Murrayville Water Supply Protection Area Groundwater Management Plan

Annual Report 2015/16

GWMWater

FOREWORD

The preparation of this report is required by Section 32C(1) of the *Water Act 1989*. Copies of the report have been provided to the Minister for Water and the Mallee Catchment Management Authority in accordance with Section 32C(2) of the *Water Act 1989*. A copy of this report is also available for inspection at the office of GWMWater, and a notice of availability of the report will be published in local newspapers as required by Section 32D of the *Water Act 1989*. This report will also be available on the GWMWater website, www.gwmwater.org.au.

The purpose of this report is to detail GWMWater's activities undertaken in administering and enforcing the Murrayville Groundwater Management Plan and to provide information that is required to be reported under the Plan.

Area:	Murrayville Water Supply Protection Area (WSPA)
Segment:	Groundwater
Year Area Declared:	1998
Date Plan Approved:	17 July 2001
Permissible Consumptive Volume:	10,883 ML
Date for Plan Review:	2017
Implementation Authority:	Grampians Wimmera Mallee Water Corporation
Relevant CMA:	Mallee Catchment Management Authority
Report Period:	1 July 2015 – 30 June 2016

GWMWater has continued to monitor groundwater levels, quality and metered use, and undertake groundwater management activities required by the Murrayville Water Supply Protection Area (WSPA) Plan and the *Water Act 1989*.

Assessment of the data indicates that groundwater levels and salinity continue to respond to the level of extraction as expected. In 2015/16, groundwater extraction from the Tertiary Limestone Aquifer was 5,581 megalitres, amounting to just over fifty percent of the Permissible Consumptive Volume, and 900 megalitres more than the average use over the previous 15 years.

GWMWater remains involved with the Border Groundwaters Agreement Review Committee and recognises the continuing challenges with how the groundwater resource is managed on both sides of the Border with South Australia. GWMWater works closely with the Department of Environment, Land, Water and Planning on Border related matters to ensure fairness is provided to its groundwater users.

The local advisory committee, consisting of landholders and government representatives, have worked with GWMWater to draft a local management plan which will provide a more contemporary set of management rules for the Murrayville area. The new planning

document builds on the prescriptions within the existing WSPA Plan and ensures compliance with the broader Murray-Darling Basin Plan as required by 2017. The draft is in the process of being finalised and should be completed by the end of the year.

Signed

Mark Williams
Managing Director

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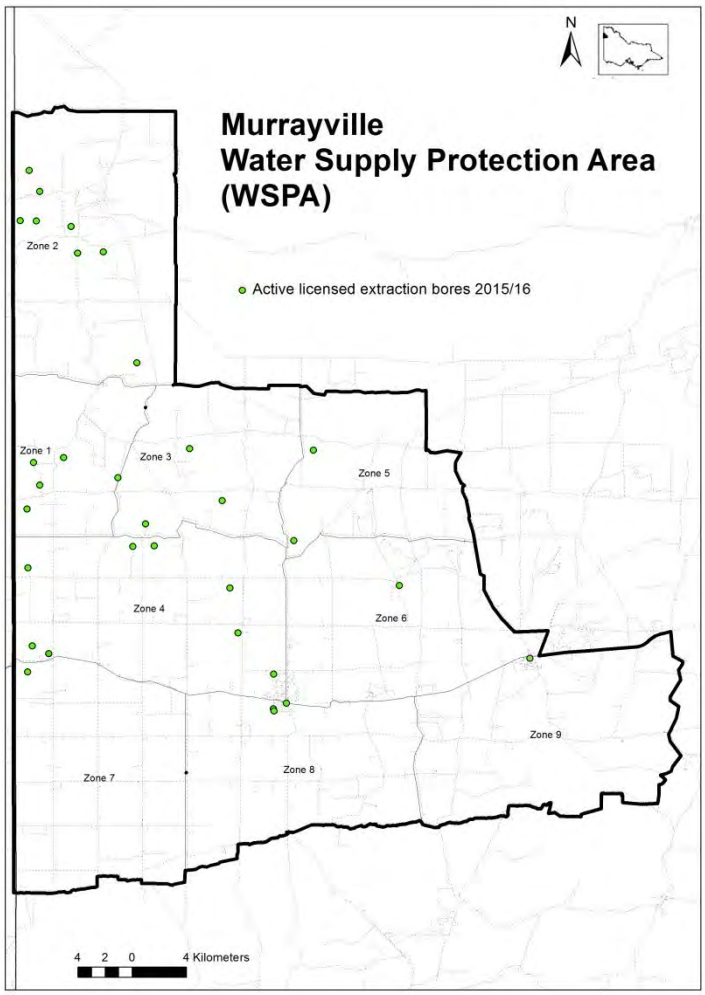
1. INTRODUCTION

The Murrayville Water Supply Protection Area (WSPA) occupies 1,578 km^2 and is centred on the town of Murrayville and abuts the South Australian border as illustrated in **Figure 1.1**. Groundwater is the sole source of water for domestic and stock, town supplies and irrigation in the region.

The dominant land use within the WSPA is dryland agriculture. However, since the early 1990s landholders have taken advantage of the good quality groundwater and suitable soils to cultivate irrigated crops, particularly potatoes and olives. Groundwater has also been used for irrigating dryland cereal and canola crops, ensuring a reasonable yield under unseasonable dry conditions. During the 2015/16 reporting period approximately 920 hectares were irrigated.

A total of 5,581 ML of groundwater was extracted in the WSPA during the reporting period with 5,435 ML for irrigation and the remaining 146 ML for urban supply.

Figure 1.1: *Location of Murrayville Wate Supply Protection Area and active extraction bores in 2015/16*



2. KEY OBSERVATIONS

2.1. Rainfall

A total of 323.2 mm of rainfall was recorded for period July 2015 to June 2016 at the Bureau of Meteorology site in Murrayville (76038). The mean annual rainfall measured at this site is 366.1 mm (based on figures gathered from 1911 to 2015). Actual and average monthly rainfall is shown in **Figure 2.1.**

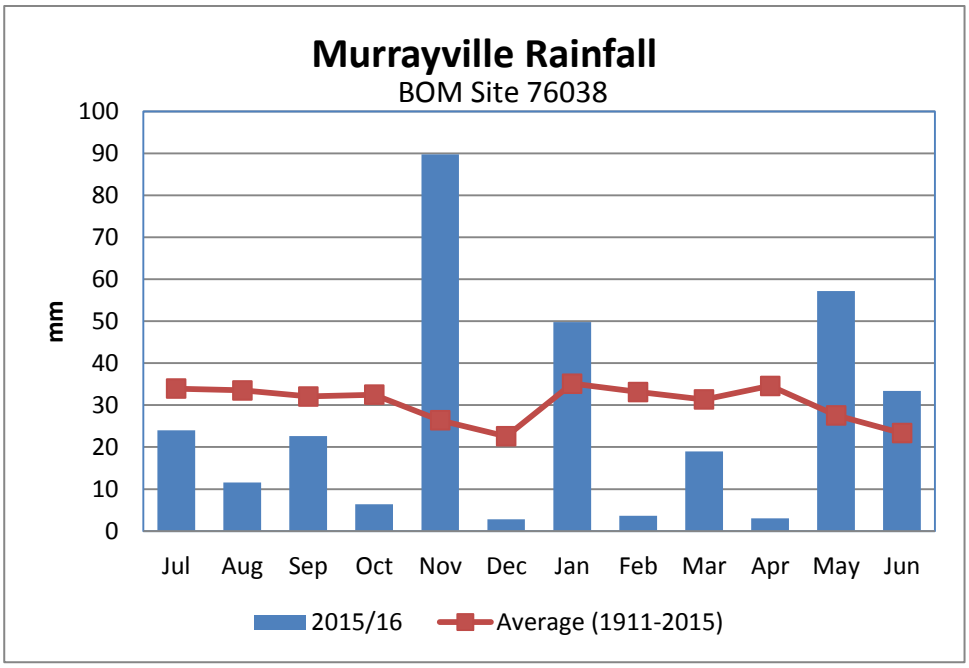


Figure 2.1: *Murrayville Rainfall*

Due to the confined nature of the Tertiary Limestone Aquifer in the Murrayville WSPA, rainfall can influence groundwater use but does not recharge the aquifer as occurs in other areas where it is unconfined.

2.2. Groundwater Water Levels

Groundwater levels are measured monthly across 35 state-owned observation bores within the WSPA. An additional eight observation bores are monitored at quarterly intervals. A list of these observation bores is provided in **Table 3.1**. The location of selected observation bores are illustrated in **Figure 2.2** with corresponding hydrographs showing the groundwater levels observed at each site.

Within the Murrayville WSPA, the Tertiary Limestone Aquifer is confined by the over lying Tertiary aquitard (Bookpurnong Beds). The long-term trend in groundwater levels reflected in seasonal drawdowns (annual peaks and troughs) is consistent with the response to groundwater pumping for irrigation from a confined aquifer. The observations from the network of monitoring bores indicate that the aquifer continues to respond as expected with the level of extraction recorded both within the WSPA and

directly across the border in South Australia. Where the concentration of extraction bores is greatest (WSPA zone 1), there is an overall downward trend (0.2 to 0.3 m per year) in groundwater level however this is within the interpreted limits determined from the Plan and its supporting documents.

Groundwater use for irrigation in the Mallee Prescribed Wells Area of South Australia is also sourced from the same Tertiary Limestone Aquifer and therefore has an influence on groundwater levels observed in the Murrayville WSPA. This is particularly evident at observation bore 134951 which is located adjacent to South Australia's Peebinga district, and closer to irrigation activity in South Australia than in the Murrayville WSPA.

The 2016 metered extraction within the Murrayville WSPA was 58% of the licenced volume, it was the largest volume extracted since 2012/13 with the increased use being evident in the seasonal fluctuation in groundwater levels recorded in observation bores close to the irrigation activity in the Murrayville WSPA and South Australia. The hydrographs reflect the early commencement of irrigation due to the dry seasonal conditions with recovery in most bores close to activity being somewhat less than previous years while the magnitude of the seasonal drawdown was similar to 2012/13 when a similar volume was extracted. This can be observed in the hydrographs (see **Figure 2.2**).

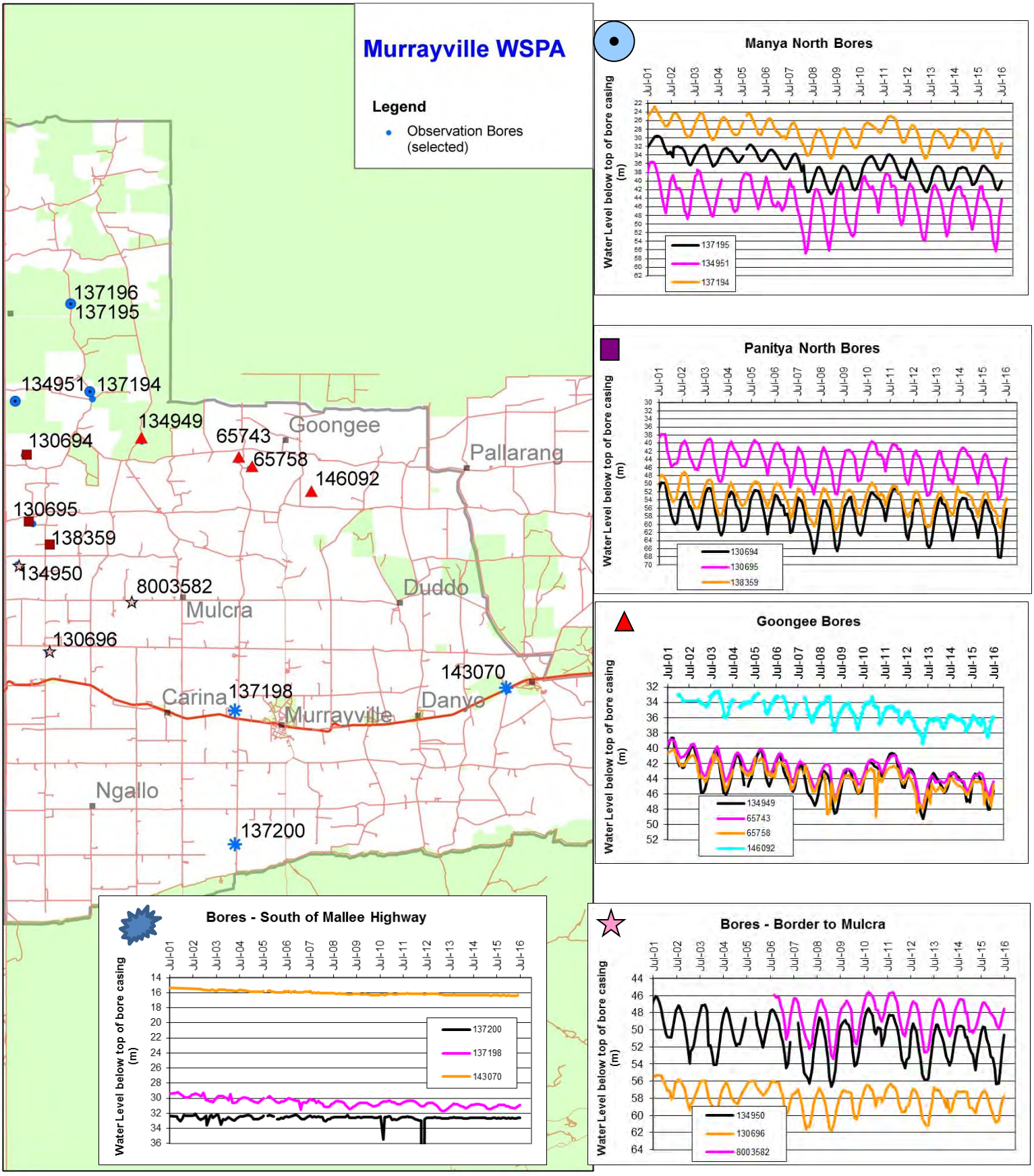
The Explanatory Paper for the Murrayville Groundwater Management Plan describes the drawdown limit as a maximum of 22 metres, with an eight metre residual drawdown over the period 2001 to 2020, or 0.4 m/year in the most intensively developed area, centred on Panitya (WSPA zone 1). Analysis of water levels in the key observation bores around zone 1 (see **Figure 2.2** - Panitya North) show that over the past sixteen years the impact of extraction on seasonal groundwater levels is significantly less than 22 metres, and at the current rates of extraction, is unlikely to reach the eight metre residual drawdown by 2020.

Table 2.1 summarises the aquifer response compared with the limits interpreted from the groundwater plan for zone 1 of Murrayville WSPA.

Table 2.1: *Summary of Aquifer Response*

Bore ID	Maximum seasonal drawdown (m)	Residual drawdown (since 2000)(m)	Average drawdown (m/year)
130694	14	4.1	0.25
130695	12	4.8	0.3
138359	10	4.1	0.25
Plan Limit	***22***	***5.6***	***0.4***

***Figure 2.2**: Selected observation bores and hydrographs (to June 2016)*



3. PLAN IMPLEMENTATION

3.1 Bore Monitoring

Water level monitoring is undertaken by Ventia (www.ventia.com.au) on behalf of DELWP and GWMWater, in accordance with the Murrayville Groundwater Management Plan (the Plan). Additional bores are monitored to address identified data gaps. Monitoring occurs through the State Groundwater Monitoring Contract. Ventia keeps records of all inspections and works as part of the agreement with DELWP and GWMWater. Data is transferred to the Water Management Information System (WMIS, http://data.water.vic.gov.au/monitoring.htm) in a timely manner as required by the Plan.

As reported previously, a small number of bores that were included in the original schedules of the Plan have been replaced by either newly constructed bores or bores in close proximity (usually within three kilometres).

Table 3.1 provides a summary of the water level monitoring undertaken since commencement of the Plan. A map illustrating the locations of the current monitoring sites in the Murrayville WSPA is provided in Appendix 1. This illustrates the geographic extent of monitoring throughout the WSPA, with particular concentration in areas where extraction is greatest. Comments regarding the water level monitoring undertaken in compliance with the plan are summarised in **Table 3.1**.

There were no reported cases of observation bores requiring works in 2015/16.

Table 3.2 provides a summary of the water quality monitoring sites scheduled in the plan. A map and the associated salinity readings are provided in Appendix 2. The salinity levels are stable at these sites, hence the altered frequency of monitoring, as this does not appear to compromise the information gathered. All data collected indicates that the salinity levels have remained relatively stable throughout the WSPA.

The water quality program scheduled in the plan has been enhanced by annual sampling of more than 40 domestic and stock bores located throughout the WSPA. This program has been in place since 2008. Annual sampling provides sufficient data to monitor salinity trends across the WSPA. A map illustrating the salinity data at sampling points as recorded in November 2013 is illustrated in Appendix 3. Graphs of bores grouped by Parish are also illustrated in Appendix 3.

Salinity data has been entered into the WMIS, though not consistently within the timeframe required by the Plan due to issues gaining access to the data input portal of WMIS. The data is now being forwarded directly to DELWP for input to the WMIS. Data has been collected for 8004168, however has failed to upload into WMIS.

Table 3.1: *Observation bore water level monitoring schedule*

Bore ID	Scheduled Frequency	Comment
130694	Monthly	
130695	Monthly	New headworks April 2011
143069	Monthly	
130696	Monthly	
134950	Monthly	New headworks April 2011
82220/ 8003582	Monthly	82220 decommissioned 8003852 commenced October 2006
137197	Monthly	
65758	Monthly	
65743	Monthly	
137191	Monthly	
137198	Monthly	
137199	Monthly	
137195	Monthly	
137196	Monthly	
137200	Monthly	
137201	Monthly	
137194	Monthly	
134949	Monthly	
137190	Monthly	
134951	Monthly	New headworks April 2011
138359	Monthly	New headworks April 2011

Bore ID	Scheduled Frequency	Comment
61571/ 8003857	Quarterly	Ceased September 2008, bore decommissioned and replaced, new bore 8003857 monitored from July 2010
61572/ 8003923	Quarterly	Ceased September 2008. Bore decommissioned and replaced new bore 8003923 monitored from July 2010
61573/ 8003854	Quarterly	Completed monthly to September 2008. Bore decommissioned and replaced, new bore 8003854 monitored from July 2010
77201	Quarterly	Not monitored. Reported previously
138350	Quarterly	Not monitored. Reported previously
82242	Quarterly	Not monitored. Reported previously
138361	Quarterly	Not monitored. Reported previously
85806	Quarterly	Completed monthly
143070	Quarterly	Completed monthly (in fill)
49676	Quarterly	Completed
49677/ 8003858	Quarterly	Ceased September 2008. Decommissioned and replaced by 8003858
49678	Quarterly	
82235	Monthly	
146092	Monthly	New headworks April 2011
New Bores not in plan		
8002663	Monthly	Monitored from August 2005
8002664	Monthly	Monitored from August 2005
8002665	Monthly	Monitored from August 2005
8002666	Monthly	Monitored from August 2005

Table 3.2: *Salinity monitoring undertaken*

Bore	Monitored by	Scheduled Frequency in Plan	Comment
54642	DELWP	Quarterly	Completed
54636	DELWP	Quarterly	Completed
65745	DELWP	Quarterly	Completed
77199	DELWP	Quarterly	Replaced by 77201 – monitored to June 2007
49679	DELWP	Quarterly	Completed
49677	DELWP	Quarterly	Not monitored since June 2006
61585	GWMWater	Six monthly	Completed
141209	GWMWater	Six monthly	Completed
141210/8002325	GWMWater	Six monthly	Replaced by 8002325, completed
141211	GWMWater	Six monthly	Ceased due to lack of infrastructure
61578/8004168	GWMWater	Six monthly	Replaced by 8004168, completed
97184	GWMWater	Six monthly	Completed
97181	GWMWater	Six monthly	Completed
105355	GWMWater	Six monthly	Completed

3.2 Water Use

3.2.1 Bore metering program

Each irrigation bore and active commercial bore is fitted with a meter. All meters were replaced early in 2016, and new meters have been installed by a contractor on behalf of GWMWater. A total of 31 meters were installed, all of which were utilised this year.

Meters are read mid-season in January and end of season in June by GWMWater.

3.2.2 Water Use

Table 3.3 provides details of total water use in the WSPA during the reporting period compared to previous years. This is represented graphically in **Figure 3.1**.

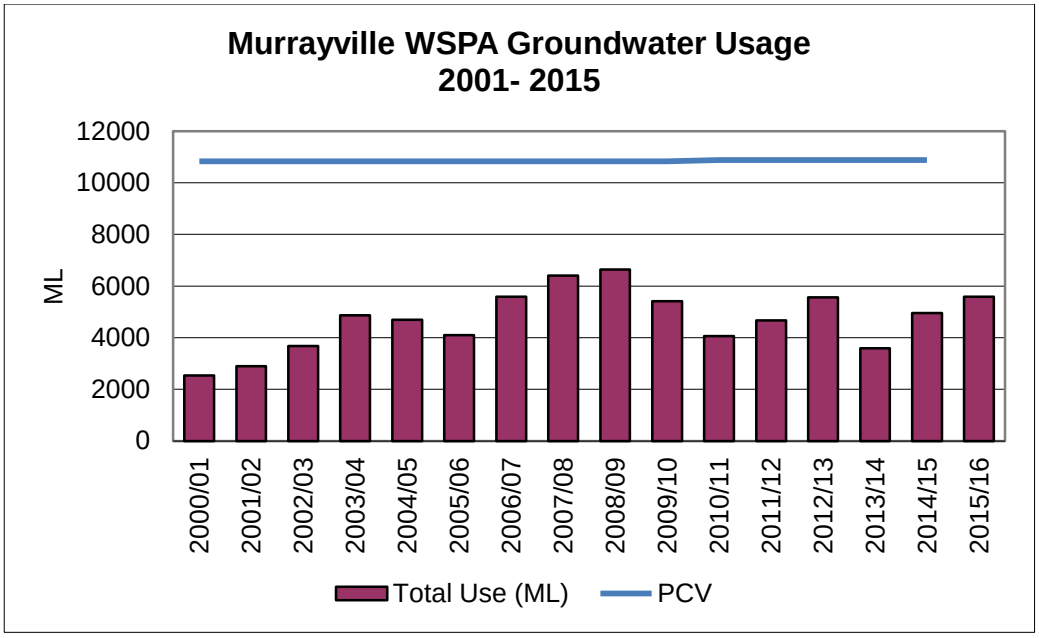
Of the 32 licences in the WSPA, 20 were utilised for the extraction of groundwater. There was just one temporary transfer of water entitlement in 2015/16. One licensee used a volume in excess of the allowable volume for the licence (including transfers and consideration of the "*Three-year rolling average*"). GWMWater has since served a Notice of Contravention under Section 151 of the *Water Act 1989* to the licensee to address the overuse.

Table 3.3: *Water use*

Parameter	2015/16	2014/15	2013/14	2012/13	2011/12	2010/11	2009/10	2008/09
Number of licences	32	32	32	32	32	36(1)	35	35
Total licensed volume (ML)	9,633.5	9,633.5	9,633.5	9,633.5	9,633.5	9,633.5(3)	9,633.8(2)	9,633.8
Total use (ML)	5,581.18	4,961.15	3,585.51	5,568	4,667.0	4,057.8	5,415	6,638
Use of licensed volume (%)	57.94%	51.5%	37.22%	57.80%	48.4%	42.1%	56.2%	68.9%
PCV (ML)	10,883	10,883	10,883	10,883	10,883	10,883	10,883	10,883
Use of PCV (%)	51.28%	45.59%	32.95%	51.16%	42.9%	37.3%	49.8%	61%

Notes
(1) The number of licences increased as some were split across management zones to assist assessment and reporting.
(2) There was an error in reporting total allocated volume which has carried through until 2008/09 when it was identified. The volume allocated has not changed since 2004/05. The error occurred in the process of accounting for temporary transfers, with the same volume being transferred each year that the incorrect figure was reported.
(3) Licensed volume adjusted to correct a rounding error detected in 2010/11.

Figure 3.1: *Groundwater usage over time*



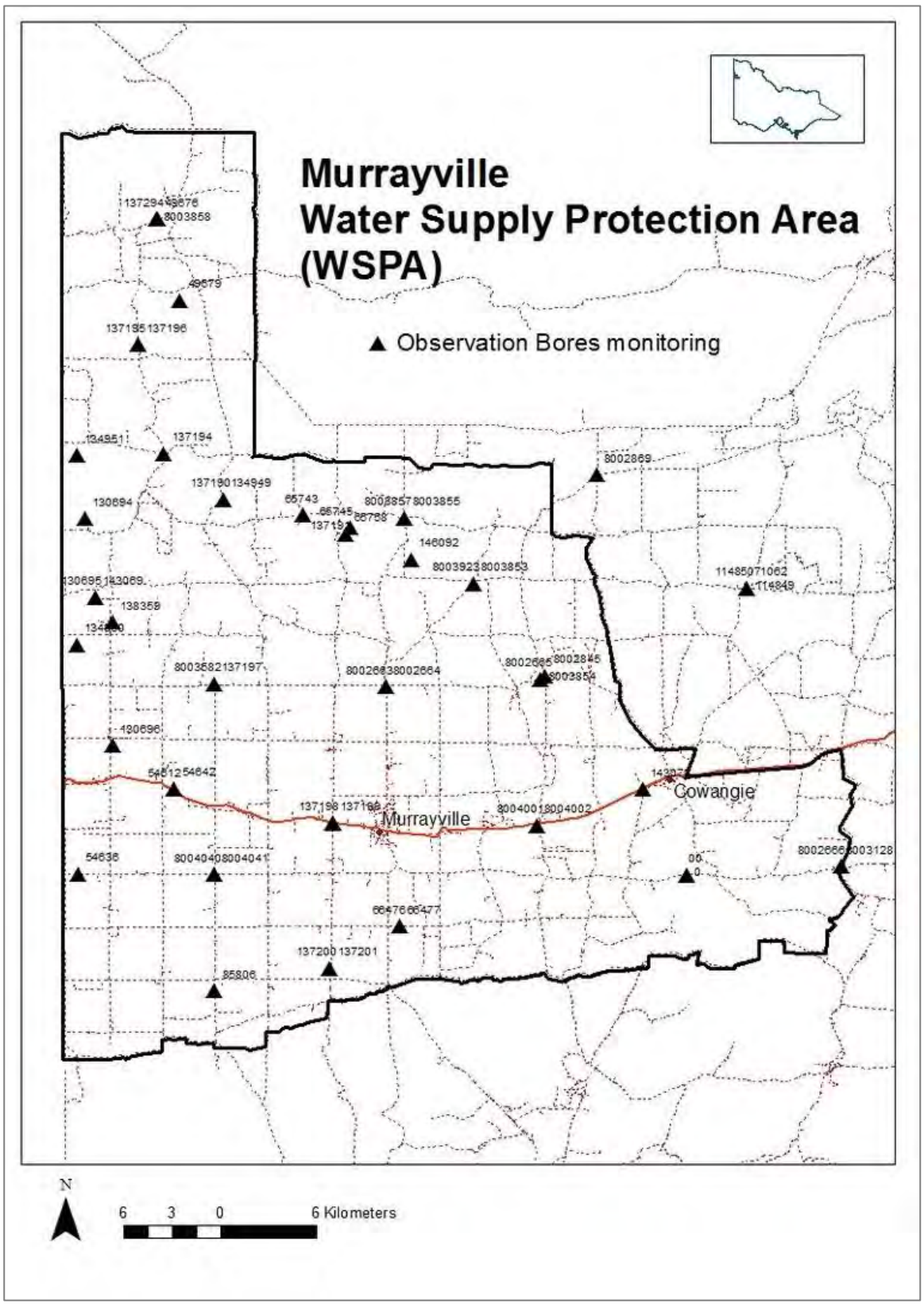
3.2.3 Notification of Domestic and Stock Users (D&S Bore Survey)

The Plan includes a requirement for a domestic and stock bore survey to be undertaken at five yearly intervals. A survey was not required in this reporting period, it is next required in 2019.

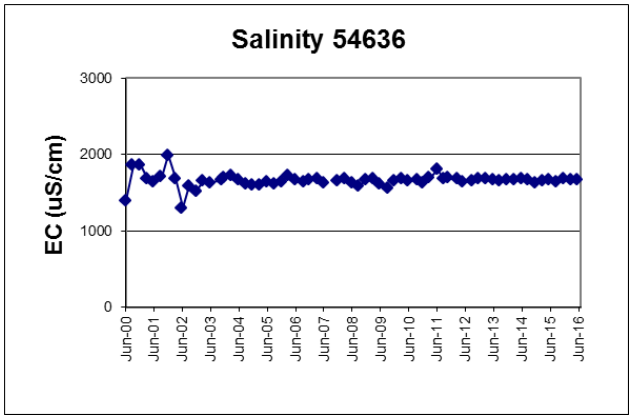
3.2.4 Reimbursement for lowering/deepening of domestic and stock pumps, mills and bores

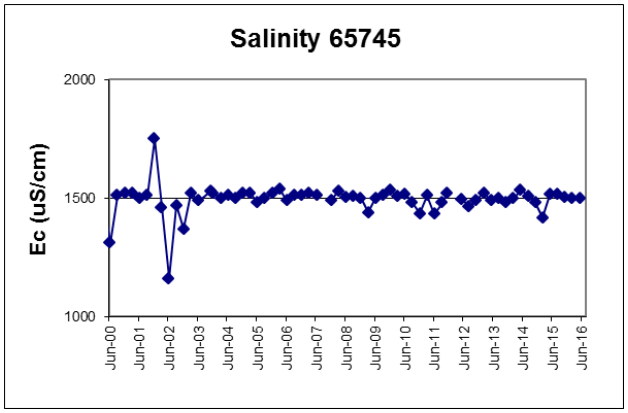
There were no instances of landholders seeking reimbursement for the lowering or deepening of domestic and stock pumps, mills or bores 2015/16.

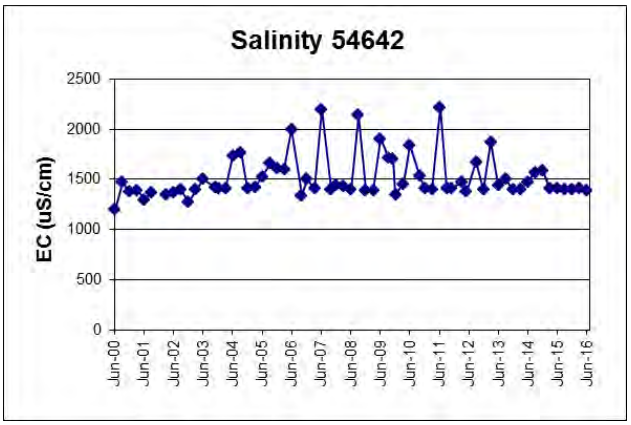
Appendix 1 Murrayville Water Supply Protection Area

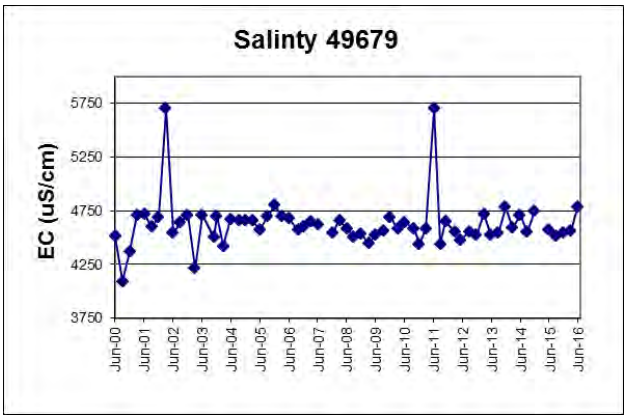


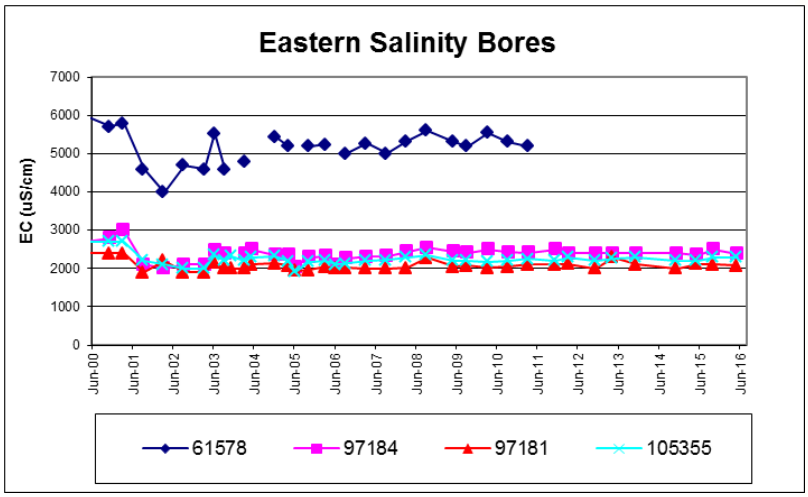
Appendix 2 Salinity readings – Plan bores

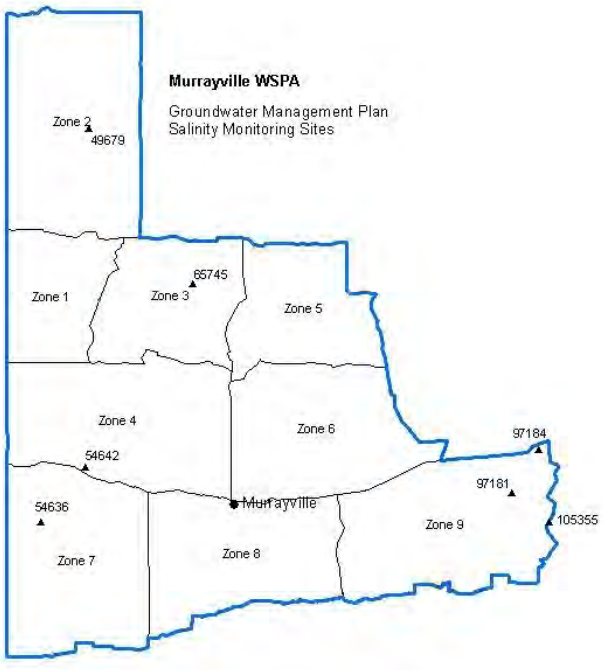




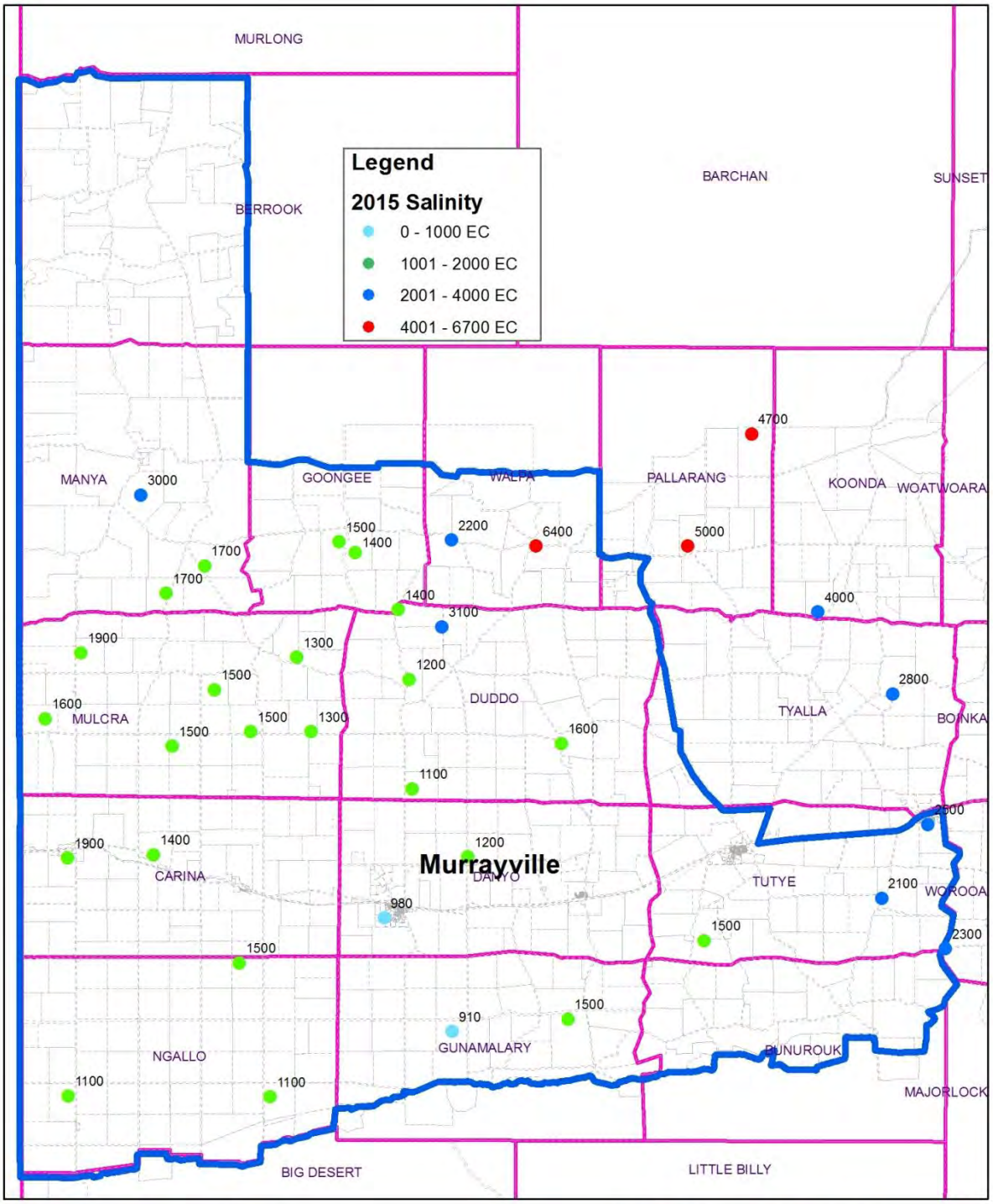








Appendix 3 Salinity sampling domestic and stock bores - November 2015



File:

GWMWater

Condition of Use:

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Murrayville Salinity Sampling 2015

Scale:
Scale: **1:250,000**
Original Sheet Size: **A4**
Print Date: **March 2016**
Datum: **Geocentric Datum of Australia (1994)**
Projection: **UTM Map Grip of Australia**
M.G.A. Zone 54

N

Salinity readings – Domestic and stock bore sampling results (2005-2015) by location (Parish)