



# **YANGERY GROUNDWATER MANAGEMENT PLAN**

**Annual Report for Year Ended  
June 2009**

## Introduction

This report summarises licence information, metered usage and monitoring data collected for the period between July 2008 and June 2009 in accordance with the recommendations given in the Yangery Groundwater Management Plan.

### 1. The Yangery Groundwater Management Plan

The groundwater located in the Yangery Water Supply Protection Area encompasses all aquifers to a depth of 100 meters below the natural surface (Figure 1). These include aquifers associated with the Newer Volcanics, the Port Campbell Limestone, the Hanson Sand plains and coastal dune and alluvial deposits. Groundwater within these aquifers is used for irrigation, dairy and stock and domestic purposes.

### 2. Southern Rural Water's duties under the Groundwater Management Plan

The Yangery Groundwater Management Plan identifies Southern Rural Water as the authority responsible for managing and administering the plan.

The plan requires SRW to:

- coordinate and cause to be carried out groundwater level monitoring and metering programs;
- administer groundwater licensing within the prescriptions of the plan;
- review and report annually to the Minister administering the Water Act 1989 on the implementation of the plan;
- review the plan and if, in its opinion, amendments are necessary or desirable, make recommendations to the Minister accordingly.

### 3. Allocations

The following table sets out the Permissible Annual Volume for the Yangery WSPA, and the total allocations for the period.

WSPA	PAV (ML)	Total No. Licences	Licensable (ML)	Domestic & Stock (ML)	Total (ML)
Yangery	14,103	163	14,084	3,338.9 <sup>1</sup>	17,422.9

---

<sup>1</sup> 398.9ML of D&S attached to existing licences and 2,940ML (1,470 registered D&S bores at 2ML estimated use per bore) as at July 2009

## 4. Metering

Of the 163 licences to take and use water from the Yangery WSPA, 158 are currently metered. Bores licensed for less than 10ML are not metered for compliance purposes. However, 20 meters are currently fitted to Dairy bores as part of a trial under the GMP.

Meters were read after the end of the irrigation season (between late May and early June) and the data stored in SRW's Water Management System. Metered use for the period was 4,812.2ML\*. This figure does not include all stock and domestic use or non-metered dairy use. It is estimated that total use could be approximately 7,752.2ML from registered bores (see footnote on previous page).

Review of the meter readings indicated that several groundwater users may have exceeded their licensed entitlement. At the time of writing, SRW was investigating these cases.

SRW is also engaged in a retrofitting program to conform with recent changes to the meter installation specifications.

\* This figure is subject to some uncertainty as water for Domestic & Stock use is extracted via metered bores in some cases.

## 5. Monitoring

There are 19 monitoring bores throughout the Yangery WSPA (see page 4). These bores are owned and managed by the Department of Sustainability & Environment and are used predominantly for monitoring static groundwater levels. Data collected from these bores are represented in appendix 1A and 1B.

Review of the groundwater level data indicates that:

- The groundwater elevations in bores 141300 and 141314 (PCL) dipped below sea level in mid-2007. However, both bores have shown good recovery during the winter months of up to 1m and 1.4m respectively; and
- The groundwater elevation in bore 141311 (PCL) was at its lowest on record in mid-2007 and has recovered by 0.5m since then; and
- The groundwater elevation in bore 141316 (PCL) has not recovered to levels greater than 1mAHD since April 2006 and was at approximately 0.67mAHD at the time of writing; and
- The groundwater elevation in bore 141301 was close to sea level in December of 2006, and is currently 1.45mAHD.

Salinity has been measured at ten bores within the Yangery WSPA since 2001, with all 19 bores being monitored recently. The salinity monitoring results can be seen in Appendix 2.

Review of the salinity data indicates that:

- The salinity in bore 141304 has more than halved between June 2006 and June 2009 from 4,430EC to 1,965EC. Bores 141300, 141301 and 141311 show the highest salinity reading across the WSPA, they all show a reading of over 3,000EC. Seawater has a salinity of around 62,000 EC.

SRW conducted a salinity monitoring program during the 08/09 irrigation season. 161 sample bottles were mailed out to groundwater licence holders of Yangery, and approximately 29 samples were returned for analysis. This data has been added to SRW's records to help monitor the salinity levels in the Yangery WSPA and surrounding areas. Data collected from these private bores are presented in Appendix 2.

Rainfall data from three weather stations in the area is presented in Appendix 3. Actual rainfall during the year was quite varied, with above average rainfall in the months of July, Dec and April. All three weather stations recorded above average rainfall for the reported period. Port Fairy received 6 inches above the long term average, (since records began in 1994).

## **6. Transfers of Water Entitlement**

During the period between July 2008 and June 2009 a number of permanent and temporary transfers were approved within the Yangery WSPA.

There were three temporary (1 year) transfers approved with a combined volume of 43ML. Also, two permanent transfers occurred in this period, for a combined volume of 224ML

## **7. Plan Review**

A review of the Groundwater Management Plan was completed in 2007. SRW did not propose to amend the Plan.

Review of additional data collected to date (including the private bore salinity) has not altered the finding of the review.

## Yangery - SOBN Locations



**Legend**

- + SOBN
- WSPA
- YANGERY WSPA

Map produced by Southern Rural Water.  
For further information contact: (03) 5139 3100.



Date: Friday, 24 July 2009

Map Projection: GDA\_1994\_VICGRID94

**Source and Accuracy**

Base information is derived from data supplied and used with the permission of the Department of Natural Resources and Environment, Victoria.

Data features used to create the accuracy of this map. However Southern Rural Water does not accept responsibility for any errors or omissions.



## Appendix 1A. Monthly Monitoring Data (Groundwater Level)

The tables below show the Reduced Water Level in metres AHD at each monitoring bore within the Yangery WSPA. This data was used to generate the hydrographs in Appendix 1B.

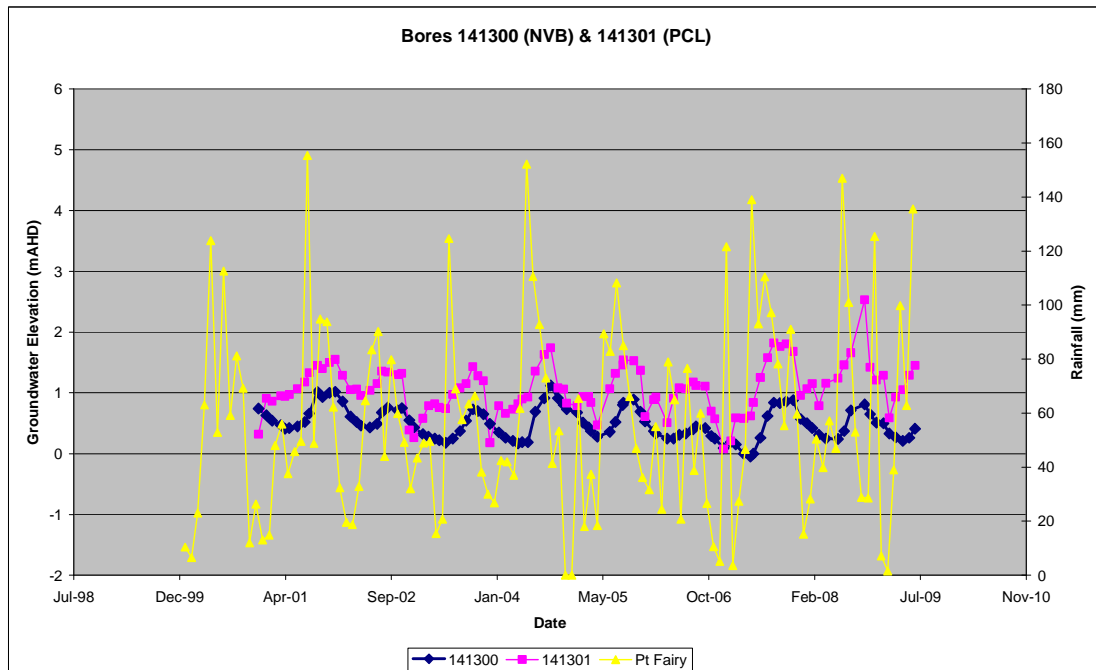
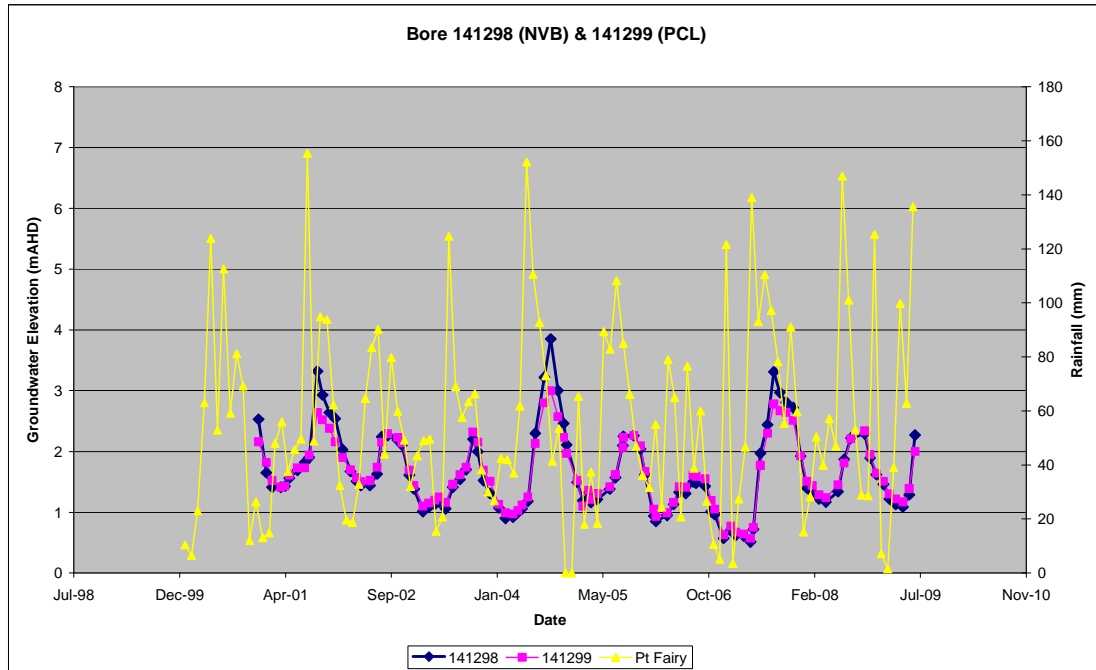
Date	141298	141299	141300	141301	141302	141303	141304	141305	141306
Jul-08	1.87	1.81	0.37	1.46	23.73	4.28	4.23	17.37	48.22
Aug-08	2.22	2.21	0.71	1.66	25.60	4.72	4.67	17.39	48.77
Sep-08	2.61	2.53	0.89	1.79	25.51	4.96	4.92	17.50	49.61
Oct-08	2.29	2.34	0.81	2.53	25.11	4.84	4.79	17.59	49.43
Nov-08	1.89	1.95	0.65	1.42	24.56	4.10	4.07	17.65	49.12
Dec-08	1.62	1.64	0.51	1.21	24.17	5.53	3.46	17.64	48.94
Jan-09	1.46	1.51	0.50	1.29	24.20	3.22	3.24	17.61	48.75
Feb-09	1.22	1.30	0.33	0.59	23.74	2.46	2.41	17.45	48.64
Mar-09	1.13	1.22	0.27	0.93	23.38	2.60	2.56	17.38	48.51
Apr-09	1.09	1.17	0.21	1.05	23.07	2.92	2.87	17.40	48.39
May-09	1.29	1.39	0.26	1.29	23.00	3.68	3.57	17.43	48.43
Jun-09	2.27	2.00	0.41	1.45	23.23	4.08	3.99	17.40	48.25
Jul-Jun	<b>+0.40</b>	<b>+0.19</b>	<b>+0.04</b>	<b>-0.01</b>	<b>-0.50</b>	<b>-0.20</b>	<b>-0.24</b>	<b>+0.03</b>	<b>+0.03</b>

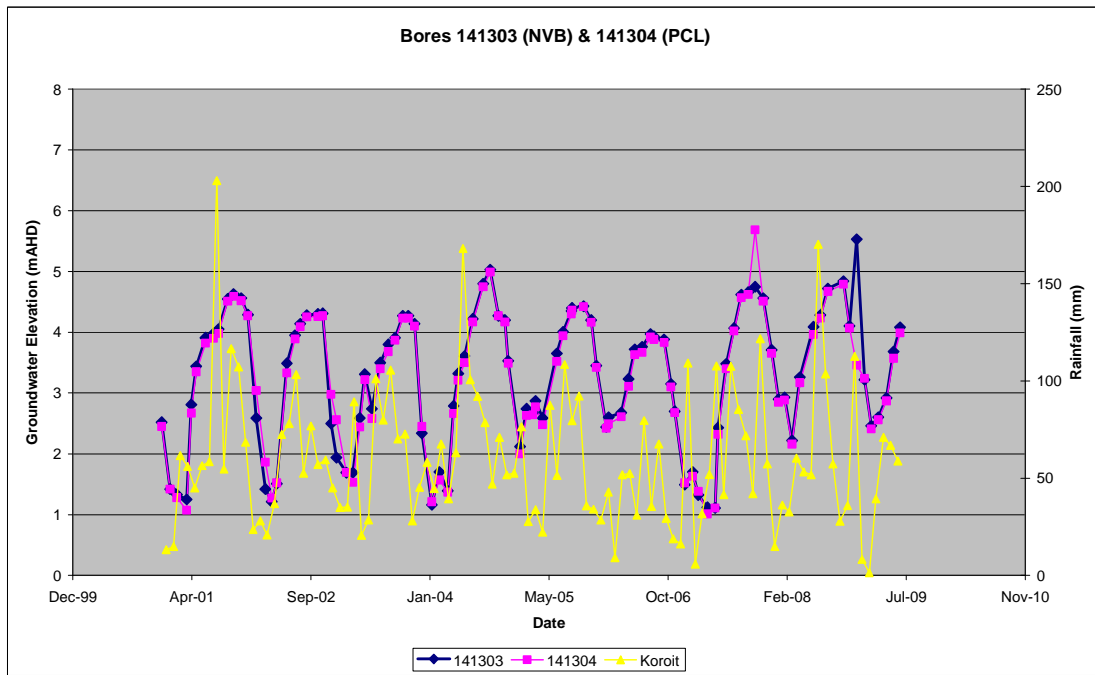
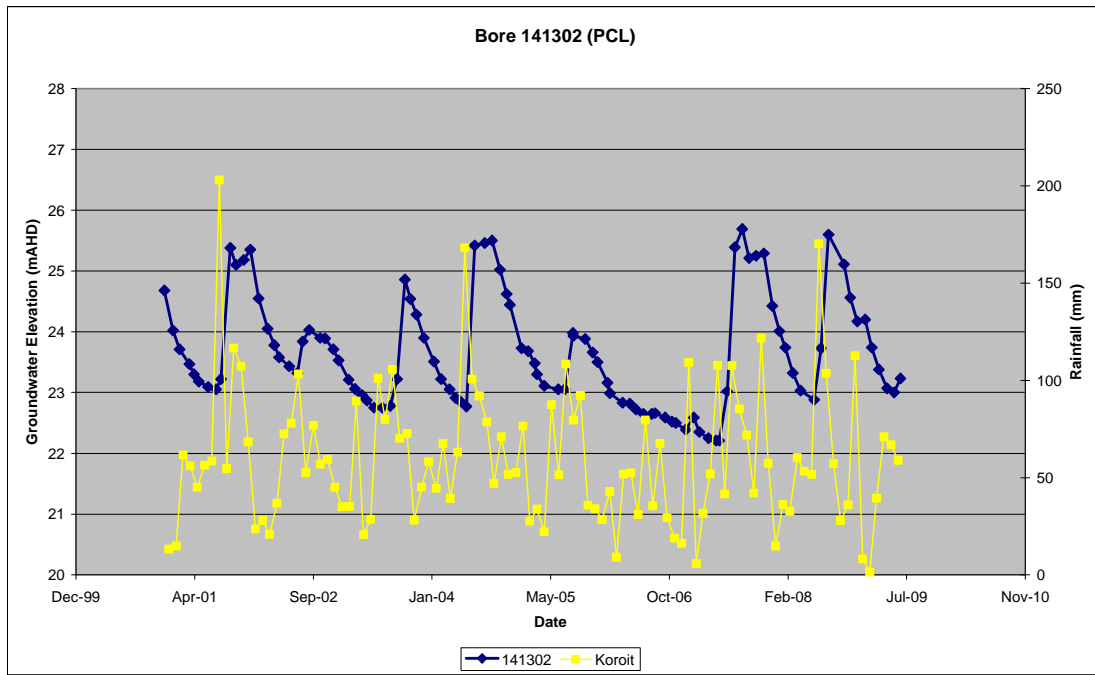
  

Date	141307	141308	141309	141310	141311	141312	141313	141314	141315	141316
Jul-08	72.78	72.79	49.44	48.61	53.58	7.86	2.38	0.82	6.11	0.64
Aug-08	73.02	73.04	49.37	48.49	53.55	7.78	2.68	1.03	6.09	0.72
Sep-08	73.61	73.63	49.36	48.92	53.79	7.78	2.87	1.32	6.11	0.83
Oct-08	73.82	73.85	49.77	49.06	54.01	7.77	2.65	1.43	6.15	0.83
Nov-08	73.44	73.45	49.61	48.87	54.13	7.79	2.51	0.96	6.14	0.76
Dec-08	73.63	73.63	49.38	48.44	54.04	7.77	2.41	0.83	6.16	0.74
Jan-09	73.04	73.05	49.36	48.12	53.98	7.78	2.35	0.73	6.16	0.74
Feb-09	72.47	72.44	49.36	47.55	53.71	7.72	2.21	0.38	6.10	0.67
Mar-09	72.16	72.14	49.39	47.76	53.47	7.78	2.09	0.16	6.10	0.62
Apr-09	72.74	72.72	49.39	48.02	53.55	7.83	2.11	-0.02	6.11	0.58
May-09	72.97	72.96	49.58	48.53	53.58	7.81	2.12	0.53	6.10	0.61
Jun-09	72.92	72.91	49.76	48.73	53.53	7.61	2.23	0.71	6.08	0.67
Jul-Jun	<b>+0.14</b>	<b>+0.12</b>	<b>+0.32</b>	<b>+0.12</b>	<b>-0.05</b>	<b>-0.25</b>	<b>-0.15</b>	<b>-0.11</b>	<b>-0.03</b>	<b>+0.03</b>

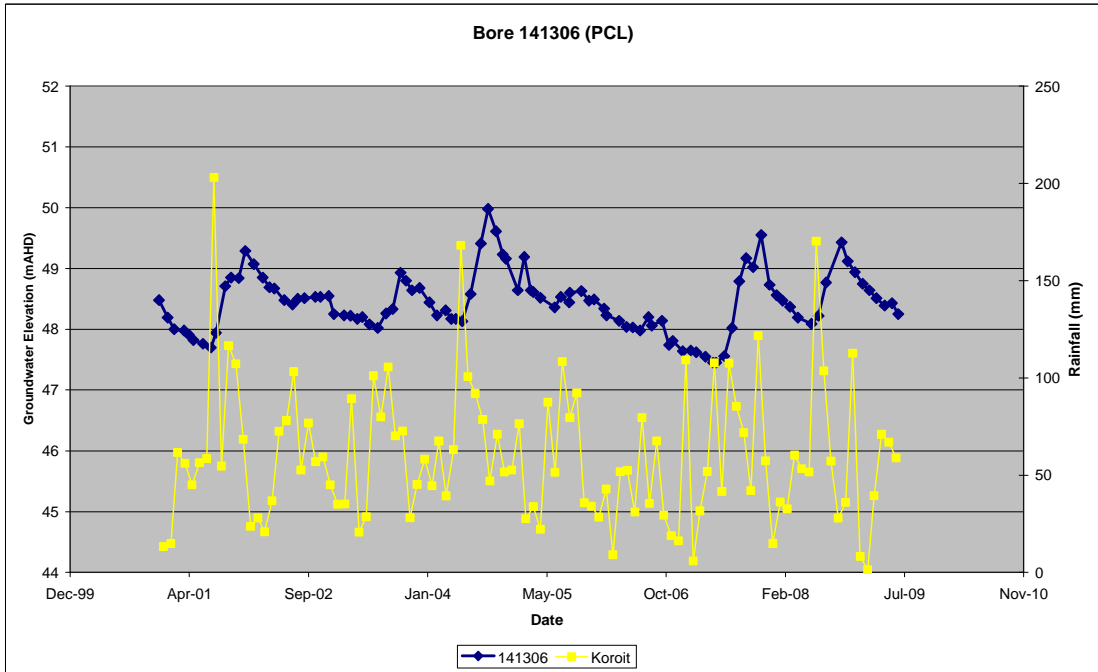
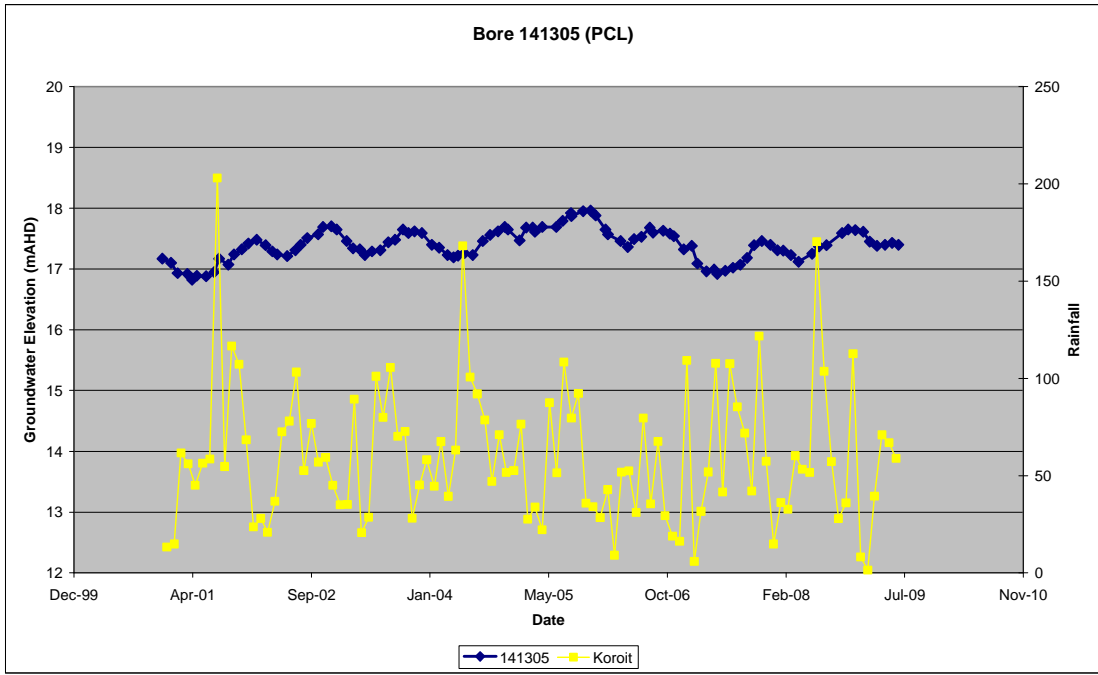
## Appendix 1B. Hydrographs

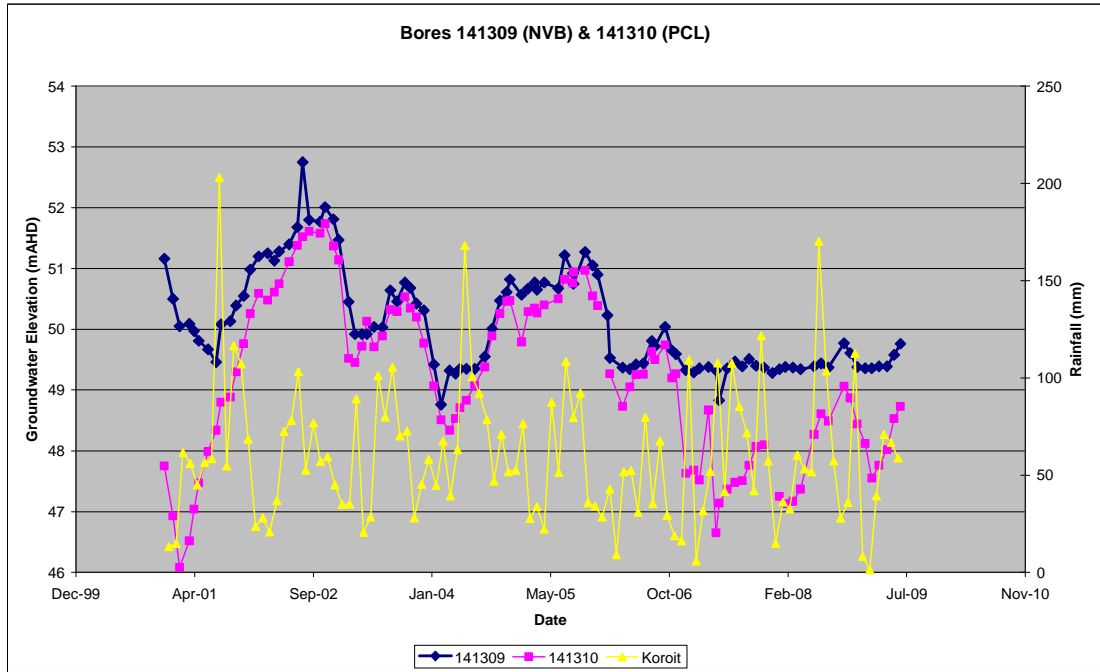
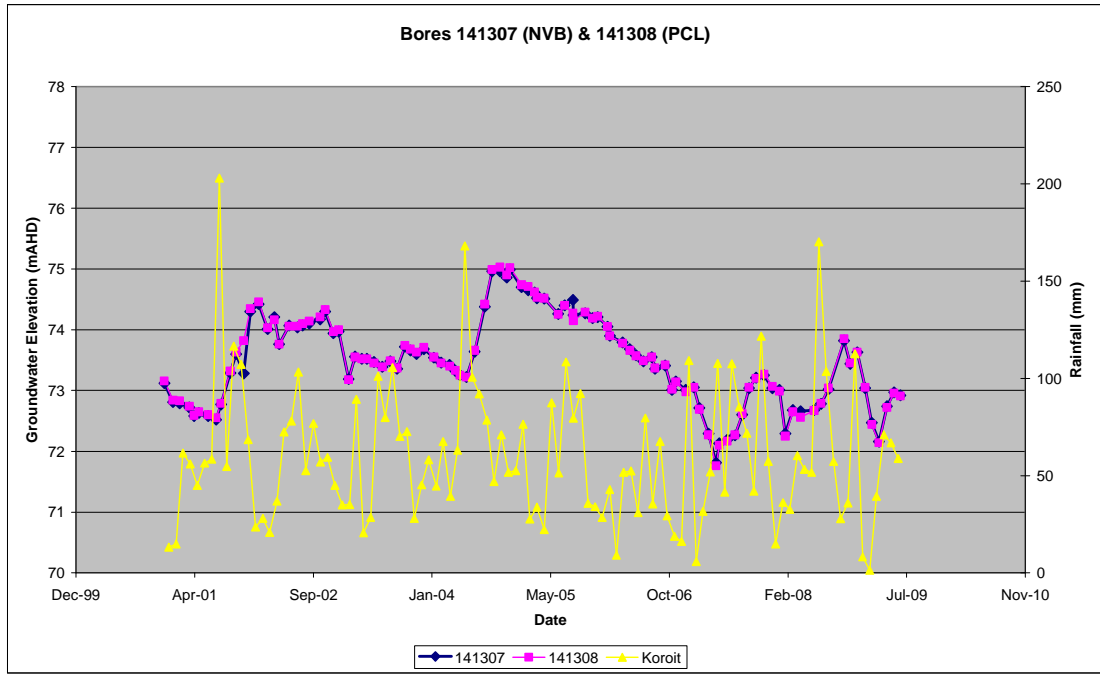
The following hydrographs show the trend in groundwater levels measured at monitoring bores throughout the Yangery Water Supply Protection Area. This is measured in metres above the Australian Height Datum (mAHD), or mean sea level.

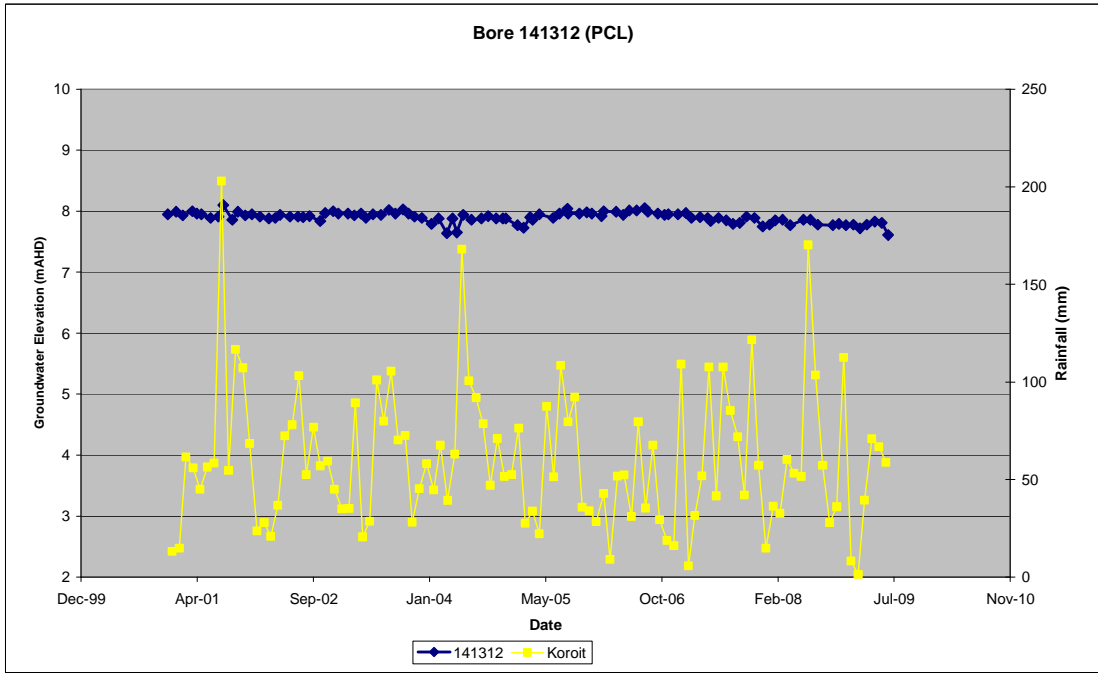
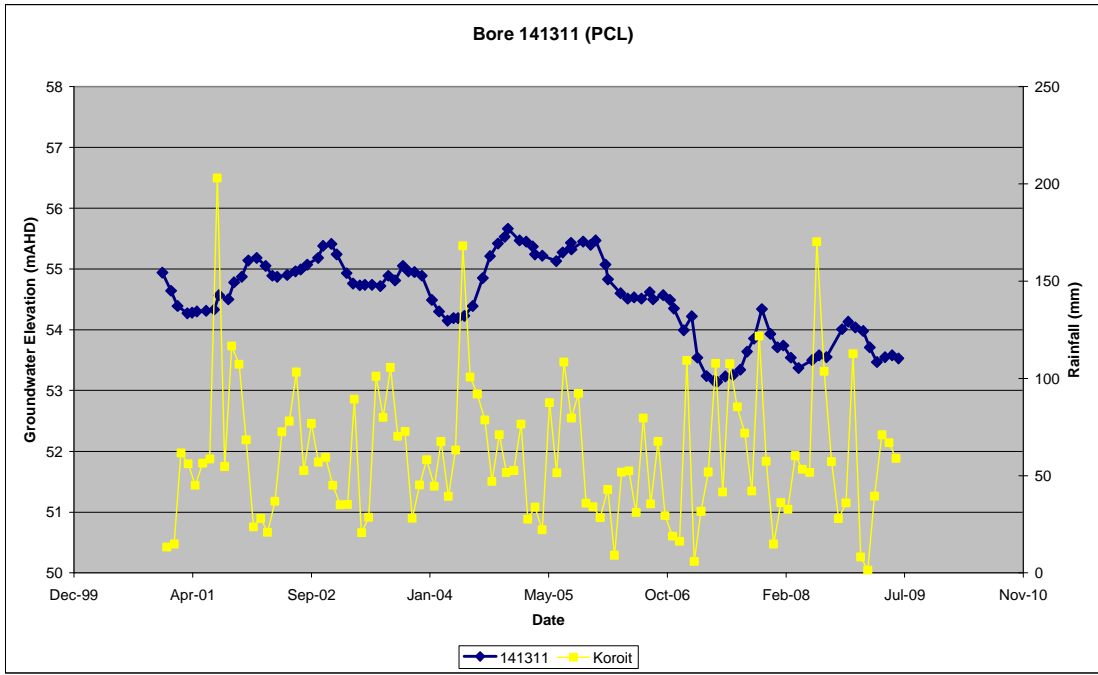


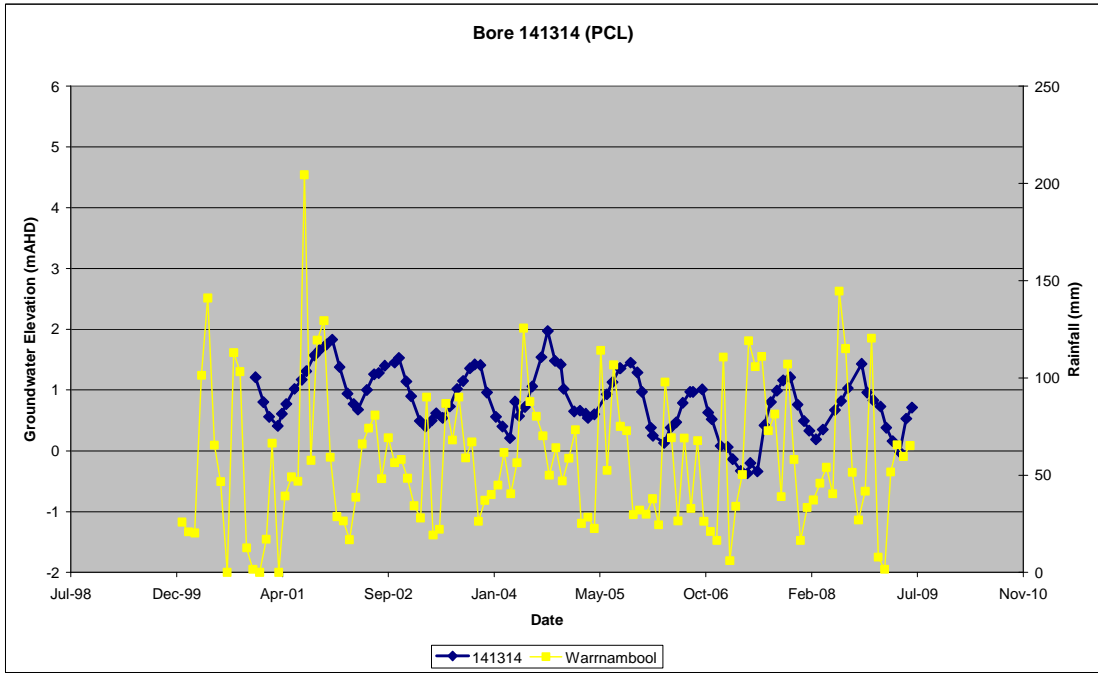
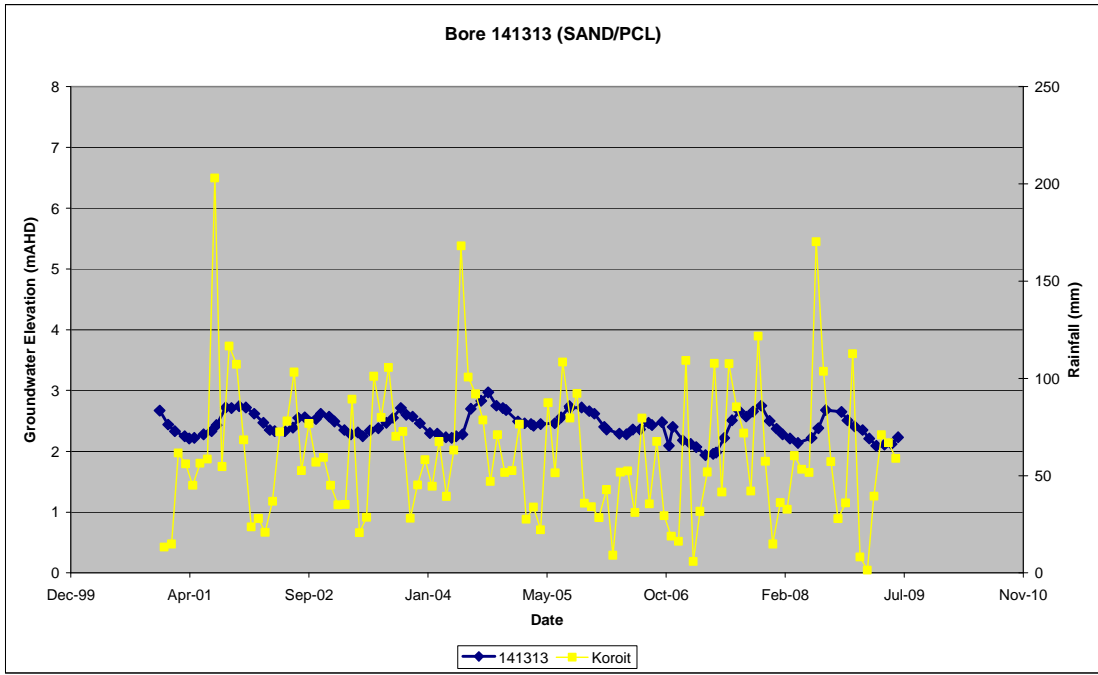


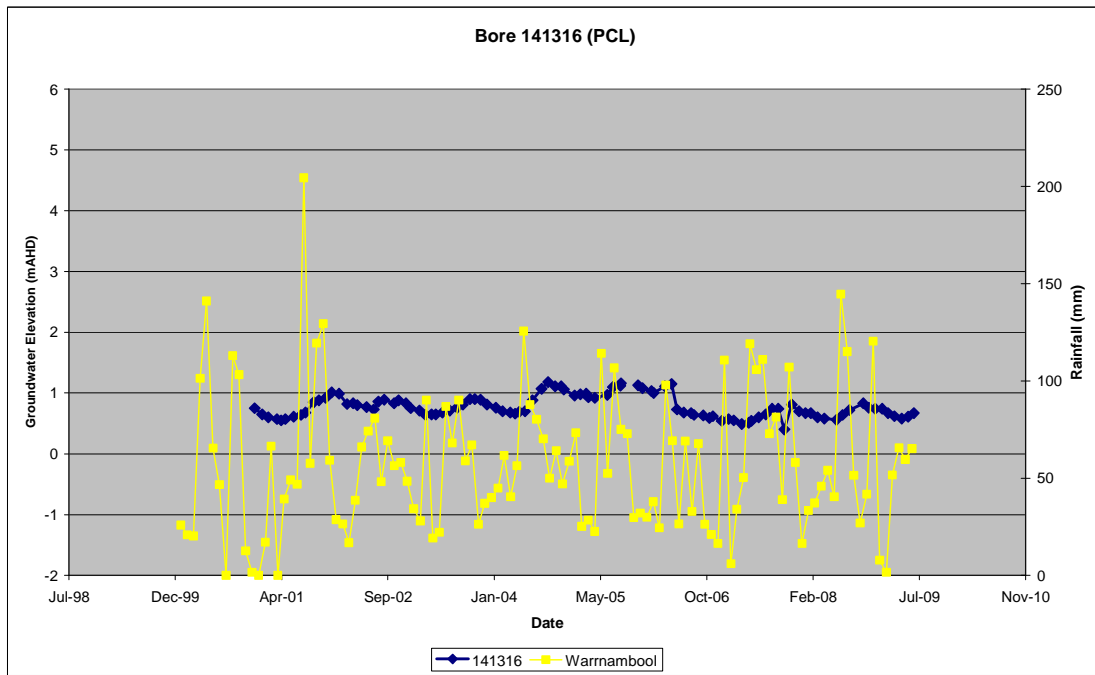
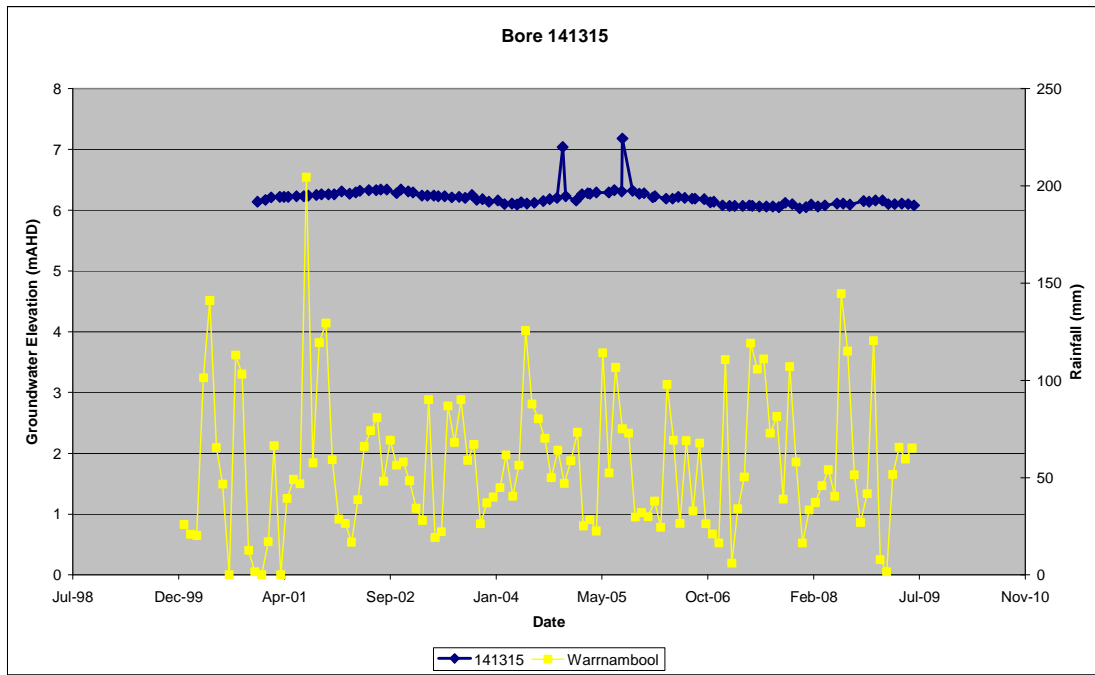












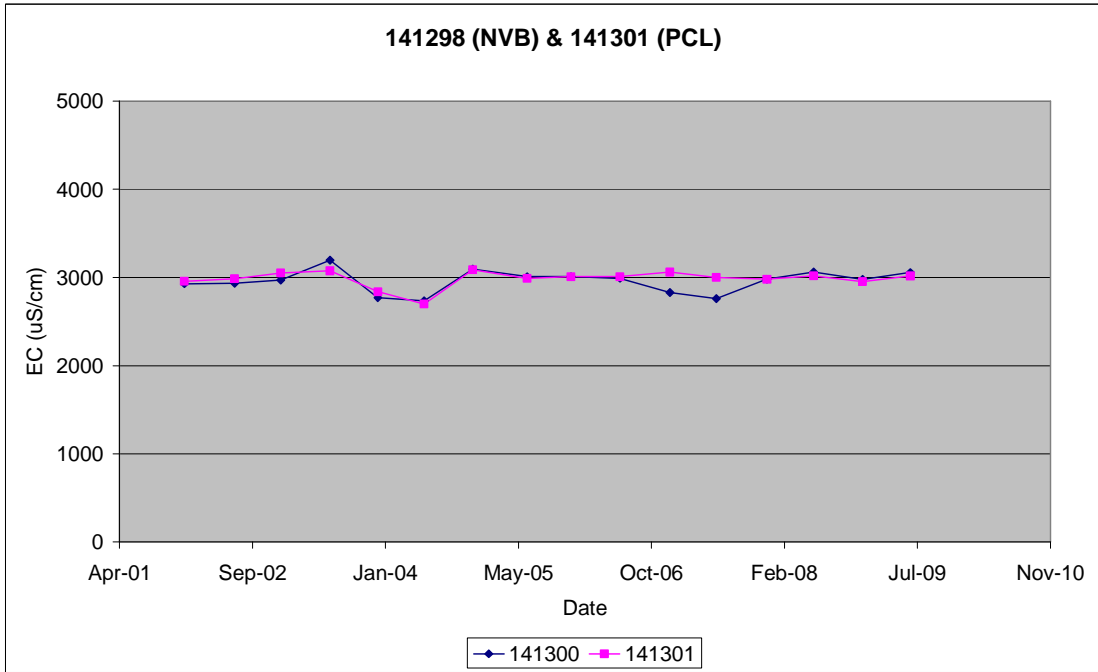
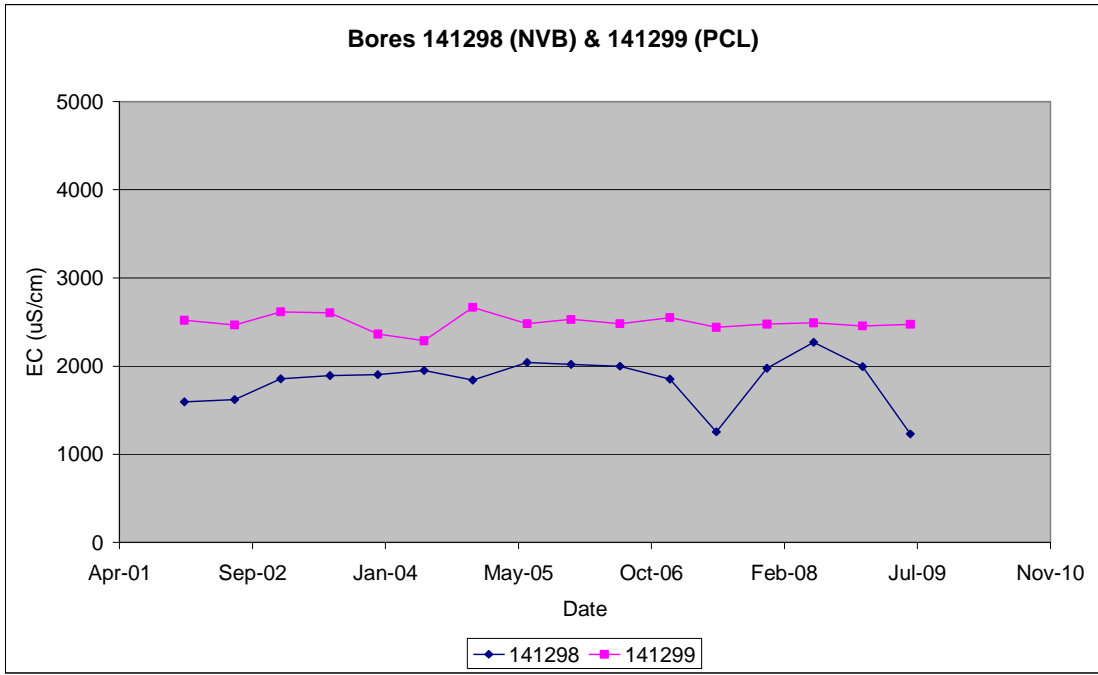
## Appendix 2. Salinity Monitoring Data

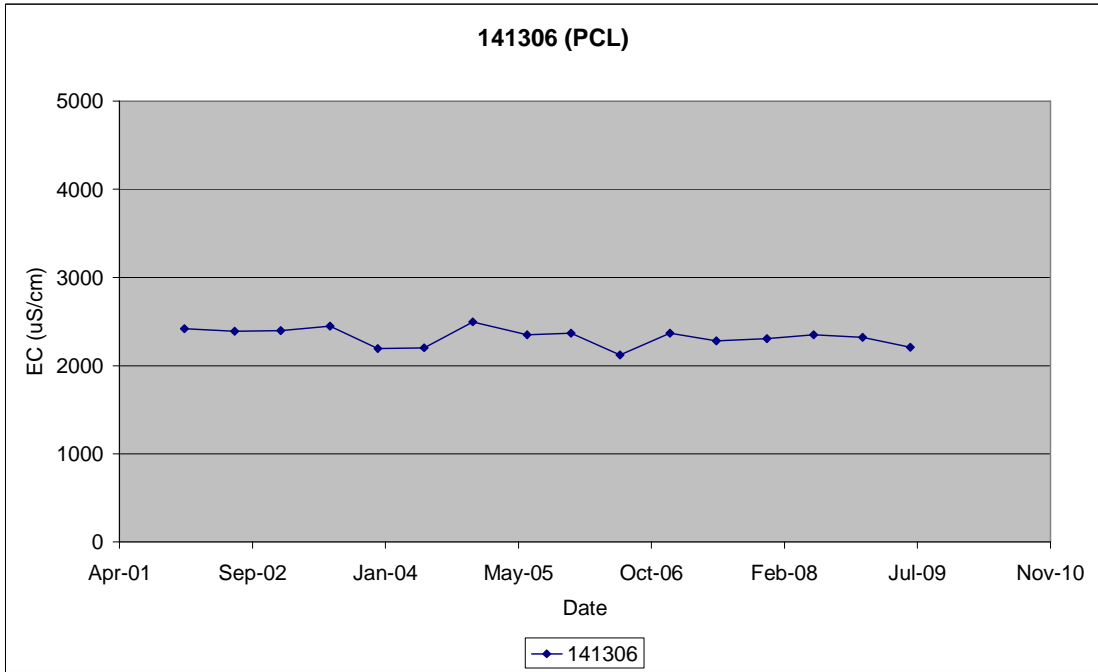
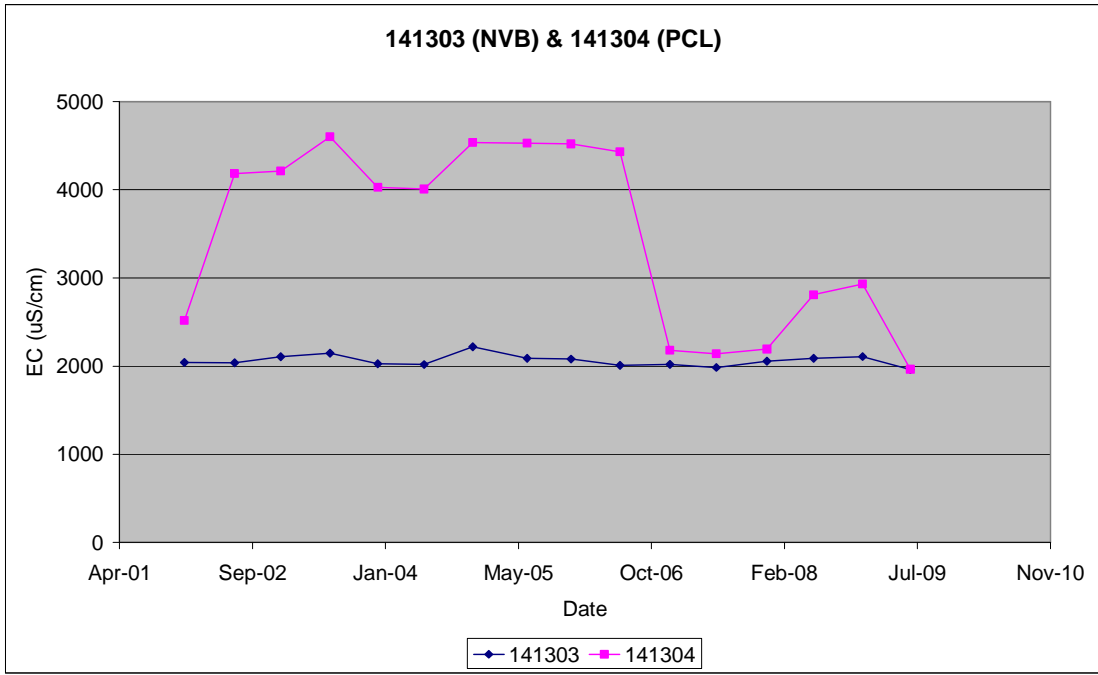
The following graph plots salinity trends observed from monitored bores between December 2001 and June 2009. Data is presented numerically below and graphically on the following pages.

Bore	141298	141299	141300	141301	141302	141303	141304	141305	141306	
Dec-01	1,594	2,520	2,928	2,957	-	2,041	2,517	-	2,419	
Jun-02	1,620	2,466	2,935	2,987	-	2,039	4,185	-	2,390	
Dec-02	1,858	2,616	2,970	3,050	-	2,106	4,212	-	2,398	
Jun-03	1,892	2,603	3,197	3,074	-	2,146	4,604	-	2,448	
Dec-03	1,904	2,364	2,772	2,838	-	2,025	4,030	-	2,194	
Jun-04	1,950	2,287	2,735	2,698	-	2,017	4,008	-	2,202	
Dec-04	1,840	2,668	3,093	3,087	-	2,219	4,537	-	2,496	
Jun-05	2,040	2,480	3,010	2,990	-	2,090	4,530	-	2,350	
Dec-05	2,020	2,530	3,010	3,010	-	2,080	4,520	-	2,370	
Jun-06	2,000	2,480	2,990	3,010	-	2,010	4,430	-	2,120	
Dec-06	1,853	2,550	2,830	3,060	-	2,020	2,180	-	2,370	
Jun-07	1,255	2,440	2,760	3,000	-	1,985	2,140	-	2,280	
Dec-07	1,975	2,476	2,980	2,980	-	2,056	2,193	-	2,306	
Jun-08	2,270	2,490	3,060	3,020	2,170	2,090	2,810	1,319	2,350	
Dec-08	1,995	2,456	2,978	2,954	1,286	2,108	2,931	1,312	2,320	
Jun-09	1,229	2,474	3,057	3,018	2,014	1,961	1,965	1,246	2,207	
Bore	141307	141308	141309	141310	141311	141312	141313	141314	141315	141316
Dec-01	-	-	-	3,075	-	2,054	-	-	-	875
Jun-02	-	-	-	3,050	-	2,025	-	-	-	877
Dec-02	-	-	-	3,270	-	1,980	-	-	-	861
Jun-03	-	-	-	3,289	-	2,233	-	-	-	882
Dec-03	-	-	-	2,953	-	2,038	-	-	-	856
Jun-04	-	-	-	2,841	-	2,008	-	-	-	871
Dec-04	-	-	-	3,231	-	2,208	-	-	-	884
Jun-05	-	-	-	3,120	-	2,120	-	-	-	644
Dec-05	-	-	-	3,140	-	2,170	-	-	-	853
Jun-06	-	-	-	3,040	-	2,150	-	-	-	825
Dec-06	-	-	-	3,170	-	2,220	-	-	-	840
Jun-07	-	-	-	2,170	-	2,150	-	-	-	820
Dec-07	-	-	-	3,000	-	2,226	-	-	-	832
Jun-08	3,830	1,759	NS	976	3,070	2,310	2,300	1,527	2,950	814
Dec-08	3,698	1,796	NS	969	3,035	2,274	2,252	1,542	2,906	799
Jun-09	3,734	1,638	NS	878	3,043	1,884	2,080	1,406	2,887	724

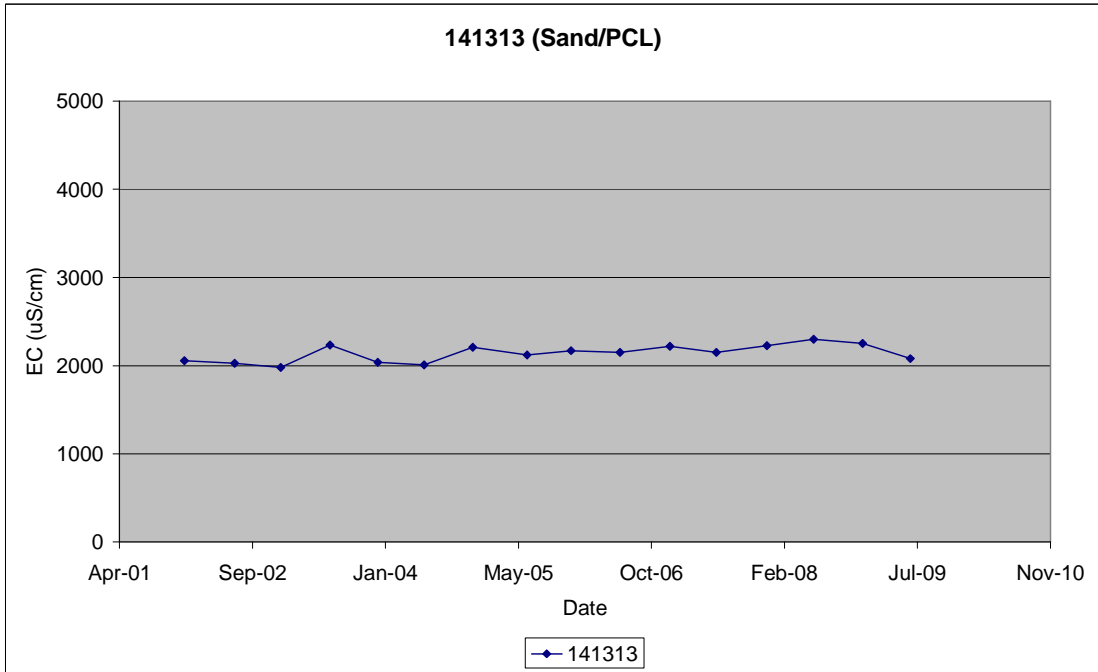
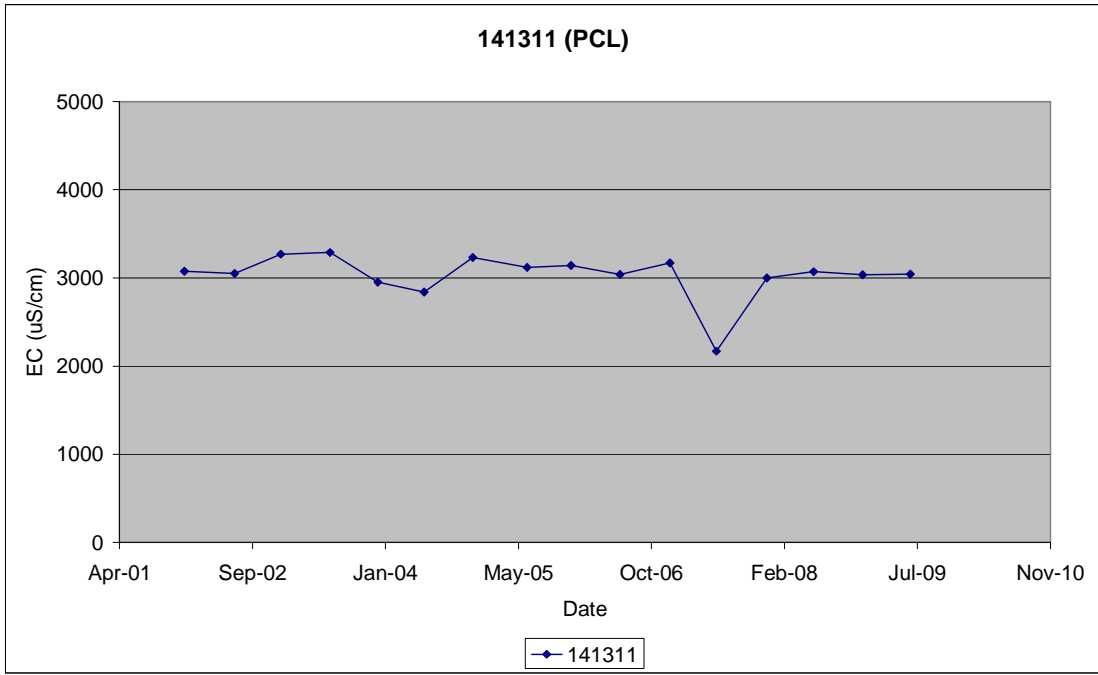
NOTE: NS = Not Sampled due to dry bore

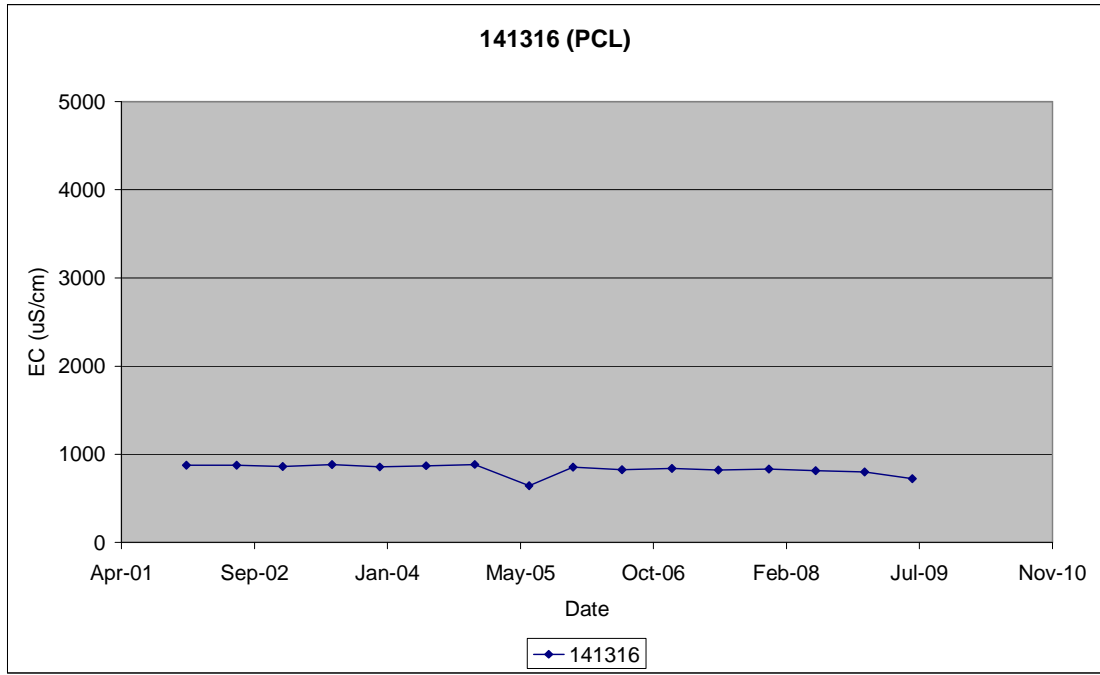
- indicates no reading taken – salinity monitoring program has been expanded recently

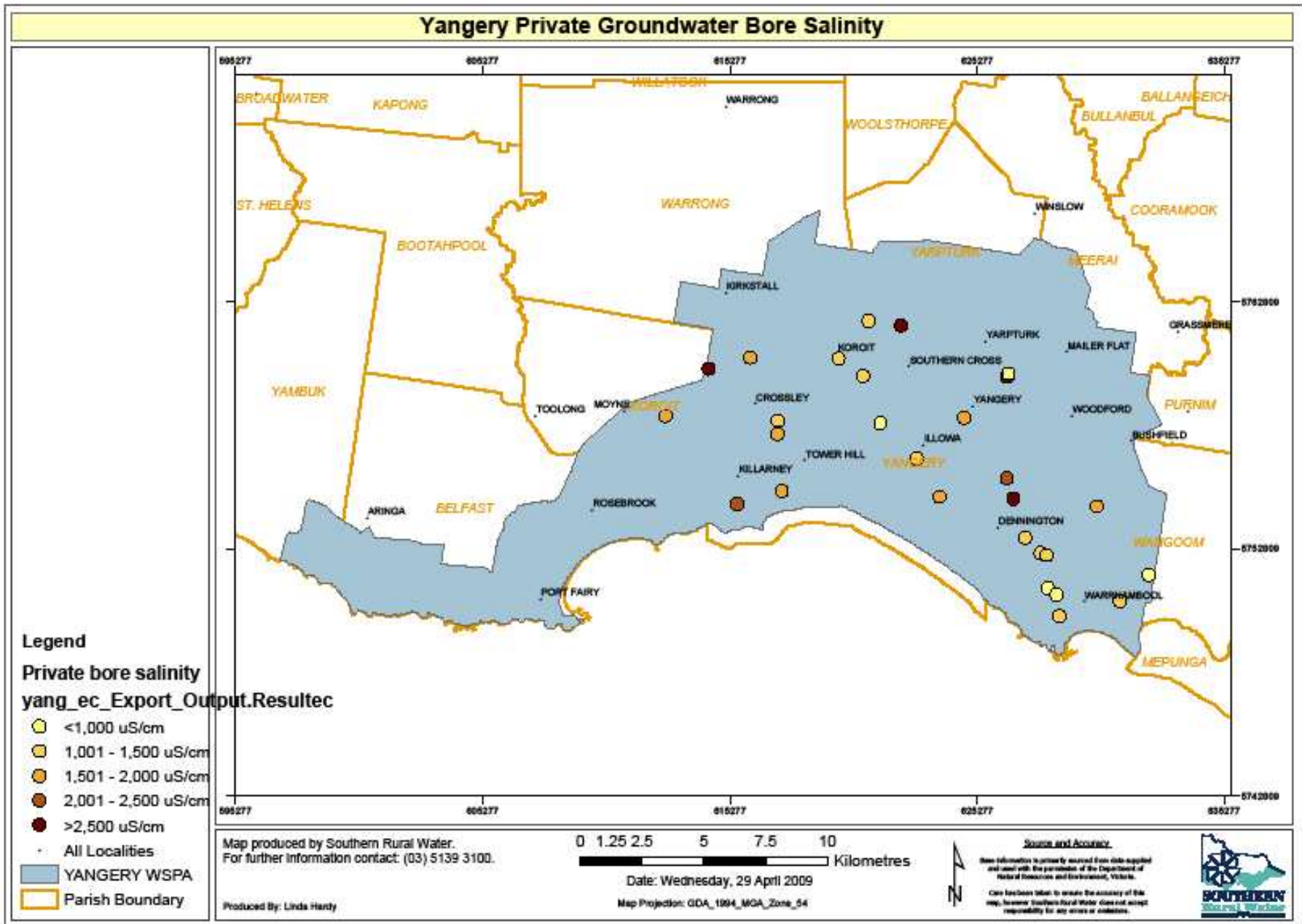












### Appendix 3. Climate Data

The following table displays actual rainfall data collected by the Bureau of Meteorology from the gauges at Port Fairy (90175), Koroit (90051) and Warrnambool Airport (90186).

Month	Port Fairy		Koroit		Warrnambool	
	Actual rainfall (mm)	Long-term median rainfall (mm)	Actual rainfall (mm)	Long-term median rainfall (mm)	Actual rainfall (mm)	Long-term median rainfall (mm)
Jul-08	147	86.5	170.2	79.9	144.6	68.5
Aug-08	101	65.4	103.6	83.6	115	80.2
Sep-08	53	73	57.2	76.8	51.4	68.5
Oct-08	28.8	55.4	27.9	52.0	26.8	62.2
Nov-08	28.6	38.2	36	48.4	41.8	51.4
Dec-08	125.4	34.8	112.6	45.0	120.4	47.0
Jan-09	7.2	27.5	8.2	28.8	7.8	29.2
Feb-09	1.6	20.6	1.4	29.2	1.6	28.0
Mar-09	39	31.8	39.4	39.4	51.6	37.2
Apr-09	99.8	39.8	70.9	53.6	65.6	43.1
May-09	62.8	61.8	66.8	52.8	59.6	56.4
Jun-09	135.6	82.2	58.8	70.5	65.2	68.2
<b>TOTAL</b>	<b>829.8</b>	<b>617</b>	<b>753</b>	<b>660</b>	<b>751.4</b>	<b>639.9</b>

*\*The median is used as it reduces any skew caused by abnormally high or low rainfall events depicting a 'truer' representation.*

The long-term median rainfall was used as a comparative tool. For the period shown actual annual rainfall across the entire GMA was above the long-term annual median. The graphs clearly illustrate the actual rainfall for the report period compared to the long-term median. Actual rainfall was around the median for most of the year. However, there were 5 months throughout the year show above average rainfall, which resulted in above average rainfall for the year.

