ANGAS BREMER PWA

MURRAY GROUP LIMESTONE AQUIFER

Groundwater Level and Salinity Status Report

2013

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

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2013 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 totalled 1996* ML in 2012–13, a 1% increase from the previous water-use year (Fig. 1). This extracted water includes water that had been stored in the aquifer by irrigators over previous years through managed aquifer recharge. The neglible increase in groundwater extraction in 2012–13 may be reflective of slightly lower rainfall compared to the previous year and of irrigators using more surface water. The total volume of managed aquifer recharge (MAR) to the MGL aquifer in 2012–13 was 1511* ML, which represents a 3% decrease from 2011–12 (Fig. 1).

Data from the Langhorne Creek rainfall station (number 24515) was chosen for the analysis of rainfall trends in 2013 (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 396 mm in 2013, compared to 445 mm in 2012. Rainfall data used in this report is sourced from the SILO Patched Point Dataset, which uses original Bureau of Meteorology daily rainfall measurements and is available online at www.longpaddock.qld.gov.au/silo.

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 from 2010 to 2012, 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. A comparison of the maximum recovered groundwater levels of the MGL aquifer for 2012 and 2013 in the 31 monitoring wells where data were available showed that there were slightly more wells that registered a rise in levels (58%). Rises in groundwater level were mostly less than 0.25 m, whilst declines ranged up to 1.1 m (Fig. 3).

** The licensed groundwater use and managed aquifer recharge volumes for the 2012–13 water-use year are based on the best data available as of February 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.

Each year, irrigators in the Angas Bremer PWRA are required to submit a salinity sample from their wells to the department for analysis. The 2013 results from the irrigators' wells have been included in this report along with measurements from the department's salinity monitoring network (Fig. 4). These salinity concentrations were compared to the salinity readings from 2012, with 49 of the 100 current salinity monitoring wells having readings for both years. Overall, 49% of the wells displayed a decrease in salinity value ranging from 5 to 2531 mg/L and remaining 51% displayed an increase in salinity ranging from 7 to 713 mg/L. In 2013, approximately 86% of the 100 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 2013:

2013 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 2013 status for the confined Murray Group Limestone aquifer is supported by:

- a minor overall increase in the maximum recovered groundwater level in 2013 when compared to 2012 water level data
- a minor overall decrease in groundwater salinity in 2013 when compared to 2012 salinity 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 2009–10*, which includes background information on hydrogeology, rainfall and relevant groundwater-dependent ecosystems, and to view the descriptions of all status symbols, please visit the *Water Resources* page on WaterConnect.

For further details about the Angas Bremer PWA, please see the *Angas Bremer Water Allocation Plan* on the South Australian Murray-Darling Basin Natural Resources Management website.

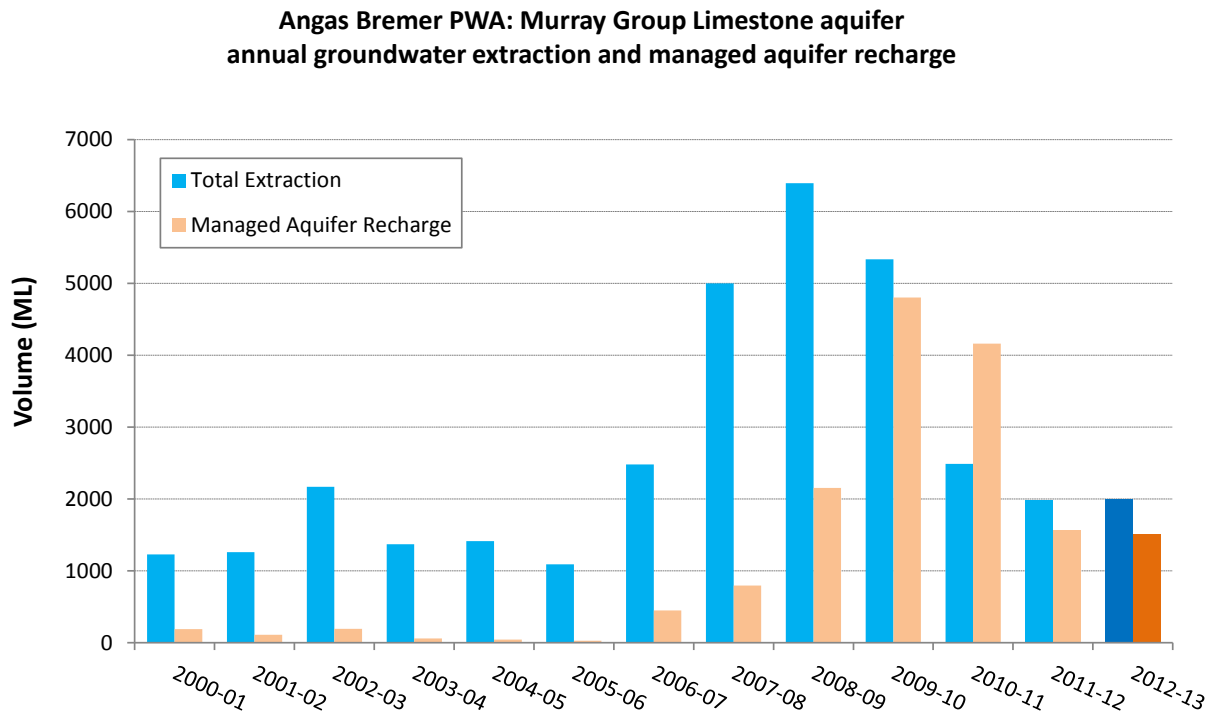

Figure 1. Historical licensed groundwater use* and managed aquifer recharge* for the confined Murray Group Limestone aquifer in the Angas Bremer Prescribed Wells Area

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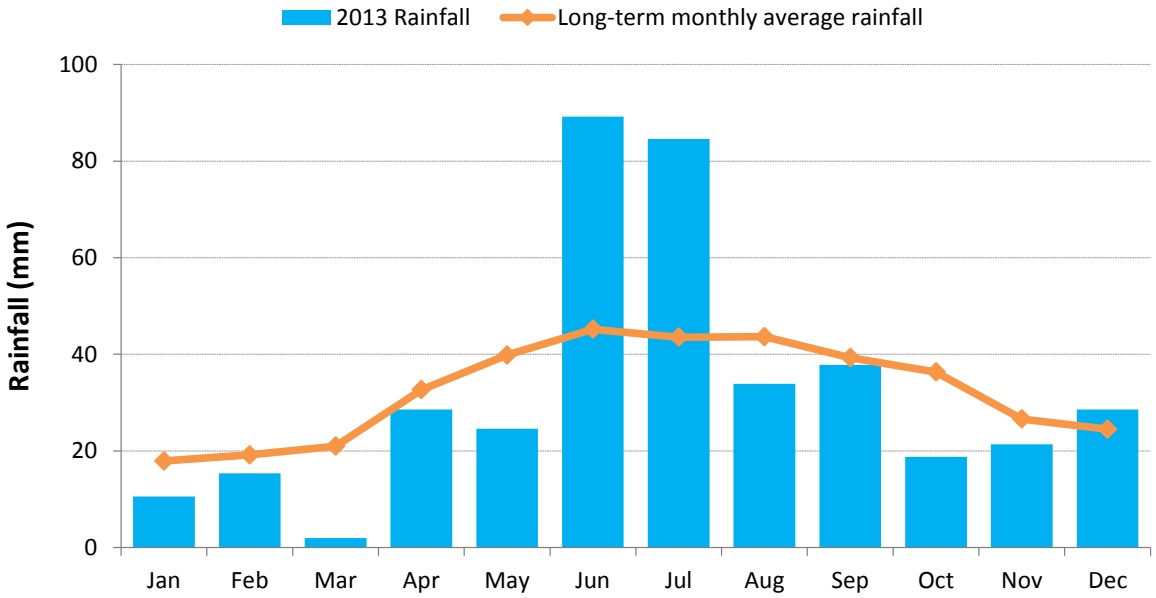

Figure 2. Monthly rainfall (mm) for 2013 and the long-term average monthly rainfall (mm) at the Langhorne Creek rainfall station (number 24515) in the Angas Bremer Prescribed Wells Area

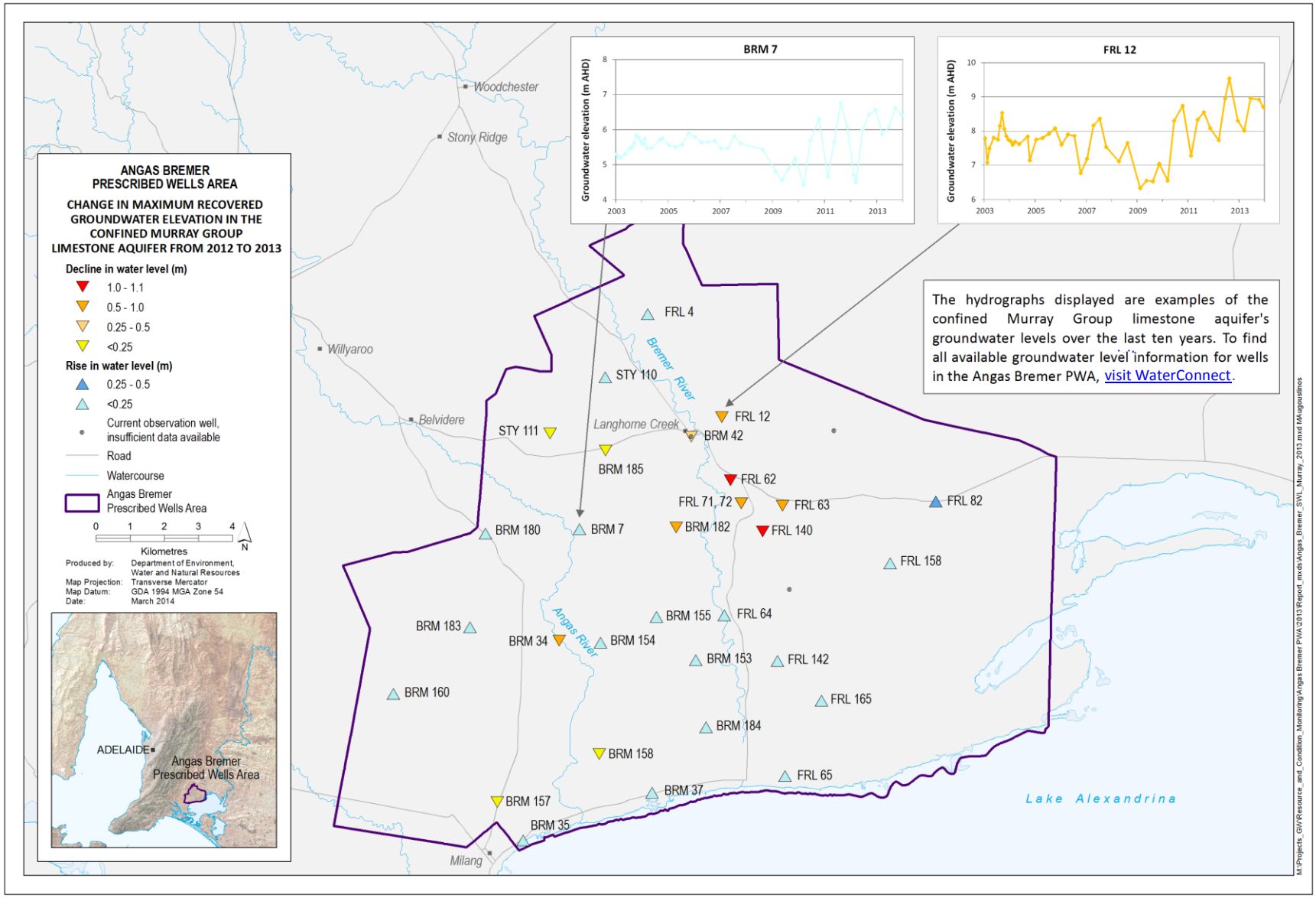

Figure 3. Overall changes in maximum groundwater levels in the confined Murray Group Limestone aquifer of the Angas Bremer Prescribed Wells Area from 2012 to 2013

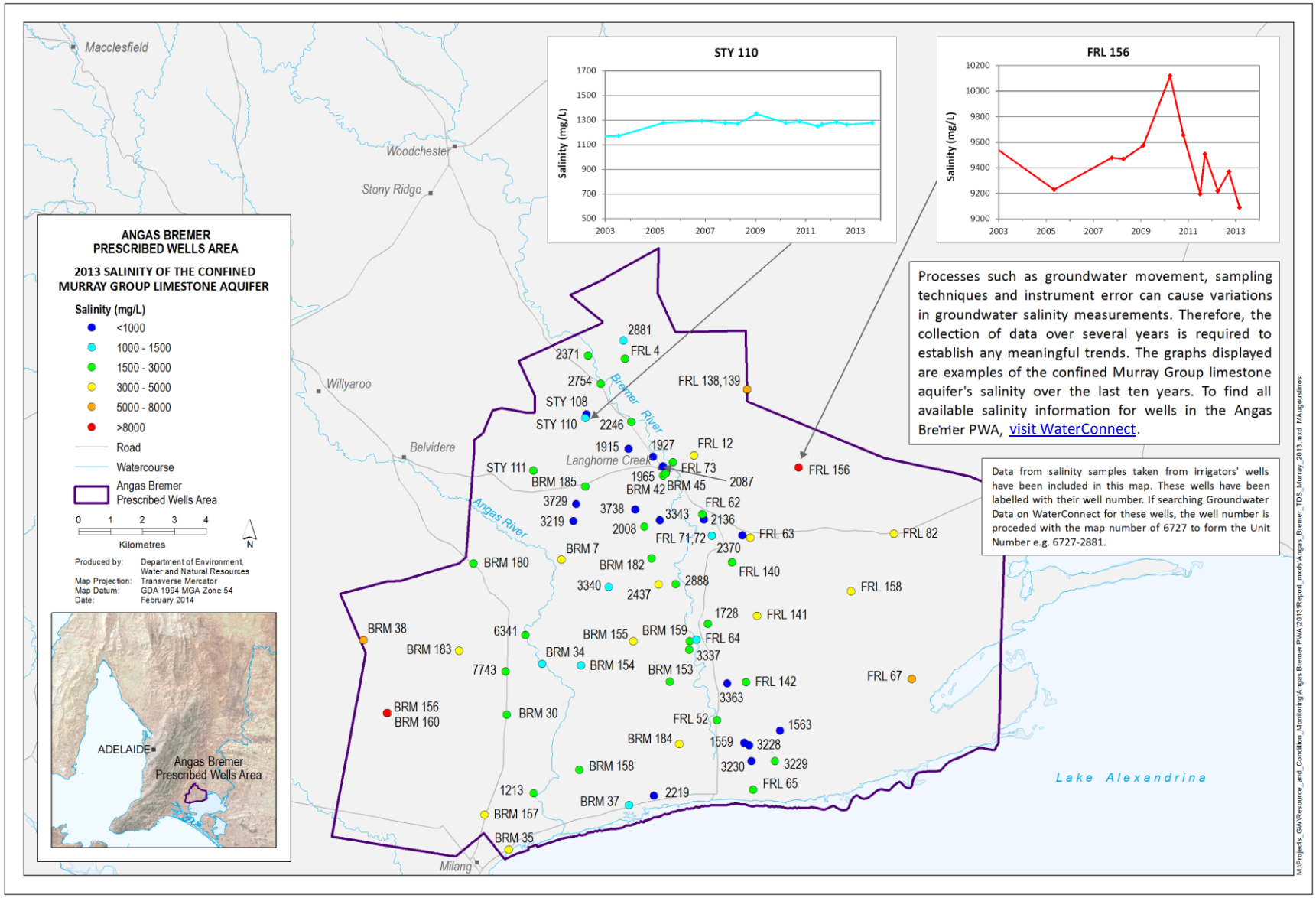

Figure 4. Groundwater salinity of the confined Murray Group Limestone aquifer in the Angas Bremer Prescribed Wells Area for 2013