

THE TERTIARY LIMESTONE AQUIFER

Information Sheet 2 of 4



Managing the Groundwater Resources across the South Australian - Victorian Border

The Border Groundwaters Agreement



2014



INTRODUCTION

Information Sheet 1 outlines the importance of the groundwater resources within the 40 km wide Designated Area along the South Australia - Victoria State border and the management arrangements under the *Groundwater (Border Agreement) Act 1985*.

Within the Designated Area there are two main regional aquifer systems—an upper aquifer referred to as the Tertiary Limestone Aquifer and a deeper confined (or pressure) aquifer termed the Tertiary Confined Sand Aquifer. These aquifers are separated wholly or in part by aquitards (or confining beds).

Two east-west cross-sections which illustrate the relationship of the regional aquifers and aquitards are shown on Figure 1. Section A-A is located in the Murrayville-Pinnaroo area and Section B-B is to the north of Naracoorte and Edenhope.

Information about the Tertiary Limestone Aquifer is provided below, and information for the Tertiary Confined Sand Aquifer is given in Information Sheet 3.

THE TERTIARY LIMESTONE AQUIFER

The Tertiary Limestone Aquifer can occur within a number of different geological formations, with the predominant unit being a regionally extensive limestone of Tertiary geological age.

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

Groundwater flow is generally from Victoria to South Australia across the state border. The direction of flow is northeast to southwest in the southern part of the Designated Area, east to west in the central part, and southeast to northwest in the northern part.

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

Groundwater elevations in metres Australian Height Datum (AHD) in the Designated Area are shown in Figure 2.

In the Designated Area, the Tertiary Limestone Aquifer has been subdivided into three hydrogeological provinces as shown in Figure 3.

Province 1 — Occurs largely in the Otway Basin and is characterised by the Gambier Limestone and younger overlying limestones forming one unconfined aquifer system.

Province 2 — Is located in the Murray Basin where the Murray Group limestone is unconfined and either crops out at the surface, or is overlain directly by younger sand units.

Province 3 — Occurs in an area of the Murray Basin where the Murray Group limestone is confined by an overlying clay aquitard.

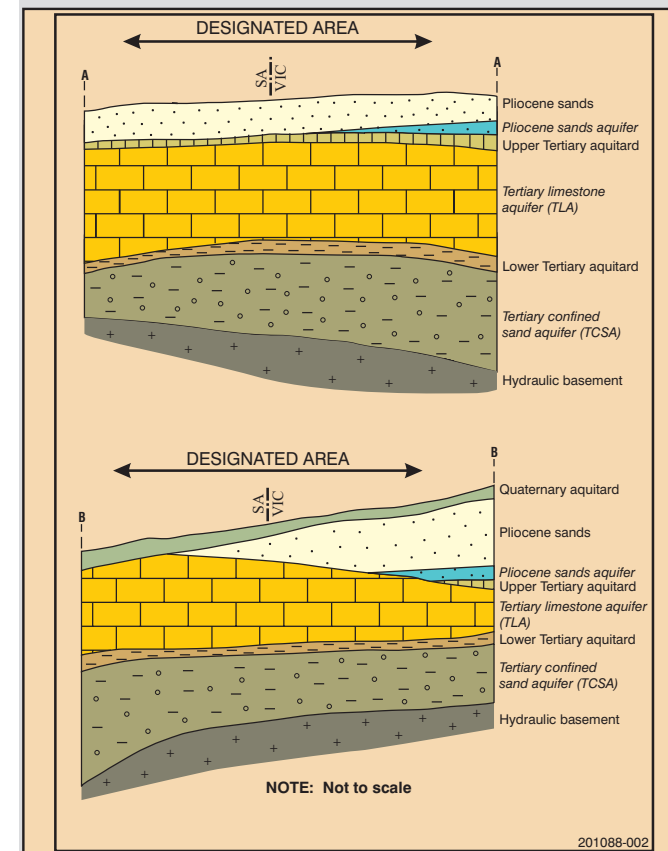


Figure 1 Hydrogeological cross-section

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GROUNDWATER MANAGEMENT IN PROVINCES 1 AND 2

Recharge or replenishment of the Tertiary Limestone Aquifer occurs from vertical recharge (the infiltration of winter rainfall and direct drainage of surface water into the aquifer via natural sink-holes in some areas) and by lateral groundwater flow.

In some parts of Province 2 the groundwater in the Tertiary Limestone Aquifer is considered an ancient resource and is up to 20 000 years old. In these areas limited recharge is occurring and the groundwater resource is managed accordingly.

The volume of groundwater available for licensed use from the Tertiary Limestone Aquifer in the Designated Area has been set recognising the extent of development in each zone and taking into account the amount of recharge and potential impacts of groundwater extraction on groundwater users and the environment.

Existing and potential groundwater management problems for the Tertiary Limestone Aquifer in Provinces 1 and 2 include:

- Water quality deterioration in some areas. Increases in salinity levels are likely to be due to either irrigation recycling and/or vegetation clearance with the resulting mobilisation of salt caused by an increase in vertical recharge.
- Declining groundwater levels due to either large-scale extractions, or the impacts of reduced recharge due to land use change.

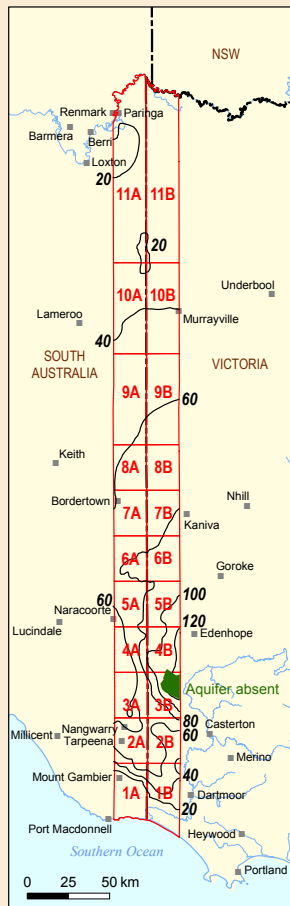


Figure 2 Tertiary Limestone Aquifer groundwater elevation (m AHD) 2006

GROUNDWATER MANAGEMENT IN PROVINCE 3

The Tertiary Limestone Aquifer in Province 3 is confined and current understanding of the aquifer's behaviour is that the present rates of vertical recharge and throughflow are very low. In the past over the last 20 000 years, considerably higher recharge rates occurred during wetter climatic periods resulting in the large fresh groundwater resource stored in the Tertiary Limestone Aquifer.

Due to the confined nature of the Tertiary Limestone Aquifer, significant drawdowns in water levels can occur with moderate rates of extraction for irrigation usage as have been observed within Zones 10A and 10B. The principal concerns are the water level interference and the potential loss of water supply in existing stock and domestic bores.

The only way that productive use could continue from the Tertiary Limestone Aquifer within this region is to allow water to be extracted from storage.

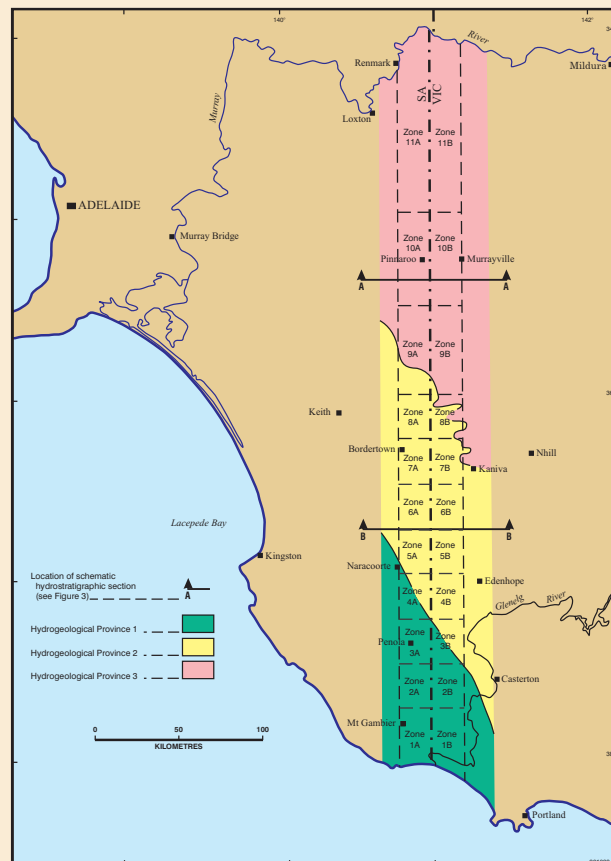


Figure 3 Hydrogeological provinces of the Designated Area

A management prescription has been developed which allows for the extraction of an equivalent volume of water as was originally intended by the Border Groundwater Agreement based on a 0.05 m/annum drawdown in an unconfined aquifer. This is a small volume compared to the total quantity of water stored in the Tertiary Limestone Aquifer.

It is recognised that such extractions are not sustainable in the long term and there needs to be active review of the behaviour of the Tertiary Limestone Aquifer, with possible modification of the volumes of groundwater authorised for extraction over time.

ADDITIONAL INFORMATION

- Further information is provided in Information Sheets 1, 3 and 4.
- Sheet 1 presents information on the Border Groundwaters Agreement.
- Sheet 3 provides information on the groundwater resources of the Tertiary Confined Sand Aquifer.
- Sheet 4 presents information on licensing and administrative arrangements in each state.

CONTACTS

For more information on the Border Groundwaters Agreement and/or the groundwater resources within the Designated Area, please contact:

South Australia

Department of Environment, Water and Natural Resources
GPO Box 1047
ADELAIDE SA 5001
T: (08) 8463 6800

www.environment.sa.gov.au/contact-us

PO Box 240
BERRI SA 5343
T: (08) 8595 2244

PO Box 1046
MOUNT GAMBIER SA 5290
T: (08) 8735 1134

Victoria

Grampians Wimmera
Mallee Water
PO Box 481
11 McLachlan St,
HORSHAM VIC 3402
T: 1300 659 961

Southern Rural Water
132 Fairy Street
WARRNAMBOOL VIC 3280
T: 1300 139 510
E: srw@srw.com.au

E: info@gwmwater.org.au

www.environment.sa.gov.au