FarmLink
Precision Ag Trials

P & N across identified Paddock zones

Location- Temora & Coolamon

Although PA tools have been available to Australian grain growers for many years, and the benefits have been well documented, it is estimated that less than 1-% of grain growers utilise PA 'beyond guidance' in any form.

The objective of this GRDC / SPAA funded project is to increase the level of adoption of PA 'beyond guidance' by broadacre farmers. The project specifically aims to increase the level of adoption of variable rate (VR) by growers in the project to 30% by 2013. This goal will be achieved by demonstrating how to use PA tools to growers at a regional level and by increasing the skills of growers and industry in PA to a level where they can then use PA tools in their farming systems to achieve economic, environmental and social benefits.

Trials and demonstrations are conducted on growers' properties and are visited throughout the season using farm walks and workshops to discuss the advantages and disadvantages of PA techniques with the involvement of other regional growers.

This information sheet presents the outcomes of the SPAA trial conducted by FarmLink Research at Coolamon & Temora in season 2010.

Aims:

- To compare the effects on yield and economics of variable rates of P
- To compare yield and economics of N across identified paddock zones

Background:

Several growers within our group have a strong interest in the adoption of precision agriculture practices to improve productivity. As part of the SPAA project trial paddocks were identified and measurements taken to determine the variation across the trial paddocks. EM survey, historical yield data, historical imagery and grower knowledge were used to zone the paddocks into different rates of P application. P & N rich strips were implemented across all zones to determine yield potentials.

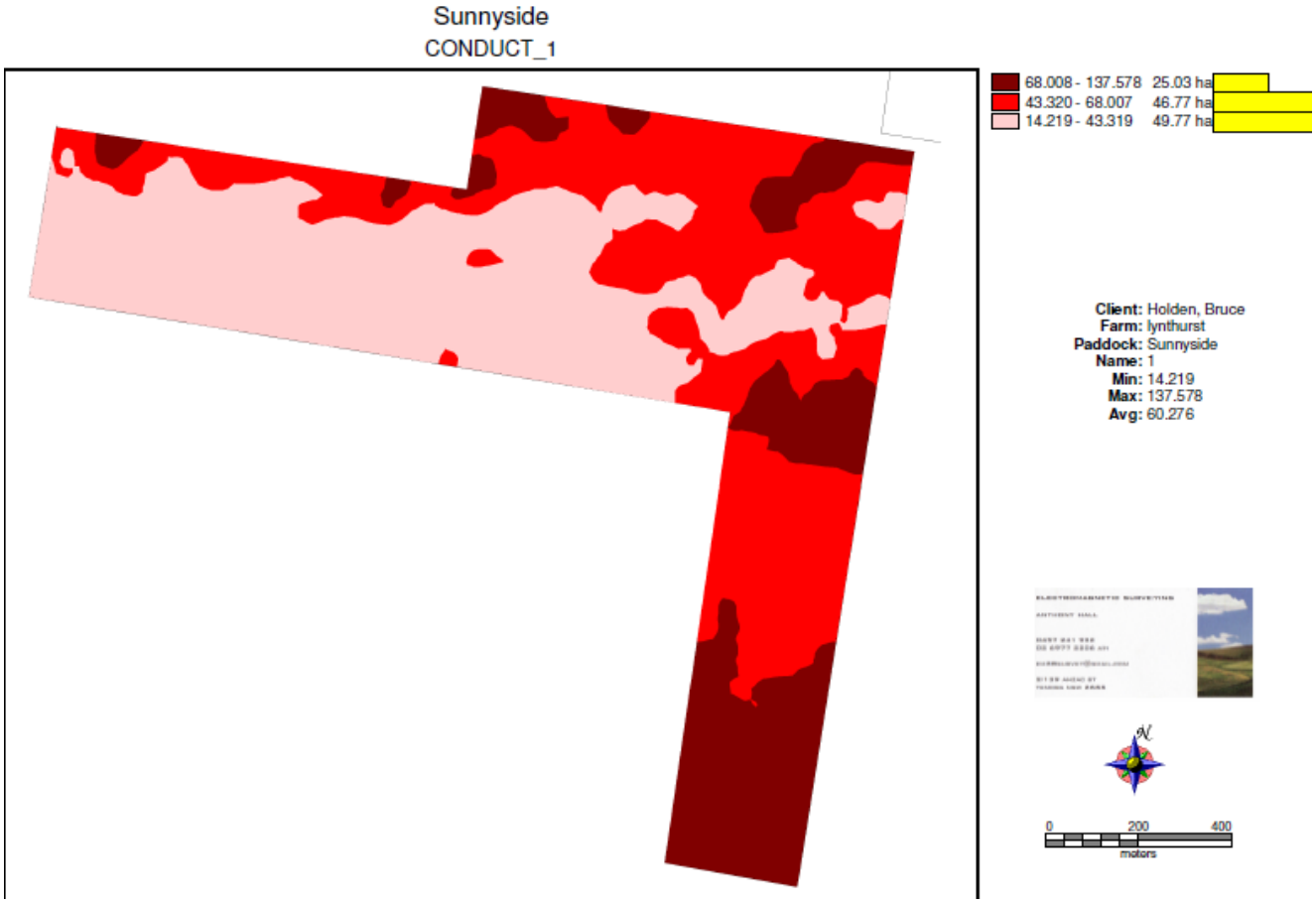
About the trial:

One trial paddock was located at Coolamon on Sunnyside the property of Bruce Holden. The paddock was sown to Crusader wheat on the 19th May 2010 using Horwood Bagshaw Scari bar with a Horwood Bagshaw seed cart behind a 8000 series JD tractor. MAP rates were 30, 40, 50 & 80kg/ha in the 3 zones and strips.

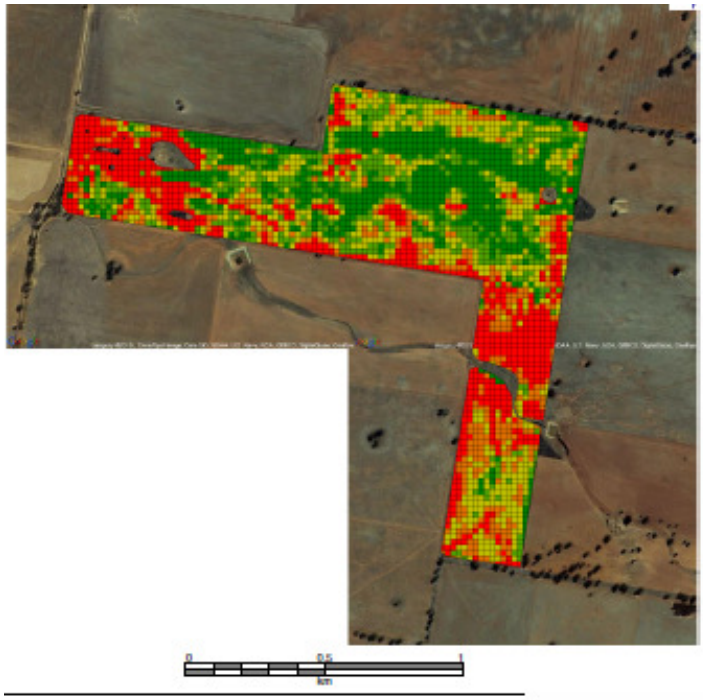
The second site was 6km North of Temora on the property of Craig Warren. It was sown to Lincoln wheat on the 23rd of May using a Morris drill with a New Holland SC180 seed cart behind a new Holland T8030 tractor. MAP rates of 25, 38 & 80kg/ha were used in the 3 zones.

3 rates of P were applied to each paddock according the yield potential of each zone plus the nutrient status of each zone as determined by deep soil testing. N & P rich strips were included as controls. EM surveys, historical yield data, soil test results and historical imagery were used to determine paddock zones.

Holden Sunnyside PA trial 2010



EM Survey Map



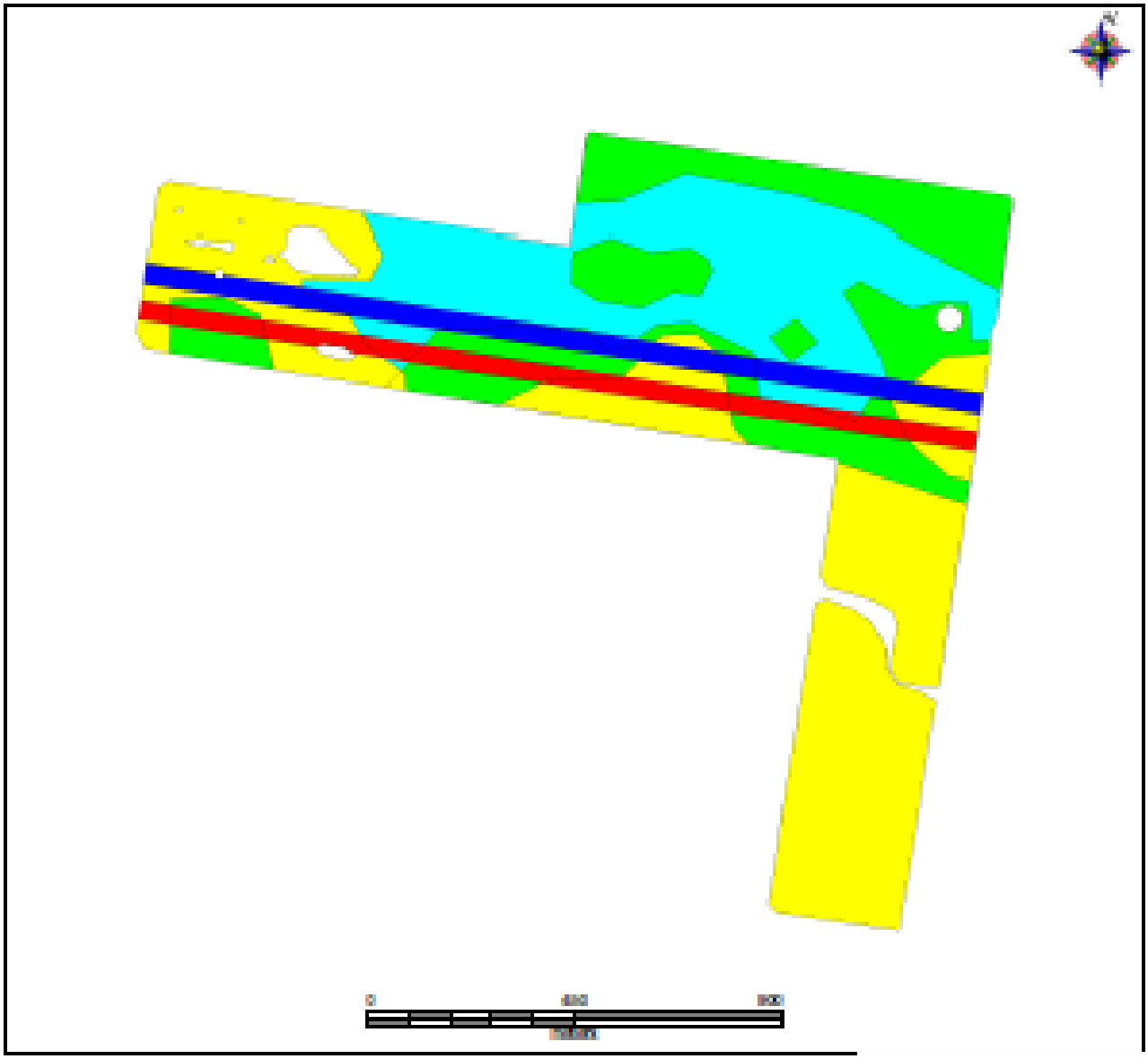
LANDMARK
look to us

Client: Holden, Bruce
Farm: Holden Holdings
Paddock: PA Paddock2
Name: Normalized Yield - 2004,200
Min: 10.66
Max: 594.51
Avg: 100.21

	118.00 - 594.51	26.53 ha
	107.00 - 117.99	20.78 ha
	96.00 - 106.99	24.04 ha
	85.00 - 95.99	16.60 ha
	10.66 - 84.99	27.51 ha

Historical NDVI Map 04-09

PA Paddock2 - 2010 Wheat: Application
MAP

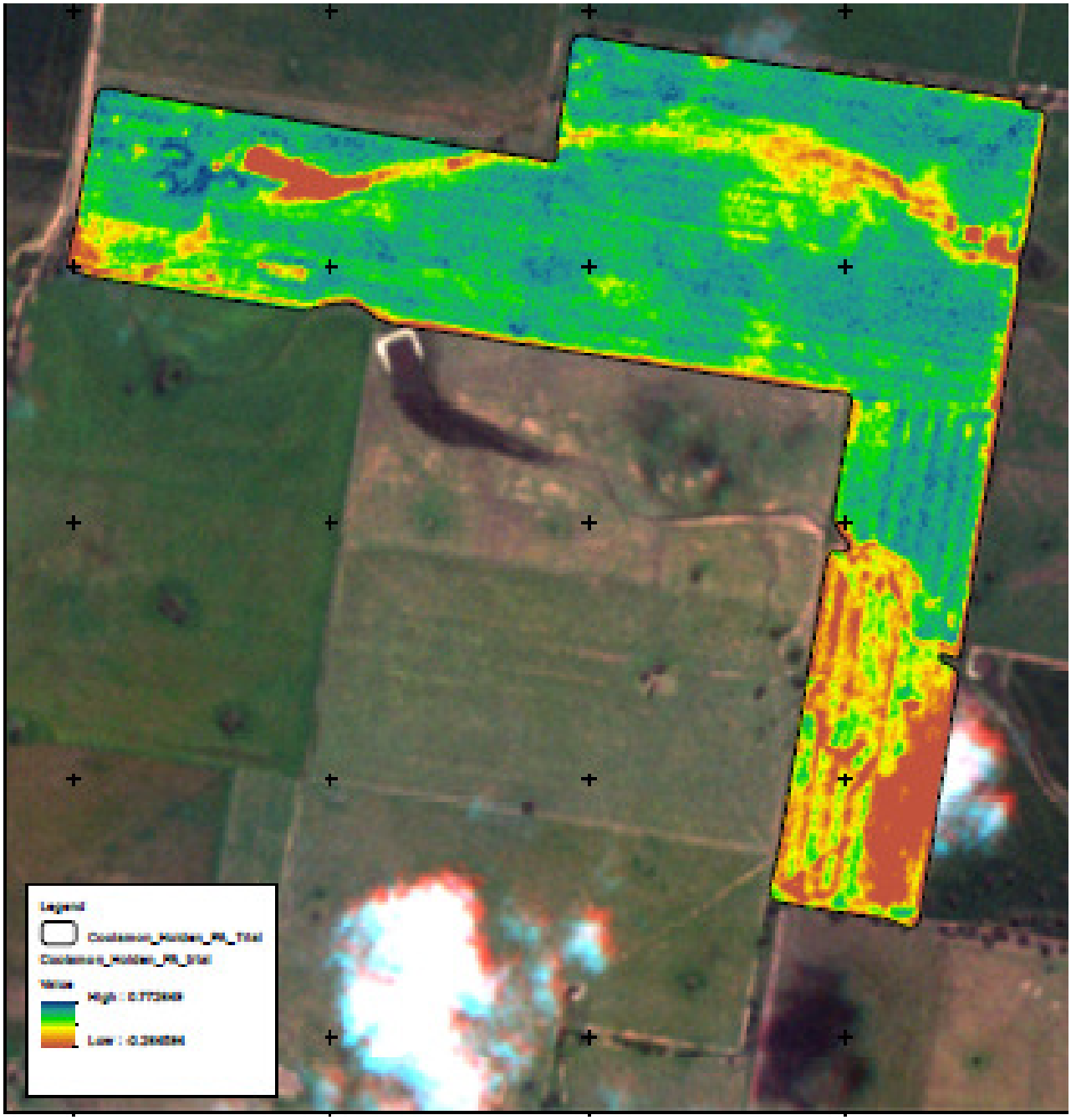


LANDMARK

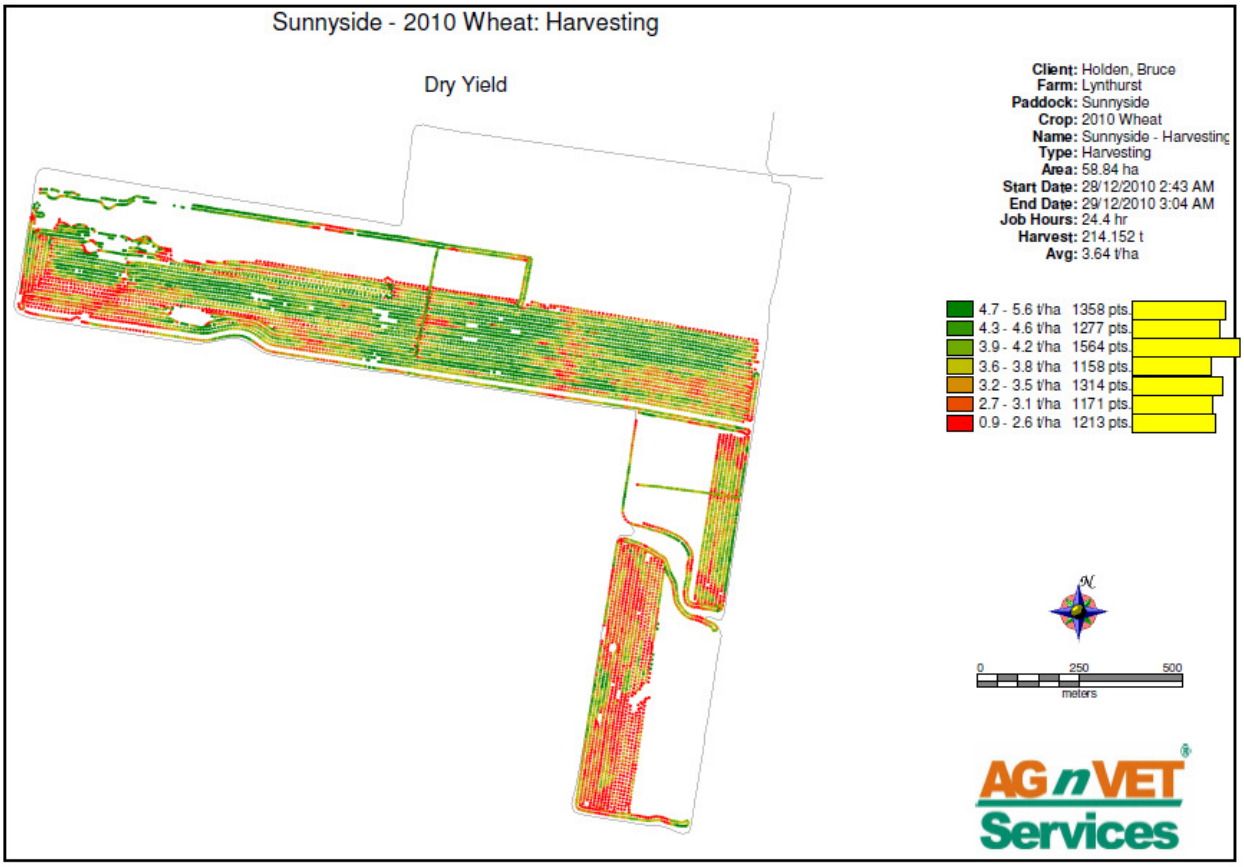
Client: Holden, Bruce
Farm: Holden Holdings
Paddock: PA Paddock2
Crop: 2010 Wheat
Name: PA Paddock2 - Application
Type: Application
Area: 120.00 ha
Date: 5/09/2010
MAP: 4.515 tonnes
Unit Cost: $0.001
Product Cost: $0.00
Cost Per Area: $0.00/ha

	60.00 kg/ha	8.26 ha
	50.00 kg/ha	26.66 ha
	40.00 kg/ha	26.63 ha
	30.00 kg/ha	43.20 ha
	0.00 kg/ha	7.58 ha

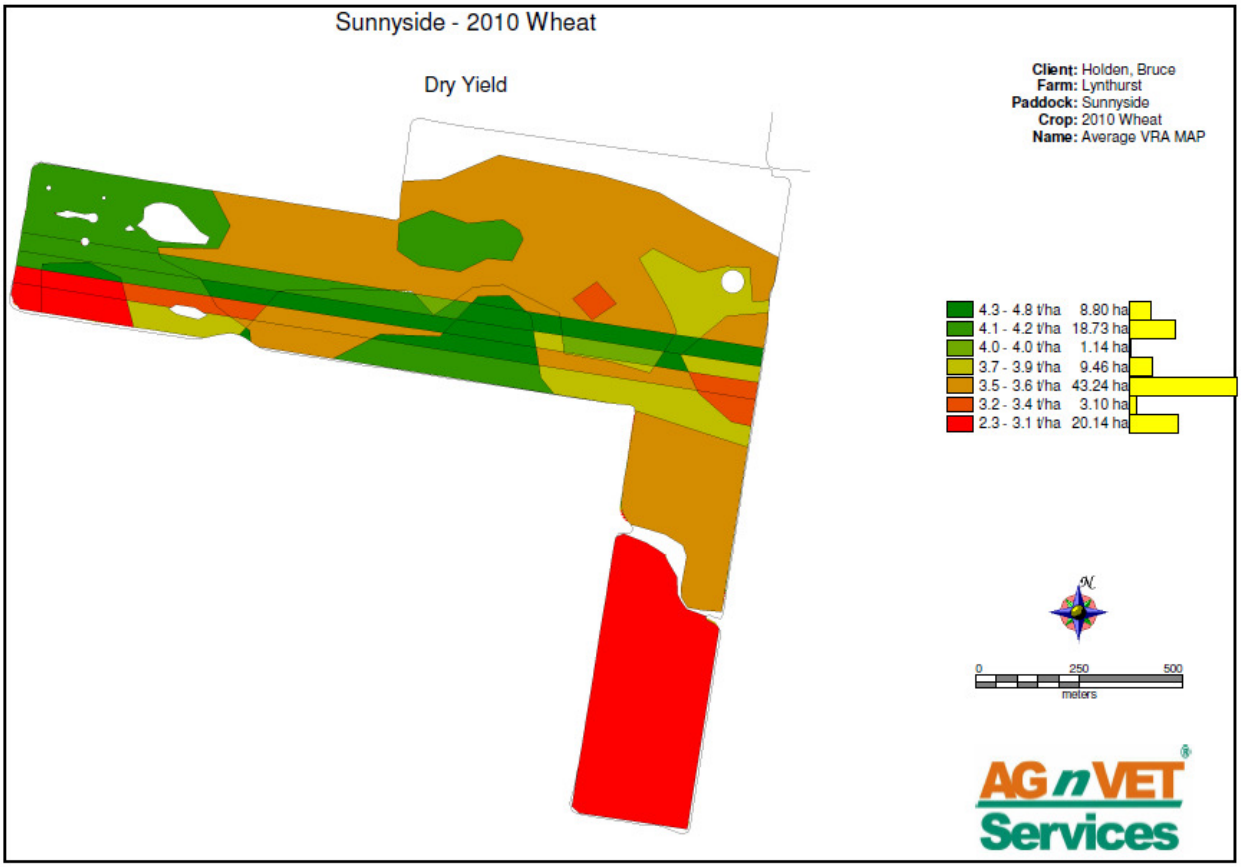
VRA Map Sunnyside 2010



NDVI map 24Sept 2010



Yield Map Sunnyside 28th December 2010



Yield Map over Zones Sunnyside 2010

	Name	Holden Sunnyside Zone 1	Holden Sunnyside Zone 1	Holden Sunnyside Zone 1	Holden Sunnyside Zone 1	Holden Sunnyside Zone 2	Holden Sunnyside Zone 2	Holden Sunnyside Zone 2	Holden Sunnyside Zone 2
	Code	YP4	YP4	YP4	YP4	YP4	YP4	YP4	YP4
	Customer	Paul	Paul	Paul	Paul	Paul	Paul	Paul	Paul
	Depth	0-10	10-40	40-70	70-100	0-10	10-40	40-70	70-100
Ammonium Nitrogen	mg/Kg	1	1	1	1	< 1	< 1	1	< 1
Nitrate Nitrogen	mg/Kg	9	6	5	2	11	3	4	4
Phosphorus Colwell	mg/Kg	85	5	3	3	63	5	3	3
Potassium Colwell	mg/Kg	334	250	239	268	373	386	523	502
Sulphur	mg/Kg	6.99	39.70	142.00	215.00	16.50	11.80	30.10	33.60
Conductivity	dS/m	0.060	0.401	0.892	1.103	0.059	0.104	0.293	0.377
pH Level (CaCl2)	pH	4.90	8.10	8.50	8.50	4.60	7.00	8.10	8.30
pH Level (H2O)	pH	6.10	9.10	9.40	9.40	5.60	8.00	9.10	9.30
Chloride	mg/Kg	20.26	136.44	516.56	29.35	22.18	0.80	1.40	0.70
PBI		78.00	100.40	92.60	85.40	92.90	84.60	112.40	120.70

	Name	Holden Sunnyside Zone 3	Holden Sunnyside Zone 3	Holden Sunnyside Zone 3	Holden Sunnyside Zone 3
	Code	YP4	YP4	YP4	YP4
	Customer	Paul	Paul	Paul	Paul
	Depth	0-10	10-40	40-70	70-100
Ammonium Nitrogen	mg/Kg	1	1	< 1	1
Nitrate Nitrogen	mg/Kg	14	9	15	5
Phosphorus Colwell	mg/Kg	104	37	8	3
Potassium Colwell	mg/Kg	491	505	684	596
Sulphur	mg/Kg	20.70	33.10	23.60	6.90
Conductivity	dS/m	0.076	0.107	0.161	0.211
pH Level (CaCl2)	pH	4.70	5.70	6.80	8.00
pH Level (H2O)	pH	5.70	6.60	7.70	8.90
Chloride	mg/Kg	8.33	3.62	6.77	0.30
PBI		47.80	72.20	112.90	106.70

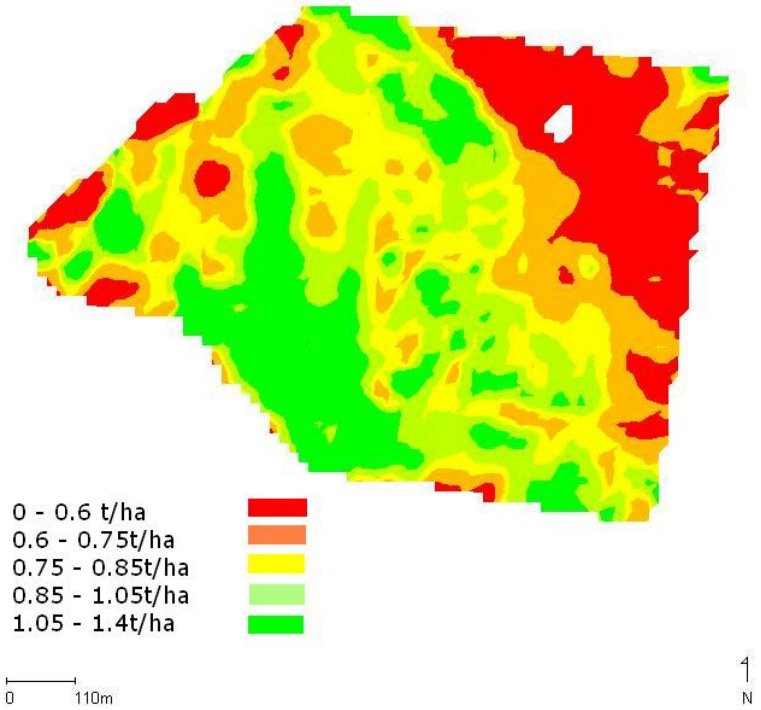
Tiller Counts Holden PA trial 20th Oct 2010.

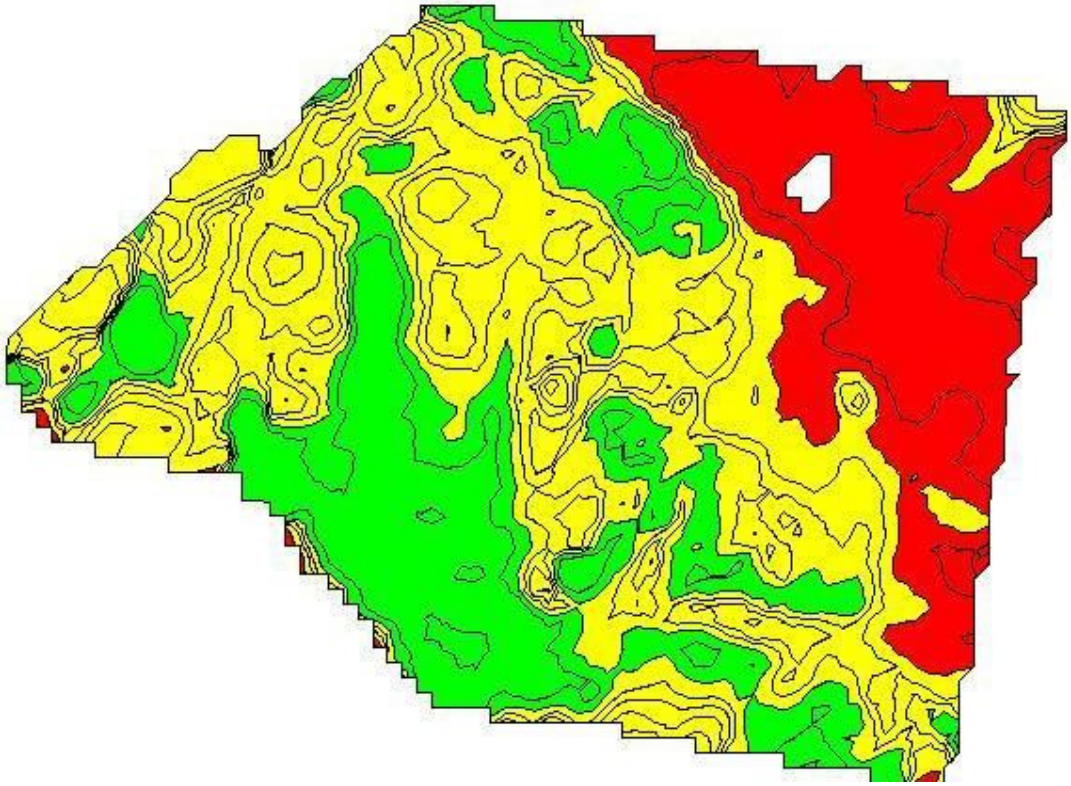
	O P strip			200kg Urea			80kg P	
Count	**Tiller/ 1m row**	**Tillers/ m2**	**Count**	**Tiller/ 1m row**	**Tillers/ m2**	**Count**	**Tiller/ 1m row**	**Tillers/ m2**
1	47	188.0	1	88	352.0	1	96	384.0
2	51	204.0	2	59	236.0	2	81	324.0
3	42	168.0	3	99	396.0	3	136	544.0
4	66	264.0	4	75	300.0	4	121	484.0
5	54	216.0	5	91	364.0	5	115	460.0
6	55	220.0	6	87	348.0	6	80	320.0
7	62	248.0	7	106	424.0	7	96	384.0
8	48	192.0	8	112	448.0	8	88	352.0
9	43	172.0	9	91	364.0	9	80	320.0
10	64	256.0	10	65	260.0	10	77	308.0
Avg	**53.2**	**212.8**		**87.3**	**349.2**		**97**	**388.0**

The initial setting up of this paddock was done using historical NDVI & yield maps. This in hindsight was not the ideal method as there are soil constraints in the paddock that were of stronger influence than P & N. Harvest was done on the 28th December 2010. There was a response to P in the tiller counts but this did not equate to high yield differences between treatments. Initial soil P levels were high and we did not expect a response to applied P. We will consider using Gypsum as a variable rate soil ameliorant in this area next season.

Warren PA trial 2010

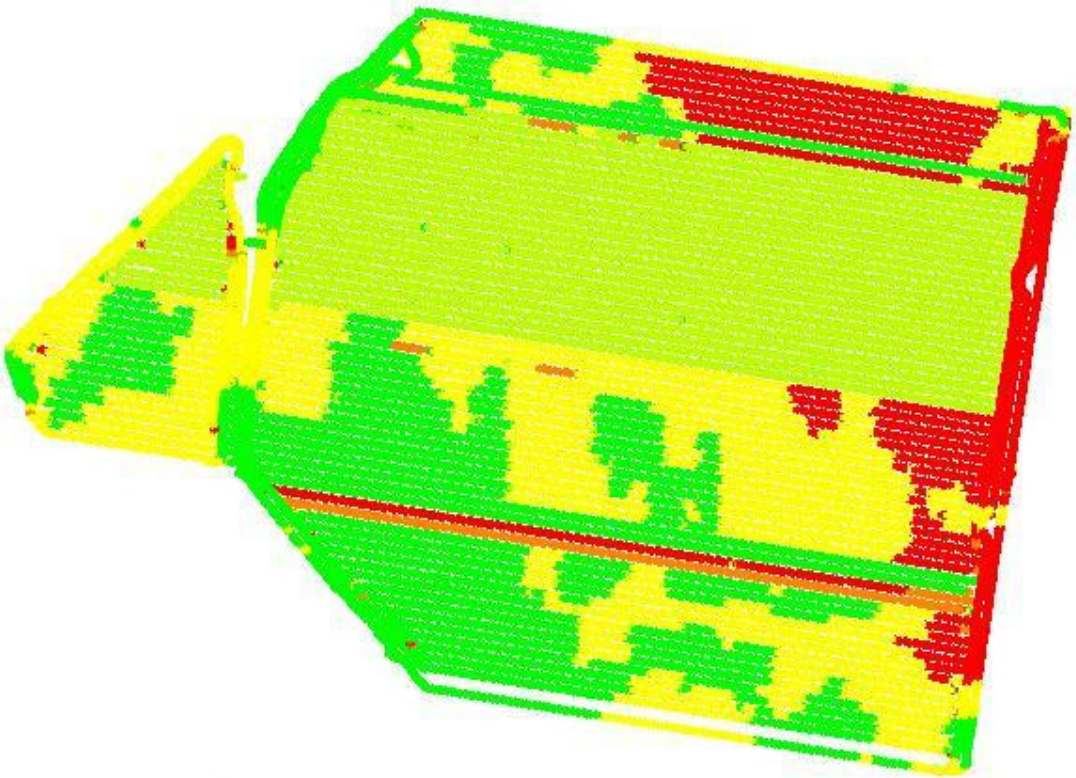
Warren Yield Map 09





Warren Application Map 2010

Warren Actual application map



80kg/ha MAP
70kg/ha MAP
60kg/ha MAP
40kg/ha MAP
20kg/ha MAP

Actual average applied 66kg/ha

Planned av. application 61kg/ha

Planned Blanket rate 75kg/ha

N

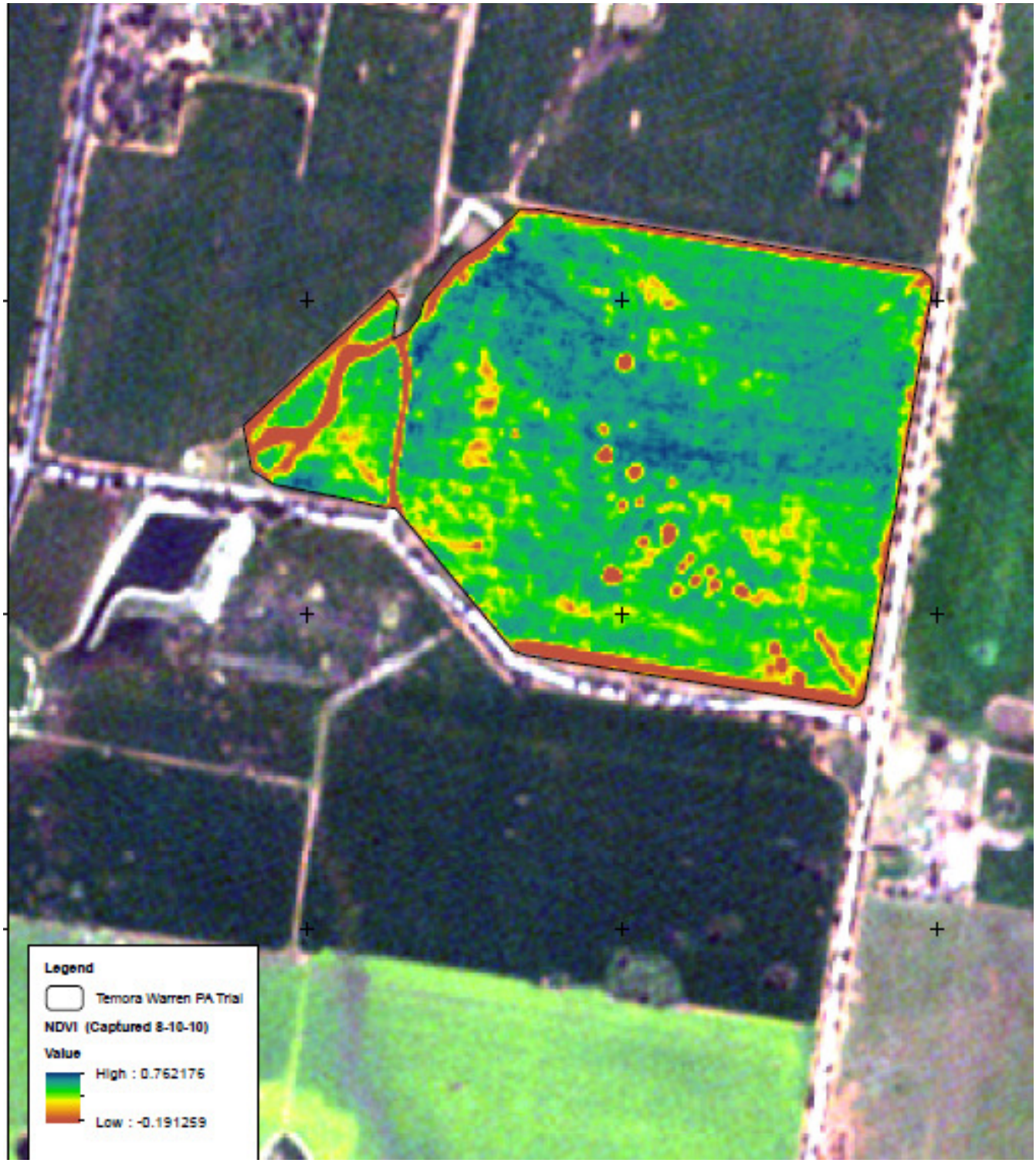
MAP @ $880/T

150ha x 0.075t = 11.25T = $9900

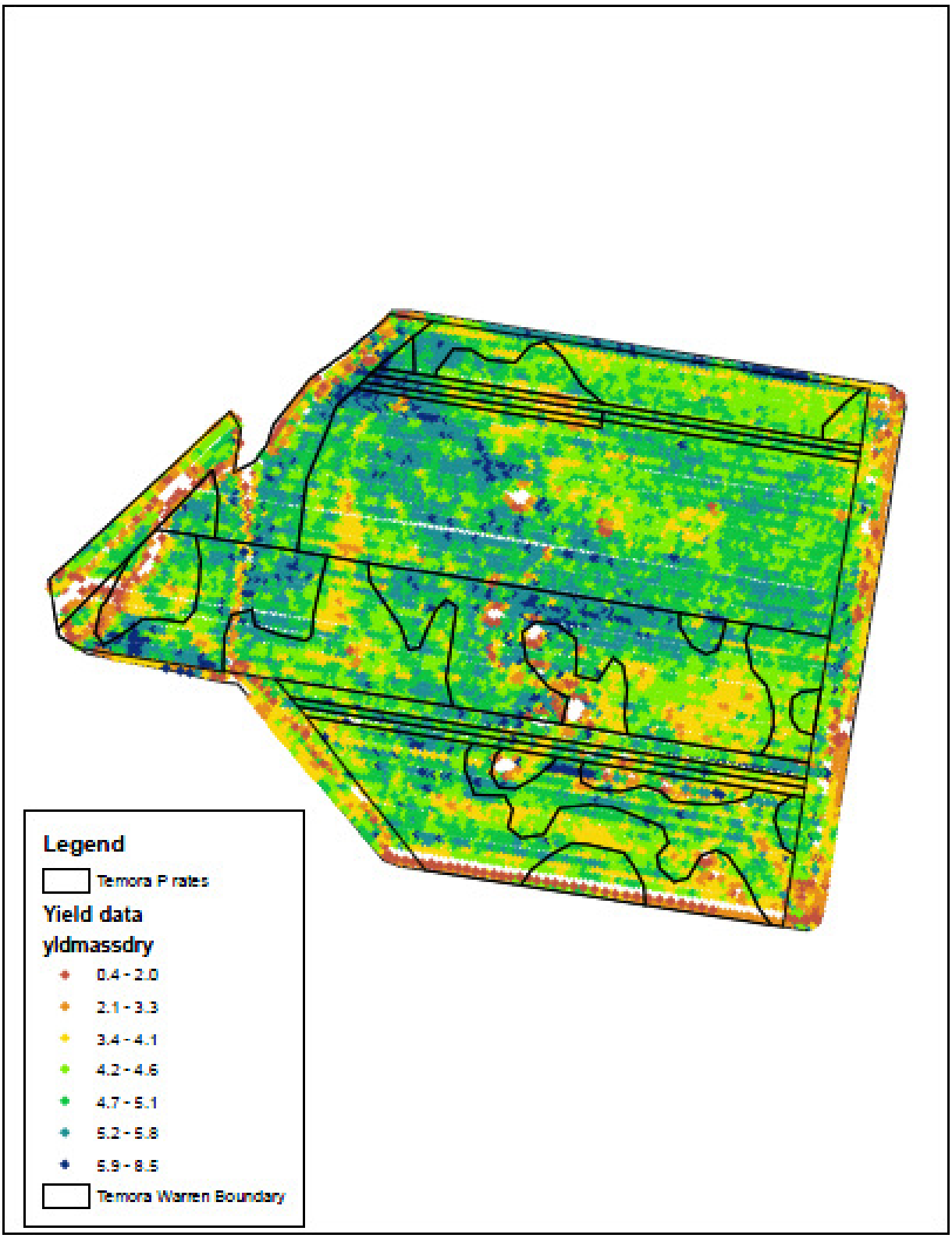
150ha x 0.066t = 9.9T = $8712

150ha x 0.61t = 9.15T = $8052

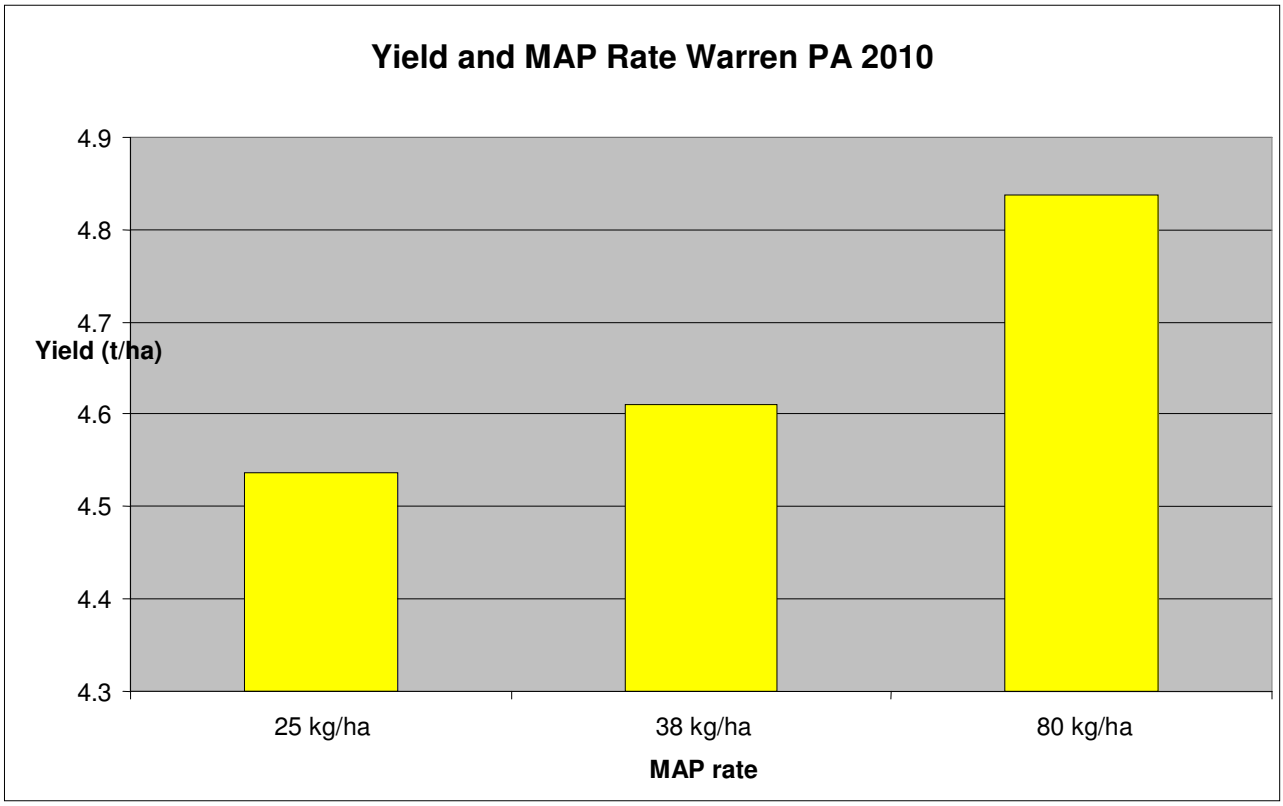
Warren Actual application map 2010



Warren NDVI map 8 Oct 2010



Warren Yield Map, 3 Jan 2011 with zone & treatment borders



The paddock at Warrens was setup using historical yield data and NDVI. Zones were allocated and MAP rates selected for each rate. Starting Colwell P was 23 and a response was expected to P as indicated by the graph above. The data above indicated that for every $ spent on P fertilizer in the 38kg/ha rate there was a return of $1.29. In the 80kg area the return was $1.22 for every dollar invested. The higher rate while increasing yields to a smaller degree and also increased the cost of fertilizer and reduced overall returns on investment.

We will do replacement P maps for 2011 season and continue to monitor this paddock.

Who was involved?

Holdens:
Bruce Holden, Anthony Hall (Agronomist Ag'n'vet Services), Leighton Wilksch (SPAA), Paul Breust (FarmLink Research)

Warrens:
Craig Warren, Leighton Wilksch (SPAA), Paul Breust (FarmLink Research)

Grower/Regional feedback:

Growers see PA as another step in gathering information on the land resource. Both are committed to developing their PA capabilities further. They see PA as another step towards improving productivity & profitability on their farms.

This project was funded by the Grains Research and Development Corporation (GRDC).

For more information

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