
MARNE SAUNDERS PWRA

MURRAY GROUP LIMESTONE AQUIFER

Groundwater Level and Salinity Status Report

2013



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Water and Natural Resources

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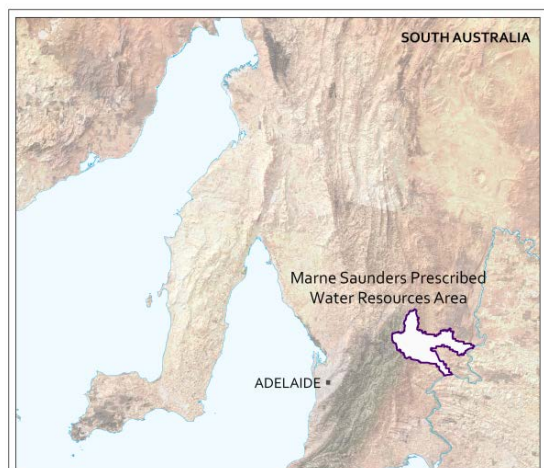
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2013 SUMMARY



The Marne Saunders Prescribed Water Resources Area (PWRA) is located on the eastern side of the Mount Lofty Ranges about 60 km northeast of Adelaide. It is a regional scale resource for which surface water and groundwater are prescribed under South Australia's *Natural Resources Management Act 2004*. A Water Allocation Plan provides for sustainable management of the water resources.

The Marne Saunders Prescribed Water Resources Area consists of two tributary catchments for the River Murray which can be divided into two distinct groundwater regions: the Hills Zone and the Plains Zone. The Plains Zone is underlain by unconsolidated sediments of the Murray Basin consisting of limestone, sand and clay layers up to 80 m thick which overlie basement rocks exposed in the Hills Zone to the west. The Murray Basin sediments consist of four layers; Quaternary sediments, Murray Group

Limestone, Ettrick Formation and the Renmark Group. The Murray Group Limestone is highly fossiliferous and sandy with solution cavities present. This aquifer is confined in the east where it is overlain by the Pooraka Formation and unconfined to the west. In general the Murray Group Limestone is overlain by Quaternary sediments and underlain by the Ettrick Formation and the Renmark Group. In the Plains Zone irrigation supplies are obtained from the Murray Group Limestone aquifer, predominantly along the Marne River valley.

Metered extractions for 2012–13 totalled 1370 ML, an increase of 21 % from the previous year (Fig. 1). Groundwater extraction from the Murray Group Limestone accounts for 76 % of the total groundwater used in the Marne Saunders PWRA.

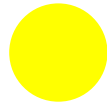
The climate of the Marne Saunders Prescribed Water Resources Area is characterised as Mediterranean with warm to hot, dry summers and mild, wet winters. Rainfall is highest in the Hills Zone at the western edge of the PWRA declining rapidly towards the east in the rain shadow of the Mount Lofty Ranges. Data from the Kongolia (24513) rainfall station was chosen for the analysis of rainfall trends (Fig. 2). In Figure 2, the long-term monthly average rainfall is graphed in orange with the total monthly rainfall graphed in blue. In 2013, the total annual rainfall was 230 mm, which is 61 mm below the long-term (1889-2013) annual average of 291 mm, noting significantly above average rainfall in June and July. 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.

Groundwater level monitoring in the limestone aquifer shows a strong relationship with rainfall and river flow. Below average rainfall in the Hills Zone results in little stream flow and consequently only minor recharge to the limestone aquifer where it is unconfined downstream of Cambrai. Groundwater levels show stable to declining trends for most wells over the past ten years (2004–2013). These trends continue during 2013 with fourteen out of fifteen observation wells monitored showing a declining trend in the maximum recovered groundwater level of up to 0.85 m (Fig. 3). Only one well displays an increase in groundwater level. Gradual water level declines are not concerning in the areas where the aquifer is unconfined, however, as levels respond rapidly to occasional floods in the Marne River.

The groundwater salinity observation network for Murray Group Limestone in the Marne Saunders Prescribed Water Resources Area is shown in Figure 4. In 2013, four out of six observation wells that have data available for both 2012 and 2013 recorded an increase in salinity ranging from 17 to 145 mg/L.

The Murray Group Limestone aquifer in the Marne Saunders Prescribed Water Resources Area has been assigned a yellow status for 2013:

2013 STATUS



“Adverse trends, indicating low risk to the resource in the medium term”

This means that gradual adverse trends in resource status have been observed over the reporting period. Continuation of these trends is unlikely to negatively impact the beneficial use (may include drinking water, irrigation or stock watering) of the resource for at least 15 years. The 2013 status for the Murray Group Limestone aquifer is supported by:

- An overall decrease in the maximum recovered groundwater level when compared to 2012 groundwater level data
- An overall increase in groundwater salinity when compared to 2012 salinity data.

To view the Marne-Saunders Prescribed Water Resources Area groundwater water status report 2011, which includes background information on hydrogeology, location of rainfall stations and relevant groundwater dependent ecosystems, and to view descriptions for all status symbols, visit the Water Resources page on [WaterConnect](#).

For further details about the Murray Group Limestone aquifer please see the Water Allocation Plan for the Marne Saunders Prescribed Water Resources Area on the SA Murray-Darling Basin Natural Resources Management [website](#).

Marne Saunders Prescribed Water Resources Area: Murray Group Limestone aquifer groundwater extraction

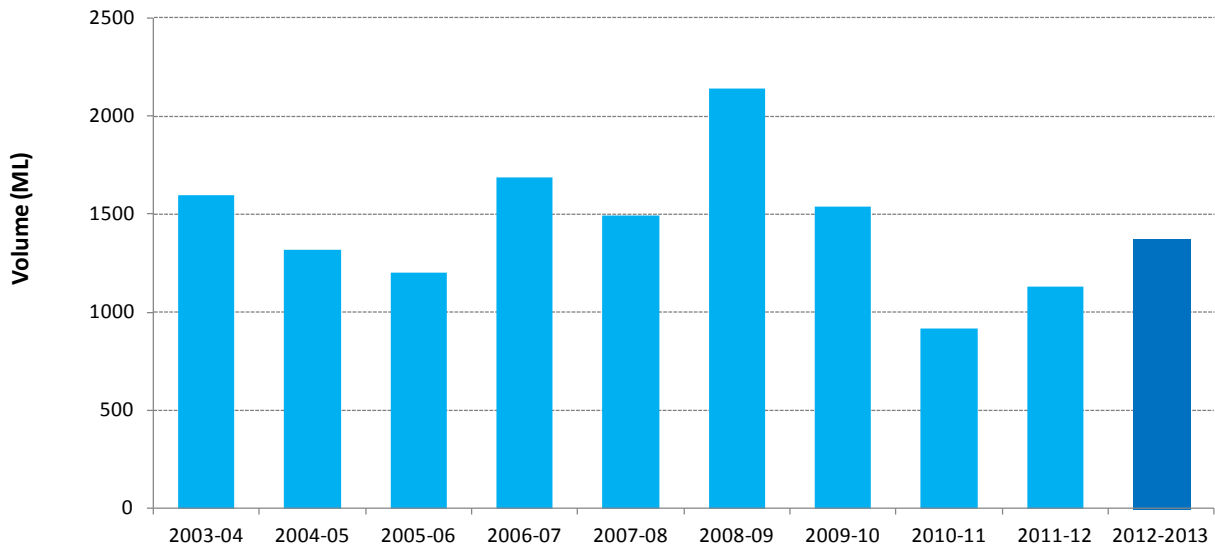


Figure 1. Historical licensed groundwater use for the Murray Group Limestone aquifer of the Marne Saunders Prescribed Water Resources Area

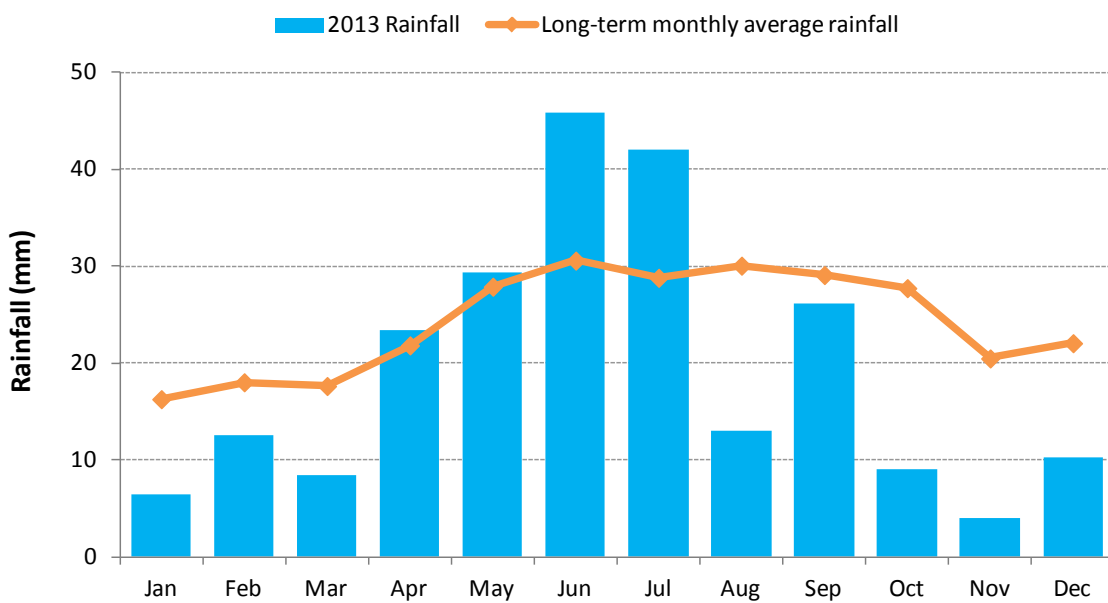


Figure 2. Monthly rainfall (mm) for 2013 and the long-term average monthly rainfall (mm) at the Kongolia rainfall station (number 24513) in the Marne Saunders Prescribed Water Resources Area

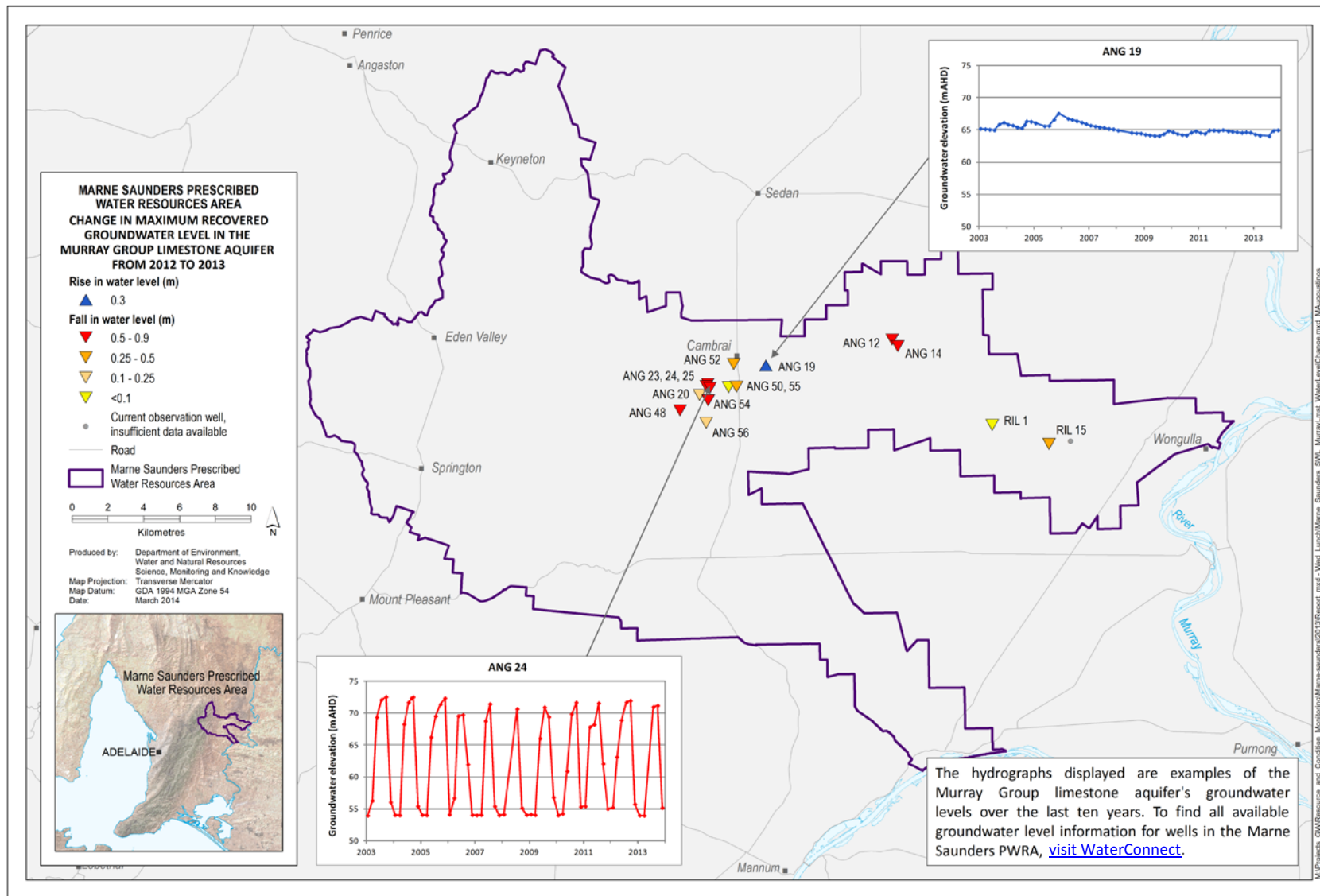


Figure 3. Overall changes in maximum groundwater levels in the Murray Group Limestone aquifer of the Marne Saunders Prescribed Water Resources Area from 2012 to 2013

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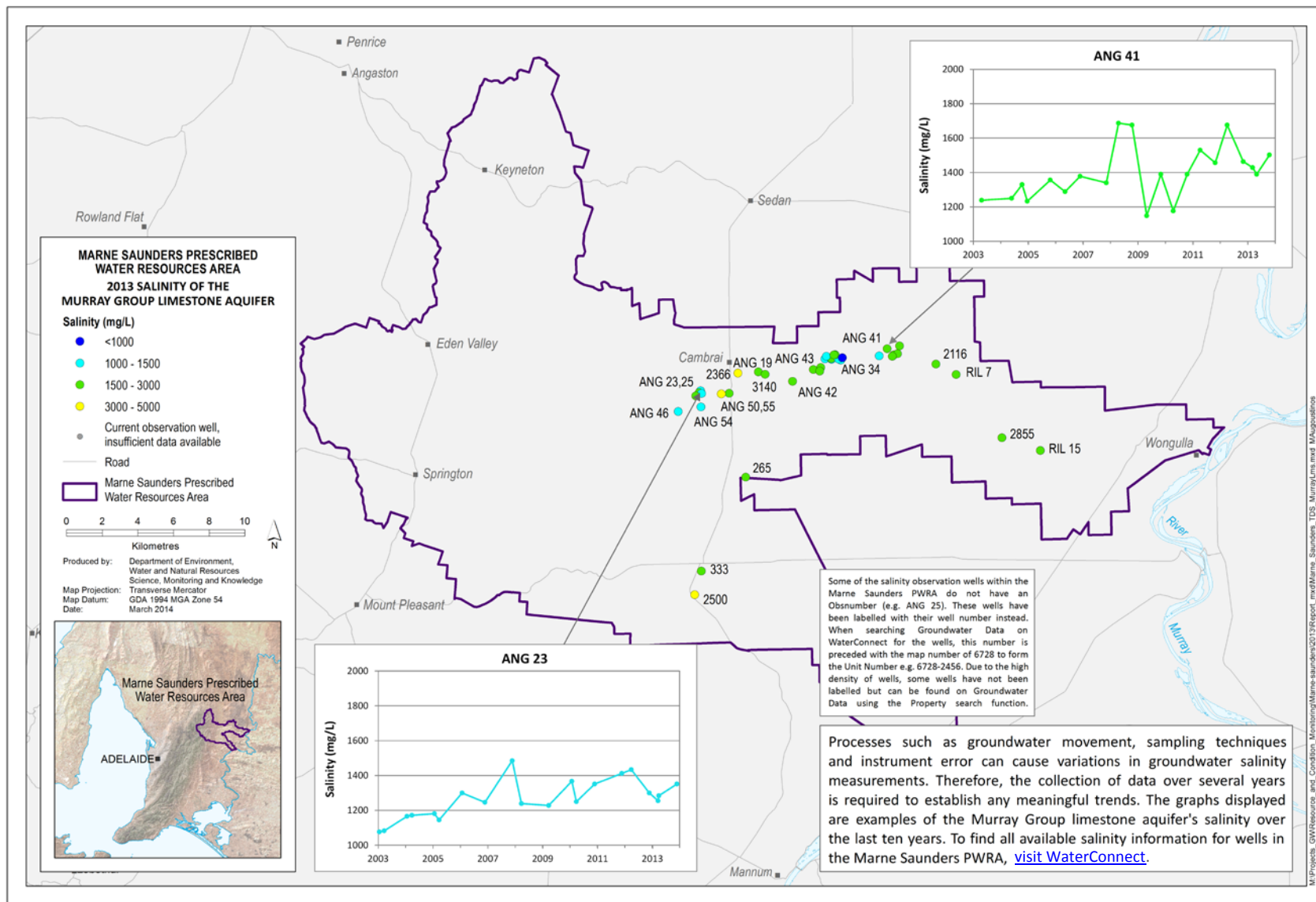


Figure 4. Groundwater salinity of the Murray Group Limestone aquifer of the Marne Saunders Prescribed Water Resources Area for 2013

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