South Australian – Victorian Border Groundwaters Agreement Review Committee

Twenty Fourth Annual Report

To June 2009

Melbourne and Adelaide

PREFACE

The Border Groundwaters Agreement Review Committee's annual report for 2008/09 fulfils the requirement under clause 30(1) of the Border Groundwaters Agreement to report on its activities during the year to 30 June 2009.

Clause 30(2) requires the Review Committee to forward a copy of the report to the appropriate Minister in each Government.

Section 11 of the Victorian *Groundwater (Border Agreement) Act 19*85, and Section 13 of the South Australian *Groundwater (Border Agreement) Act 1985* provide that the relevant Minister shall cause a copy of the annual report to be laid before the Parliament within fourteen sitting days of the receipt of the report.

TABLE OF CONTENTS

1. The year in summary **6**
Province 1 6
Province 2 7
Province 3 7
Metering 7
2. About the Agreement and the Review Committee **8**
The Border Groundwaters Agreement 8
Border Groundwaters Agreement Review Committee 9
3. General Information **10**
Groundwater resources in the South Australian – Victorian border area 10
Management approach 10
Permissible Annual Volumes, allocations and volumes extracted 12
Permissible distance from the border 15
Permissible potentiometric surface lowering 15
Permissible salinity 16
Reports from the States 16
4. Funding **18**

FIGURES **25**
Figure 1 The Designated Area and zones 19
Figure 2 Hydrogeological provinces 20
Figure 3 Schematic hydrostratigraphic cross-sections 21
Figure 4 Relationship of management areas in Victoria and South Australia to the Designated Area 22
Figure 5 Map of groundwater level trends for the Tertiary Limestone Aquifer 23
Figure 6 Map of groundwater level trends for the Tertiary Confined Sand Aquifer 24

GLOSSARY **25**
REFERENCES **26**
BIBLIOGRAPHY **26**

1. The year in summary

Along the South Australian – Victorian border, groundwater is the only reliable water source. It is used extensively in both States for irrigation, industry use, urban water supply, and farm stock and domestic use.

While groundwater supplies are relatively secure for the short term, the Border Groundwaters Agreement Review Committee (Review Committee) has been addressing the technical understanding and management responses affecting the ongoing sustainable and equitable use of the resources in the area.

Long-term declines in groundwater levels continue to occur in a number of locations in the Designated Area.

Province 1

The Tertiary Limestone Aquifer[1] is a high yielding and renewable resource; it is replenished by rainfall recharge. Parts of Province 1 are experiencing long-term declines in groundwater levels, in the Tertiary Limestone Aquifer and the Tertiary Confined Sand Aquifer[2]. The system is out of balance in that outflows and extractions exceed inflows.

The use of the water includes both extractions for irrigation and other purposes under licence as well as the interception and direct extraction by plantation forests. The latter is considered to be a significant factor in declining water levels. The drier conditions of recent years are also contributing to the declines. Without a change in the current land and water use, these declines will continue over parts of Province 1.

The Review Committee completed a review of the groundwater resource in Province 1 in June 2008. It proposed to the States that a new management approach is needed to achieve long-term sustainability and made a number of recommendations.

The Review Committee gave a presentation of the review to Victorian agencies in November 2008 at Hamilton and to South Australian agencies in March 2009 at Mount Gambier.

The Review Committee is overseeing a joint South Australian-Victorian study to determine the nature of the interaction between the Tertiary Limestone Aquifer and the Tertiary Confined Sand Aquifer in Province 1. The connection between the aquifers is of interest because the declines in groundwater levels occurring in the Tertiary Confined Sand Aquifer are similar to those observed in the Tertiary Limestone Aquifer even though there is very little extraction from the Tertiary Confined Sand Aquifer. The study will determine whether the two aquifers should be managed together or separately. The National Water Commission is funding the study.

1 The Tertiary Limestone Aquifer is generally the Gambier Limestone in the Otway Basin and the Murray Group Limestone in the Murray Basin (Figure 3).
2 The Tertiary Confined Sand Aquifer is the Dilwyn Formation in the Otway Basin and the Renmark Group in the Murray Basin (Figure 3).

Province 2

The Tertiary Limestone Aquifer in Province 2 is effectively not being replenished by modern recharge and is considered a non-renewable resource for water allocation and management purposes.

In the previous financial year, the Review Committee completed a review of the groundwater resource in Province 2 and recommended that the States develop a policy for the management and use of the resource on the basis that it is non-renewable.

Victoria is developing a management strategy for the West Wimmera based on the understanding that the resource is non-renewable. The Review Committee has representation on the advisory committee that is preparing the draft strategy.

South Australia is revising its water allocation plan for the Tatiara Prescribed Wells Area which covers part of Province 2. The plan will convert the current area based irrigated allocation system to volumetric entitlements. The Review Committee has been liaising to ensure that the plan's arrangements in the Designated Area are consistent with the Agreement.

Province 3

This resource is not being replenished by modern recharge and has been managed as a non-renewable resource since 2001. Groundwater levels have declined and a cone of depression has formed, centred on the area of concentrated irrigation development. Whilst these declines were expected and have been closely monitored, there is a need to review the appropriateness of the long-term commitment. The review will address if the current level of commitment imposes an unacceptable impact, such as aquifer depressurisation or the introduction of water of higher salinity (e.g. vertical leakage of saline groundwater from aquitards and the Parilla Sands Aquifer).

During the year the Review Committee commissioned a consolidated technical report of the groundwater resource in Province 3. The report will inform the Review Committee's review of the management arrangements for the province. The report is due in late 2009.

Groundwater level drawdowns in the summer of 2007/08 were double those in previous years in certain parts of Province 3. These drawdowns were of concern due to the potential for loss of water supply to groundwater users, particularly for stock and domestic. The Review Committee sought reports from the States and actions have been taken to prevent further declines. Large seasonal drawdowns re-occurred during the summer of 2008/09. The Review Committee continues to monitor the levels to ascertain if further action is warranted.

Metering

Substantial progress has been made in acquiring an understanding of water use and the behaviour of groundwater systems in and adjacent to the Designated Area with South Australia completing its metering program. 2008/09 was the first year that complete metering records have been obtained.

2. About the Agreement and the Review Committee

The Border Groundwaters Agreement

The groundwater resource along the South Australian – Victorian border is shared between both States. In recognition of the need to cooperatively manage these resources, the two States entered into the Border Groundwaters Agreement (the Agreement) in 1985. The Agreement was updated in 2005.

The Agreement establishes a Designated Area, extending 20 kilometres either side of the border, and from the coast to the River Murray. The Agreement applies specifically to this Designated Area. The Designated Area is divided into 22 management zones with 11 zones in each State (Figure 1).

The Agreement provides that the available groundwater shall be shared equitably between the two States and applies to all existing and future bores within the Designated Area, except domestic and stock bores.

Extraction licences or permits may not be granted or renewed within the Designated Area other than in accordance with the management prescriptions set out in the Agreement. The prescriptions limit water use to a Permissible Annual Volume for total withdrawals from all aquifers, to a permissible rate of potentiometric surface lowering, and to a permissible level of salinity. The prescriptions also provide that, where appropriate, casing of new wells shall be sealed between aquifers to prevent inter-aquifer contamination.

The allocation of water is the responsibility of the licensing agencies in each State in accordance with the relevant groundwater management plan or water allocation plan prepared under the States' respective water resources legislation.

The approach taken by the States in developing management plans has included objectives to better quantify the resource, to establish appropriate mechanisms for allocating the resource or, if needed, to restrict the use of the resource. Plans are developed through consultative committees to maximise community and industry involvement in making and implementing the arrangements.

Table 1 sets out the management areas relevant to the Designated Area. The locations of the areas are shown in Figure 4.

Table 1 Management areas relevant to the Designated Area

South Australia	Victoria
Lower Limestone Coast Prescribed Wells Area Tatiara Prescribed Wells Area Mallee Prescribed Wells Area Noora Prescribed Wells Area	Murrayville Water Supply Protection Area Neuarpur Water Supply Protection Area West Wimmera Groundwater Management Area Glenelg Water Supply Protection Area

Border Groundwaters Agreement Review Committee

The Review Committee, with membership from both States, is established under the Border Groundwaters Agreement as the operating body for the effective implementation and administration of the Agreement.

The Review Committee is required at intervals of not more than five years to review the management prescriptions – that is, the Permissible Annual Volume, the Allowable Annual Volume, the permissible distance, the permissible rate of potentiometric surface lowering (drawdown) and the permissible level of salinity (if any such levels have been declared).

The Agreement provides that the Review Committee shall have the power to alter the permissible distance, Permissible Annual Volume, Allowable Annual Volume, and to declare a period of restriction. The relevant State Ministers have the power to alter the permissible rate of potentiometric surface lowering and the permissible level of salinity, on the recommendation of the Review Committee.

The Agreement provides that the Review Committee may also:

- coordinate, or cause to be carried out, surveys, investigations and studies concerning the use, control, protection, management or administration of the groundwater in the Designated Area;

- make recommendations to the Contracting Governments or to any authority, agency or tribunal of the Contracting Governments concerning any matter which, in the opinion of the Review Committee, may in any way affect the investigation, use, control, protection, management or administration of the groundwater within the Designated Area; and

- review the Agreement and, if in its opinion, amendments thereto are necessary or desirable, make recommendations to the Contracting Governments accordingly.

The Review Committee met seven times during the year:

19 August 2008	Adelaide
18 September 2008	Teleconference
30 October 2008	Teleconference
10 December 2008	Teleconference
5 February 2009	Adelaide
2 April 2009	Melbourne
24 June 2009	Adelaide

During the year membership of the Review Committee comprised:

South Australia		**Victoria**	
Mr N Power	member	Mr R Nott	member
Mr H Hopton	member	Dr J Cooke	member
Ms B Cohen	deputy member	Mr M Burns	deputy member

Mr R Nott was President during the year. Ms E Nelson was Secretary.

3. General Information

Groundwater resources in the South Australian – Victorian border area

There are two main aquifer systems along the State border comprising the Tertiary Confined Sand Aquifer and the overlying Tertiary Limestone Aquifer (Figure 3).

The Tertiary Limestone Aquifer is the principal source of groundwater throughout the Designated Area, with water being used for a range of purposes – municipal supplies for towns such as Mount Gambier, individual domestic and stock water supplies, industry and widespread irrigation use.

Groundwater salinity in the Tertiary Limestone Aquifer is mostly less than 3000 ECU (about 1800 mg/L TDS) in the Designated Area, except in the far north where it exceeds 30,000 ECU (about 18,000 mg/L TDS).

In the Designated Area, the Tertiary Limestone Aquifer has been sub-divided into three hydrogeological provinces as shown in Figure 2 and described below:

> Province 1 occurs largely in the Otway Basin and is characterised by Quaternary calcareous sandstone overlying the Tertiary Limestone Aquifer (Gambier Limestone) forming one unconfined aquifer system;
>
> Province 2 is located in the Murray Basin where the Tertiary Limestone Aquifer (Murray Group Limestone) is unconfined and either outcrops at the surface, or is overlain directly by the Pliocene Sands Aquifer; and
>
> Province 3 is in an area of the Murray Basin where the tertiary Limestone Aquifer (Murray Group Limestone) is confined by the Upper Tertiary Aquitard.

Management approach

In accordance with its role to advise the States, as outlined in the previous section, the Review Committee has taken the following management approach for each Province.

Tertiary Limestone Aquifer - Province 1
The Tertiary Limestone Aquifer is a high yielding and renewable resource and is replenished by rainfall. The long term management objective is to have stable groundwater levels. Parts of Province 1 are experiencing long-term declines in groundwater levels, in both the Tertiary Limestone Aquifer and the Tertiary Confined Sand Aquifer. The system is out of balance in that outflows and extractions exceed inflows.

The use of the water includes both extractions for irrigation and other purposes under licence and interception and direct use by the plantation forests. The impact of plantation forests is a significant factor in the groundwater level declines. The drier conditions of recent years are also contributing to the declines. Without a change in the current land and water use, these declines are expected to continue in this province.

The Review Committee proposed to the States that a new management approach is needed in Province 1 to achieve long-term sustainability (BGARC 2008). This is likely to require reductions in the area under plantation forestry and the volume extracted via bores under groundwater entitlements. The most significant deficiency in the current management arrangements is the lack of comprehensive water accounts. The major missing component is the impact of plantation forestry on groundwater resources. The Review Committee proposed that the States develop a consistent approach to accounting for the water used by plantation forestry. The Review Committee recommended that, in the meantime, the current moratoriums on the issue of new licences be retained.

Tertiary Limestone Aquifer - Province 2

The Tertiary Limestone Aquifer in Province 2 is effectively not being replenished by modern recharge and is considered a non-renewable resource for water allocation and management purposes. This is evidenced by the observed declines in groundwater levels of approximately 0.2m/yr since 1996 in the area of concentrated extractions around Zones 5A, 6A, 5B and 6B.

While the declines in groundwater levels appear to be manageable with respect to the capacity of the resource in the short term, the Review Committee has advised the States of the need to develop a common policy for the long-term management and use of the non-renewable resource (BGARC 2007).

Pending the outcome of the States' agreement on a common policy, in December 2007 the Committee determined to cap allocations as a precaution against further declines. The Permissible Annual Volumes for Zones 7A, 7B, 8A and 8B were reduced to the volumes allocated for each zone at that time.

Tertiary Limestone Aquifer - Province 3

This resource is not being replenished by modern recharge and has been managed as a non-renewable resource since 2001.

In 2001 the Review Committee recognised that the aquifer in Province 3 is confined and that vertical recharge and throughflow are negligible. The Review Committee subsequently reduced the Permissible Annual Volumes for the Tertiary Limestone Aquifer based on a proportion of groundwater storage where the resources were useable (i.e. <3000mg/L TDS). Allocations in Zones 11A, 10A, 9A and 9B, which were within the previous Permissible Annual Volumes, exceeded the volume calculated under the revised approach. In these zones the Permissible Annual Volumes were set to meet the existing commitment.

The Committee recommended in 2001 that the States meter extractions and monitor the levels of groundwater drawdown and quality in Province 3 over the next five years to determine whether the Permissible Annual Volumes need to be reduced. In that event, entitlements would have to be reduced.

Tertiary Confined Sand Aquifer

Management prescriptions for the Tertiary Confined Sand Aquifer in the Designated Area were established in 2001. The volumes available for allocation are based on a proportion of throughflow. Due to the extensive regional nature of the Tertiary Confined Sand Aquifer and its hydraulic behaviour, the States extended the approach applied in the Designated Area to the whole aquifer system outside of the Designated Area.

Pliocene Sands Aquifer

The Pliocene Sands Aquifer overlies the Tertiary Limestone Aquifer in the Murray Basin and is a significant feature in Zone 11A. The groundwater is generally saline in the part of the aquifer within in the zone. In 2007, the Review Committee determined a Permissible Annual Volume for the Pliocene Sand Aquifer in Zone 11A to provide for salinity mitigation extractions for the Murtho Salt Interception Scheme.

Permissible Annual Volumes, allocations and volumes extracted

Table 2 sets out the Permissible Annual Volumes for each aquifer in each zone at 30 June 2009.

Tables 3, 4 and 5 list the allocations and use for the Tertiary Limestone Aquifer, Tertiary Confined Sand Aquifer and Pliocene Sands Aquifer respectively. Note that the 'volume extracted' is volume of groundwater extracted under permit/licence and does not take into account the volume extracted for domestic and stock use or the impacts of plantation forests. The Permissible Annual Volumes remain unchanged from the previous year.

South Australia completed its metering program in 2008. 2008/09 was the first year that complete metering records have been obtained for the Designated Area.

The Agreement does not apply to bores for domestic and stock purposes. The estimated number of domestic and stock bores for each zone is listed in Table 6. This indicates the important role groundwater plays for domestic and stock purposes.

Table 2 Permissible Annual Volumes at 30 June 2009

South Australia				Victoria		
Permissible Annual Volume			Zone	Zone	Permissible Annual Volume	
Pliocene Sands Aquifer (ML/yr)	Tertiary Limestone Aquifer (ML/yr)	Tertiary Confined Sand Aquifer (ML/yr)			Tertiary Limestone Aquifer (ML/yr)	Tertiary Confined Sand Aquifer (ML/yr)
2,144[1]	6861	0	11A	11B	1823	0
	9400	320	10A	10B	6720	560
	11595[2]	570	9A	9B	5960	630
	7700[2]	340	8A	8B	6760[2]	330
	7500[2]	350	7A	7B	6600[2]	350
	8850	360	6A	6B	9838	360
	18500	540	5A	5B	11949	570
	20000	710	4A	4B	14000	300
	24000	1900	3A	3B	16500	1000
	25000	2900	2A	2B	25000	5100
	30900[3]	9200	1A	1B	45720	14500

[1] Gazetted 22 May 2008.

2 In December 2007 the Committee determined to alter the Permissible Annual Volume to the volumes then allocated in these zones. It also proposed to sub-zone Zone 9A. The alterations were gazetted during the preparation of this report on 15 October 2009. The volumes shown in Table 3 are the Permissible Annual Volumes at 30 June 2009.

3 In June 2008 the Committee determined to sub-zone Zone 1A, which is yet to be gazetted.

Table 3 Permissible Annual Volumes, allocations and volume extracted for the Tertiary Limestone Aquifer at 30 June 2009

South Australia					Victoria				
Tertiary Limestone Aquifer				Zone	Zone	Tertiary Limestone Aquifer			
Permissible Annual Volume (ML/yr)	Licensed Allocations					Permissible Annual Volume (ML/yr)	Licensed Allocations		
	Licences	Volume Allocated (ML)	Volume Extracted (ML)				No. of Licences	Volume Allocated (ML)	Volume Extracted (ML)
6861	17	6627	4256	11A	11B	1823	3	1600	872
9400	43	9251	9458	10A	10B	6720	23	6358	5270
11595	13	10230	9113	9A	9B	5960	3	5000	1332
7700	42	4854	676	8A	8B	6760	7	2538	1345
7500	104	8254	7010	7A	7B	6600	15	5692	850
8850	63	8758	6620	6A	6B	9838	15	10261	6489
18500	146	18943	12801	5A	5B	11949	36	12519	8410
20000	191	22115	14728	4A	4B	14000	6	2339	284
24000	273	24049	17538	3A	3B	16500	6	515	58
25000	136	19976	15890	2A	2B	25000	41	24586	5106
30900	373	31806	22836	1A	1B	45720	19	4780	2354

Table 4 Permissible Annual Volumes, allocations and volume extracted for the Tertiary Confined Sand Aquifer at 30 June 2009

South Australia					Victoria				
Tertiary Confined Sand Aquifer				Zone	Zone	Tertiary Confined Sand Aquifer			
Permissible Annual Volume (ML/yr)	Licensed Allocations					Permissible Annual Volume (ML/yr)	Licensed Allocations		
	No. of Licences	Volume Allocated (ML)	Volume Extracted (ML)				No. of Licences	Volume Allocated (ML)	Volume Extracted (ML)
0	0	0	0	11A	11B	0	0	0	0
320	0	0	0	10A	10B	560	0	0	0
570	0	0	0	9A	9B	630	0	0	0
340	0	0	0	8A	8B	330	0	0	0
350	0	0	0	7A	7B	350	0	0	0
360	0	0	0	6A	6B	360	0	0	0
540	0	0	0	5A	5B	570	0	0	0
710	1	63	3	4A	4B	300	0	0	0
1900	2	1031	0	3A	3B	1000	0	0	0
2900	3	1455	58	2A	2B	5100	0	0	0
9200	4	1711	983	1A	1B	14500	0	0	0

Table 5 Permissible Annual Volumes, allocations and volume extracted for the Pliocene Sands Aquifer at 30 June 2009

South Australia				
Pliocene Sands Aquifer				Zone
Permissible Annual Volume (ML/yr)	Licensed Allocations			
	No. of Licences	Volume Allocated (ML)	Volume Extracted (ML)	
2144	1	2144	0	11A

Table 6 Number of domestic and stock bores

South Australia		Victoria	
Number of Domestic and Stock Bores	Zone	Zone	Number of Domestic and Stock Bores
18	11A	11B	17
28	10A	10B	243
9	9A	9B	47
12	8A	8B	113
74	7A	7B	104
80	6A	6B	56
233	5A	5B	162
253	4A	4B	339
244	3A	3B	79
228	2A	2B	577
545	1A	1B	625

NOTE: The numbers of domestic and stock bores are best estimates made in 2004 based on State database records.

No commitments of new water allocations were made during the year. Many of the zones are fully committed. A moratorium on new licences and permanent transfers of groundwater entitlements remains in place for Zones 1B to 9B under Victoria's water legislation. The volumes allocated in Zones 2A, 9A, 10A and 11A are less than the Permissible Annual Volumes. Under the water allocation plan for the Lower Limestone Coast Prescribed Wells Area, the un-allocated water in Zone 2A is held in a Minister's reserve, protecting it from allocation under the current water allocation plan. The Review Committee has requested that South Australia not allocate this volume due to the continuing decline in groundwater levels in the Tertiary Limestone Aquifer (BGARC 2008). In respect to Zones 9A, 10A and 11A it is expected that these zones are fully committed under South Australia's program to convert current area based licences to volumetric entitlements for this area.

Except for Zones 9A and 2A the volume of groundwater extracted is similar or less than the extractions in the previous year. Use does not exceed the Permissible Annual Volumes except in Zone 10A. All permitted/licensed extraction in the Designated Area is metered.

In Zones 1A, 3A, 4A, 5A and 5B and 6B the allocations slightly exceed the Permissible Annual Volumes. Details concerning over-allocation appear below under the section "Reports from the States".

Permissible distance from the border

The permissible distance is the distance from the border within which all applications for a permit or licence must be forwarded to the Review Committee for approval. The permissible distances are specified in Table 7.

There were no applications for the Review Committee to consider during the year.

Table 7 Permissible distance at 30 June 2009

South Australia		Victoria	
Distance (km)	Zone	Zone	Distance (km)
3	11A	11B	3
3	10A	10B	3
1	9A	9B	1
1	8A	8B	1
1	7A	7B	1
1	6A	6B	1
1	5A	5B	1
1	4A	4B	1
1	3A	3B	1
1	2A	2B	1
1	1A	1B	1

Permissible potentiometric surface lowering

The Agreement provides for a rate of drawdown that must not be exceeded. The prescribed permissible potentiometric surface lowering rates for each zone is shown in Table 8.

Table 8 Permissible potentiometric surface lowering rates at 30 June 2009

South Australia		Victoria	
Rate (m/yr)	Zone	Zone	Rate (m/yr)
0.65	11A	11B	0.65
0.65	10A	10B	0.65
0.65	9A	9B	0.65
0.05	8A	8B	0.65
0.05	7A	7B	0.05
0.05	6A	6B	0.05
0.25	5A	5B	0.25
0.25	4A	4B	0.25
0.25	3A	3B	0.25
0.25	2A	2B	0.25
0.25	1A	1B	0.25

Following the Review Committee's review of groundwater resources in Province 2 (BGARC 2007), the Review Committee recommended to the Ministers that they alter the rate of permissible potentiometric surface lowering for a number of the zones as detailed below:

- alter the rate of permissible potentiometric surface lowering for the Tertiary Limestone Aquifer for Zones 5A, 5B and 6B to 0.2 metres per annum; and

- replace the rate of permissible potentiometric surface lowering for the Tertiary Limestone Aquifer for Zone 6A with the rates for Sub-zone 6A South at 0.2 metres per annum and Sub-zone 6A North at 0.05 metres per annum.

The alterations for Zones 6A and 6B would enable existing licensed groundwater extraction and farming operations to continue. The alterations for Zones 5A and 5B better reflect the observed declines in groundwater levels in the region. The changes would not affect licence holders. The alterations will come into effect when they have been approved by both Ministers.

Permissible salinity

Following the reviews of Province 1 and Province 2 (BGARC 2008, BGARC 2007) the Review Committee has determined that there is no need to set such a rate at this time.

During the year the Committee received a final report from the Department of Water Land and Biodiversity Conservation on a three-year study on salt accession in Zones 2A, 3A, 4A, 5A, 6A and 7A of the Designated Area (DWLBC 2008). The Committee will consider the implications of the study for groundwater management in 2009/10.

Reports from the States

The Agreement requires that the Contracting Governments provide an annual report to the Review Committee detailing the number of permits or licences issued, volumes authorised, and details of potentiometric surface levels in each zone. The Review Committee has received the annual reports from the States and the information is contained in Tables 3, 4, 5, and 6.

With respect to groundwater levels, Figures 5 and 6 show the location of groundwater trends across the Designated Area for the Tertiary Limestone Aquifer and Tertiary Confined Sand Aquifer respectively. Areas with long-term declining trends in Province 1 and Province 2 continued to show declines in 2008/09. In Province 3 groundwater levels declined from 1995 and a cone of depression has formed, centred at Peebinga which is an area of concentrated irrigation development. Groundwater level drawdowns in the summer of 2007/08 were double those of previous years in certain parts of Province 3. The drawdowns were of concern due to the potential for loss of water supply to groundwater users, particularly for stock and domestic. The Review Committee sought reports from the States. The cause was due to a change in water use patterns by two licensees in South Australia. The extractions were within the licensed allocation. The Department of Water, Land and Biodiversity Conservation instituted a range of measures to prevent deepening of the drawdowns and increased its monitoring in the area.

The South East Natural Resources Management Board is revising the water allocation plans for the Tatiara Prescribed Wells Area and the Lower Limestone Coast Prescribed Wells Area. The South Australian Murray Darling Basin Natural Resources Management Board is revising the water allocation plan for the Mallee Prescribed Wells Area. A significant aspect of these new plans will be the transition from the area based irrigation allocation system to volumetric allocations.

A recent review of licences and entitlements in Zones 5B and 6B has indicated that the volumes allocated are greater than the Permissible Annual Volumes. Grampians Wimmera Mallee Water Corporation has advised that no new licences have been granted. The Committee will consider what action to take on this issue during 2009/10.

A new strategic approach is being developed to improve groundwater management in the Tertiary Limestone Aquifer in the West Wimmera which take account of the new understanding that the resource is non-renewable for allocation and management purposes. A draft groundwater management plan for the West Wimmera is due in late 2009.

4. Funding

In Victoria:

- the Department of Sustainability and Environment is responsible for the overarching management and planning of the State's water resources and for meeting State priorities and interstate and national obligations. The Department undertakes investigations, groundwater monitoring and the State Water Inventory;

- Grampians Wimmera Mallee Water Corporation and Southern Rural Water Corporation are responsible for licensing groundwater extractions and bore construction. The corporations have direct contact with groundwater users in allocating the resource, managing areas of intense development and resolving complaints.

In South Australia:

- the Department of Water, Land and Biodiversity Conservation is responsible for the overarching management and planning of the State's water resources and for meeting State priorities and interstate and national obligations. In addition the Department undertakes investigation, monitoring, allocation, licensing and management of water resources; and

- the South Australian Murray Darling Basin Natural Resources Management Board and the South East Natural Resources Management Board undertake community-based policy, management and water allocation planning.

Table 9 sets out the level of funding for 2008-2009. The figures for Victoria include the Water Corporations' licensing and administration costs.

Table 9 Funding for 2008-2009

State	Investigations	Monitoring	Resource Management	Agreement Management	Total
Victoria	$77,035	$130,500	$153,660	$71,753	$432,948
South Australia	$24,300	$142,500	$143,000	$74,700	$384,500
Totals	$101,335	$273,000	$296,660	$146,453	$817,448

Figure 1 The Designated Area and zones

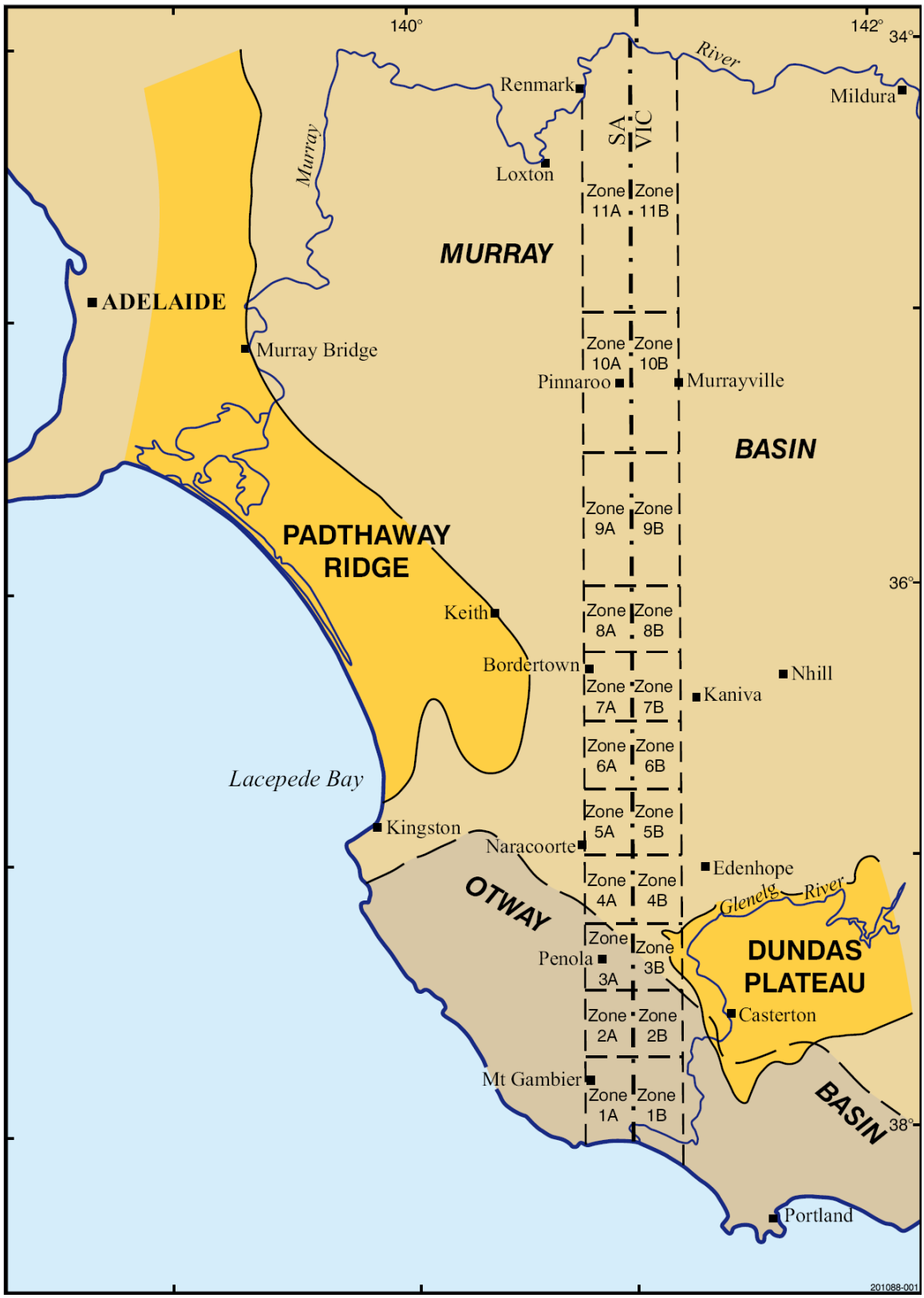


Figure 2 Hydrogeological provinces

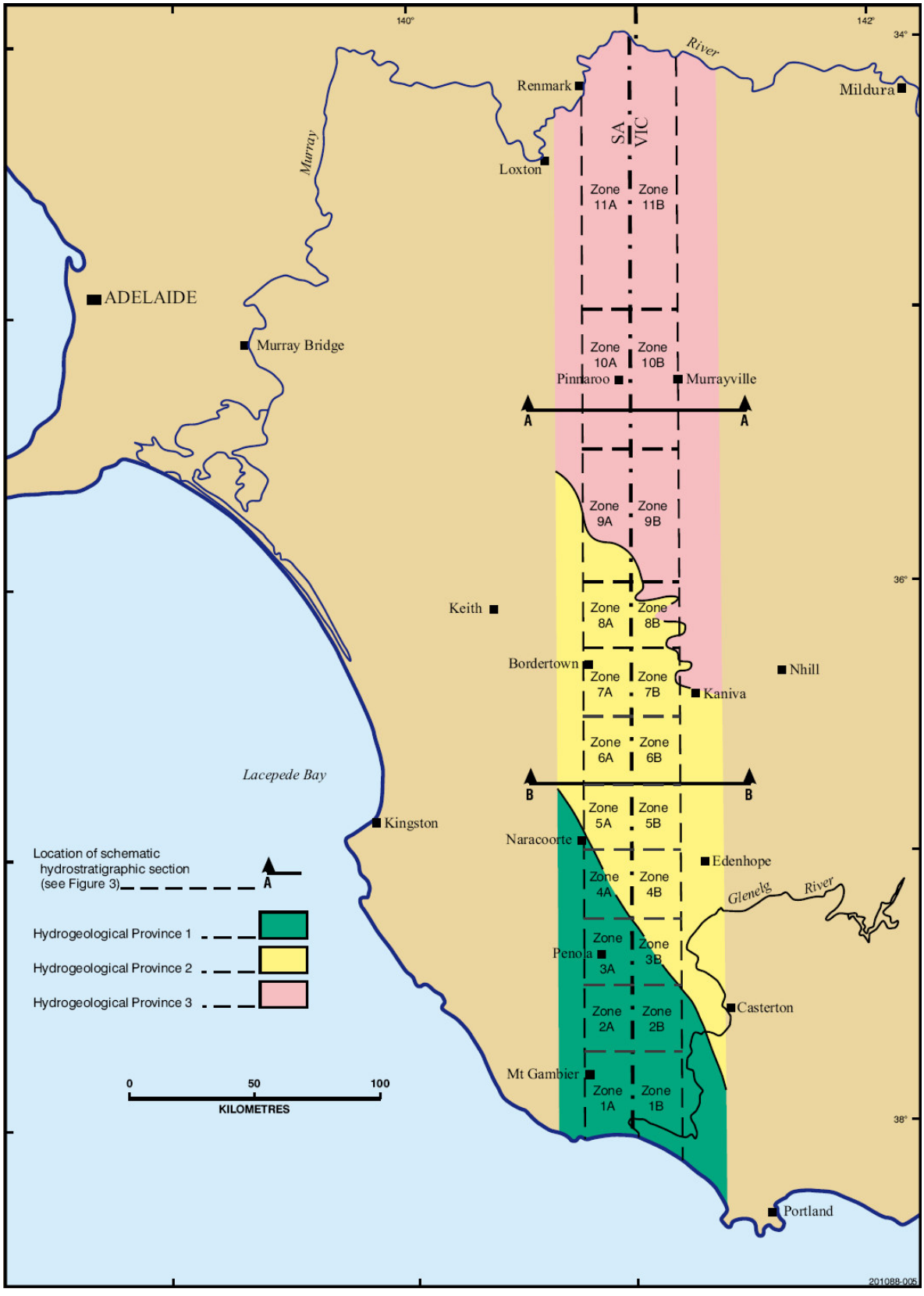


Figure 3 Schematic hydrostratigraphic cross-sections

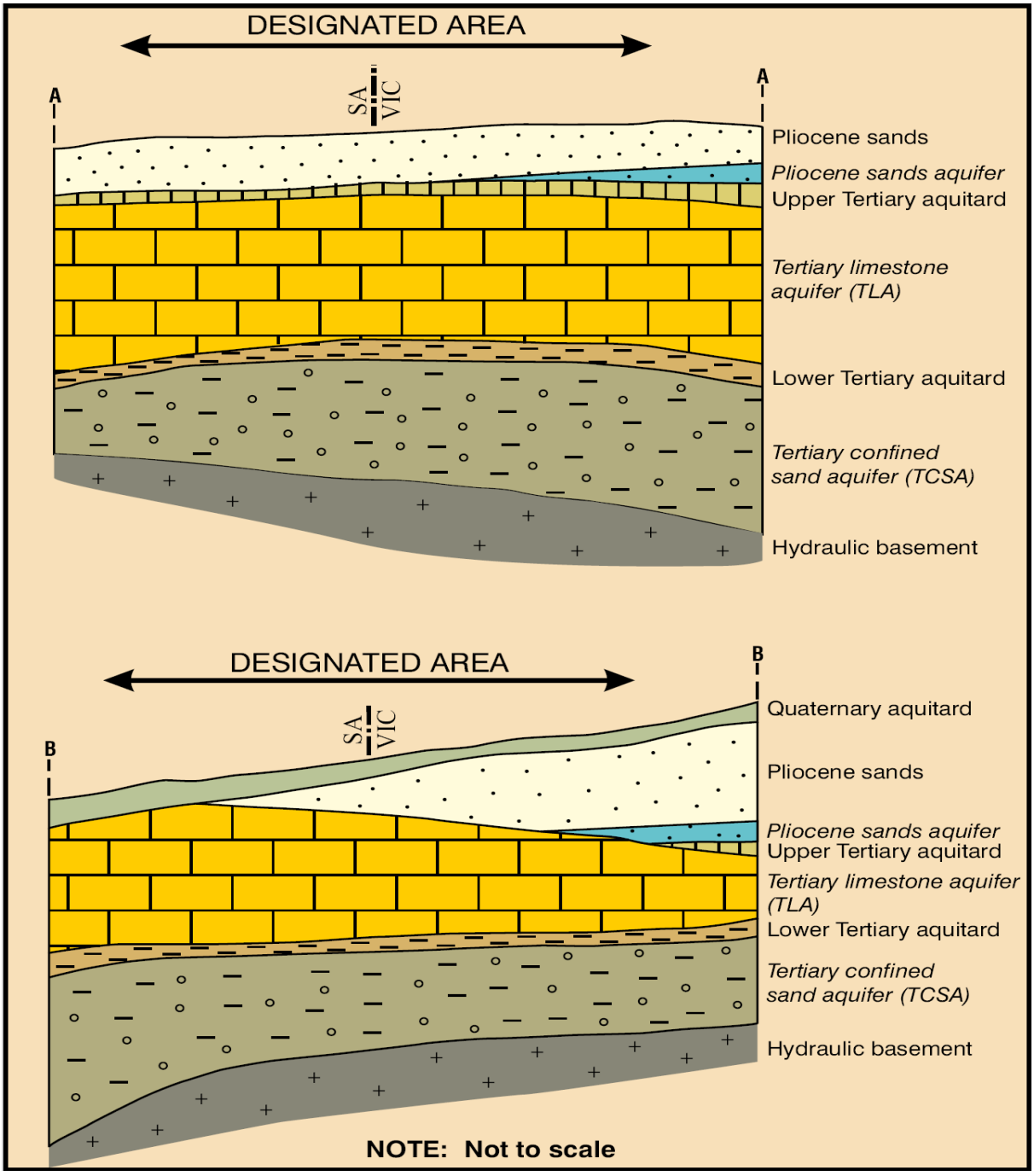


Figure 4 Relationship of management areas in Victoria and South Australia to the Designated Area

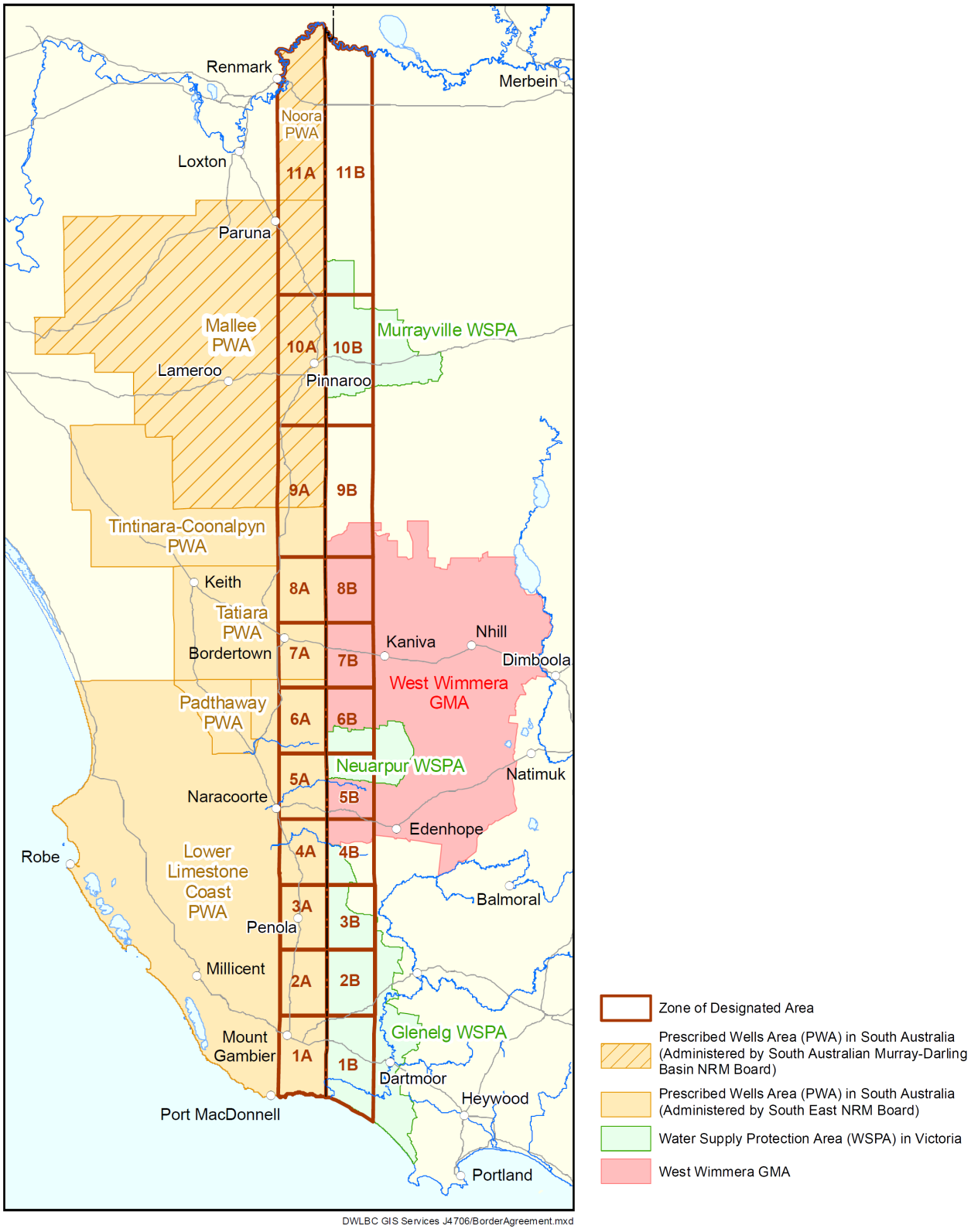


Figure 5 Map of groundwater level trends for the Tertiary Limestone Aquifer

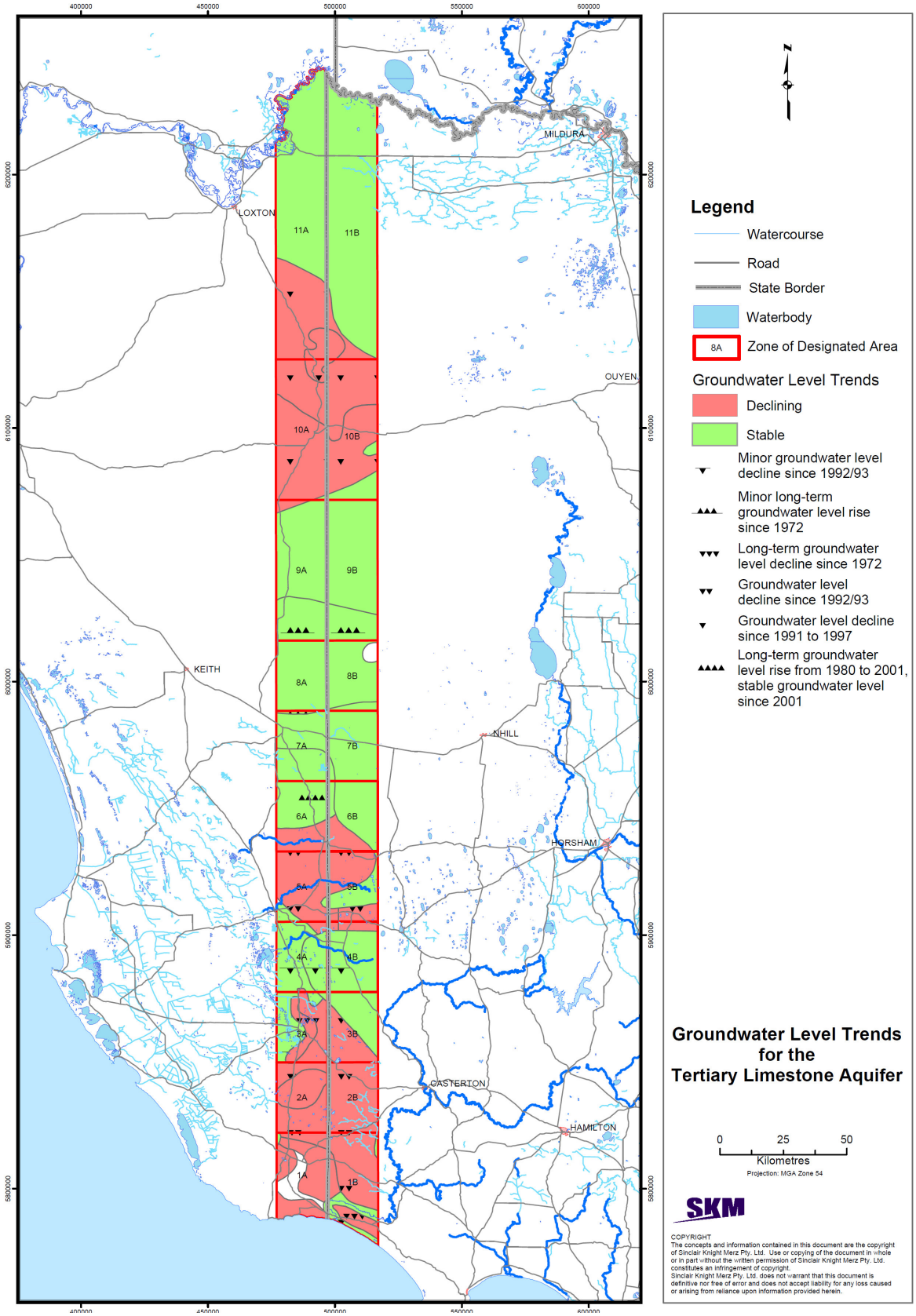
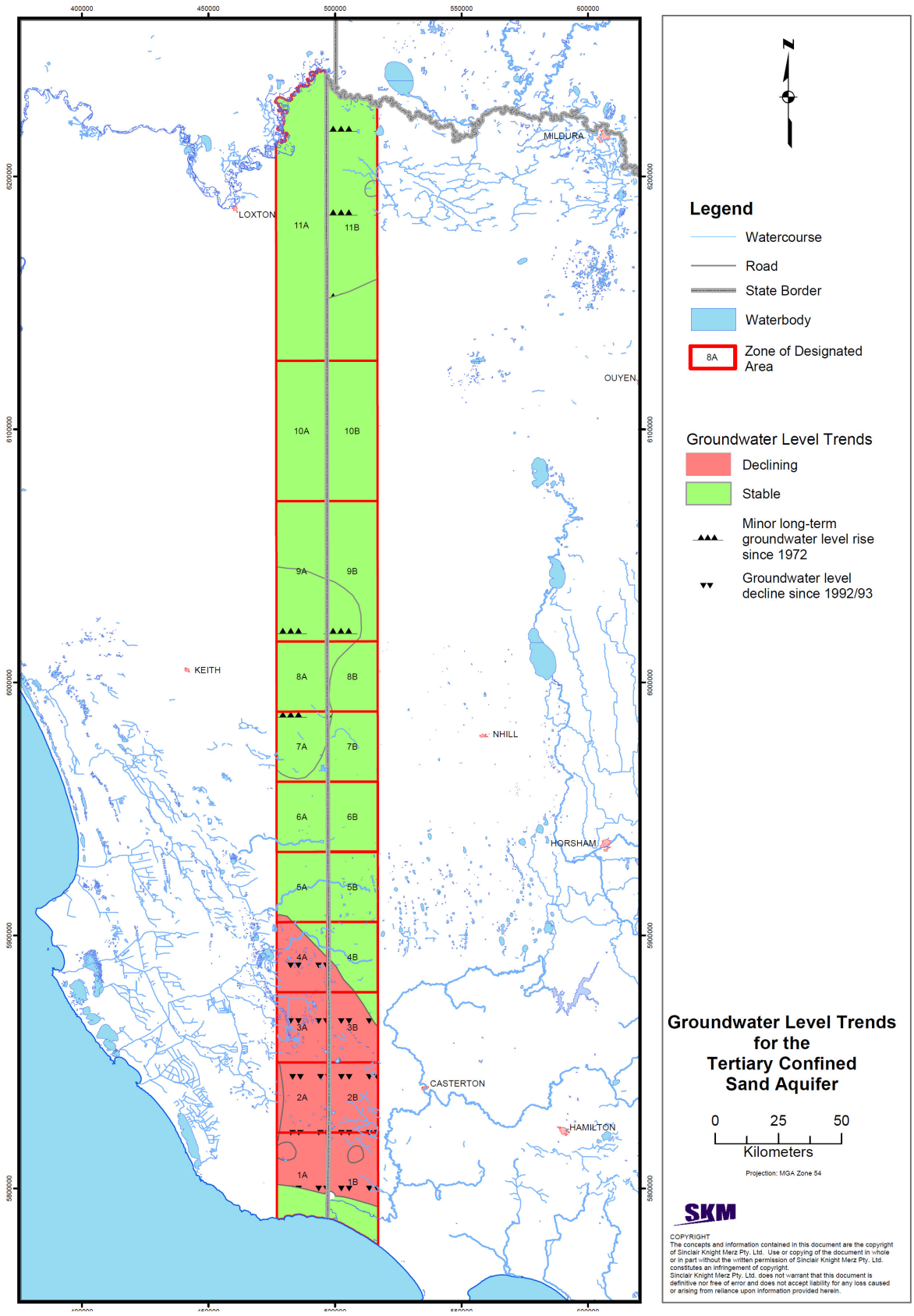


Figure 6 Map of groundwater level trends for the Tertiary Confined Sand Aquifer



GLOSSARY

"Aquifer". Means a geological structure or formation or an artificial landfill permeated or capable of being permeated permanently or intermittently with water.

"Allowable Annual Volume". Means the allowable volume of extraction specified for a particular sub-zone or aquifer within a sub-zone as has been determined by the Review Committee under clause 28(7) of the Agreement.

"Designated Area". Means the area comprising part of the State of South Australia and part of the State of Victoria as specified in the First Schedule of the Act. This is an area 40 km wide and centred on the South Australia - Victoria Border and is the area to which the *Groundwater (Border Agreement) Act 1985* applies.

"ECU". Means electrical conductivity units. Determination of the ECU of water is a rapid way of evaluating the approximate total salt content of water.

"Permissible Annual Volume". Means the Permissible Annual Volume of extraction specified for a particular zone or aquifer in a particular zone in the Designated Area.

"Permissible distance". Means the distance from the border in which all applications for licences must be referred to the Review Committee to determine whether the licence should be issued.

"Permissible potentiometric surface lowering". Means an average annual rate of potentiometric surface lowering within a zone as prescribed under the Agreement or has been agreed by the Minister for each Contracting Government.

"Permissible salinity". Means a certain level of salinity within a zone as has been agreed by the Minister for each Contracting Government.

"Prescribed Wells Area". Means an area declared to be prescribed under the South Australian *Natural Resources Management Act 2004*. Prescription of a water resource requires that future management of the resource be regulated via an approved water allocation plan and extraction of water be licensed.

"TDS". Means total dissolved solids. The soluble mineral and organic matter content of water.

"Tertiary Limestone Aquifer". Comprises aquifers in the Murray Group, Heytesbury Group, Coomandook Formation, Bridgewater Formation and Padthaway Formation, called collectively the Tertiary Limestone Aquifer, the base of which is identified as marl or black carbonaceous silt, sand or clay.

"Tertiary Confined Sand Aquifer". Comprise aquifers in the Wangerrip Group and Renmark Group, below the Tertiary Limestone Aquifer.

"Water Supply Protection Area". An area declared under the Victorian *Water Act 1989* to protect the area's groundwater or surface water resources through the development of a management plan, which aims for equitable management and long-term sustainability.

REFERENCES

Border Groundwaters Agreement Review Committee (2001). *Five Year Management Review Report 1996 – 2000.* September 2001.

Border Groundwaters Agreement Review Committee (2007). *Management Review of the Tertiary Limestone Aquifer in Province 2 of the Designated Area.* December 2007.

Border Groundwaters Agreement Review Committee (2008). *Management Review Tertiary Limestone Aquifer and Tertiary Confined Sand Aquifer in Province 1 of the Designated Area.* May 2008.

BIBLIOGRAPHY

Department of Water, Land and Biodiversity Conservation (2008). *Minimising Salt Accession in the South East of South Australia. The Border Designated Area and Hundred of Stirling Salt Accession Projects. Volume 2 – Analytical Techniques, Results and Management Implications*. DWLBC Report 2008/23.