



Mid-Loddon
Groundwater Management Area
Local Management Rules

Annual Report
2010

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1 Introduction

The Mid-Loddon Groundwater Management Area (GMA) Local Management Rules (the Rules) were implemented from 1 July 2009 to ensure groundwater resources are managed in an equitable and sustainable manner.

This report has been prepared to provide groundwater users with an overview of implementation of the Rules to 30 June 2010. It reports on items specified in Rule 10 including:

- groundwater extractions, including trading and carryover (Chapter 2);
- groundwater level response (Chapter 3);
- groundwater quality description (Chapter 4); and
- the need to amend any of the Rules based on policy developments, improved technical understanding of the aquifer system or validity of the Rules (Chapter 5)

1.1 Local Management Rules

The Rules were developed by a Goulburn-Murray Water appointed Groundwater Reference Committee which comprised groundwater users in the area. The Rules were designed to be transparent, consultative and adaptive. A copy of the rules can be downloaded from the Goulburn-Murray Water website <http://www.gmwater.com.au/>.

The Rules provide groundwater licence holders with greater flexibility to manage their entitlement and scope for future development through provisions for carryover and the permanent transfer of entitlement. The establishment of a cap on licensed volume, trigger levels and restrictions on annual extractions if required offer security of access to existing groundwater users, including domestic and stock users. Further, the Rules consider environmental water requirements, risks to the aquifer and provide land salinity benefits.

The Rules ensure that there is effective reporting and communication of the resource status, determined through appropriate monitoring. Importantly, a methodology for reviewing the Rules is prescribed to ensure that they remain current and appropriate.

1.2 Groundwater management area

The Mid-Loddon GMA lies within the Loddon River Catchment of the Murray Darling Basin. It covers an area of around 3,000 km², extending from Tullaroop Reservoir in the south to Mitiamo in the north, including the towns of Carisbrook, Bridgewater and Serpentine (Figure 1).

The GMA includes all major aquifers in this region, including the Newer Volcanic Basalts, Calivil Formation and Shepparton Formation. No depth limit has been specified for the GMA to ensure that all of these aquifers are included.

Three management zones have been established within the GMA:

1. Moolort Zone 1011
2. Laanecoorie-Serpentine Zone 1012
3. Jarklin Zone 1013

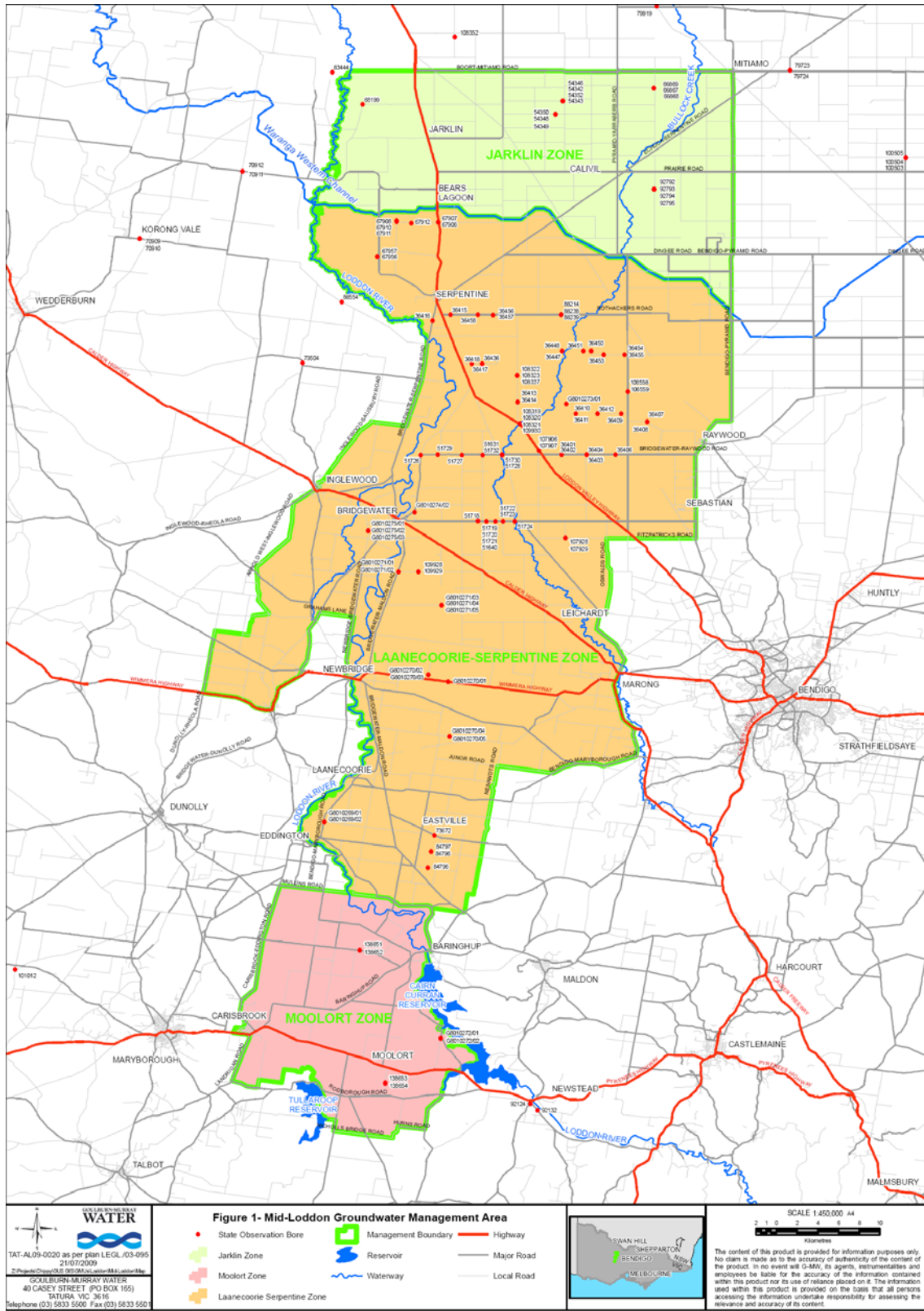


Figure 1 Mid-Loddon GMA boundary and management zones

2 Monitoring groundwater extractions

2.1 Licence volume

Licence volume in the Mid-Loddon Groundwater Management Area is 34,014 ML/year. It has been capped to protect existing groundwater users and the environment. The distribution of entitlement is shown in Table 1.

No additional licence volume is to be issued in the area, however new development may occur through the transfer of existing groundwater licence entitlement.

Table 1 Licensed volume and metered extraction to 30 June 2010

Zone	Licensed volume (ML)	Metered use (ML)	% of licensed volume extracted
Moolort	2,956	615	40%
Laanecoerie-Serpentine	28,118	12,666	44%
Jarklin	2,940	1,223	33%
TOTAL	34,014	14,504	39%

2.2 Allocations

Allocations are a percentage of licensed entitlement volume that may be extracted in a given season.

Allocations in the Mid-Loddon GMA are determined from the average maximum groundwater recovery level three year rolling average compared to the trigger level.

Allocations were 100% in the 2009/10 season as the maximum groundwater recovery level three year rolling average was above the trigger (Figure 2).

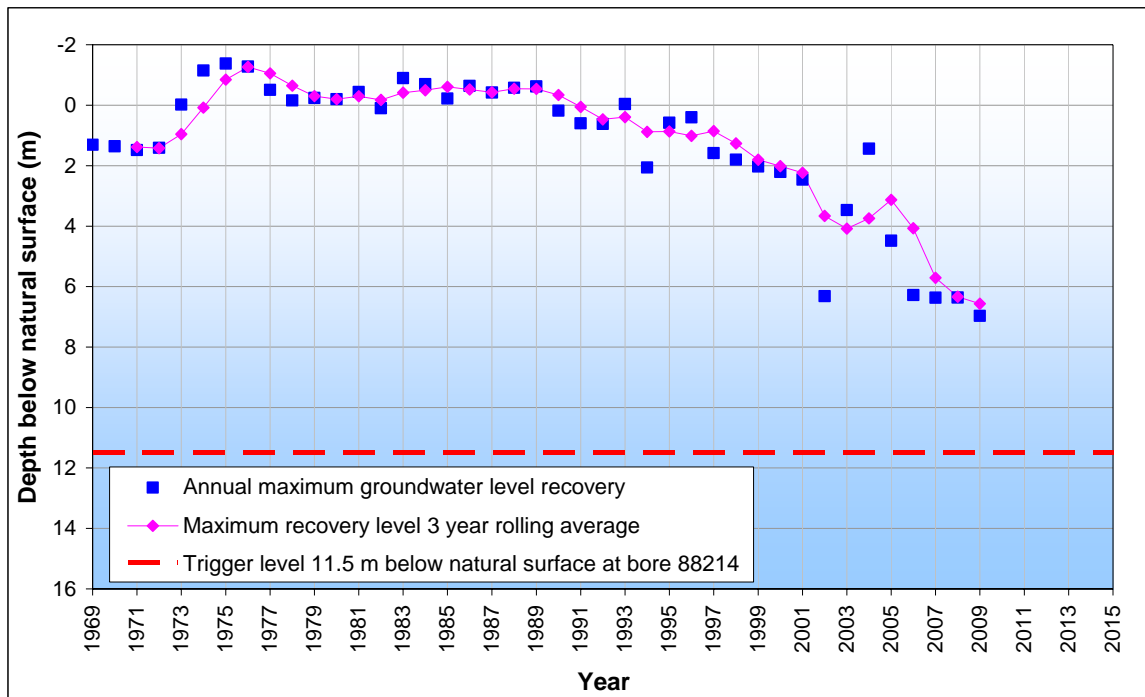


Figure 2 Maximum recovery level three year rolling average

2.3 Groundwater use

Metered groundwater extraction in the Mid-Loddon GMA in 2009/10 was 14,504 ML (Table 1). This is a reduction in licensed extraction compared to recent years, which may be attributed to reduced demand due to timely rainfall events.

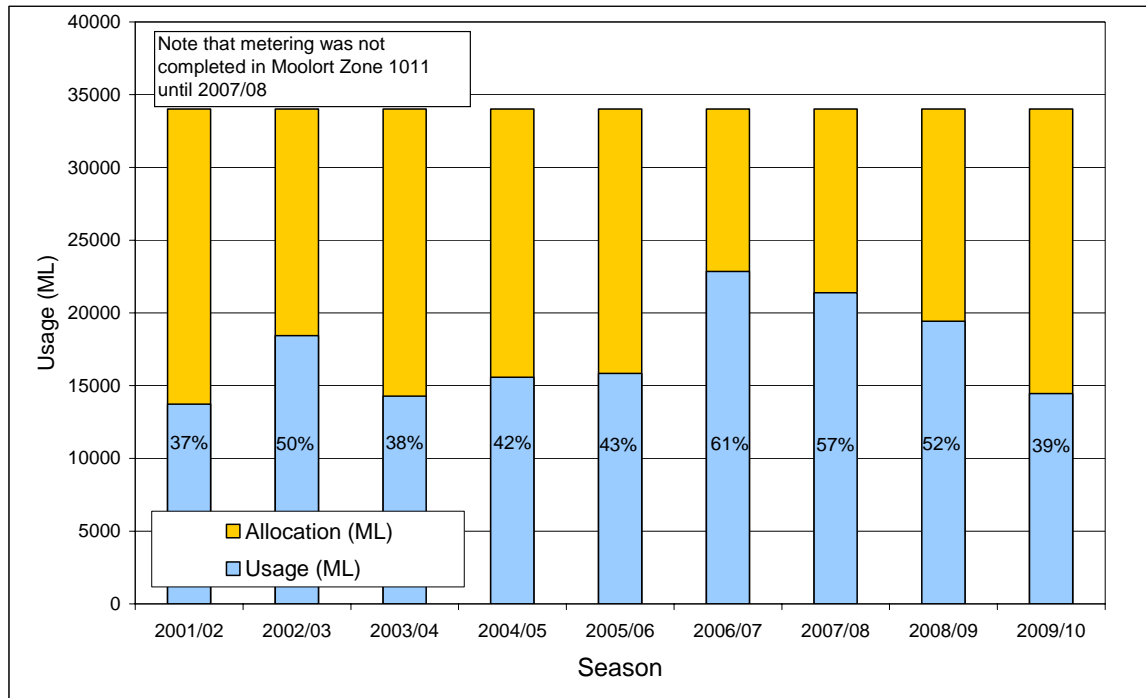


Figure 3 Metered groundwater extraction

The greatest volume was extracted from the Laanecoorie-Serpentine Zone, which has the largest proportion of licensed entitlement. The percentage of licensed volume extracted from each zone was between 33% and 44% (Figure 4).

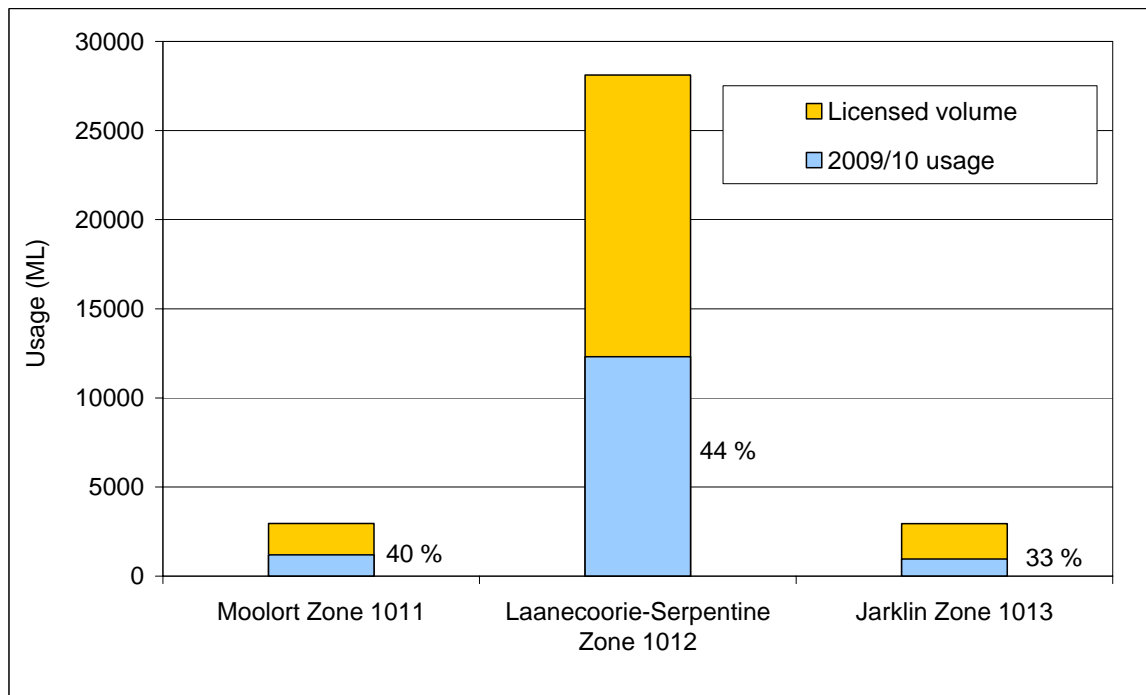


Figure 4 Licence volume and use per zone

All licensed bores are metered. Meters were read by Goulburn-Murray Water in November, January, March and May in the 2009/10 season. Licence holders are required to report any faulty meter issues to Goulburn Murray Water immediately.

Groundwater users are reminded that if groundwater is to be extracted for any other purpose than domestic and stock use the bore must be licensed and metered.

2.4 Transfer of groundwater entitlement

The temporary and permanent transfer of groundwater entitlement is permitted in the Mid-Loddon GMA subject to prescribed conditions set out in the Rules.

There was 911 ML of groundwater licence entitlement temporarily transferred in the 2009/10 season. This is less than in previous seasons, which may be attributed to less demand due to timely rainfall events.

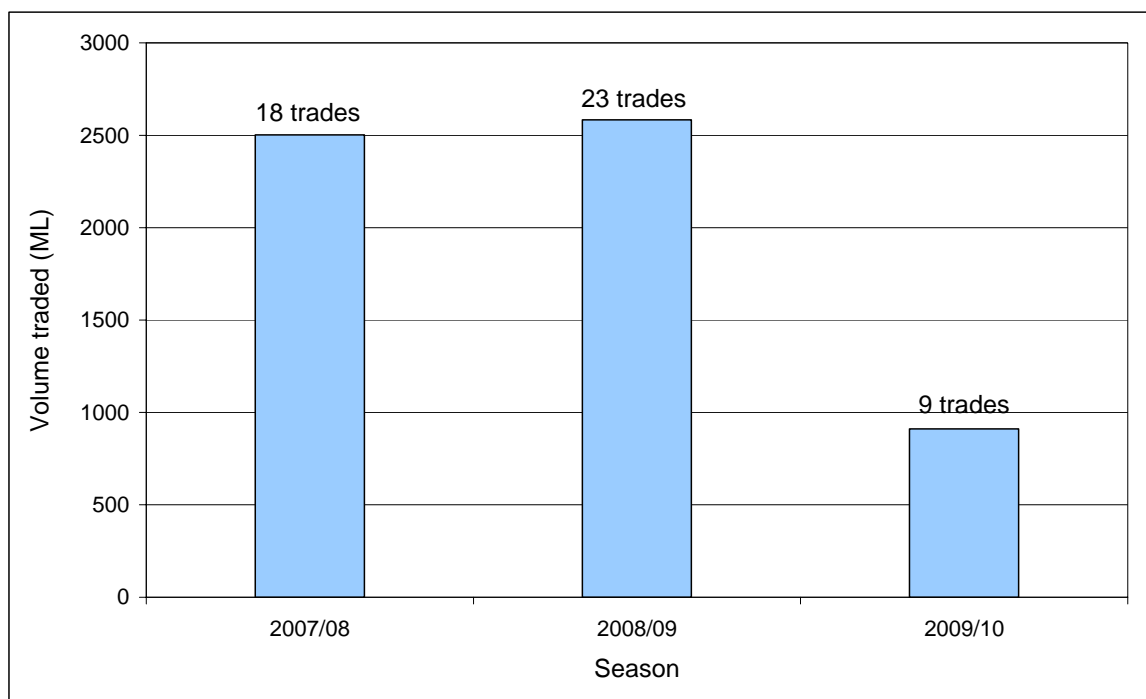


Figure 5 Temporary transfer of entitlement

The temporary and permanent transfer of entitlement is permitted between zones provided that the entitlement in the Laanecoorie-Serpentine zone does not exceed 28,000 ML and the entitlement in the Jarklin Zone is not less than 3,000 ML.

There was no temporary transfer of groundwater entitlement between zones (Figure 6).

There was no permanent transfer of groundwater entitlement in 2009/10. This does not include any change of land ownership as this would not impact on current licensed pumping conditions.

Licence holders are reminded to ensure that they have written approval from Goulburn-Murray Water before extracting any groundwater in excess of their licence entitlement.

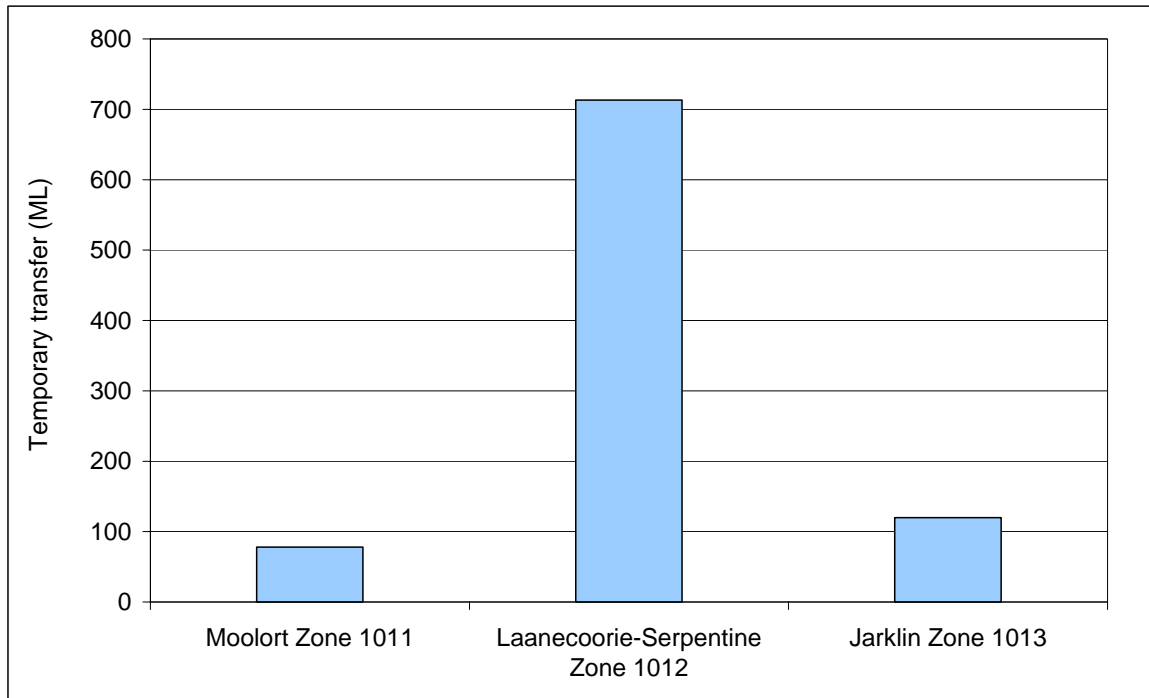


Figure 6 Temporary transfer of entitlement for zones

2.5 Carryover

Carryover has been introduced for groundwater for the first time in Victoria under the Rules. Carryover provides licence holders with greater flexibility to manage their licence entitlement.

Licence holders that do not use all their allocation may carryover up to a maximum of 30% of their licence volume for use in the next season.

In 2009/10 there was 14,776 ML of groundwater extracted from a licence volume of 33,604 ML. Therefore there was 19,128 ML of unused allocation.

The sum of individual licence holder carryover volumes for 2009/10 was 8834 ML, which is 26% of the total licence volume Figure 7.

Licence holders must obtain approval from Goulburn-Murray Water before using any carryover volume that will result in usage exceeding licensed volume prior to extraction of the water. This can be done by applying to amend a groundwater licence to include the carryover condition.

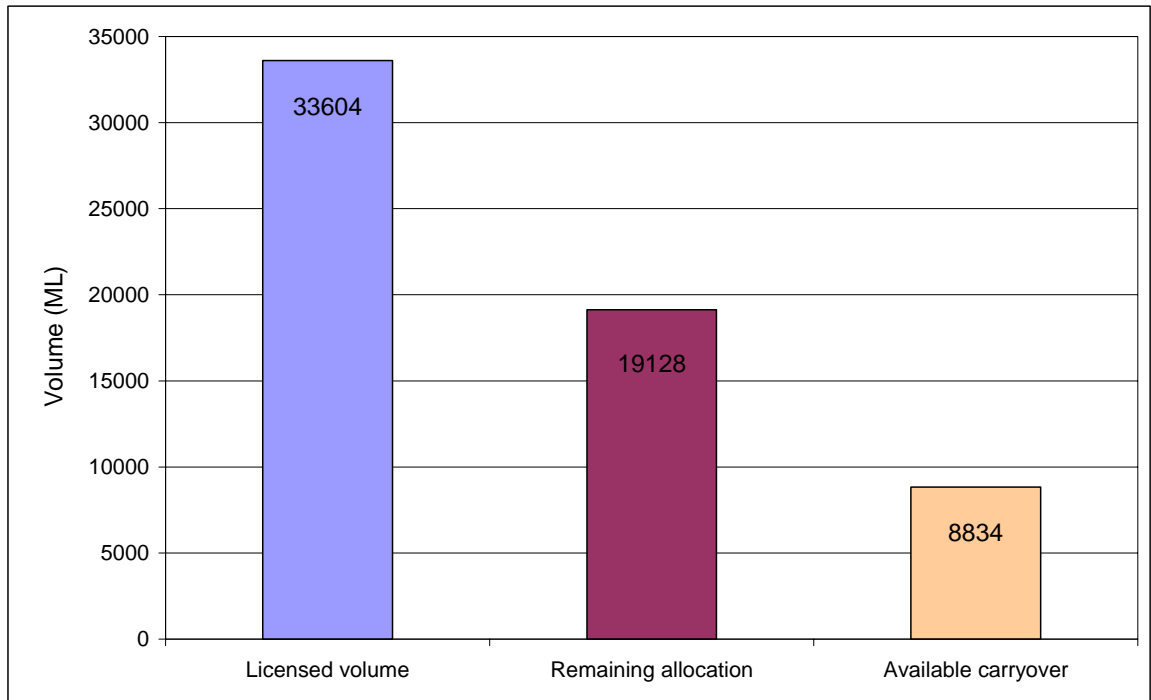


Figure 7 Available carryover to 2010/11

3 Monitoring groundwater levels

The Mid-Loddon GMA has an extensive network of groundwater monitoring bores that are monitored and maintained by the Department of Sustainability and Environment.

Groundwater levels are measured quarterly in February, May, August and November in over 100 State observation bores by the Department of Sustainability and Environment. Goulburn-Murray Water undertakes additional monitoring in key State observation bores identified in the local management rules to capture monthly measurements.

Plots of the change in groundwater levels over time from these key bores are presented in Appendix A. Goulburn-Murray Water also plots the change in groundwater level over time and posts it on its website <http://www.g-mwater.com.au/> for the benefit of customers.

The plots indicated that in the Moolort Zone 1011 groundwater recovery levels have fallen by around 5 m around Locks Lane, but remain relatively steady around the Baringhup-Havelock Road. The fall in groundwater levels around Locks Lane may be partly attributed to increased groundwater pumping in the region.

In the Laanecoorie-Serpentine Zone 1012 groundwater recovery levels were slightly lower compared to 2008/09; however drawdown levels did not fall as low as previous dry years during the irrigation season. This suggests that there was less demand, which may be attributed to timely rainfall events.

In the Jarklin Zone 1013 groundwater levels remain steady, although there is increased seasonal fluctuation in the deep lead that may be attributed to increased groundwater pumping in the region.

Changes in the annual groundwater recovery levels represent a change in groundwater storage in the aquifer. Declining groundwater levels over the last 15 years may be largely attributed to reduced rainfall recharge (Figure 8).

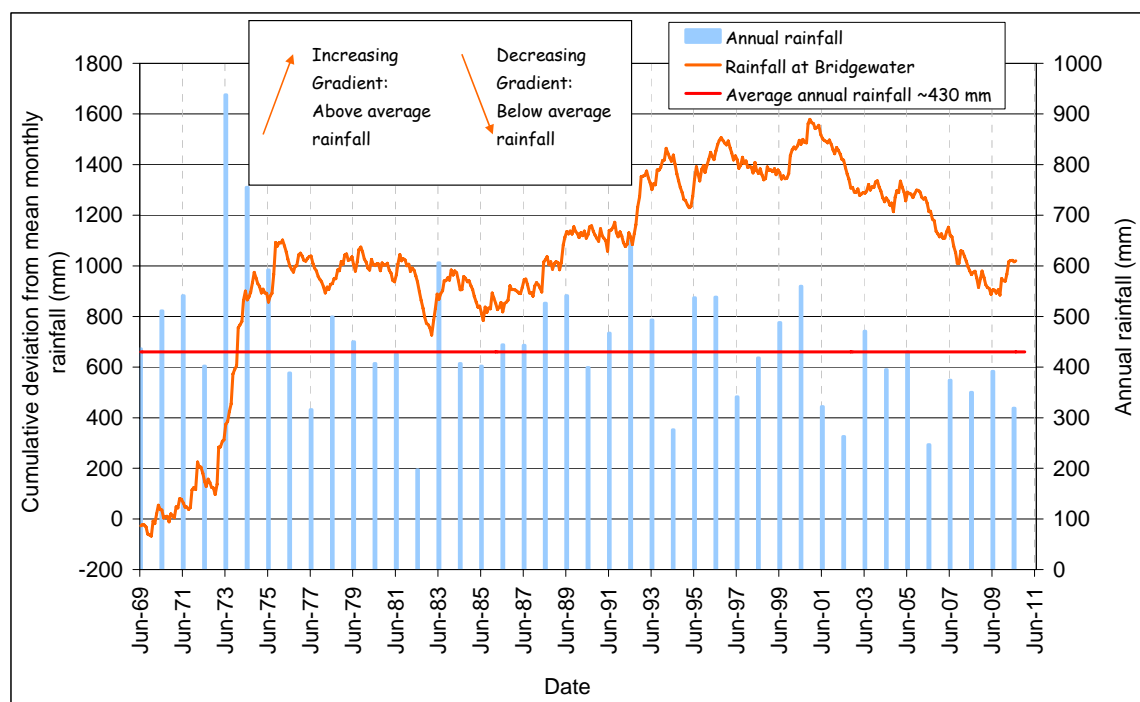


Figure 8 Rainfall at Bridgewater

3.1 North-south section

Groundwater levels from key bores along a north-south section are monitored monthly to assess aquifer response against historical observations. Figure 9 illustrates that the system response is consistent over time, noting greater drawdown levels in the Jarklin Zone during the irrigation season.

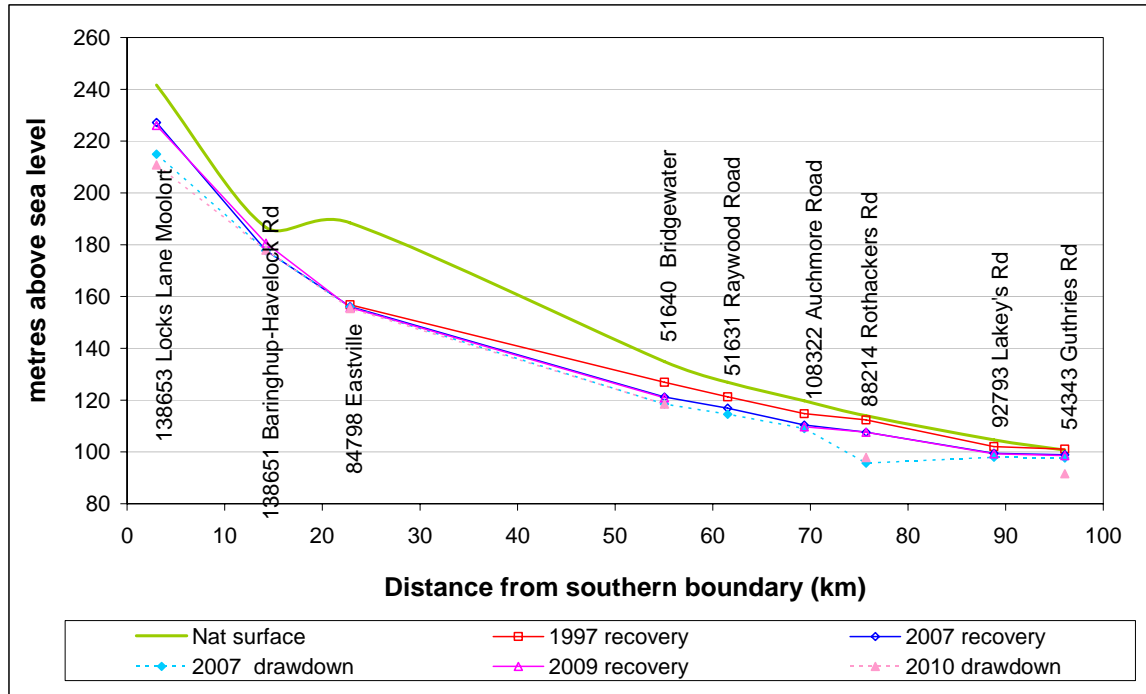


Figure 9 Groundwater level down valley from Moolort

3.2 Aquifer margin

Additional monitoring has been undertaken along an east-west section of Rothackers Road to assess groundwater level response at the margins of the Mid-Loddon GMA. Groundwater levels from bores 36415, 36416 and 36458 show little seasonal variation suggesting that they are not well connected to the deep lead (Appendix A).

G-MW has also undertaken a survey of domestic and stock bores west of Rothackers Road to assess potential impacts. These bores are shallow (ranging from 12 to 40 m depth) and are interpreted to be poorly connected to the deep lead. It is also noted that a domestic and stock pipeline is proposed to be installed which will service landholders on the margin of the GMA.

3.3 Installation of new bores

While there is an extensive network of monitoring bores in the Mid-Loddon GMA, it has been identified that there are some places where more information is required.

Two nested groundwater monitoring bores have been installed on Donovans Road near Cairsbrook to better understand the relationship between groundwater in the basalt and the deep lead.

This work has been undertaken as part of the Department of Sustainability and Environment's State Observation Bore Network Refurbishment Project.

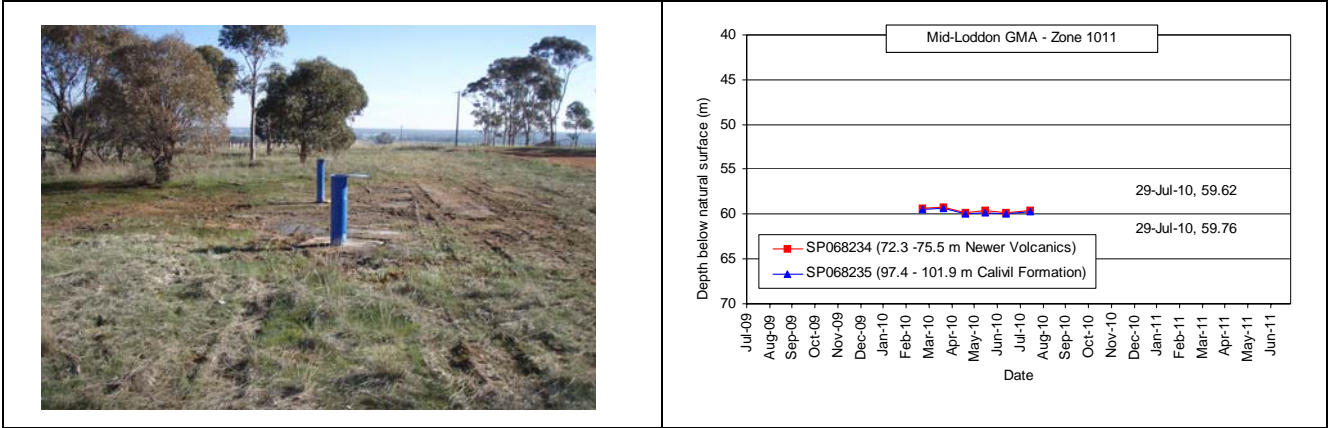


Figure 10 Nested bores SP068234 and SP068235 installed near Carisbrook

4 Monitoring groundwater quality

4.1 State observation bores

The Department of Sustainability and Environment undertook a major groundwater sampling program across Victoria during 2009/10. The program included sampling of six bores in the Mid-Loddon GMA. Groundwater salinity (EC) ranged between 1760 and 4840 EC (Table 2).

Table 2 Groundwater quality in Mid-Loddon GMA

Bore	Zone	Formation	Groundwater EC
67908	Jarklin	Calivil	4840
67911	Jarklin	Shepparton	2610
88214	Laanecoorie –Sepentine	Calivil	2590
G8010269-01	Laanecoorie –Sepentine	Calivil	4460
138653	Moolort	Calivil	1760
138654	Moolort	Newer Volcanics	2720

Source: Department of Sustainability and Environment, 2010. Central sustainable water strategy region.

The full suite of chemical parameters analysed for are provided in Appendix B. It should be noted that groundwater sampled from bore 67911 is considered a replacement for bore 53434 as specified in the Rules.

Continued monitoring of groundwater chemistry over time will enable trends to be identified.

4.2 Private bores

Goulburn-Murray Water provided sample bottles to all groundwater licence holders, and any stock and domestic users upon request, and measured groundwater salinity of returned samples. Only twenty-six groundwater samples were returned for analysis.

Groundwater salinity was found to range between around 1,200 and 8,400 EC with a median of around 2,700 EC (Figure 11). This is within expected ranges. The results suggest that groundwater is more saline in the north

There is insufficient information to assess groundwater salinity trends.

A greater return rate would further improve the spatial understanding of groundwater salinity. Continued return of samples will enable trends in groundwater quality to be observed.

Groundwater users are strongly encouraged to return samples so that they can monitor any change in groundwater salinity from their bore.

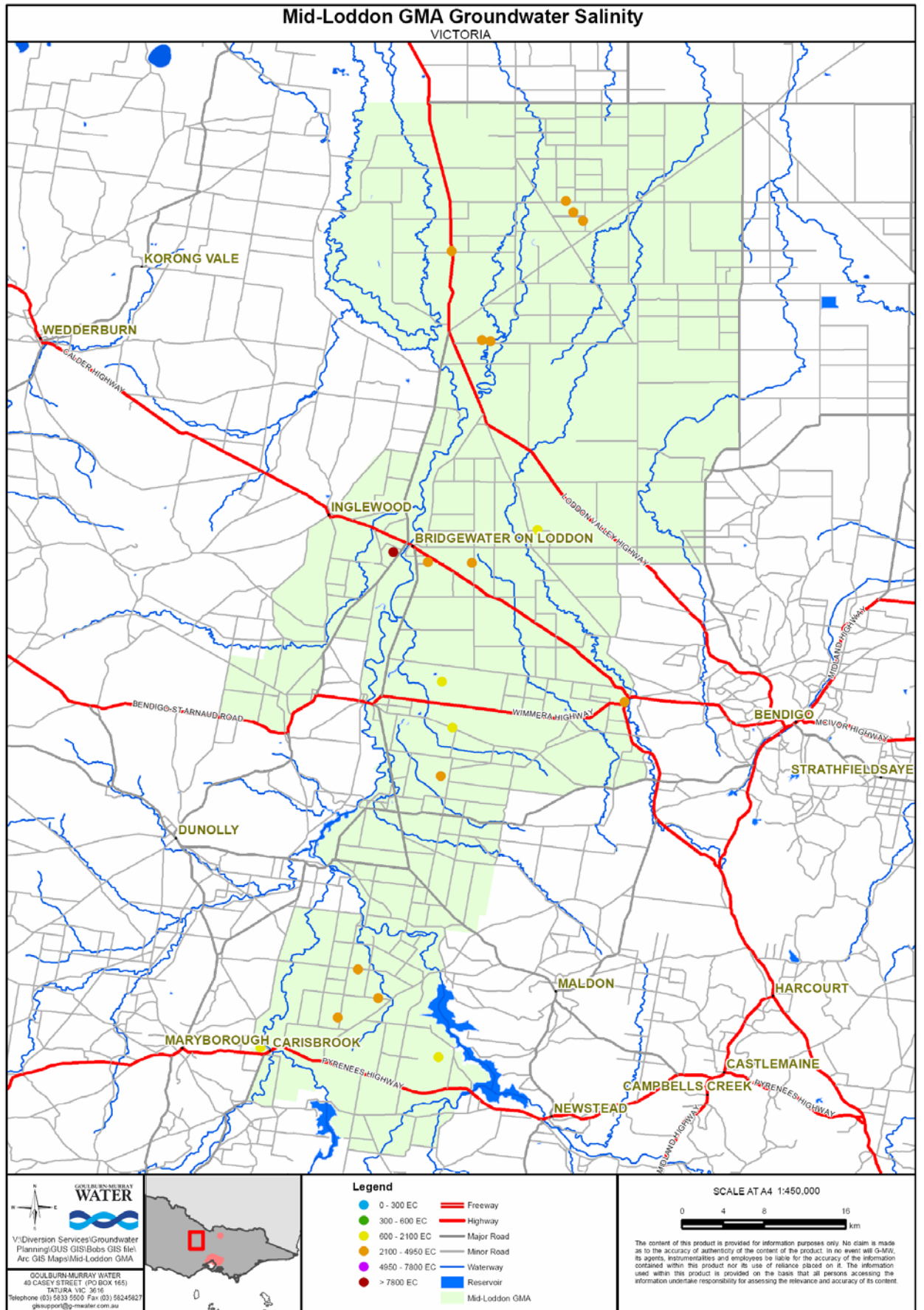


Figure 11 Groundwater salinity

5 Review of local management rules

Goulburn-Murray Water met with the Mid-Loddon GMA Groundwater Reference Committee on 18 August 2010 to review the Rules and consider the need for any amendments.

The ability to amend the Rules to reflect changes in policy or an increased technical understanding of the groundwater systems is one of the key strengths of the Rules. At the Groundwater Reference Committee meeting the following items were discussed.

5.1 New technical information

Goulburn-Murray Water has commissioned a project to map the aquifer systems in the Loddon and Campaspe catchments as part of a resource appraisal in the upper Campaspe catchment. The project, which builds on works completed in the Mid-Loddon GMA, will better define the extent of the aquifer systems and will be complete by July 2011.

Goulburn-Murray Water continues to develop its relationship with the University of Melbourne through projects undertaken by students that seek to better describe the interaction between groundwater and surface water. Tim Plain, an honours student, has been undertaking measurements of seepage rates in the Loddon River to determine the conductance of river bed sediments.

Goulburn-Murray Water has also developed a proposal to undertake investigations on groundwater dependant ecosystems in the Loddon and Campaspe catchments. Goulburn-Murray Water is working with the North Central Catchment Management Authority and the Department of Sustainability and Environment to secure funding for the project.

There are no outcomes from any technical work undertaken that suggests there is any need to amend the Rules.

5.2 Policy change

5.2.1 Carryover

The Victorian Government Northern Region Sustainable Water Strategy (NRSWS) was released in November 2009. Generally, the Rules are in agreement with the NRSWS. However with respect to carryover, Action 5.5 (b) of the NRSWS states:

'Five per cent will be deducted to recognise that through-flow into deeper aquifers or groundwater dependent ecosystems will reduce the volume of carryover water physically retained in the system in the following year.'

A key objective of the Rules is to minimise through-flow by encouraging the use of groundwater before it moves northward from the region, where groundwater quality deteriorates, and provide increased drainage benefits for land salinity management in the northern parts of the GMA.

Goulburn-Murray Water sought clarification on the NRSWS and has been advised by the Department of Sustainability and Environment that there is no need to amend the Rules to consider through-flow.

5.2.2 Dairy wash licensing

The Department of Sustainability and Environment is running the Dairy Shed Water Licence Transition Program to ensure water used in the dairy shed, such as water for

washing yards, milking equipment, platforms and other plant is fully licensed. This includes water from streams, catchment run-off, groundwater and other sources.

There was an amnesty period to licence the water used in the dairy shed. These applications are now being assessed and may impact on the revision of the permissible consumptive volume in the Mid-Loddon GMA as described in the Rules. Once these dairy shed water licence applications have been finalised, the permissible consumptive volume will be amended.

5.3 Boundary

The Loddon Highlands Water Supply Protection Area has been declared effective from 1 August 2010 immediately to the south of the Mid-Loddon GMA. The boundary follows easy identifiable features at the surface; however it does not align with the Mid-Loddon GMA boundary.

The boundaries of the Mid-Loddon GMA are not as easy to communicate as they are aligned with cadastral boundaries in some places. A motion was passed by the Groundwater Reference Committee to revise the boundary.

Goulburn-Murray Water will advertise its intention to make minor amendment to the Mid-Loddon GMA boundary in 2010/11 so that it aligns with the Loddon Highlands WSPA boundary and follows surface features that are easy to identify and communicate in 2010/11. If there are no objections then Goulburn-Murray Water will amend the GMA boundary.

5.4 Trading in intensive management areas

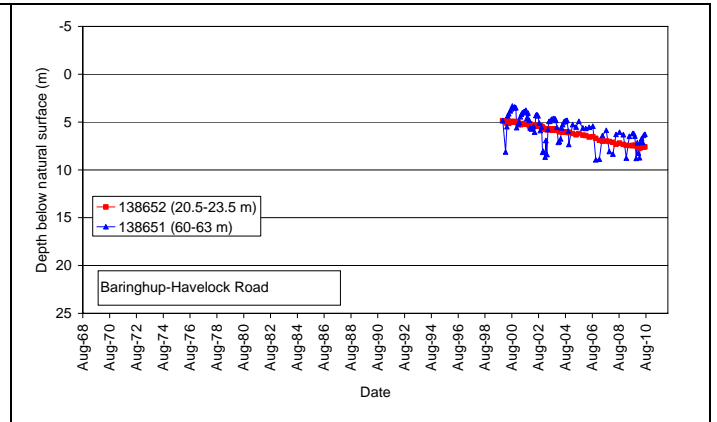
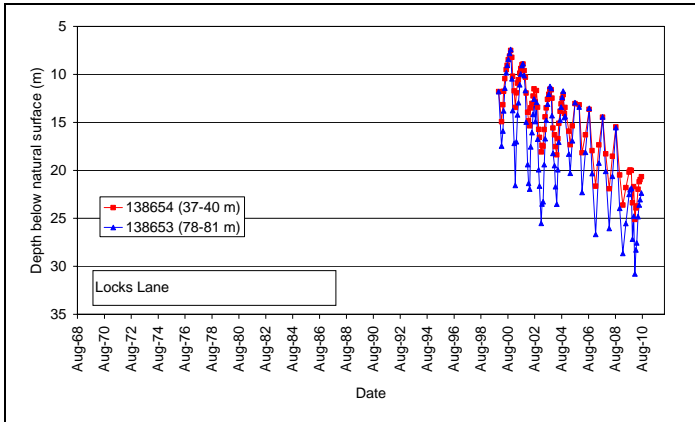
Goulburn-Murray Water received an application for a temporary transfer of groundwater in an area of intensive groundwater use. The temporary transfer of groundwater in areas of intensive groundwater use is limited to 10% under the Rules. On this occasion the application exceeded 10%. Goulburn-Murray Water contacted the applicant and approved the application for 10% only. However, it was noted that the water was to be transferred from the applicant's neighbour. While the intensity for the applicant and his neighbour may not have changed, there was potential for impacts to other neighbours and the Groundwater Reference Committee was reluctant to consider a change to the Rules in the first year for what might be an isolated occurrence.

5.5 Groundwater monitoring

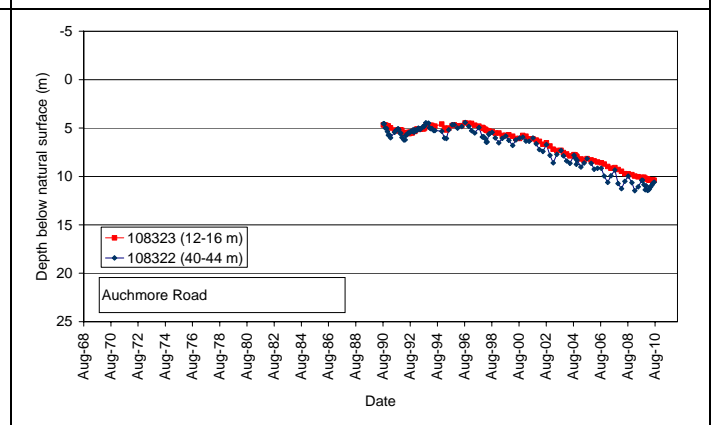
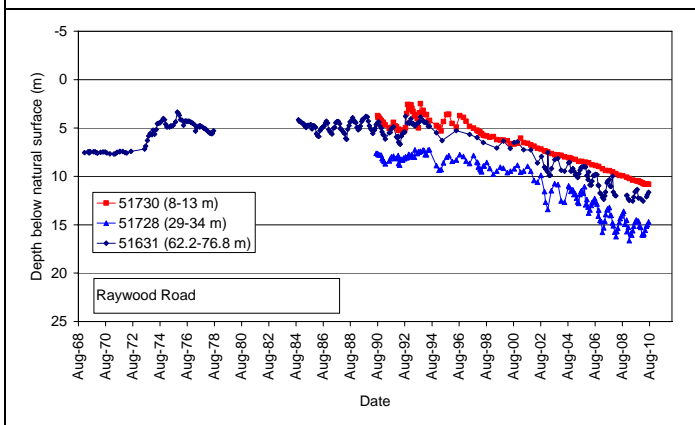
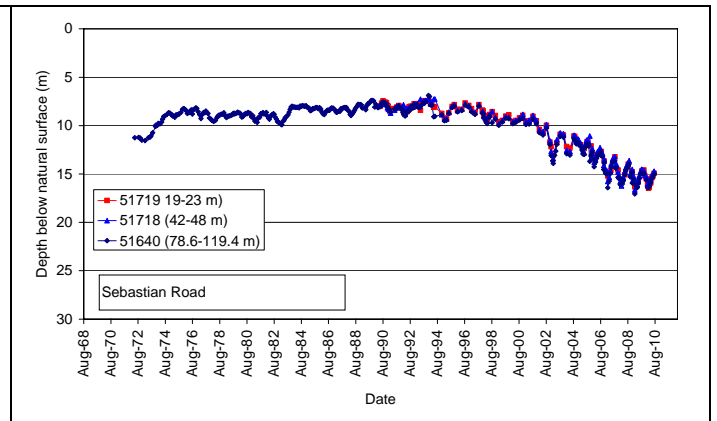
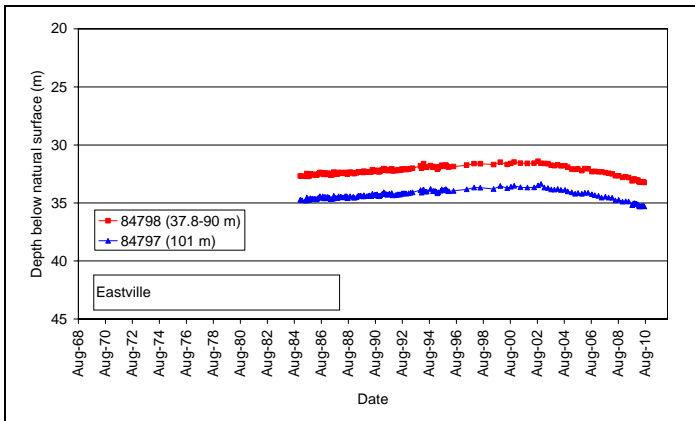
Goulburn-Murray Water noted the difficulty with updating groundwater hydrographs on their website monthly due to delays in obtaining the data. The groundwater levels are captured monthly, however Goulburn-Murray Water will only update hydrographs quarterly in the future.

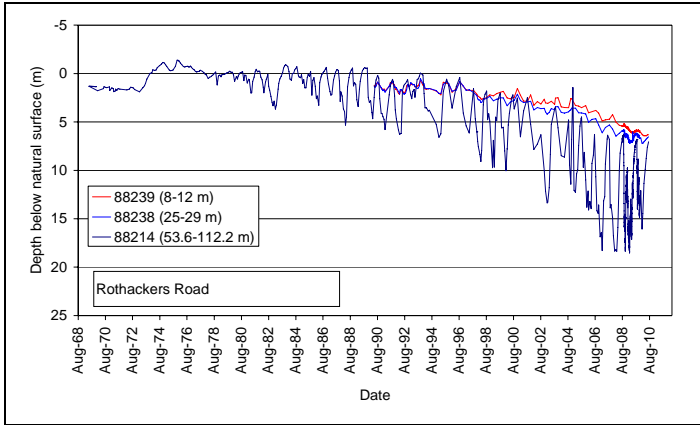
Appendix A

Moolort Zone 1011

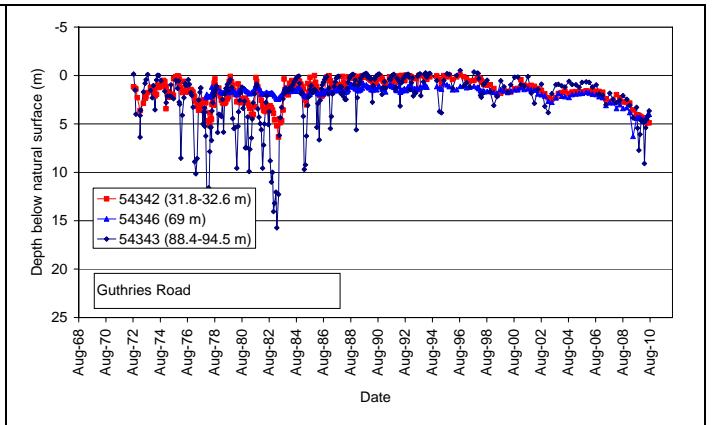
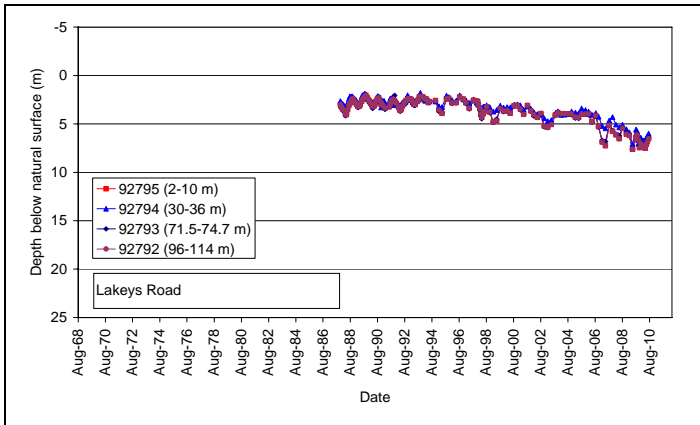


Laanecoorie-Serpentine Zone 1012

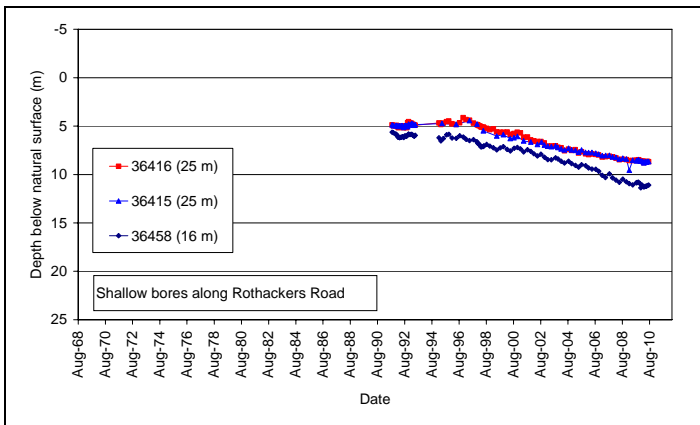




Moolort Zone 1011



Shallow monitoring bores along Rothackers Road



Appendix B

Source: Department of Sustainability and Environment, 2010. Central sustainable water strategy region.

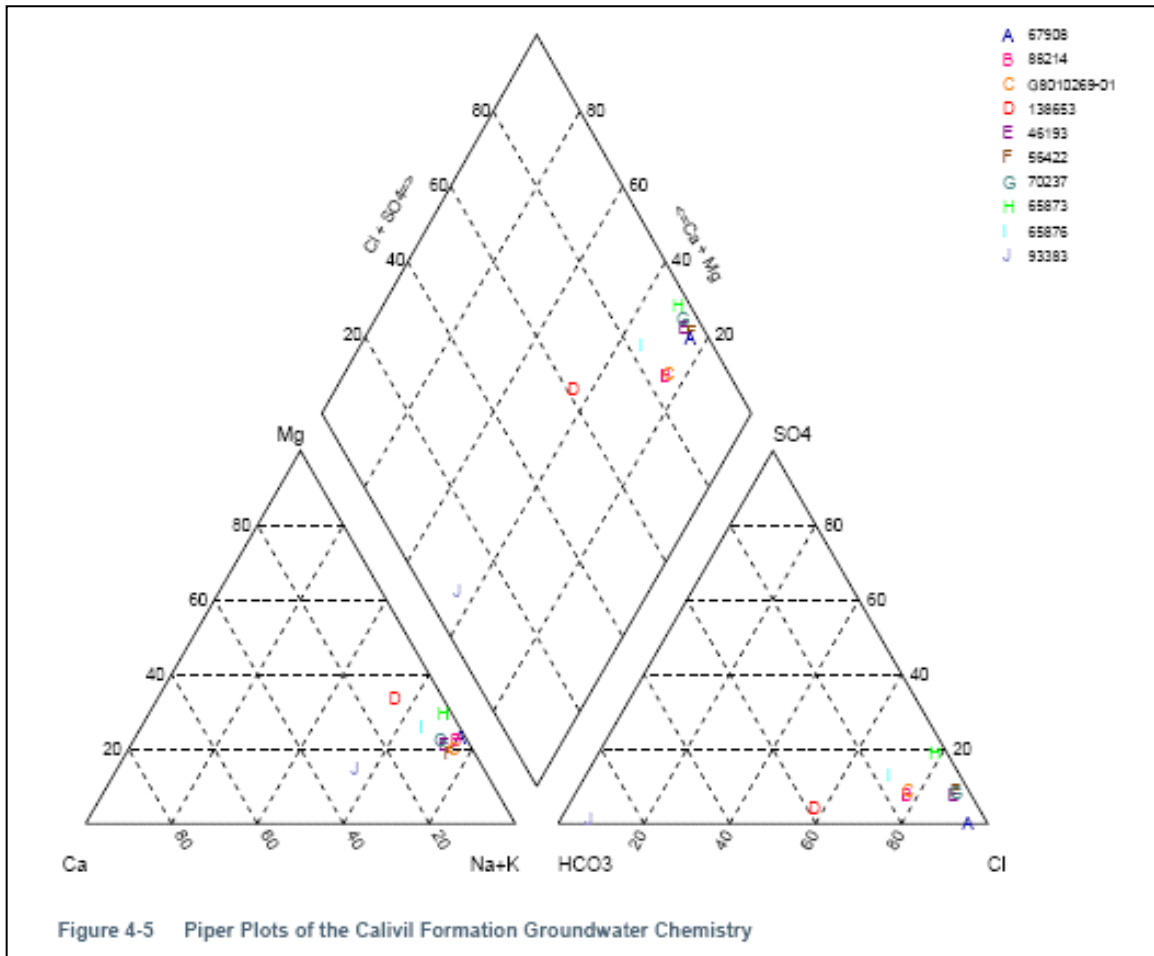


Figure 4-5 Piper Plots of the Calivil Formation Groundwater Chemistry

