MCLAREN VALE PWA

FRACTURED ROCK AQUIFER

Groundwater Level and Salinity Status Report

2013

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

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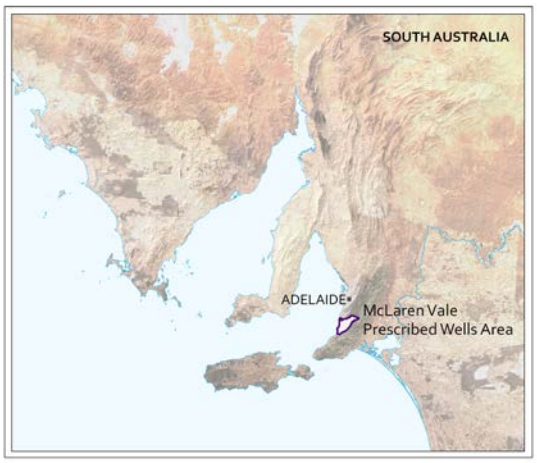
2013 SUMMARY



The McLaren Vale Prescribed Wells Area (PWA) is located approximately 35 km south of Adelaide. It is a regional-scale resource for which groundwater has been prescribed under South Australia's *Natural Resources Management Act 2004*. A Water Allocation Plan provides for sustainable management of the water resources.

Groundwater in the McLaren Vale PWA can be found in four major aquifers: Quaternary aquifer, Port Willunga Formation aquifer, Maslin Sands aquifer and Fractured Rock aquifer. The Fractured Rock aquifer outcrops to the east of the Willunga fault and along the northern extent of the PWA along the Onkaparinga Gorge. Groundwater flows through fractures and fissures in the formation. The flow is variable and strongly influenced by the size, density and orientation of the fractures. The Fractured Rock aquifer is recharged by rainfall in outcropping areas and the watertable is likely to reflect the surface topography. The aquifer is comprised of basement rock consisting of slates, quartzites, shales and limestones which are overlain by the Quaternary, Port Willunga Formation and Maslin Sands aquifers. Groundwater movement within this aquifer system follows topography flowing from high points along the basin margins towards low points within the basin where discharge to sedimentary aquifers occur. Beneath the sediments, the flow direction within the Fractured Rock aquifer turns south-west towards the coast.

Groundwater extraction (excluding stock and domestic use) from the Fractured Rock aquifer in the McLaren Vale PWA totalled 778 ML for 2012-13, which represents an increase of 125 ML (19 %) from the previous year (Fig. 1). In 2013, groundwater extraction from the Fractured Rock aquifer accounted for 18 % of total water use within the McLaren Vale PWA. Groundwater in the region is primarily used for viticulture which is also supplemented with treated effluent as an additional water resource. This water is sourced from the Christies Beach Wastewater Treatment Plant via the Willunga Basin Water Company reticulation scheme.

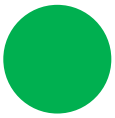
The climate of the McLaren Vale PWA is characterised as Mediterranean with warm to hot, dry summers and mild, wet winters. As the primary recharge area for the Fractured Rock aquifer is in the Mount Lofty Ranges, data from the Mount Bold Reservoir rainfall station (23734) was chosen for analysis of rainfall trends (Fig. 2) in the area. 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 812 mm, which is over 100 mm above the annual average of 711 mm.

Groundwater levels in the Fractured Rock aquifer tend to follow rainfall patterns and show an overall declining trend for the majority of monitoring wells over the past 40 years. In recent years, however, monitored water levels have generally stabilised or risen due to above average rainfall, and therefore recharge. In 2013, 19 observation wells completed within the Fractured Rock Aquifer had sufficient records to compare the maximum recovered water levels with those recorded in 2012 (Fig. 3). Of these, 10 observation wells showed a rising water level trend of up to 2.8 m, while nine displayed declines in groundwater levels up to 1.1 m (Fig. 3). The median change in maximum levels from 2012 and 2013 was a rise of 0.05 m. There change in groundwater levels in 2013 is therefore insignificant. The increased recharge expected from the higher than average rainfall has most likely been offset by increased extraction from the aquifer.

The groundwater salinity observation network for the McLaren Vale PWA Fractured Rock Aquifer is shown in Figure 4. Over the 10 year period from 2003 to 2013, several wells have shown a slight increasing trend in salinity. In 2013, 47 wells were monitored for salinity within the area. Half of these wells had salinity readings less than 1500 mg/L, and 10 wells (21%) had salinity levels between 2000 and 3500 mg/L. The wells with higher salinities are mostly clustered within close proximity of each other, in the region just north of McLaren Vale. As only five wells in the Fractured Rock Aquifer were sampled in 2012, it is not possible to draw conclusions regarding general trends in aquifer salinity over the course of the reporting period.

The Fractured Rock Aquifer in the McLaren Vale PWA has been assigned a green status for 2013:

2013 STATUS



"No adverse trends, indicating negligible risk to the resource."

This means 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 (drinking water, irrigation or stock watering). The 2013 status for the Fractured Rock Aquifer is supported by:

- no significant change in maximum recovered water levels in 2013 when compared to 2012 data.

There was insufficient data available from 2012 to allow an assessment of salinity trends within the resource, however half of the wells that were monitored in 2013 indicated salinity levels below 1500 mg/L.

To view the *McLaren Vale Prescribed Wells Area 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 the Water Resources page on WaterConnect.

For further details about the relevant prescribed resource please see the Water Allocation Plan for the McLaren Vale prescribed wells area.

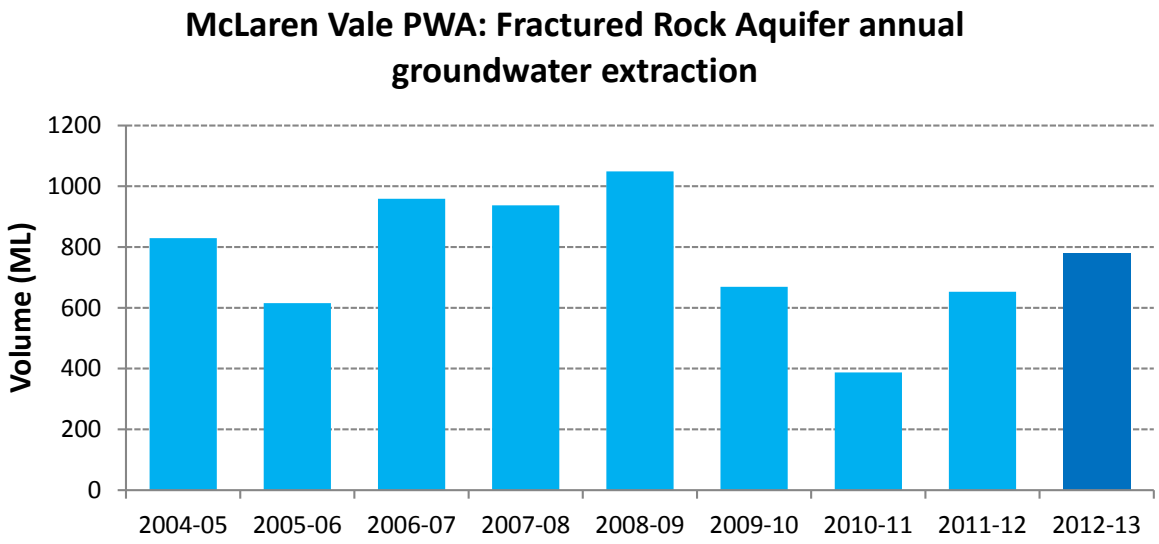


Figure 1. Historical licensed groundwater use for the Fractured Rock Aquifer in the McLaren Vale PWA

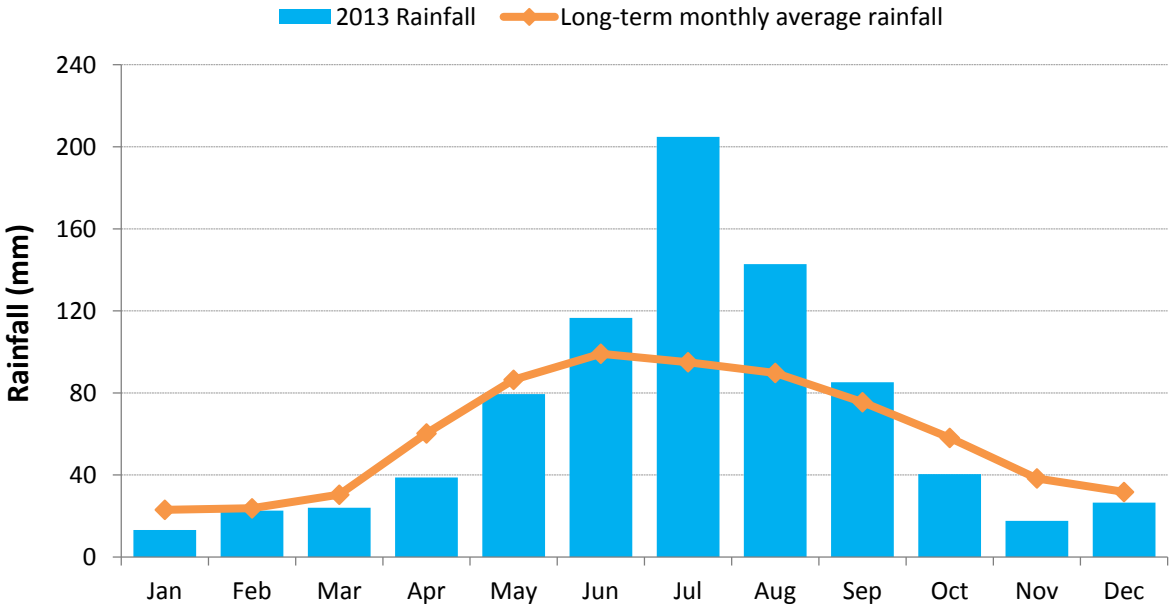


Figure 2. Monthly rainfall (mm) for 2013 and the long-term average monthly rainfall (mm) at the Mount Bold Reservoir rainfall station (23734) in the McLaren Vale PWA

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.

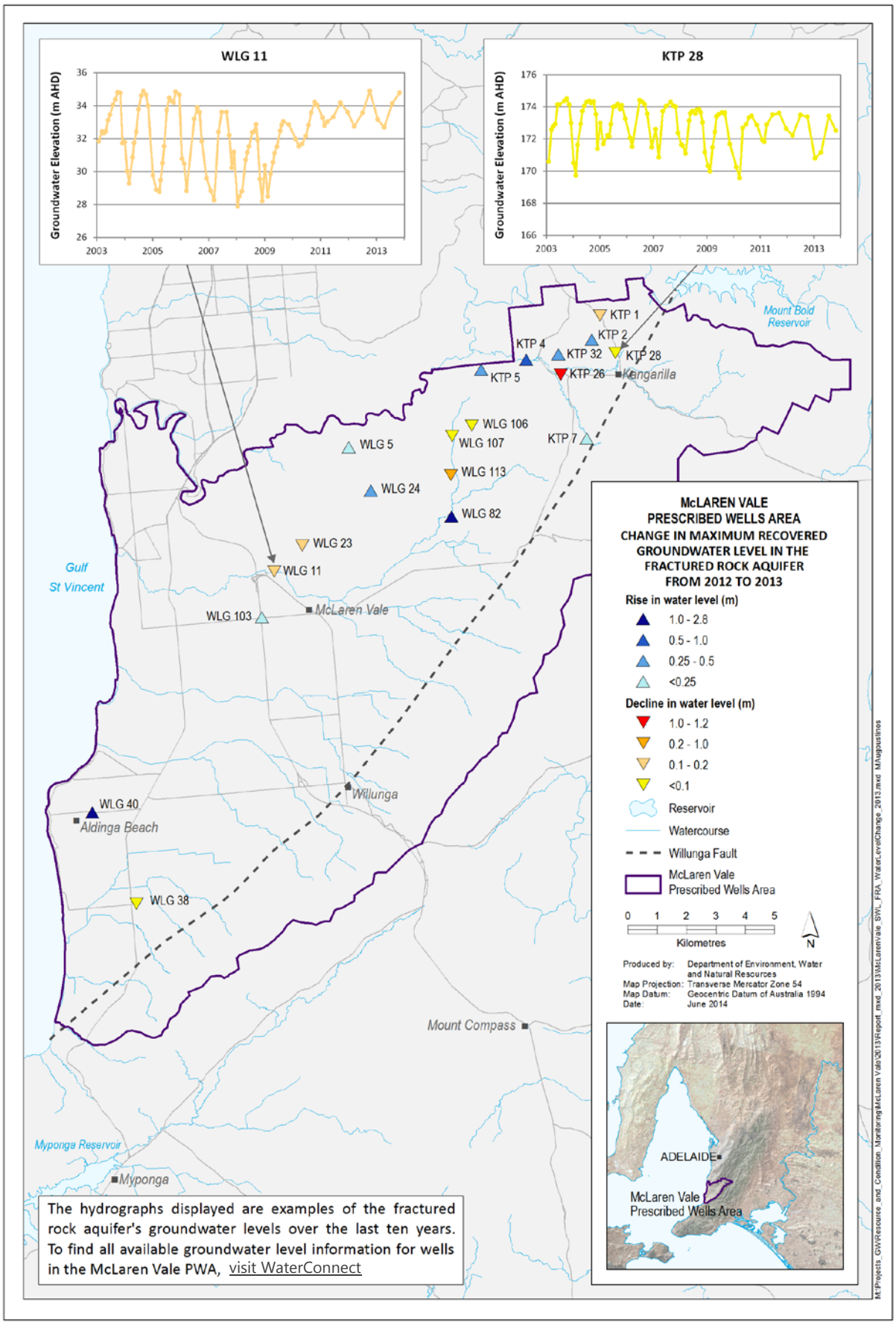


Figure 3. Overall changes in maximum groundwater levels in the Fractured Rock Aquifer in the McLaren Vale PWA from 2012 to 2013.

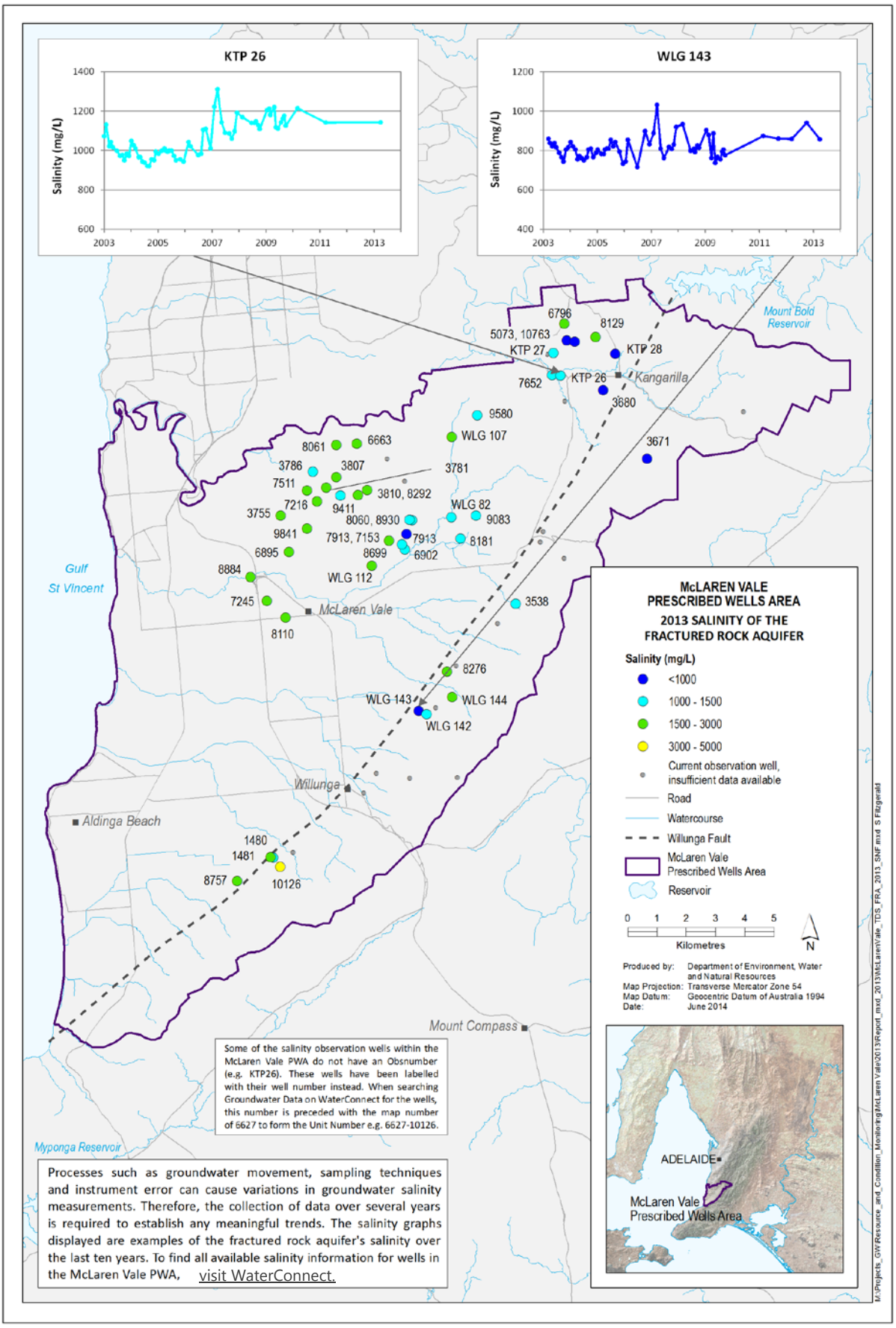


Figure 4. Groundwater salinity of the Fractured Rock Aquifer in the McLaren Vale PWA for 2013.