
MARNE SAUNDERS PWRA

FRACTURED ROCK AQUIFER

Groundwater Level and Salinity Status Report

2013



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Water and Natural Resources

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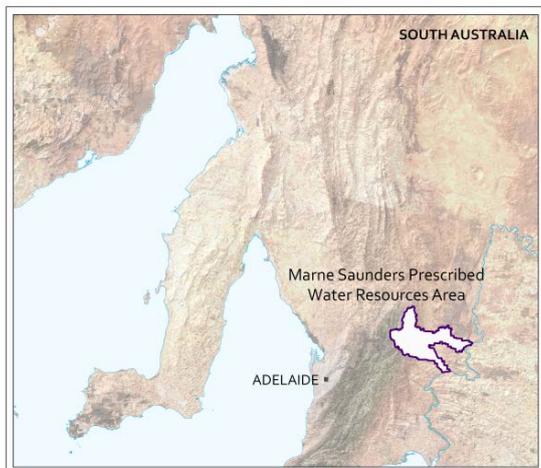
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2013 SUMMARY



The Marne Saunders Prescribed Water Resources Area 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 Hills Zone comprises the consolidated basement rock of the Mount Lofty Ranges which form Fractured Rock aquifers consisting of micaceous and feldspathic sandstones and siltstones of the Kanmantoo Group of Cambrian age. The metamorphic rocks are generally tight and impermeable with few

fractures and joints to store and transmit groundwater, consequently boreholes produce low well yields (2 L/s). The movement of groundwater within the catchment follow topographic contours flowing from high points to low points where discharge into streams occurs. Groundwater also moves eastward from the Range and discharges to the sedimentary aquifers in the Plains Zone. Recharge to the Fractured Rock aquifer of the Hills Zone occurs by rainfall percolation through the soil profile.

Metered extractions from the Fractured Rock aquifer declined from 2006-07 to 2010-11 in response to increased rainfall and therefore lower demand for groundwater resources. In 2012-13 the total extraction was 443 ML which represents an increase of 44 % from 2011-12 (Fig.1). This volume is still substantially less than the extraction in 2006-07. Extraction from the Fractured Rock aquifer accounts for 24 % of the total groundwater used in the Marne Saunders Prescribed Water Resources Area.

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 Prescribed Water Resources Area declining rapidly towards the east in the rain shadow of the Mount Lofty Ranges. Data from the Mount Pleasant rainfall station (number 23737) was chosen for the analysis of rainfall trends (Fig.2). The long-term monthly average rainfall is graphed in orange with the 2013 monthly rainfall graphed in blue. In 2013, the total annual rainfall was 634 mm, which is 34 mm below the long-term (1889-2013) annual average of 668 mm. A notable feature is the July rainfall, which was 50 % more than the long-term average. 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.

Due to the nature of the unconfined Fractured Rock aquifer water level responses can be highly variable. Over the past five years groundwater level trends have been stable to slightly declining. In 2013, increases in the maximum recovered groundwater level ranging from 0.09 to 0.56 m were recorded in twelve observation wells (86 % of total), when compared to 2012 groundwater level data. Decreases ranging from 0.25 to 0.56 m were recorded in two observation wells (14 % of total). These responses are predominantly caused by rainfall trends as extraction volumes are considered too low and dispersed to affect regional water levels.

Irrigators in the Marne Saunders PWRA are required to submit a water sample from their wells to DEWNR for salinity analysis every year. In 2013, a range of salinities from 768 to 5215 mg/L were recorded, with 89 % of the 28 monitored wells recording levels of less than 3000 mg/L (Fig. 4).

The Fractured Rock aquifer in the Marne Saunders Prescribed Wells Area 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 12 month reporting period. Continuation of these trends favours a very low likelihood of negative impacts on the beneficial use (e.g. drinking water, irrigation or stock watering) of the resource. The 2013 status for Fractured Rock aquifer is supported by:

- an overall rise in the maximum recovered groundwater level in 2013 when compared to 2012 groundwater level data.

To view the *Marne Saunders PWRA Groundwater Level and Salinity 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, please see the Water Resources page on [WaterConnect](#).

For further information about the Marne Saunders PWRA, please see the Marne Saunders *Water Allocation Plan* on the SA Murray-Darling Basin Natural Resources Management [website](#).

Marne Saunders Prescribed Water Resources Area: Fractured Rock aquifer groundwater extraction

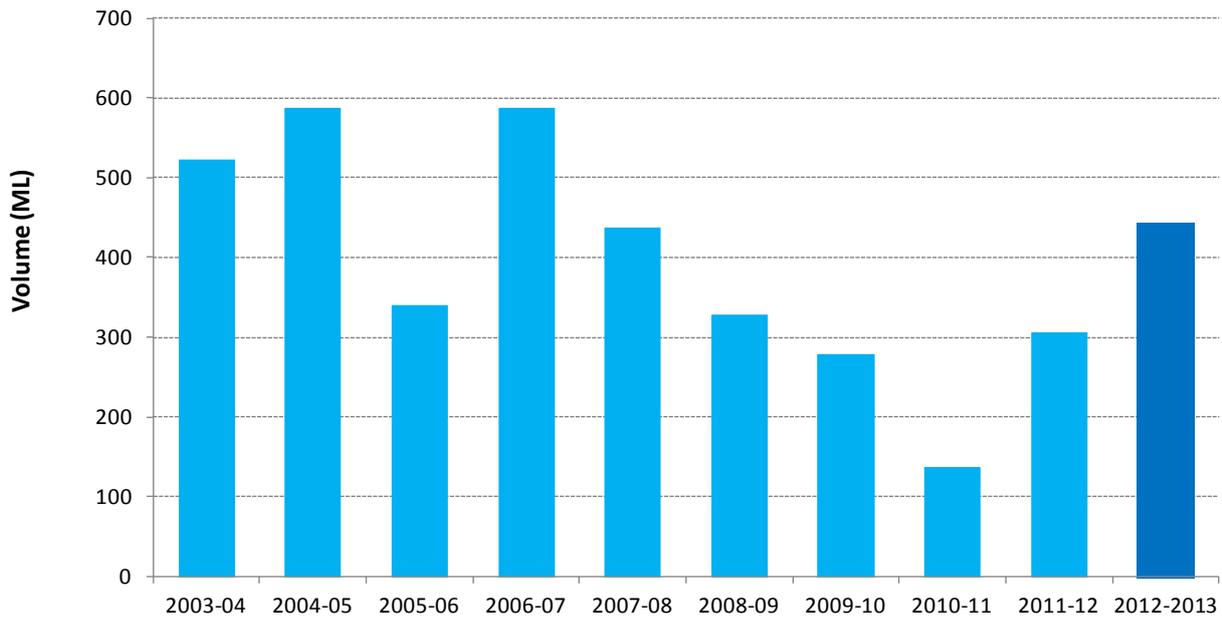


Figure 1. Historical licensed groundwater use for the Fractured Rock aquifer of the Marne Saunders Prescribed Water Resources Area

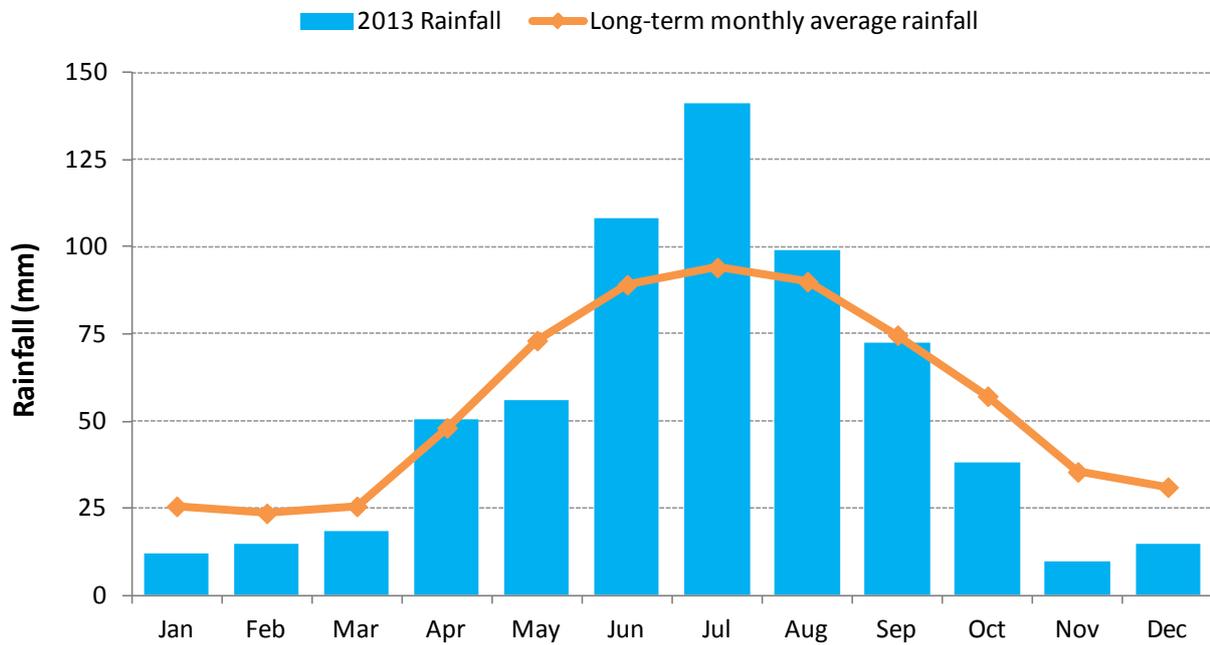


Figure 2. Monthly rainfall (mm) for 2013 and the long-term average monthly rainfall (mm) at the Mount Pleasant rainfall station (number 23737) in the Marne Saunders Prescribed Water Resources Area

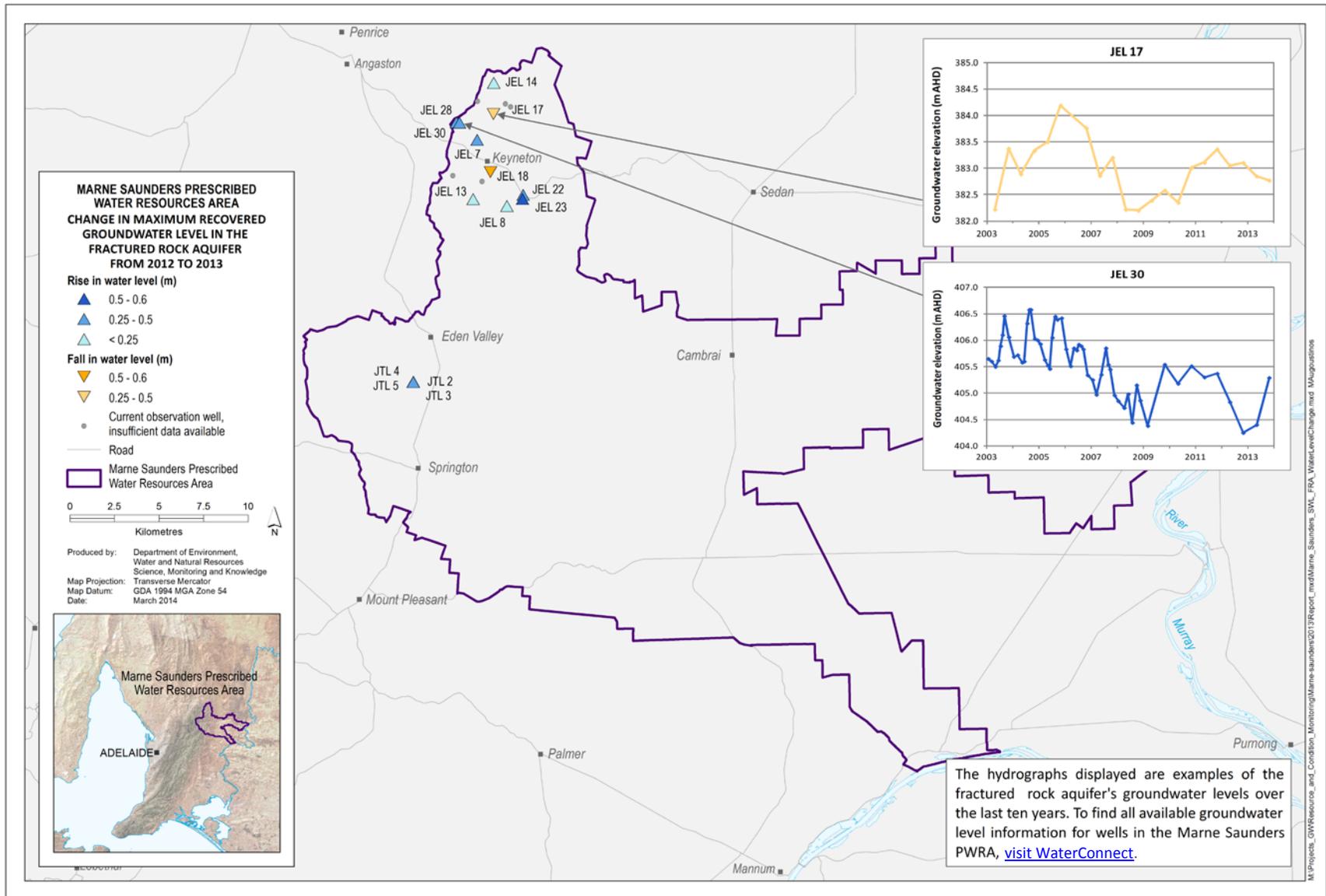


Figure 3. Overall changes in maximum groundwater levels in the Fractured Rock aquifer of the Marne Saunders Prescribed Water Resources Area from 2012 to 2013

Marne Saunders Prescribed Water Resources Area

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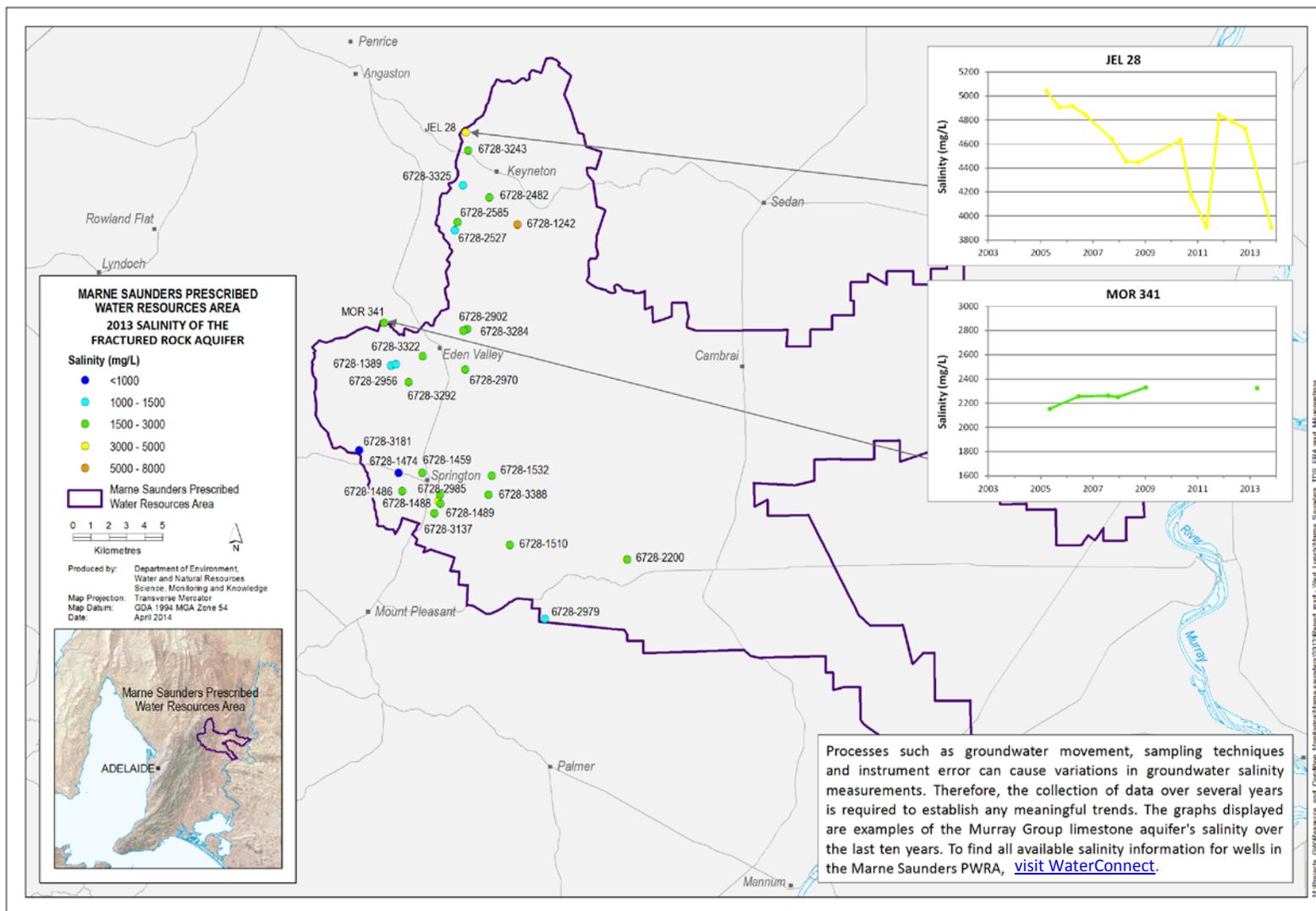


Figure 4. Groundwater salinity of the Fractured Rock aquifer of the Marne Saunders Prescribed Water Resources Area for 2013