CLARE VALLEY PWRA

FRACTURED ROCK AQUIFER

Groundwater Level and Salinity Status Report

2012

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

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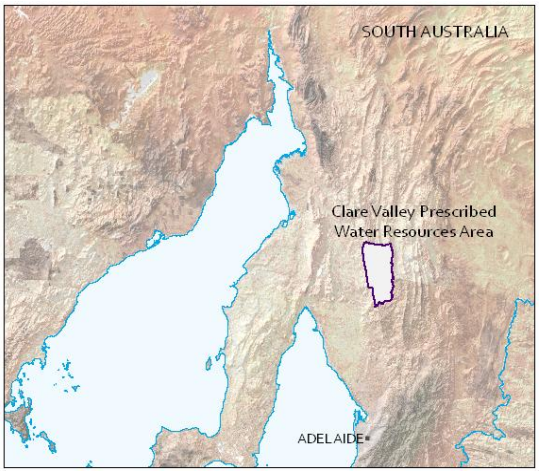
2012 SUMMARY



The Clare Valley Prescribed Water Resources Area is located approximately 130 km north of Adelaide within the Mount Lofty Ranges. It is a regional-scale resource for which surface water and groundwater is prescribed under South Australia's *Natural Resources Management Act 2004*. A water allocation plan provides for sustainable management of the groundwater resources.

There are two aquifer systems within the Clare Valley region. A Quaternary alluvial aquifer occurring at shallow depths (<15 m) in valley floors which provides only a small portion of the groundwater resource (mainly in the vicinity of Stanley Flat). The Quaternary aquifer is underlain by an extensive Fractured Rock aquifer which is the main aquifer system developed within the Clare Valley. Both aquifers are recharged by local rainfall.

The Fractured Rock aquifer that provides groundwater for irrigation in the Clare Valley is composed of the Mintaro Shale, Saddleworth Formation, Undalya Quartzite, and the Skillogalee Dolomite. Fracturing in the region is considered to be continuous and groundwater can flow across geological units. Within the Fractured Rock aquifer, the fractures act as conduits for groundwater flow. The yield of groundwater from a particular well is dependent on the size and spacing between fractures and the orientation of fractures intercepted. The Fractured Rock aquifer can be divided into two zones; a relatively permeable zone in the upper 20–40 m within which fractures are closely spaced (generally <0.5 m), and a deeper low permeability regional zone. The size and spacing of fractures tends to decrease with depth.

Metered extractions in 2011–12 from the Fractured Rock aquifer totalled 766 ML, which represents an increase of 269 ML from the previous water use year (Fig.1). This usage is still the second lowest usage over the past 10 years which can be partly attributed to above average late-spring rainfall in 2011 reducing irrigation demand.

The climate of the Clare Valley region is characterised by hot, dry summers and cool to cold, wet winters. There are two rainfall stations, Calcannia (21075) and Watervale (21054) within the Clare Valley Prescribed Water Resources Area. The long-term average annual rainfall recorded at Watervale and Calcannia rainfall stations for the period of 1889 to 2012 is 652.9 mm and 554.0 mm respectively. In Figure 2 the long-term monthly average rainfall at Calcannia is graphed in orange and the 2012 total monthly rainfall graphed in blue. Rainfall for 2012 was well below the long-term average with 543.8 mm recorded at Watervale and 423.4 mm at Calcannia.

The majority of water level observation wells display declining long-term trends over the past 20 years up to 2009, followed by rising water levels up to and including 2011. In 2012 the majority of observation wells (76 out of 137) show a decline of up to 2.43 m in the maximum water level attained in comparison to the maximum water level observed in 2011 (Fig. 3).

Water sampling for salinity was completed in March 2012 and is therefore more reflective on the 2011 rainfall year. Groundwater salinity throughout the Clare Valley Prescribed Water Resources Area is generally below 1500 mg/L which is within the salinity threshold for grape growing, the primary use for irrigation water in the PWRA, but can reach up to 2773 mg/L in some locations (Fig. 4). In 2012, nine out of 18 salinity observation wells showed a slight increase in salinity when compared with measurements from March 2011.

The Clare Valley Prescribed Water Resources Area Fractured Rock aquifer has been assigned a yellow status for 2012:

2012 STATUS

"Gradual adverse trends, indicating a 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 (i.e. drinking water, irrigation or stock watering) of the resource for at least 15 years. The 2012 status for the Fractured Rock aquifer is supported by:

- A decrease in the maximum water level observed in 57% of monitoring wells by up to 2.4 m when compared to the maximum water level attained in 2011
- An increase in salinity observed in 50% of wells monitored by up to 690 mg/L when compared to 2011 salinity data

To view the *Clare Valley PWRA Groundwater Level and Salinity Status Report 2009-10*, 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 Fractured Rock aquifer please see the Water Allocation Plan for the Clare Valley Prescribed Water Resources Area.

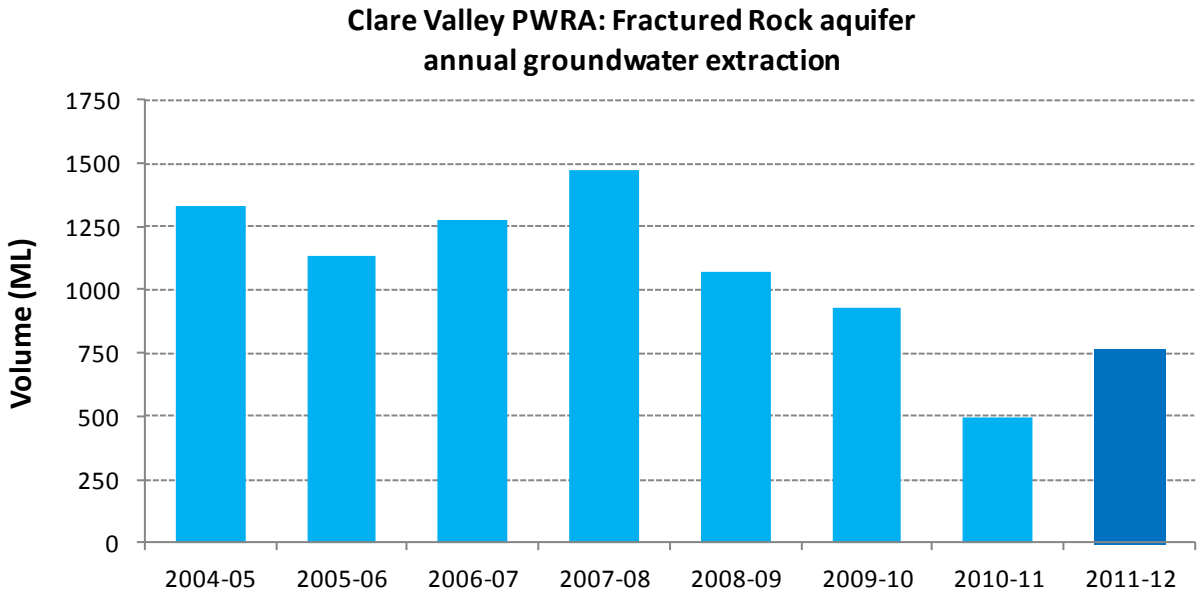


Figure 1. Historical licensed groundwater use for the Fractured Rock aquifer of the Clare Valley Prescribed Water Resource Area

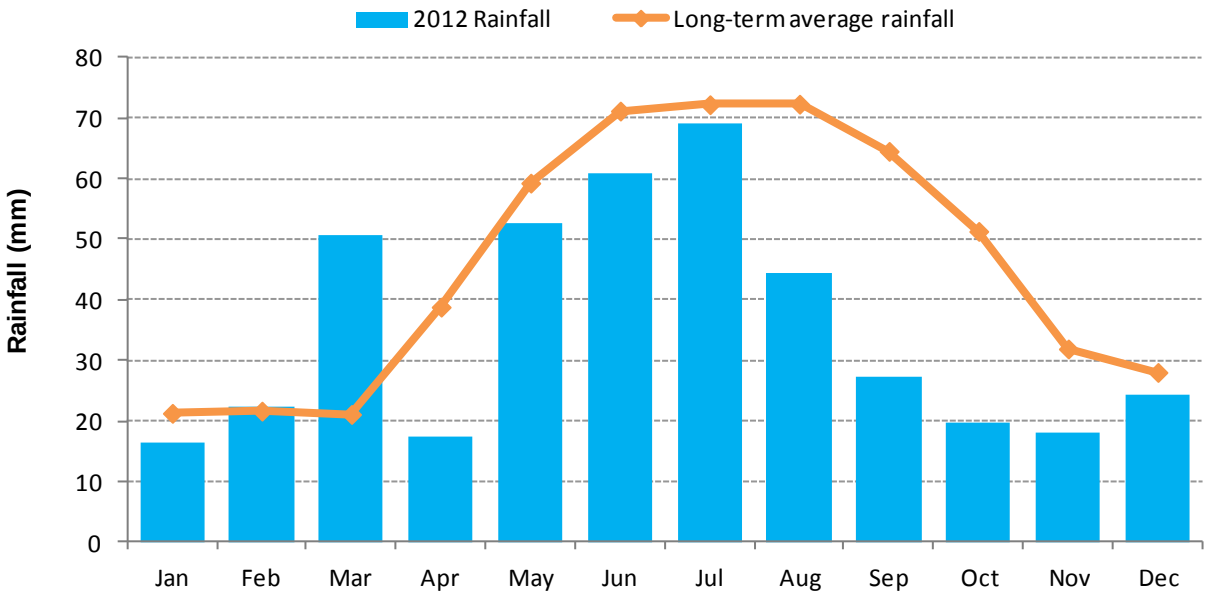


Figure 2. Monthly rainfall (mm) for 2012 and the long-term average monthly rainfall (mm) at the Calcannia rainfall station (21075) in the Clare Valley Prescribed Water Resource Area

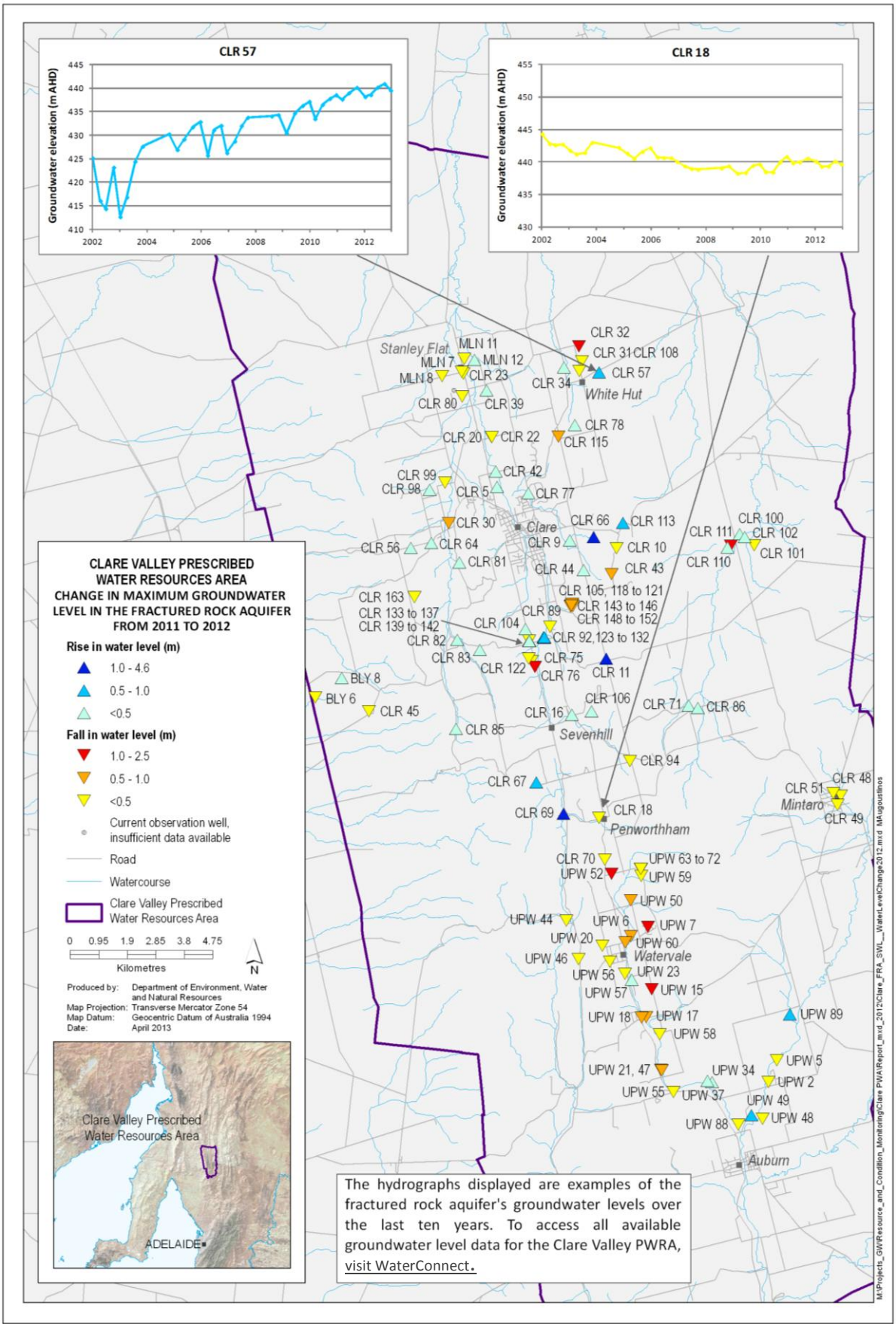


Figure 3. Overall changes in maximum groundwater levels in the Fractured Rock aquifer of the Clare Valley Prescribed Water Resource Area from 2011 to 2012

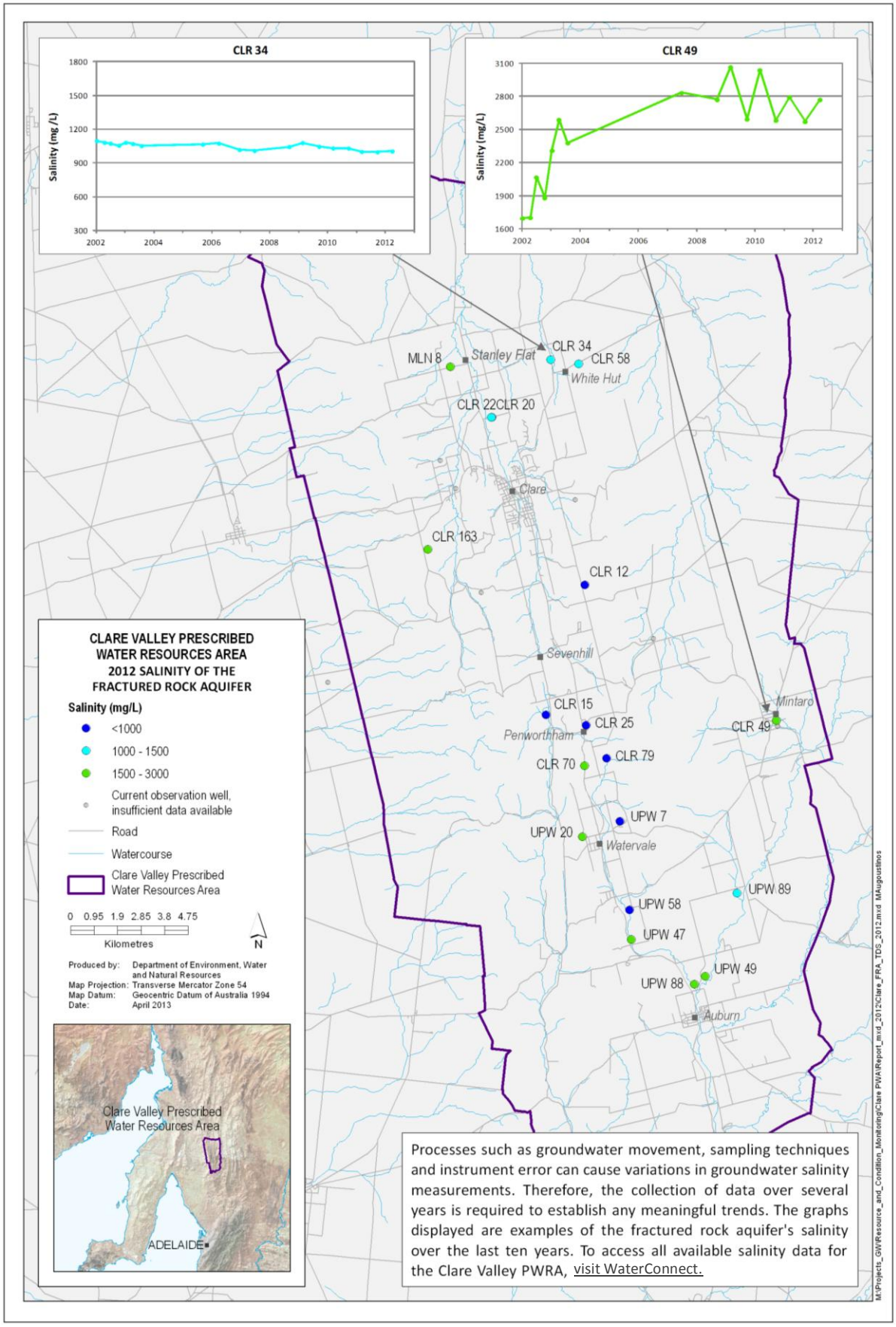


Figure 4. Groundwater salinity of the Fractured Rock aquifer of the Clare Valley Prescribed Water Resource Area for 2012