



# **Koo Wee Rup Groundwater Management Plan**

**Annual Report  
2016-17**

## Foreword

This report is submitted to the Minister for Water, Port Phillip & Westernport Catchment Management Authority and Melbourne Water in accordance with s32C *Water Act 1989*. A copy of this report is available for inspection at the offices of the Authority, and notice of report availability of the report will be published as required by s32D of the *Water Act 1989*.

The purpose of this report is to detail Authority activities administering and enforcing the management plan, and provide information that is required to be reported under the Plan.

### Area Summary

<b>Area</b>	Koo Wee Rup Water Supply Protection Area
<b>Segment</b>	Groundwater
<b>Area Declared</b>	January 2002
<b>Plan Approved</b>	4 August 2010
<b>Allocation Limit (Permissible Annual Volume)</b>	12,915 ML
<b>Scheduled Plan Review</b>	A review is being undertaken in 2017
<b>Implementation Authority</b>	Southern Rural Water
<b>Relevant CMA</b>	Port Phillip & Westernport Catchment Management Authority
<b>Report Period</b>	1 July 2016 – 30 June 2017

<b>1</b>	<b>Executive Summary.....</b>	<b>3</b>
<b>2</b>	<b>Introduction.....</b>	<b>4</b>
<b>3</b>	<b>Key Observations .....</b>	<b>5</b>
3.1	Rainfall .....	5
3.2	Water Levels.....	5
3.3	Salinity .....	7
3.4	Water Use.....	8
3.5	Non compliance .....	9
<b>4</b>	<b>Plan Implementation.....</b>	<b>9</b>
4.1	Monitoring.....	9
4.1.1	Prescriptions .....	9
4.1.2	Issues Affecting Implementation .....	<b>Error! Bookmark not defined.</b>
4.2	Metering .....	10
4.2.1	Prescriptions .....	10
4.2.2	Compliance and Exceptions.....	12
4.2.3	Issues Affecting Implementation .....	13
4.2.4	Metering activities .....	10
4.3	Restrictions on Licensing and Licence Transfers .....	11
4.3.1	Prescriptions .....	11
4.3.2	Compliance and Exceptions.....	<b>Error! Bookmark not defined.</b>
4.3.3	Issues Affecting Implementation .....	<b>Error! Bookmark not defined.</b>
4.4	Licensing Activities .....	12
4.4.1	Issues Affecting Implementation .....	<b>Error! Bookmark not defined.</b>
<b>5</b>	<b>Conclusions .....</b>	<b>12</b>
<b>6</b>	<b>Appendices .....</b>	<b>14</b>
6.1.1	Monitoring program details.....	14
6.1.2	Hydrographs .....	16
6.1.3	Salinity .....	30

## 1 Executive Summary

The Koo Wee Rup Groundwater Management Plan (GMP) was prepared under Division 3 Part 3 of the *Water Act 1989* for the Koo Wee Rup Water Supply Protection Area (WSPA) and relates to the groundwater resources of the protection area. The Koo Wee Rup GMP was approved by the Minister for Water in August 2010.

The objective of the management plan is to make sure that the water resources of the area are managed in an equitable manner so as to ensure the long-term sustainability of those resources.

Southern Rural Water (SRW) is the authority responsible for managing and administering the plan, which includes the preparation of an annual report to demonstrate compliance. The annual report summarises licence information, metered usage and monitoring data collected for the reporting period in accordance with the recommendations given in the Koo Wee Rup GMP.

The Koo Wee Rup GMP Annual Report for 2016-17 demonstrates that SRW has complied with the requirements of the plan.

Monitoring and metering indicate no significant changes in the condition of the resource or water usage patterns; therefore it is considered that the groundwater resources of the Koo Wee Rup WSPA are being managed sustainably. No changes are proposed for the monitoring strategy in 2016-17.

SRW will undertake a review of the Koo Wee Rup GMP in 2017 to determine whether a groundwater management plan is still necessary or whether a local management plan would be more suitable. The review will also consider appropriateness of the existing prescriptions, particularly in relation to groundwater transfers. SRW has received feedback from licence holders that the trading zones and one year transfers do not provide sufficient flexibility for groundwater users.



CHRIS HUGHES  
Manager Groundwater & Rivers

## 2 Introduction

This report summarises licence information, metered usage and monitoring data collected for the period between 1 July 2016 and 30 June 2017 in accordance with the recommendations given in the Koo Wee Rup GMP.

The Koo Wee Rup WSPA is separated into 8 zones and comprises the groundwater resource, mainly in the Westernport sequence (Baxter, Sherwood and Yallock formations). The Westernport sequence is generally considered a single aquifer system, as there is a hydraulic connection between each individual formation. Taking this into account, there has been no vertical limits placed on the depth of the Koo Wee Rup WSPA. However basaltic clay of the Older Volcanics is considered to form a semi-confining layer between the Westernport sequence and the underlying Older Volcanics/Childers formations.

Groundwater within the Koo Wee Rup WSPA is used for irrigation, dairy, industrial and stock and domestic purposes.

The Koo Wee Rup GMP identifies SRW as the authority responsible for managing and administering the plan.

The objective of the management plan, as set out in the *Water Act 1989*, is to make sure that the water resources of the area are managed in an equitable manner so as to ensure the long-term sustainability of those resources.

The plan requires SRW to:

- Coordinate groundwater level monitoring and metering programs;
- Review monitoring and metering data;
- 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;
- Seek review of the plan and if, in its opinion, amendments are necessary or desirable, make recommendations to the Minister accordingly.

The success of the Koo Wee Rup GMP is measured through a number of licensing, metering and monitoring objectives. These include:

- All consumptive use to be metered and recorded in line with both State Government and Corporation metering policies;
- Groundwater usage is to be maintained within licence volumes;
- Water levels and water quality (salinity) is to be monitored to maintain acceptable levels and to ensure the long term sustainable use of the aquifer(s);
- Trading of existing consumptive use allocations occurs in accordance with all relevant provisions of the *Water Act 1989* and/or any supplementary rules adopted for the Koo Wee Rup WSPA;
- No new groundwater licences will be issued if the total of all groundwater licence entitlements equals or exceeds the PCV declared for the Koo Wee Rup WSPA, unless allowed for by prescriptions 7 & 8.

Further information can be obtained from the Koo Wee Rup WSPA Groundwater Management Plan. A copy can be found on Southern Rural Water's website: [www.srw.com.au](http://www.srw.com.au).

### **3 Key Observations**

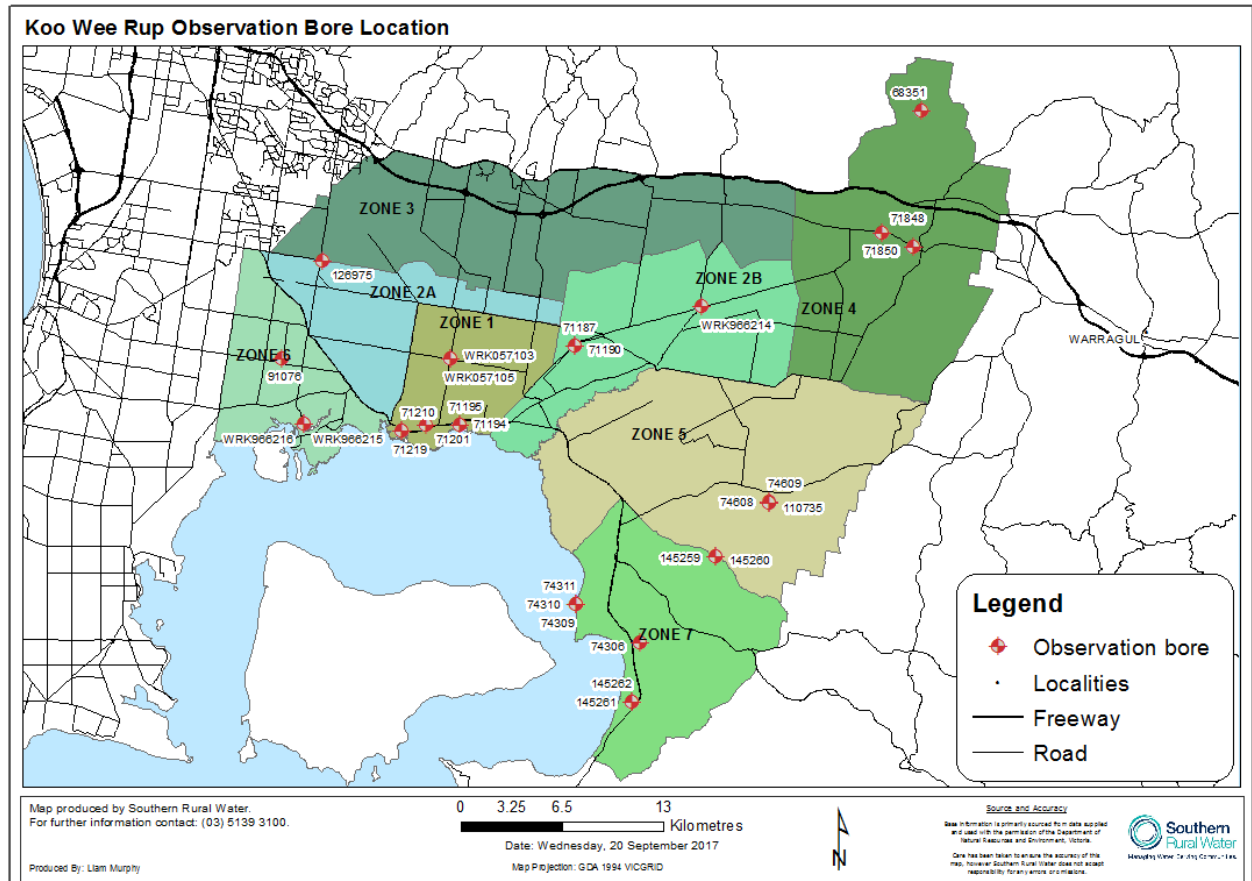
#### **3.1 Rainfall**

Rainfall during the reporting period was 814.2mm (measured at Lang Lang). Lang Lang has an average rainfall of 860mm per year.

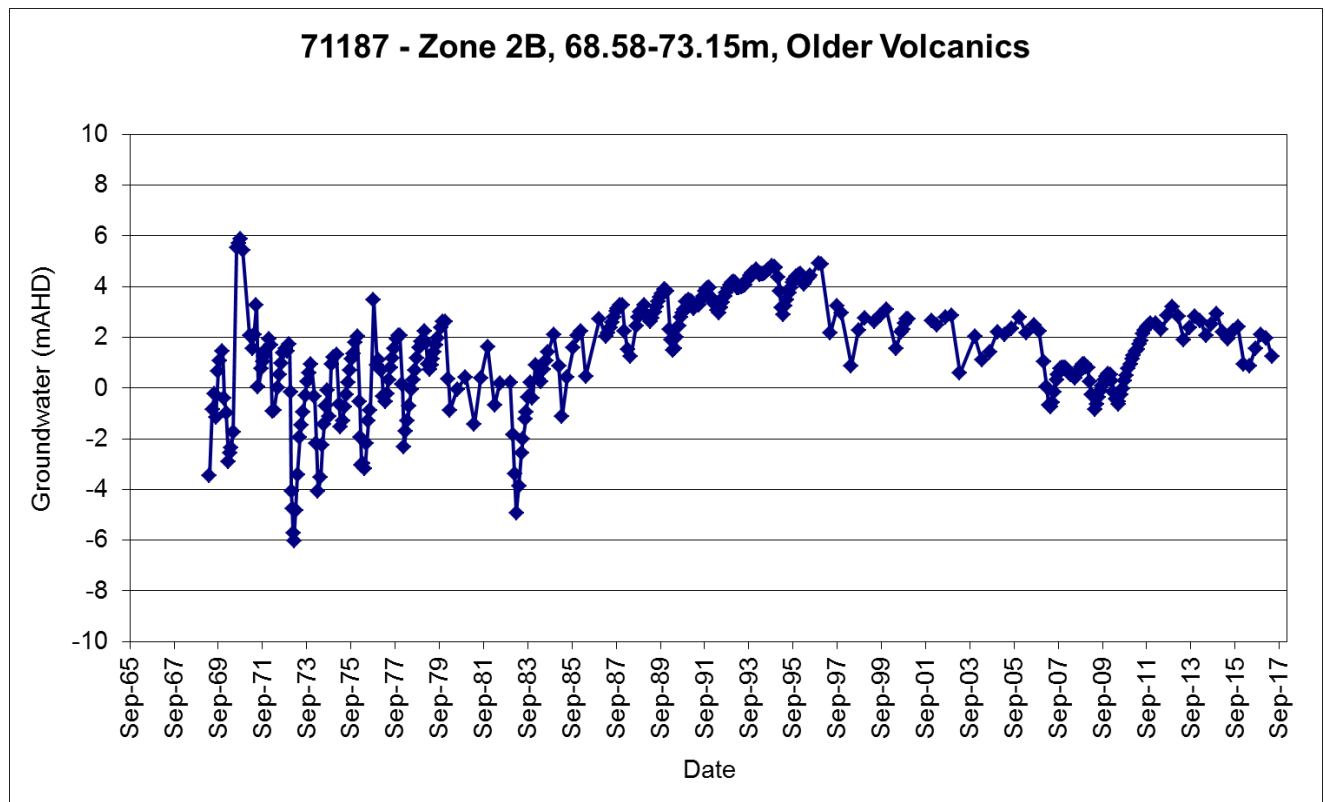
#### **3.2 Water Levels**

Groundwater levels are actively measured in twenty eight (28) bores, monitoring the Quaternary Sands, Westernport Group, Older Volcanics and Childers aquifers. Monitoring was reduced from monthly to quarterly in 2011 due to rising groundwater levels, which reduced the risk of saline intrusion.

In July 2016, DELWP reduced the number of active observation bores in KWR from 43 to 28. This reduction was part of a project that looked into “Improving management of Victoria’s groundwater resources”. This project reduced the number of active observation bores all across Victoria.



**Figure 1: SOBN locations in Koo Wee Rup WSPA.**



**Figure 2: Example hydrograph from Zone 2B.**

All hydrographs are presented in appendix 2.

The groundwater elevation data indicates:

- Long term declining water levels across the WSPA, with most bores falling by 4m or less over forty years.
- Current water levels in many bores are similar to levels seen in the 1990's.
- In the last 12 months levels have risen in many bores which reflects the reduced recorded use of groundwater compared to the previous year.
- All bores levels are currently above their historic low; and
- As of May 2017, a total of seven bores had groundwater levels below sea level. Water levels in many of these bores hover around 0mAHD and may recharge to above this level over the winter.

### 3.3 Salinity

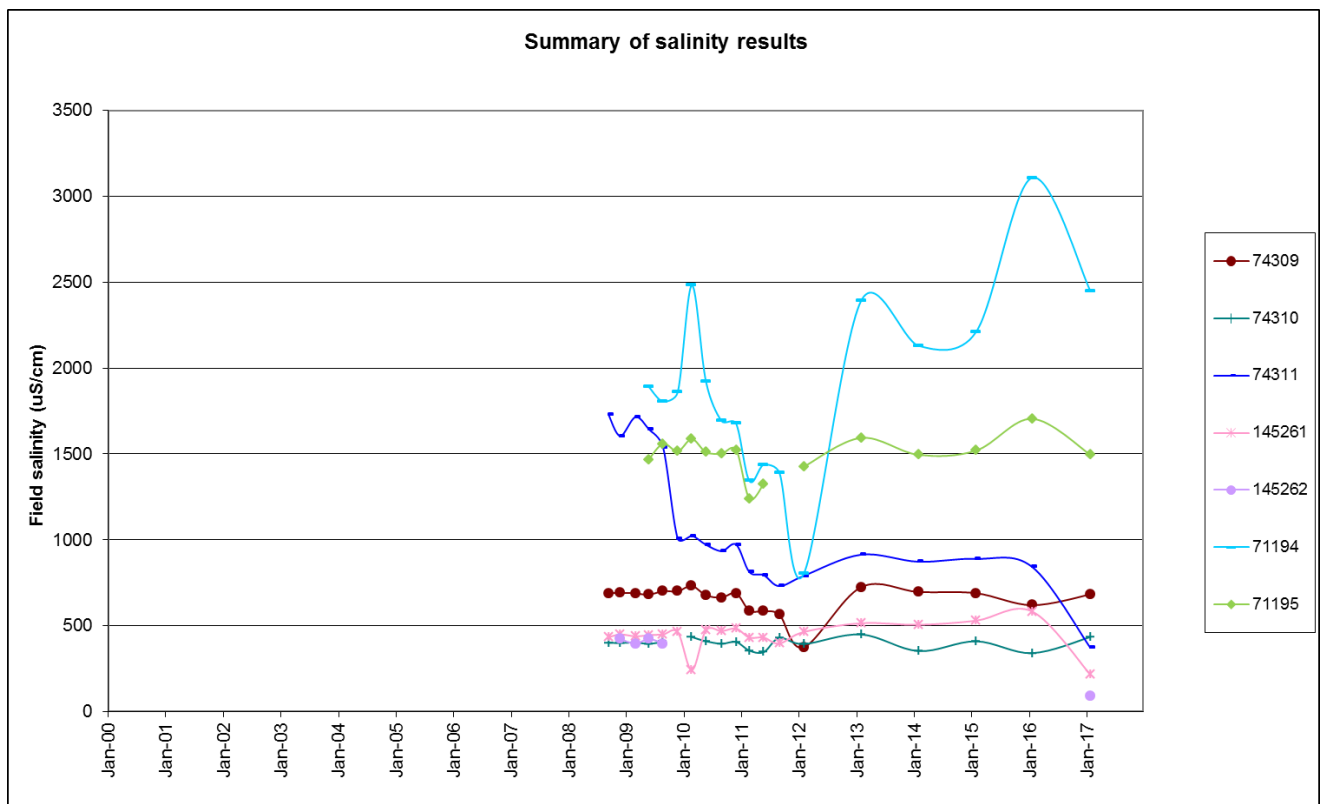
Salinity has been relatively stable over the past 8 years. Readings over the past 12 months have risen in some bores and fallen in others, so there is no clear trend, but most bores remain within historic ranges.

Bores to make note of:

- Bore 71194, which is on the coast in zone 1 has decreased significantly over the past year. Salinity in this bore has varied considerably over the past several years, so there is no cause for concern at the moment.
- Bore 74311, which is on the coast in zone 7 has decreased since monitoring began in 2008.

Salinity will continue to be monitored and reviewed on an annual basis. Salinity monitoring was reduced from quarterly to annually in 2011 due to rising groundwater levels, which reduced the risk of saline intrusion.

All salinity graphs are presented in appendix 3.



**Figure 3: Graph showing salinity in KWR.**

EC (electrical conductivity) units are microSiemens per centimeter (uS/cm)



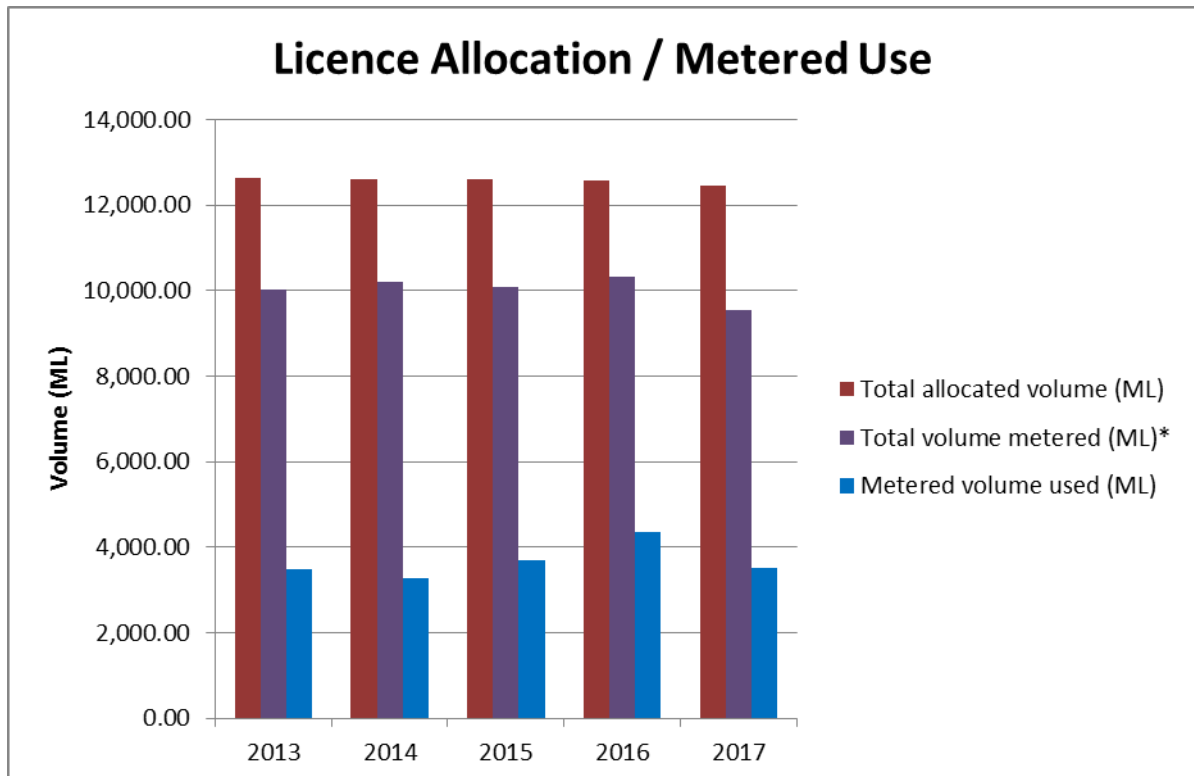
### 3.4 Water Use

The following table provides detail on water use in the 2016-17 year as compared to four previous years.

At 30 June	2013	2014	2015	2016	2017
No. of licences	369	370	364	352	344
Total allocated volume (ML)	12,624.8	12,611.8	12,597.5	12,579.6	12,577.2
No. of metered licences	207	204	197	193	173
Total volume metered (ML)	10,020.8	10,208.8	10,076.2	10,314.3	9,561.1
Metered volume used (ML)	3,474	3,277.2	3,698.8	4,347.8	3,503.3
Use % of allocation	28%	26%	29%	35%	28%
No. of licences with use greater than allocation	6	3	6	2	1
Permissible Consumptive Volume (PCV)	12,915	12,915	12,915	12,915	12,915
Use as a % of PCV	27%	25%	29%	34%	27%
No. of D&S bores <sup>1</sup>	1,251	1,164	1,126	1,125	1,061
D & S bores estimated use <sup>1</sup>	1,877	1,746	1,689	1,688	2,402
Estimated D & S use from licensed bores <sup>2</sup>	553.5	555	534	528	516

<sup>1</sup>Taken from the Victorian State Water Accounts 2014-15

<sup>2</sup>Estimated 1.5ML per licence 2013 onwards



**Figure 4: Licence allocation compared to metered volume and usage.**

### 3.5 Non compliance

The following table lists the licences where water was taken in excess of licensed entitlement.

Licence No	Licence Volume	Amount taken	Amount overused	Comment
BEE073706	216	229.7	13.7	The matter was investigated and a warning letter was issued.
<b>Totals</b>	<b>216</b>	<b>229.7</b>	<b>13.7</b>	

SRW investigates all compliance issues and considers several factors such as the seriousness of the breach and impact on the resource and other users, prior to deciding on the most appropriate action. The action taken by SRW can include the use of direction notices, warning letters and prosecution.

## 4 Plan Implementation

### 4.1 Monitoring

#### 4.1.1 Prescriptions

The following table details the requirements of the management plan in relation to monitoring.

Plan Requirement:	Activity / Reference	Complies
13. The Department must ensure that monitoring bores are properly maintained and replaced if necessary; and	The monitoring bores are owned and managed by the Department of Environment, Land, Water and Planning (DELWP).	Yes
14. The Department and the Corporation must ensure that data collected from monitoring bores are entered into the State's groundwater management system (or equivalent), within 30 days of them being received.	All bores have minor maintenance carried out annually which includes site clearance, rust removal, painting, and ensuring the bore is secure and safe.  The DELWP carries out maintenance on bores that have been identified by the field service provider through the Extra Works Advice. This is bore specific.	Yes
15. The Department and the Corporation must ensure that water level monitoring and investigations are carried out at appropriate locations throughout the Protection Area to:  i. assess annual and long term impact on water levels from groundwater pumping; ii. monitor regional and local seasonal drawdown; iii. examine interaction between groundwater and surface water; iv. provide information for future resource assessments; and v. monitor the impacts of groundwater pumping	SRW works closely with the DELWP to ensure that the monitoring program meets the requirements of the Plan.  If SRW identifies bores of greater interest, monitoring may be undertaken in addition to the DELWP's monitoring program.  SRW regularly reviews the groundwater level monitoring program and data.	Yes

generally across the Protection Area and in areas of high intensity groundwater pumping.		
16. The Corporation shall review the groundwater level monitoring program as the established trigger level is approached (the trigger level at the time of writing is specified in Schedule 1 but may be reviewed and amended by the Corporation, as necessary).	SRW regularly reviews the groundwater level monitoring program. Monitoring program is presented in the Appendices.	Yes
17. The Corporation must ensure that water quality monitoring is carried out at appropriate locations throughout the Protection Area to provide information that allows assessment of changes in the groundwater salinity.	SRW regularly reviews the salinity monitoring program and data. Salinity monitoring program is presented in the Appendices.	Yes
18. The Corporation shall review the groundwater quality monitoring program as the established trigger level is approached (the trigger level at the time of writing is specified in Schedule 1 of the Plan).	SRW regularly reviews the salinity monitoring program.	Yes

## 4.2 Metering

### 4.2.1 Prescriptions

The following table details the requirements of the management plan in relation to metering.

Prescription	Activity	Complies
10. All meters will comply with State metering policy and the Corporation's metering policy	SRW has completed a Metering Action Plan that outlines how our metering fleet will comply with the required metering standards. Meters comply with the current requirements.	Yes
11. The Corporation must: i. ensure all meters within the Protection Area are read twice per year – in or around January and June; ii. determine the volume of water extracted from the bore since the flow meter was last read; and iii. within 30 days after a meter is read, record the amount of water used on a database.	All meters were manually read twice however a project was commenced installing Automated Meter Reading (AMR) technology on all metered bores. This will provide access to daily meter readings.  Meter readings and usage data were recorded and stored in SRW's metering system. Usage is also recorded in the State Water Register.	Yes
12. The Corporation may request the Licensee to read a meter and to provide the Corporation with the meter reading: i. the Licensee must comply with the request; and ii. for the purposes of this clause, the Corporation must provide a phone number, email address, pre-paid mail or similar method for the licensee to lodge the meter read.	SRW did not request any licensee's to read their meter and provide the meter reading.	Yes

### 4.2.2 Metering activities

	<b>Year to 30 June 2017</b>	<b>Total for WSPA at 30 June 2017</b>
Number of licences issued (see section 4.4 for details)	3	344
Number of meters installed	2	214
Meters requiring maintenance	1	
Meters replaced	18 removed 1 replaced	
Meters read (1 – date)	Jan 2017	
Meters read (2 – date)	May/Jun 2017	
Number of estimated readings	0	

### 4.3 Restrictions on Licensing and Licence Transfers

#### 4.3.1 Prescriptions

The following table details the requirements of the management plan in relation to licensing

<b>Plan Requirement:</b>	<b>Activity/Reference</b>	<b>Complies</b>
1. Temporary trade of water entitlement is allowed within a zone or coastal sub-zone and from one zone to another zone provided that: (i) Where usage has exceeded 80% of allocation over the previous 2 years, water levels have recovered appropriately*; (ii) Transfer does not occur into coastal sub-zones**; (iii) Transfer does not occur into zones 1, 2B, 4 and 5; and (iv) A temporary trade shall expire no later than 30th June in the financial year in which it is approved (ie 1 July to 30 June). (v) At the request of both trading parties, the temporary transfer may commence on 1 July if it is approved prior to 30 June (ie transfer entitlements can start in the new irrigation season rather than having to commence in the middle of an irrigation season).	18 temporary transfers were processed during the reporting period in accordance with this prescription.	Yes
2. Permanent trade of Water Entitlement shall be allowed within zones and from one zone to another zone provided that: (i) Where usage has exceeded 80% of allocation over the previous 2 years, water levels have recovered appropriately*; (ii) Review of groundwater monitoring data indicates that the transfer is unlikely to have significant adverse impacts and seasonal water level recovery in the target zone is acceptable. (iii) Transfer does not occur into zones 1, 2B, 4 & 5; and (iv) Transfer does not occur into coastal sub-zones.	1 permanent transfer was processed during the reporting period.	Yes
3. All groundwater licenses in the WSPA will be migrated to the State Water Register within six months of Ministerial approval of this Management Plan.	All licences are located in the Water Register.	Yes
4. No new groundwater licenses shall be issued, except as described in Prescriptions 7 and 8.	1 new licence was issued as part of a spilt on sale of property, 2	Yes

	additional licenses were issued to allow trades to occur	
5. The total licence entitlement/allocation shall not exceed 12,915 ML (PCV Gazette G28 11 July 2011), or any volume adjusted in accordance with Prescriptions 6 to 8.	Total entitlement volume is less than PCV.	Yes
6. If a groundwater licence is surrendered, revoked or not renewed the total entitlement in Prescription 5 will be reduced by that licence volume.	2 licenses totalling 2.4 ML were surrendered at the request of the licence holder. As per prescription 5 the total licence volume is 12,577.2ML	Yes
7. The Corporation may issue a licence which may lead to the total groundwater licence entitlement in Prescription 5 being exceeded to overcome an administrative oversight or other anomaly, provided it does not exceed the PCV (12,915ML at time of writing).	The new licence issued did not increase the overall total entitlement volume for the GMU	Yes
8. The Corporation may issue or amend a groundwater licence in accordance with any State-wide policy. The volume in Prescription 5 and the PCV (by application to the Minister) will be adjusted.	1 new entitlement was issued. PCV and prescription 5 were not affected.	Yes
9. The Corporation must report the details of any licence referred to in Prescriptions 6 to 8 in the annual report.	Refer to appendices for details	Yes

#### 4.4 Licensing Activities

The following table provides details of licensing activities.

<b>Year to 30 June 2017</b>	<b>No.</b>	<b>Volume ML</b>
New licences issued*	1	30.0
New licences issued#	2	0
Additional volumes on existing licences	0	0
Licences revoked	0	0
Permanent transfers	1	53.3
Temporary transfers	18	633.5
D&S Bores notifying use	0	0

\*Issued as a result of a split licence

# Issued with zero entitlement to enable trade to occur

##### 4.4.1 Compliance and Exceptions

Activities under taken during the reporting period generally comply with the requirements of the Plan.

#### **4.4.2 Issues Affecting Implementation**

There are no issues to report.

### **5 Conclusions**

The objective of the management plan, as set out in the *Water Act 1989*, is *to make sure that the water resources of the area are managed in an equitable manner so as to ensure the long-term sustainability of those resources.*

It is considered that the groundwater resources of the Koo Wee Rup WSPA are being managed sustainably.

SRW is currently reviewing the Koo Wee Rup GMP to determine whether a groundwater management plan is still necessary or whether a local management plan would be more suitable. This is due for completion by the end of 2017. The review will also consider appropriateness of the existing prescriptions, particularly in relation to groundwater transfers. SRW has received feedback from licence holders that the trading zones and one year transfers do not provide sufficient flexibility for groundwater users.

## 6 Appendices

### 6.1.1 Licence Details

Entitlement Number	Application Type	Purpose	Previous Volume	Approved Volume
BEE027554	Surrender	Dairy	1.3	0
BEE023847	Surrender	Dairy	1.1	0

Water Trade details for the 2016-17 season can be found at:

<http://waterregister.vic.gov.au/water-trading/take-and-use-licence-trading>

### 6.1.2 Monitoring program details

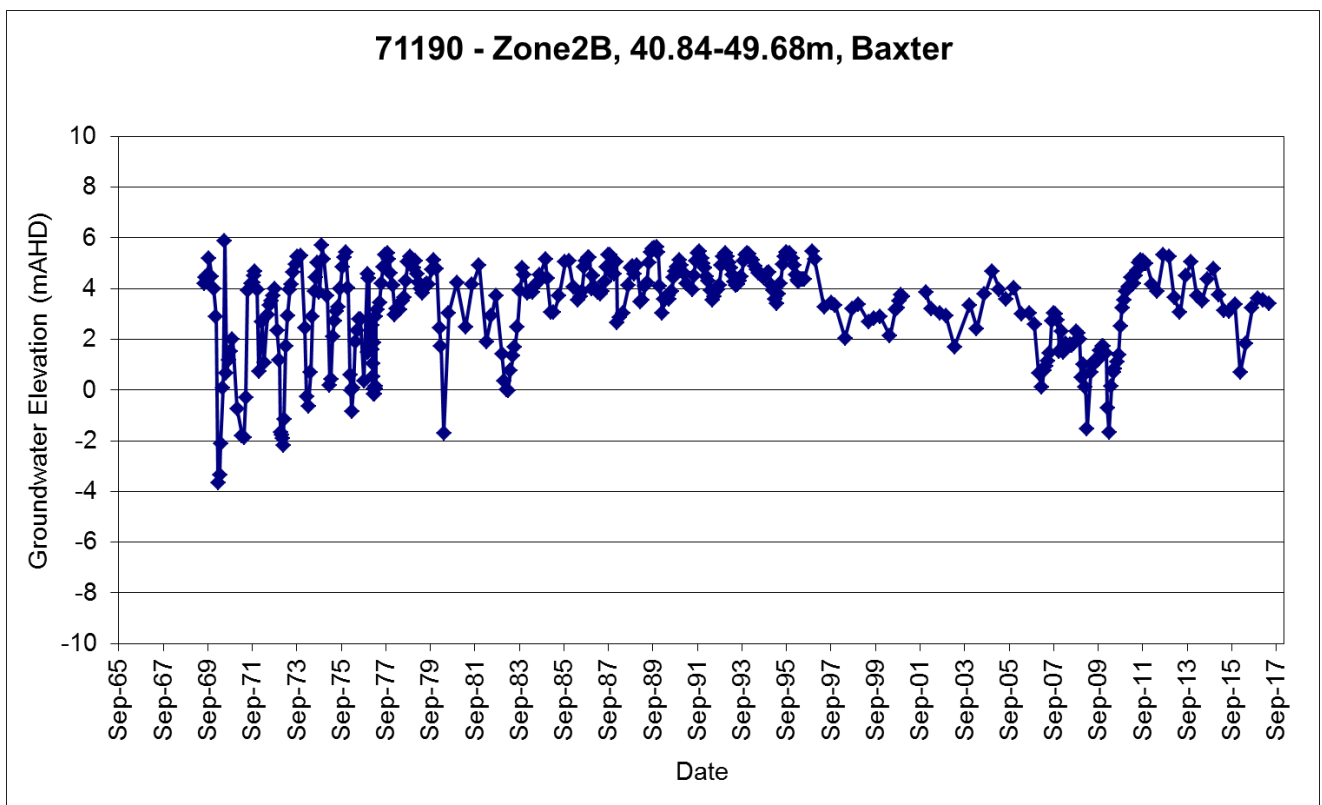
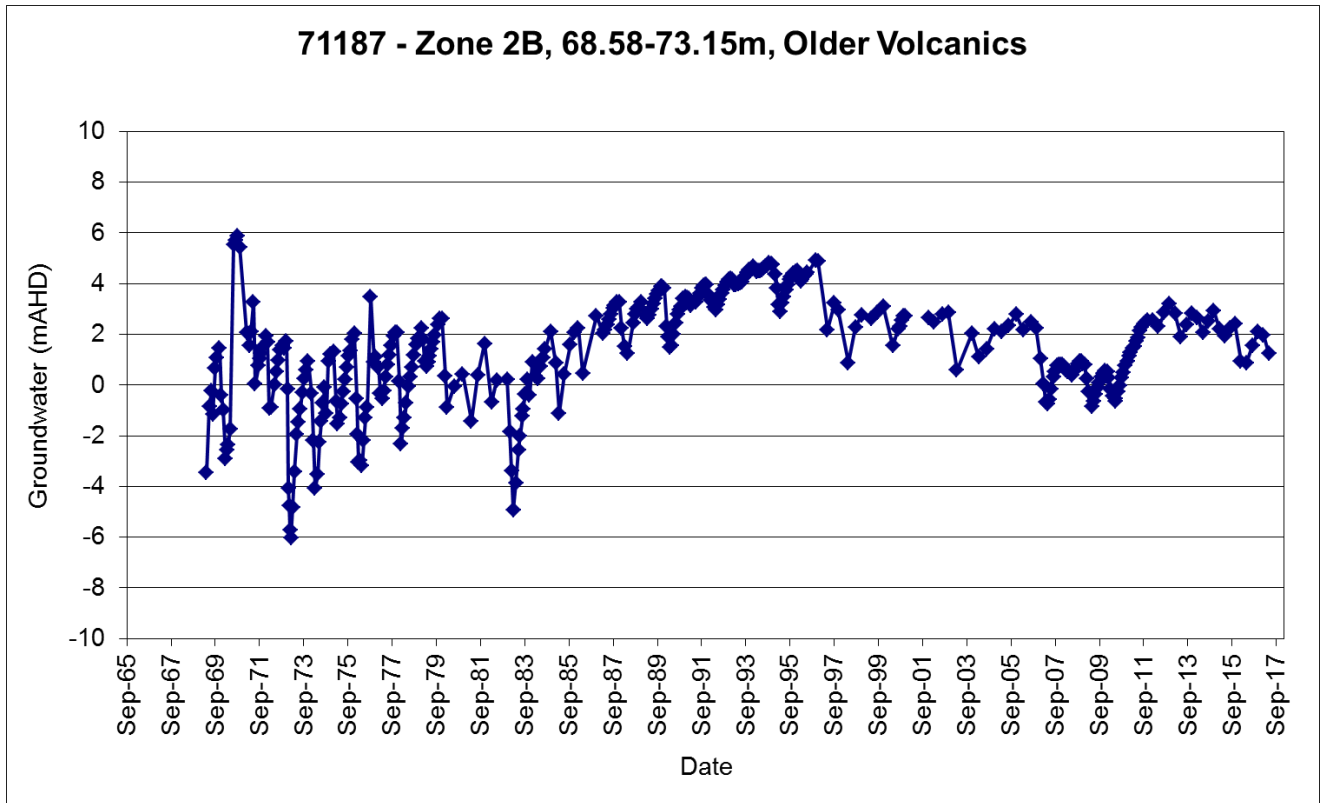
#### Groundwater monitoring program summary

BHID	Zone	Formation	GW Level	Salinity
71194	1	Baxter, Sherwood	Quarterly	Annual
71195	1	Sherwood	Quarterly	Annual
71201	1	Sherwood	Quarterly	
71210	1	Sherwood	Quarterly	
71219	1	Baxter	Quarterly	Annual
WRK057103	1	Older Volcanics	Quarterly	
WRK057105	1	Sherwood	Quarterly	
68351	4	Quaternary Sands	Quarterly	
71848	4	Yallock	Quarterly	
71850	4	Yallock	Quarterly	
74608	5	Older Volcanics	Quarterly	
74609	5	Yallock	Quarterly	
110735	5	Quaternary Sands	Quarterly	
91076	6	Silurian Bedrock	Quarterly	
74306	7	Childers	Quarterly	
74309	7	Older Volcanics	Quarterly	Annual

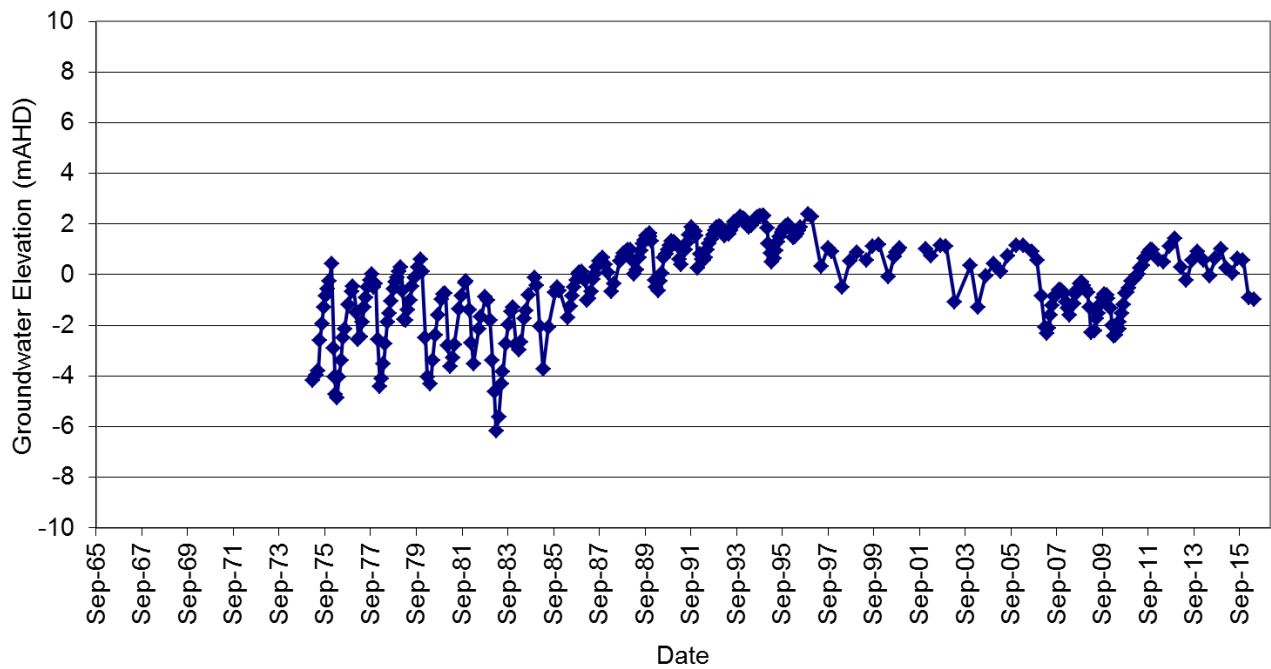
74310	7	Sherwood	Quarterly	Annual
74311	7	Baxter	Quarterly	Annual
145259	7	Westernport	Quarterly	
145260	7	Childers	Quarterly	
145261	7	Westernport	Quarterly	Annual
145262	7	Childers	Quarterly	Annual
126975	2A	Older Volcanics	Quarterly	
71187	2B	Older Volcanics	Quarterly	
71190	2B	Baxter	Quarterly	
WRK966214	2B	Yallock	Quarterly	
WRK966215	6	Sherwood	Quarterly	
WRK966216	6	Older Volcanics	Quarterly	



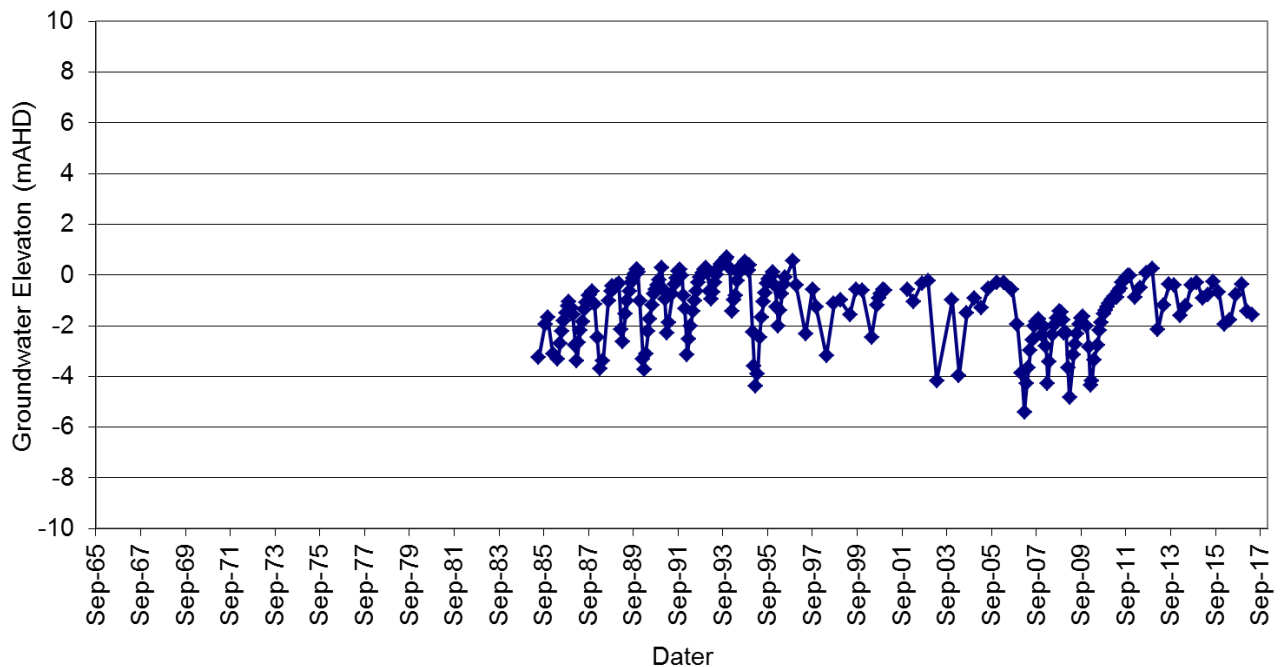
### 6.1.3 Hydrographs



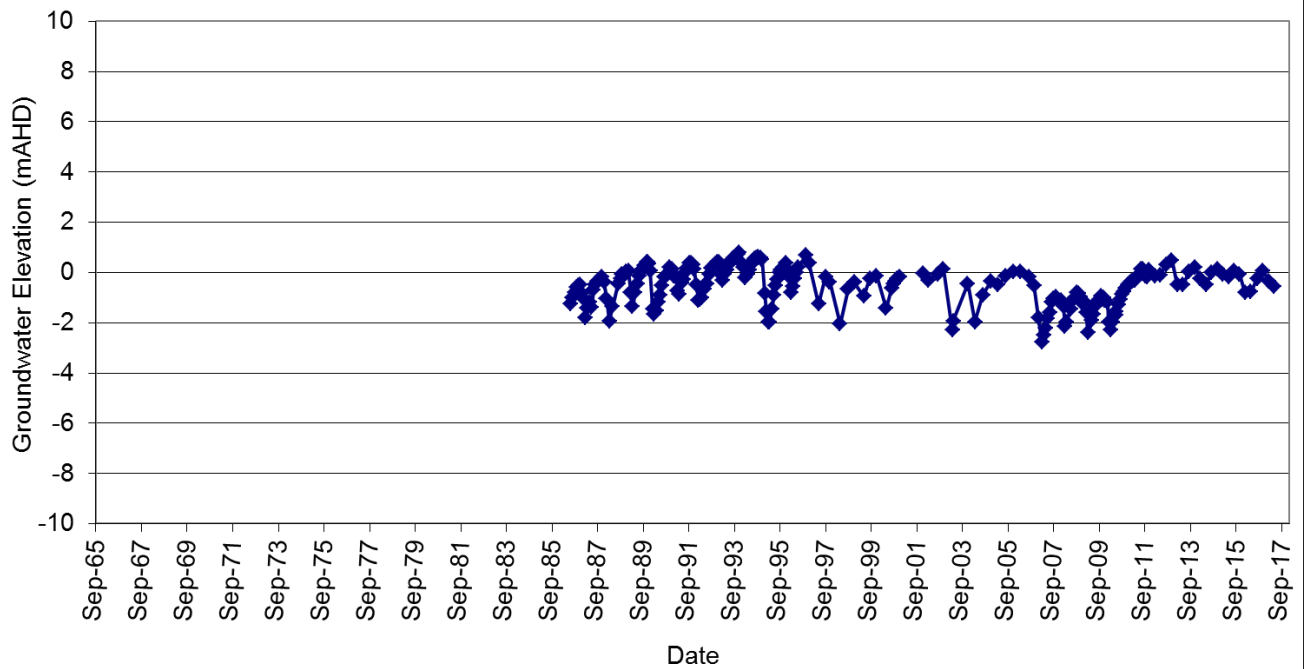
**71192 - Zone 2B, 43-123m, Baxter/Sherwood/Volcanics**



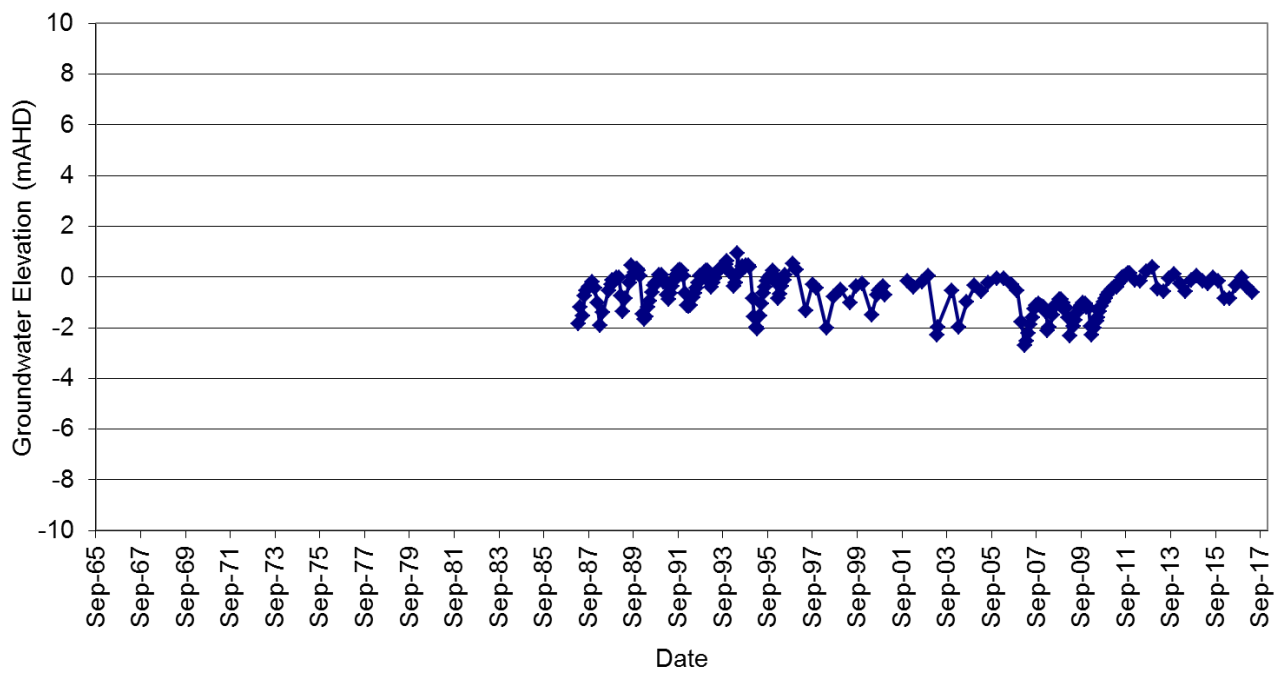
**71201 - Zone 1, 84-96m, Sherwood**



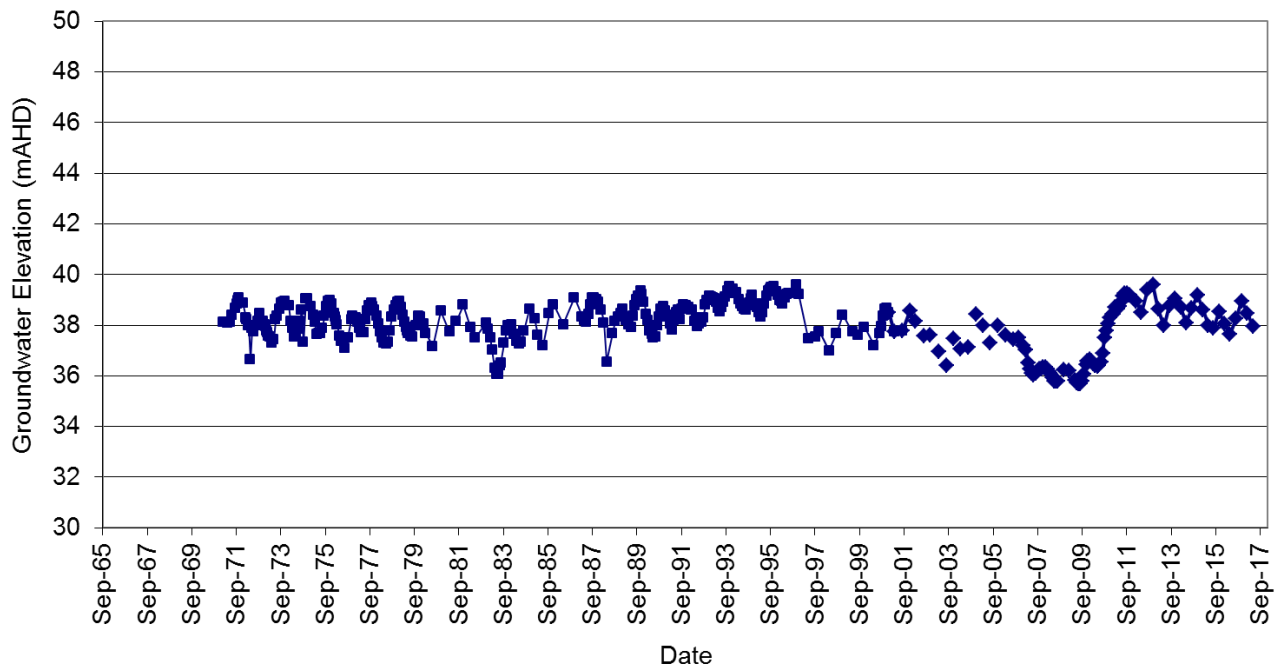
**71210 - Zone 1, 52.5-61.5m, Sherwood**



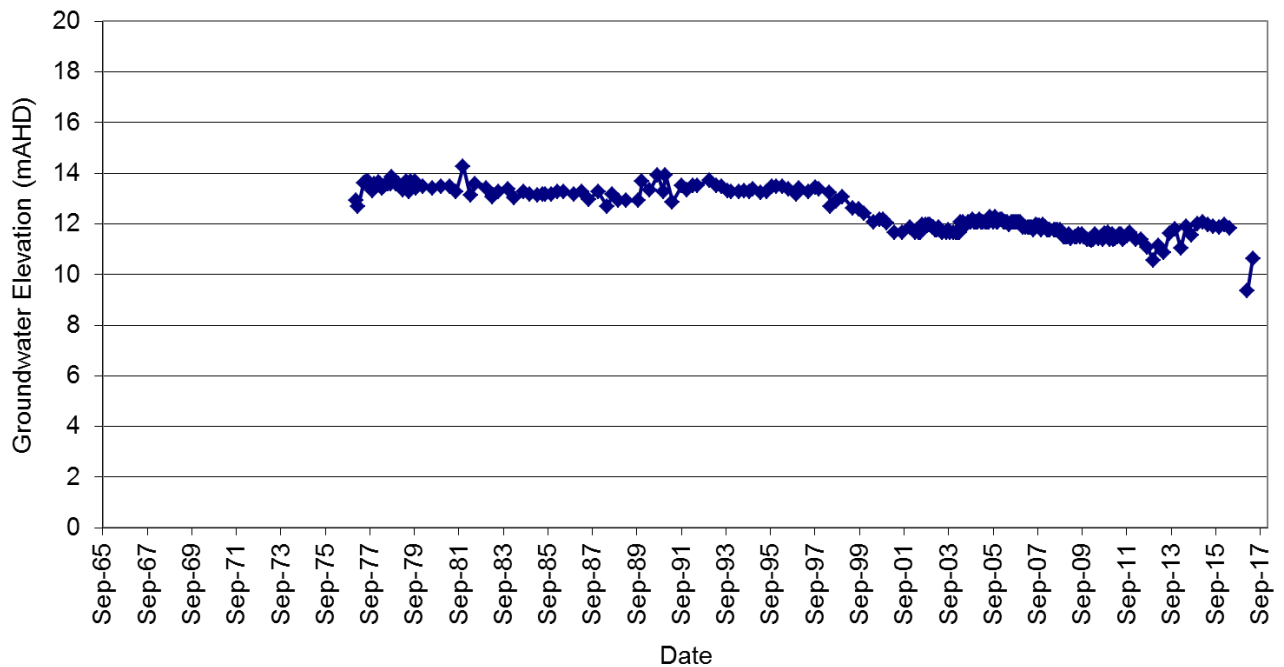
**71219 - Zone 1, 21-39m, Baxter**



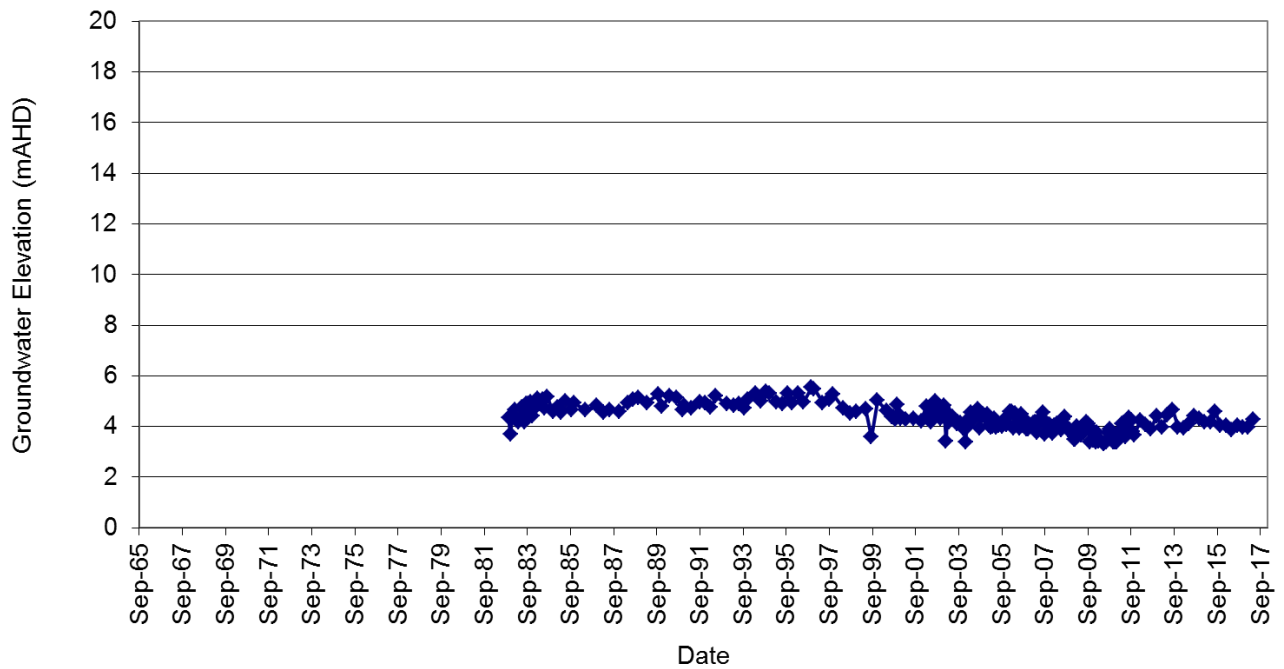
**71850 - Zone 4, 43.9-51.8, Yallock**



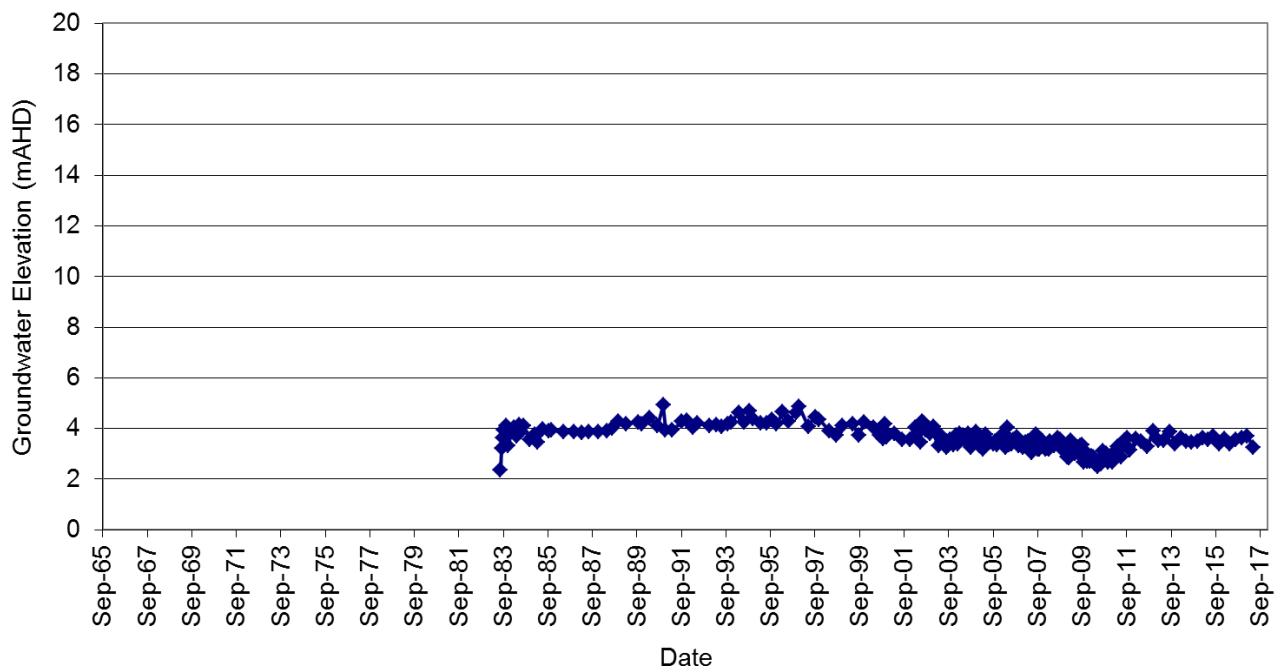
**74306 - Zone 7, 242-244m, Childers**



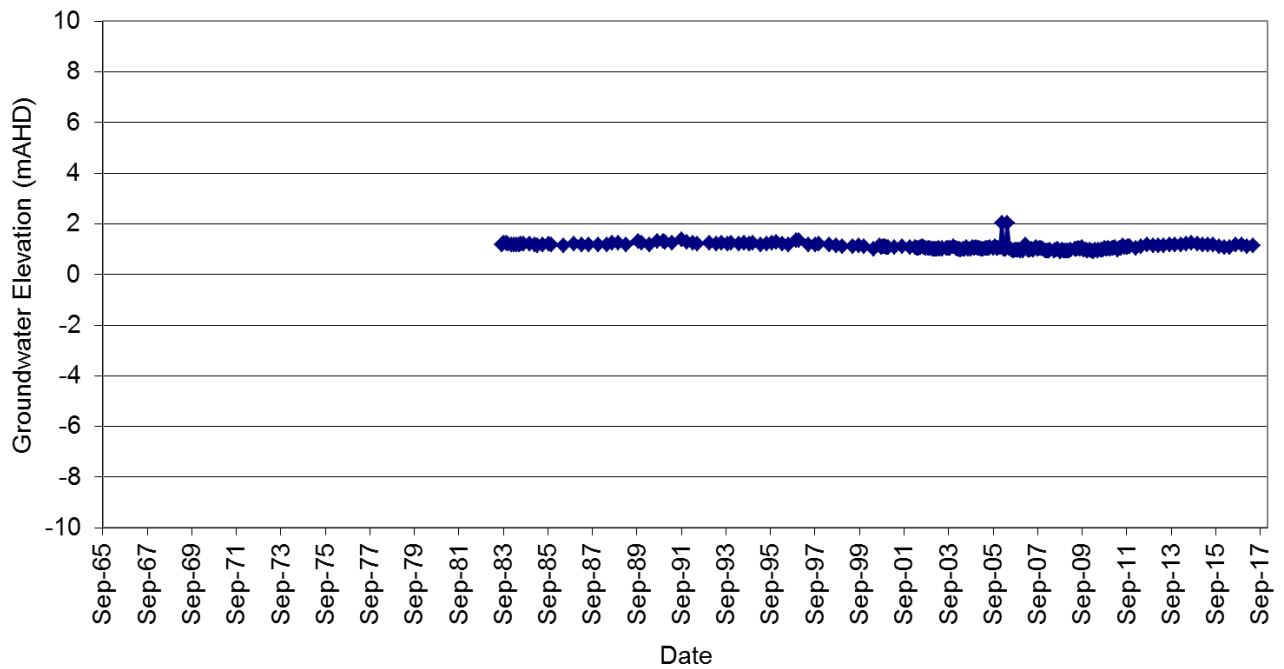
**74309 - Zone 7 coastal, 97.5-118.5m, Older Volcanics**



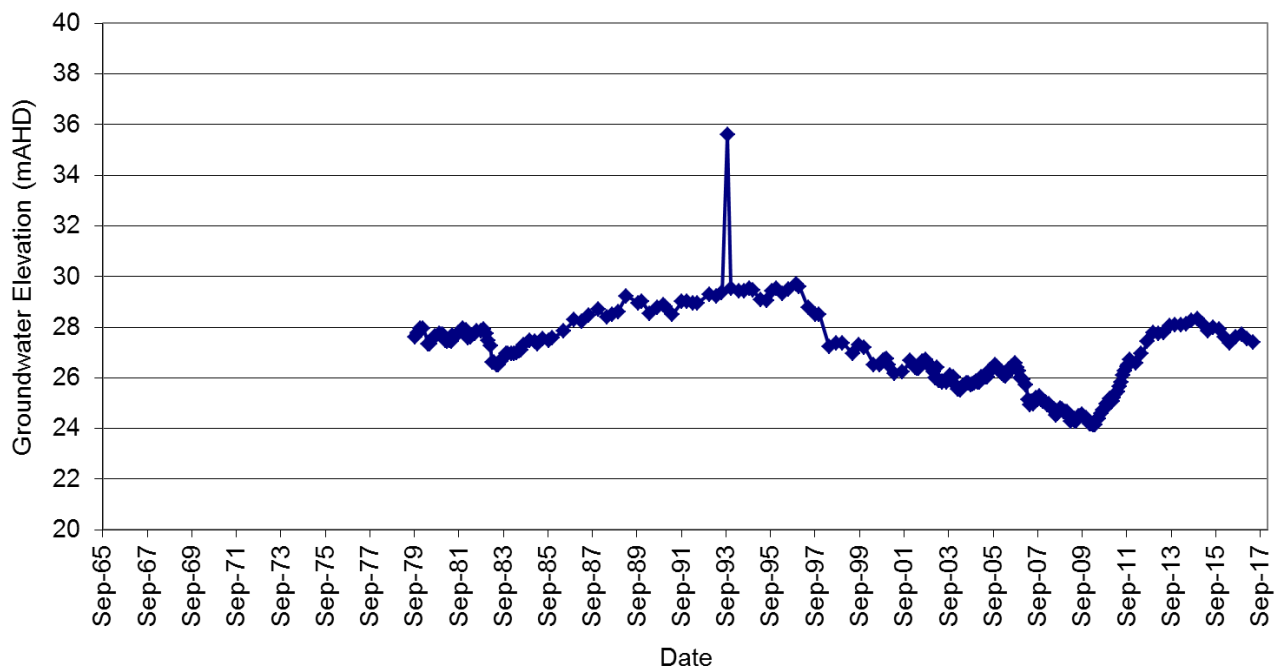
**74310 - Zone 7 coastal, 84.1-87.5m, Sherwood**

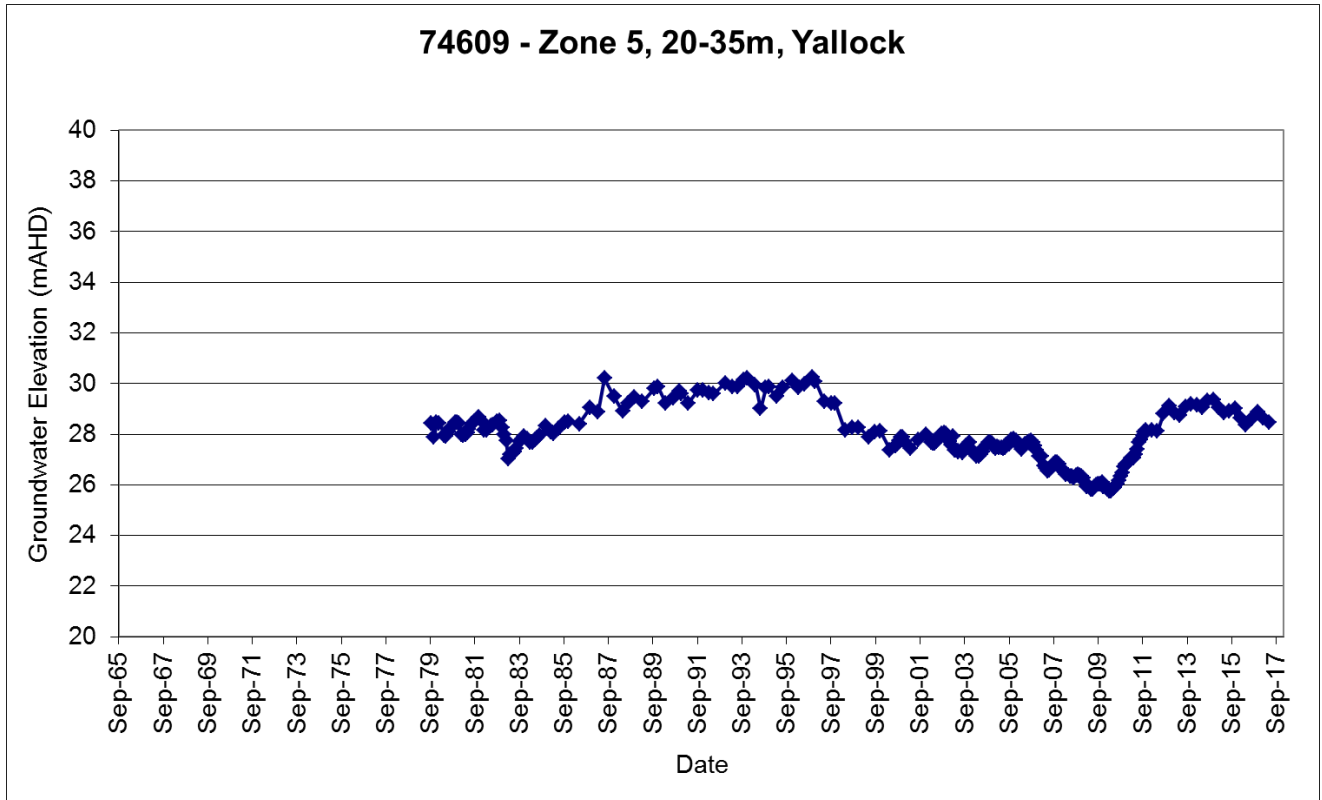


**74311 - Zone 7 coastal, 17-25m, Baxter**

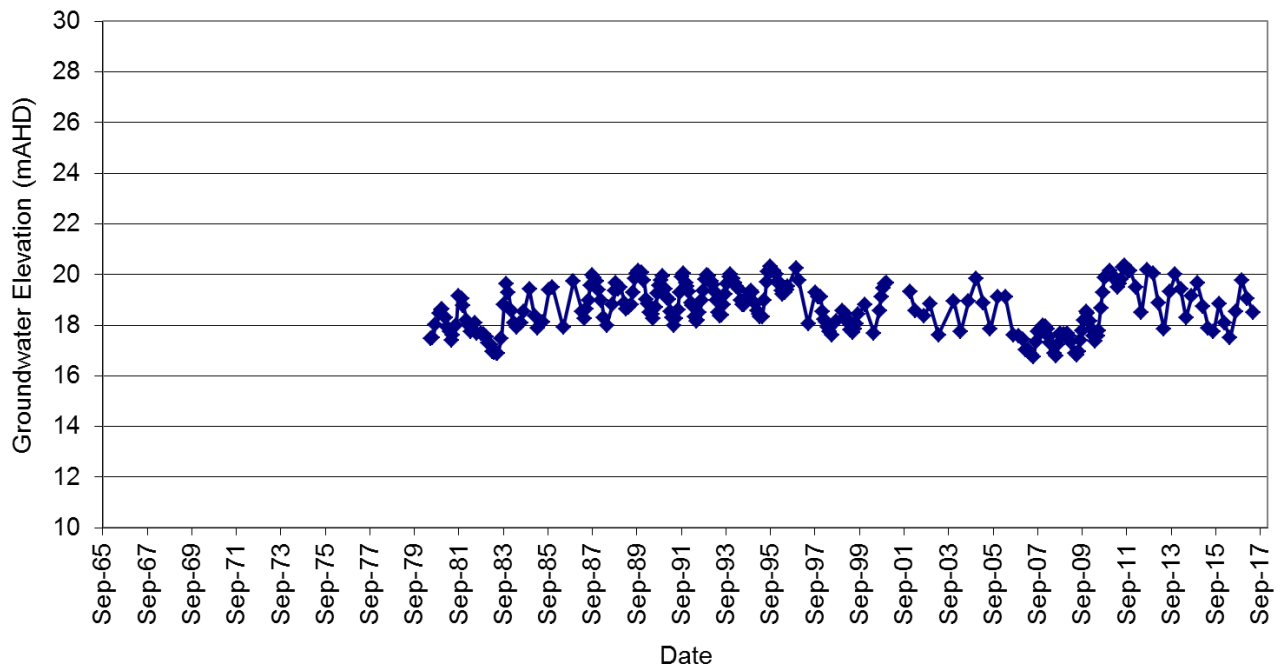


**74608 - Zone 5, 184.5m, Older Volcanics**

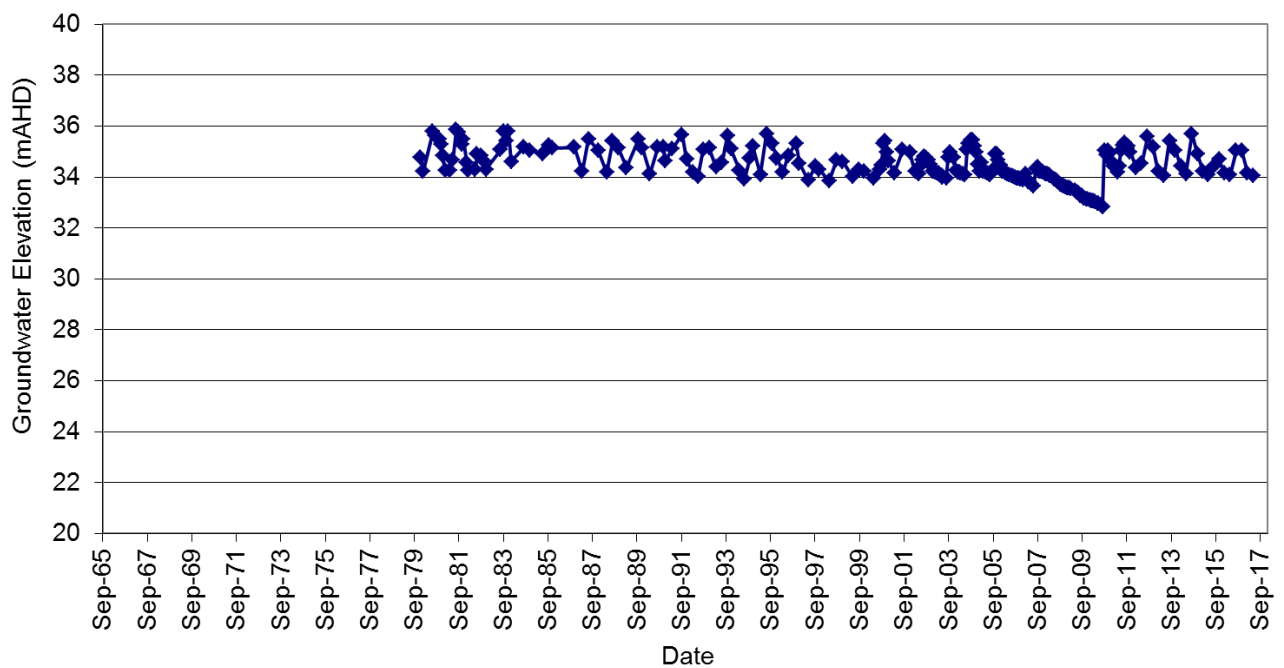




**91076 - Zone 6, 12-18m, Bedrock**



**110735 - Zone 5, 46m, Quaternary sands**





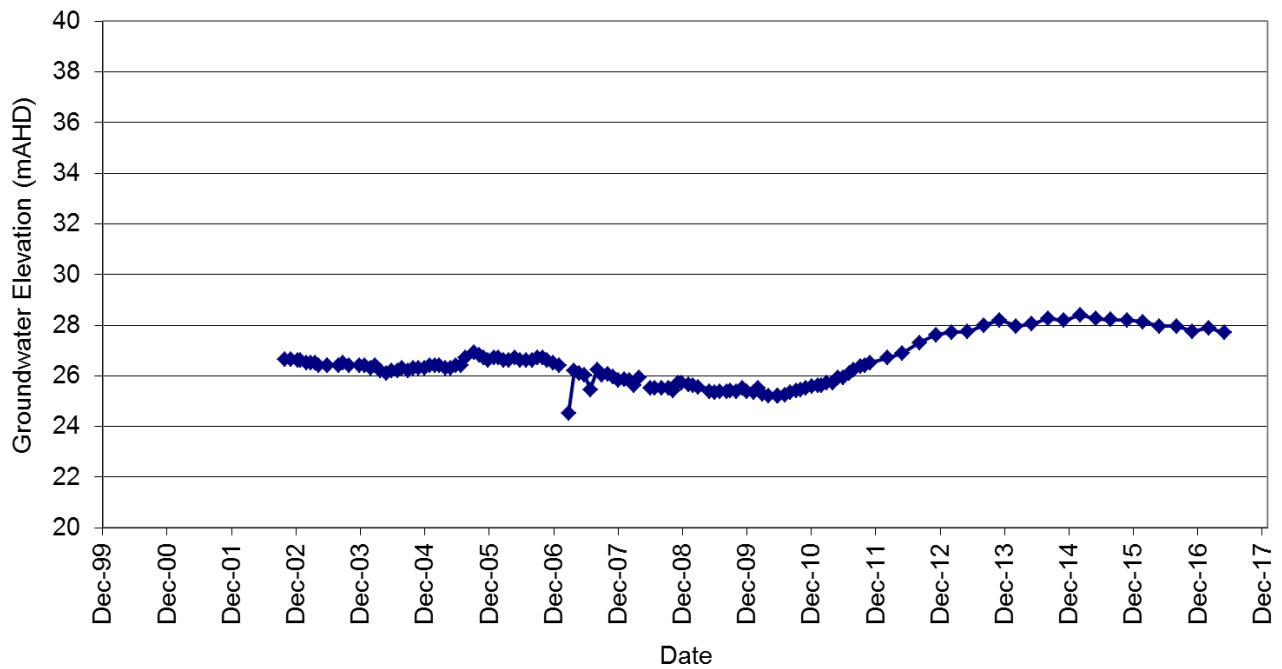
**126975 - Zone 2A, 41-49m, Older Volcanics**



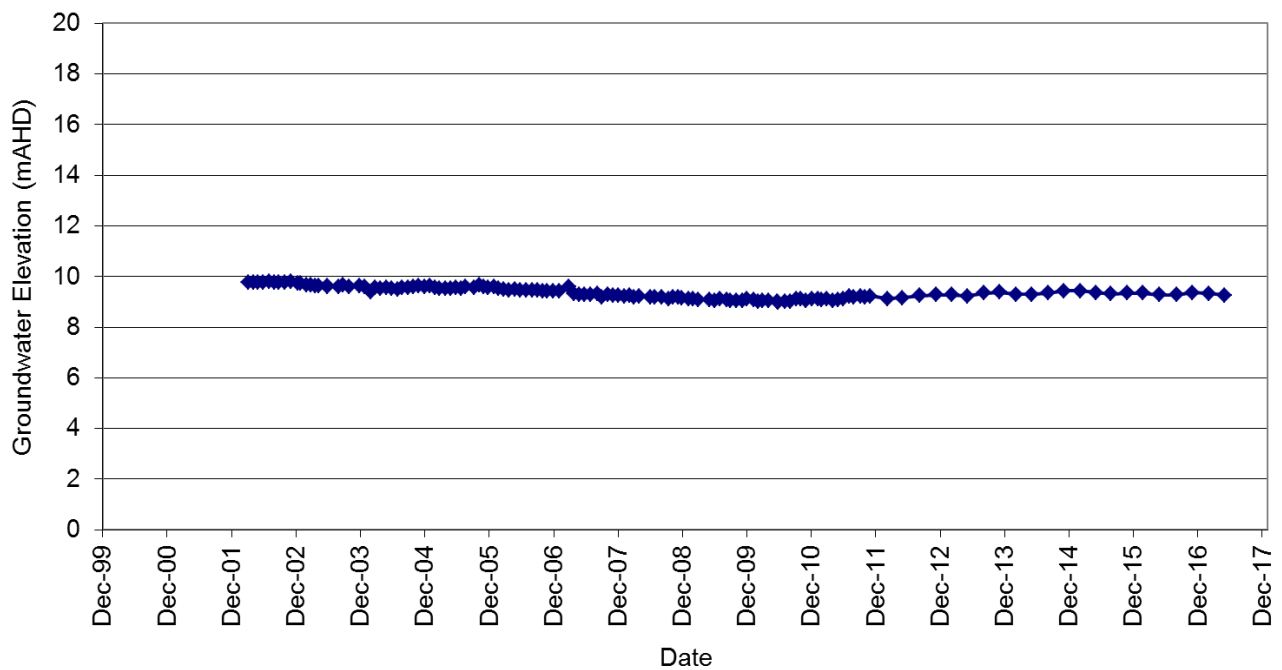
**145259 - Zone 7, 37-40m, Westernport**



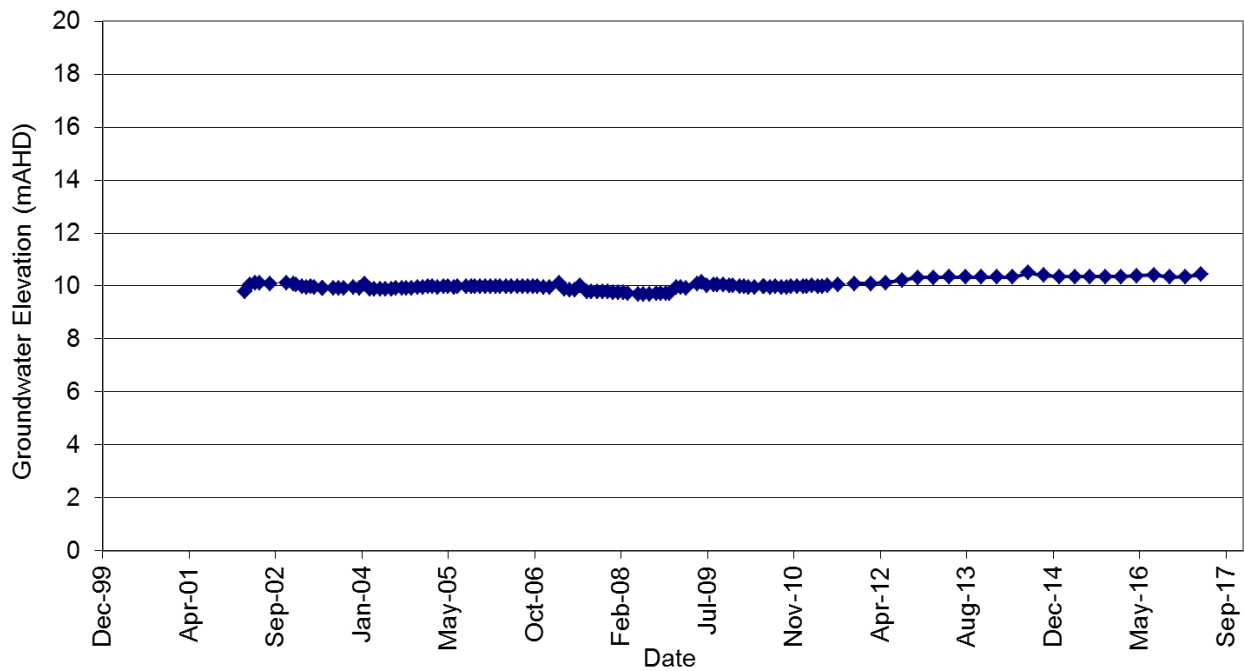
**145260 - Zone 7, 165-168m, Childers**



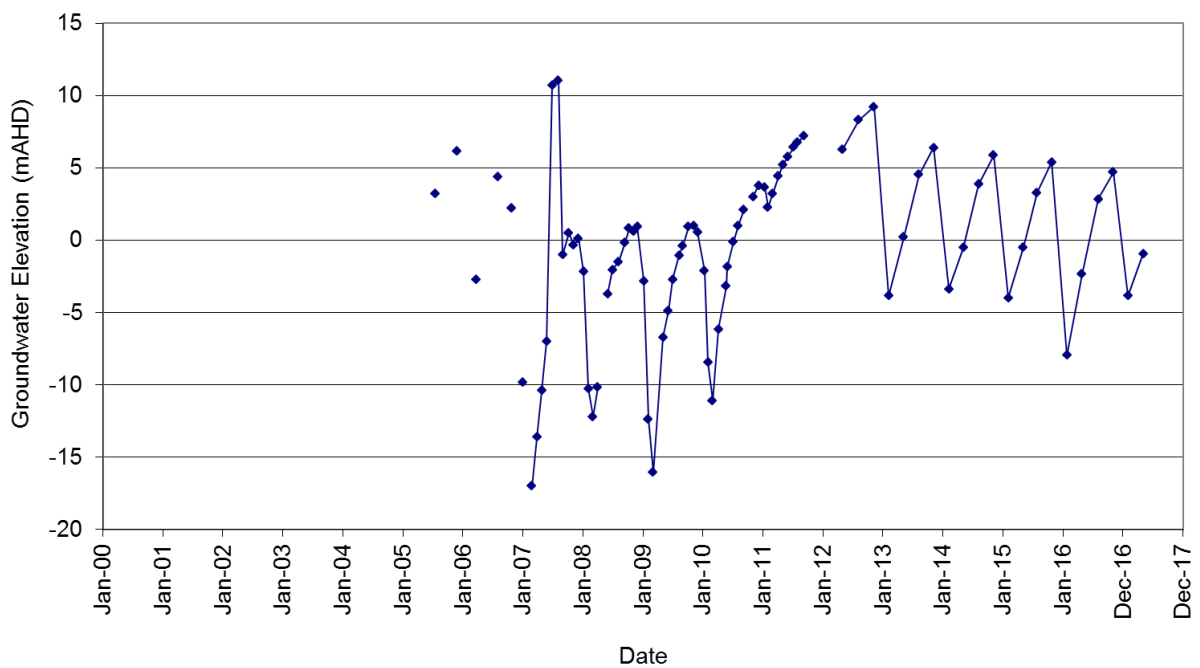
**145261 - Zone 7, 67-70m, Westernport**



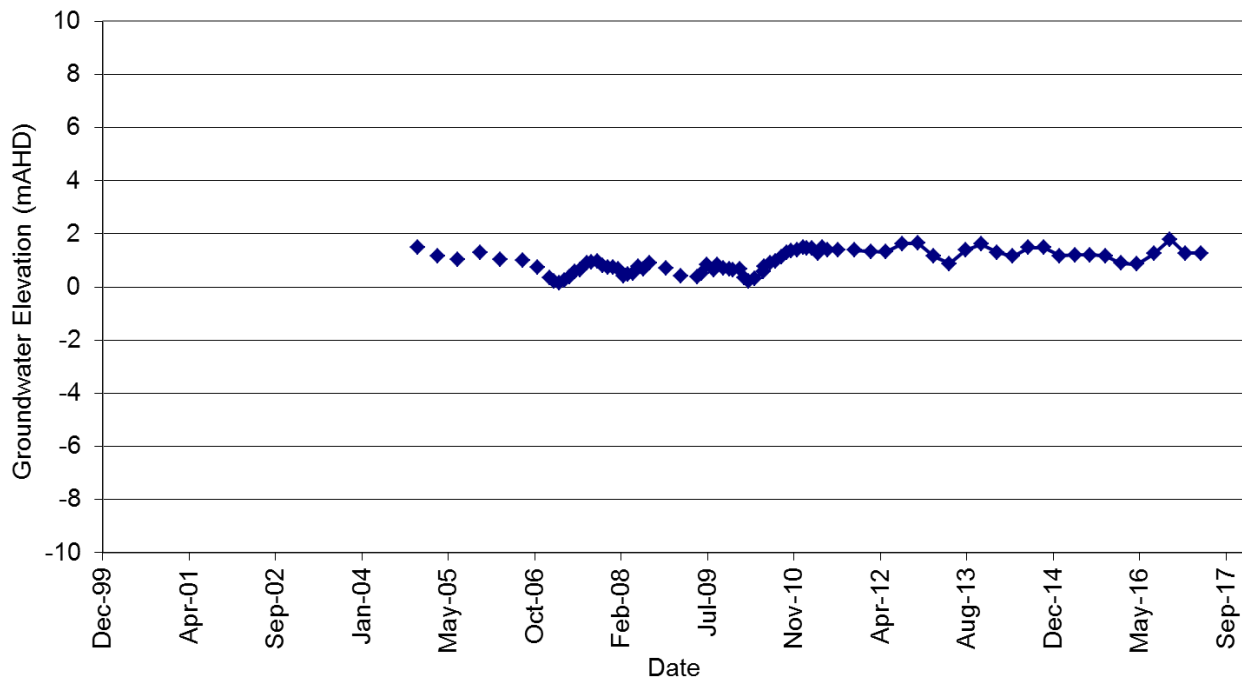
**145262 - Zone 7, 205-208m, Childers**



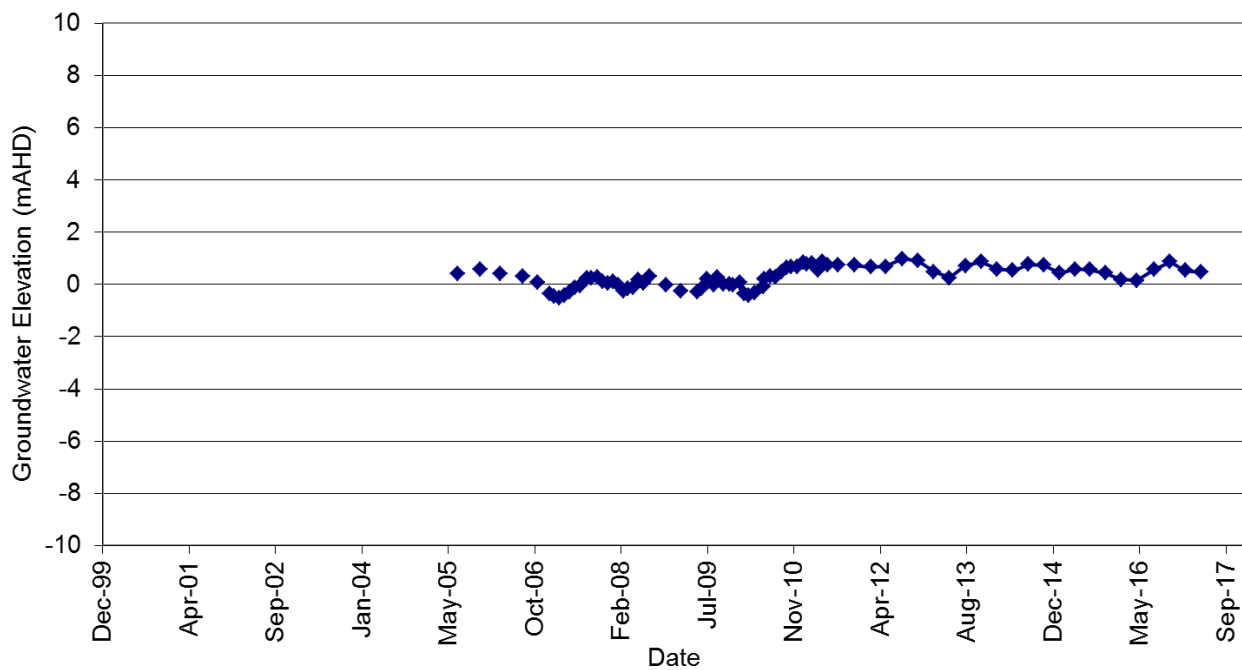
**WRK966214**



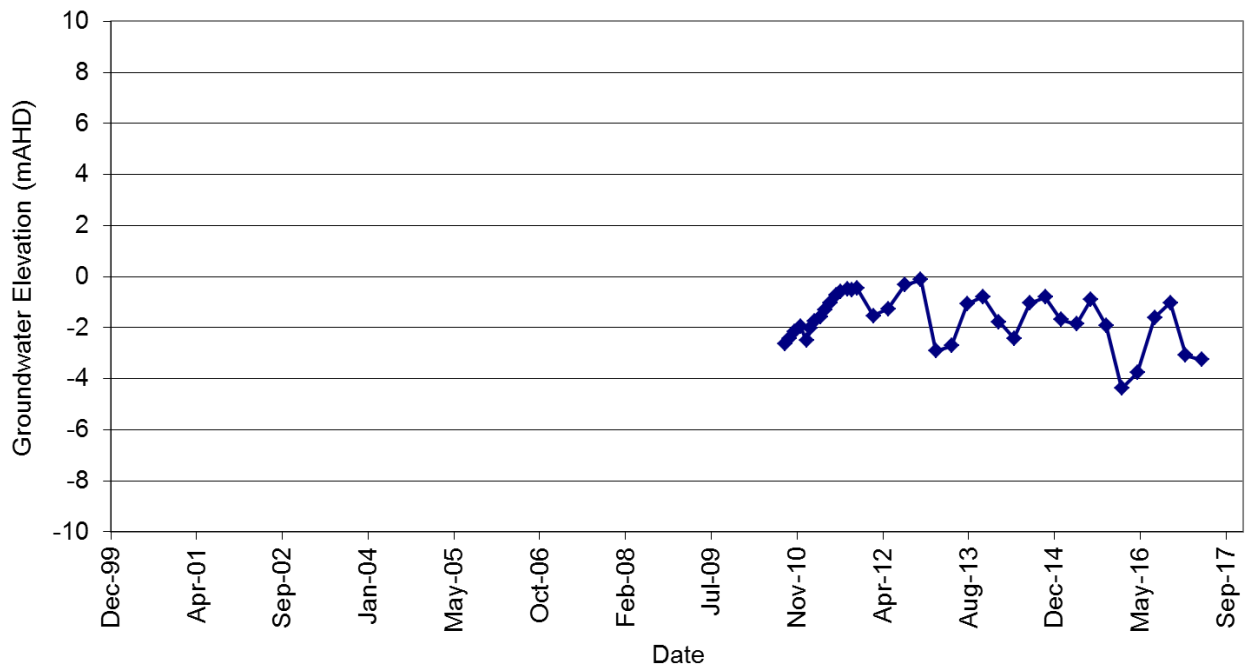
**WRK966215 - Zone 6, 32.5-71.2, Sherwood**



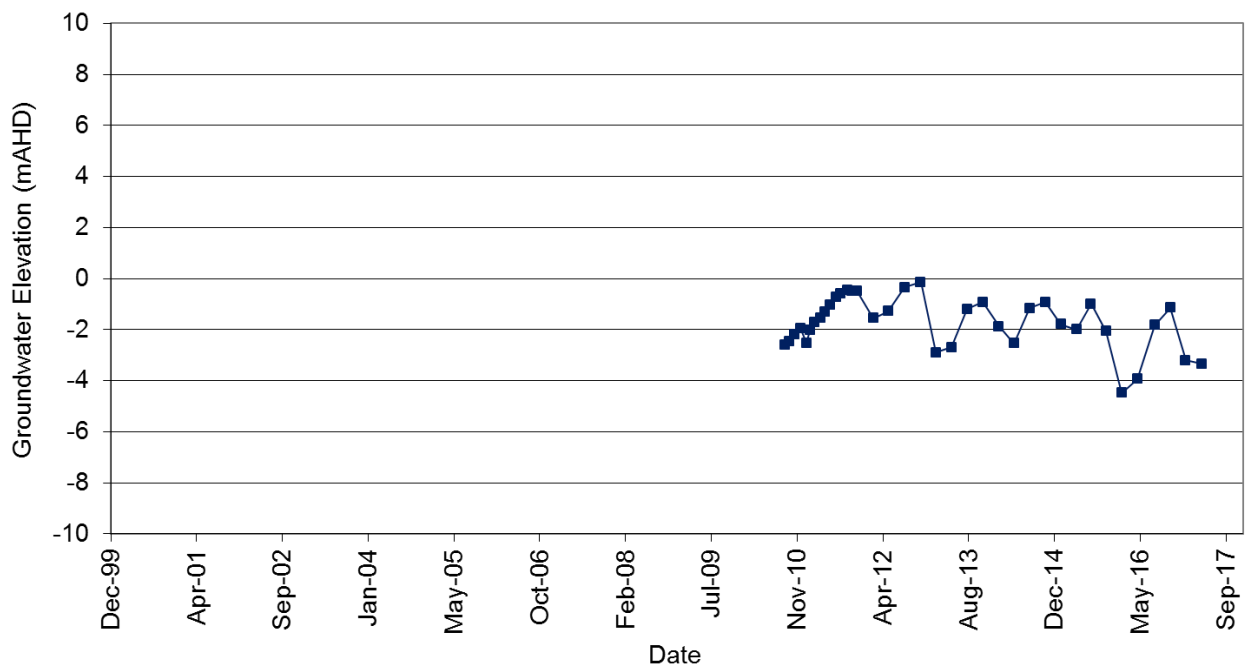
**WRK966216 - Zone 6, 87.5-90m, Older Volcanics**



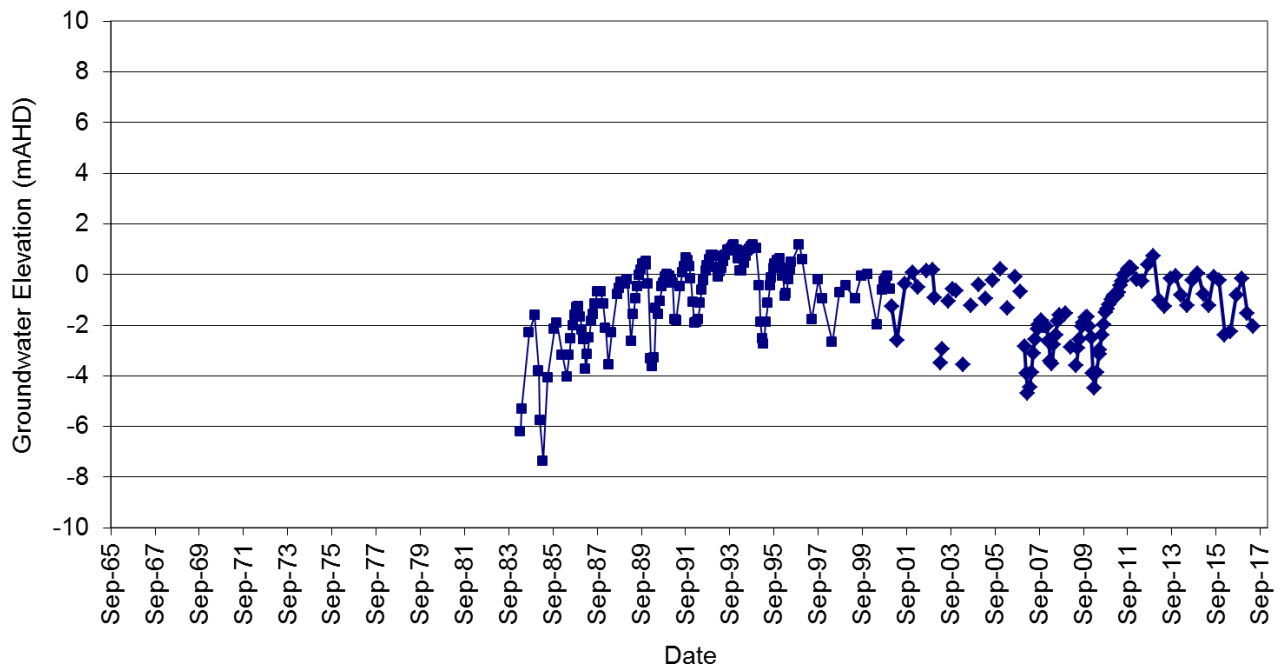
**WRK057103 Zone 7, 70-73m, Older Volcanics**



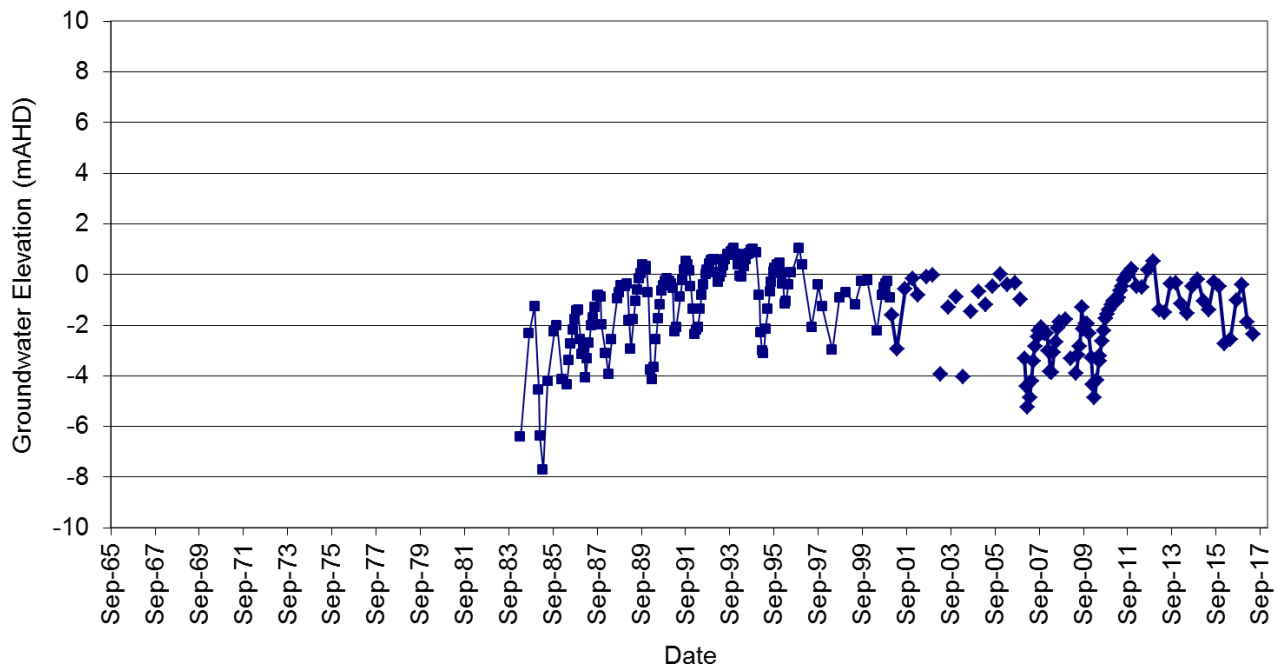
**WRK057105 - Zone 1, 35.8-41.8m, Sherwood**



**71194 - Zone 1, 34-51m, Baxter & Sherwood**



**71195 - Zone 1, 82-94.5m, Sherwood**



## 6.1.4 Salinity

