
ANGAS BREMER PWA

MURRAY GROUP LIMESTONE AQUIFER

Groundwater Level and Salinity Status Report

2012



Government of South Australia
Department of Environment,
Water and Natural Resources

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2012 SUMMARY



The Angas Bremer Prescribed Wells Area (PWA) is located on the western side of Lake Alexandrina approximately 60 km south-east of Adelaide and is underlain by sediments of the Murray Basin. It is within the boundary of the Eastern Mount Lofty Ranges Prescribed Water Resources Area (PWRA). It is a regional-scale resource for which groundwater resources are prescribed under South Australia's *Natural Resources Management Act 2004*. A water allocation plan provides for the sustainable management of the groundwater resources. In the near future, water management policy for the Angas Bremer PWA will be incorporated into the Water Allocation Plan for the Eastern Mount Lofty Ranges PWRA, which is currently in development.

There are three aquifer formations underlying the Angas Bremer PWA, namely the Quaternary aquifer, confined Murray Group Limestone (MGL) aquifer and Renmark Group aquifer. All licensed groundwater extractions occur from the confined MGL aquifer, which is the focus of this report.

The confined MGL aquifer is up to 100 m thick and varies in composition from soft clayey limestone, hard sandy limestone to soft bryozoal limestone layers. The general groundwater flow direction is towards Lake Alexandrina in a south-easterly direction. Irrigation supplies are generally obtained from the fossiliferous limestone member, which can be cavernous in some areas. Well yields vary from about 5 L/s in the north to over 15 L/s to the south, with occasional yields of up to 40 L/s.

The low-salinity groundwater of the MGL aquifer is limited to relatively narrow zones near the Angas and Bremer Rivers, where salinity ranges from less than 1500 mg/L to 3000 mg/L. Towards the margins of the basin to the east and west, salinities can be as high as 10 000 mg/L.

Metered extractions in the 2011–12 water user year totalled 1981* ML, a 20% reduction in use from the 2010–11 water use year (Fig. 1). This water extracted includes water that had been stored in the aquifer by irrigators over previous years, through managed aquifer recharge. The reduction in groundwater extraction in 2011–12 may be reflective of higher rainfall than previous years and irrigators using more surface water. The total volume of managed aquifer recharge (MAR) to the MGL aquifer in 2011–12 was 1557* ML, which represents a 63 % decrease from 2010–11 (Fig. 1).

Data from the Langhorne Creek rainfall station (number 24515) was chosen for the analysis of rainfall trends in 2012 (Fig. 2). The long-term average monthly rainfall is graphed in orange and identifies periods where monthly rainfall measurements are above or below average. The total annual rainfall recorded was 445 mm in 2012, compared to 413 mm in 2011.

The groundwater level trends observed in the MGL aquifer are highly influenced by groundwater extractions and managed aquifer recharge. Water level rises were observed in the MGL aquifer in 2010 and 2011, due to the reduced demand on groundwater resources as a result of the recovery of the Lake Alexandrina, coupled with the significant volumes of managed aquifer recharge to the aquifer. Overall, the water level of the MGL aquifer continued to rise from 2011 to 2012. A comparison of the maximum recovered groundwater levels of the MGL aquifer recorded in 2011 and 2012 indicates that the majority of observation wells (31 out of 34) experienced a rise in groundwater level ranging from <0.5 to 1.8 m. The fall recorded for the remaining three wells ranged from <0.3 to 0.8 m (Fig. 3).

* The licensed groundwater use and managed aquifer recharge volumes for the 2011–12 water-use year are based on the best data available as of March 2013 and may be subject to change, as some extraction volumes are in the process of being verified.

Increases in salinity in the MGL aquifer have been identified as the main threat to the long term sustainability of irrigation in the Angas Bremer PWA. Downward leakage from the overlying brackish to saline Quaternary aquifer is the predominant cause of such salinity increases and is driven by the head difference between the two aquifers. The head difference and downward leakage are higher during periods of high extraction both on a regional scale and locally where large drawdowns in an individual irrigation well may induce significant leakage.

The latest salinity concentrations monitored in 2012 are shown in Fig. 4. These salinity concentrations were compared to the latest salinity readings of 2011, with 29 of the 34 current salinity monitoring wells having readings for 2011 and 2012. Overall, 15 of the 29 wells displayed a decrease in salinity value ranging from 2 to 334 mg/L and 12 displayed an increase in salinity ranging from 12 to 392 mg/L, while two displayed no change since 2011. In 2012, approximately 85% of the 34 current salinity monitoring wells had a salinity greater than 1500 mg/L, which is typically considered to be the salinity tolerance level for most crop types.

The Angas Bremer PWA confined Murray Group Limestone aquifer has been assigned a green status for 2012:

2012 STATUS "No adverse trends, indicating negligible risk to the resource"

This means that the groundwater status was observed to be stable (i.e. no significant change) or improving over the reporting period. Continuation of these trends favours a very low likelihood of negative impacts on beneficial use. The 2012 status for the confined Murray Group Limestone aquifer is supported by:

- When comparing the change in salinity from 2011 to 2012, 59% of monitoring wells (17 out of 29 wells) had no change or a decrease in salinity.
- An overall increase in the maximum recovered water level in 91% of observation wells, when compared to 2011 water level data.

The use of the Murray Group Limestone aquifer for the storage of water that is of adequate water quality, which can later be extracted during irrigation season, enables the continued beneficial use of this aquifer.

To view the *Angas Bremer PWA Groundwater Level and Salinity Status Report 2011*, which includes background information on hydrogeology, location of rainfall stations and relevant groundwater dependent ecosystems, visit [WaterConnect](#).

To view descriptions of all status symbols, [click here](#).

For further details about the Angas Bremer PWA please see the [Water Allocation Plan for the Angas Bremer Prescribed Wells Area](#).

**Angas Bremer PWA: Murray Group Limestone aquifer
annual groundwater extraction and managed aquifer recharge**

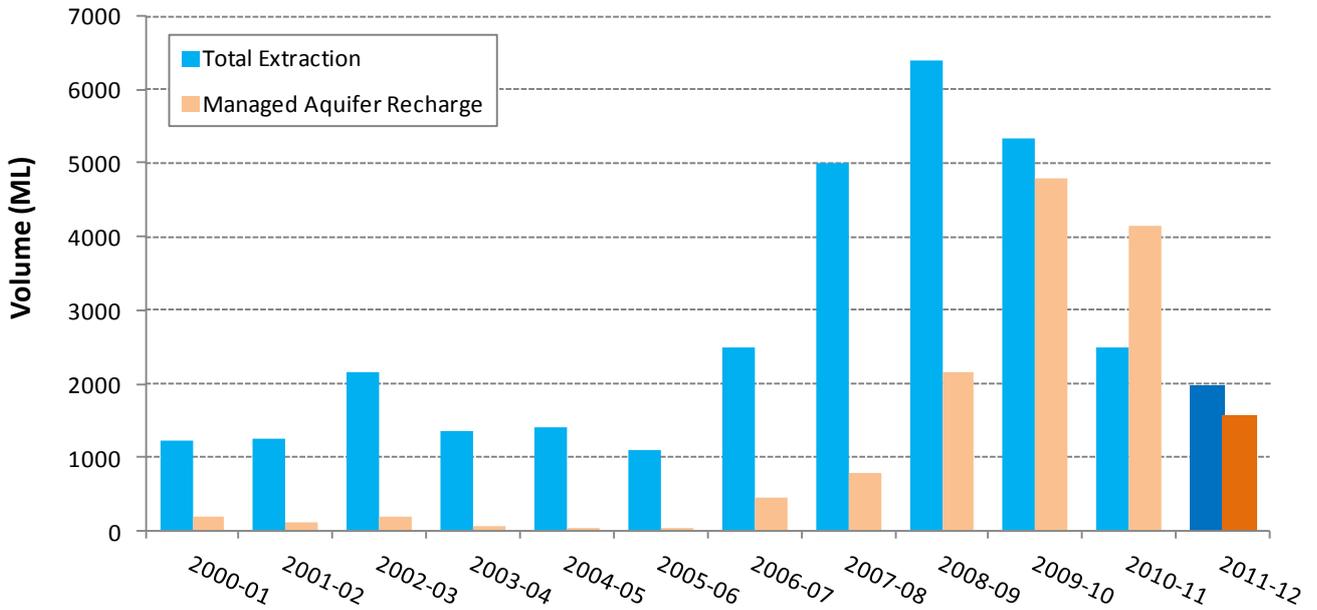


Figure 1. Historical licensed groundwater use* and managed aquifer recharge* for the confined Murray Group Limestone aquifer in the Angas Bremer Prescribed Wells Area

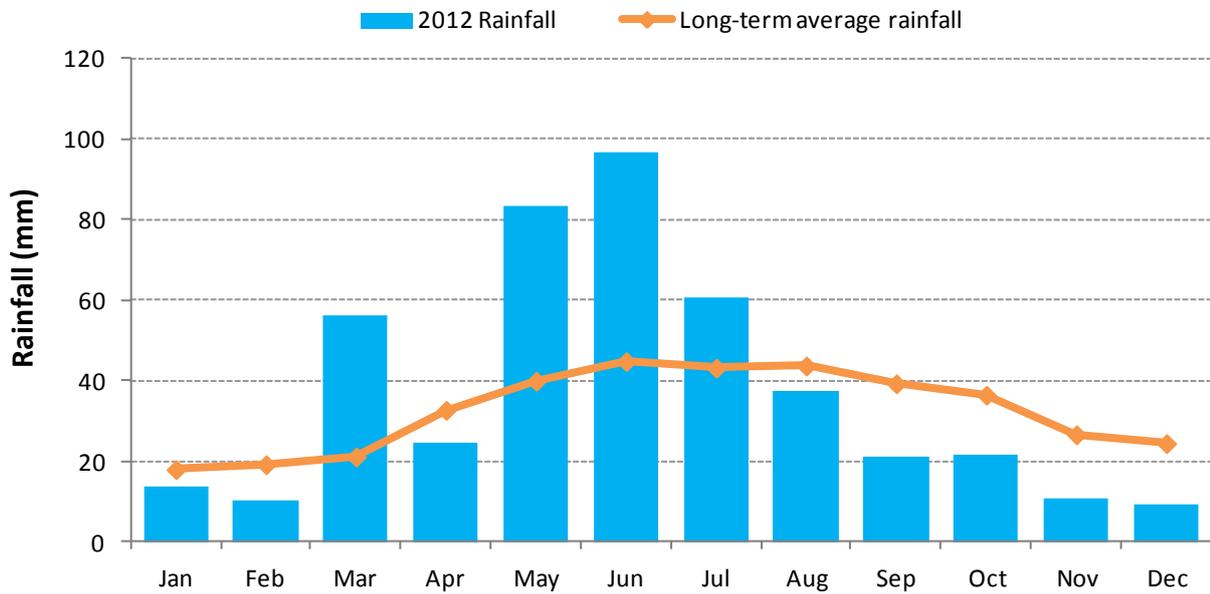


Figure 2. Monthly rainfall (mm) for 2012 and the long-term average monthly rainfall (mm) at the Langhorne Creek rainfall station (number 24515) in the Angas Bremer Prescribed Wells Area

* The licensed groundwater use and managed aquifer recharge volumes for the 2011–12 water–use year are based on the best data available as of March 2013 and may be subject to change, as some extraction volumes are in the process of being verified.

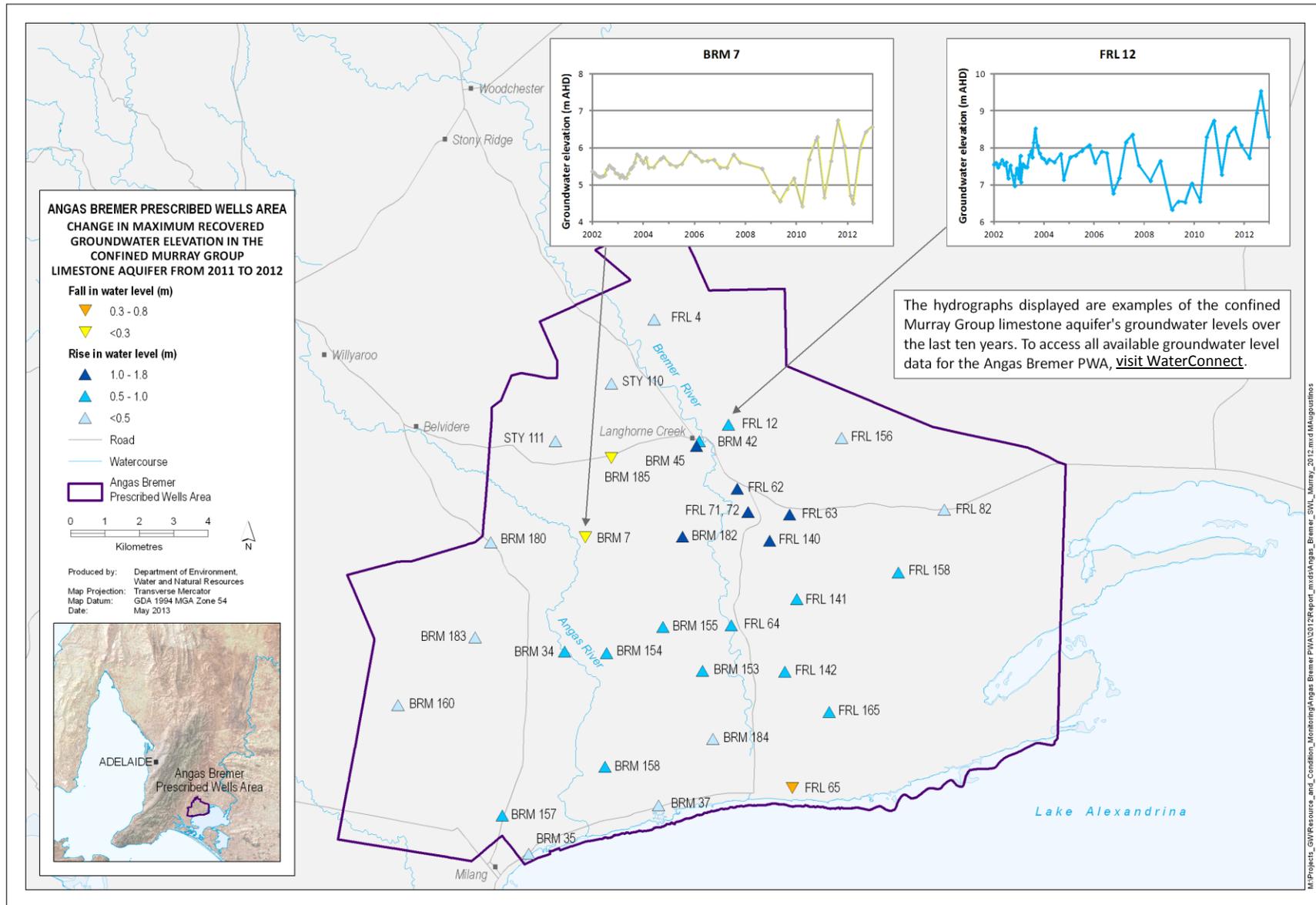


Figure 3. Overall changes in maximum groundwater levels in the confined Murray Group Limestone aquifer of the Angas Bremer Prescribed Wells Area from 2011 to 2012

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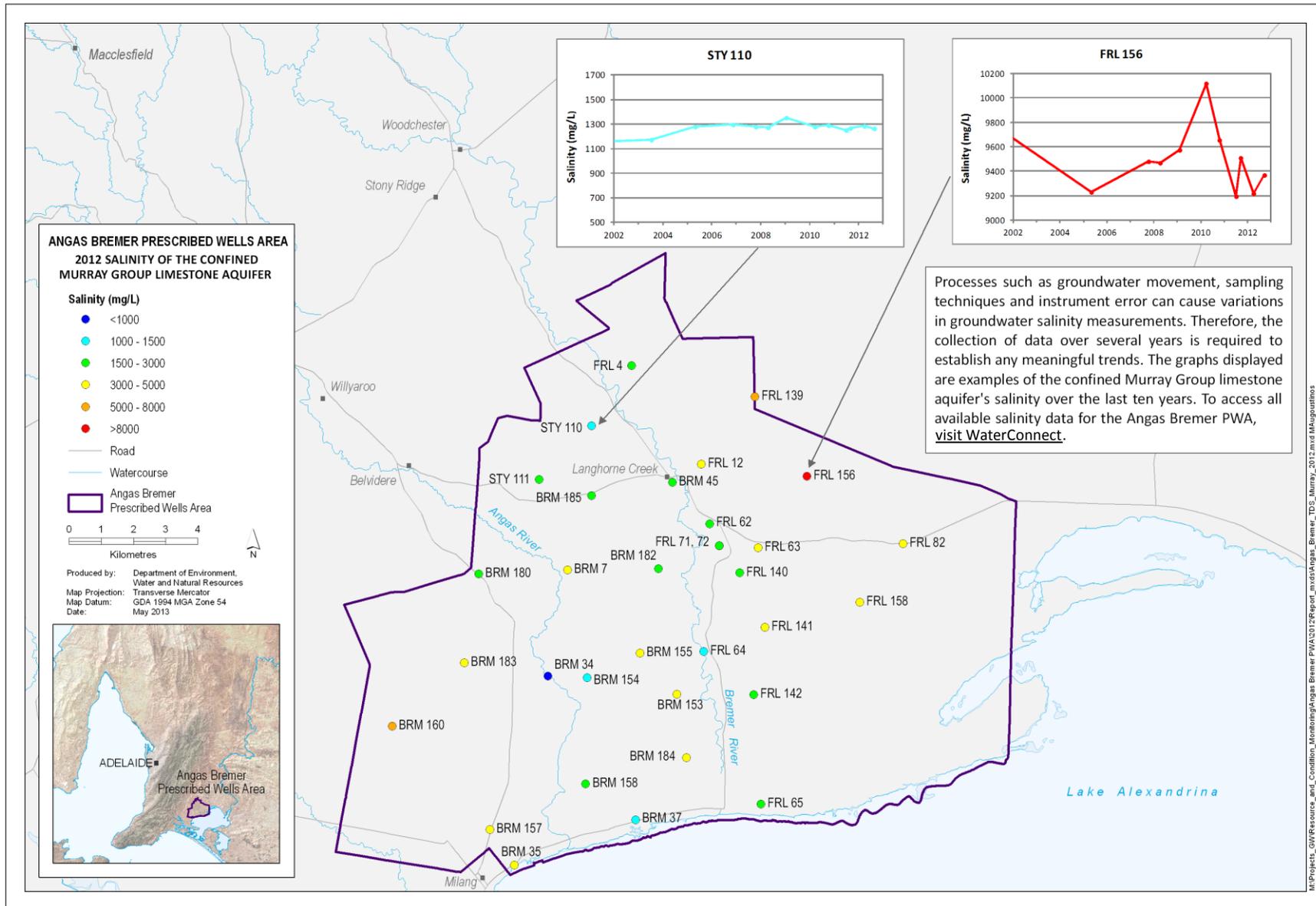


Figure 4. Groundwater salinity of the confined Murray Group Limestone aquifer in the Angas Bremer Prescribed Wells Area for 2012

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