



Koo Wee Rup WSPA

Groundwater Management Plan

Annual Report
2022-2023



Status	Date	Comments	Author
Draft	07/09/2023	Final draft version completed	M Onken/M Hudson
Approved	07/09/2023	Approved – Manager Groundwater & Rivers	B Morden
Approved	12/09/2023	Approved – General Manager Service Delivery	S Wilkinson
Approved	15/09/2023	Approved – Managing Director	C FitzGerald

Contents

Forward.....	4
Area Summary	4
1. Executive Summary.....	5
2. Introduction.....	6
3. Key Observations	7
3.1 Rainfall	7
3.2 Water Levels	7
3.3 Groundwater Salinity	9
3.4 Water Use	10
3.5 Water Use by Zone.....	11
3.6 Non-Compliance.....	12
4. Plan Implementation.....	13
4.1 Monitoring.....	13
4.2 Metering	14
4.3 Restrictions on Licensing and Licence Transfers	16
4.4 Licensing Activities	17
5. Conclusions.....	18
6. Appendices.....	19
6.1 Licence Details.....	19
6.2 Hydrographs.....	19
6.3 Salinity.....	33
6.4 Links for Compliance.....	34

Forward

This report is submitted to the Minister for Water and Melbourne Water in accordance with s32C *Water Act 1989*. A copy of this report is available by contacting Southern Rural Water at srw@srw.com.au or by calling 1300 139 510. A notice of report availability will be published as required by s32D of the *Water Act 1989*.

The purpose of this report is to detail Southern Rural Water activities implementing the groundwater management plan along with documenting information that is required to be reported under that plan.

Area Summary

Area	Koo Wee Rup Water Supply Protection Area
Segment	Groundwater
Area Declared	January 2002
Plan Approved	4 August 2010
Permissible Consumptive Volume	12,915 ML
Scheduled Plan Review	A review of the Plan was completed in 2019.
Implementation Authority	Southern Rural Water
Relevant CMA	Melbourne Water
Report Period	1 July 2022 – 30 June 2023

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 and 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 with requirements of the plan. 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 2022-23 demonstrates that SRW has complied with the requirements of the plan.

Groundwater monitoring and water use metering indicate minor changes in the condition of the resource and no significant changes in water usage patterns; therefore, it is considered that the groundwater resources of the Koo Wee Rup WSPA as a whole are being managed sustainably.

Whilst overall licensed entitlement is within the Permissible Consumptive Volume for the Koo Wee Rup WSPA, SRW are currently investigating whether the zonal entitlements have been correctly recorded within the Victorian Water Register. If issues are identified, SRW will work collaboratively with key stakeholders to rectify.

SRW has identified a local area where there has been a notable decline in groundwater levels. This is the McDonald's Track area along the boundary of Zone 5 and Zone 7. A hydrogeological report has been commissioned to examine the potential causes of the decline to help inform management action.



Bryce Morden
Manager Groundwater & Rivers
Southern Rural Water

2. Introduction

This report summarises licence information, metered usage and monitoring data collected for the period between 1 July 2022 and 30 June 2023 in accordance with the requirements of the Koo Wee Rup GMP.

The Koo Wee Rup WSPA is separated into 8 zones, with groundwater resources consisting mainly of the Westernport sequence (Baxter, Sherwood, and Yallock geological formations). The Westernport sequence is generally considered a single aquifer system, as there are hydraulic connections between each formation. The basaltic clay of the Older Volcanics acts as 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 management plan objective, 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 and 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 to understand resource status.
- 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; and
- Periodically review 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 several 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).
- Transfer of existing licences occurs in accordance with all relevant provisions of the Water Act 1989 and/or any supplementary rules adopted for the Koo Wee Rup WSPA; and
- No new groundwater licences will be issued if the total of all groundwater licence entitlements would exceed the PCV declared for the Koo Wee Rup WSPA, unless in accordance with prescriptions 7 & 8 of the GMP.

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

3. Key Observations

3.1 Rainfall

Rainfall during the reporting period was 971 mm measured at Lang Lang (Rainfall data is unavailable for July 2022 at Lang Lang and has been substituted with Nyora weather station data for July 2022). Rainfall in 2022-2023 was above the long-term average for Lang Lang of 859mm per year.

3.2 Water Levels

Groundwater levels are measured quarterly or monthly at twenty-eight (28) observation bores, targeting the Quaternary Sands, Westernport Group, Older Volcanics and Childers aquifers.

The location of observation bores in the area are shown in Figure 1. The hydrograph for bore 71219 is shown in Figure 2, with all hydrographs are presented in appendix 6.2.

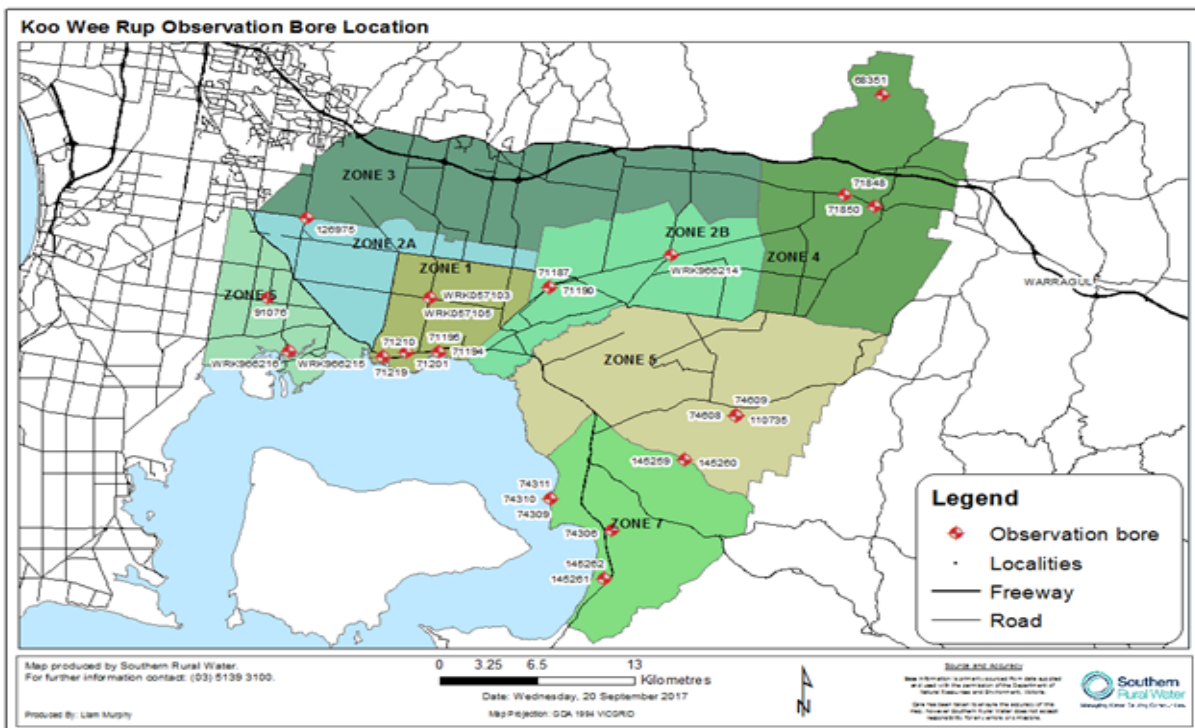


Figure 1 – SOBN locations in Koo Wee Rup WSPA

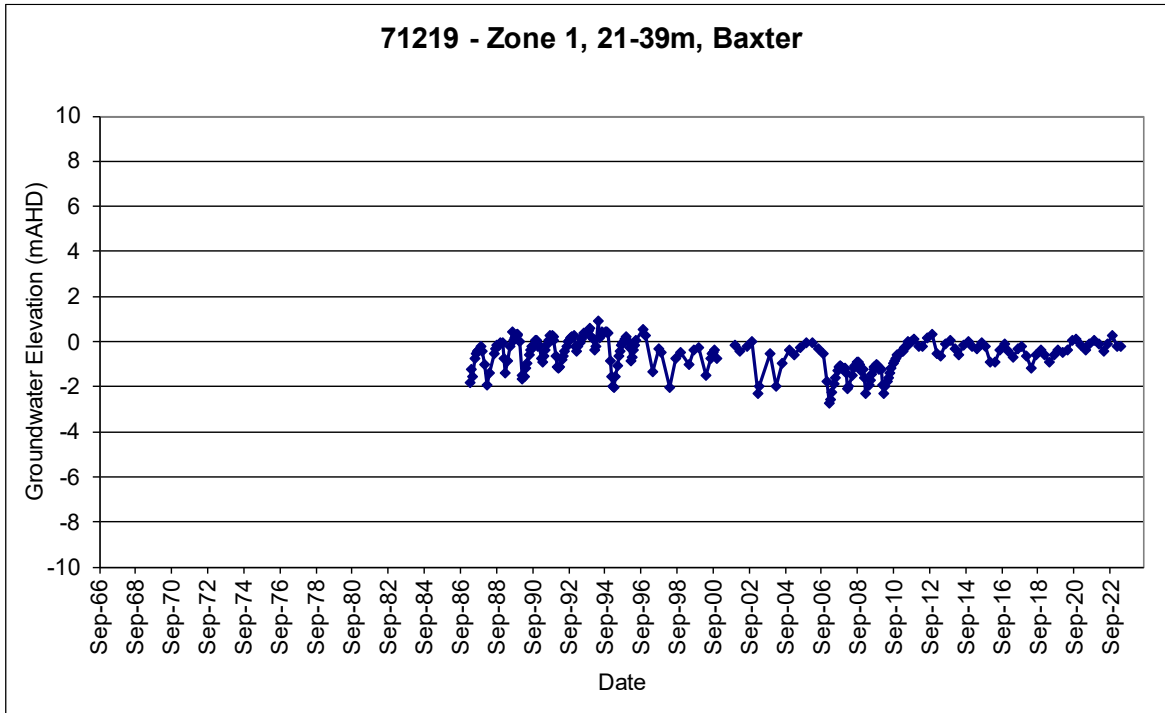


Figure 2 – Example hydrograph using data from bore 71219

The groundwater level data from all observation bores indicate that:

- Groundwater level trends over the last 30 years in all aquifers are broadly stable across almost all of the WSPA except for one locality.
- Current water levels in many bores are similar to levels observed in the 1990s.
- Groundwater levels in the Westernport formation bore 145259 have declined by approximately 10 m between 2012 and 2022. The groundwater elevation in this bore now appears to have stabilized over the past 12 months. The causes of this local decline are currently being investigated by SRW and a hydrogeological report into this area has been commissioned.
- There are isolated locations where hydrographs show a relatively small longer-term declining trend across a range of formations, in Zone 7 (SOBN bores 74306, 145261) and Zone 7 coastal (74309 and 74310).
- Similar small falls are observed in Zone 1 (WRK057103/5). These declines are likely to represent the impact of local pumping.
- Bore 145262 was replaced by bore WRK116126 during 2020-21. Due to the redrill, the correct water level is now being recorded which is around 2m higher than previously understood.
- Bore 110735 was refurbished in 2021-2022 and the groundwater elevation reported by this bore is currently considered to be non-representative of aquifer conditions, whilst the water level continues to recover. Over time, the characteristics of this refurbished bore will be better understood in the context of the monitoring program.

3.3 Groundwater Salinity

One of the key drivers for monitoring salinity in the plan was the potential of saline intrusion into the aquifer near the coast, as well as broader resource management issues.

Monitoring has shown that salinity has been relatively stable over the period since 2009 and most bores remain within historic ranges. Figure 3 provides a summary of results.

The exceptions to this are:

- Salinity in Bore 71194, which is on the coast in zone 1, has varied considerably over the period of record.
- Salinity in Bore 74311, which is on the coast in zone 7, has decreased since monitoring began in 2008 but remained stable over the past 12 months.
- Bore 71219 (appendix 6.2) has much higher levels of salinity than the other monitored bores, although these levels are stable. This is potentially due to a remnant pocket of saline water in the aquifer, or because the impermeable clays and mudstones that separate the aquifer from the sea are thinner in this area. Salinity in this bore remains within historic ranges.

Salinity will continue to be monitored and reviewed on an annual basis. All salinity graphs are presented in appendix 6.3.

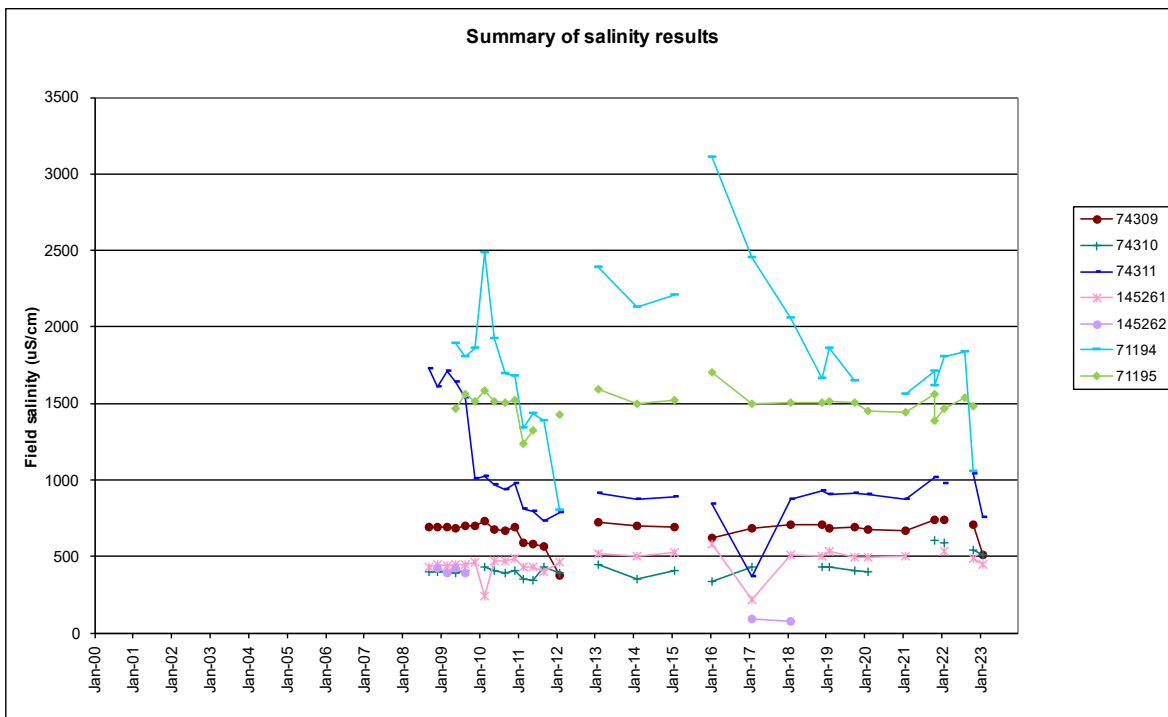


Figure 3 – Groundwater salinity trends in the KWR WSPA

3.4 Water Use

Details of water use in the 2022-23 year with comparison to the four previous years are provided in Table 1 and Figure 4. Variability in the total number of licences overall between 2020 and 2023 reflects the issuing of licences to facilitate temporary trades.

The total number of metered licences have been relatively stable throughout the past five years.

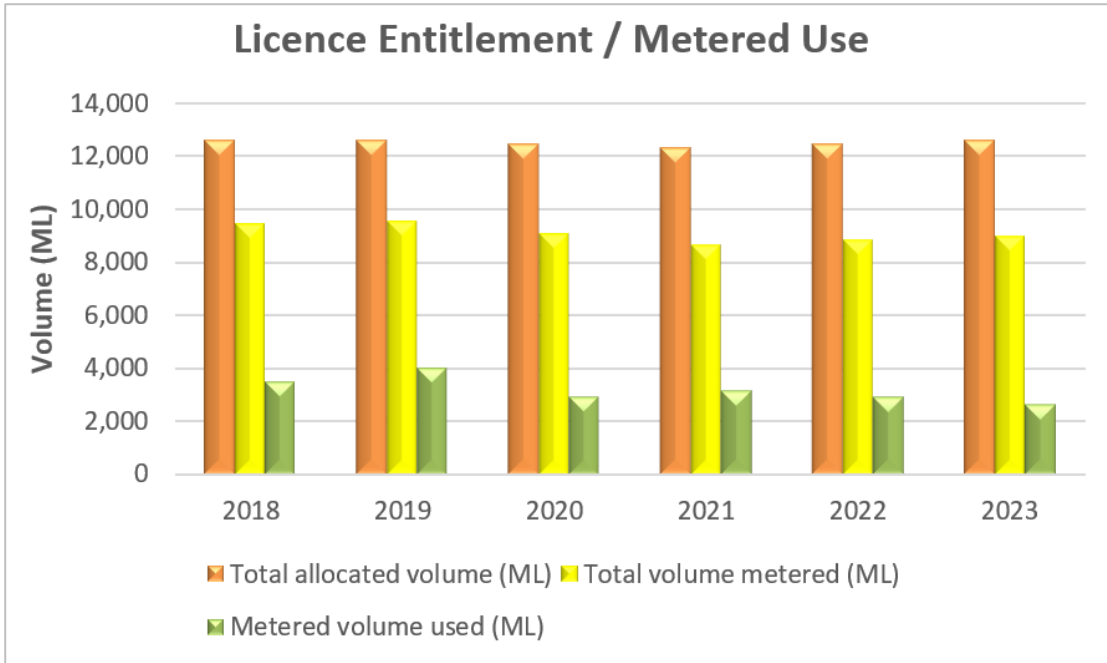


Figure 4 – Licence entitlement compared to metered volume and usage (data from Table 1)

At 30 June	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
No. of licences	339	340	339	328	337
Total allocated volume (ML)	12,575	12,575	12,566	12,427	12,565
No. of metered licences	156	155	153	151	154
Total allocated volume metered (ML)	9,547.4	9,041.6	8,618.6	8802.0	8962.0
Metered volume used (ML)	3,964	2,912	3,123	2,886	2,637
Metered use of allocation (%)	32%	23%	25%	23%	21%
No. of licences with unauthorised take ¹ at 30 June 2023 (refer to section 3.6)	0	0	0	1	2
Permissible Consumptive Volume (PCV)	12,915	12,915	12,915	12,915	12,915
Metered use as a % of PCV	31%	23%	24%	22%	20%
No. of D&S bores ²	467	450	428	428	428
D&S bores estimated use ²	701	675	642	642	642
Estimated D&S use from licenced bores ³	509	510	509	492	506

Table 1 – Change in water use, licence numbers and entitlement volumes over the past 5 years

¹ Unauthorised Take of Non-Urban Water

² Taken from the Victorian State Water Accounts. Note that the values have been updated based on the file 'Groundwater Data (2017 to 2021)' published on <https://accounts.water.vic.gov.au/groundwater/>. The D&S bore count for 2022-2023 was unavailable at the time of issue – therefore the 2020-2021 count was assumed

³ Estimated 1.5ML per licence 2013 onwards

3.5 Water Use by Zone

The total water usage by zone is presented in table 2 which shows that within the KWR WSPA overall, the licensed volume is within the PCV of 12,915 ML and total usage is 21.2% of this.

Whilst overall licensed entitlement is within the Permissible Consumptive Volume for the Koo Wee Rup WSPA, SRW are currently investigating whether the zonal entitlements have been correctly recorded within the Victorian Water Register. If issues are identified, SRW will work collaboratively with key stakeholders to rectify.

Koo Wee Rup Zone	Licenced Vol (ML) 2022-2023	Metered use per zone (ML)	Metered use (% of 2022-23 licenced volume)
Zone 1	1077.3	244.9	22.7%
Zone 2a	628.3	23.2	3.7%
Zone 2b	2916.3	762.8	26.2%
Zone 3	335.5	1.4	0.4%
Zone 4	1785.4	170.9	9.6%
Zone 5	1912.5	436.4	22.8%
Zone 6	635.6	8.8	1.4%
Zone 7	3136.9	988.5	31.5%
Total	12427.8	2636.9	21.2%

Table 2 – Water usage by zone for the reporting period 2022-23

3.6 Non-Compliance

The Victorian Government and SRW have a zero-tolerance approach to unauthorised take of non-urban water. SRW is responsible for ensuring water users in southern Victoria comply with their licence conditions.

Further information regarding Southern Rural Water and State Governments approach to compliance is provided in appendix 6.4.

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.

There were a total of two compliance issues identified in the Koo Wee Rup WSPA during the 2022-23 season. One being in KWR Zone 1 and one in KWR Zone 5. Both breaches related to unauthorised take and were identified as first-time offences.

Enforcement was via formal warning letters, in line with the compliance and enforcement guidelines.

4. Plan Implementation

4.1 Monitoring

Prescriptions

Table 3 below 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 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 being received.	The monitoring bores are owned and managed by the Department of Energy, Environment and Climate Action (DEECA). All bores have minor maintenance carried out annually which includes site clearance, rust removal, painting, and ensuring the bore is secure and safe. DEECA undertakes additional maintenance on bores that have been identified as requiring attention under the annual program.	Yes Yes
15. The Department and the Corporation must ensure that water level monitoring and investigations are carried out at appropriate locations throughout the Water Supply Protection Area to: a) assess annual and long-term impact on water levels from groundwater pumping. b) monitor regional and local seasonal drawdown. c) examine interaction between groundwater and surface water d) provide information for future resource assessments; and e) monitor the impacts of groundwater pumping generally across the Water Supply Protection Area and in areas of high intensity groundwater pumping	SRW works closely with DEECA 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 DEECA's monitoring program. SRW regularly reviews the groundwater level monitoring program and data.	Yes
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. The 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 Water Supply Protection Area to provide information that allows assessment of changes in 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
---	--	-----

Table 3 – Monitoring plan prescriptions

4.2 Metering

Prescriptions

Table 4 below 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	Meters comply with the current requirements.	Yes
11. The Corporation must: a) ensure all meters within the Protection Area are read twice per year – in or around January and June. b) determine the volume of water extracted from the bore since the flow meter was last read; and c) within 30 days after a meter is read, record the amount of water used on a database.	All meters were manually read twice each year, with ongoing works to install Automated Meter Reading (AMR) technology on all metered bores. This will provide access to near-real time meter readings exceeding the minimum requirement. Meter readings and usage data were recorded and stored in SRW's metering system. Usage is also recorded in the Victorian Water Register.	Yes
12. The Corporation may request the Licensee to read a meter and to provide the Corporation with the meter reading: a) the Licensee must comply with the request; and b) 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 use these powers to request any licensees to read their meter and provide the meter reading.	Yes

Table 4 – Metering prescriptions

Metering Activities

Meters are installed on bores with active licences greater than 10ML with few exceptions. Some licences may require multiple meters to properly account for water usage. The continued rollout of automated meter read technology adds to the ability of SRW and its customers to actively manage the resource throughout the year.

As highlighted in section 3.4 the total number of metered licences has decreased in the area due to changes in licence use from irrigation to stock and domestic use only, licence consolidation or licences becoming inactive. Where consistent with criteria set out in the SRW metering action plan, meters may be removed from some sites. Summary statistics relating to metering activities are provided in Table 5

	Year to 30 June 2023	Total for WSPA at 30 June 2023
Number of licences issued (see section 4.4 for details)	0	332
Number of meters installed	-2	192
Number of meters repaired, or maintenance activity conducted.	0	0
Meters replaced	0	Not applicable
Meters read – mid-year date range	Jan/Feb 2023	
Meters read – end of year date range	May/June 2023	
Number of estimated readings	0	Not applicable
Meters fitted with Taggle (telemetry)	0	150

Table 5 – Summary of meter details for Season 2022-2023 and overall

4.3 Restrictions on Licensing and Licence Transfers

Prescriptions

Table 6 below details the requirements of the management plan in relation to licencing

Plan Requirement	Activity / Reference	Complies
<p>1. Temporary trade of water entitlement is allowed within a zone or coastal sub-zone and from one zone to another provided that:</p> <ul style="list-style-type: none"> a) Where usage has exceeded 80% of allocation over the previous 2 years, water levels have recovered appropriately b) Transfer does not occur into coastal sub-zones c) Transfer does not occur into zones 1, 2B, 4 and 5; and d) A temporary trade shall expire no later than 30 June in the financial year in which it is approved (i.e. 1 July to 30 June) e) At the request of both trading parties, the temporary transfer may commence on 1 July if it is approved prior to 30 June (i.e. transfer entitlements can start in the new irrigation season rather than having to commence in the middle of an irrigation season). 	14 temporary transfers were processed during the reporting period in accordance with this prescription.	Yes
<p>2. Permanent trade of water entitlement shall be allowed within zones and from one zone to another provided that:</p> <ul style="list-style-type: none"> a) Where usage has exceeded 80% of allocation over the previous 2 years, water levels have recovered appropriately b) 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 c) Transfer does not occur into zones 1, 2B, 4 and 5; and d) Transfer does not occur into coastal sub-zones 	No permanent transfers were processed during the reporting period.	Yes
<p>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.</p>	All licences are recorded in the Water Register.	Yes
<p>4. No new groundwater licenses shall be issued, except as described in Prescriptions 7 and 8.</p>	0 licences were issued.	Yes
<p>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.</p>	Total entitlement volume is less than PCV.	Yes
<p>6. If a groundwater licence is surrendered, revoked, or not renewed the total entitlement in Prescription 5 will be reduced by that licence volume.</p>	1 licence was surrendered.	Yes
<p>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).</p>	Not applicable	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.	Not applicable	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

Table 6 – Licensing Prescriptions

4.4 Licensing Activities

Table 7 provides details of licensing activities. As highlighted in section 3.4 the number of licences over the past 5 years has remained relatively stable following an earlier period of decline as customers amalgamated licences. This activity changed the total number of licences but not the volume of entitlement held.

Year to 30 June 2023	No.	Volume ML
New licences issued	0	0
New licences issued ¹	1	0
Additional volumes on existing licences	0	0
Licences revoked	1	1.2
Permanent transfer	0	0
Temporary transfers	14	379.2

Table 7 – Licensing activities in 2022-23

¹Issued with a licence to enable trade to occur

Compliance and Exceptions

Activities undertaken during the reporting period comply with the requirements of the GMP.

Issues Affecting Implementation

No issues were experienced or identified.

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 and to ensure the long-term sustainability of those resources.

Groundwater monitoring and water use metering indicate no major changes in the condition of the resource or in water usage patterns; therefore, it is considered that the groundwater resources of the Koo Wee Rup WSPA as a whole are being managed sustainably.

The monitoring data, and the updated hydrogeological conceptual report highlight that there is one local area where groundwater levels have declined at a rate greater than expected (the McDonalds Track area along the boundary of Zone 5 and Zone 7). SRW has commissioned a hydrogeological report to review the decline with a view to understanding the causes and possible management interventions.

The Koo Wee Rup GMP Annual Report for 2022-23 demonstrates that SRW has complied with the requirements of the plan.

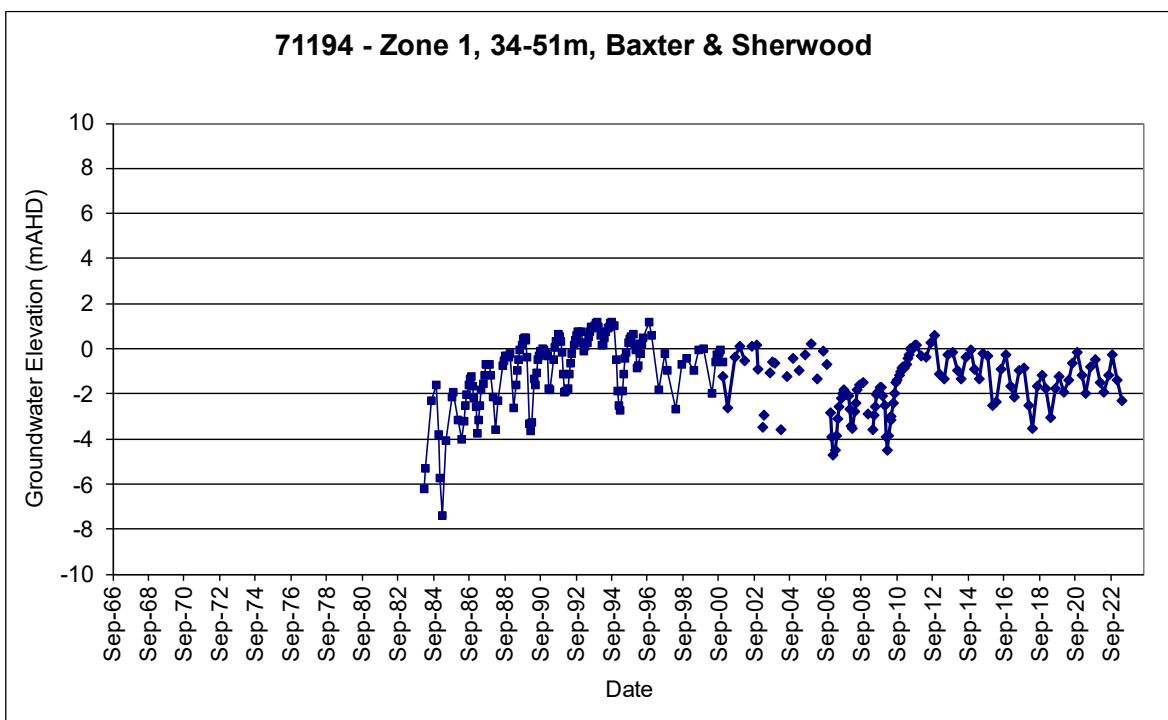
6. Appendices

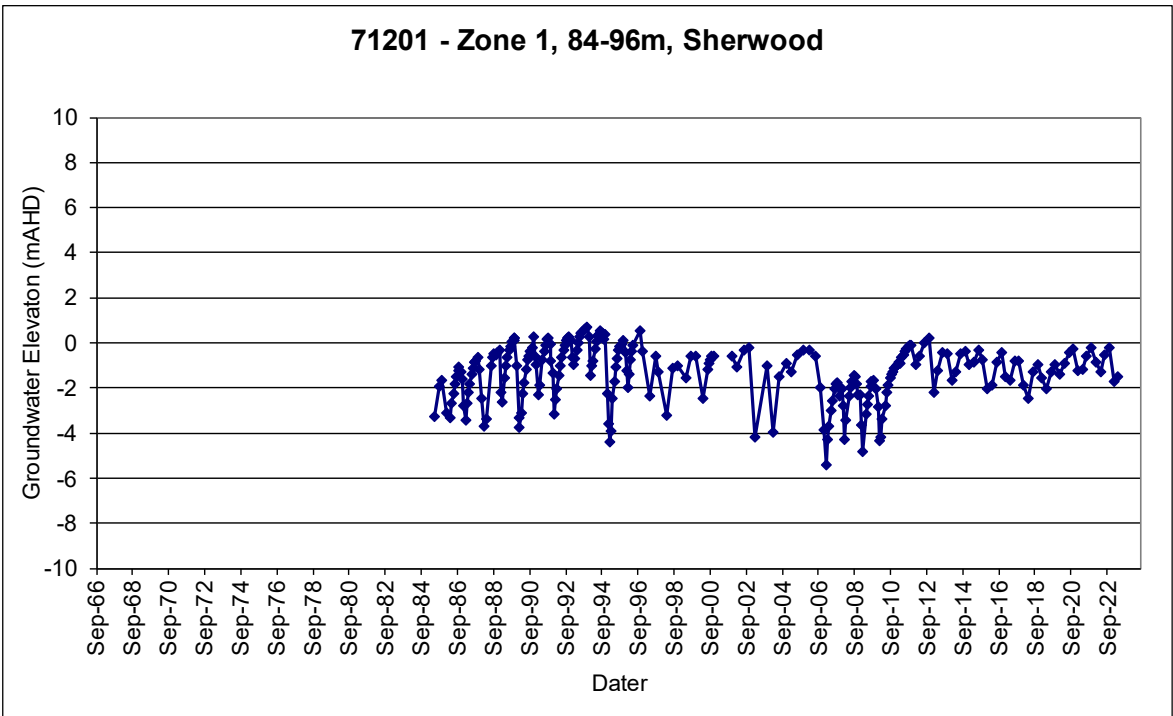
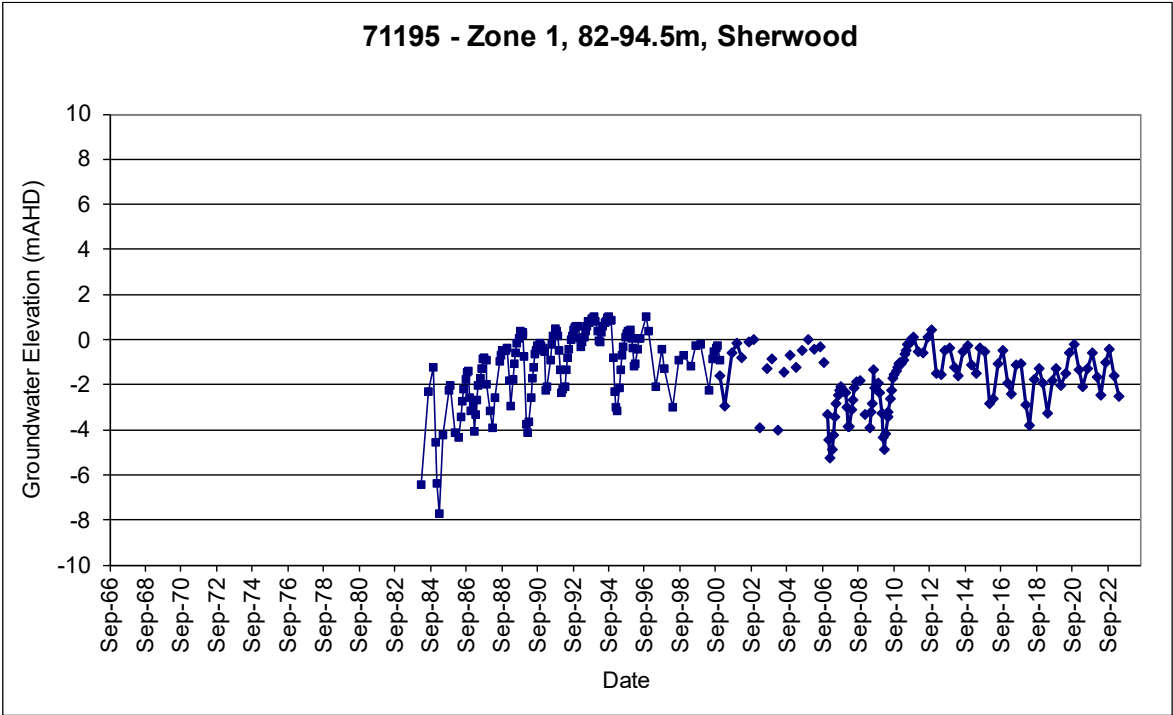
6.1 Licence Details

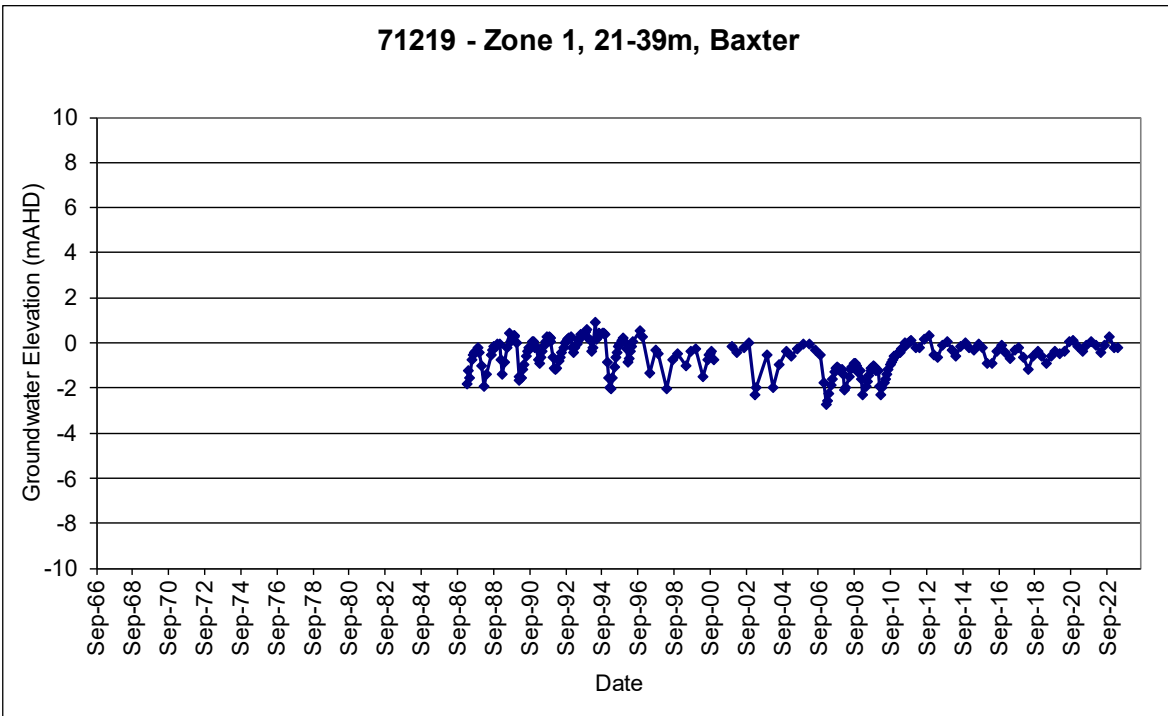
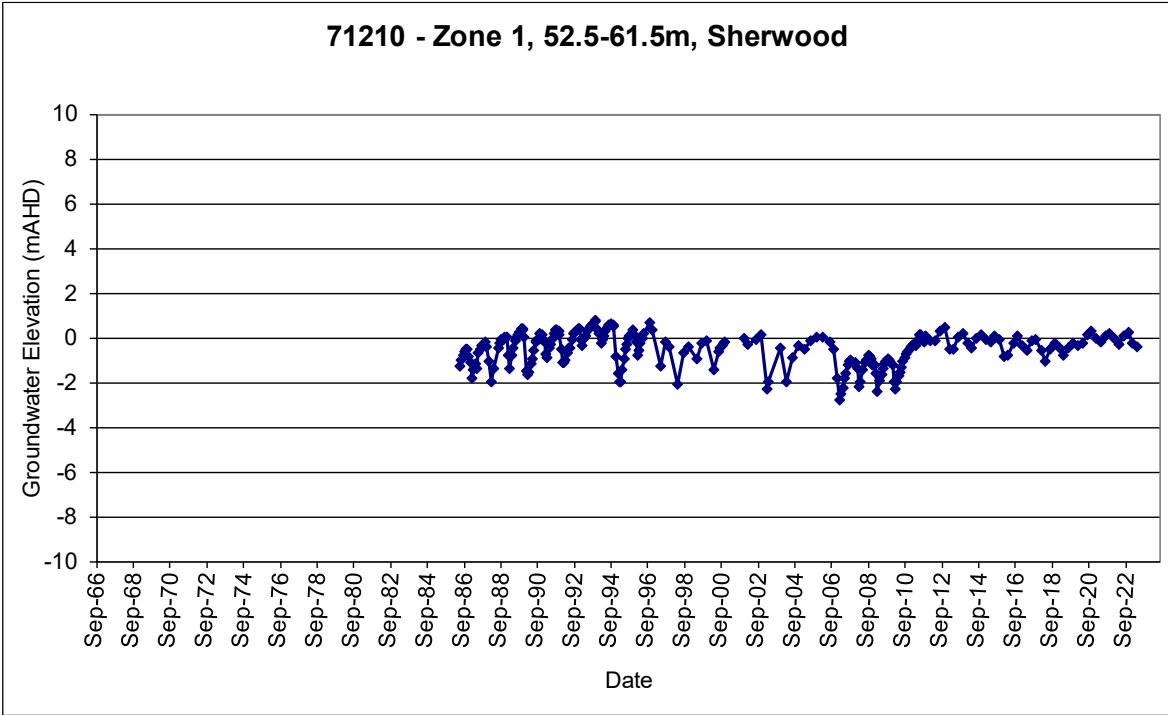
Water trade details for the 2022-23 season can be found at:

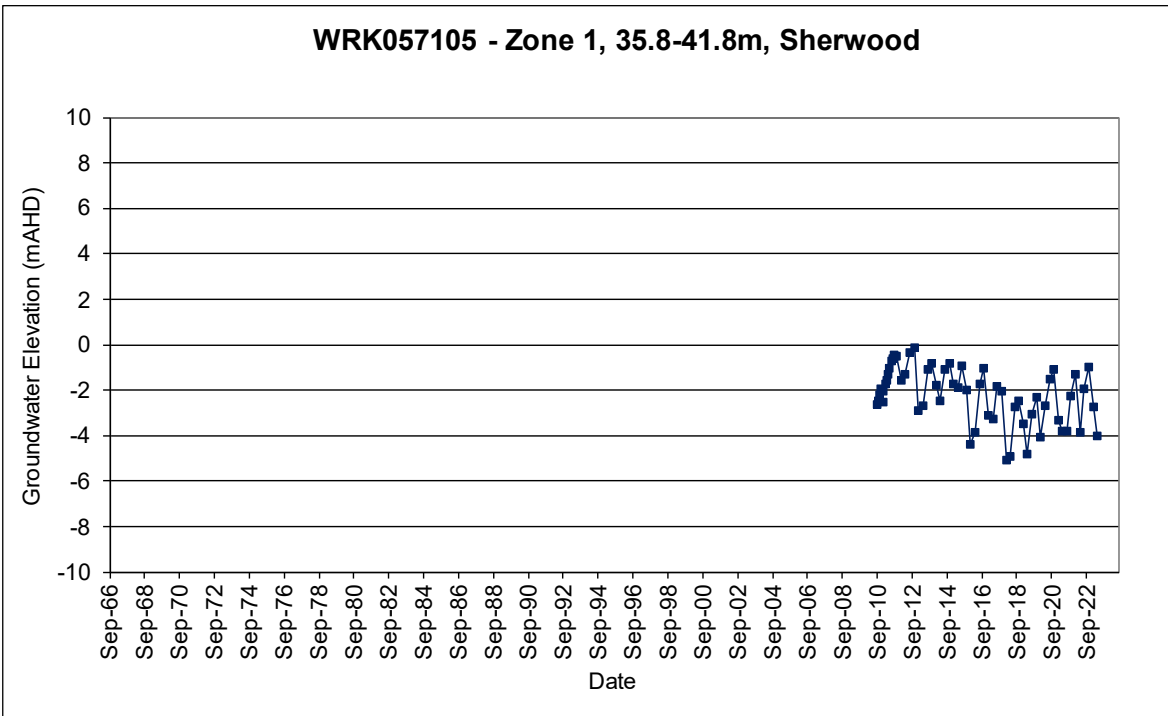
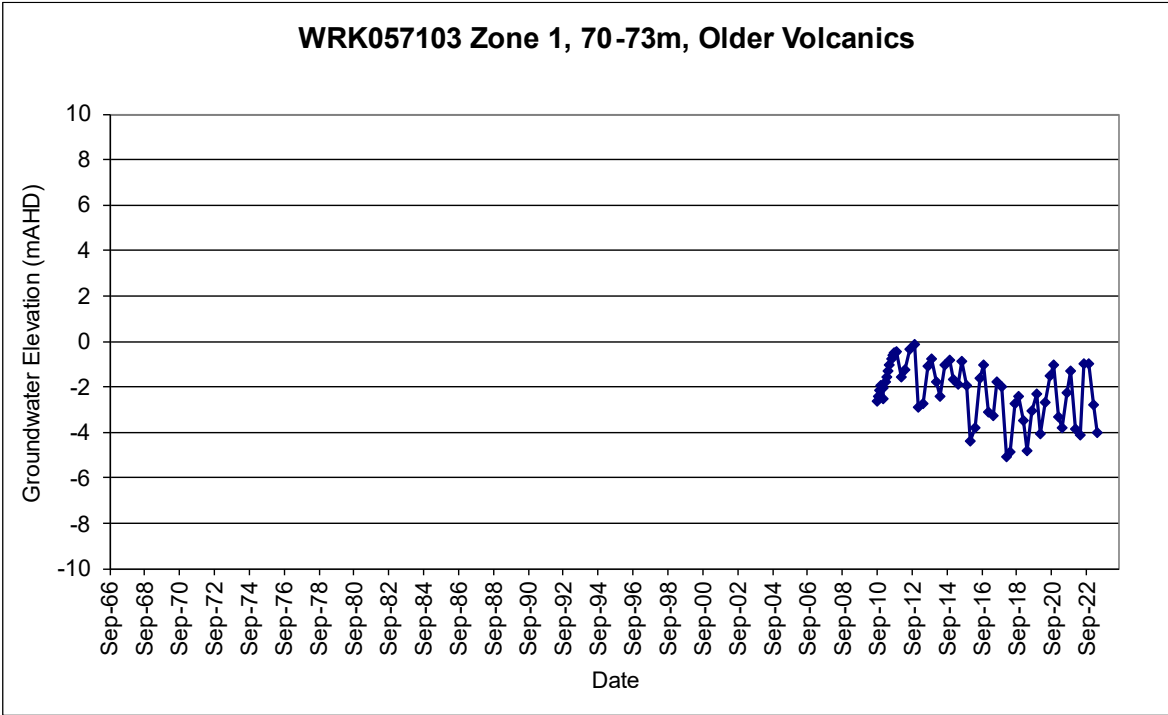
<http://waterregister.vic.gov.au/water-trading/take-and-use-licence-trading>

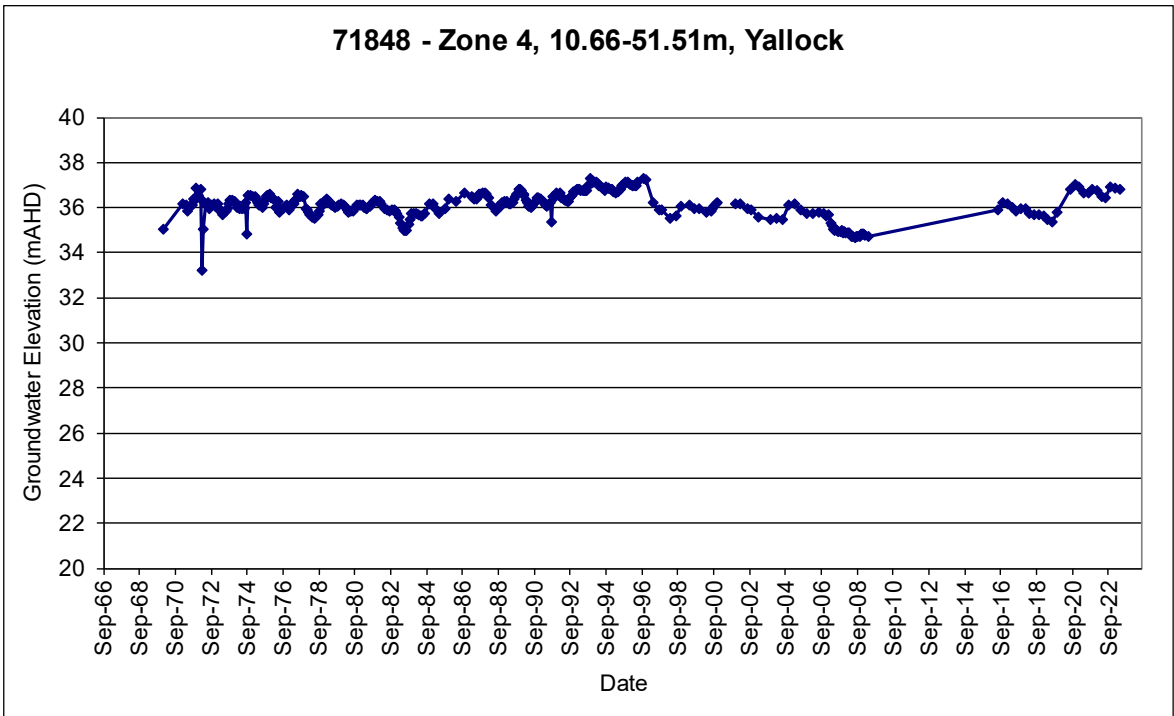
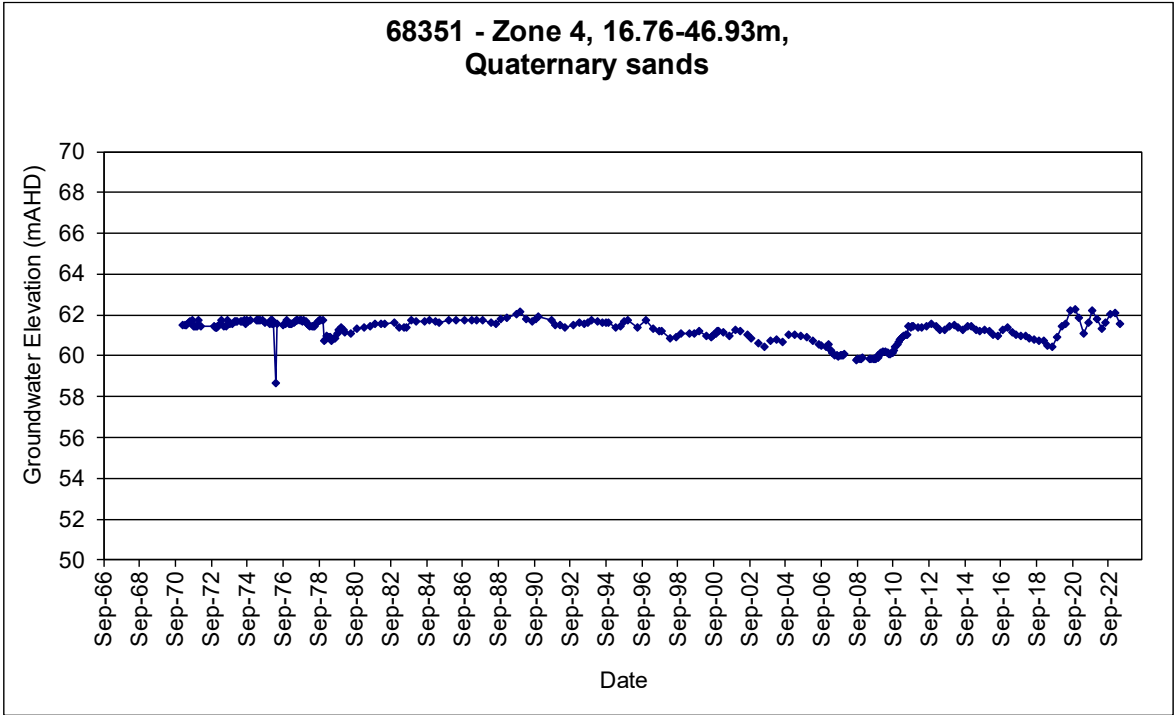
6.2 Hydrographs

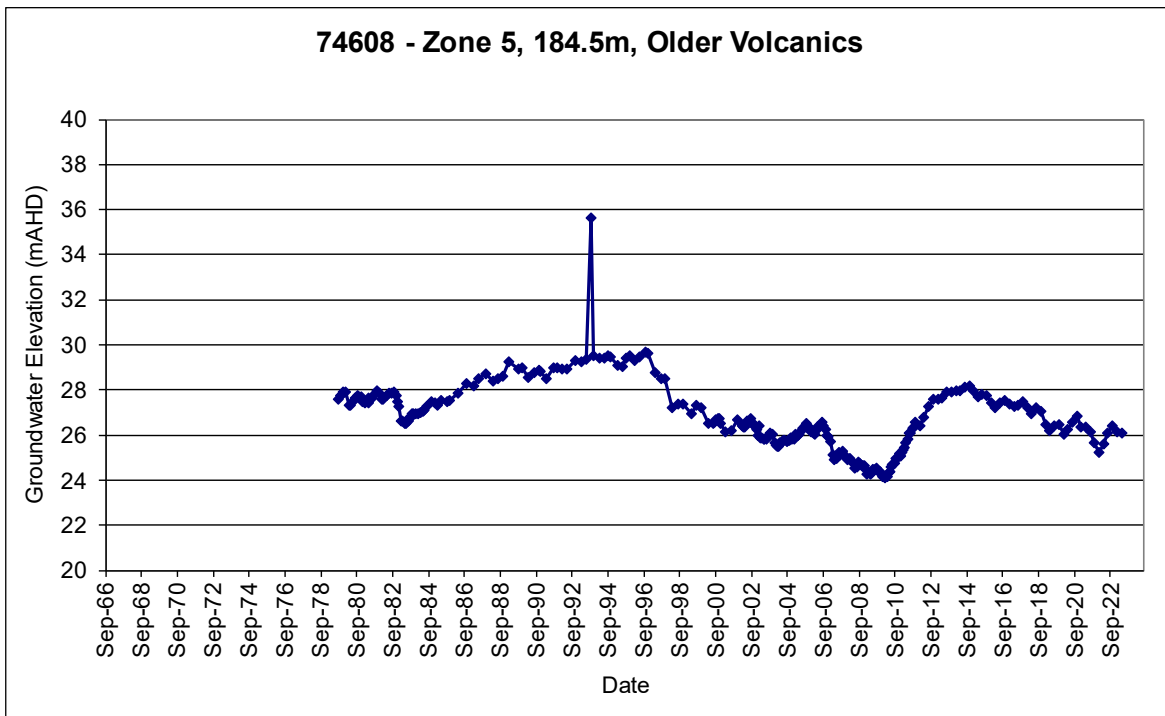
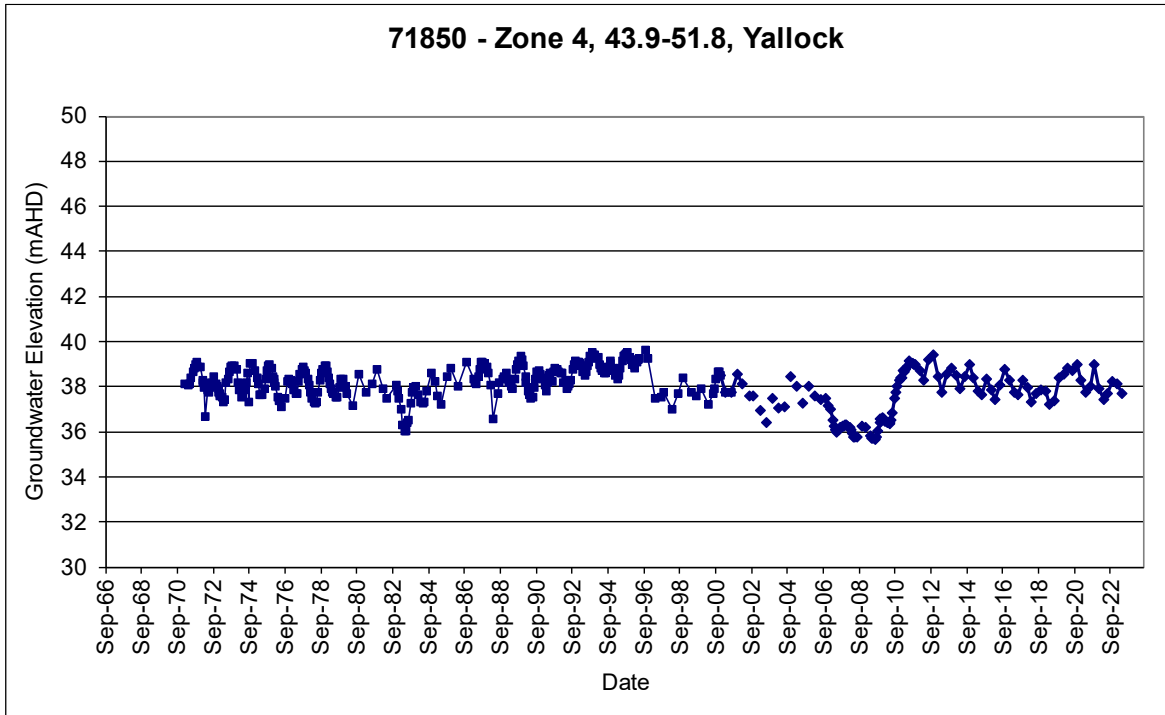


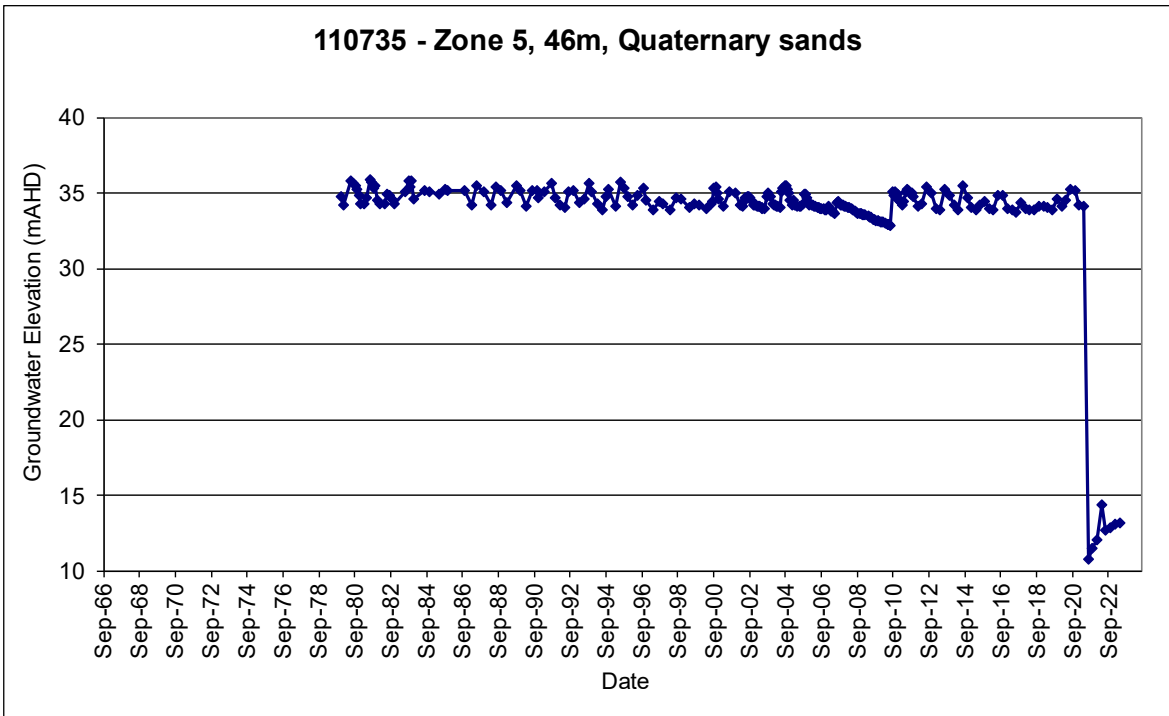
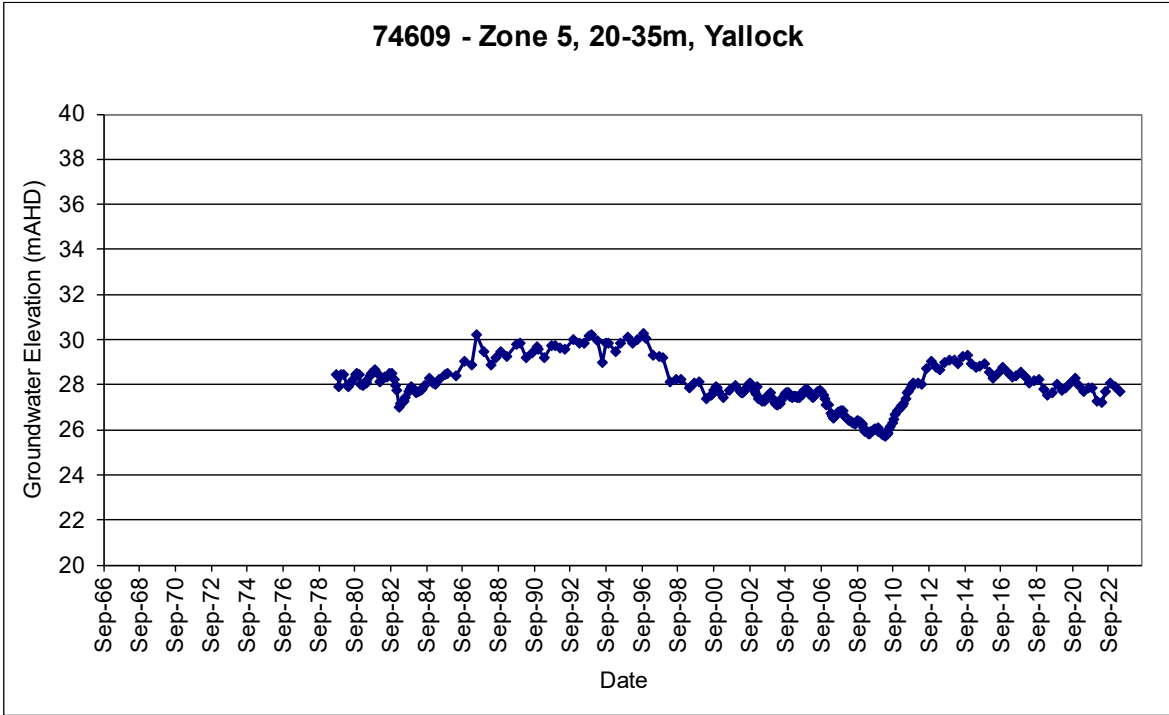




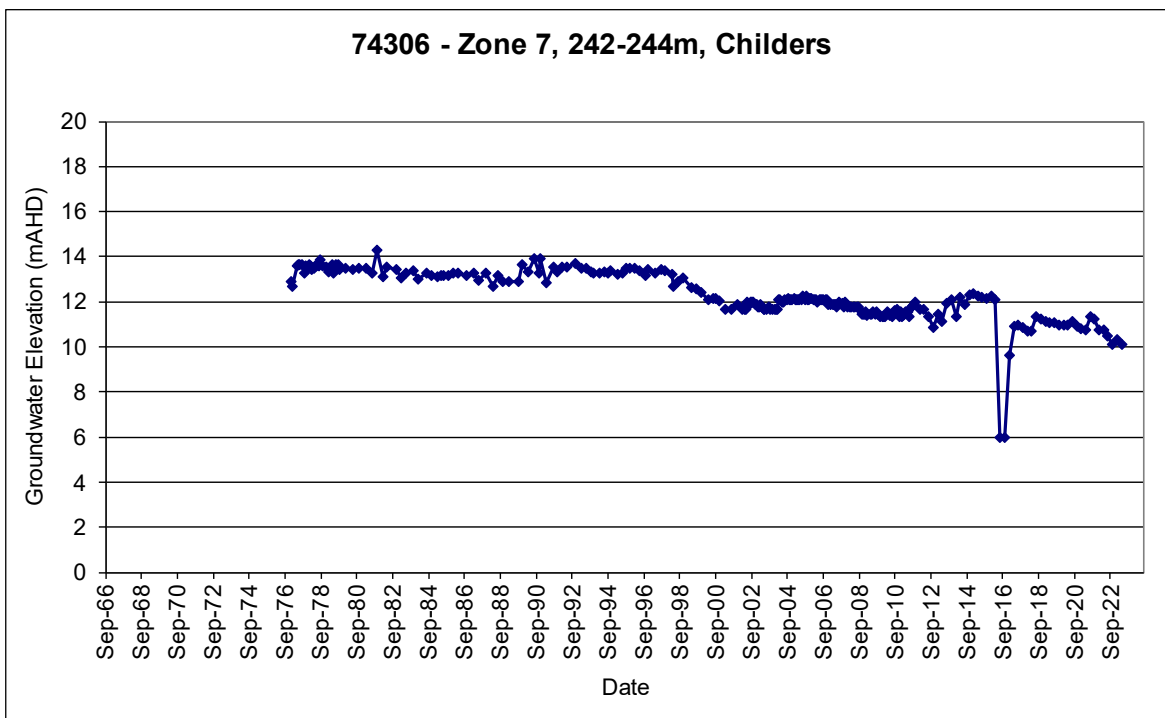
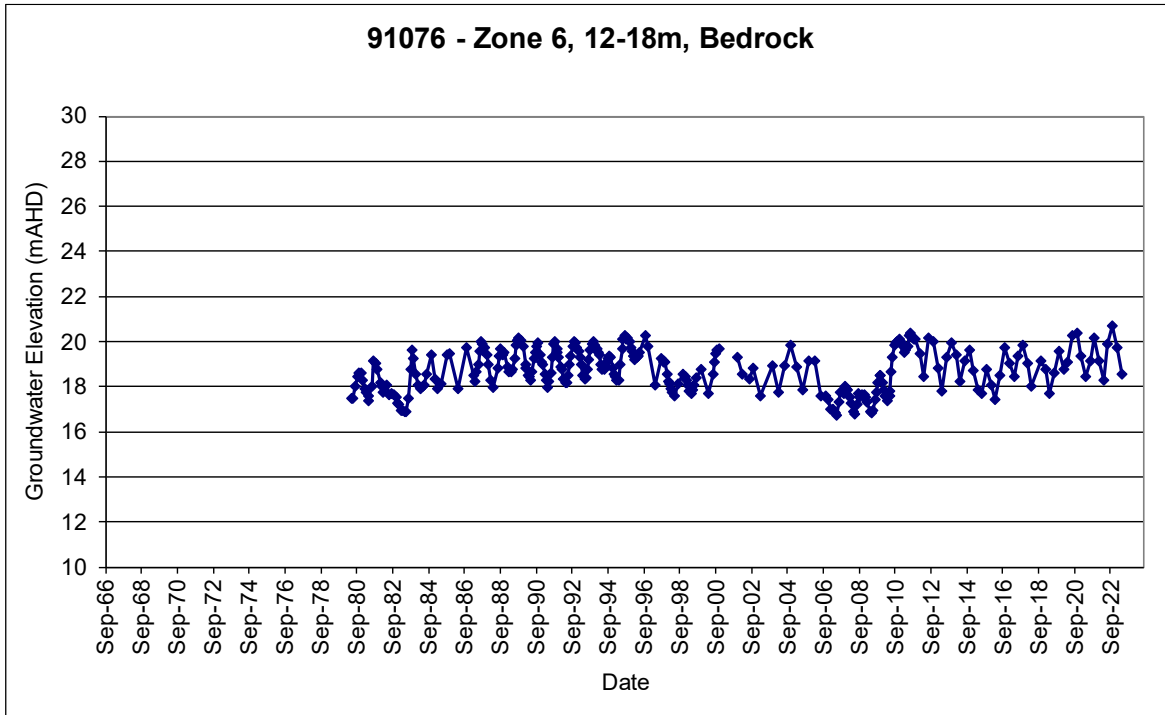




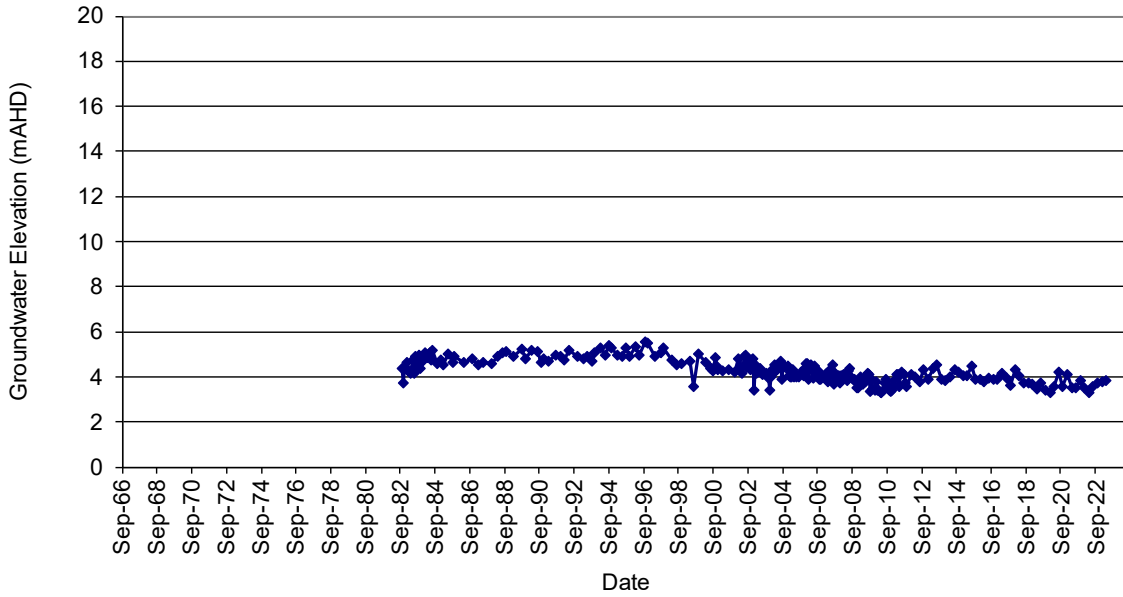




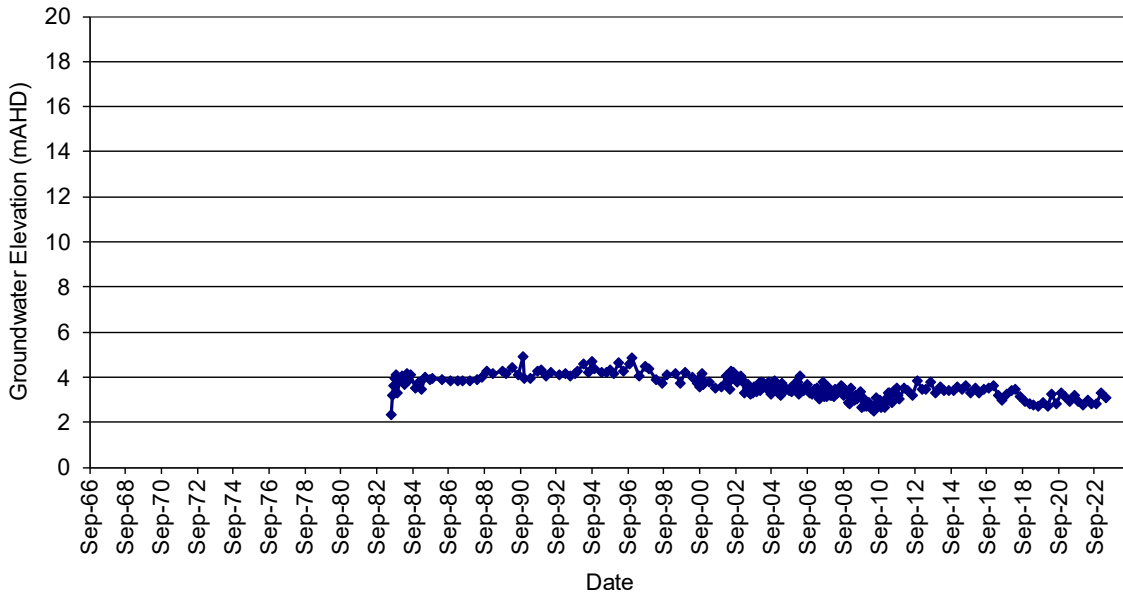
Note: Bore 110735 was refurbished during the reporting period which resulted in disturbance of the groundwater level within the bore. The level has since started to recover however the groundwater elevation reported by this bore is currently considered to be non-representative of aquifer conditions. Further monitoring will take place during 2022-2023 to inform the status of this bore.

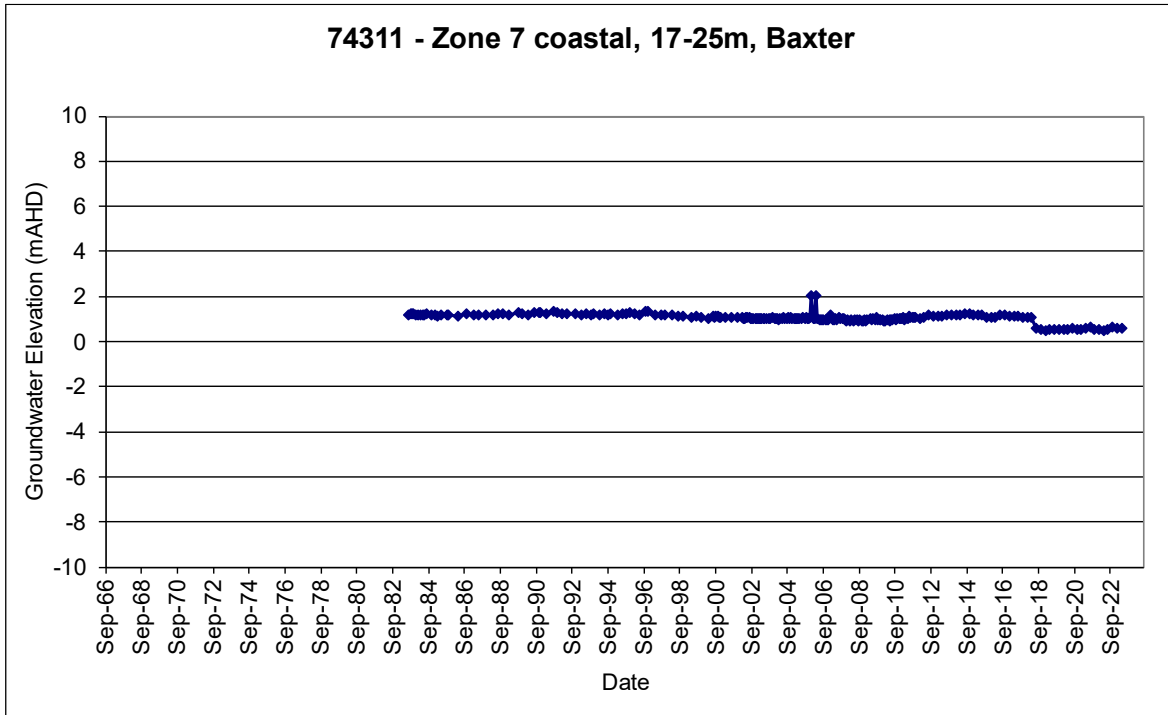


74309 - Zone 7 coastal, 97.5-118.5m, Older Volcanics

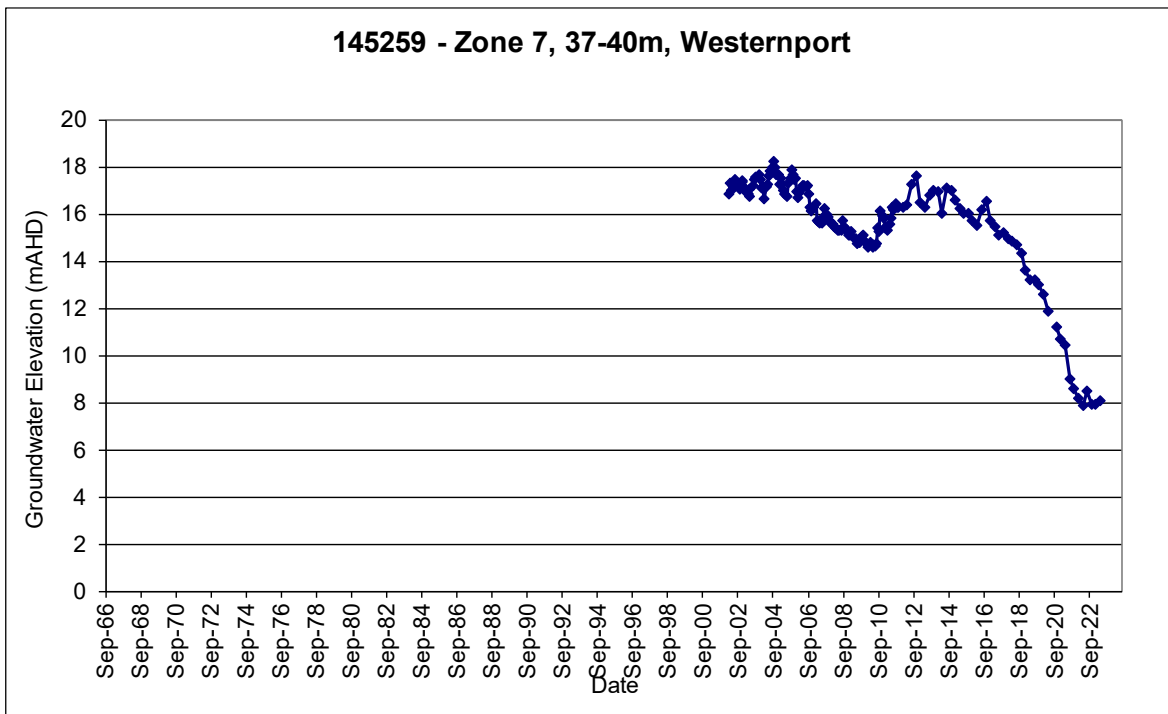


74310 - Zone 7 coastal, 84.1-87.5m, Sherwood

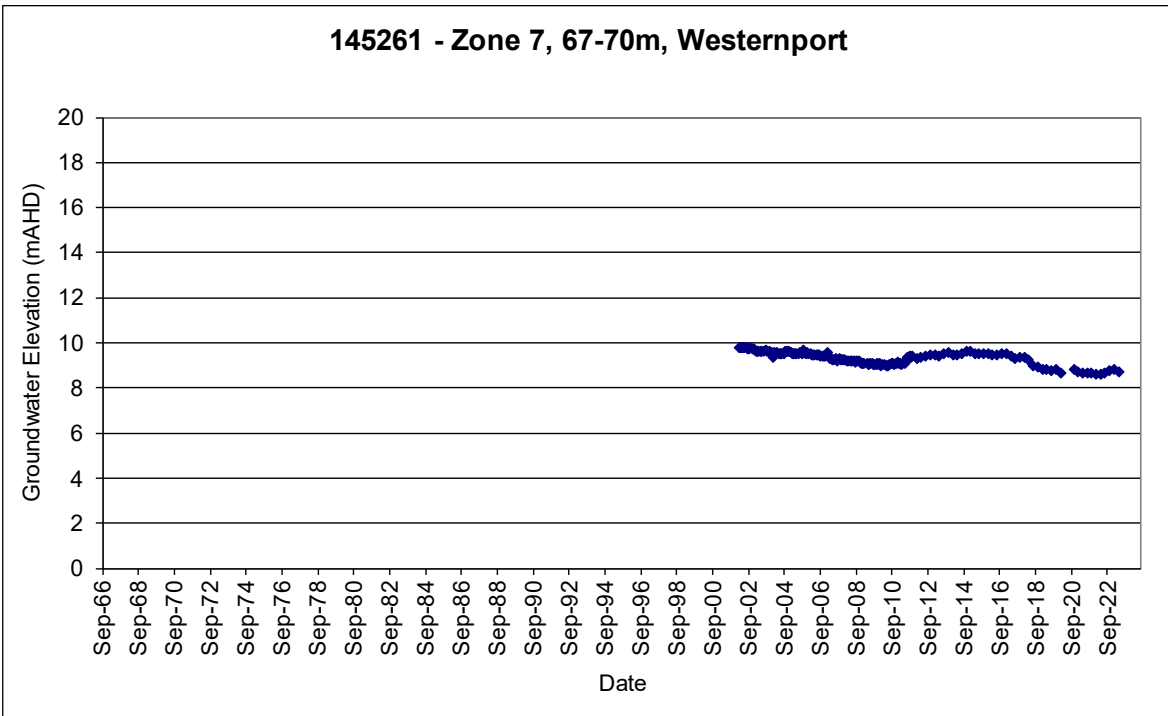
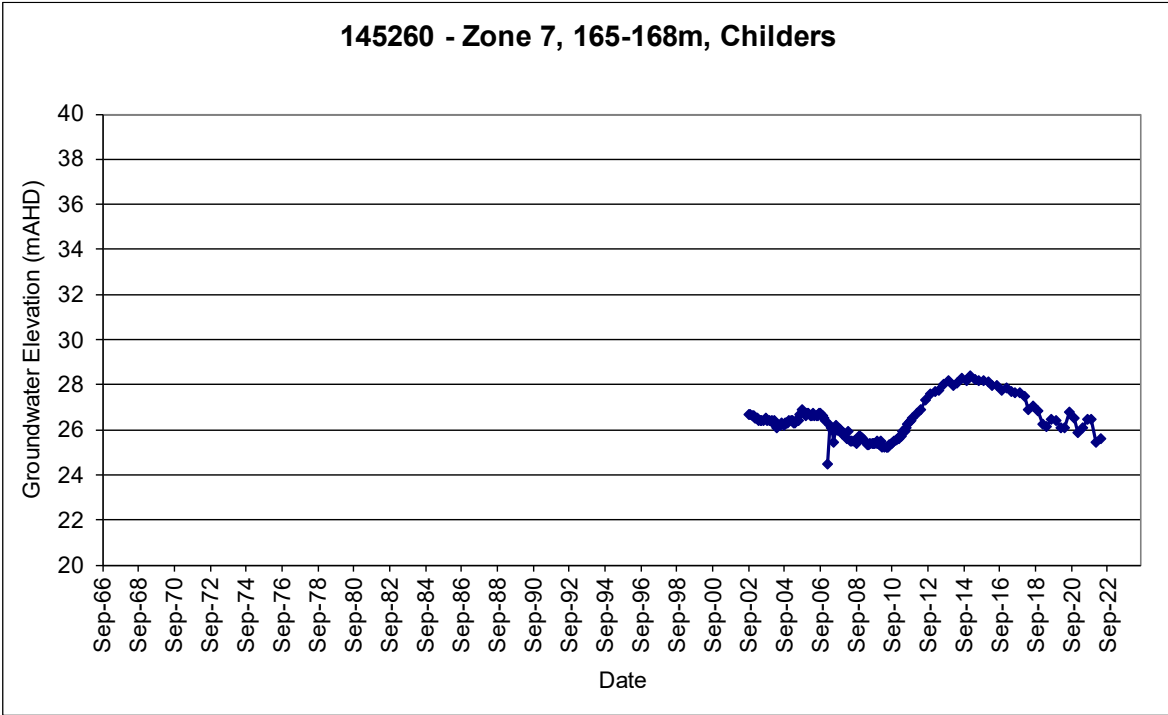


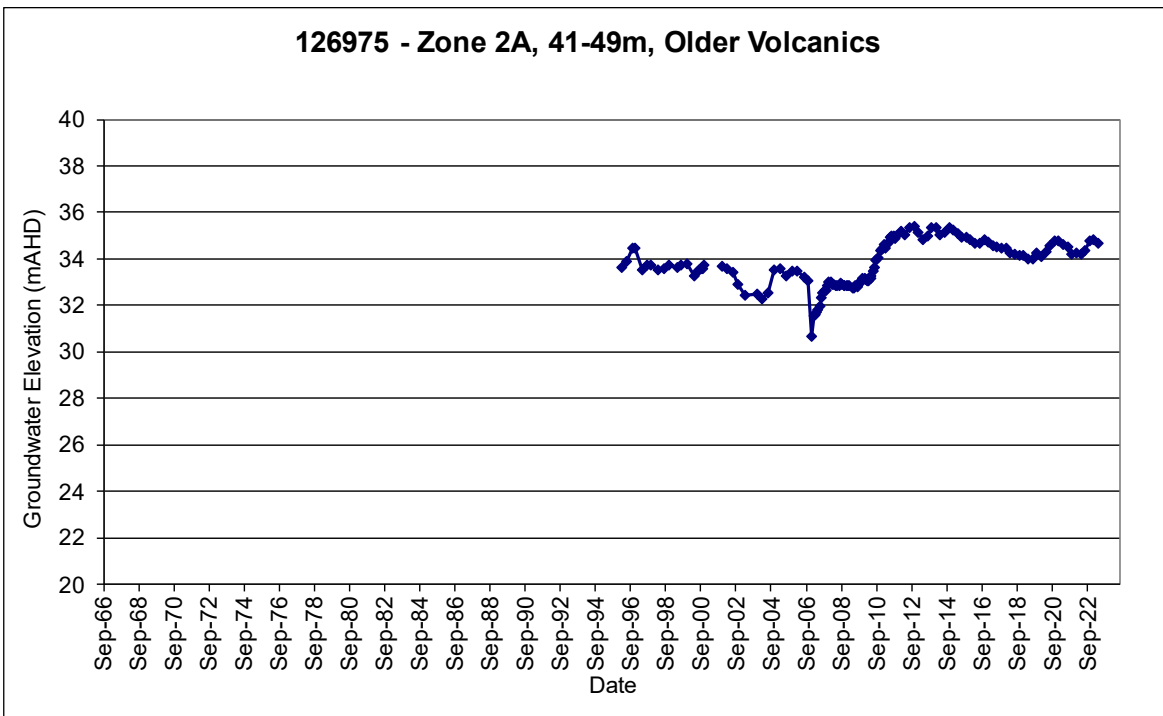
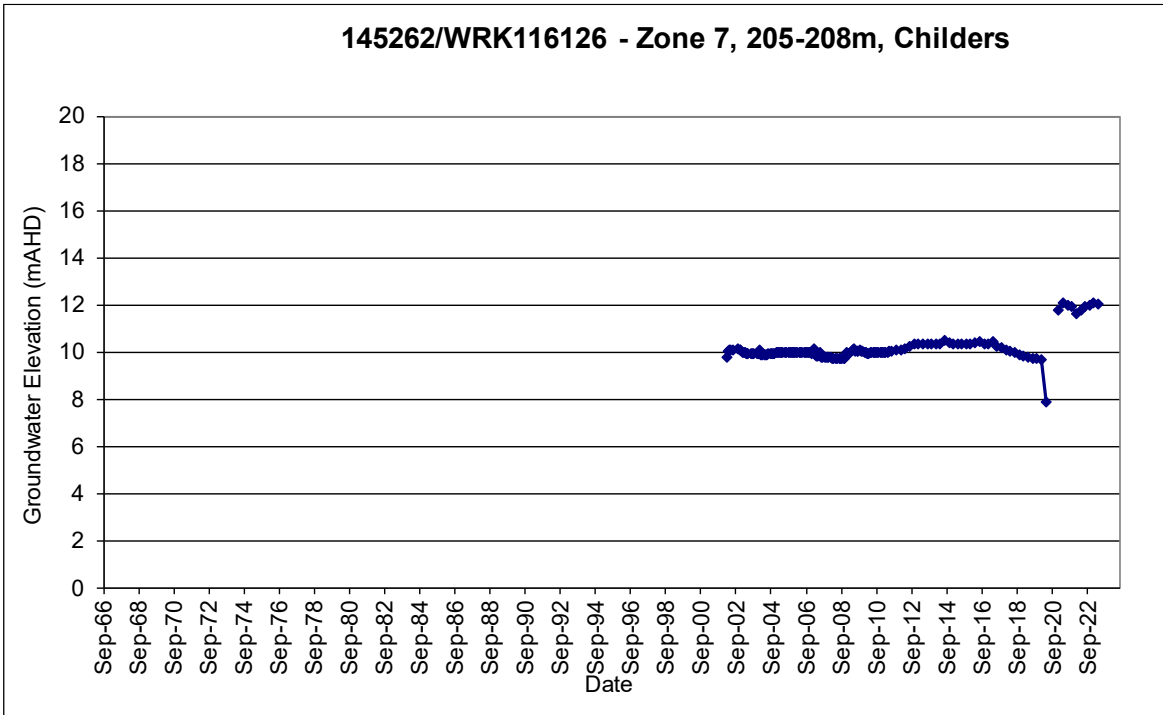


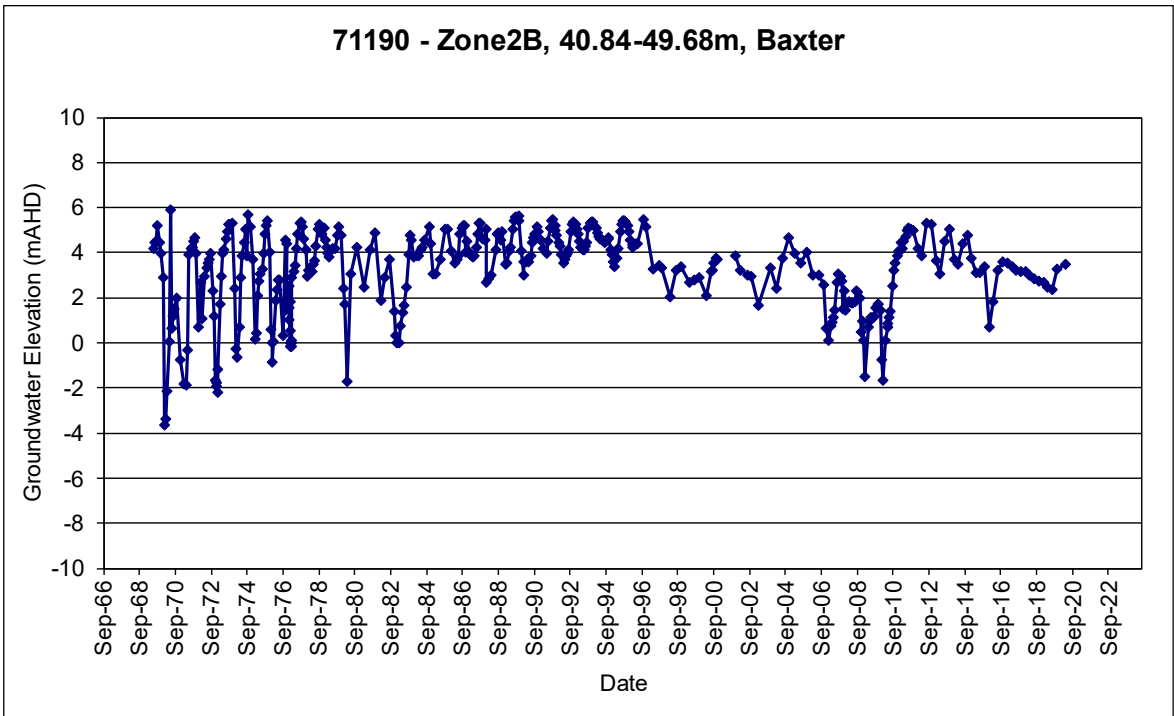
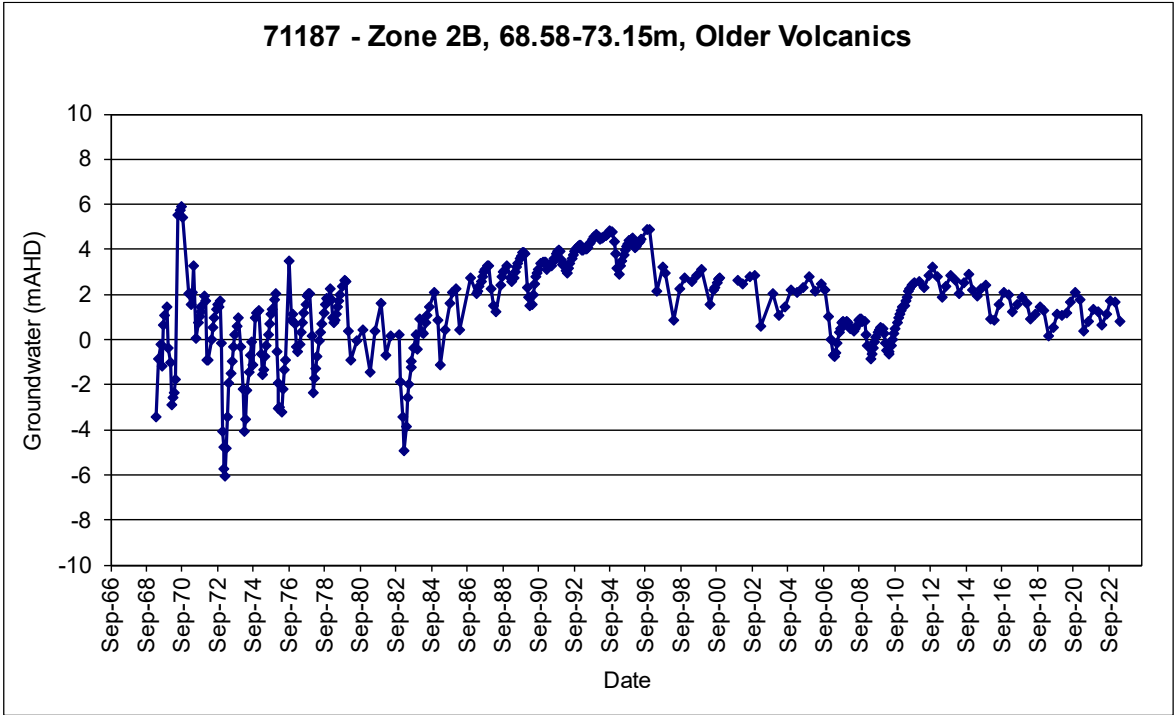
Note: Bore 74311 - the apparent change in the groundwater elevation in early 2018 is attributed to the bore measurement point being resurveyed.

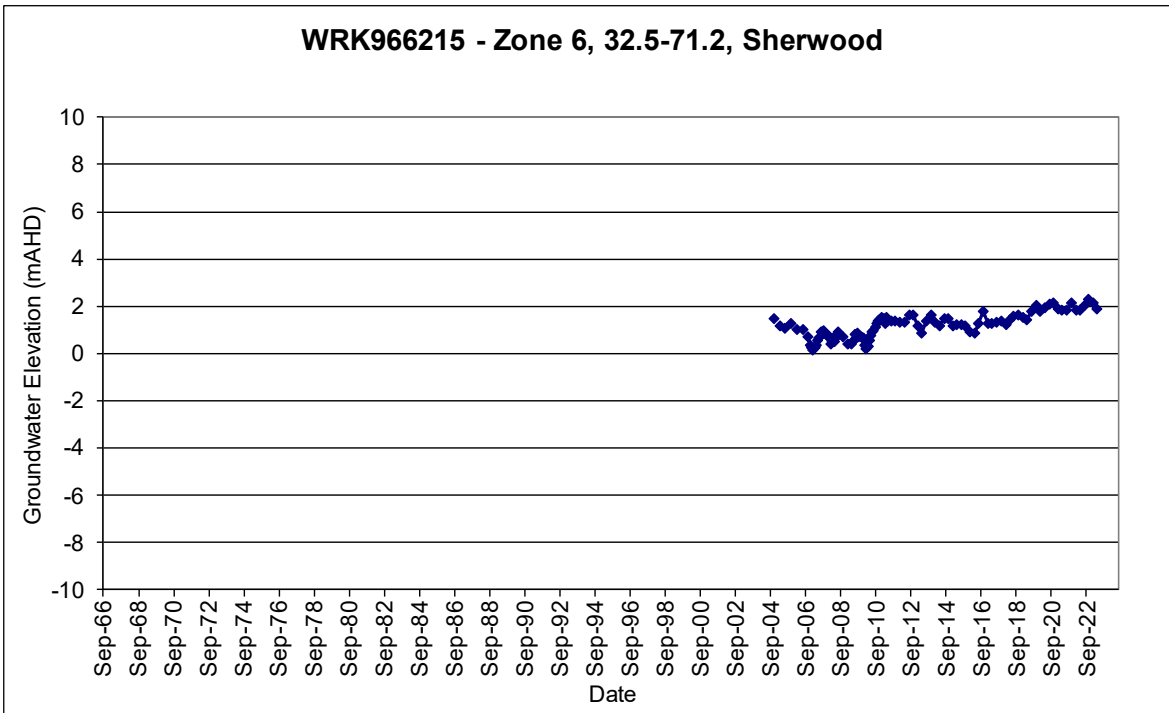
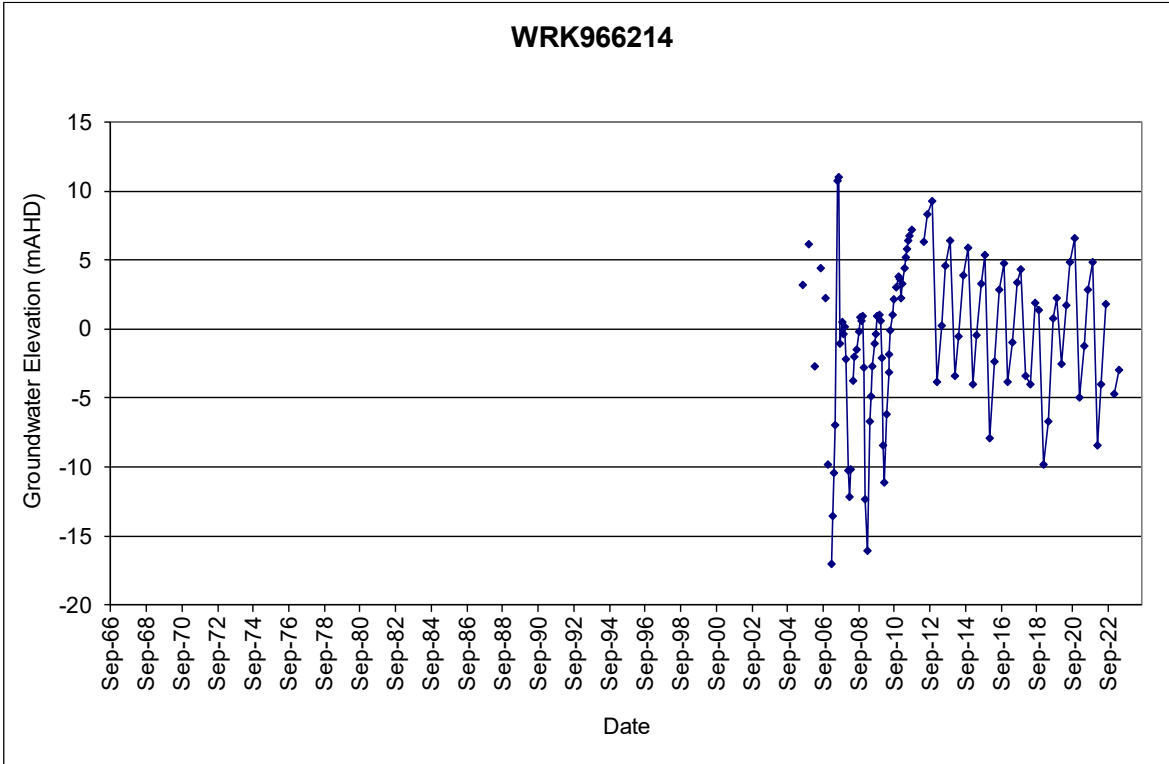


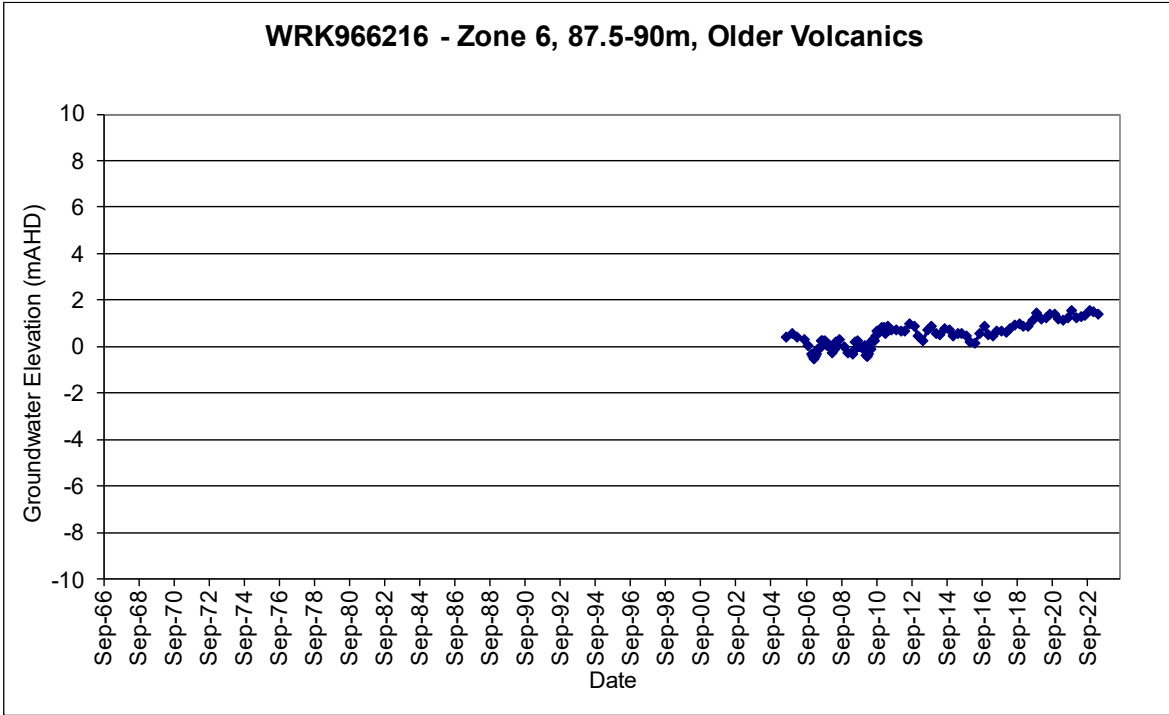
Note: The groundwater elevation reported by monitoring bore 145259 is affected by local groundwater drawdown because of activity at a number of quarries within Zone 7.





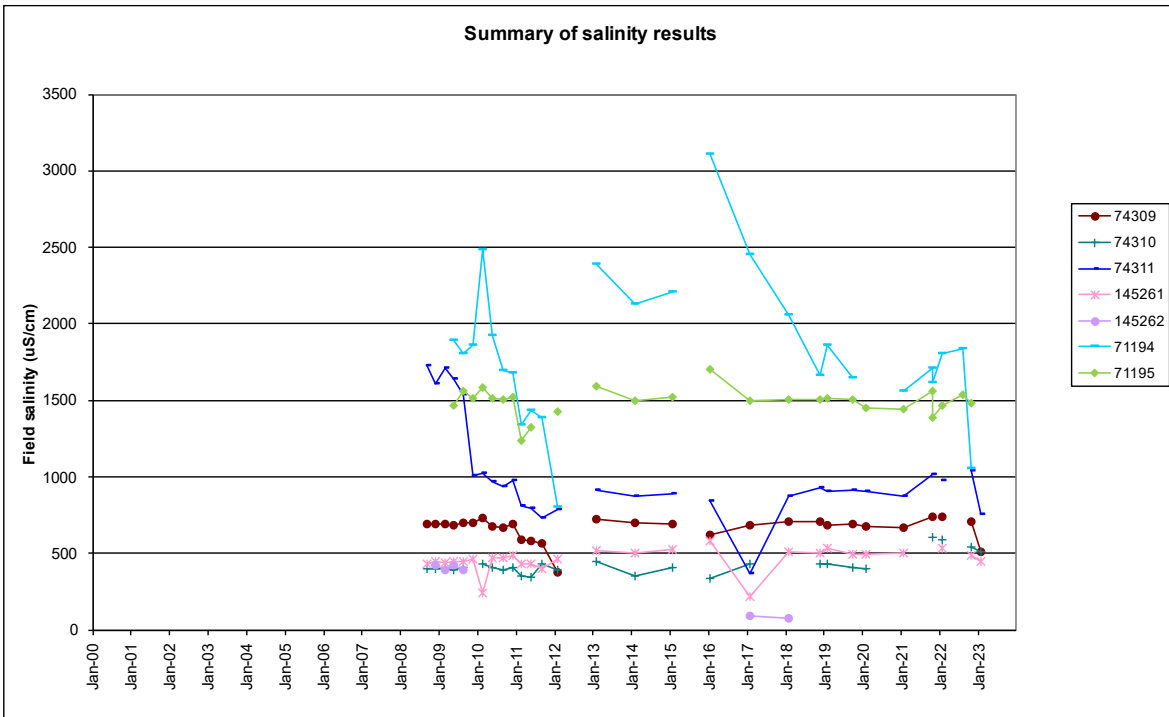


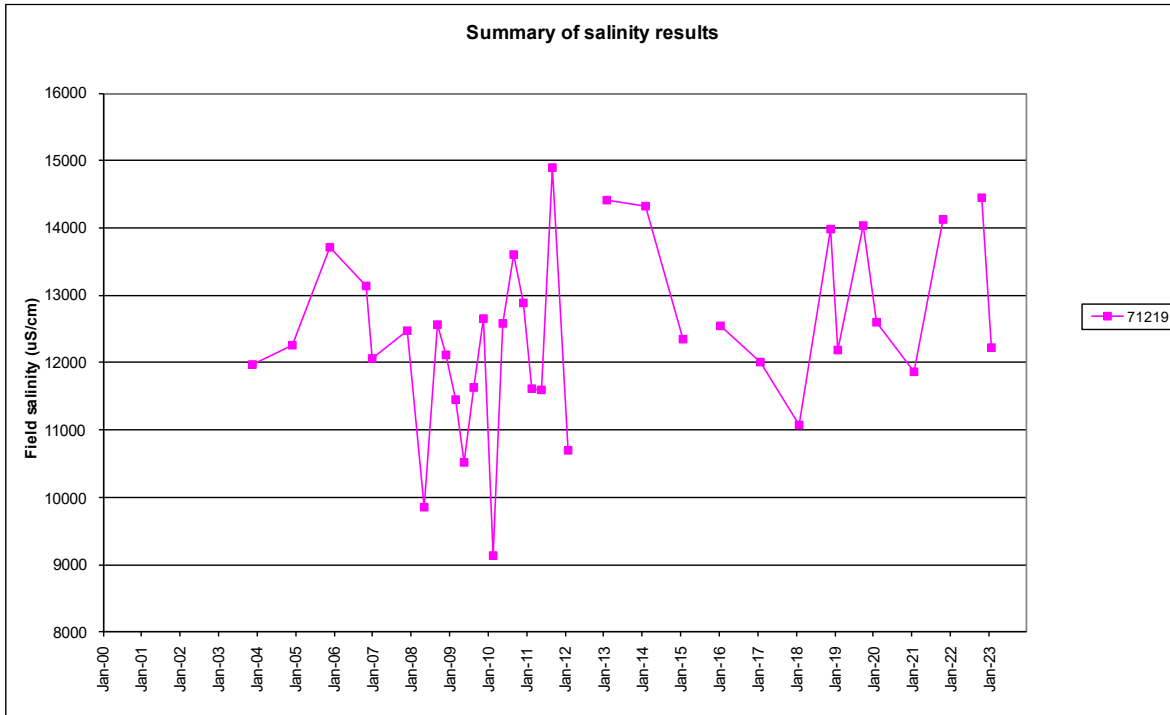




6.3 Salinity

EC (electrical conductivity) units are micro-Siemens per centimetre ($\mu\text{S}/\text{cm}$)





6.4 Links for Compliance

[Zero Tolerance To Water Theft In Victoria | Premier of Victoria](#)

[Compliance | SRW](#)

[Non-urban water compliance and enforcement in Victoria](#)