GOULBURN-MURRAY WATER

Mid-Loddon Groundwater Management Area Local Management Rules

Annual Report

July 2013

Document History and Distribution

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Foreword

Goulburn–Murray Water (GMW) is pleased to present the annual report for the Mid-Loddon Groundwater Management Area Local Management Rules (the Rules) for the 2012/13 season.

GMW is responsible for implementing and administering the Rules, which were approved in 2009.

This report provides an overview of groundwater use and management activities in the Mid-Loddon Groundwater Management Area during 2012/13.

A copy of this report is available for inspection at GMW's Tatura office, or for download from the GMW website at http://www.g-mwater.com.au.

Simon Cowan
MANAGER GROUNDWATER AND STREAMS

Executive summary

The 2012/13 irrigation season saw the fourth successful year of management under the Mid-Loddon Groundwater Management Area (GMA) Local Management Rules (the Rules) approved by Goulburn-Murray Water in July 2009.

The Minister for Water declared the Permissible Consumptive Volume in the Mid-Loddon GMA to be 34,037 ML/year in March 2013 which caps licence entitlement volume in the GMA.

Groundwater recovery levels have been steady since the 2010/11 season when significant recharge was recorded following two wetter than average seasons.

Allocations were announced at 100% in all zones of the Mid-Loddon GMA in 2012/13.

Metered use in the Mid-Loddon GMA was 51 % (17,206.9 ML) of licence entitlement in 2012/13. This is an increase from recent seasons, which is likely to be due to the drier conditions and timing of rainfall events.

There was only a modest amount of temporary licence transfers in the GMA, but there were three permanent transfers.

Licensed groundwater users have carried over 9,720.6 ML to 2013/14.

Groundwater monitoring and metering programmes continue to be support the Rules.

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1 Introduction

1.1 Purpose

This report has been prepared to meet requirements of the Mid-Loddon Groundwater Management Area (GMA) Local Management Rules (the Rules) (GMW, 2009).

It provides an overview of groundwater management activities undertaken in accordance with the Rules for the 2012/13 season.

1.2 Groundwater Management Area

The Mid-Loddon GMA is extends from Tullaroop Reservoir in the south to Mitiamo in the north, incorporating the townships of Carisbrook, Bridgewater and Serpentine.

The Mid-Loddon GMA incorporates groundwater resources to all depths.

There are three management zones in the Mid-Loddon GMA: the Moolort, Laanecoorie-Serpentine and Jarklin zones (Figure 1).

1.3 Local Management Rules

The Local Management Rules were approved for implementation on 1 July 2009.

The Rules aim to ensure groundwater resources in the Mid-Loddon GMA are managed in an equitable and sustainable manner.

The rules can be downloaded from the GMW website http://www.g-mwater.com.au/.

Goulburn-Murray Water (GMW) is responsible for the implementation of the rules. An assessment of GMW's activities against the Plan prescriptions is presented in Appendix A.

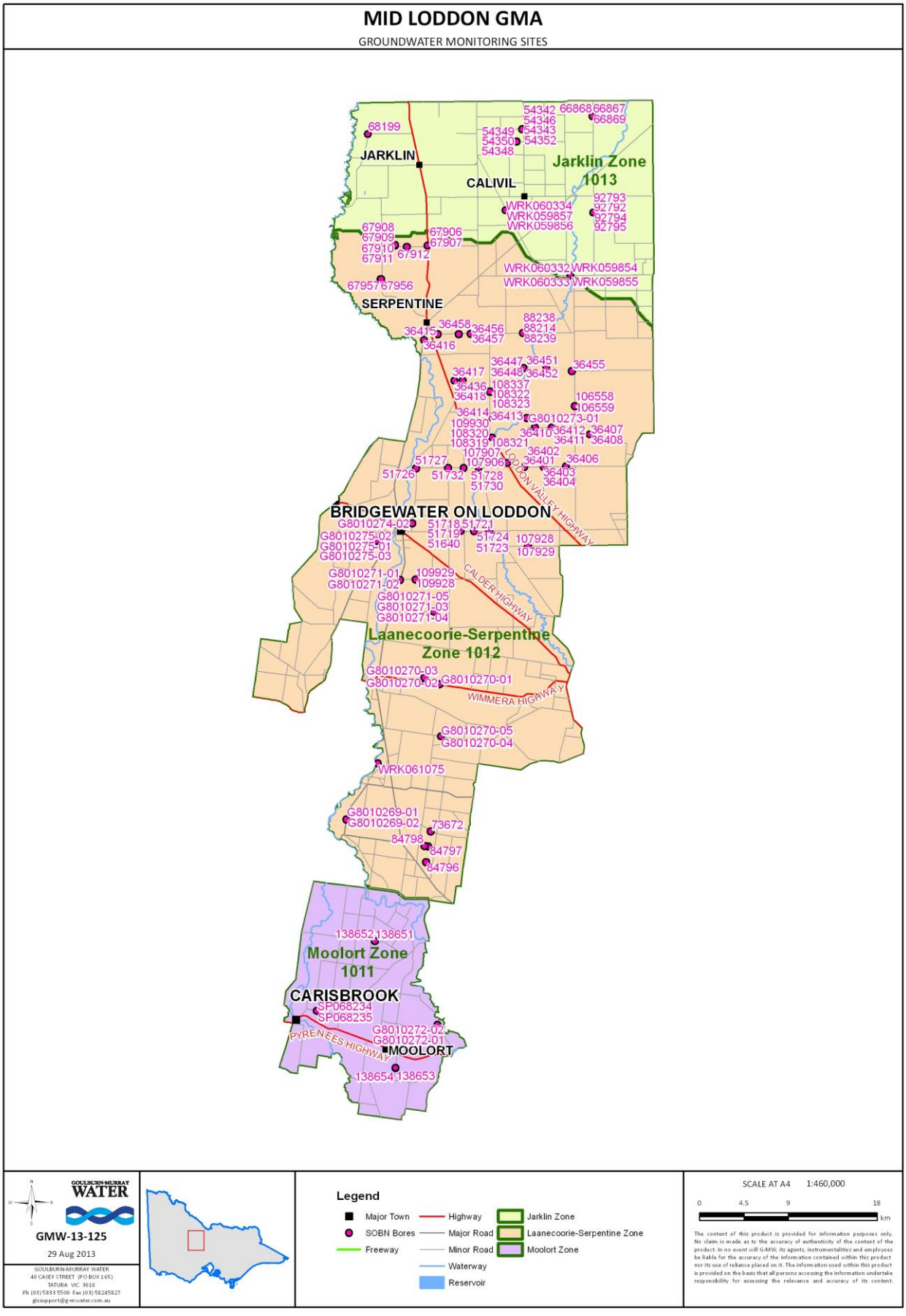


Figure 1 Mid-Loddon Groundwater Management Area showing State Observation Bore locations

2 Groundwater management

2.1 Licence entitlement

The Minister for Water declared the Permissible Consumptive Volume in the Mid-Loddon GMA to be 34,037 ML/year in March 2013 (VGG, 2013). This aligns with the current licence entitlement volume in the GMA (Table 1).

Table 1 Licence entitlement in the Mid-Loddon GMA

Zone	Licences	Licensed bores	Licence volume (ML)
Moolort	24	27	3,445
Laanecoorie-Serpentine	65	76	27,635
Jarklin	17	18	2,957
Total	106	121	34,037

NOTE: Data extracted from the Victorian Water Register 30 June 2013

2.2 Groundwater allocations

Allocations describe a percentage of licence entitlement that may be extracted in a given water season.

Allocations in the Mid-Loddon GMA are assessed by comparing the three year rolling average of the annual maximum groundwater recovery level to a trigger level (Figure 2).

An allocation of 100 % was announced for all groundwater licence holders in the Mid-Loddon GMA on 20 September 2012.

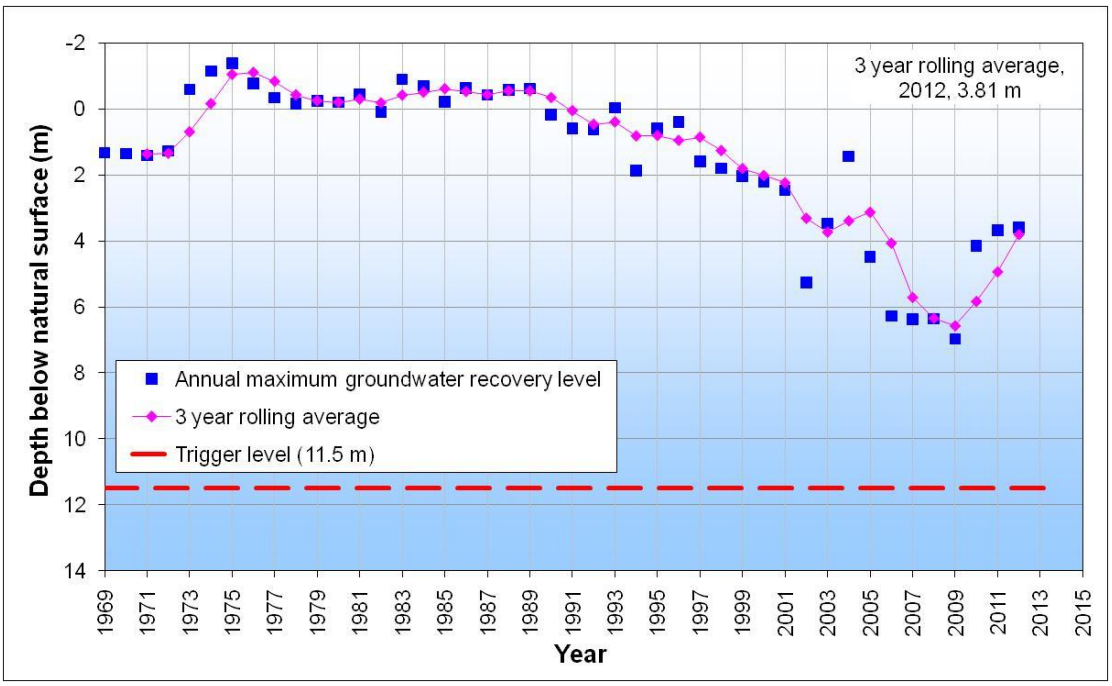


Figure 2 Mid-Loddon GMA groundwater and trigger levels

2.3 Groundwater use

Metered use in the Mid-Loddon GMA in 2012/13 was 17,207 ML, or 51 % of licence entitlement (Figure 3). This was closer to average than the previous two seasons, which is likely to be due to the drier conditions and timing of rainfall events.

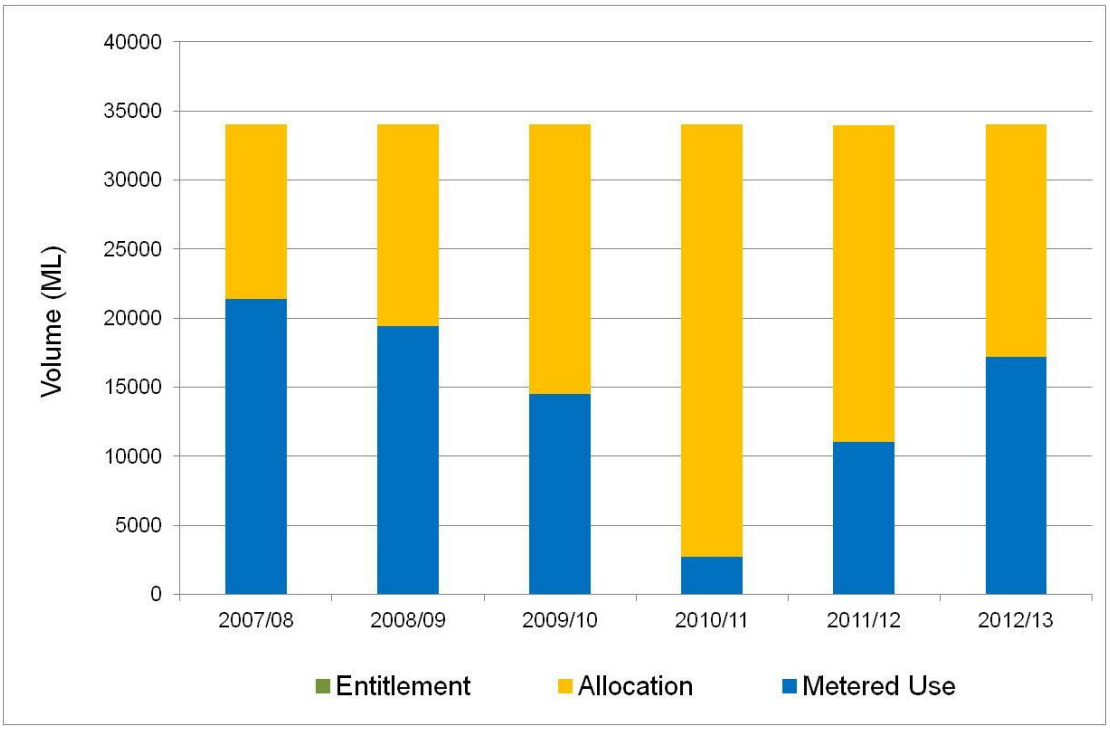


Figure 3 Metered usage in the Mid-Loddon GMA

Usage was around 50% in both the Moolort and Laanecoorie-Serpentine Zones, however only 38% of licence entitlement was used in the Jarklin Zone (Table 2). This is likely to be due to the increased availability of surface water for irrigation. Surface water is typically taken in preference to groundwater because the total cost for irrigators is less than groundwater and surface water quality is generally better.

Table 2 Metered usage in the Mid-Loddon GMA in 2012/13

Zone	Metered use (ML)	% Licensed volume
Moolort	1,898.4	55 %
Laanecoorie-Serpentine	14,198	51 %
Jarklin	1,110.5	38 %
Total	17,206.9	51 %

NOTE: Data extracted from the Irrigation Planning Module 19 August 2013

2.4 Transfer of entitlement

The Rules allows groundwater licence holders to temporarily or permanently transfer licence entitlement.

There were three temporary transfers for a total of 609 ML and three permanent transfers for a total of 300 ML in 2012/13 (Figure 4).

An increase in temporary transfers compared to last season may be attributed to drier conditions, but they are still small in comparison to the volumes traded in 2007/08 and 2008/09.

The permanent transfers resulted from licence holders seeking to secure entitlement to meet existing demands or establish new business enterprises.

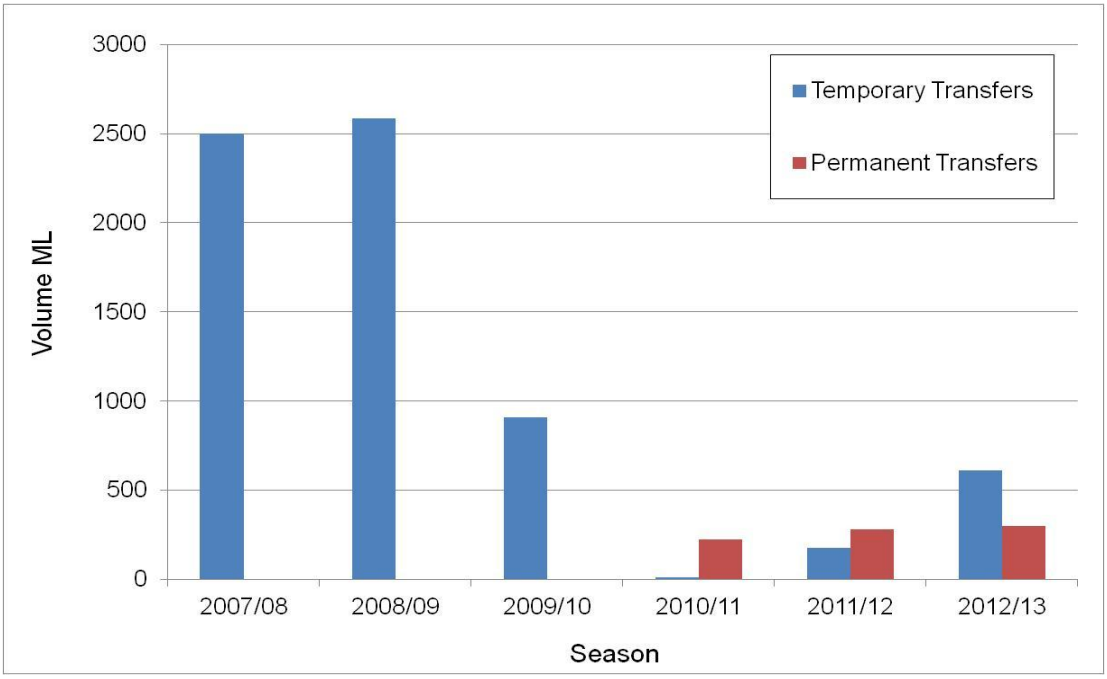


Figure 4 Transfer activity in the Mid-Loddon GMA

Temporary transfers occurred between licence holders in the same zones (Table 3). Licence entitlement was permanently transferred out of the Laanecoorie-Serpentine Zone largely to the Moolort Zone.

Table 3 Transfers in the Mid-Loddon GMA 2012/13

Zone	Temporary				Permanent			
	Transfer from		Transfer to		Transfer from		Transfer to	
	No. of transfer	Volume (ML)	No. of transfer	Volume (ML)	No. of transfer	Volume (ML)	No. of transfer	Volume (ML)
Moolort	1	1	20	20			2	288
Laanecoorie-Serpentine	1	1	409	409	3	300	1	12
Jarklin	1	1	180	180				
Total	3	3	609	609	3	300	3	300

2.5 Carryover

Licence holders are permitted to carryover up to a maximum of 30% of their licence entitlement for use in the next season.

At the conclusion of the 2012/13 season, groundwater licence holders in the Mid-Loddon GMA had 9,720.6 ML of entitlement available to carry over and use in the 2013/14 season.

3 Monitoring program

3.1 Groundwater levels

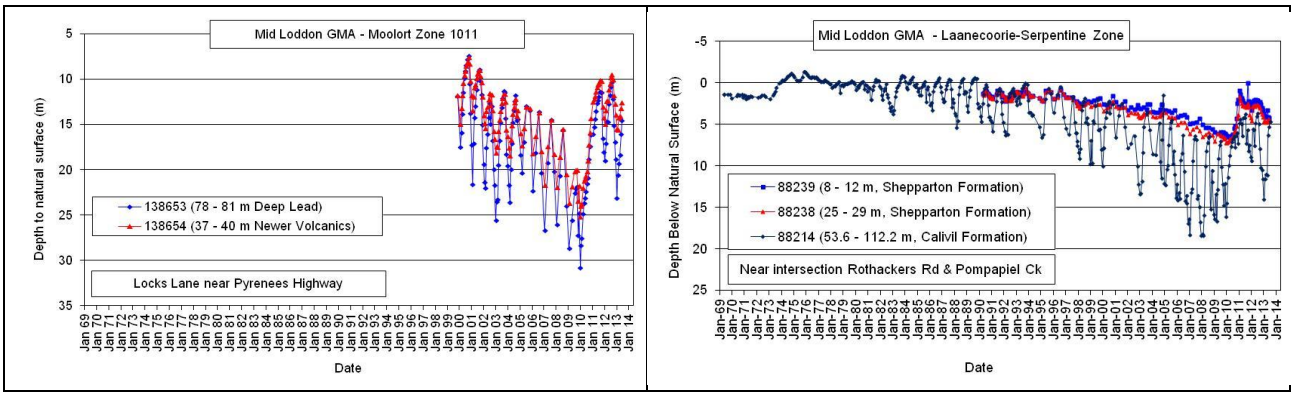
The Department of Environment and Primary Industries (DEPI) monitored over one hundred bores in the Mid-Loddon GMA as on a quarterly basis in February, May, August and November as part of the State Observation Bore Network (Figure 1).

GMW conducted monthly infill monitoring of twenty-five key State observation bores identified in Schedule 1 of the Rules (Appendix B).

Groundwater recovery levels in 2013/14 were similar to 2012/13.

Seasonal drawdown of up to 13m was observed in the Moolort Zone deep lead bore 138653 at Locks Lane (Figure 5). This is in response to the increased local pumping in the area. Seasonal drawdown in the nested basalt bore 138654 is only around 5 m. It is noted that the groundwater levels recover quickly at the end of each irrigation season. GMW continues to closely monitor the development of groundwater resources in this area.

Seasonal drawdown of around 10m was observed in the Laanecoorie-Serpentine Zone at bore 88214 on Rothackers Road which is typical for the area (Figure 5).



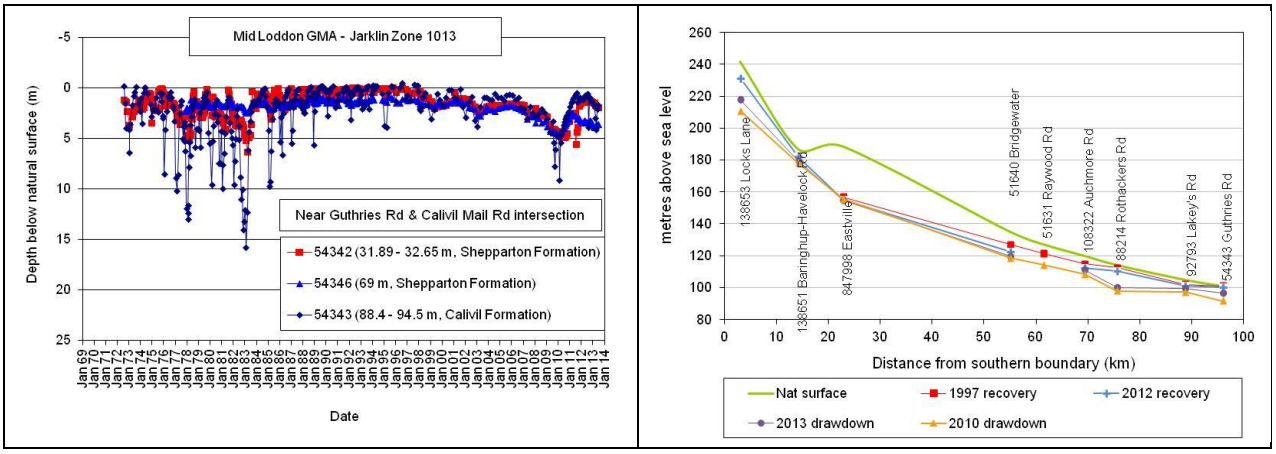
(a) Moolort Zone (b) Laanecoorie-Serpentine Zone

Figure 5 Groundwater level monitoring

Additional monitoring has been undertaken along an east-west section at Rothackers Road to assess groundwater level response at the margins of the GMA. Groundwater levels from bores 36415, 36416 and 36458 show little variation in groundwater levels which suggests that there is not a strong connection to the deep lead.

Groundwater levels remain close to the surface in the Jarklin Zones and could lead to water logging and land salinity problems (Figure 6).

Groundwater levels from key State observation bores along a north-south section illustrate that aquifer response is consistent with historical observations (Figure 6).



(a) Jarklin Zone (b) North-south section

Figure 6 Groundwater level monitoring

3.2 Groundwater quality

3.2.1 State observation bores

Groundwater quality has been recorded from deep lead bores 88214 in the Laanecoorie-Serpentine Zone and WRK059856 in the Jarklin Zone by GMW (Appendix C). Issues have been reported with the functionality of bore 53434 in the Jarklin Zone, so bore WRK059856 has been sampled as a replacement.

The results indicate that the groundwater salinity in bore 88214 has remained steady since monitoring commenced in 1968 and varies between 2,300 and 2,950 EC (Figure 7).

Ongoing annual monitoring of these key bores will confirm the long term trend of groundwater salinity levels in the WSPA.

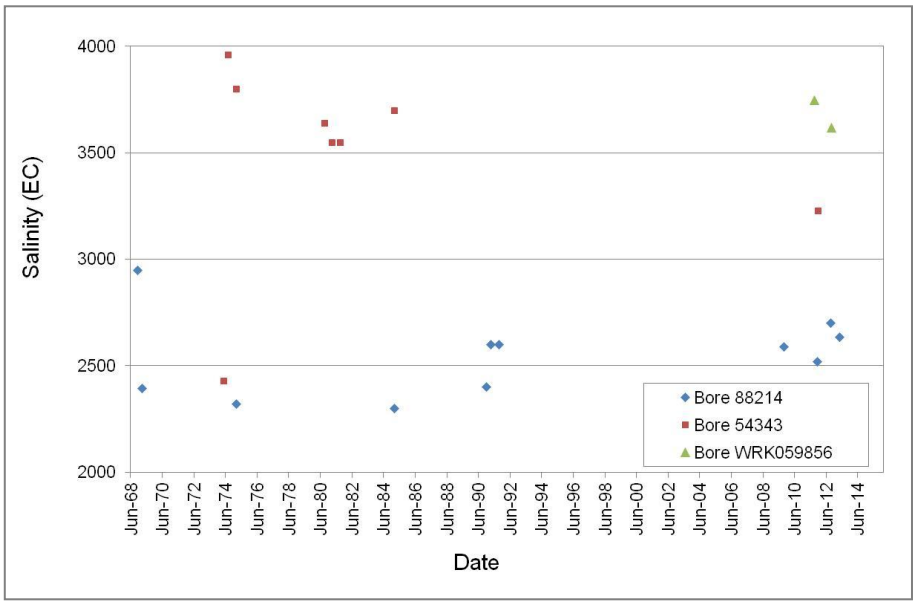


Figure 7 Groundwater salinity in key monitoring bores in the Mid-Loddon GMA

3.2.2 Private bores

Goulburn-Murray Water provides all groundwater licence holders in the Mid-Loddon GMA with a sample bottle and a reply paid envelope to submit a groundwater sample for salinity analysis. In the 2012/13 season, 121 sample bottles were sent out and 24 samples returned for analysis.

Groundwater salinity in each zone is within expected ranges (Table 4). Despite limited information to accurately assess trends, the data provided indicates that groundwater is more saline in the north. Continued return of samples assists with identifying any trends in groundwater salinity. A greater return rate would further improve the spatial and temporal understanding of groundwater salinity in the Mid-Loddon GMA.

Groundwater users are strongly encouraged to participate in this program so that they can identify any changes in groundwater salinity at their bore that might impact on their business.

Table 4 Salinity results from private bores

Zone	Number of samples returned	Salinity range EC (µS/cm)
1011 Moolort	6	1211 - 3500
1012 Laanecoorie-Serpentine	16	1327- 4520
1013 Jarklin	2	3290 - 4560

4 Future management considerations

4.1 Policy changes

4.1.1 Groundwater trading

The Executive Director of Water Resources at DEPI confirmed during the 2012/13 season that GMW may consider approving the temporary transfer of any licence in its region of operation for up to five years.

The assessment of multiple year temporary transfer applications must consider the resource conditions to confidently determine that there would not be any unacceptable impact on third parties or the environment for the duration of the transfer period.

4.1.2 Victoria's Water Law Review

A review of Victoria's *Water Act 1989* is currently being undertaken. The impact on the Rules will not be clearly known until this water law reform is complete in mid 2014.

4.1.3 Murray-Darling Basin Plan

The Murray-Darling Basin Plan was approved in November 2012. There are no impacts to groundwater users in the Mid-Loddon GMA; however aspects of the Basin Plan's implementation, such as trading rules, will need to be carefully considered in a review of the Rules in 2014/15.

4.1.4 Loddon Highlands Water Supply Protection Area

The Minister for Water approved the Loddon Highlands Water Supply Protection Area (WSPA) Groundwater Management Plan in November 2012.

The Plan provides the opportunity for the temporary transfer of entitlement between the Mid-Loddon GMA and Loddon Highlands WSPA; however it is currently not possible due to total licence entitlement being equal to Permissible Consumptive Volume in each area.

4.2 Technical investigations

GMW has assessed the impacts of groundwater development in the Moolort Zone around Locks Lane (G-MW, 2012). Investigations suggest that groundwater pumping from the deep lead is not having a significant impact on groundwater levels in the overlying basalt aquifer and the impact to existing users is within acceptable limits.

4.3 Amendment to the Rules

GMW met with the Mid-Loddon Groundwater Reference Group on 10 September 2013 to report on the resource status and review the implementation of the Rules. The Reference Group noted that there may be some opportunity to improve the Rules, but there was a consensus that there is no need to adjust the Rules at present. Rather, these opportunities should be investigated as part of a comprehensive and programmed 5 year review of the Rules in 2014/15.

Appendix A

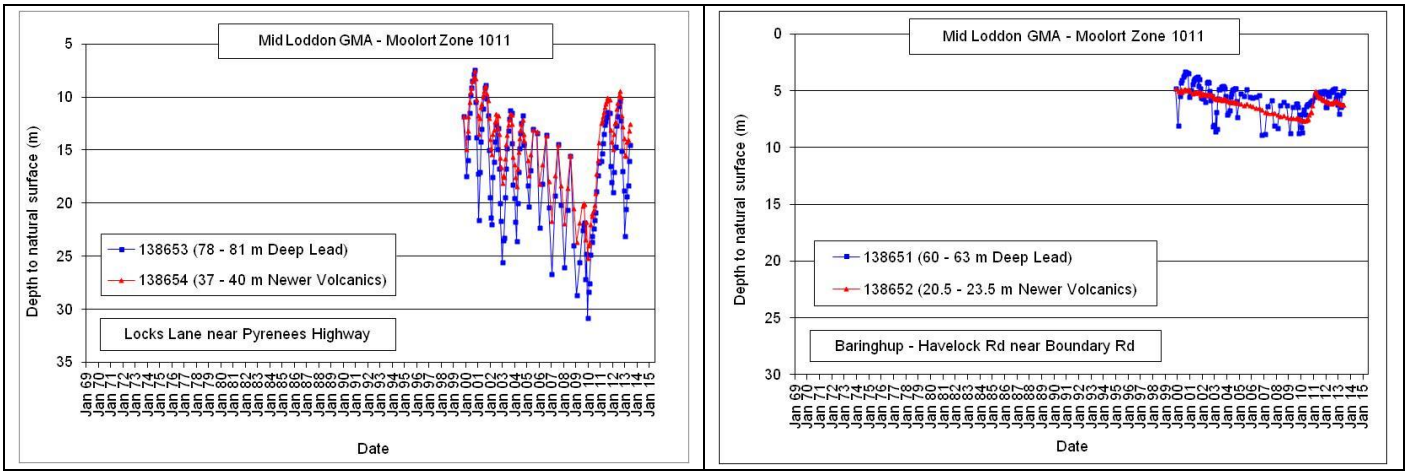
Assessment of activities against Rules

Rule	Activity	Compliant?
1. Cap on licence entitlement	The Minister for Water declared the Permissible Consumptive Volume in the Mid-Loddon GMA to be 34,037 ML/year in March 2013. This aligns with total licence entitlement volume in the area.	Yes
2. Managing groundwater interference	GMW processed all groundwater licence applications in accordance with Rule 2 and section 40 of the Act.	Yes
3. Managing intensity of groundwater extraction	GMW processed all groundwater licence applications in accordance with Rule 3.	Yes
4. Managing groundwater levels	GMW announced allocations of 100% for all groundwater licence holders in September 2012.	Yes
5. Transfer of groundwater licence entitlement	GMW processed three transactions for temporary transfer and three transactions for permanent transfer in 2012/13. All transfers were compliant with conditions in Rule 5.	Yes
6. Carryover	Carryover up to 30% of licence volume was available to licence holders. Use of carryover complied with Rule 6.	Yes
7. Monitoring groundwater levels	GMW obtained monthly readings from State observation bores listed in Schedule 1 of the Rules where practicable.	Yes
8. Monitor groundwater salinity	Groundwater salinity was analysed from State observation bores 88214 and WRK059856. Bottles were sent to all licensed groundwater users and salinity measured in returned samples. Licence holders were advised of the results.	Yes
9. Record meter readings	Meters are fitted to all operational bores in the Mid-Loddon GMA. Meters were read in January and May in 2012/13.	Yes
10. Annual reporting	GMW has prepared this annual report for the 2012/13 season and posted it its website.	Yes
11. Provide effective communication	GMW met with groundwater users in the Rothackers Road area on the 1 March 2013 to discuss trading and carryover opportunities in the area. GMW met with the Mid-Loddon Groundwater Reference Group on 10 September 2013 to report on the resource status and review the implementation of the Rules.	Yes
12. Review of local management rules	GMW met with the Mid-Loddon Groundwater Reference Group on 10 September 2013 and determined that there was no need to amend the Rules at present.	Yes

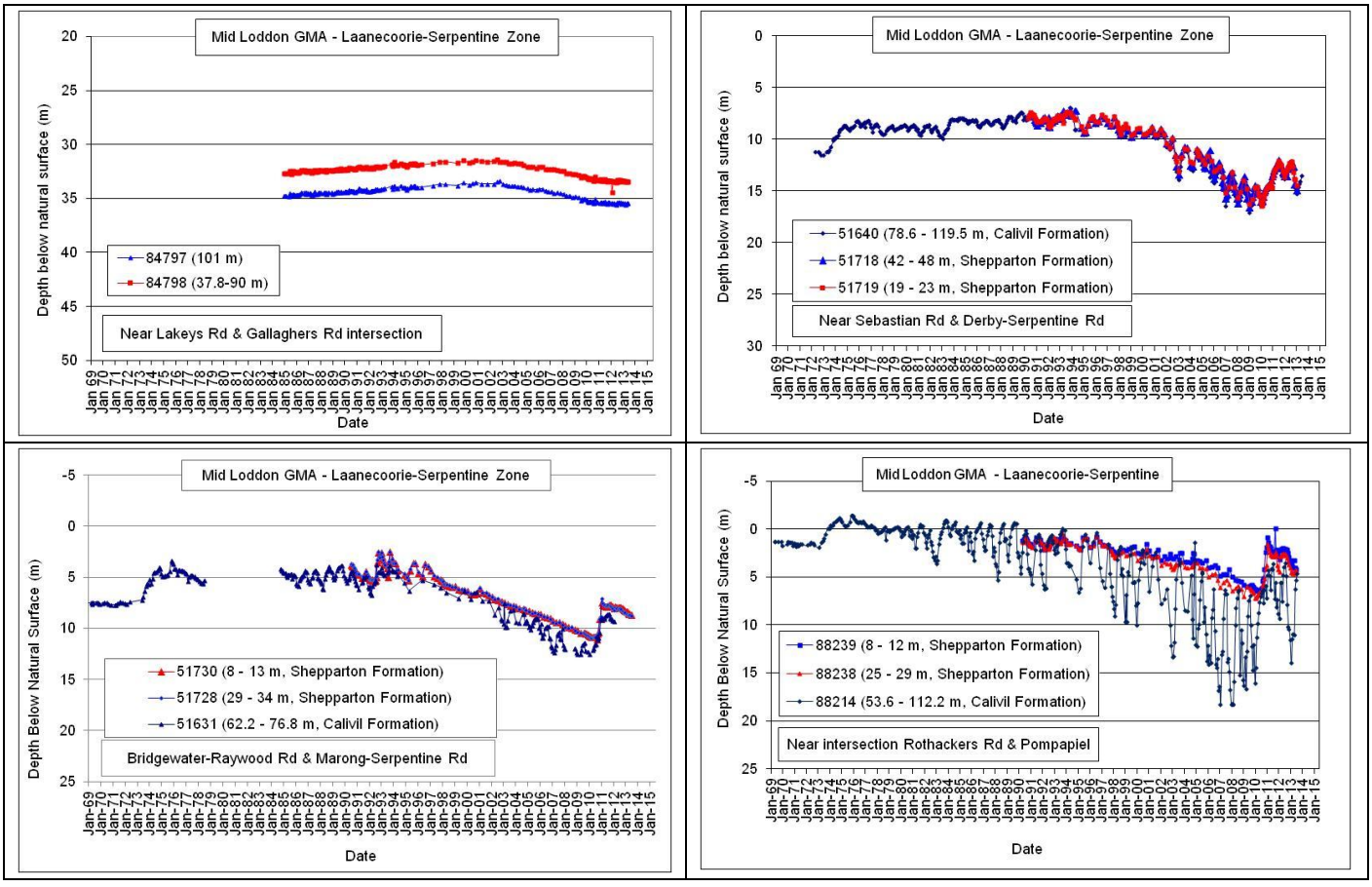
Appendix B

Hydrographs for key monitoring bores. Groundwater level information on other State observation bores can be obtained from the Visualising Victoria's Groundwater website at http://www.vvg.org.au/.

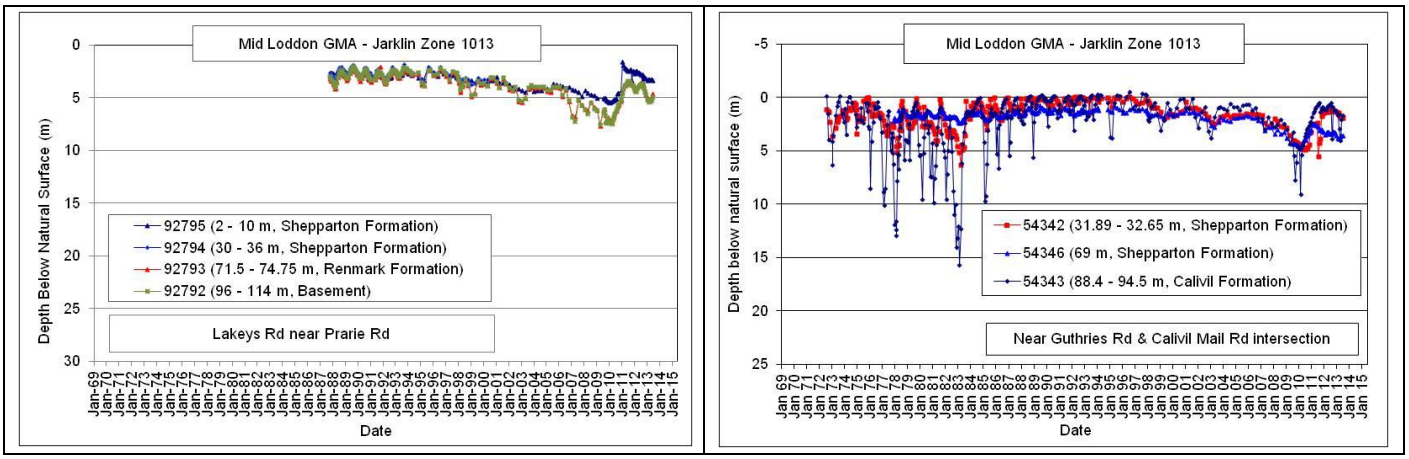
Moolort Zone 1011



Laanecoorie-Serpentine Zone 1012



Jarklin Zone 1013



Appendix C

Groundwater quality results from key State observation bores

Analyte	Bore	WRK059856	WRK059856	88214
	Date	6/09/2011	1/10/2012	7/09/2012
Bicarbonate Alkalinity as CaCO3	mg/L	223	218	215
Carbonate Alkalinity as CaCO3	mg/L	<1	<1	<1
Hydroxide Alkalinity as CaCO3	mg/L	<1	<1	<1
Total Alkalinity as CaCO3	mg/L	223	218	215
Sulfate as SO4 - Turbidimetric	mg/L	206	164	66
Chloride	mg/L	917	957	595
Calcium	mg/L	54	50	16
Magnesium	mg/L	85	81	67
Potassium	mg/L	10	10	11
Sodium	mg/L	589	548	386
Arsenic	mg/L	0.04	0.005	<0.001
Cadmium	mg/L	<0.0001	<0.0001	<0.0001
Chromium	mg/L	<0.001	<0.001	<0.001
Copper	mg/L	<0.001	<0.001	<0.001
Iron	mg/L	0.88	0.9	<0.05
Lead	mg/L	<0.001	<0.001	<0.001
Manganese	mg/L		0.109	0.093
Nickel	mg/L	0.002	0.002	0.001
Zinc	mg/L	<0.005	0.012	<0.005
Mercury	mg/L		<0.0001	<0.0001
Ammonia as N	mg/L	0.07	0.08	0.09
Nitrite as N	mg/L	<0.01	<0.01	<0.01
Nitrate as N	mg/L	<0.01	0.02	0.02
Nitrite + Nitrate as N	mg/L	<0.01	<0.1	<0.1
Total Kjeldahl Nitrogen as N	mg/L	<0.1	<0.1	<0.1
Total Nitrogen as N	mg/L	<0.1	<0.1	<0.1
Total Phosphorus as P	mg/L	<0.01	<0.01	<0.01
Ionic Balance	%	1.34	2.24	2.01
Total Anions	meq/L	34.6	34.8	22.4
Total Cations	meq/L	35.6	33.2	23.4
Total Organic Carbon	mg/L	3	2	8