



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

ANNUAL REPORT FOR THE YEAR ENDED
JUNE 2008

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 describe activities of G-MW in administering and enforcing 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 Groundwater 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 2007 – 30 June 2008

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.

There has been significant decline in the watertable between August 2006 and August 2007. 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 likely as a result of the continuation of lower than average rainfall (notably during the 2006 autumn/ winter and 2007 late winter periods) recorded in various locations across the region in the 12 months to

August 2007. This change could also be attributed to low surface water allocations and increasing reliance on pumping shallow groundwater for resource use.

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.

2. Twenty six percent of licensees with irrigation bores complied with G-MW's request for a groundwater sample during 2007-08. This is a decrease (18%) on the previous reporting period 2006-07. G-MW is now providing 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 has also 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. G-MW will also implement a strategy in 2008-09 to improve the sample capture during groundwater licence assessments and, during these assessments, survey licence holders to better understand the impediments to returning samples and assess how the salinity sample program can be improved.
3. Thirty-nine (39) bores had metered usage in excess of licence entitlement, which is significantly less than the one hundred and thirty three (133) recorded last year. The groundwater used over licence entitlement by these bores was 2.7% of total metered use, compared to 2006-07 where the volume used in excess of licence entitlement was 12.6% of total metered use. It is clear that this decrease is linked to the overall decrease in metered usage. This in turn may be attributed to further decline in shallow groundwater levels, resulting in greater difficulty accessing shallow groundwater and hence leading to reduced bore yields.

Managing use within licence entitlement is expected and communicated annually to all licensed groundwater users within the SIRWSPA. The new compliance strategy to manage use within entitlement has already contributed to a significant reduction in use in excess of entitlement in 2007-08.

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 has been proposed in the upcoming Northern Region Sustainable Water Strategy and engagement with key stakeholders has commenced.

Signed

Ian Moorhouse
ACTING MANAGING DIRECTOR

INDEX

1. Introduction	1
1.1. The Region.....	1
1.2. Hydrogeology	3
1.3. Salt Disposal	3
2. Goulburn-Murray Rural Water Corporation's Duties under the Groundwater Management Plan.	5
3. Works Program	6
4. Groundwater Licence Entitlement at 30 June 2008	7
5. Metered Usage	8
5.1. Metered Groundwater Bores and Usage in 2007-2008.....	8
5.2. Use in Excess of Groundwater Licence Entitlement.....	10
6. Groundwater Monitoring and Reporting.....	11
6.1. Groundwater Monitoring Costs	12
7. Transfer of Water Entitlement.....	13
8. Data Review	14
8.1. Groundwater Level Trends	14
8.2. Groundwater Salinity	15
9. Discussion of Issues Arising.....	17
9.1. Response from Annual Groundwater Sample Program	17
9.2. Managing Use in Excess of Entitlement.....	17
9.3. Future Management Issues in the SIRWSPA	18

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.

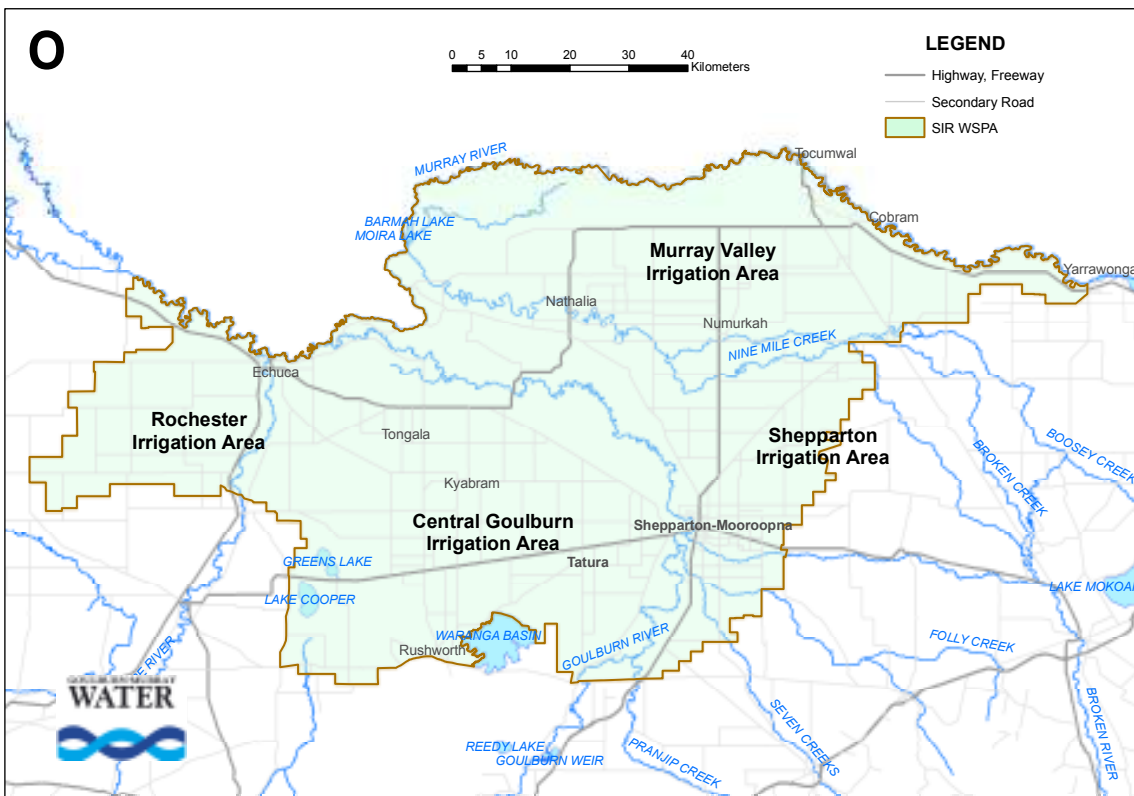


Figure 1 – Shepparton Irrigation Region Water Supply Protection Area boundary

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 Kraft, Fonterra, Plumrose, Unilever (Rosella), Tatura Milk, 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 encourage 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 form 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 m 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. The connection between deep and shallow aquifers will be more fully addressed in a project planned for 2008/09 aimed at understanding water balance changes in the Shepparton Region. The study will provide the technical foundation for a review of the Groundwater Plan and inform future management arrangements for shallow groundwater in the Region.

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.

2. Goulburn-Murray Rural Water Corporation'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 eighth annual report to the Minister and presents the outcome of the above key activities undertaken in the period 1st July 2007 to 30th June 2008.

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	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09
Meters Fitted: Installation Program ¹	205	109	41	0	14	57	6	0	N/A	Complete ²
Meter Reading (summer season)	Done	Done	Done	Done	Done	Done	Done	Done	Done	For compliance purpose only
Meter Reading (winter season)	N/A ³	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Ongoing
Groundwater Level Monitoring	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing
August Watertable Map Reporting	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing
Groundwater Salinity Assessment	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing
Groundwater Licence Administration	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing
Annual Reporting to the Minister	Done	Done	Done	Done	Done	Done	Done	Done	Done	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 All bores that meet the criteria in Dot Point 1 in Section 2 have now been metered. New bores are metered by the licence holder at their cost.

³ Winter pumping did not occur due to low dilution flows in the Murray River.

4. Groundwater Licence Entitlement at 30 June 2008

The following table includes the groundwater licence entitlement volumes allocated to June 2008 for extractive use purposes.

Table 2 – Licence volume totals as of 30 June 2008

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	1,417	221,744	1109	15,754	238,607

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 below shows the distribution of the licensed groundwater extraction bores summarised in the table above.

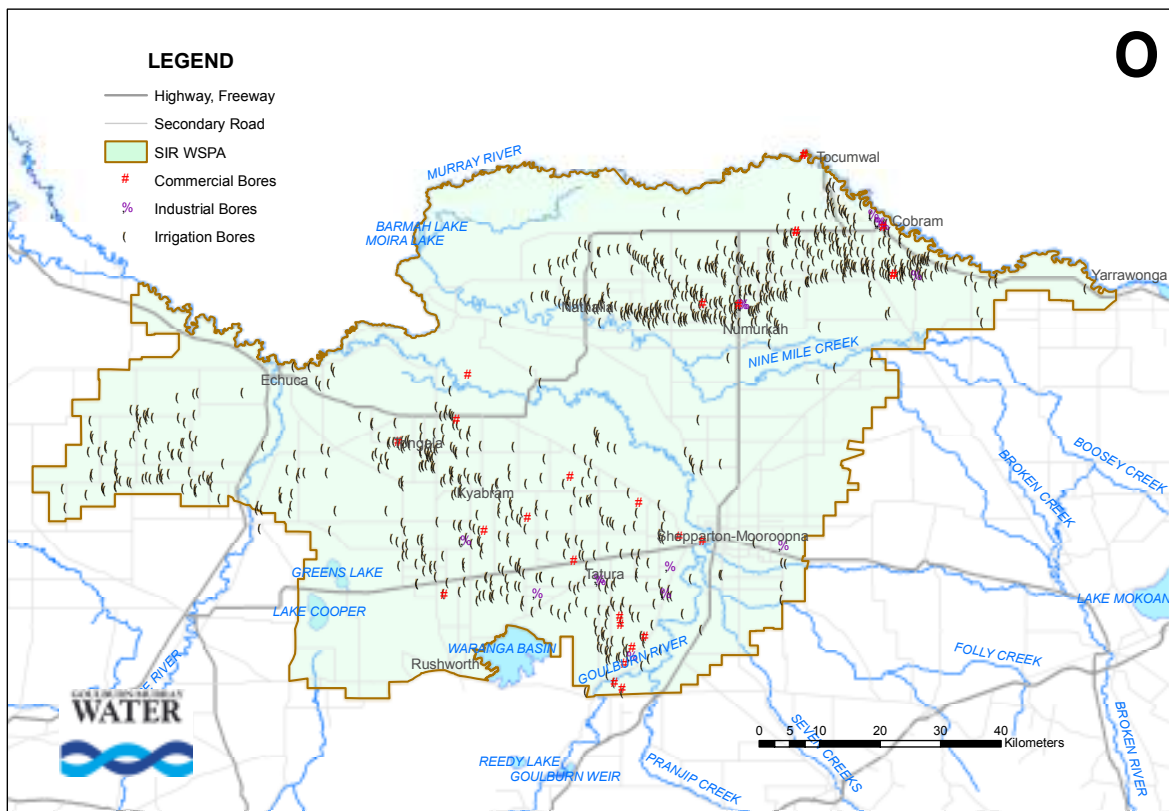


Figure 2 - The distribution of licensed groundwater extraction bores in the SIRWSPA

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 ML⁴ 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 in 2007-2008

Nine hundred and ten (910) licensed irrigation bores were fitted with a volumetric flow meter at the end of the reporting period. Of these, the number verified as having reliable usage data for the full reporting period totalled 869. The majority of the remaining 41 bores had meters installed or repaired during the reporting period and therefore did not have verified base meter readings. Data from meters assessed as being reliable are considered to be representative of groundwater use in the reporting period. Metering data are 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 2008.

Table 3 – Metered bore details as of 30 June 2008

WSPA	Column 1 Total No. Metered Bores	Column 2 Metered Bore Entitlement (ML)	Column 3 2007/08 Metered Bore Use (ML)
Shepparton Irrigation Region	869	193,159	85,801

Notes:

Column 1 Number of licensed irrigation bores fitted with a meter that have been verified as being operational for the full reporting period.

Column 2 Total licensed entitlement of the irrigation bores numbered in Column 1

Column 3 Total volume of metered groundwater use from irrigation bores numbered in Column 1

Figure 3 overleaf shows the distribution of licensed irrigation bores that supplied data summarised in the table above.

⁴ 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.

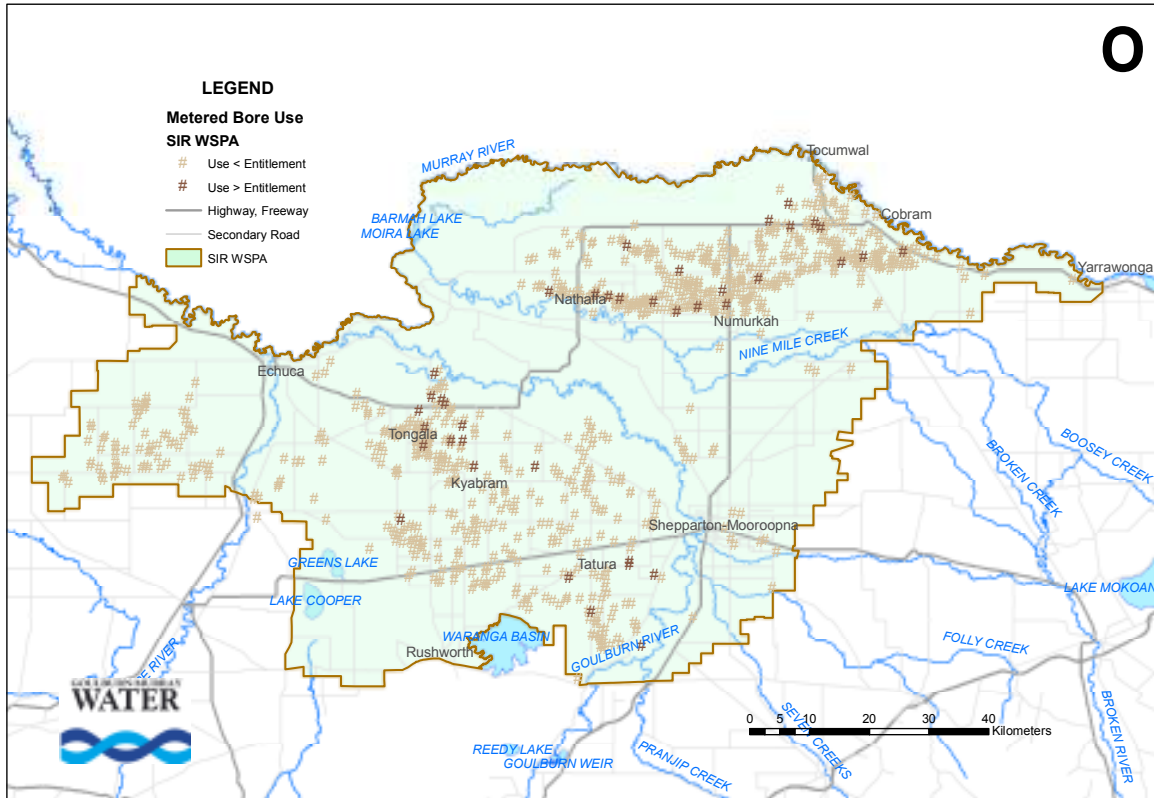


Figure 3 - The distribution of metered groundwater extraction bores in the SIRWSPA

Groundwater usage from the licensed irrigation bores with meters considered as being reliable in this reporting period, was 85,801 ML. This represents a total use of 44% of the total licensed entitlement for those bores. The metered usage volumes for the past six years are shown below in Figure 4.

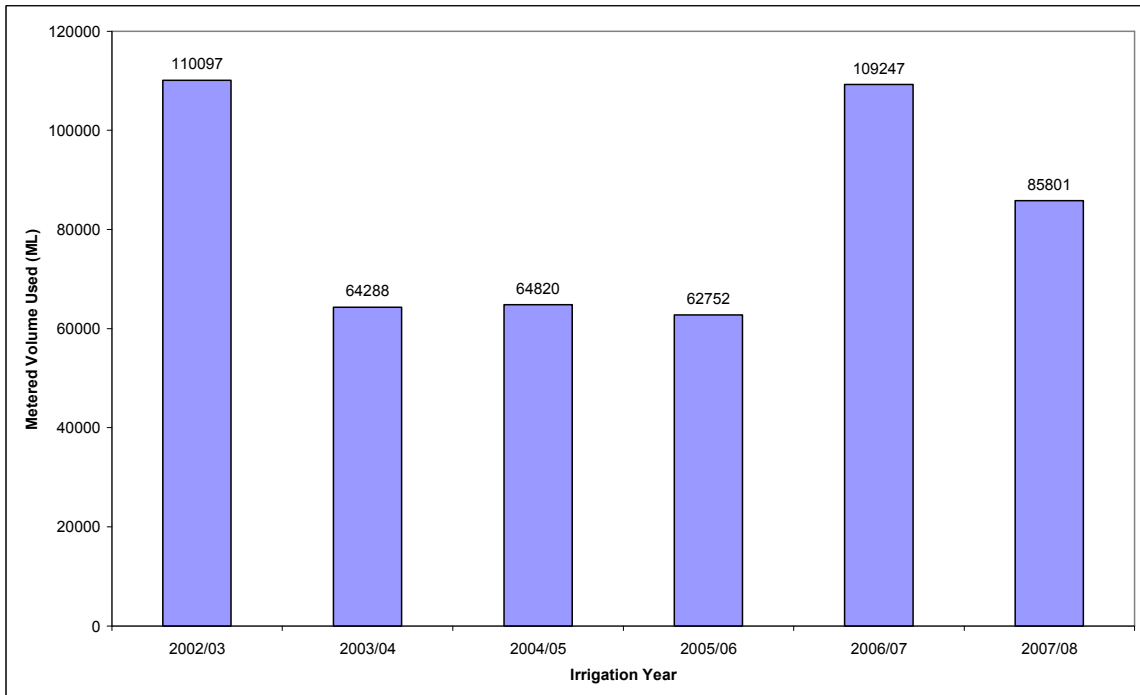


Figure 4 - Total metered usage in the SIRWSPA since 2002-2003

Of the 869 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.

5.2. Use in Excess of Groundwater Licence Entitlement

There is a significant decrease from since 2006/2007 from 133 (16.4%) of metered irrigation bores that exceeded licence entitlement. The total volume used in excess of entitlement decreased from 13,741 ML to 2274 ML (of the metered volume recorded, the amount of use in excess of entitlement is 2.7%, compared to 12.6% of metered entitlement last year).

Table 4 – Summary of licensed use within entitlement

Percentage Excess of Entitlement	No. of Users	Total Volume Overused (ML)
0 – 25%	21	435
25.01 – 50%	9	732
50.01 – 75%	4	491
75.01 – 100%	2	134
> 100%	3	482
Totals	39	2,274

Table 4 above summarises use in excess of entitlement from metered bores in the SIRWSPA for the irrigation year 2007-2008. The decrease in use in excess of entitlement is consistent with the decrease of shallow groundwater use in 2007-2008 compared to 2006-2007. This decreased use has occurred despite the unprecedented drought conditions continuing into 2007-2008 combined with record low surface water allocations. There has however been continued reliance on resource use from groundwater to meet the shortfalls in surface water irrigation entitlement. 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 3,800 observation bores in the SIR WSPA 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 below. It is clear that while there is risk to land productivity in some parts of the SIRWSPA, the need for Groundwater Plan salinity and water table control measures in these affected areas is lessening.

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.

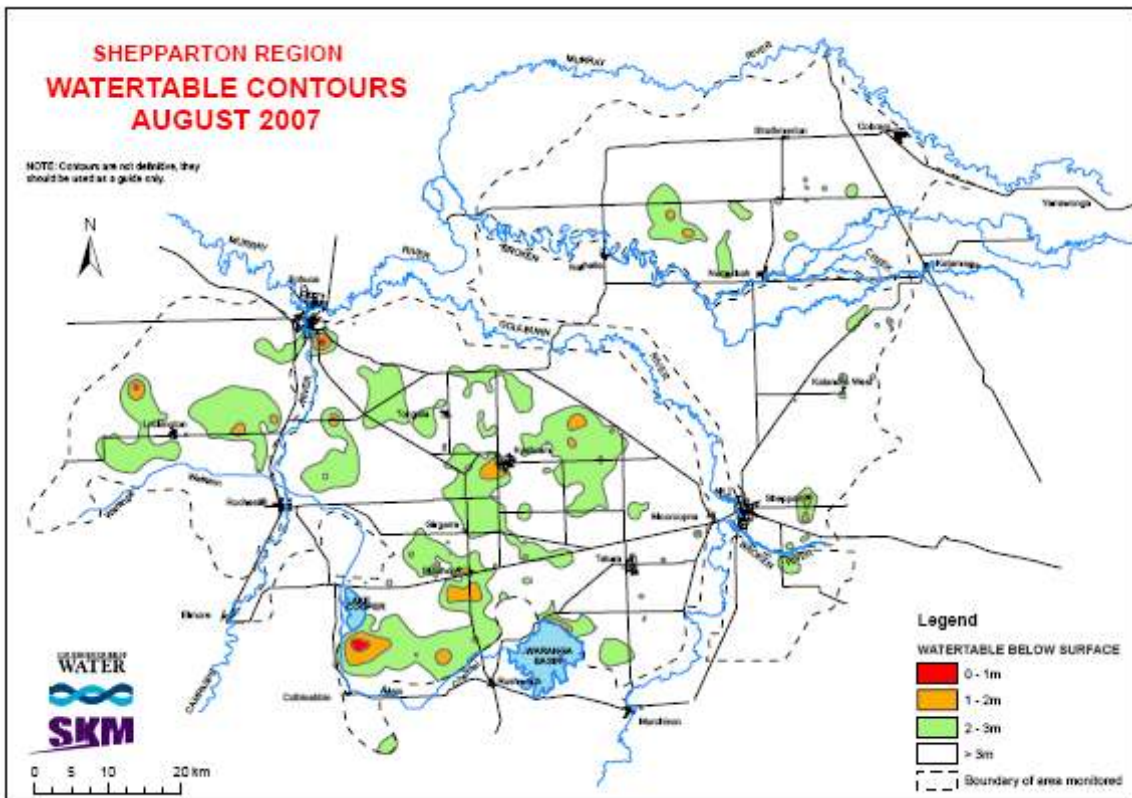


Figure 5 – Watertable contours for year ending August 2007 for the SIRWSPA

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 5 – Groundwater monitoring costs in the SIRWSPA for 2006/2007

No. Observation Bores	Observation Bore Monitoring	Behaviour Analysis	Total
3,800 ⁵	\$211,971	\$10,971	\$222,942

⁵ Approximately 1,700 are used to construct the August 2007 watertable map. A further 2100 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 2007 shallow watertable levels were generally within 3 metres of the ground surface across about 14.5% of the SIRWSPA, compared around 33% in August 2006. 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%. This is represented in Figure 6.

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 2006 and August 2007 and; as for the previous year, this change occurred most notably in the Murray Valley and Central Goulburn irrigation areas. Across the SIRWSPA the total area bounded by 1 metre contours was 0.09% in August 2007 compared with 6.4% in August 1997. Only a small part of the Rochester/ Campaspe East district with water table level within 1m of the groundwater surface (88 ha) showed little change between August 2006 and August 2007.

The increased rate of water table decline observed in the 12 months to August 2007 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 2006 (note: rainfall totals from August 2006 to August 2007 recorded at Tatura, Kyabram, Rochester and Cobram were more than 50% below historic median totals)

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 6.

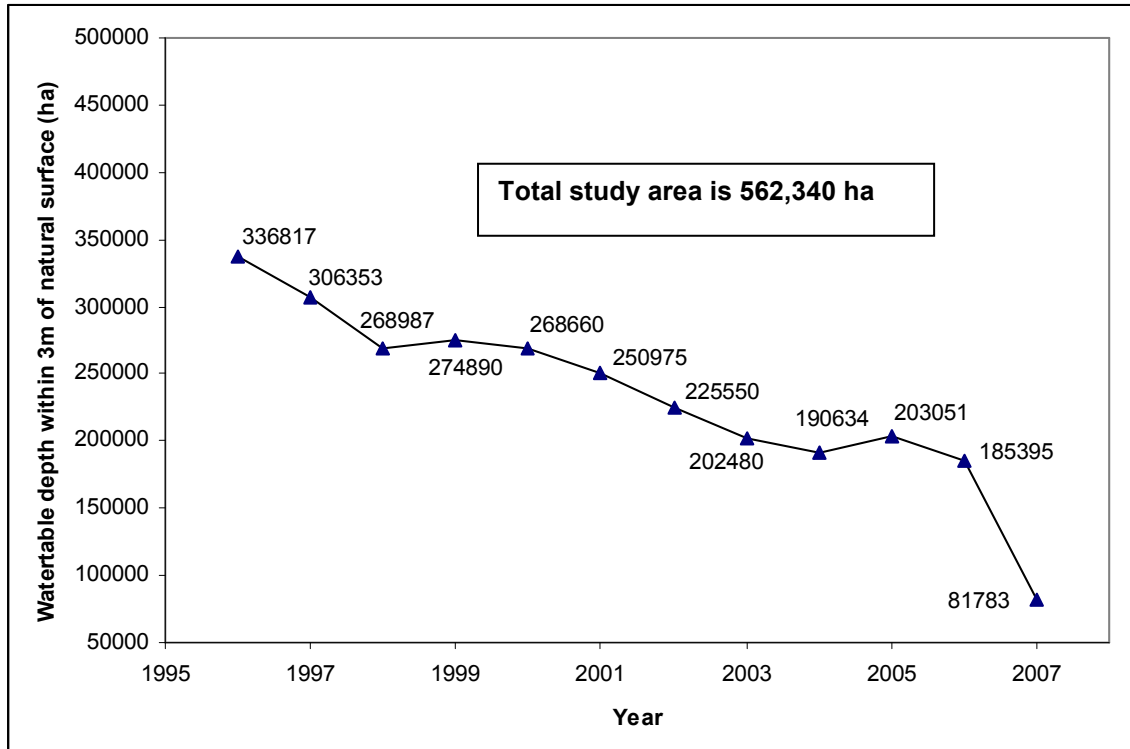


Figure 6 – Land coverage of the SIRWSPA (ha) with watertable depth within 3 metres of natural surface

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).

Table 6 – Salinity sampling summary for 2007/08

Column 1	Column 2	Column 3	Column 4	Column 5
Sample Requests	No. of bores with salinity sample history since July 1 2004	Samples returned from Mail-Out	Samples from Other Sources	Total No. Samples
1192	688	293	17	310

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 bores which have a history of returned salinity samples since 2003.
- Column 3 No. of groundwater salinity samples obtained in response to the Mail-out during the current reporting period
- Column 4 No. of groundwater salinity samples obtained from other sources (such as site inspection) during the current reporting period
- Column 5 Columns 3 + 4

The data was also collected from salinity samples obtained during the approximately 150 groundwater licence renewal assessments carried during 2007/08. This data also contributes to the regional salinity trend analysis.

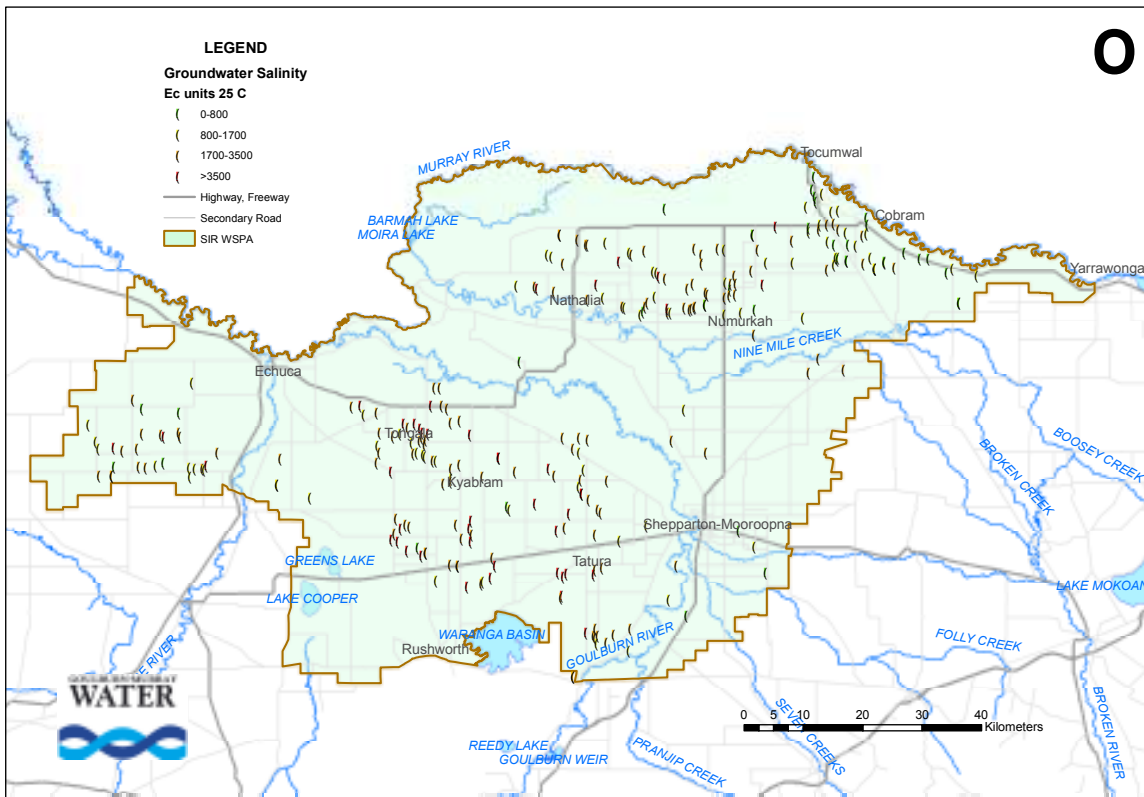


Figure 7 – The distribution of groundwater salinity samples received for SIRWSPA irrigation bores

Figure 7 above 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 Sample 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 26% 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 a marked decrease (18%) on the previous reporting period 2006-2007. Whilst this is a disappointing result it is likely that decreased usage, 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 will be implemented in 2008-09. This strategy will include two key components:

- A brief survey included as a part of Groundwater Licence renewal or transfer or land ownership site inspections, which will gather data on willingness to participate in the annual salinity program and importantly reasons why (if applicable) licence holders have not returned samples. This survey data will be analysed to better inform the future design and implementation of the annual salinity sampling program.
- 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 93 licence holders who were found to have used in excess of licence entitlement in 2006-07. 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 17 licence holders who were found to have used in excess of licence entitlement in 2006-07 and 2005-06. This letter provided advice similar to the first warning letter; however recipients of the second letter will be referred to G-MW's compliance unit to instigate legal action if confirmed to have used groundwater 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 new compliance strategy is a mid season meter reading and compliance check program which includes visits to all licence holders who recorded use in excess of entitlement in 2006-2007.

From this compliance check program, which occurred in January – February 2008, there were 3 licence holders confirmed to have already exceeded their annual groundwater licence entitlement. All 3 licence holders had recorded use in excess of entitlement in 2006-07 (but not in 2005-06) and were managed as 'second strike' users. These licence holders were sent a second warning letter and received a follow-up visit by a G-MW officer to further discuss their groundwater usage and implications of use in excess of entitlement. All 3 licence holders were advised to cease pumping and warned that any further instances of unauthorised use will be referred for legal action.

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.

A mid-season meter reading and compliance check is scheduled for 2008/2009 to ensure unauthorised use is reduced further; however the target for managing licensed use remains at zero use in excess of entitlement.

G-MW's compliance strategy has successfully contributed to a significant reduction in use in excess of entitlement in 2007-2008.

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 Management 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 Management Plan may be 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).

Mindful of these important issues, groundwater resource managers and catchment managers are currently working together to develop strategies to deal with the changing environment and management issues in the Shepparton Irrigation Region. The following conceptual approach has been developed and engagement with key stakeholders has already started.

1. Review the Region's total water balance in light of changing climatic conditions and improving irrigation efficiency
2. Reassess local, regional and basin salt management requirements
3. Review the current Plan and assess its role in a future groundwater management framework for the Region
4. Assess the Region's groundwater resource availability and develop management options
5. Develop salinity and resource management strategies in consultation with key stakeholders
6. Implement agreed management strategies with appropriate monitoring and adaptive management

The above approach will be further developed 2008-2009 in conjunction with the policy directions outlined in the Northern Region Sustainable Water Strategy. The conceptual approach will also have to be considered in the context of the Northern Victorian Irrigation Renewal Project and anticipated changes to the irrigation system in the Shepparton Irrigation Region during the next 3 years.