Angas Bremer Irrigation Management Zone

2005 – 2006 Annual Report

Website: - www.angasbremerwater.org.au

Angas Bremer Water Management Committee Inc

Supported by

Government of South Australia

South Australian Murray-Darling Basin Natural Resources Management Board

Bruce Allnutt (08)85360114

Report Contents

Angas Bremer Water Management Committee Inc.

Committee Members 2006-2007

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Mr. Terry McAnaney
Vice Chairman
Mr. John Pargeter
Treasurer
Mr. Guy Adams
Committee
Ms Sarah Keough & Di Davidson
Messrs. Colin Cross, John Follett, Rick Trezona and Brian Wyatt

Non-elected members of the Committee
Messrs. Tony Thomson Herb Videka and Peter Leah, Dept of Water, Land and Biodiversity Conservation (DWLBC)
Ms. Lyz Risby and, Natural Resource Management Board (RMCWMB)
Ms. Lian Jaensch, representing the Langhorne Creek Wine Industry Council
Secretary
Mrs. Barbara Blaser
Program/Project Coordinator
Mr. Bruce Allnutt

Report of the Activities of the Committee 2005-2006

1. FullStop

The FullStop is a tool that is used to monitor irrigation.
The FullStop has no wires, no electronics and no batteries.
The inexpensive, simple, mechanical FullStop does two things:
1. It displays a flag whenever the soil is wetted down to the depth at which the FullStop is installed
2. It easily and automatically collects a water sample that can be used to measure the amount of salt in the root zone

The patented CSIRO FullStop is the only commercially-available, inexpensive device that will both automatically detect a wetting front and automatically collect a soil-water sample.

The full report on the FullStop data for the 2003-4 irrigation year will be available on the Angas Bremer website before the end on 2006 www.angasbremerwater.org.au

The 2003-4 report includes the following three observations:

> "First, although average salinity readings in the 3000 – 3500 ppm range are high, these are the sort of numbers we might expect at 100 cm depth when trying to flush salt from the root-zone In fact lower values could indicate unnecessary leaching of salt.
> Second, maximum salt readings greater than 4800 ppm, as found at 50 cm depth, are a cause for concern. Most growers who took readings at 50 cm did so because they did not activate detectors at 100 cm. The high salt readings in the root zone confirm that the combination of their soil type and irrigation scheduling method is resulting in a build up salt right in the centre of the root zone.
> The third observation is that a decrease of around 500 ppm at 50 cm and an increase of around 500 ppm at 100 cm from the first to second seasons is a move in the right direction – although the trend needs to continue."

2.Flood-plain study: Report on the data collected to September 2004

Juliette Woods from Australian Water Environments (AWE) has collated all the data and written a report which will soon become available from the AB website www.angasbremerwater.org.au. (Target December 2006)

The soil moisture records show that when flood-water is applied, the speed that the wetting front moves down into the soil varies widely (1) at different sites, (2) at different soil depths (at the same site) and (3) in different years (at the same site).

The well water-level records show that beside the Bremer, during flooding, the watertable rises along a length of about 4km and for about 800m on each side of the Bremer. The rise is highest close to the river (2 to 4 metres) and zero at 800m from the river. It is proving difficult accurately to quantify how much of the water entered directly through the bottom of the river and how much additional water drained below the flooded land.

3. Map Layers CD

A copy of the first DRAFT of this computer disc was posted to every Angas Bremer irrigator in October 2005.
A project is underway to make each of these map layers available from the Angas Bremer website (Target December 2006).
Whenever more data becomes available (e.g. from the District Irrigation Annual Report for each New Year) additional map layers will be added and made accessible from the website.

4. Angas Bremer Soils book

When the “Management” section for each soil has been completed a hard-copy, full-colour book will be provided to every Angas Bremer irrigator. (Target December 2006)

5. Database.

In the 2005-06 Irrigation year the Committee commissioned a computer programmer to produce a new database for the Irrigation Annual reports, this database collates the data for the Angas Bremer Annual report.

You will have noticed that the Irrigation Annual report forms were different this year as the database produces the forms with the base data from the previous year already printed on the form. The forms for 2006-07 will include the meter readings from the end of the 2005-06 year.

Any feedback from the Community in connection with Irrigation Annual reporting would be appreciated by the Committee.

6. ABWMC Sub-surface Drainage Trial report 2005-2006

This trial has been underway since the winter of 2001; the first report appeared in the 2002-2003 Angas Bremer Annual report. The report for 2005-2006 can be found at **Appendix “L”** of this report.

Irrigation Annual Reports 2005-2006 Data Summary

Irrigation Annual Report forms (IAR's) were posted out to 144 Angas Bremer Irrigators, of these 50% (72 irrigators) had their forms back to the Secretary by the due date, i.e. 31st July, 35% (50 irrigators) by the 31st of August, 7% (10irrigators) on or after the September 1st and the remainder (11 irrigators, 8%) are outstanding.

Outstanding IAR's mean that the district total figures in this report are understated. While the allocations to these irrigators are included in the report the total usage crop types and hectares irrigated are not included.

As a concession for 2006 the Committee decided to accredit those irrigators who had their forms returned to the Secretary after the due date, provided all other elements of the Angas Bremer Code of Practice were met.

One hundred and ten irrigators have been accredited for 2005-2006 irrigation year and twenty three irrigators have **not** being accredited due to incompletion of the Irrigation Annual Report forms or for late lodgement of the forms. i.e. after August 31st.

Four Statutory organisations submitted Irrigation Annual reports. The data from these irrigators add to the district total usage.

The irrigators who were **not** accredited will be sent a letter of explanation as to why accreditation was not achieved.

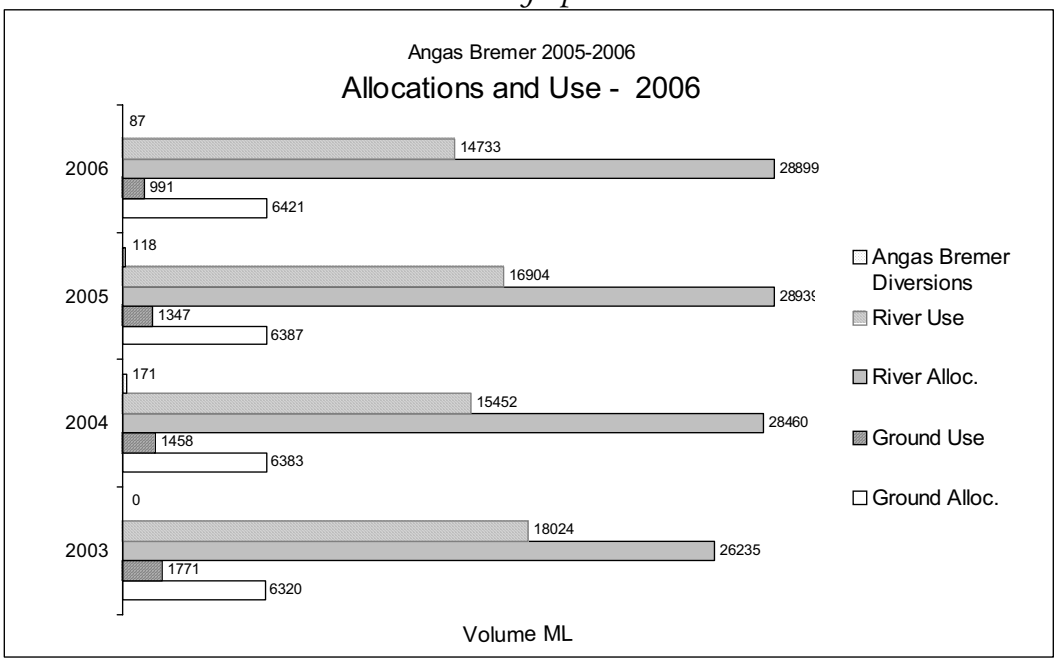
The "Accredited Angas Bremer Irrigator" Logo can be obtained from the Secretary or the Program/ Project Coordinator.

The Following graphs and charts have been created from the submitted Irrigation Annual Report data.

1. Water Allocation and use in the Angas Bremer Irrigation Management Zone 2005-2006

Graph 1 (below) the bar graph illustrates the total volumes of Ground and River Murray water on allocation and the actual usage for 2005-2006, as well this graph includes surface water (i.e. water pumped or diverted from the Angas and Bremer Rivers) used in the ABIMZ for the past three years. River Murray water, groundwater and surface water use are all less than the previous year, Murray water by 14% and ground and surface water by approximately 25%.

Graph 1



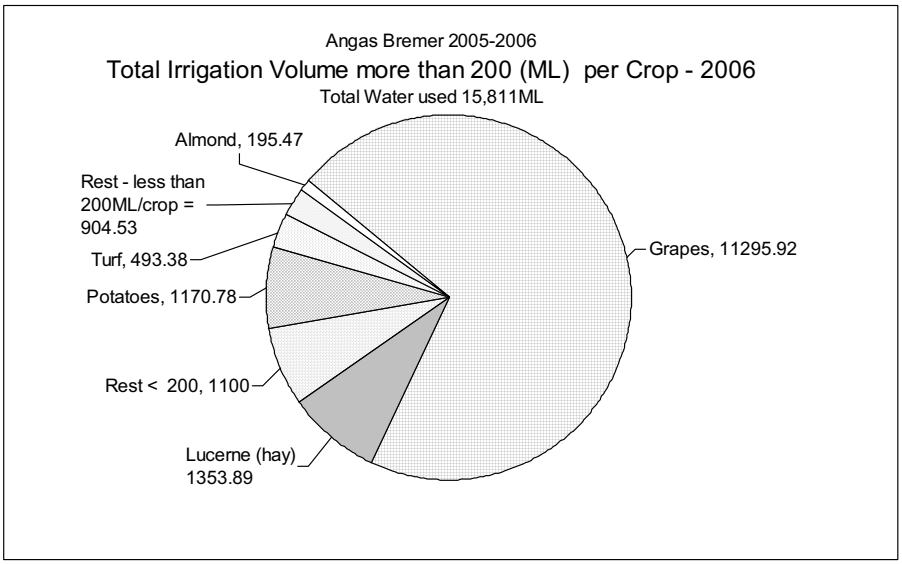
2. Water used for each Crop 2005-2006

The following 2 pie graphs illustrate the volume of water used for each crop and water used for other purposes during the 2005-2006 irrigation year. The first graph, 2(a), is for usage with a volume more than 200ML per crop and lumps all other use as "minor values". The "minor values' are then shown in graph 2(b) as volumes used less than 200ML which includes that water used for other uses such as Industrial, Stock & Domestic and dam fill..

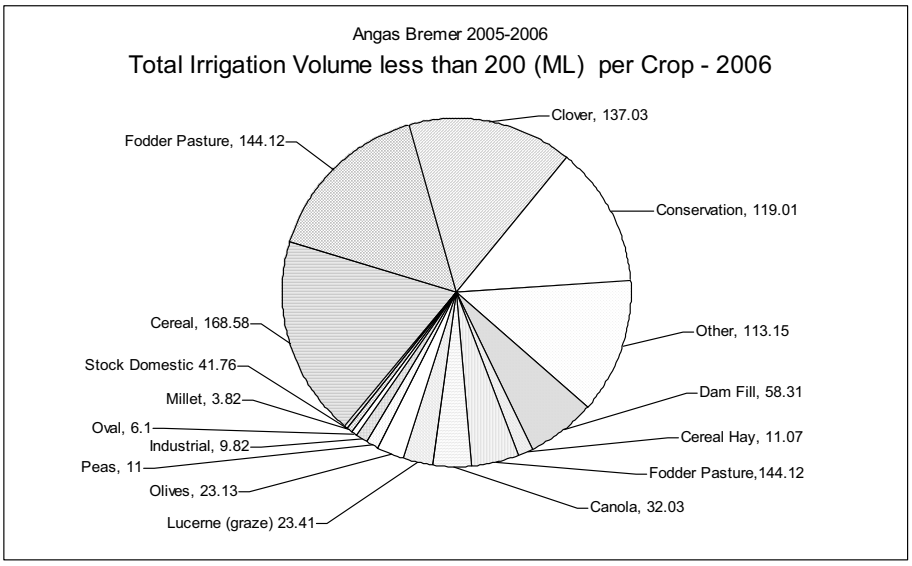
Total of all water used for 2005-2006 = 15,811ML, of which 15,446ML was used for irrigated crops and 365ML was used for Conservation, Industrial, stock & domestic, fill dam and other uses.

See Table s 1 and 2 on page 8 for comparative uses with other years.

Graph 2(a)



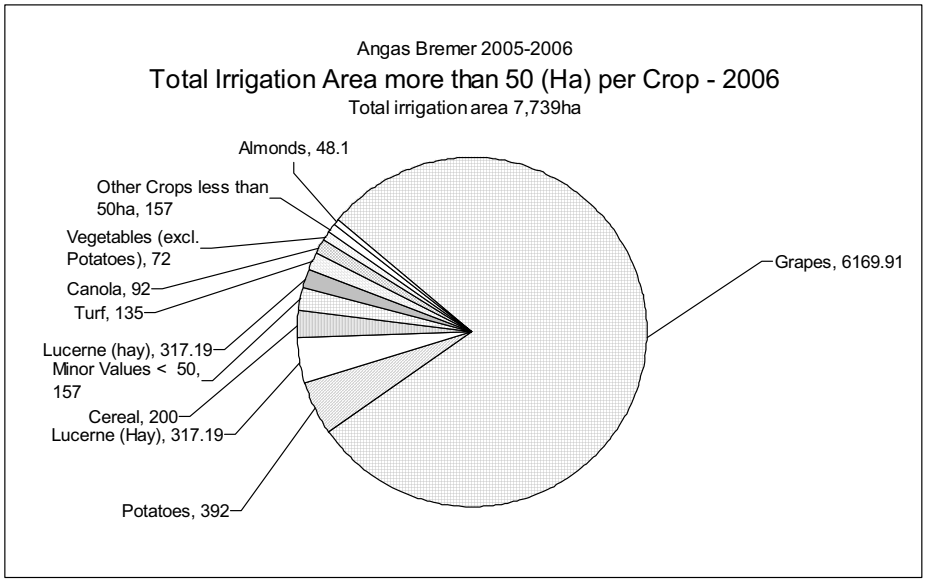
Graph 2 (b)



3. Area of Land Irrigated in the ABIMZ 2005-2006

7,739ha were irrigated in the 2005-2006irrigation year as compared with 2004-2005 of 7,869ha
The next 2 pie graphs give details on which crops irrigation water was used in the 2005-2006 irrigation year.
See Tables 2 and 3 (page 8) for comparisons with other years

Graph 3(a)



Graph 3(b)

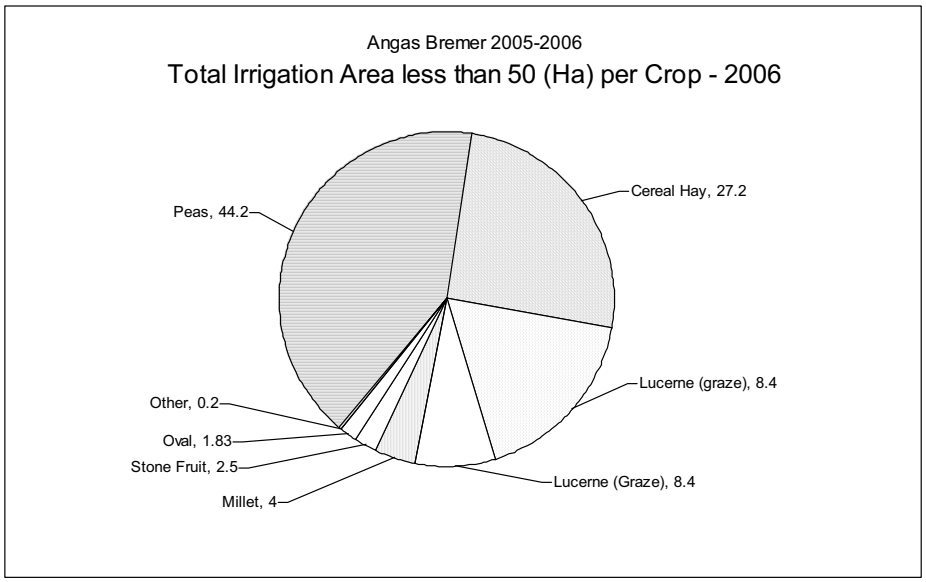


Table 1

The table below shows the total water used on each crop and the number of hectares of each crop irrigated.
Percentage of change between 2004-05 and 2005-06 for water and hectares is shown at the bottom of the table.

Year	Total ML	Total ha	Grape ML	Grape ha	Lucn. ML	Lucn. ha	Other ML	Other ha	Veg. ML	Veg. ha	Potato ML	Potato ha	Past. ML	Past. ha	Alm. ML	Alm. ha
1996-7	11,348	4,156	4,332	2,134	2,490	741	3,081		1,446					328		88
1997-8	16,100	6,545	6,001	3,645	3,700	876	2,248	872	2,670	679			1,526	369	147	61
1998-9	16,509	6,153	8,864	4,084	3,526	698	738	555	2,355	518			906	241	119	61
1999-00	16,961	6,625	10,021	4,665	2,491	418	1,354	777	761	121	1,812	485	358	96	164	58
2000-01	17,467	6,788	10,626	4,991	2,040	429	1,259	533	769	134	1,773	490	742	157	172	55
2001-02	17,428	7,089	11,159	5,357	2,051	471	1,286	583	651	103	1,719	425	316	97	246	55
2002-03	20,715	7,934	13,165	6,059	2,560	376	1,899	777	647	108	1,504	394	752	173	188	47
2003-04	17,154	7,509	11,927	6,059	1,608	354	1,132	443	605	69	1,280	360	399	146	203	48
2004-05	17,719	7,869	11,688	5,876	1,791	343	1,589	936	638	123	1,278	348	505	184	230	48
2005-06	15,811	7,739	11,293	6,170	1,378	325	900	588	363	72	1,171	392	144	144	195	48
% change 04-05 to 05-06	-12%	-1.5%	-3.5%	+5%	-22%	-4%	-44%	-38%	-43%	-43%	-8%	+13%	-72%	-23%	-15%	same

Note : ***Potato was included with Vegetable prior to 99-00***

Table 2 *(This table repeats the data in charts 2 and 3 in a percentage format)*

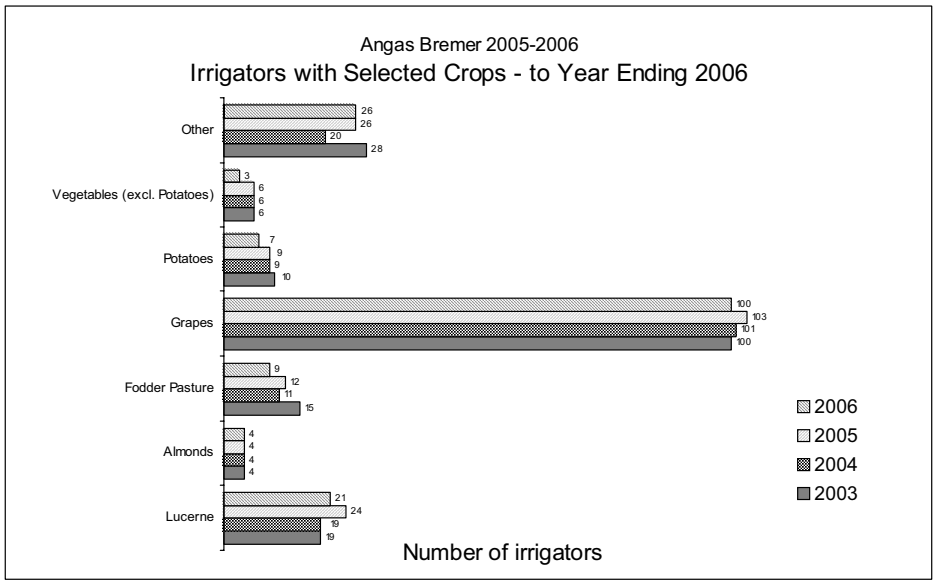
the percentage of the total ML used and ha irrigated for each crop irrigated in 2005-2006

	Grape	*Lucerne*	*Other*	*Vegetable*	*Potato*	*Fodder & Pasture*	*Almond*
ML used	*73%*	*9%*	*6%*	*2.5%*	*7.5%*	*1%*	*1 %*
Ha irrigated	*79.5%*	*4%*	*8%*	*1%*	*5%*	*2%*	*0.5%*

4. Number of Irrigators for major crops

A bar graph (below) indicates the number of irrigators for each of the major crops. The graph has the previous 3 years number of irrigators for major crops for comparison purposes.

Graph 4

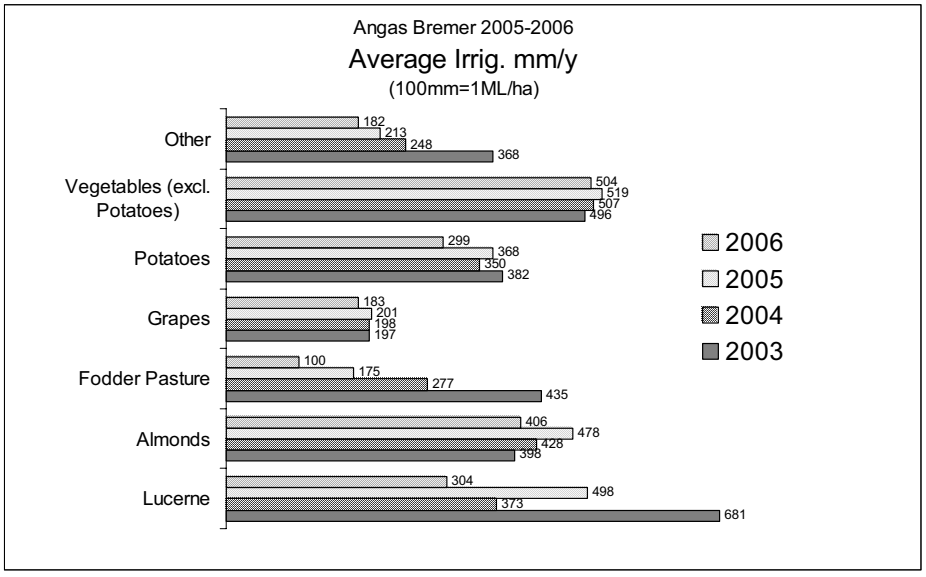


Note:- the less number of grape irrigators for 2005-2006 is because several grape irrigators didn't complete reports

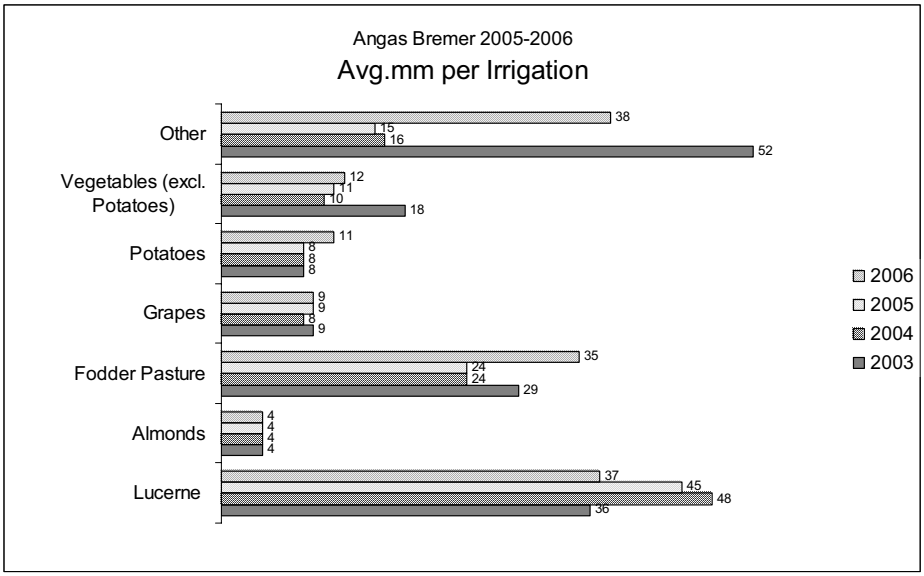
5. Average Irrigation applied to the major crops

Average irrigation for each of the major crops are shown in the following 2 bar graphs, the first being the average irrigation applied for the whole irrigation season and the second the average irrigation applied per irrigation. 2005-2006 and the three previous years are shown to compare.

Graph 5(a)



Graph 5(b)

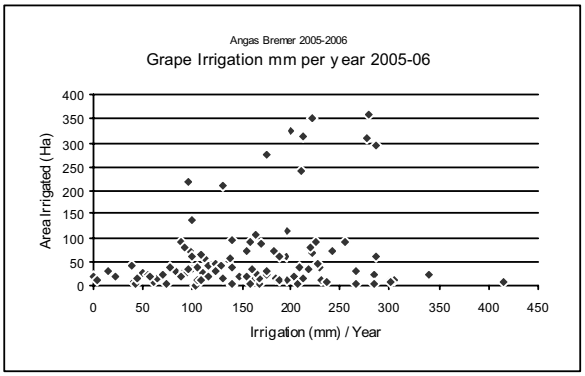


6. Irrigation applied to each of the major crops

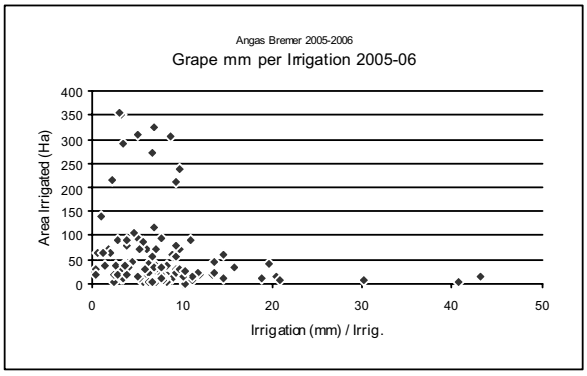
The next seven pairs of scatter graphs indicate the volume of water applied to each crop, (a) annually and (b) per irrigation by each of the irrigators who returned their Irrigation Annual Report forms. Each dot on the graphs represent an irrigator, each irrigator will know what they applied and can compare their watering practices with other irrigators who are not identified.

Note:- one record in the database was deleted for Grape irrigation as it distorted the graphs.

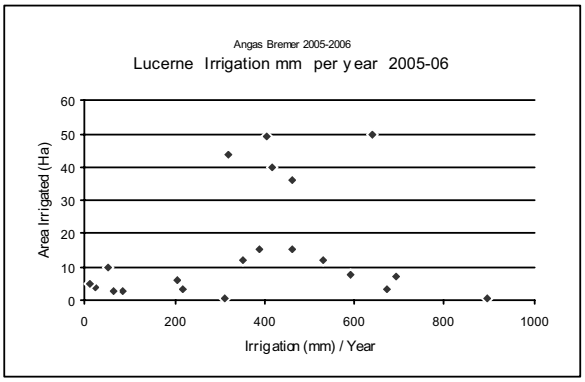
Graph 6(a)



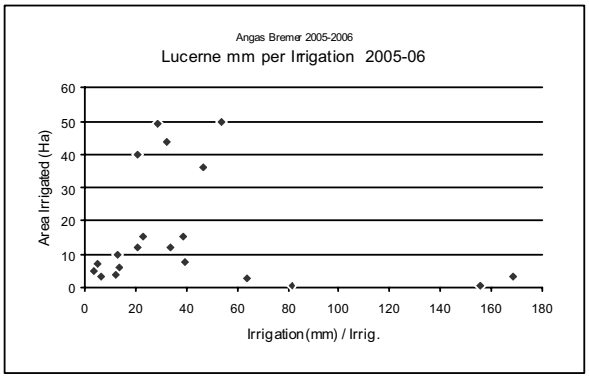
Graph 6(b)



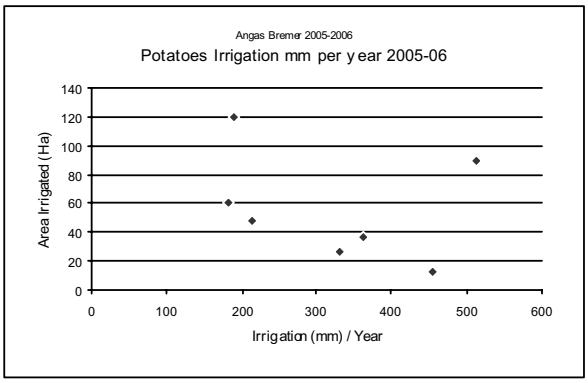
Graph 7(a)



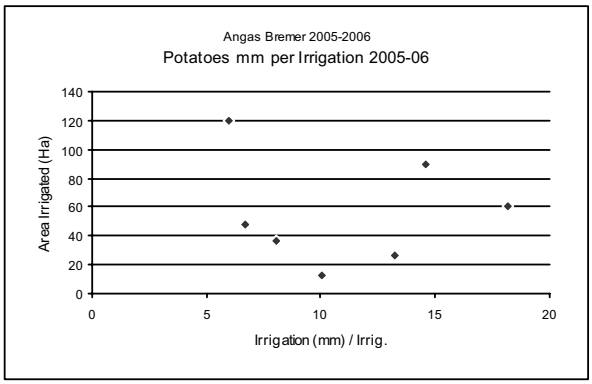
Graph 7(b)



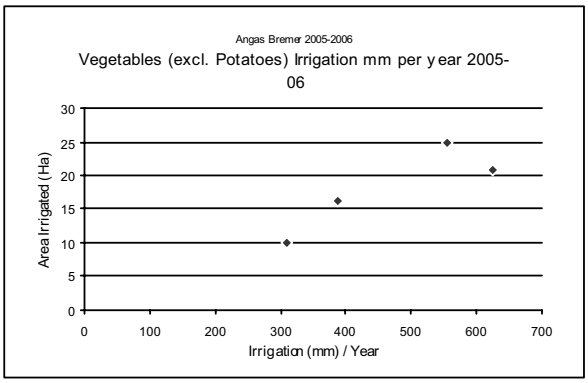
Graph 8(a)



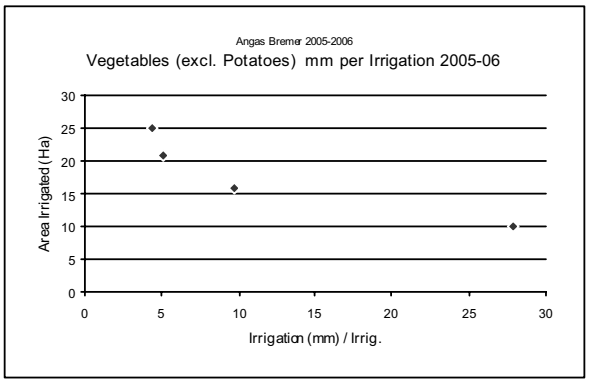
Graph 8(b)



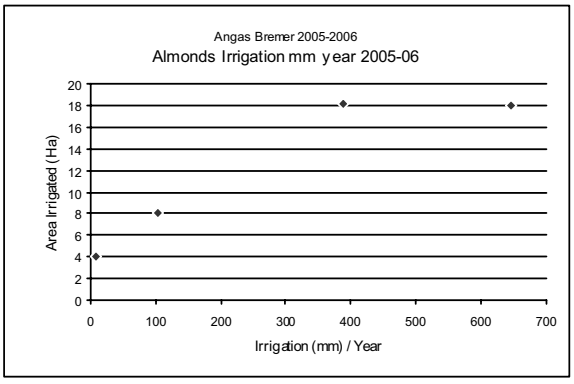
Graph 9(a)



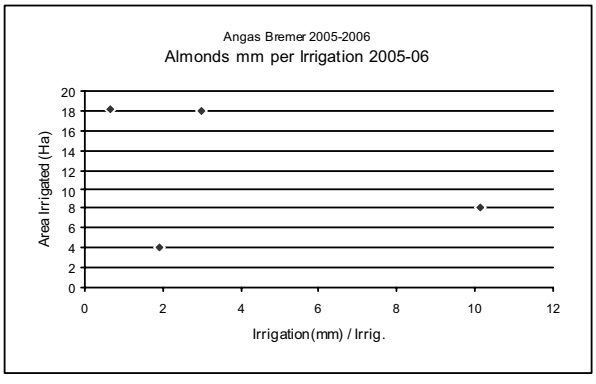
Graph 9(b)



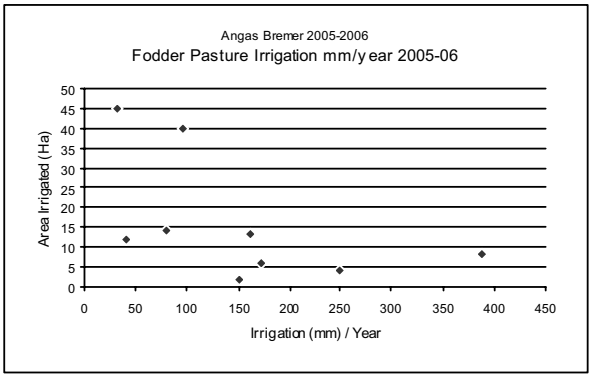
Graph 10(a)



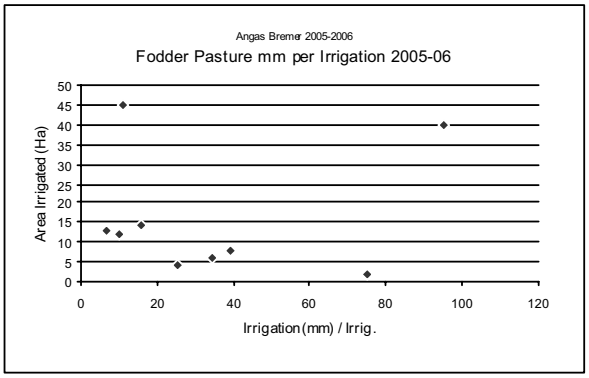
Graph 10(b)



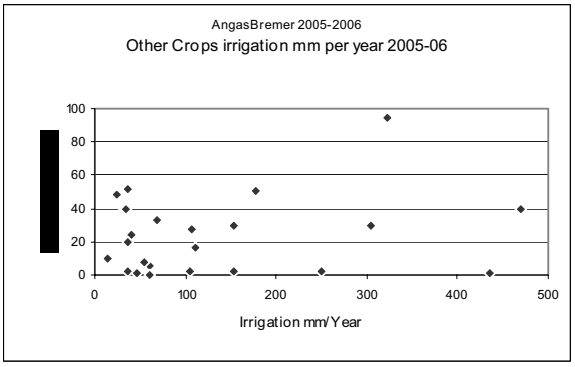
Graph 11(a)



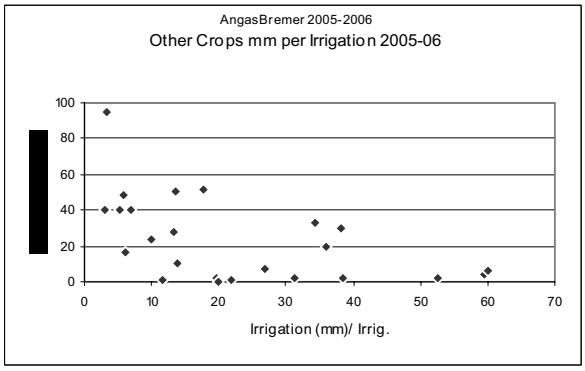
Graph 11(b)



Graph 12(a)



Graph 12(b)



7. ML per hectare per year (major crops)

Table 3 (below) illustrates the ABIMZ average volume of irrigation water applied to each of the major crops in each of the 10years data has been collected.

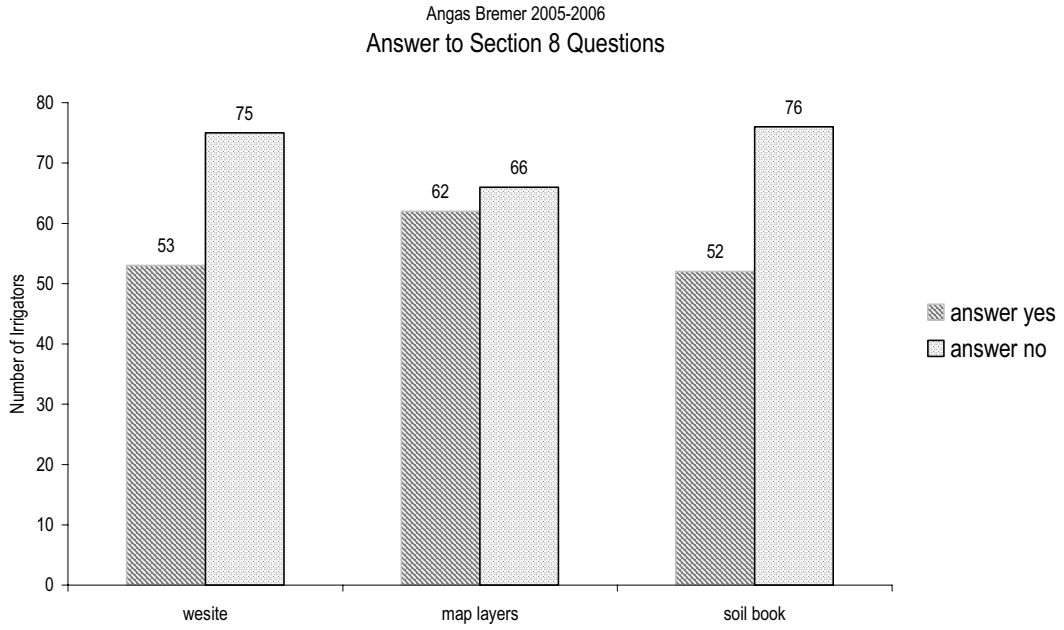
Table 3: Average ML per hectare

Year	Grape	Lucerne	Other	Vegetable	Potato	Pasture	Almond	All Crops
1996-1997	2.0	3.4		4.0				2.7
1997-1998	1.6	4.2	2.6	3.9		4.1	2.4	2.5
998-1999	2.2	5.1	1.3	4.5		3.8	2.0	2.7
1999-2000	2.1	6.0	1.7	6.3	3.7	3.7	2.8	2.6
2000-2001	2.1	4.8	2.4	5.7	3.6	4.7	3.1	2.6
2001-2002	2.1	4.4	1.7	5.1	4.0	3.3	4.5	2.5
2002-2003	2.2	6.8	2.4	6.0	3.8	4.3	4.0	2.61
2003-2004	1.97	4.5	2.5	8.8	3.5	2.7	4.2	2.28
2004-2005	1.99	5.22	1.69	5.18	3.67	2.74	4.79	2.25
2005-2006	1.8	4.23	1.53	5.04	2.99	1.00	4.06	2.95

8. Questionnaire, Website, AB Map Layers and Soils Book

Question 8 on the 2005-2006 Irrigation Annual report asked irrigators whether they had (a) visited the Angas Bremer Website, (b) had viewed or used the Angas Bremer Map Layers (on the CD) and (c) had viewed or used the soils book on the CD. 128 Irrigators answered the questionnaire; the following bar graph (13) shows the results.

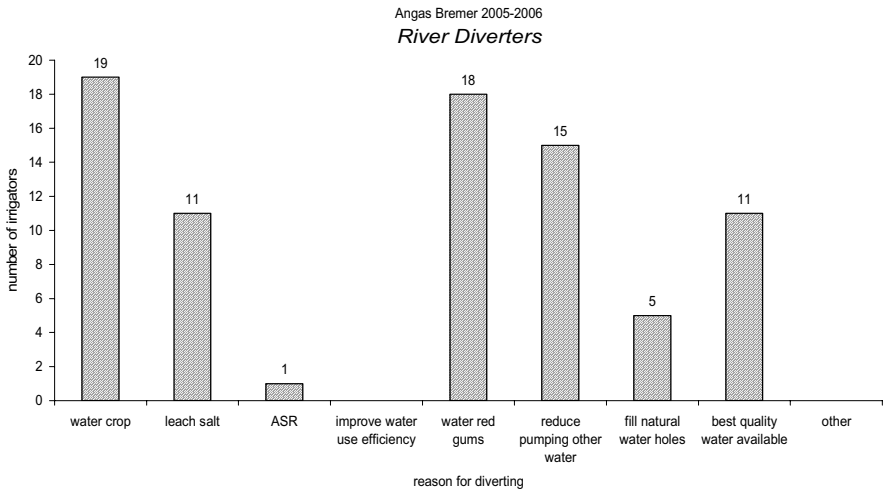
Graph 13



9 Diversions from Angas and Bremer Rivers 2005-2006

Twenty irrigators reported diversions during the months of July, August and September and then one event in early November. All the diversions were from the Bremer River. Salinity ranged from 500ppm to 1100ppm. The target was to fill an average root-zone soil depth of 1.8metres. The total area irrigated by diversions was 316ha and the average time of diversions was 22hours. Graph 14 shows the reasons for diverting the river.

Graph 14



note:- ASR = Aquifer Storage and Recovery.

10. Growers Monitoring wells

Of the 181 Grower monitoring wells reports were received for 168 wells were. Table 4 shows the number of wells with and without water in the 4 quarterly readings. The water table maps for each of the 4 quarters can be found in appendix "E"

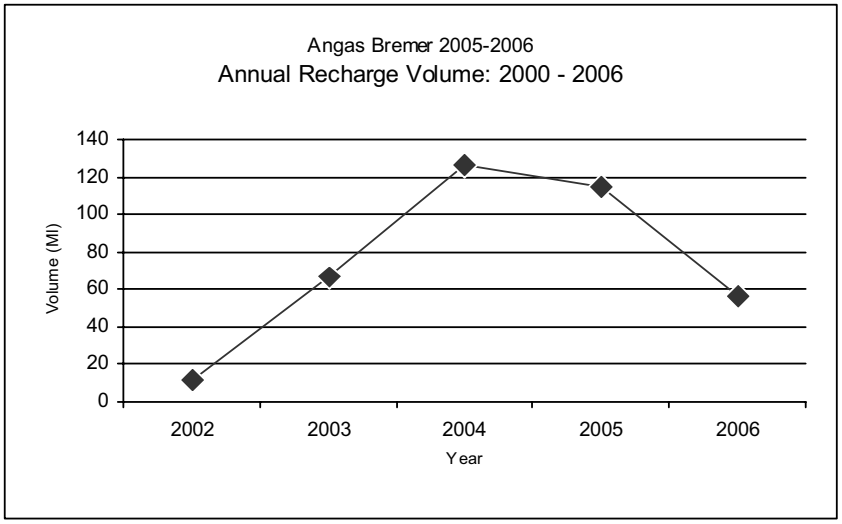
Table 4

	September 2005	December 2005	March 2006	June 2006
wells reported on	162	166	162	168
wells reported dry	86	82	88	85
wells with water in	76	84	74	83

11. Aquifer Storage and Recovery (ASR) Artificial Recharge

16 irrigators reported on their ASR wells, of these only 4 irrigators recharged, a total of 56ML
Graph 15 shows the recharge that has occurred in each year.

Graph 15



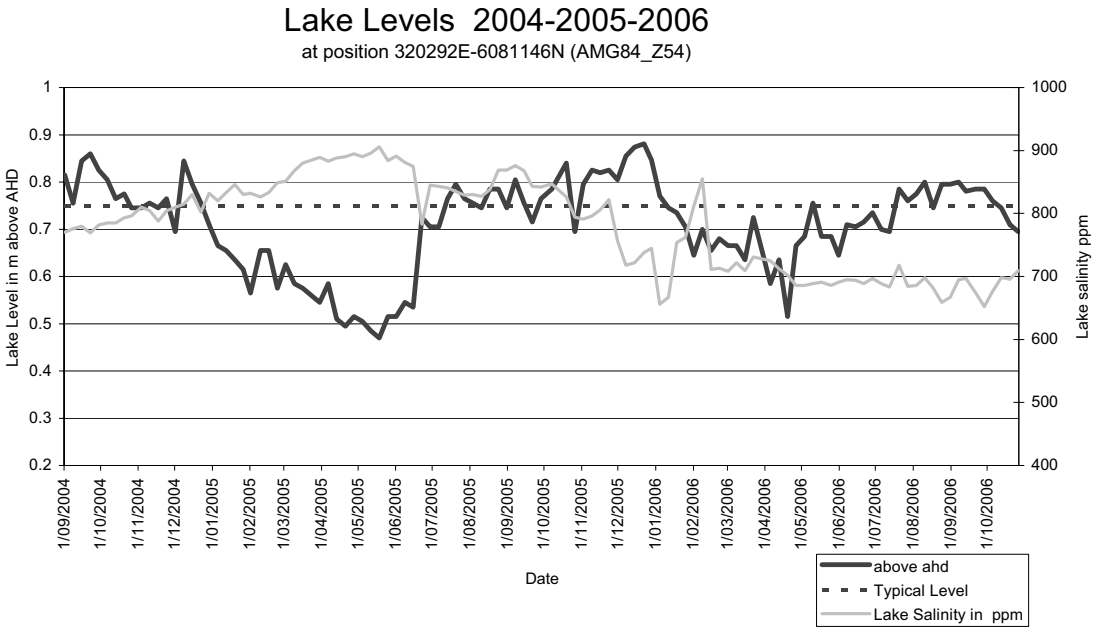
12. Flooding in Angas Bremer 2005-2006

Grape crops were flooded 29 times, average time crop flooded 18hours, area flooded 297ha (note some of this area may have been flooded several times)
2 pasture crops were flooded, a total of 25ha, average time flooded 18hours.
One other crop flooded area 5ha, flooded for a period of 12hours.
62ha of non crop area reported as being flooded.
Flooding occurred in:-
July- 5th to the 9th
August – 6th to the 8th and again 23rd to the 28th
September – 2nd to the 15th
November – 7th to the 10th
A map of the area flooded in 2005-2006 is at Appendix "J" (page 27) and 2004-2005 at Appendix "I" page 26
A number of irrigators were asked to mark up a map of the 1992 flooding, to enable the Committee to produce a more accurate map of the flooding in that year. Maps have been received from irrigators and a meeting of irrigators will be held to improve map.

13. Salinity of Irrigation Water

Salinity reports were received from 87 licences, 52 River Murray and 35 groundwater.
52 River Murray licences were reported on, with water salinity of between 470 and 1320ppm. These values may be incorrect as the lowest salinity reading obtained from DWLBC for the year was 603ppm (1005µS/cm) recorded in May 2006 and the highest reading was 840ppm (1400µS/cm) in late August 2005. Average grower readings from the river Murray is 751ppm. The DWLBC readings are obtained from a logger on the Milang Jetty. It is recognised that most irrigators are taking their water from nearer the Lake edge and in some cases from places like Boggy Lake where salinity can be higher than from the DWLBC site.
35 groundwater irrigators reported the salinity levels in their production wells, the lowest being 1254ppm and the highest at 3100ppm with an average of 1892ppm. The lowest salinity reading from a well on the bank of the Bremer, the highest reading from a well midway between the 2 rivers.
Below is a graph of the Lake levels, height and salinity for the past 12 month.
Note:- the graph below is from data collected at the Lake edge at the end of Chapel Road over a 2 year period.

Graph 16



14. Revegetation in the Angas Bremer Irrigation Management Zone

Revegetation in the ABIMZ continues to increase; the area of revegetation reported by growers from the 2005-2006 Irrigation Annual reports totals 1,715 ha and this is an increase from the previous year of over 200ha. Revegetation comprises of 61 ha of Community planting, 12 ha of Council Reserves, 230 ha joint ownership, 33 ha leased vegetation and 1,379 ha of privately owned revegetation.
In one weekend at the end of July 2006 Greenfleet Australia, in collaboration with Scouts Australia and the Goolwa to Wellington LAP, planted approximately 25,000 plants, ranging from trees to groundcovers, on a property off Mosquito Creek Road near the Lake. The area planted by Greenfleet and the Scouts is not included in the figures above.
A report from the Angas Bremer Irrigators Revegetation Association Inc is attached at Appendix "C"
Mapping of the revegetated areas can be found at Appendix "K" (page 28) of this report.

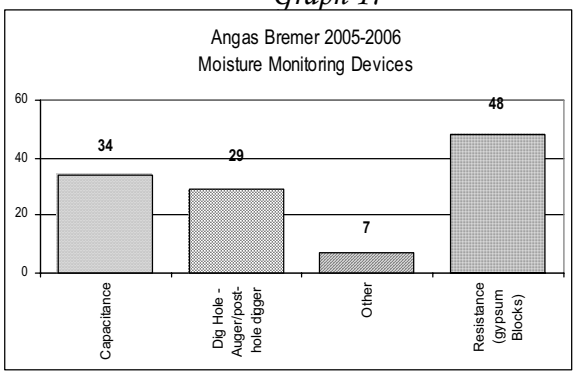
15. Soil Moisture Monitoring

Annual reports record that there are 116 irrigators using 118 (excluding FullStop's) devices for soil moisture monitoring.

The number of each type of devices is shown in graph 17. Capacitance devices include, Agrilink, Sentek, Agwise and data Flow. Dig hole includes spade, auger, dig stick etc. Resistance is gypsum blocks. Other includes neutron probes, tensiometer and irriometer.

The majority of these devices are in vineyards. Other crops that have devices installed are Lucerne, Cereal, Potato, Turf and Vegetables.

Graph 17



16. Aquifer Water levels 2005-2006

Well water height contours based on the growers monitoring wells together with the Government shallow observation wells can be found at Appendix "D"

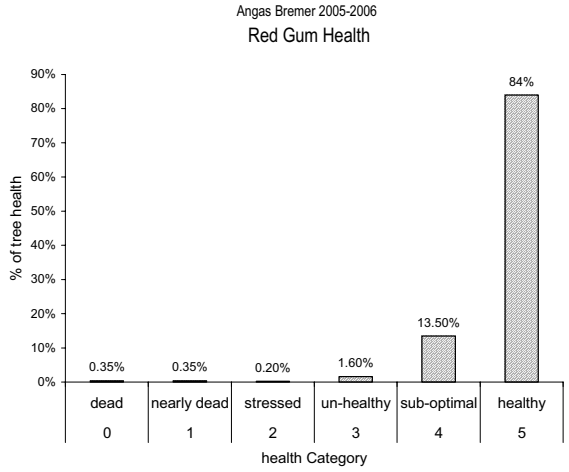
Government observation well confined aquifer water height contours are reported at Appendix "E"

As the Government observation well salinity was not tested in 2005-2006 the maps at appendixes "G" and "H" are those for the 2004-2005 irrigation year. Salinity testing of these wells is due in 2006-2007.

The contour map at appendix "F" shows salinity levels as measured by growers from their production wells, as was reported in their Irrigation Annual Reports for 2005-2006.

17. Red Gum Health (data from Question 9 of the Irrigation Annual Report)

38 irrigators reported on Red Gum Health. 22 irrigators reported no change and 14 had observed changes. Most noticeable change was reported as no water or no flooding. Several irrigators had noticed new growth or new germinations. The following graph shows the tree health as recorded by irrigators



Appendix "A"

Angas Bremer Water Management Committee Inc.

Minutes of the Annual Public Meeting held in the Langhorne Creek Football Clubrooms on Monday the 29th of August 2006

Agenda Item 1.

The Chairman (Mr. T. McAnaney) opened the meeting at 7.40pm and welcomed all those in attendance, with a special welcome to Anna Carr, Richard Stirzaker and Tony Thomson.

Chairman called for apologies.

Apologies from: - Tim Roberts, Loene Furler, Judy Good, Diane Davidson., Roger Follett, Ron Nurse, Trevor Giles, Mark Cleggett, Tom Keelan and John Pargeter.

Agenda Item 2.

Chairman presented and read the Chairman's annual report (copy attached to these minutes)

Agenda Item 3 - Chairman asked Tony Thomson to present a report on the Flood Plain Study.

Tony explained that the purpose of the Study is to determine the water volume that drains below the flooded land during flood events. The Committee has equipped 8 soil moisture monitoring sites, 12 unconfined aquifer well-water-level sites and 12 confined aquifer well-water-level sites . All the sites record data at 15 minute intervals.

A comparison was made between flooding of the Nile River in Egypt and winter-flooding in the Angas Bremer district.

Maps of the Angas Bremer district, showing the extent of flooding in each of 1992, 2001-02, 2003-04 and 2004-05 were shown.

Charts using data collected at site "J" were discussed to show the relationships between rainfall, river-level, soil moisture, unconfined aquifer level and confined aquifer level.

The estimated drainage in the 2003-04 irrigation year was 1,000 to 2,000ML which included the flow into the unconfined aquifer through the beds of the rivers.

A report on the Flood Plain study will be available from the Angas Bremer Website.

The accurate interpretation of soil moisture records, the wide variation in infiltration rates and quantifying the volume that recharge's through the river beds are some of the challenges that will be addressed as part of the Angas Bremer Water Project.

In 2004-05, 587ha were reported by growers to have been flooded and this corresponds with a mound in the unconfined aquifer that was 4km long by 1.6km wide. In 2004-05, 987ha were reported as being flooded and the mound was 1.6km wide. Cross section drawings of the unconfined in the AB district in each of September 01 and March 02 were shown. At the end of the irrigation season the mound was lower, suggesting that irrigation must have been efficient because it did not add water to raise the level of the unconfined aquifer.

Several questions were asked of Tony.

Agenda Item 4 - Chairman thanked Tony and asked Bruce Allnutt to present the interim District Irrigation Annual Report Data.

Bruce presented graphs and charts based on the data provided by growers in the Irrigation Annual Reports that had been received to the date of the Annual Public Meeting. Explanations were provided on some aspects of the data presented.

Several questions were put to Bruce.

Agenda Item 5 - As the proposed speaker was unable to attend the Chairman reported on the water resources and lower lakes.

Previous problems with the strategy of managing the Lake have been overcome with the formation of the Lake Consultative Committee (of which Terry is a member). Lake shore erosion and flooding of samphire flats are some of the previous problems. A further meeting of the Consultative Committee was to be held on the 1st of

September. River flows into SA in September will be cut back and very low flows into SA in February and March 2007 can be expected.

Agenda Item 6 – Chairman asked Tony Thomson to report on the 'Big Project"

Tony told the meeting the project now has the name 'Angas Bremer Water Project'.

By attracting selected specialists, the project will interconnect much of the 20-year's work that has been done in the AB district (eg. Databases and map layers) and it will address the 36 questions asked by the Angas Bremer Community. These questions include the district Water balance, salt balance, suitable sites for future irrigation expansion, the optimum sites for planting revegetation; control the water table near the Lake and the use of the FullStop.

As part of the project the Angas Bremer Soils book will be completed and distributed, the map layers from the CD will be made available from the AB website and salinity data that has been collected from the FullStop's will be compared with the data collected from the aerial geophysics.

World fresh water use is 3.6 million GL per year, of which 30% is groundwater. This includes an overdraft of groundwater of 0.3 million GL/yr.

Use of Groundwater in the AB decreased from 27,000Ml in 1980 to 2,000ML in 2002. The accuracy of these figures was questioned by Mac Cleggett and this created discussion with Ray McDonald and the audience. Tony asked that if anyone has better data he is keen to use it. As the use of groundwater has decreased the use of lake water has increased.

Tony reminded everyone of why all AB irrigators installed their monitoring wells and then installed their FullStop devices. A graph displaying the data that is being obtained from a FullStop was shown; better communication with the irrigators is needed about how they can best use the information from the FullStop devices. .

Agenda Item 7. Chairman asked Richard Stirzaker to report on the FullStop and on the salt data that it is detecting.

Richard presented the history of the use of FullStop in the Angas Bremer IMZ. Three prototypes were supplied in 2000, an additional 18 units were made locally and all these units were installed and used by volunteer irrigators. 2001 saw the start of the district-wide rollout of FullStop devices. . For each year, Richard displayed the number of irrigators who had both the 50cm and the 100cm operate, the number who had only the 50cm device go off and the number of irrigators who had never had either FullStop go off. He then discussed the salt content of the water samples taken from the FullStop's.

Richard expressed admiration that the AB irrigators are prepared to measure things and he stated that it is normal to have salt at the bottom of the root zone, he also stated that the depth at which the FullStop's have been installed is too deep for many of the irrigators and as a result some growers were given an additional FullStop to be installed at 30cm.

Because 17 irrigators had reported that neither the 0.5m nor the 1.0m FullStop had ever triggered, Rex Jaensch installed a 200litre drum dripping water above each of these FullStop's. The FullStop at every one of the 17 locations did trigger when sufficient water was applied.

Richard stated that before starting the work at Angas Bremer there had been no concept of solute monitoring, or of measuring water use efficiency by using salt content. The work at Angas Bremer has raised more questions than it has provided answers.

Several questions were put to Richard, one of which asked about measuring nutrient levels in the FullStop water samples. The reply was that Richard uses nitrate test strips which he has found to be easy to use.

Richard demonstrated the working of the commercially available version of the FullStop wetting front detector and he explained the difficulty of obtaining salinity data in other ways.

Measurement Engineering Australia (MEA) has secured from CSIRO the rights to market the FullStop in Australia.

The Chairman thanked Richard for his presentation and introduced Anna Carr, a Social Scientist form the Canberra Bureau of Rural Sciences, who is to be part of the Angas Bremer Water Project.

Anna explained what she and her colleague will do. They are keen to work with landowners to discover how people see the relationship between science (e.g. FullStop) and the real world. Anna is keen to talk with a large number of people from the AB Community. She can be contacted on (02) 6272-4929.

Agenda Item 8. Lyz Risby was asked by the Chairman for her presentation of Mundulla Yellows.
Lyz introduced herself to the audience and explained that during workshops on water course diversions in 2005, it was recognised that there were problems with some of the Red Gums along the water courses. A plant ecologist from DEH was asked to look at the problem and identified Mundulla Yellows because of the interveinal yellowing of the leaves. Lyz explained that Mundulla Yellows is caused by nutrient deficiencies, that the nutrients are in the soil but due to the soil-conditions the trees are unable to access the nutrients. The deficient elements are iron and manganese; these can be implanted into the trees. Lyz is eager to conduct trials with the iron and manganese implants and hopes to have more to report next year.
Terry McAnaney raised the issue of Councils using limestone to build up roads which may be a cause of concern.
Agenda Item 9 -The Treasurer (Guy Adams) was asked to present his report
Guy summarised the profit and loss Statement for 2005-2006, he then moved that the Statement be accepted, this was seconded by Ray McDonald and all were in favour.
Agenda Item 10 - Election of Members for 2006-07.
Chairman announced that the following persons had nominated for the Committee, Brian Wyatt, John Follett, John Pargeter, Di Davidson and Rick Trezona. Dennis Elliot moved, Len Case seconded that the nominations be accepted, all in favour. The Chairman congratulated the newly elected Committee members.
Agenda Item 11 – General Business
The situation with the River Murray was discussed following a question from Guy Adams about the water movement in the basin over the next 12 months.
Terry McAnaney stated that as all the Murray storage is in NSW and Victoria, SA can only claim one third of the storage.
Sam Newell announced that the SA irrigators Assn. AGM will be held at Mannum in September.
As there was no further business the Chairman thanked the speakers and the audience for their attendance and hoped that the situation with the Murray will improve.
Meeting concluded at 9.45pm.

Appendix "B"

AB Chairman's Report 05/06

Another successful, if challenging, year for the Angas Bremer Committee with the approval of a big project giving the committee a direction to the future. Further challenges in the next year will arise with the development of the eastern Mt Lofty Ranges W.A.P. and the impact on surface water use and the need to protect our river redgum swamps. N.R.M. continues to cause some concern with the resignation of Di Davidson from the board leaving this region unrepresented. Di represented the board on Angas Bremer and I am very pleased that she has nominated for committee. Rick Trezona was appointed to regional board and he has also resigned and fortunately he has also nominated for committee. During the year I was appointed to the River Murray Advisory Committee formerly the Drought Liaison Committee and the Murray Lakes Coorong and Murray Mouth Consultative Committee. The drought continues to impact on both water volumes and quantity and the impact on this region may be very severe if above average spring and autumn rainfall is not received and the River Murray storage may well be virtually empty by autumn. During the year committee has continued to receive strong support from both government and N.R.M. representation and with a big project the work of this and past committees should be recorded and analyzed for future use. During the year committee representatives met with Kayinga Directors to discuss future problems that may arise with the recovery of the basin. Workshops were held with river diverters to discuss river red gum health and diversion problems. After the May committee meeting a workshop to discuss future directions with the committee was held. I am pleased to report committee received an award for the Angas Bremer map layer computer compact disc in the South Australian Spatial Excellence Awards and congratulations must go to Tony Thompson and those involved. The recent discovery that the committee is not covered by N.R.M. or L.A.P. insurance has meant the new committee will have to make sure proper insurance is obtained. In closing I wish to thank the committee for their work and support, Barb for her dedicated work and Bruce for his untiring effort.

Terry McAnaney

Appendix "C"

Contribution by Simon Chinner

Angas Bremer Irrigators Revegetation Association Inc.

The ABIRA planting sites have progressed well over the last year. This season will see some more tube stock and direct seeding to fill in the gaps. We are going to add more species to some areas and are looking to continue community involvement in to the future with the Langhorne Creek Campus planting days etc.

Look out for the signs along the road to Wellington, around Kangaroo Rd and along the lake road west of the Bremer's mouth. Feedback from various individuals indicates we are promoting a very positive message of our commitment to sustainable irrigation practice in the Angas Bremer region.

There are still eight members, from corporate bodies to family and individual irrigators.

37.16 Hectares of land, on four properties, have been planted to native vegetation with the involvement of numerous organisations, community groups, contractors and individuals.

The legal process to tie the vegetation planted to individual water licenses is almost ready for signing. It will use a section of the recently enacted River Murray legislation to provide an agreement between the Minister for the Environment and the donor landholders, protecting the vegetation. We hope to have a public field day to coincide with the signing of agreements to showcase our work.

This is the first time this has been done - another first by the Angas Bremer region! We hope this model along with the other unique strategies developed in the Angas Bremer region will soon be promoted much further "Up River" to enhance the Save the Murray Darling cause.
The following are again acknowledged for supporting ABIRA's work-

The Angas Bremer Water Management Committee, for the idea and financing the legal assistance in dealing with the Government bodies, with The River Murray Catchment board.

The National action plan - Salinity, Goolwa – Wellington LAP, E-tree and Landcare, for help with funding the work.

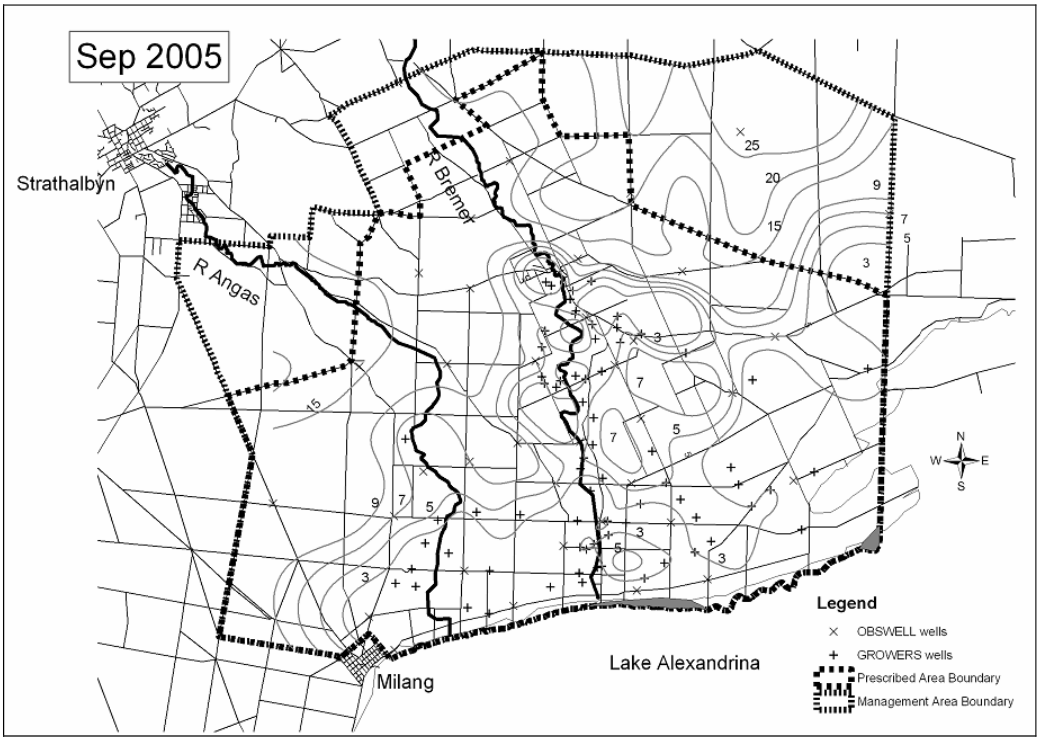
The landholders who have keenly offered land for the planting – The McAnaney family, Guy Adam's Metala, Dennis Elliot and Colin Wilson, Belvidere.

Community groups – Langhorne Creek & District Landcare, Langhorne Creek EFS R-6 Campus and Strathalbyn Scout Group.

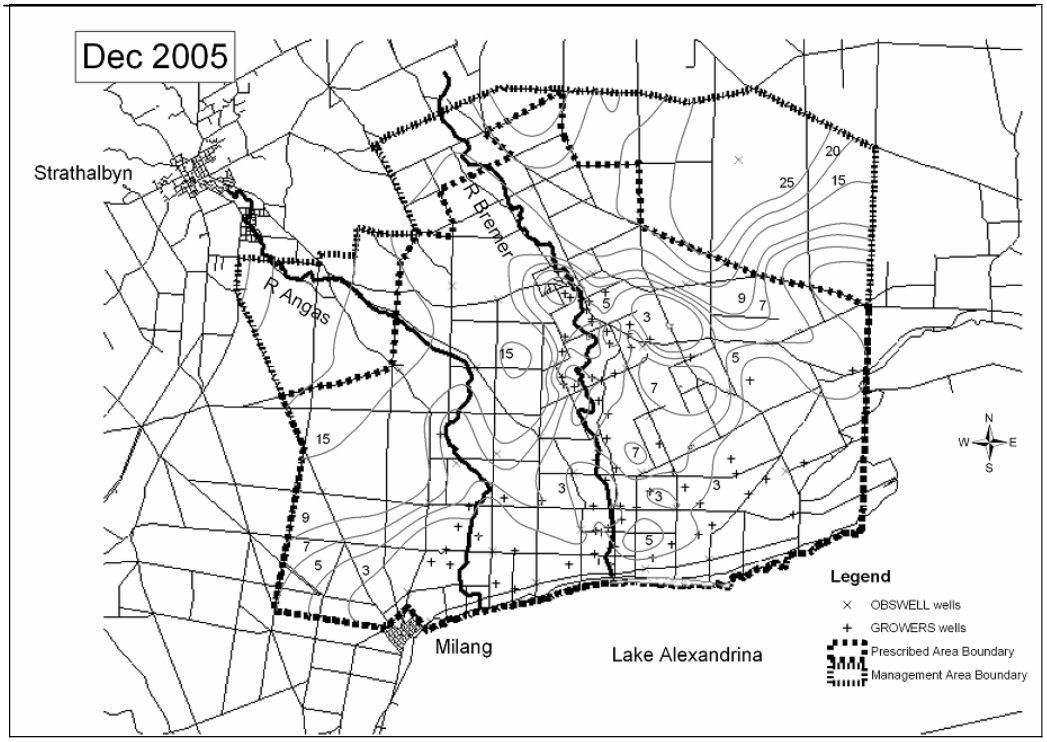
Jeff Whittaker, our revegetation contractor, who has done a great, job getting the plants in and growing. Many thanks Jeff for your guidance.

Appendix "D"

Angas Bremer Unconfined wells Standing water levels September 2005

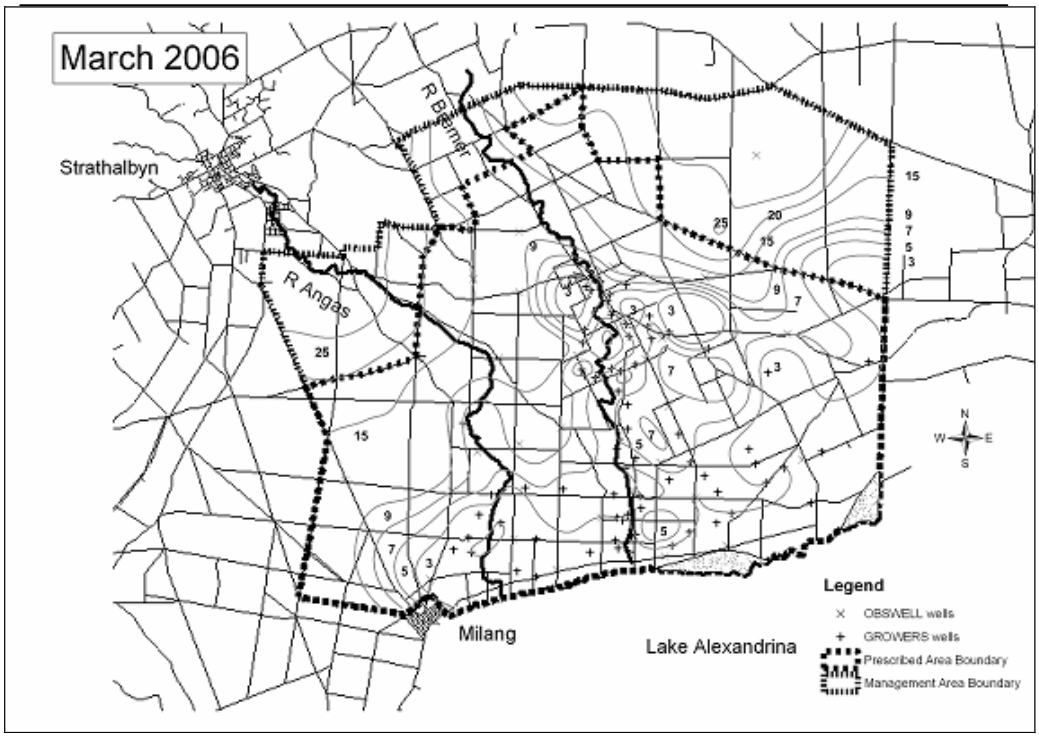


Angas Bremer Unconfined wells Standing water levels December 2005

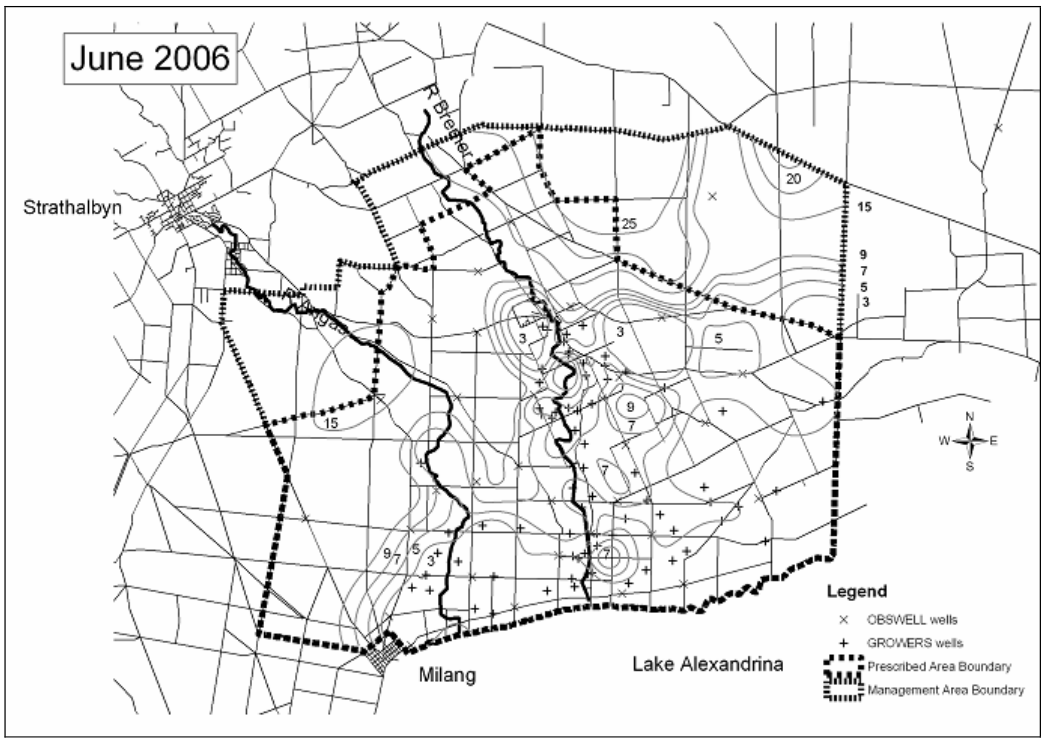


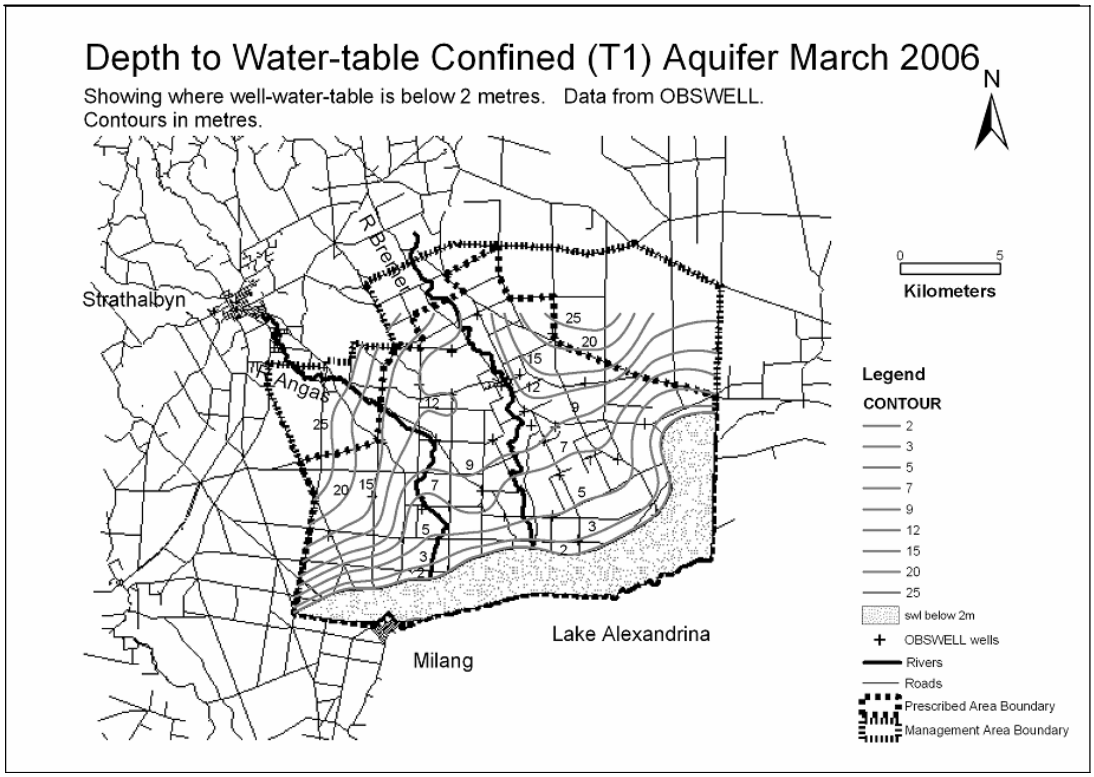
Appendix "D"

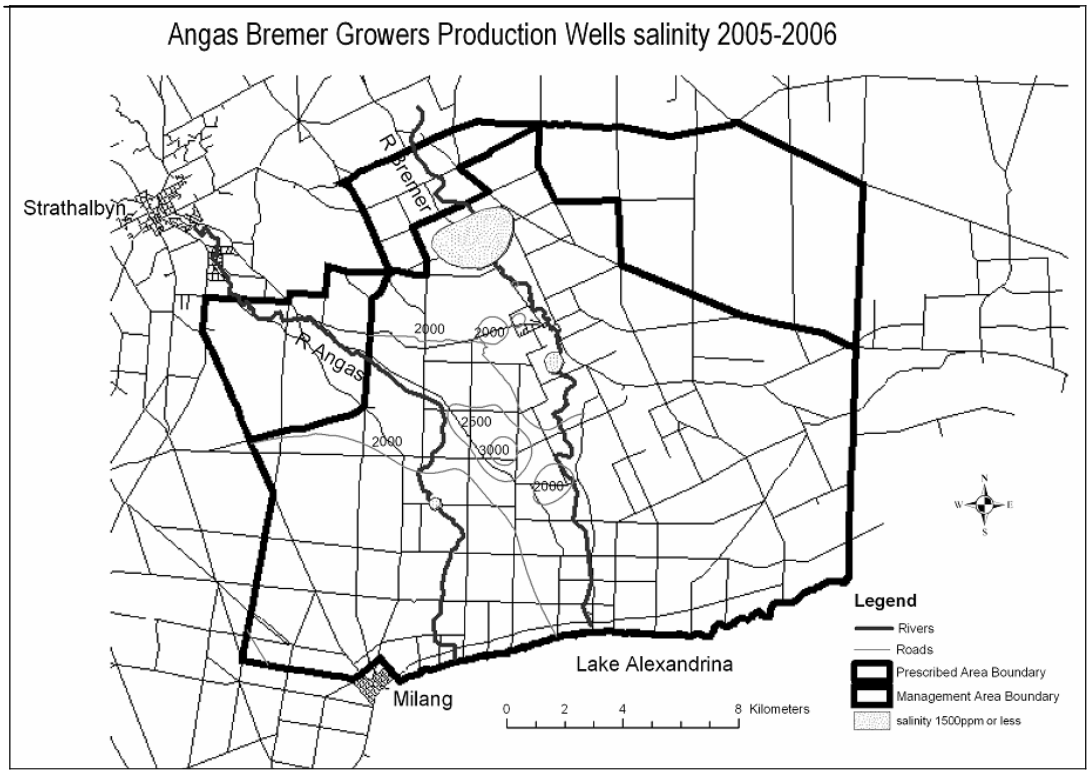
Angas Bremer Unconfined wells Standing water levels March 2006



Angas Bremer Unconfined wells Standing water levels June 2006

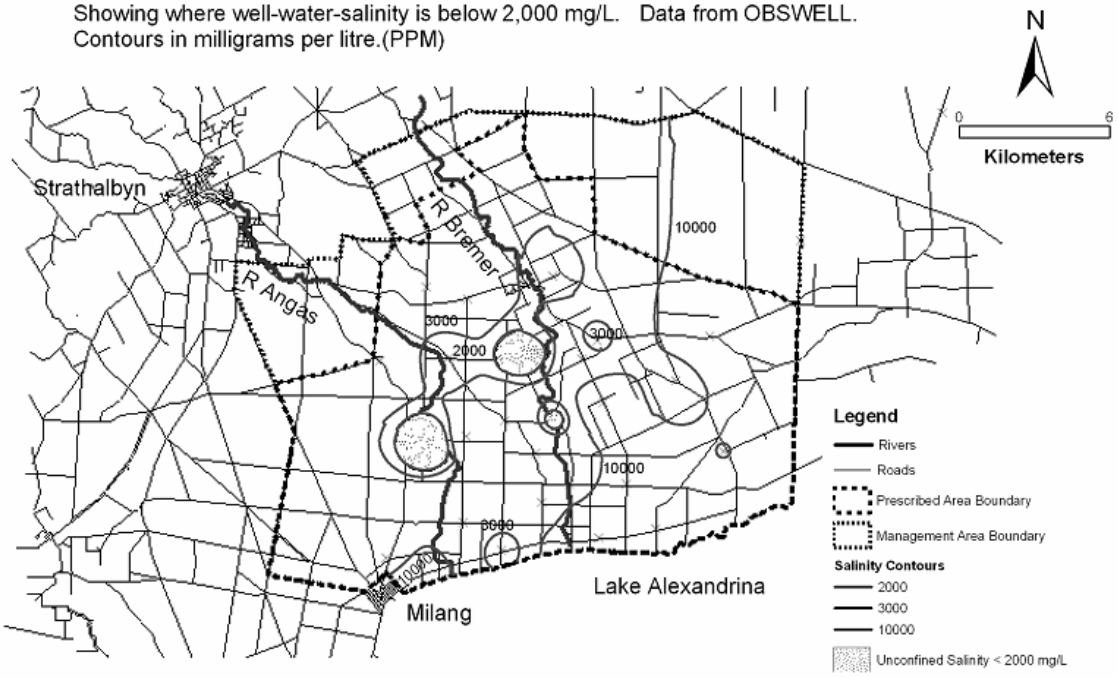



Depth to Water-table Confined (T1) Aquifer March 2006
Showing where well-water-table is below 2 metres. Data from OBSWELL.
Contours in metres.
N
R Bremer
Strathalbyn
R Angas
Lake Alexandrina
Milang
0 5
Kilometers
Legend
CONTOUR
2
3
5
7
9
12
15
20
25
swl below 2m
OBSWELL wells
Rivers
Roads
Prescribed Area Boundary
Management Area Boundary


Angas Bremer Growers Production Wells salinity 2005-2006
R Bremer
Strathalbyn
R Angas
2000
2000
2500
2000
3000
2000
Lake Alexandrina
Milang
0 2 4 8 Kilometers
Legend
Rivers
Roads
Prescribed Area Boundary
Management Area Boundary
salinity 1500ppm or less

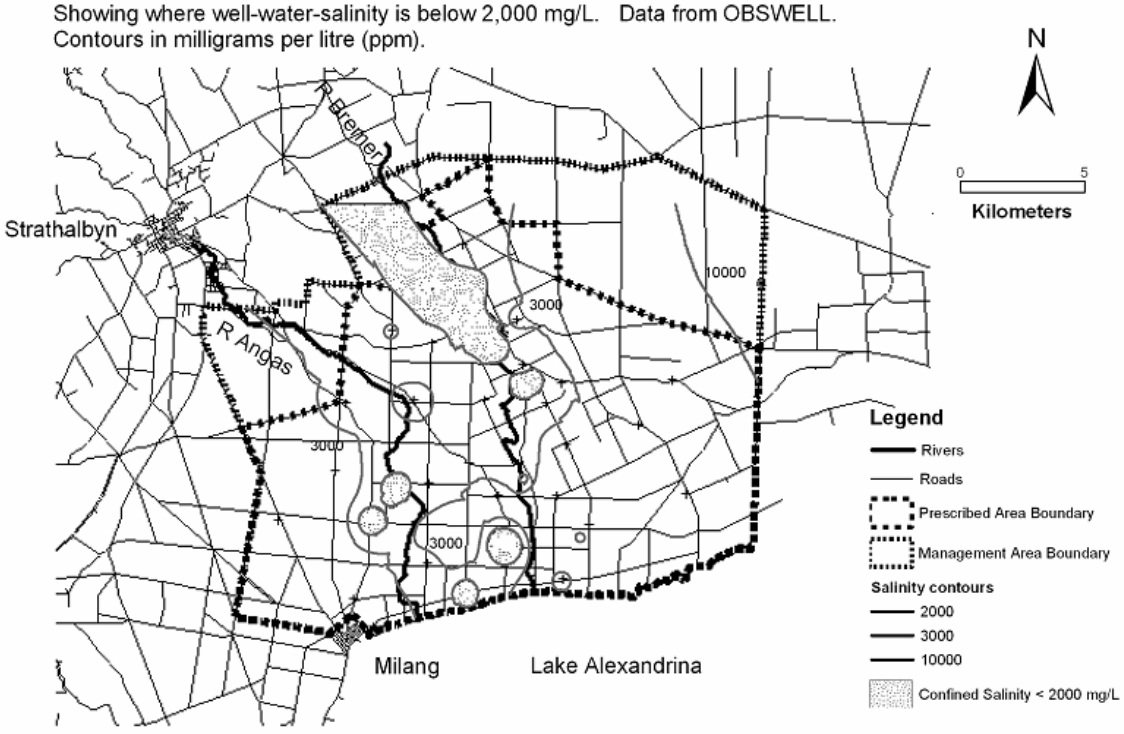
Salinity of Unconfined (Q) Aquifer Angas Bremer 2005

Showing where well-water-salinity is below 2,000 mg/L. Data from OBSWELL.
Contours in milligrams per litre.(PPM)

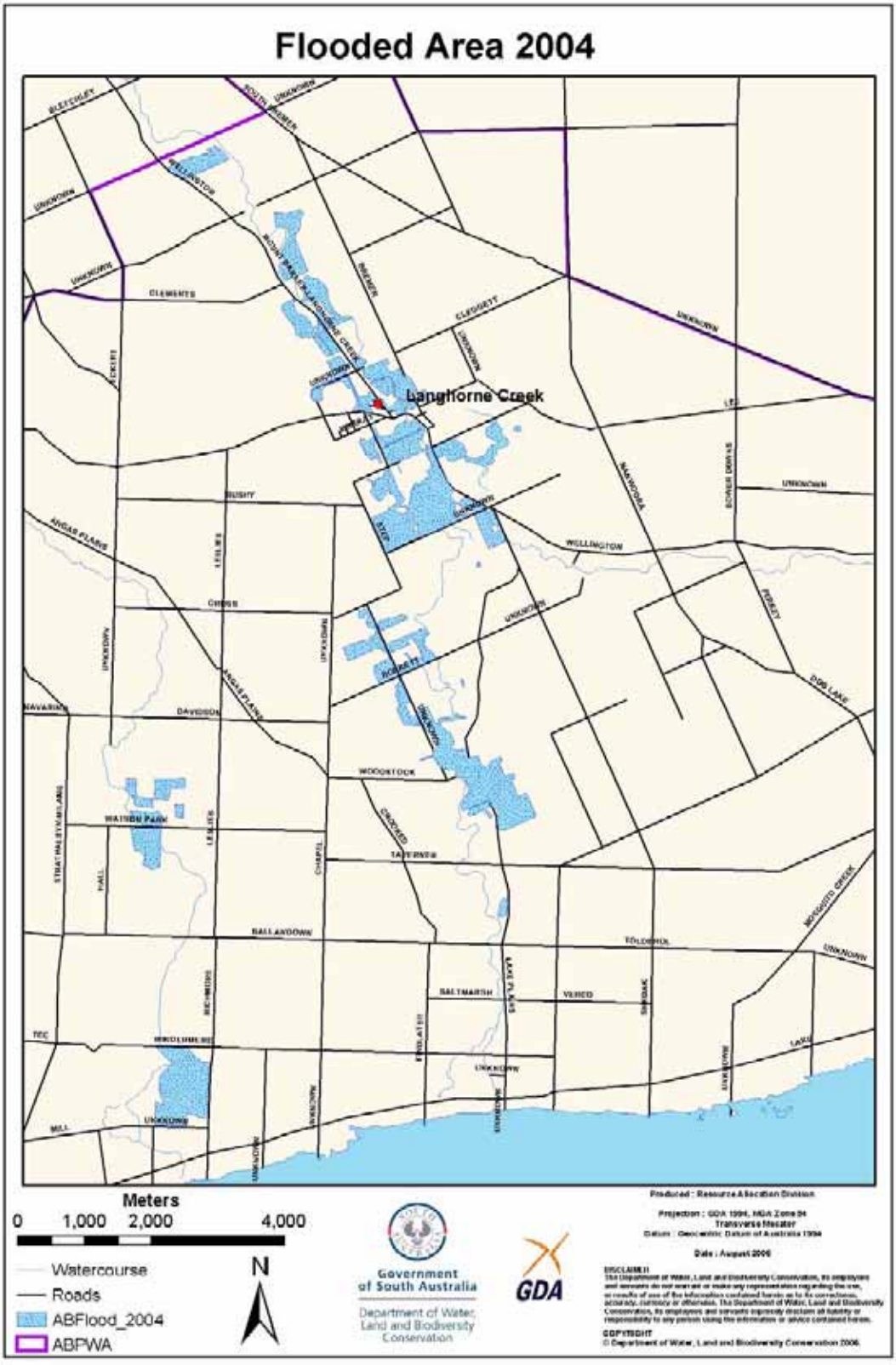


Salinity of Confined (T1) Aquifer Angas Bremer 2005

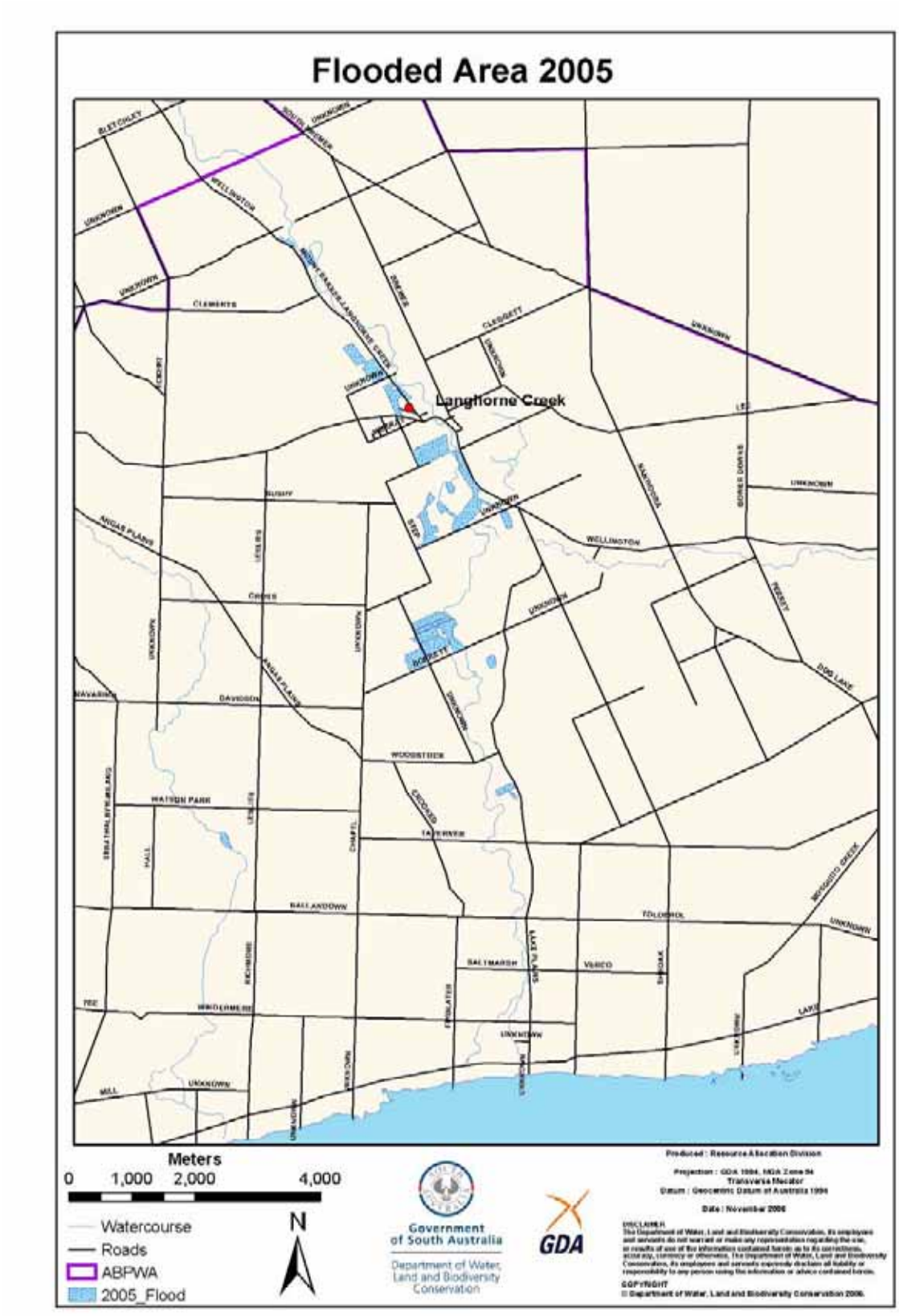
Showing where well-water-salinity is below 2,000 mg/L. Data from OBSWELL.
Contours in milligrams per litre (ppm).



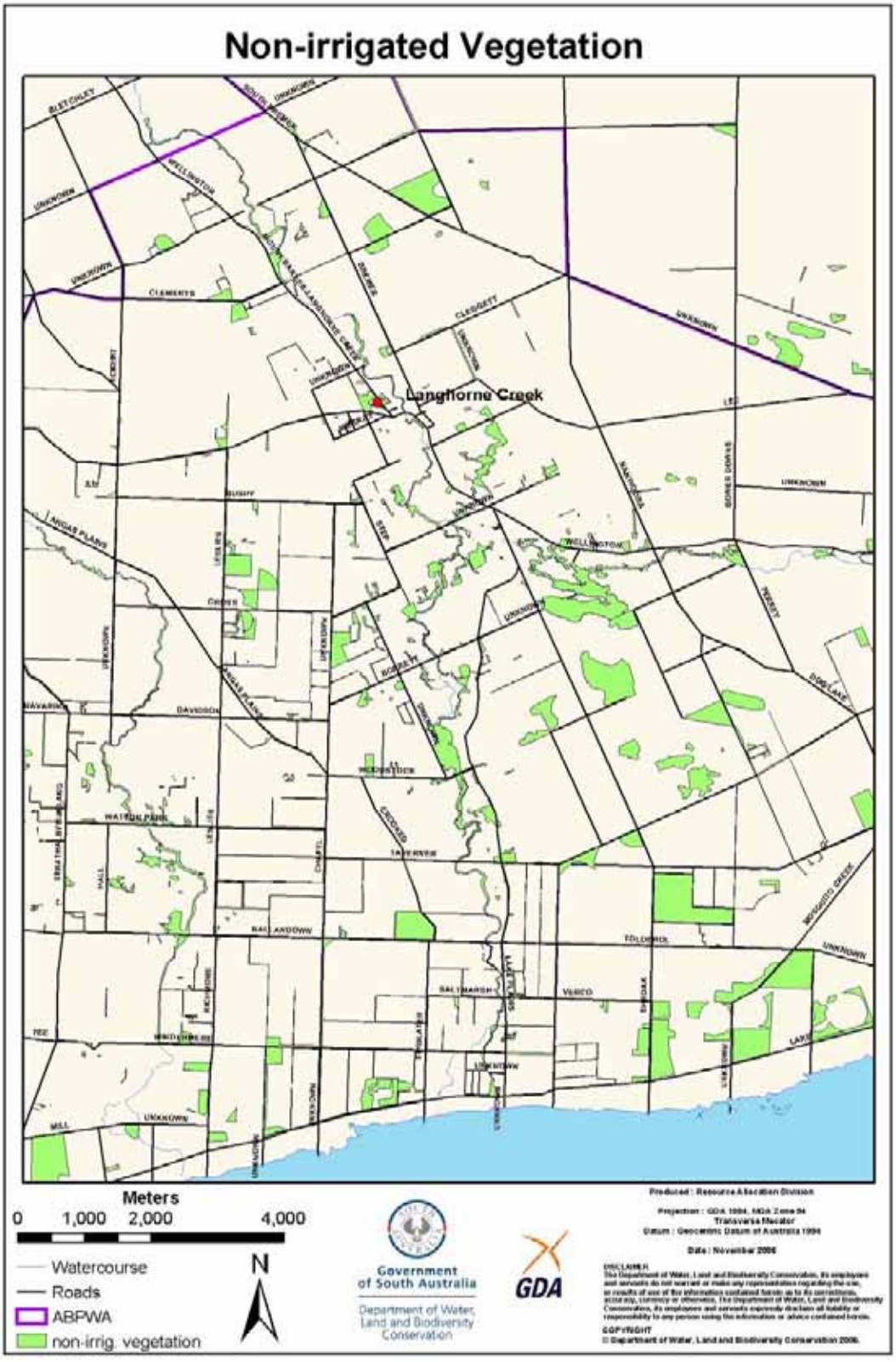
Appendix "I"


Flooded Area 2004
Langhorne Creek
Meters
0 1,000 2,000 4,000
Watercourse
Roads
ABFlood_2004
ABPWA
N
Government of South Australia
Department of Water, Land and Biodiversity Conservation
GDA

Appendix "J"


Flooded Area 2005
Langhorne Creek
Meters
0 1,000 2,000 4,000
Watercourse
Roads
ABPWA
2005_Flood
N
Government of South Australia
Department of Water, Land and Biodiversity Conservation
GDA

Appendix "K"


Non-irrigated Vegetation
Langhorne Creek
Meters
0 1,000 2,000 4,000
Watercourse
Roads
ABPWA
non-irrig. vegetation
N
Government of South Australia
Department of Water, Land and Biodiversity Conservation
GDA
Produced : Resource Assertion Division
Projection : GDA 1994, MGA Zone 54
Transverse Mercator
Datum : Geocentric Datum of Australia 1994
Date : November 2006
DISCLAIMER
COPYRIGHT
© Department of Water, Land and Biodiversity Conservation 2006.

Sub-surface Drainage Trial
Kayinga Vineyard

FABAL Agribusiness Management

25th August, 2006

Introduction

Areas of Kayinga Vineyard are threatened by shallow water tables. Sub-surface drainage has been installed to lower the water table in order to sustain vine growth. Funding from the Angus Bremer Water Management Committee (ABWMC) via the Natural Heritage Trust allowed for a trial of varying drain spacing. The aim of the trial is to determine whether closer drain spacing increases their efficiency in dropping the water table. This is the fourth annual report.

Background

There are 2 main sites at Kayinga Vineyard which had sub-surface drainage installed in 2000. Site 1 covers 5.62ha while Site 2 covers 0.75ha. Site 1 had drains installed every 10m. However in a small section drains were installed every 5m. Site 2 had drains installed every 20m. However, again, in a small section drains were installed every 10m.

In order to measure whether narrower drain spacings have an effect on water table height test wells were installed in the middle of each drain spacing.

Season 05-06

Figures 1 and 2 on the following pages summarise, on charts, the depth to water table within the various drain spacings for the 10 month period from September 2005 to June 2006 inclusive. The 2005 drainage report described the events between July 2005 and August 2005.

Depth to water table measured in millimetres is on the x-axis and the time the measurements were taken is on the y-axis.

As the charts show all drains have maintained a water table depth for the 10 month period that is considered adequate for sustainable vine growth.

As the charts also show the narrower drain spacings at each site continue to maintain a lower depth to water table than the wider drain spacing.

A plant cell density (PCD) map was taken at veraison 2006. Plant cell density maps show areas of a vineyard with different levels of vine vigour. PCD maps have been generated for the past 3 years. The maps consistently show lower vine vigour within the drainage areas compared to other parts of the block that are unaffected by shallow water tables. Whilst vine vigour has improved since the drains were installed the level of vigour is still at undesirable levels. There is no difference in vigour between the narrow or wide drains for both sites.

This year a yield monitoring system fitted to a machine harvester was used to generate a yield map of the block in which Site 2 is located. The yield map showed that Site 2, where drainage has been installed, had a yield of about 8.8T/ha whereas the rest of the block which does not have drainage installed and is unaffected by shallow water table had a yield of about 13T/ha. The yield map does not show a difference in yield between the narrow and wide drains.

Conclusions

1. All drain widths have increased the depth to water table.
2. The narrower drain spacings have a greater depth to water table than the wider drain spacings.
3. There has been an improvement in vine vigour since drains were installed.
4. Even though vigour has improved it is still at undesirable levels.
5. There is no difference in vine vigour between the drain spacings for both sites.
6. There is no difference in yield between the drain spacings for Site 2.
7. The yield at Site 2 is also at undesirable levels.
8. It seems that there is an over-riding factor, such as soil type, which is stopping any further improvement in vigour and yield.

Figure 1. Chart of depth to water table for Site 1. 10m drain spacing are shown by diamonds and 5m drain spacing are shown by squares.

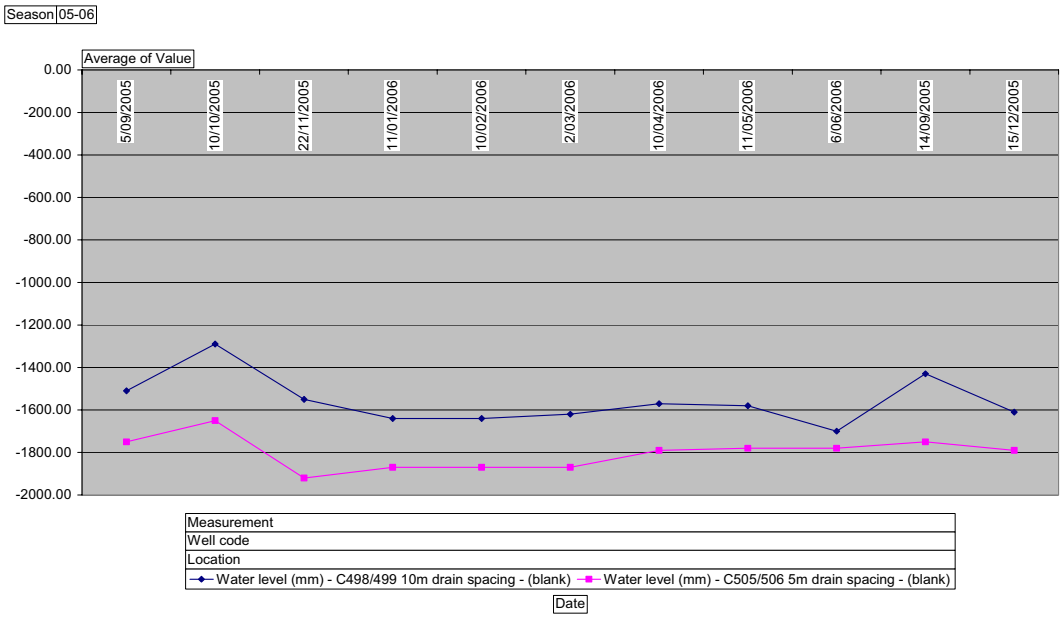


**Figure 2. Chart of depth to water table for Site 2.
10m drain spacing is shown by diamonds and 20m drain spacing is shown by squares.**