



**Shepparton Irrigation Region
Water Supply Protection Area
Management Plan (Groundwater)**

ANNUAL REPORT FOR THE YEAR ENDING
JUNE 2009

Foreword

This report is submitted to the Minister for Water, the Goulburn Broken Catchment Management Authority and the North Central Catchment Management Authority in accordance with Section 32C of the *Water Act 1989*. A copy of this report is available for inspection at the Tatura office of Goulburn-Murray Water (G-MW), or upon request. A notice of report availability will also be published as required by Section 32D of the *Water Act 1989*.

The purpose of this report is to detail Goulburn-Murray Water activities administering the Shepparton Irrigation Region Water Supply Protection Area Groundwater Management Plan (the Groundwater Plan), and provide information that is required to be reported under the Plan.

Area	Shepparton Irrigation Region Water Supply Protection Area (SIRWSPA)
Segment	Groundwater
Area Declared	September 1995
Plan Approved	1999
Scheduled Plan Review	No review date specified in the plan
Implementation Authority	Goulburn-Murray Rural Water Corporation
Relevant CMA	Goulburn Broken Catchment Management Authority and North Central Catchment Management Authority
Report Period	1 July 2008 – 30 June 2009

Since approval of the Groundwater Plan in 1999, G-MW has successfully implemented the metering and monitoring program required under the Plan. There are ongoing elements of the management plan; which require longer term planning, consultation and negotiations with landholders. For example, new operational issues arise annually and can impact on plan implementation; such as new bores requiring meter fitting or existing bores requiring meter maintenance or replacement. G-MW continues to actively address these issues to ensure prompt resolution or completion.

This report identifies the following issues that require consideration by G-MW and the Department of Sustainability and Environment (DSE) relating to the implementation of the Groundwater Plan:

1. G-MW monitors shallow groundwater levels across the SIRWSPA through a network of 3,800 groundwater observation bores. A watertable map is produced annually based on winter (August) shallow groundwater levels and is available by the end of September each year.

Risk to land productivity from high watertables only remains in small and isolated parts of the SIRWSPA and these regions are continuing to contract. Shallow water table levels continue to fall over much of the region, and are likely to be adversely affecting many users reliant on a shallow groundwater as a resource.

There has been a continuing decline in the watertable between August 2007 and August 2008. Only a tiny area of the eastern Rochester Irrigation Area (~85ha) showed little change in area bounded by 0m and 1m contours. All other regions across the SIRWSPA experienced a large contraction in the areas bounded by the 1m, 2m and 3m watertable contours. This is probably resulting from the continuation of lower than average rainfall recorded in various locations across the region in the past season. This change could also be attributed to low surface water allocations and increasing reliance on pumping shallow groundwater for resource use.

2. Thirty one percent of licensees with irrigation bores complied with G-MW's request for a groundwater sample during 2007/08. This is an increase on the previous reporting period 2006/07, which had a return rate of twenty six percent. G-MW is continuing to provide more prompt feedback on salinity results to participating licence holders in an effort to improve the return rate in the salinity sampling program. G-MW last year reviewed its communication in the annual salinity sample mail out by providing improved information to licensees on the purpose and benefits of contributing to the program. A survey was also conducted of licence holders to better understand the impediments to returning samples and assess how the salinity sample program can be improved. This resulted in a slight increase in samples returned, and some feedback from licence holders on ways to make further improvement.
3. The overall decrease in metered usage may be attributed to further decline in shallow groundwater levels, resulting in greater difficulty accessing shallow groundwater and hence leading to reduced bore yields.

Sixty-three (63) bores recorded use in excess of entitlement in the 2008/09 season. Managing use within licence entitlement is expected and communicated annually to all licensed groundwater users within the SIRWSPA. The compliance strategy that has been undertaken to manage use within entitlement has already contributed to a reduction in use in excess of entitlement in the past two seasons.

Despite achieving initial success, G-MW will continue to communicate the aims of the compliance strategy to all licence holders in 2008-09 with the continued support of all key SIRWSPA stakeholders. The target for managing licensed use remains at zero use in excess of entitlement, however G-MW recognises that managing use within entitlement in the SIRWSPA must also include consideration of the catchment management objectives of the Groundwater Plan.

4. In response to the continuing dry climatic conditions, strategic changes to existing Northern Victorian irrigation systems and key management issues, G-MW's groundwater resource and catchment managers are working together to develop adaptive management strategies to deal with the changing environment in the Shepparton Irrigation Region. A conceptual approach will be considered in the upcoming Northern Region Sustainable Water Strategy.

Signed

David Stewart
MANAGING DIRECTOR

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1. Introduction

1.1. The Region

The Shepparton Irrigation Region (the Region) was declared a Water Supply Protection Area in September 1995. The Region includes the Murray Valley, Shepparton, Central Goulburn and Rochester Irrigation Areas and some adjacent dryland areas (see Figure 1 below). The majority of the Region falls within the area covered by the Goulburn Broken Catchment Management Authority with a small part of the Rochester Irrigation Area covered by the North Central Catchment Management Authority.

A Consultative Committee prepared the Shepparton Irrigation Region Groundwater Management Plan (the Groundwater Plan), which was approved in 1999. The Groundwater Plan was developed to augment the Shepparton Irrigation Region Land and Water Salinity Management Plan (the Salinity Plan). The objectives and implementation measures of the Salinity Plan have since been absorbed into the wider agricultural, social and environmental resource management objectives specified in the Goulburn Broken Catchment Management Strategy.

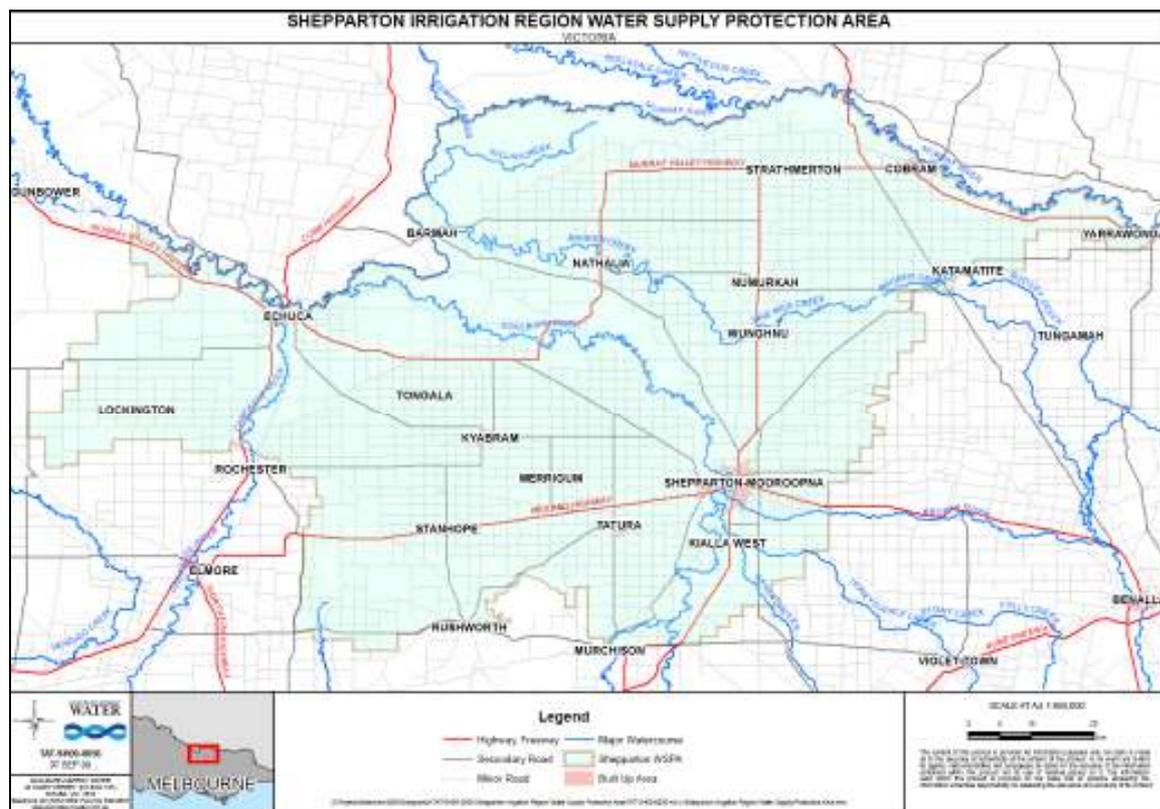


Figure 1 - Shepparton Irrigation Region Water Supply Protection Area

The area covered by the Groundwater Plan is 725,000 hectares (ha) of which 430,000 ha occurs in the Irrigation Areas and is suitable for irrigation. Around 280,000 ha are irrigated in most years. Most of the irrigated area is used for pasture production (246,000 ha or 88%) usually for dairy production, about 9,600 ha (3%) is used for horticulture, and the remainder is made up of grain crops, seed crops, lucerne, forage crops and vegetables.

Of the approximate 7,300 farms within the Irrigation Areas, 3,600 (49%) are “mixed” farms,

3,100 (42%) are dairy farms and 650 (9%) are horticultural farms.

The Region is one of the major food processing areas of Australia with large local and international companies such as Bega, Fonterra, Plumrose, Unilever (Rosella), Tatura Milk (now owned by Bega), Murray-Goulburn, SPC-Ardmona, Leggos, Campbell Soups and Girgarre Foods (Heinz) established within its boundaries.

However, the economic benefits to the region, state and nation brought about by widespread irrigation practises in the Region over the last century have come at an environmental cost. The cost is manifest in high and shallow groundwater tables, saline groundwater and associated environmental degradation. Despite these challenges, agencies and the Region's community have worked in partnership over recent decades to improve irrigation efficiency and environmental outcomes.

Other groundwater management plans have been developed to manage overuse of groundwater resources that could result in excessive declines in groundwater pressures within those Water Supply Protection Areas covered by such plans.

The Groundwater Plan is unique to Victoria by comparison to other groundwater management plans in both its intent and management measures.

Section 2 of the Groundwater Plan states: *"The primary objective of this Plan is to support the implementation of the Salinity Plan which aims to protect the Region's agricultural productivity and natural resources. It will do this by encouraging and supporting regular and responsible pumping of groundwater to provide salinity control while protecting both the groundwater resource and the rights of groundwater resource users."*

The Goulburn Broken Catchment Management Strategy focuses more particularly on encouraging regular groundwater pumping to provide salinity and partial groundwater control. It encourages groundwater use within agreed salinity limits which are designed to promote sustainable land and water management practises.

Goulburn Murray Water's primary interest includes equitable groundwater resource management to allow sustainable usage of that resource within licence conditions. Goulburn-Murray Water also has a statutory responsibility to consider matters under section 40 of the *Water Act 1989*, which includes, determining effects on existing users, the sustainability of the groundwater resource and the environment (including connections between groundwater and surface water).

The Groundwater Plan does not have a Permissible Consumptive Volume (PCV) against which licence entitlements are measured or mechanisms to control water usage on a seasonal basis. Groundwater level monitoring is not undertaken with the specific aim of tracking where excessive declines in groundwater levels are occurring, rather monitoring is undertaken to allow watertable and salinity control works to be targeted in the high risk, high watertable areas.

1.2. Hydrogeology

The riverine plains of the Shepparton Region are alluvial deposits which have a comparatively flat surface. The depth of alluvium above bedrock varies, typically ranging from 20 metres to 120 metres with a maximum recorded thickness of 250 metres. The

nature of the sub-surface strata is complex.

The alluvial deposits are divided into three principal geological units: the Renmark Group, the Calivil Formation and the Shepparton Formation.

The Renmark Group and Calivil Formation (often considered one hydrogeological unit) are unconsolidated gravels and sands which lie unconformably upon weathered pre-Cainozoic basement rock. These sediments were deposited during the Tertiary period along broad valleys by rivers flowing from the highlands onto the plain. The Renmark Group/ Calivil Formation forms three major aquifers that generally follow the course of today's Murray, Goulburn and Campaspe Rivers (commonly referred to as "Deep Leads"). These aquifers broaden toward the north and west and merge to form a continuous sheet under much of the south-eastern Murray Basin.

The Shepparton Formation overlies the Calivil/Renmark aquifer and forms the uppermost geological formation (usually 80 to 100 metres thick) over most of the region. The Shepparton Formation predominantly comprises alluvial silts and clays interspersed with meandering channels of sands and gravels, typically up to 5 metres thick, and often discontinuous. The aquifers of sand and gravel are locally capable of supplying significant quantities of water. However, due to the highly variable lithology of the Shepparton Formation, the occurrence of good quality groundwater available in useful quantities is highly irregular. For management purposes the unit is often divided into the Upper and Lower Shepparton Formation.

As defined by the Groundwater Plan, aquifers which are wholly or in part within 25 metres of surface are defined as "shallow aquifers", and aquifers at greater depths than that are defined as "deep aquifers". Since 1999, other Groundwater Management Plans have been developed, which cover the deep lead aquifers in the Murray Valley (Katunga WSPA) and Lower Campaspe (Campaspe Deep Lead WSPA) areas of the Region respectively. The Groundwater Plan has not been modified to reflect current management relating to the deep lead aquifers within the SIRWSPA.

1.3. Salt Disposal

The Salinity Plan was developed with the aim of managing shallow groundwater levels and land salinity in the Region. As discussed above, an important outcome of the Salinity Plan has been the establishment of the Groundwater Plan for the SIRWSPA. The main aim of the Groundwater Plan is to manage private irrigation groundwater use to ensure sustainability of the region's land and water resources. The secondary aim of the Groundwater Plan is to equitably manage the groundwater resource.

A key aspect of the Groundwater Plan, as originally envisaged, was management of salt disposal from the Region. The Region is able to export salt under the Murray Darling Basin Salinity Management Strategy, and private groundwater bores have provided a part of the region's salt disposal capacity.

The requirement for private irrigation bores to provide regional salt disposal was reviewed in April 2007 under the Shepparton Irrigation Region Catchment Implementation Strategy. This review concluded that it is now considered unlikely that winter salt disposal from

private shallow irrigation bores will provide tangible benefits for salinity control or protection against rises in pumped groundwater salinity over the next 100 years. The watertable level reduction due to groundwater pumping for irrigation should allow sufficient leaching of salt from the root zone by irrigation and rainfall to provide salinity control for pastures. Accordingly requirements or options for off-farm disposal from private shallow irrigation bores have been removed. This means that shallow groundwater users will no longer have an off-site salinity disposal entitlement allowance on their groundwater licence.

Upon groundwater licence renewal all remaining salinity disposal entitlement is being removed.

1.4. Catchment Management Authority Groundwater Activities

The Goulburn Broken Catchment Management Authority delivers several natural resource management programs in the Region with the aim of ensuring land and water resources are protected and enhanced as well as improving the region's social wellbeing, environmental quality and productive capacity in a sustainable manner.

The Shepparton Irrigation Region Catchment Implementation Strategy (SIRCIS) includes a number of core programs including the Groundwater and Salt Management Program (GSMP). This program includes a strategic planning sub-program to provide adaptive management capacity. The adaptive management issues have recently included issue related to salt storage and mobilisation, water balance changes and optimising institutional arrangements, with an emphasis on the community and the environment.

The Key Performance Indicators (KPI) report is a method being used under the GSMP to provide a standard method for evaluating and reporting important aspects of the program performance to key stakeholders, including government funding bodies, statutory and regulatory agencies, and community organisations and groups.

The annual KPI reports on achievements versus set targets and mainly focuses on the implementation aspects of the GSMP program. The implementation works include the Farm Exploratory Drilling Scheme (FEDS) designed to investigate suitable groundwater pumping sites in areas of high watertables, installation of Private Bores funded by incentives and investigation and installation of public pumps where private pumping is not feasible or economic.

Three categories of Key Performance Indicators have been used including:

- Operations
- Management
- Environmental

The number of successful FEDS was lower than previous years because of the extended drought conditions which led to lower watertables over most of the Region. Similarly the reduced groundwater levels have led the program to focus on private pumping rather than public pumping. The increased area of salinity protection from all works undertaken in 2007/08 was estimated 3700 ha, taking the total area of protection to 46,830 ha from the program funded works to date.

2. Goulburn-Murray Water's Duties under the Groundwater Management Plan.

Goulburn-Murray Rural Water Corporation (G-MW) is the authority responsible for managing and administering the Groundwater Plan.

The Groundwater Plan requires that G-MW undertakes:

- groundwater volumetric usage meter fitting to all licensed irrigation bores existing prior to 1 July 1999 with usage of >20ML/a at the cost of G-MW (note that bores installed for licensed use since 1 July 1999 must be metered at the licensee's cost)
- groundwater volumetric usage meter reading – post irrigation (summer) season;
- groundwater level monitoring;
- groundwater level reporting (August watertable map production);
- groundwater salinity assessments;
- administering groundwater licensing within the prescriptions of the Groundwater Plan and in accordance with G-MW's statutory responsibility under the *Water Act 1989*; and
- review and report annually to the Minister administering the *Water Act 1989* on the prescribed activities of the plan

This report is the ninth annual report to the Minister and presents the outcome of the above key activities undertaken in the period 1st July 2008 to 30th June 2009.

3. Works Program

The required works program in accordance with the Groundwater Plan and completion dates are shown in the table below:

Table 1 – Works program in accordance with the Groundwater Plan

Works	July 1999 to June 2009	08/09
Meters Fitted: Installation Program ¹	432	Complete ²
Meter Reading (summer season)	Complete	Done - For compliance purpose only
Meter Reading (winter season)	Complete	Ongoing
Groundwater Level Monitoring	Complete	Ongoing
August Watertable Map Reporting	Complete	Ongoing
Groundwater Salinity Assessment	Complete	Ongoing
Groundwater Licence Administration	Complete	Ongoing
Annual Reporting to the Minister	Complete	Ongoing

¹ Refer to Dot Point 1 in Section 2 (i.e. a meter must be fitted to all licensed irrigation bores existing prior to 1 July 1999 with usage of >20ML/a at the cost of G-MW).

² Total meters installed since 1999/00 as per Dot Point 1 is 432.

4. Groundwater Licence Entitlement

The groundwater licence entitlement volumes allocated to 30 June 2009 for extractive use purposes is shown below in Table 2.

Table 2 – Licence volume totals as of 30 June 2009

WSPA	Column 1 Total No. Licences	Column 2 Licensable (ML)	Column 3 Domestic & Stock (ML)	Column 4 Watertable & Salinity Control (ML)	Column 5 Total (ML)
Shepparton Irrigation Region	1,234	221,679	1,147	19,351	242,177

Notes:

Column 1 *Number of Licences*

Column 2 *Total volume of groundwater allocated under licence (excludes Domestic & Stock).*

Column 3 *Domestic & stock allowance*

Column 4 *Includes Public Pump and bores licensed for off site disposal of groundwater for watertable and salinity control purposes (e.g. private dewatering). This figure no longer included salt disposal allocations held by Salinity Plan Bores.*

Column 5 *Total groundwater allowance*

Figure 2 over page shows the distribution of the licensed groundwater extraction bores and Licensed bores with metered use

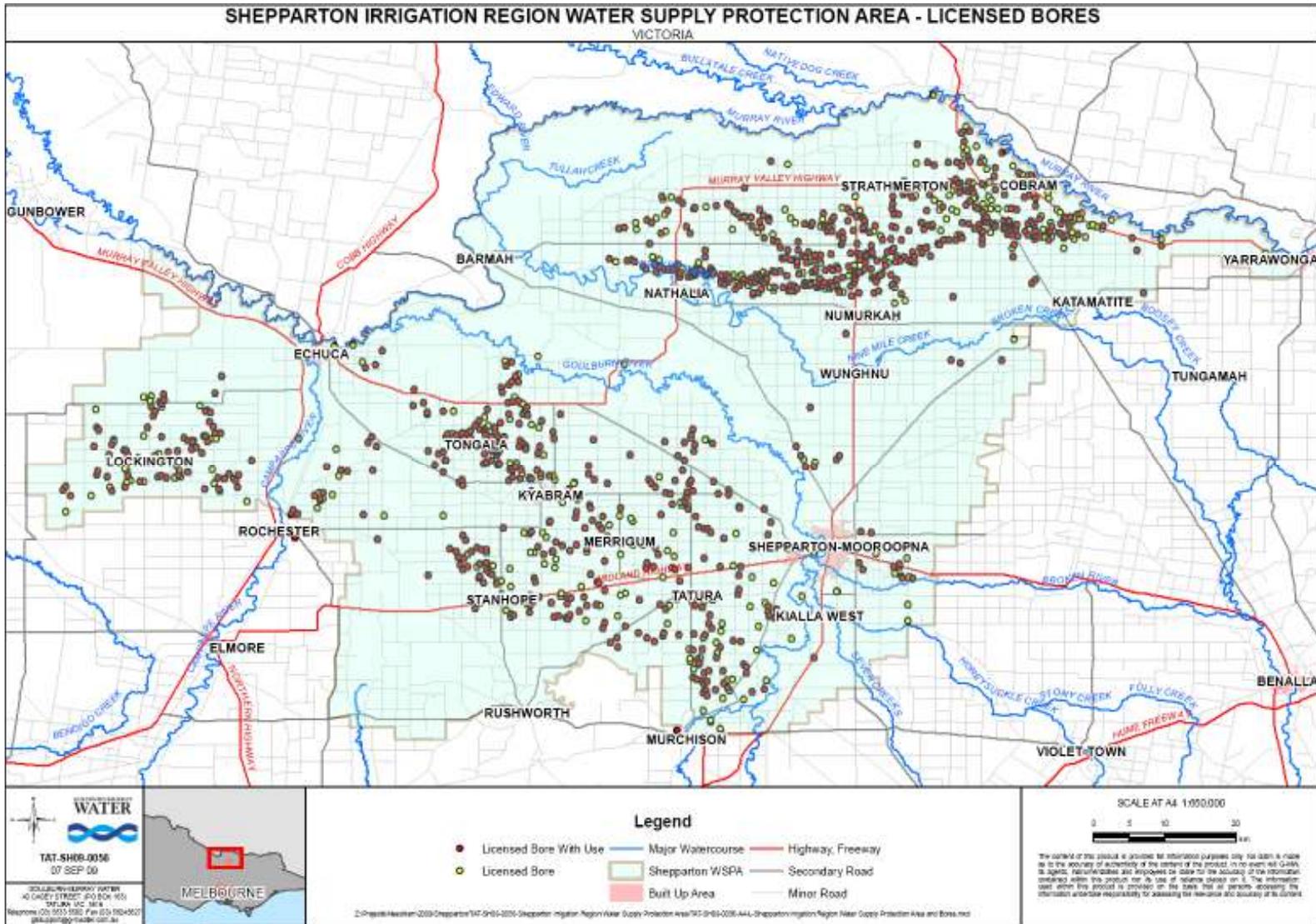


Figure 2 - Licensed bores and bores with usage within SIR WSPA

5. Metered usage

Volumetric flow meters are required to be fitted at the owner's expense to all new licensed groundwater irrigation bores. The meters are to be fitted to meet G-MW's specifications. All private dewatering bores are also fitted with a volumetric flow meter.

In accordance with the Groundwater Plan, all licensed irrigation bores with an annual usage of more than 20 ML³ installed prior to 1 July 1999 have had funding provided for the supply and fitting of a G-MW approved volumetric flow meter. Details on the status of works completed under this program are shown in section 3 of this report.

5.1. Metered Groundwater Bores and Usage

Nine hundred and twenty four irrigation bores were fitted with a volumetric flow meter at the end of the reporting period. Of these, the number verified as having usage data for the full reporting period totalled 779. The difference between the total number of metered bores and those with verified use is explained by the fact that 145 metered bores were not operational during 2008-09. A greater number of non operational bores was expected due to the continued shallow water level decline; which has lead to many shallow bores systems no longer being able to pump groundwater (i.e. the shallow groundwater level is below the intake of many shallow bores).

Data from meters assessed as being reliable are considered to be representative of groundwater use in the reporting period. Metering data is stored and maintained by G-MW.

The following table sets out the volume used as recorded by fully operational meters for the year to 30 June 2009.

Table 3 – Metered bore details as of 30 June 2009

WSPA	Column 1 Total No. Metered Bores	Column 2 Total No. Bores With Verified Metered Use	Column 3 Total Entitlement of Bores with Metered Use (ML)	Column 4 2008/09 Metered Bore Use (ML)
Shepparton Irrigation Region	924	779	155,358	57,154

Notes:

- Column 1* *Number of licensed irrigation bores fitted with a meter fitted with a volumetric flow meter at the end of the reporting period.*
- Column 2* *Number of licensed irrigation bores fitted with a meter that have been verified as being operational for the full reporting period.*
- Column 3* *Total licensed entitlement of the irrigation bores numbered in Column 1*
- Column 4* *Total volume of metered groundwater use from irrigation bores numbered in Column 2*

Figure 2 over page shows the distribution of licensed irrigation bores that supplied data summarised in Table 3.

³ 20 ML is the annual groundwater usage defined as the upper limit for low capacity bores in the SIR and is a figure endorsed by the former SIR Groundwater Management Plan Working Group in 2000.

Groundwater usage from the licensed irrigation bores with meters considered as being reliable in this reporting period, was 57,154 ML. This represents a total use of 36% of the total licensed entitlement for those bores. The metered usage volumes for the past seven years are shown below in Figure 3.

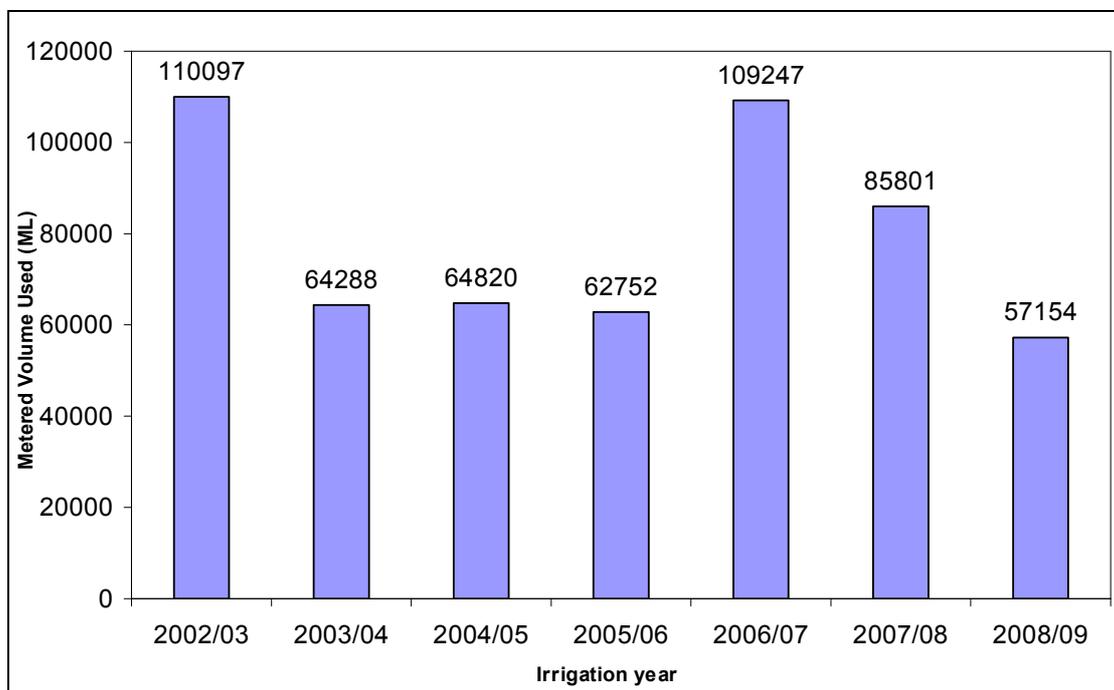


Figure 3 - Total metered usage in the SIRWSPA since 2002/03

The overall decrease in metered usage has occurred despite the unprecedented drought conditions continuing into 2008/09 combined with record low surface water allocations. Whilst there has been continued reliance on resource use from groundwater to meet the shortfalls in surface water irrigation entitlement, shallow groundwater users appear to be having greater difficulty accessing groundwater. Many shallow groundwater pumping bores can no longer operate due to water table levels dropping below the bore; or in other circumstances, limited groundwater access is possible with significantly reduced bore yields.

5.2. Use in Excess of Groundwater Licence Entitlement

There has been an increase since 2007/08 in metered irrigation bores that exceeded licence entitlement. Of the 779 metered licensed irrigation bores considered as providing reliable usage data over the reporting period, a total of 39 (4.5%) had a recorded usage that exceeded their licence entitlement. The total volume used in excess of entitlement increased from 2274 ML to 7609 ML. While overall usage in the SIRWSPA is declining, possibly because a number of users are having difficulty accessing the resource, it appears some of those that can access it are pumping above entitlement to compensate for the lack of water from other sources. The apparent increase in use in excess of entitlement is inconsistent with the decrease of shallow groundwater use in 2008/09 compared to 2007/08. For further discussion on use in excess of entitlement see section 9.2 of this report.

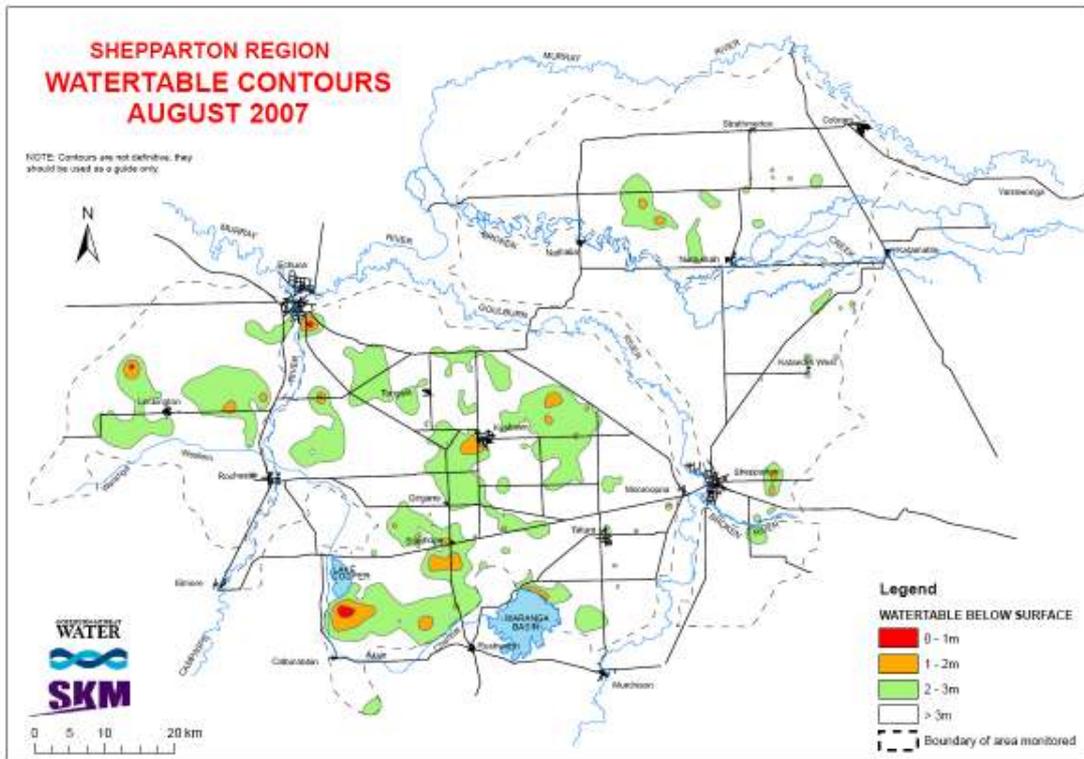
6. Groundwater Monitoring and Reporting

Groundwater levels have been collected from 3,120 observation bores in the SIRWSPA groundwater observation bore network throughout the reporting period.

The Groundwater Plan specifies that a shallow aquifer watertable map be prepared annually on the basis of groundwater levels recorded in August (when impacts from irrigation are expected to be minimal). The August watertable map during the current reporting period is presented in Figure 4. It is clear that while there is risk to land productivity in some small regions of the SIRWSPA, the need for Groundwater Plan salinity and water table control measures in these affected areas is continuing to decrease.

Potentiometric level data resulting from observation bore monitoring were recorded in the State Groundwater Management System (GMS). Reporting of individual groundwater observation bore hydrographs is not a requirement of the Groundwater Plan.

a) August 2007



b) August 2008

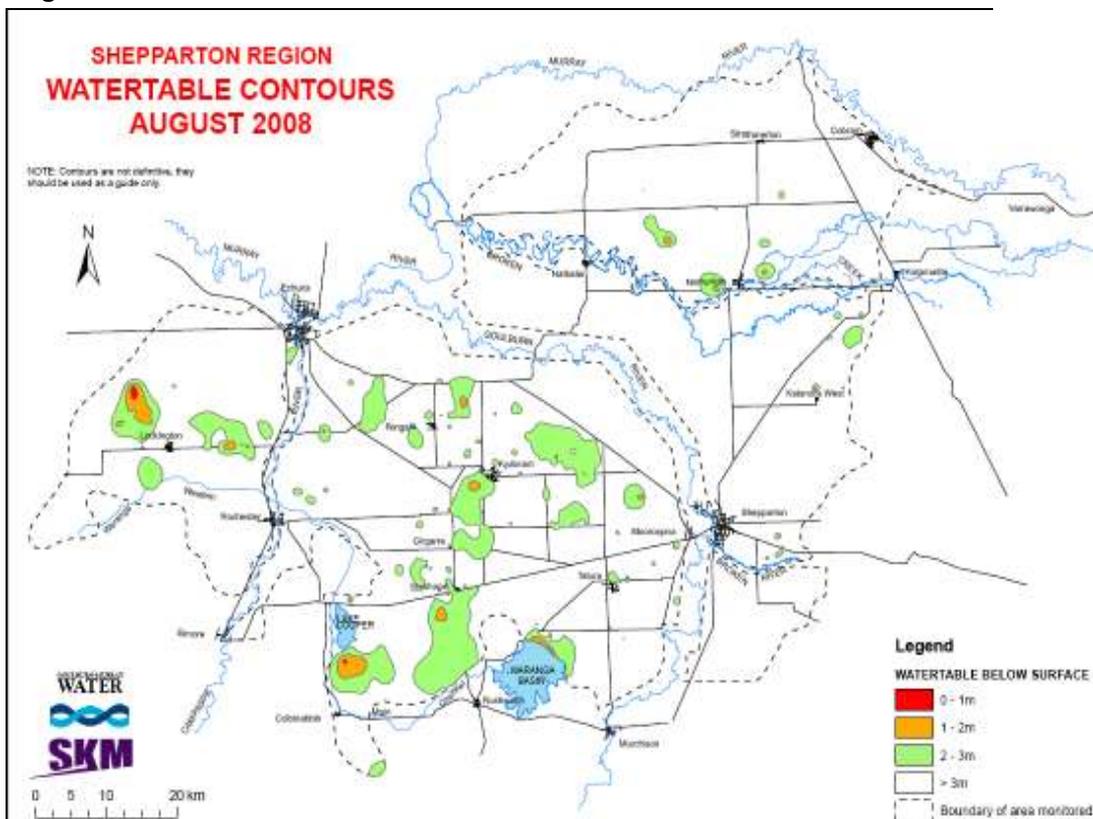


Figure 4 – Watertable contours for the SIRWSPA for year ending August 2007 (a) and August 2008 (b)

6.1. Groundwater Monitoring Costs

The table below summarises the cost of observation bore maintenance, groundwater level monitoring and analysis and production of the August watertable map in the SIRWSPA during the current reporting period.

Table 4 – Groundwater monitoring costs in the SIRWSPA for 2008/09

No. Observation Bores	Observation Bore Monitoring	Behaviour Analysis	Total cost of Bore monitoring and Behaviour Analysis
3,120 ⁴	\$333,800	\$18,353	\$352,153

⁴ Approximately 1,194 are used to construct the August 2008 watertable map. A further 1,926 observation bores are monitored and maintained at varying frequencies within the SIRWSPA.

7. Transfer of Water Entitlement

Transfer of licence groundwater entitlement (temporary or permanent) is not permitted in the SIRWSPA.

8. Data Review

8.1. Groundwater Level Trends

In August 2008 shallow watertable levels were generally within 3 metres of the ground surface across about 7.6% of the SIRWSPA (42 721 Ha), compared to around 14.5% (81 783 Ha) in August 2007. Note that in 1997 the percentage of land area in the SIRWSPA with water table levels within 3 metres of the ground surface was 54% (306 353 Ha). This is represented in Figure 5.

Nearly all districts across the SIRWSPA experienced water table decline in areas bounded by the 1 metre, 2 metre and 3 metre watertable contours between August 2007 and August 2008 and; as for the previous year, this change occurred most notably in the Murray Valley and Central Goulburn irrigation areas (Figure 4). Across the SIRWSPA the total area bounded by 1 metre contours was 0.03% in August 2008 compared with 6.4% in August 1997. Overall the total area within 1m of water table decreased by 308 ha between August 2007 and 2008.

The continued rate of overall water table decline observed in the 12 months to August 2008 may be attributed to the continuation of significantly lower than average rainfall across the Region for the same period, particularly in the late winter/ spring period of 2007.

The “lower than average” groundwater recharge conditions within the SIRWSPA can be attributed to:

1. significantly reduced natural rainfall recharge to the shallow aquifer system and,
2. a dramatic reduction in surface water allocations to irrigators.

Since 1996, the above factors have resulted in watertable levels across the SIRWSPA which are not reflective of shallow watertable conditions observed in the previous decade, as shown in Figure 5.

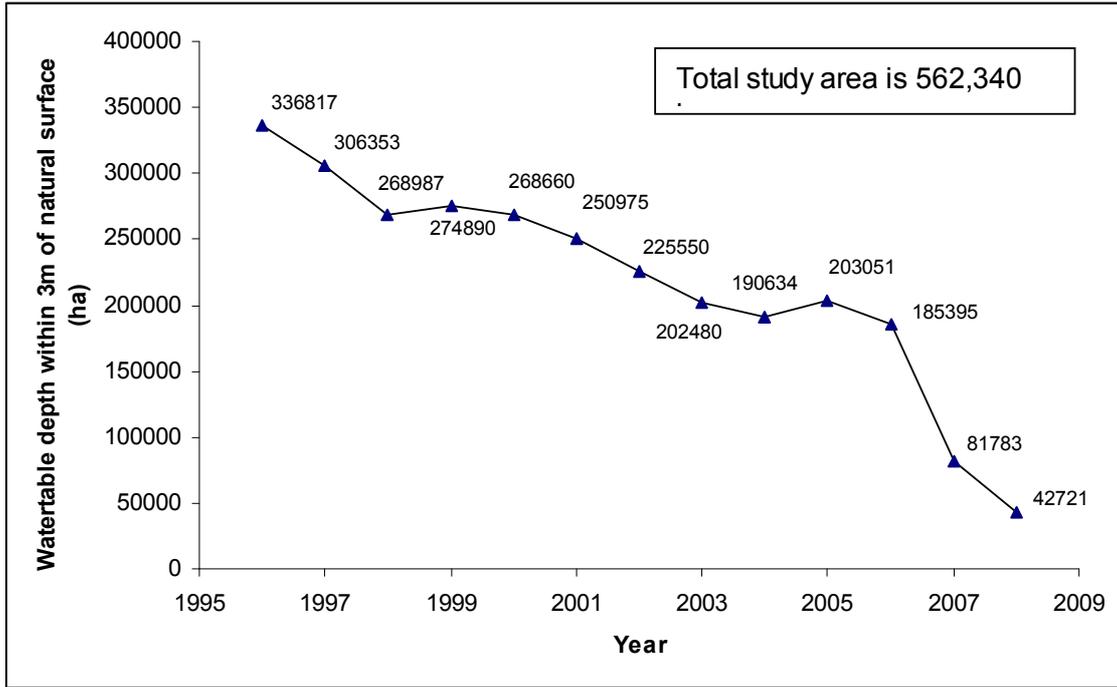


Figure 5 – Land coverage of the SIRWSPA (ha) with watertable depth within 3 metres of natural surface

8.2. Groundwater Salinity

G-MW conducts a salinity mail-out during the irrigation season each year. A sample bottle is provided to registered owners of all licensed shallow (i.e. <25m deep) irrigation bores within the Region. Included is a pre-paid return envelope and an accompanying letter requesting that a groundwater sample be collected during operation of the irrigation bore and returned to G-MW for salinity testing (as electro-conductivity, EC). As shown in Table 5, 31% of licensed groundwater users (irrigation and commercial use) returned a groundwater sample for analysis during the current reporting period

Table 5 – Salinity sampling summary for 2008/09

WSPA	Column 1 Sample Requests	Column 2 Samples returned from Mail-Out	Column 3 Samples from Other Sources	Column 4 Total No. Samples
Shepparton Irrigation Region	691	212	0	212

Notes:

- Column 1 *No. of sample bottles mailed to licensed groundwater users as part of the salinity mail-out during the irrigation season (includes bores licensed for purposes other than irrigation).*
- Column 2 *No. of groundwater salinity samples obtained in response to the Mail-out during the current reporting period*
- Column 3 *No. of groundwater salinity samples obtained from other sources (such as site inspection) during the current reporting period*
- Column 4 *Columns 2 + 3*

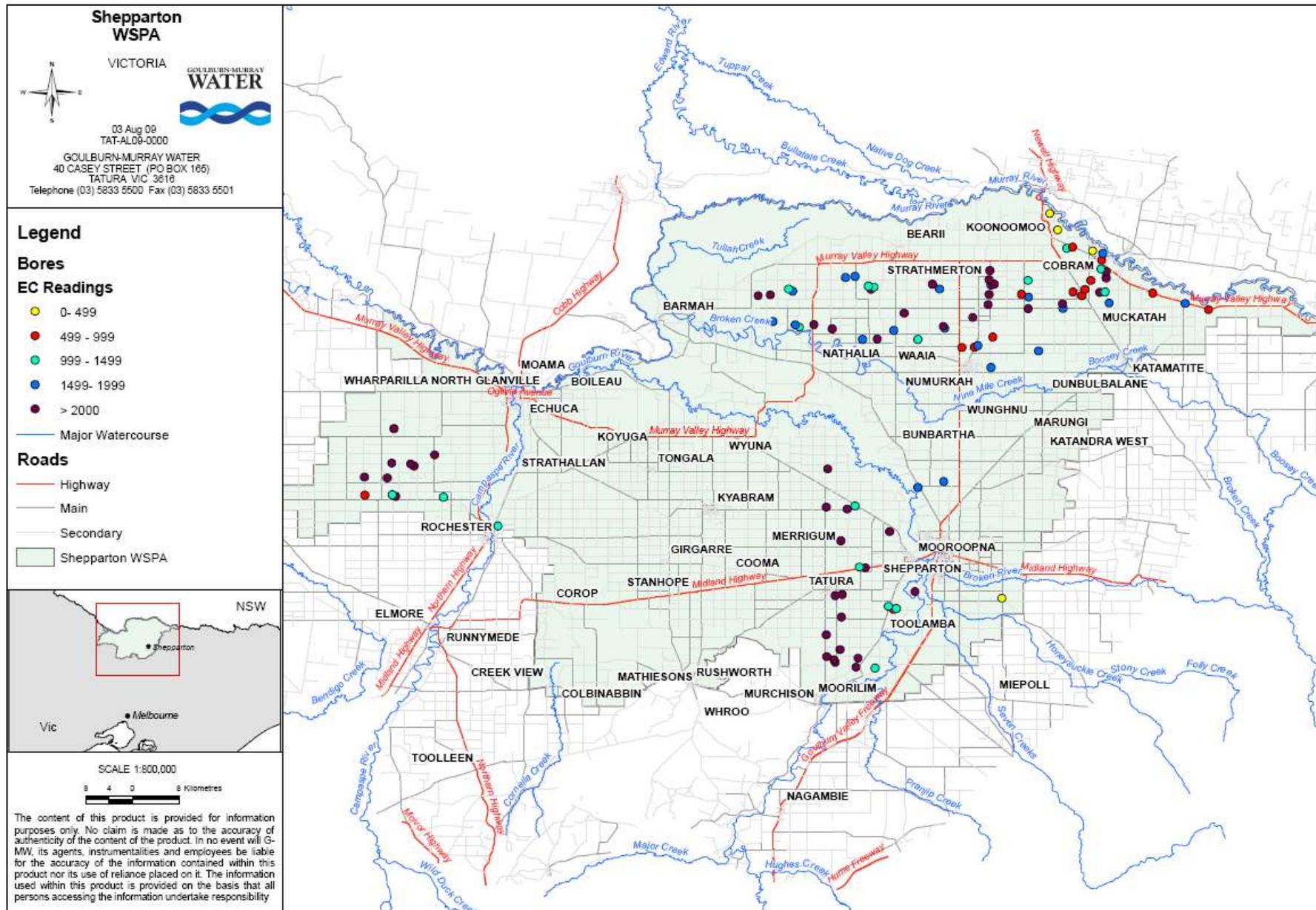


Figure 6 – The distribution of groundwater salinity samples received for SIRWSPA irrigation bores

Figure 6 shows the distribution of irrigation bores for which groundwater salinity data is available during the reporting period. The figure highlights that groundwater salinity in the SIRWSPA is highly variable due to the complex nature of the shoe-string sands that make up the Upper Shepparton Formation aquifer. However from the above distribution it can be observed that shallow groundwater quality is generally better in the eastern Murray Valley and poorer in the region between Tatura and Echuca. Refer to section 9.1 for further discussion on salinity sampling.

9. Discussion of Issues Arising

9.1. Response from Annual Groundwater Salinity Sampling Program

It is a condition on groundwater irrigation licences in the SIRWSPA that licensees are required to submit a sample of groundwater from their licensed irrigation bore when requested to by G-MW. Typically this is done by G-MW officers during groundwater licence renewal assessments. G-MW officers are generally not able to collect samples when meter reading as meters are read annually and at the end of the irrigation season when licensed bores are typically not in operation.

About 31% of licensed groundwater users (irrigation and commercial use) complied with G-MW's request for a groundwater sample during the current reporting period. This is an increase of 5% on the previous reporting period 2007/08. Whilst this is good result it is important to note that the return rate is still low. It is likely that continuing watertable declines and, for many groundwater users, reduced bore yields have contributed to the lower salinity sample rate.

G-MW has endeavoured to improve compliance with the sampling program by providing prompt feedback to licensees on salinity sample results. Accordingly salinity sample results are now sent out at the end of the irrigation year and customers are provided with previous salinity data to allow them to better observe salinity trends from their bore. The letter sent to customers in the annual salinity mail out has also been refined to more clearly highlight the importance and benefits of providing groundwater samples.

In addition to these measures a strategy to improve sample return rate and increase the salinity data collected across the SIRWSPA was implemented in 2008/09. This strategy included two key components:

1. *A brief survey*

A brief survey included as a part of Groundwater Licence renewal or transfer or land ownership site inspections, which gathered data on willingness to participate in the annual salinity program and importantly reasons why (if applicable) licence holders have not returned samples. Some common responses as to why a sample had not been returned previously included:

- first time a sample was requested,
- were too busy/ didn't get around to it,
- G-MW's slow response in returning sample results,

Suggestions of ways to improve amount returned were also received, including:

- Getting quicker response on returning results, from G-MW,
- more frequent monitoring,
- sending samples at different time of the year; and,
- providing salinity results for the entire WSPA.

This survey data will be analysed and used to better the future design and implementation of the annual salinity sampling program.

2. *Field collection of samples*

Ensuring all salinity sample results collected by G-MW field officers during Groundwater Licence renewal or transfer of land ownership site inspections are compulsorily entered into G-MW's Integrated Planning Module database.

9.2. Managing Use in Excess of Entitlement

In early 2007 G-MW developed a compliance strategy to manage licence holders who used in excess of their groundwater licence entitlement. The compliance strategy is modelled on a 'three strikes' approach, which includes a first warning letter, a final warning letter for a second instance and, should use in excess of entitlement occur on a third occasion, prosecution for breach of licence conditions. G-MW has support for this strategy from all Groundwater Plan stakeholders.

The new compliance strategy was communicated to all SIRWSPA licence holders in May 2007 and reminders will continue to be issued on a yearly basis outlining both the strategy as well as legal obligations to managing use within licence entitlement.

A first warning letter was sent to 11 licence holders who were found to have used in excess of licence entitlement in 2007/08. This letter advised groundwater users that once their annual licence entitlement is reached they must cease pumping for the year. Licence holders were reminded that use in excess of groundwater licence entitlement is a breach of licence conditions. They were also advised that any future use in excess of licence entitlement will be addressed through a more rigorous compliance approach and may lead to licence cancellation and prosecution under the *Water Act 1989*.

A second warning letter was sent to 14 licence holders who were found to have used in excess of licence entitlement in 2007/08 and 2006/07. This letter provided advice similar to the first warning letter; however recipients of the second letter were referred to G-MW's compliance unit to instigate legal action upon confirmation that groundwater was used in excess of licence entitlement in 2007/08.

Flow meters are typically read once at the end of each irrigation year, making use in excess of entitlement difficult to monitor, manage and address. A key component of the compliance strategy is a mid season meter reading and compliance check which includes visits to all licence holders who recorded use in excess of entitlement in 2007/08. This compliance check will be conducted in follow up of cases from 2008/09.

Currently there are 3 licence holders being assessed for incurring a 'third' strike in 2007/08 for using groundwater in excess of licence entitlement and may, pending the outcome of investigations, be facing prosecution. All instances (39 recorded) of use in excess of licence entitlement recorded in 2008/09 are currently being verified and where cases are confirmed, relevant licence holders will be sent either a warning letter, or if a repeat occurrence, will be referred to G-MW's compliance unit for investigation.

There are also 17 cases of water theft which occurred in the Shepparton Irrigation Region WSPA for the 2008/09 season and are currently progressing for legal action.

9.3. Future Management Issues in the SIRWSPA

Due to the extended dry climatic conditions over the last decade, G-MW, in consultation with DSE and other Groundwater Plan stakeholders, needs to ensure the SIRWSPA can be successfully managed to encompass both sustainable resource use needs and catchment strategy objectives (e.g. salinity management). It has been recognised that the Groundwater Plan is of limited value for future groundwater resource management because it does not have mechanisms to allow shallow groundwater to be adaptively managed in response to changing seasonal and climatic conditions.

It is also clear that since 2002/03 there has been a greater reliance on shallow groundwater as a resource. This has been mainly due to the low surface water allocations and the need for irrigators to seek viable alternatives to maintain agricultural production. Whilst this has led to short term benefits to production, there is an increased risk that; due to licence holders being less able to meet licensed blending requirements with surface water supplies, land productivity may decline as a result of more saline shallow groundwater being applied. Licence holders have generally had access to some surface water and are able to temporarily transfer additional surface water as required; however it is also recognised that overall availability of surface water has made it difficult for licence holders to meet the blending requirements specified in their groundwater licence.

Currently groundwater licence volumes can be reduced upon licence renewal if salinity increases in pumped groundwater are not able to be addressed through access to and blending with surface water supplies. Whilst this may be an effective mechanism for reducing the impact of salt on land productivity, the current groundwater licensing and management framework does not recognise shallow groundwater as a relatively low security and opportunistic resource. This may lead to licence holders being less willing to invest in and rely on shallow groundwater and may also have implications for shallow groundwater pumping programs developed to bring about catchment benefits (e.g. lowering watertables).

Work has commenced on understanding groundwater balance implications of variable climatic and water management regimes. Key outputs from this work will be development of an adaptive management system and “triggers” for salinity and shallow groundwater resource management. The aim is to achieve harmonisation of salinity management and shallow groundwater resource management.