

Mid-Loddon Groundwater Management Area Local Management Rules

Annual Report

June 2014

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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 2013/14 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 2013/14.

A copy of this report is available for inspection at GMW's Tatura office, or for download from the GMW website.

Matthew Hudson A/MANAGER GROUNDWATER AND STREAMS

Executive summary

The 2013/14 irrigation season was the fifth year the Mid-Loddon Groundwater Management Area (GMA) Local Management Rules (the Rules) have been successfully implemented by Goulburn-Murray Water.

Groundwater recovery levels remain steady across much of the GMA, however were around 1 to 2 m lower in 2013/14 than in 2012/13.

Allocations were announced at 100 per cent in all zones of the Mid-Loddon GMA in 2013/14.

Metered use in the Mid-Loddon GMA was 37 per cent (12,653.6 ML) of licence entitlement in 2013/14. This is a 14 per cent decrease on use from 2012/13 despite the drier conditions experienced during the summer months.

There were few licence transfers in the 2013/14 season, which suggests most groundwater licence holders have sufficient entitlement to meet their water needs in most years.

Licensed groundwater users have carried over 9,690.6 ML into the 2014/15 season.

Groundwater monitoring and metering programs continue to be successfully applied to support the implementation of 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 2013/14 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 Rules is presented in Victorian Government, 2013. Victorian Government Gazette No. G10 Thursday 7 March 2013. Victoria Government, Melbourne, Victoria.

Appendix A.



Figure 1 Mid-Loddon Groundwater Management Area 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).

Zone	Licences	Licensed bores	Licence volume (ML)
Moolort	24	28	3,445
Laanecoorie-Serpentine	66	83	27,635
Jarklin	16	18	2,957
Total	106	129	34,037

Table 1 Licence entitlement in the	e Mid-Loddon GMA
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NOTE: Data extracted from the Victorian Water Register 30 June 2014

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 were assessed by comparing the three year rolling average of the annual maximum groundwater recovery level to the trigger level (Figure 2).

An allocation of 100 per cent was announced for all groundwater licence holders in the Mid-Loddon GMA on 11 September 2013 as the three year rolling average of the annual maximum groundwater recovery level remained well above the trigger level.



Figure 2 Groundwater levels in bore 88214 compared to the trigger level

2.3 Groundwater use

Metered use in the Mid-Loddon GMA in 2013/14 was 12,653.6 ML, or 37 per cent of licence entitlement (Figure 3). Despite the dry summer, use in 2013/14 was 14 per cent less than in 2012/13, however it is within the historical range for seasonal use in the area.



Figure 3 Metered usage in the Mid-Loddon GMA

Usage was around 40 per cent in both the Moolort and Laanecoorie-Serpentine Zones; however the majority of metered use in the GMA occurs in the Laanecoorie-Serpentine Zone (Table 2).

Table 2 Metered usage in the Mid-Loddon GMA in 2013/14				
Zone	Metered use (ML)	% Licens		

Zone	Metered use (ML)	% Licensed volume
Moolort	1,344.5	39%
Laanecoorie-Serpentine	10,409.0	38%
Jarklin	900.1	30%
Total	12,653.6	58%

NOTE: Data extracted from the Irrigation Planning Module 1 July 2014

2.4 Rainfall

Monthly rainfall data from the Bureau of Meteorology weather station at Bridgewater indicates annual rainfall in 2013 was around 100 mm below average.

Since high rainfall events in 2010 and 2011, the cumulative deviation from the mean monthly rainfall has had a declining trend, which highlights the dry conditions experienced during the 2013/14 season (Figure 4).



Figure 4 Monthly rainfall data for Bridgewater

2.5 Transfer of entitlement

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

There was only one temporary transfer of 292 ML and four permanent transfers for a total of 628 ML in 2013/14 (Figure 5). All trades occurred within the Laanecoorie-Serpentine Zone. The trading activity represents a decrease in the number and volume of temporary transfers and an increase in permanent transfers from 2012/13. This suggests, groundwater licence holders are seeking to secure entitlement to meet existing demands or establish new businesses.



Figure 5 Transfer activity in the Mid-Loddon GMA

All temporary and permanent transfers occurred within the Laanecoorie-Serpentine Zone (Table 3).

Zone		Temp	orary		Permanent			
	Transfer from		Transfer to		Transfer from		Transfer to	
	No. of transfer	Volume (ML)	No. of transfer	Volume (ML)	No. of transfer	No. of Volume transfer (ML)		Volume (ML)
Moolort	0	0	0	0	0	0	0	0
Laanecoorie- Serpentine	1	292	1	292	4	628	4	628
Jarklin	0	0	0	0	0	0	0	0
Total	1	292	1	292	4	628	4	628

Table 3 Transfers in the Mid-Loddon GMA 2013/14

2.6 Carryover

Licence holders in the Mid-Loddon GMA are permitted to carryover up to a maximum of 30 per cent of their licence entitlement for use in the next season.

There was 9,721 ML of carryover available to licence holders in the Mid-Loddon GMA in the 2013/14 season.

At the conclusion of the 2013/14 season, groundwater licence holders in the Mid-Loddon GMA had 9,690.6 ML of entitlement available to carry over and use in the 2013/14 season.

2.7 Domestic and stock bores installed

GMW received two bore completion reports for domestic and stock purposes 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 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 generally around 1 to 2 m lower than in 2012/13.

Seasonal drawdown of up to 8 m was observed in the Deep Lead aquifer in the Moolort Zone at bore 138653 at Locks Lane (Figure 6). Seasonal drawdown in the nested basalt bore 138654 is around 4 m. GMW continues to closely monitor the development of groundwater resources in this area.

Seasonal drawdown of around 8 m was observed in the Laanecoorie-Serpentine Zone at bore 88214 on Rothackers Road, which is typical for the area (Figure 6).



(a) Moolort Zone

(b) Laanecoorie-Serpentine Zone

Figure 6 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 Zone and could lead to water logging and land salinity problems (Figure 7).

Groundwater levels from key State observation bores along a north-south section show that the aquifer response is consistent with historical observations (Figure 7).



(a) Jarklin Zone

(b) North-south section

Figure 7 Groundwater level monitoring

3.2 Groundwater quality

3.2.1 State observation bores

Groundwater quality has been recorded from SOBN bores 88214 in the Laanecoorie-Serpentine Zone and WRK059856 in the Jarklin Zone by GMW (Appendix C). Both bores are screened in the Deep Lead aquifer. Issues have been reported with the reliability of the water level readings of bore 53434 in the Jarklin Zone, so bore WRK059856 has been sampled as a replacement.

The results indicate that the groundwater salinity in both bores 88214 and WRK059856 remain steady (Figure 8).

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





3.2.2 Private bores

GMW 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 2013/14 season, 138 sample bottles were sent out and 17 samples were 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 of the GMA. 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.

Zone	Number of samples returned	Salinity range EC (μS/cm)	
1011 Moolort	4	1237 – 3290	
1012 Laanecoorie-Serpentine	13	1212 – 4640	
1013 Jarklin	0	No data	

Table 4 Salinity results from private bores

3.3 Metering

All operational bores in the Mid-Loddon GMA were metered as of 30 June 2014.

There was no maintenance activities reported in 2013/14 however seven new meters were installed across the GMA (Table 5).

All meters were read at least twice throughout the 2013/14 season, with a total of 248 meter reads undertaken.

Table 5 Metering activities in the Mid-Loddon GMA in 2013/14

	Year to 30 June 2014
Number of meters installed	7
Meters which had maintenance	0
Total number of meters in GMA	119
Number of meter reads in season	248

3.4 Licence compliance

There were no prosecutions or convictions relating to groundwater matters in the area.

There was one incident where the transfer of licence entitlement was approved subsequent to the take and use of water.

This incident has been investigated and GMW has taken action to encourage users to trade earlier in the season to ensure compliance. GMW manages compliance in accordance with the National Framework for Compliance and Enforcement of Systems for Water Resource Management (DSEWPC, 2012).

4 Future management considerations

4.1 Groundwater Reference Group

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 five year review of the Rules in 2014/15.

4.2 SOBN review

The State Observation Bore Network (SOBN) is owned and managed by the Department of Environment and Primary Industries (DEPI) who currently monitor around 2,300 bores across Victoria on a quarterly basis to provide valuable information on groundwater resources.

GMW use the SOBN to collect additional monitoring data from selected bores across its region to inform resource management decisions.

DEPI has recently undertaken a detailed review of the SOBN. The aim of the review was to identify opportunities to make the network more cost effective, and to reassess management arrangements.

Following DEPI's review of the network, GMW has been asked to review its' own monitoring priorities and future monitoring needs.

GMW will seek its customer's views through the Water Services Committees and Groundwater Reference Committee's on future groundwater monitoring needs.

4.3 Local Management Rules review

As per the Mid-Loddon GMA Local Management Rules, GMW will undertake a comprehensive review of the rules in 2014/15.

Groundwater licence holders will be consulted throughout the review of the management rules.

5 References

Goulburn-Murray Water, 2009. Mid-Loddon Groundwater Management Area Local Management Rules. Goulburn-Murray Water, Tatura, Victoria.

Victorian Government, 2013. Victorian Government Gazette No. G10 Thursday 7 March 2013. Victoria Government, Melbourne, Victoria.

Ru	le	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 2013.	Yes
5.	Transfer of groundwater licence entitlement	GMW processed one transaction for temporary transfer and four transactions for permanent transfer in 2013/14. 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	Groundwater salinity was analysed from State observation bores 88214 and WRK059856.	Yes
	samny	Bottles were sent to all licensed groundwater users and salinity measured in returned samples. Licence holders were advised of the results.	
9.	Record meter readings	Meters are fitted to all operational bores in the Mid- Loddon GMA. Meters were read in January/February and May/June during 2013/14.	Yes
10.	Annual reporting	GMW has prepared this annual report for the 2013/14 season and posted it on its website.	Yes
11.	11. Provide effective communication 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 A – Assessment of activities against Rules

Appendix B – Hydrographs

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 chemistry

Groundwater quality results from key State observation bores

Analyte	Bore	88214	WRK059856
	Date	5/03/2014	5/03/2014
pH Value	pH Unit	8.65	7.12
Electrical Conductivity @ 25°C	μS/cm	2660	3600
Total Dissolved Solids @180°C	mg/L	1590	2290
Turbidity	NTU	14.7	20.3
Bicarbonate Alkalinity as CaCO3	mg/L	199	207
Hydroxide Alkalinity as CaCO3	mg/L	<1	<1
Sulfate as SO4 - Turbidimetric	mg/L	98	274
Chloride	mg/L	691	964
Calcium	mg/L	17	50
Potassium	mg/L	8	9
Sodium	mg/L	406	566
Arsenic	mg/L	<0.001	0.004
Cadmium	mg/L	<0.0001	<0.0001
Chromium	mg/L	<0.001	<0.001
Copper	mg/L	0.001	0.001
Iron	mg/L	0.07	1.27
Lead	mg/L	<0.001	<0.001
Manganese	mg/L	0.071	0.121
Nickel	mg/L	0.002	0.005
Zinc	mg/L	0.013	0.009
Mercury	mg/L	<0.0001	<0.0001
Ammonia as N	mg/L	0.05	<0.01
Nitrite as N	mg/L	<0.01	<0.01
Nitrate as N	mg/L	0.02	0.02
Nitrite + Nitrate as N	mg/L	0.02	0.02
Total Kjeldahl Nitrogen as N	mg/L	<0.1	1.3
Total Nitrogen as N	mg/L	<0.1	1.3
Total Phosphorus as P	mg/L	0.03	0.05
Ionic Balance	%	2.57	4.15
Total Anions	meq/L	25.9	37
Total Cations	meq/L	24.6	34.1
Total Organic Carbon	mg/L	1	2