4	6.0	
M 5	4	50J	620394	6493515	Sand	5.4	4.4	4.4	3t
M 5	5	50J	620710	6493527	Sand	5.4	4.7	5.1	2t
M 5	6	50J	621118	6493505	Sand	5.6	4.6	4.1	3t
M 5	7	50J	621845	6493495	Sand	4.7	4.2	4.1	4t
M 5	8	50J	621858	6493983	Sand	5.7	4.6	4.1	3t
M 5	9	50J	621586	6493984	Sand	5.3	4.4	4.1	3t
M 5	10	50J	621247	6493924	Sand	5.1	4.6	4.7	3t
M 5	11	50J	621250	6493579	Sand	4.7	4.4		3t
M 5	12	50J	621468	6493397	Sand	4.7	5.7	5.5	1t
M 7	1	50J	620997	6493233	Sand	5.7	4.4		3t
M 7	2	50J	620713	6493176	Sand	5.8	4.2		3t
M 7	3	50J	620418	6493268	Sand	5.4	4.1		3t
M 7	4	50J	620326	6492718	Sand	5.6	4.6		3t
M 7	5	50J	620641	6492727	Sand	6.3	4.4	4.4	3t
M 7	6	50J	620992	6492643	Sand	5.3	4.4		3t

Colour key for quick soil acidity assessment

Colour	Soil pH	Acidity Rating	Urgency of these areas requiring lime
	Less than 4.5	Extremely Acid	Very Urgent – This season is highly desirable
	4.6 to 5.2	Moderately Acid	Urgent – Within the next year or two
	5.3 – 5.9	Slightly Acid	Maintenance Liming – Within the next few years
	Above 6.0	Good	Maintenance Liming – Possibly after 5 to 7 years

Aglime

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BUILDING BETTER SOILS

Lime Recommendation

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
M 5	1	1					1				1	3t
M 5	2	1					1				1	3t
M 5	3											
M 5	4	1					1				1	3t
M 5	5	1					1					2t
M 5	6	1					1				1	3t
M 5	7	2				2						4t
M 5	8	1				1				1		3t
M 5	9	1				1				1		3t
M 5	10	1				1				1		3t
M 5	11	1				1				1		3t
M 5	12	1										1t
M 7	1	1			1			1				3t
M 7	2	1			1			1				3t
M 7	3	1			1			1				3t
M 7	4	1			1			1				3t
M 7	5	1			1			1				3t
M 7	6	1			1			1				3t

Lime Recommendation

Prepared by the Building Better Soils professionals:
Helping to ensure the future profitability of your farm.

PRECISION SoilTech

Aglime of Australia

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pH Results

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
Back Hangar	1	50H	619733	6458388	Sandy Loam	6.4	4.3		2t
Back Hangar	2	50H	619553	6457748	Loam	5.2	5.4		1t
Back Hangar	3	50H	619164	6457768	Loam	6.9			
Back Hangar	5	50H	619030	6458594	Loam	6.7			
Back Hangar	6	50H	619488	6458598	Loamy Clay	8.0			
Back Hangar	7	50H	619299	6458399	Loam	8.0			
Grindstone	1	50H	621541	6458634	Loam	5.5			1-3t
Grindstone	2	50H	621991	6458440	Loam	5.2			2-4t
Grindstone	3	50H	621596	6458230	Loam	7.5			
Grindstone	4	50H	620949	6458567	Loam	5.1			2-4t
Grindstone	5	50H	620669	6458323	Sandy Loam	5.2	5.3		1t
Grindstone	6	50H	621068	6458178	Loam	8.3			
Hangar	1	50H	620039	6458520	Sandy Loam	4.7	4.6		3t
Hangar	2	50H	620469	6458431	Sandy Loam	4.4	4.2		5t
Hangar	4	50H	620607	6457855	Sand	6.3			0-3t
Hangar	5	50H	620236	6457709	Sandy Loam	5.1	5.1		2t
Hangar	6	50H	620645	6457482	Sandy Loam	6.8			
Hangar	7	50H	620042	6458232	Sandy Loam	4.8			2-4t

Colour key for quick soil acidity assessment

Colour	Soil pH	Acidity Rating	Urgency of these areas requiring lime
	Less than 4.5	Extremely Acid	Very Urgent – This season is highly desirable
	4.6 to 5.2	Moderately Acid	Urgent – Within the next year or two
	5.3 – 5.9	Slightly Acid	Maintenance Liming – Within the next few years
	Above 6.0	Good	Maintenance Liming – Possibly after 5 to 7 years

pH Results (cont.)

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
Wilkinson Mill	2	50H	620994	6457638	Loam	7.7	7.3		
Wilkinson Mill	3	50H	621286	6457607	Loam	6.4			0-3t
Wilkinson Mill	4	50H	621452	6457820	Loam	7.3			
Wilkinson Mill	5	50H	622010	6457595	Loam	5.3			1-3t
Wilkinson Mill	6	50H	621962	6457905	Loam	5.8			0-3t
Wilkinson Mill	7	50H	621133	6457974	Loam	6.2			0-3t

Lime Recommendation

Paddock	Site	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10yr Rec
Back Hangar	1	1				1						2t
Back Hangar	2					1						1t
Back Hangar	3											
Back Hangar	5											
Back Hangar	6											
Back Hangar	7											
Grindstone	1						1				1	1-3t
Grindstone	2		1				1				1	2-4t
Grindstone	3											
Grindstone	4		1				1				1	2-4t
Grindstone	5		1									1t
Grindstone	6											
Hangar	1	1			1				1			3t
Hangar	2	2			2				1			5t
Hangar	4											0-3t
Hangar	5				1				1			2t
Hangar	6											
Hangar	7	1			1				1			2-4t
Wilkinson Mill	2											
Wilkinson Mill	3											0-3t
Wilkinson Mill	4											
Wilkinson Mill	5			1					1			1-3t
Wilkinson Mill	6								1			0-3t
Wilkinson Mill	7											0-3t

Soil Sampling Summary

Prepared by the Building Better Soils professionals:
Helping to ensure the future profitability of your farm.

PRECISION SoilTech

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For a detailed Lime Report (fully rebated on Aglime orders over 250t) contact Precision SoilTech on 1800 644 951.

pH Results

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH
A 03	1	50J	617446	6460441	Sandy Loam	5.3	4.6	
A 03	2	50J	617698	6460455	Sandy Loam	5.2	4.5	
A 04	1	50J	617913	6460412	Sandy Loam	4.9	4.1	4.5
A 07	1	50J	621582	6458886	Sandy Loam	4.4	4.3	
A 07	2	50J	621767	6459405	Sandy Loam	4.4	4.3	
A 07	3	50J	621207	6459661	Sandy Loam	4.6		
A 08	1	50J	619016	6459236	Loam	7.4	7.6	
A 08	2	50J	619701	6459604	Sandy Loam	7.6	7.5	
A 08	3	50J	619834	6458925	Loam	8.3	8.0	
A 08	4	50J	620463	6458905	Loam	7.5	7.4	
A 10	1	50J	617602	6459540	Sandy Loam	5.0	4.3	
A 10	2	50J	618502	6459340	Loam	7.6	7.5	
Avon 06	1	50J	621470	6460452	Sand	6.1	5.0	
Avon 06	2	50J	621964	6460190	Sand	5.3	4.7	
Avon 06	3	50J	621656	6459926	Sand	5.7	5.5	
G 02	1	50J	619926	6461943	Sand	7.8	7.6	
G 02	2	50J	620798	6461717	Sand	6.2		

pH Results (cont.)

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH
R 02	1	50J	615577	6461642	Sand	5.5	5.2	5.7
R 02	2	50J	615766	6462354	Sandy Loam	6.0	5.7	
R 02	3	50J	616144	6462192	Sandy Loam	5.2	5.0	
R 02	4	50J	616171	6461637	Sandy Loam	6.2	5.4	
R 06	1	50J	614539	6460975	Sandy Loam	5.0	5.7	
R 06	2	50J	613958	6461082	Sand	6.3	4.9	5.8
R 06	3	50J	614025	6460874	Loam	8.1	8.0	
R 06	4	50J	614545	6460835	Sandy Loam	5.0	4.7	
R 07	1	50J	614902	6460469	Sandy Loam	4.6	4.7	
R 07	2	50J	614713	6460169	Sandy Loam	4.8	5.2	
R 07	3	50J	614240	6460543	Sand	4.9	4.7	
R 08	1	50J	615806	6460580	Sandy Loam	5.2	4.8	
R 08	3	50J	615399	6460114	Sandy Loam	5.3	4.7	
R 08	4	50J	615397	6460358	Sandy Loam	5.0	4.2	
S 01	1	50J	623320	6476962	Sand	5.5	4.9	
S 01	2	50J	623554	6477257	Sand	5.2	4.3	
S 01	3	50J	623303	6477771	Sand	5.2	4.4	
S 01	4	50J	622930	6477724	Sand	6.0	5.2	
S 02	1	50J	623228	6478033	Sand	5.2	4.2	
S 02	2	50J	623479	6478364	Sand	5.1	5.1	
S 02	3	50J	623613	6478650	Sand	5.1	4.1	4.3
S 02	4	50J	622747	6478699	Sand	4.9	4.7	
S 03	1	50J	622814	6479175	Sand	5.2	5.3	
S 03	2	50J	622482	6479384	Sand	5.1	4.9	
S 03	3	50J	623035	6479621	Sand	5.0	4.6	4.2
S 03	4	50J	623618	6479353	Sand	4.1	6.4	5.4
S 04	1	50J	623550	6480210	Loam	4.9	4.1	4.0
S 04	2	50J	623098	6479899	Sand	4.9	4.9	4.3
S 04	3	50J	622401	6480077	Sand	5.0	4.2	
S 04	4	50J	622973	6480376	Sand	4.9	4.3	

pH Results (cont.)

Paddock	Site	Zone	Easting	Northing	Soil Type	Top pH	Mid pH	Sub pH
S 05	1	50J	623807	6480272	Sand	4.7	4.0	
S 05	2	50J	624224	6480608	Sand	5.1	5.2	
S 05	3	50J	624642	6480168	Sand	4.9	4.6	
S 05	4	50J	624155	6479808	Sand	5.0	4.3	
S 06	1	50J	624171	6479643	Sand	4.8	4.2	4.2
S 06	2	50J	624654	6479262	Sand	4.8	4.2	4.5
S 06	3	50J	624301	6479053	Sand	4.5	4.1	4.2
S 06	4	50J	623800	6479293	Sandy Loam	4.6	4.2	4.1
S 08	1	50J	624020	6477758	Sand	5.7	5.3	
S 08	2	50J	623764	6477417	Sand	5.5	4.8	
S 08	3	50J	624229	6476971	Sand	5.4	5.1	
S 08	4	50J	624666	6477608	Sand	5.7	5.1	
S 09	1	50J	625410	6477173	Loam	5.0	5.2	
S 09	2	50J	625340	6476863	Clay	5.3		
S 10	1	50J	625191	6477819	Sand	4.9	4.3	
S 10	2	50J	625182	6477374	Sandy Loam	4.5	4.1	

Interpreting your Report

Quality of Liming Material

The liming recommendations are based upon our high quality Aglime limesand. Limes are natural products, largely consisting of broken down coral and shells. There is considerable variation in the quality of different lime sources. Aglime limesands have been independently established as the best available source of lime for much of the agricultural zone in WA. If other liming materials such as crushed limestone or dolomite (or limesands that may be poorer quality than Aglime) are used, higher rates or more frequent liming may be needed to adjust for the lower quality.

Testing pH

We have used topsoil pH measurements from your CSBP or Summit tests. If you have had midsoil or subsoils sampled, these pH measurements will have been made in our own laboratory. All soil pH we report has been measured in a 1:5 0.01M $CaCl_2$ solution. All clients are welcome to visit our laboratory and see our pH robot in action.

Limited Profile Sampling

The best liming recommendations are possible when soil samples are taken from the top (0-10cm), mid (10-20 cm) and subsoil (20-30cm). When we only have the topsoil pH, the liming requirement over the 10 year period is in an estimated range. For example, when the subsoil is clayey (and likely to be higher pH), the lower recommendation is most likely relevant. In contrast, where the subsoil is sandy (and we expect the pH to be lower), the higher recommendation is most likely the more accurate.

Remedial and Maintenance Liming

Aglime of Australia recommends topsoil pH's should be at least in the mid 5's and subsoils at least into the high 4's, preferably 5.0. One t/ha of Aglime every 5 to 10 years is needed to maintain soils at this level in most farming areas. However, most sandy and loamy soils initially need remedial liming and this can result in up to 5 applications of 1t/ha (or better still two application of 2t/ha, followed by a fifth tonne if needed) of Aglime recommended over a 10 to 15 year period before maintenance liming is adopted.

In this situation, liming increases the topsoil pH well into 6's. As the lime leaches out of the topsoil and into the subsoil, the topsoil pH falls at about 0.1 units per year. We welcome clients to call into our office, and be shown the very detailed models of lime movement that have been developed from long term lime trials to confirm the rate of movement into the subsoil.

Application Rate

We recommend that Aglime be applied at regular 1t/ha rates on most soils as this has generally proved the most economic method on farms that have large areas in need of treatment. On the more acid sites (ph below 4.5), Aglime should be applied at higher rates (2t/ha) and more regularly (2 to 4 times in the first 10 years) until the subsoil has been adequately treated. DAFWA research has confirmed the best way to treat subsurface acidity is to ensure topsoil pH is near 6.

If you are growing a very aluminium sensitive crop or pasture (eg barley, canola or medic) in your rotation, it is also likely to be worth increasing the rate of Aglime as quickly as possible if the soils are very acid to ensure best returns from these more sensitive species.

What to expect for Sandy-Loam Soils

From measurements taken in our extensive field trial research program, we can estimate the following pH increases in sandy loam soils with a typical initial topsoil pH of around 4.5:

1st tonne:	Increases topsoil pH levels by around 0.7 units *(4.5 -> 5.2)*.
2nd tonne:	Increases topsoil pH by around a further 0.5 units *(5.2 -> 5.7)*, allowing excess lime to leach into the mid and subsoil, treating acidity at that level *(4.1 -> 4.3)*. More lime will leach into the subsoil over time.
3rd tonne:	Increases topsoil pH by around a further 0.3 units *(5.7 -> 6.0)*, providing more excess Aglime for leaching *(4.3 -> 4.5 in the midsoil, 4.1 -> 4.2-4.3 in the subsoil)*.

Subsoil Leaching

Most of the Aglime dissolves in the first season and can start leaching into the midsoil on sandy soil types once the pH reaches about 5.3 or higher. It may take several years for the Aglime to leach from the topsoil into the deeper subsoils. Consequently, regular liming should be started early to ensure sufficient Aglime is moving down into the subsoils to rehabilitate them and also to prevent those that currently have pH levels around 4.5-5.0 from becoming too acid.

Monitoring your soil's response

All soils behave slightly differently and, although we can fairly confidently predict their reaction to liming, they still need to be regularly tested (at least every 4 years) to be sure sufficient Aglime is being added, especially when subsoils require treatment. Based upon on comprehensive soil testing across WA (over 120,000 sites over the past 10 years) we can be fairly confident that much of the state does indeed have quite severe subsoil acidity.

We encourage all clients to purchase digitised and rectified aerial photographs so that we can show you the pH levels overlain on the paddock; it makes the maps much clearer. If you have not already done so, please contact Precision SoilTech to arrange purchase of this photo through LANDGATE. All we need is a current farm map showing paddocks, surrounding roads and direction to the nearest town.

- Manganese and zinc are less available to plants after liming. Ensure these nutrients are at good levels to get the best results from liming (Mn >20ppm, Zn>16ppm at least).
- Potassium and copper should be adequate especially when liming lupins.
- Keep watch for take-all root disease and manage with grass control, ammonium sulphate fertilisers and / or manganese fertilizer.
- Take care with sulfonyl urea herbicides; use according to the label and avoid carry over effects.

If you have any other questions do not hesitate to call us on 1800 644 951.
Kind Regards,

The Building Better Soils Team