TINTINARA–COONALPYN PWA

UNCONFINED AQUIFER

Groundwater Level and Salinity Status Report

2012

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

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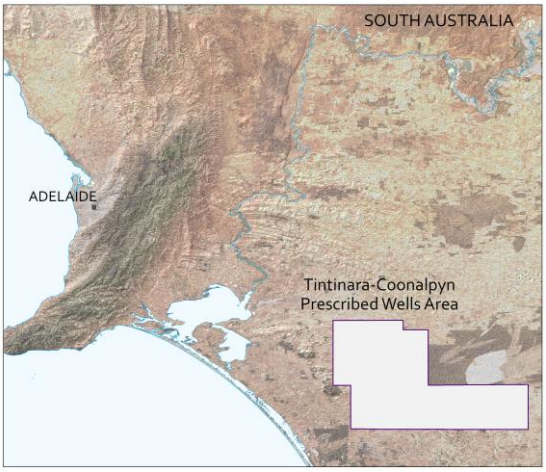
ISBN 978-1-922174-11-6

This document is available online at http://www.waterconnect.sa.gov.au/GSR

2012 SUMMARY



The Tintinara–Coonalpyn Prescribed Wells Area (PWA) is located in the upper South East of South Australia, approximately 175 km south-east of Adelaide. It is a regional-scale resource for which groundwater is prescribed under South Australia's *Natural Resources Management Act 2004*. A water allocation plan provides for the sustainable use of the groundwater resources.

The Tintinara–Coonalpyn PWA is underlain by sediments of the Murray Basin and can be divided topographically into two discrete landforms, each with different hydrogeological characteristics and different groundwater management issues. A low-lying coastal plain lies to the west, with the highlands located to the east. Both regions are underlain by two aquifer systems—an unconfined aquifer comprising various Quaternary and Tertiary limestones and an underlying confined Tertiary sand aquifer. The Quaternary-aged Padthaway, Coomandook and Bridgewater Formations form the unconfined aquifer on the coastal plain. In the highlands, the Tertiary-aged Murray Group Limestone forms the unconfined aquifer. The main source of recharge to the unconfined aquifer is the direct infiltration of rainfall and groundwater flows from east to west.

Verified metered groundwater extraction volumes for the 2011–12 water-use year were not available at the time of writing so are not included in this report.

Analysis of climatic trends in the South East has revealed a general drying trend since the early 1950s. This is reflected in most groundwater hydrographs and a strong relationship has been demonstrated between decreases in average annual rainfall and declining water levels measured in observation wells for both the confined and unconfined aquifers over the last 40 years. The Tintinara rainfall station (number 25514) is located in the township of Tintinara in the west of the Tintinara–Coonalpyn PWA and recorded 344 mm of rain in 2012. This is more than 110 mm less than the long-term average annual rainfall for this station. Both March and June received rainfall significantly above their long-term monthly average, but February, May and September through to November recorded significantly below-average rainfall (Fig. 1). The response of groundwater levels to rainfall varies between the Coastal Plain and the Highlands primarily due to the depth of the watertable. Levels are more responsive to rainfall on the low-lying Coastal Plain as the watertable is shallow. In the Highlands the watertable can be more than 10 m below the surface resulting in a delayed response, with a lag time dependent on the depth to the watertable and the permeability of the sediments.

On the Coastal Plain, observation wells in the unconfined aquifer have recorded a long-term decline in groundwater levels since 1994 to 1996. Levels either stabilised or increased between 2007 and 2010.

In 2012, 31 observation wells (69%) recorded a decline in the maximum recovered water level of up to 1 m when compared to 2011 water level data (Fig. 2). Thirteen observation wells displayed an increase of up to 0.8 m and one well recorded no overall change in groundwater level. The overall decline in groundwater levels is likely caused by the increase in extractions and below-average rainfall.

Numerous irrigation wells are showing rising groundwater salinity trends due to the recycling of irrigation drainage water in the shallow aquifer. Beneath the highlands, the widespread clearance of native vegetation has resulted in salt, which was previously stored in the root zone of the native vegetation, being flushed down into the unconfined aquifer. This has caused salinity increases of up to 15 mg/L per year. In areas of low elevation and permeable soils near the coastal plain the salt has almost been completely flushed and lower-salinity water is now recharging the aquifer, resulting in falling salinity levels. However, in the

eastern part of the PWA, where the depth to the watertable is 40–50 m, the impacts of clearing have yet to reach the watertable and no salinity rises have been observed.

In 2012, salinity ranged between 700 and 6540 mg/L and five of seven wells with sufficient data recorded a decrease in salinity when compared to 2011 salinity data. Nearly 70% of monitored wells recorded salinity of less than 3000 mg/L (Fig. 3).

The unconfined aquifer of the Tintinara–Coonalpyn PWA has been assigned a yellow status for 2012:

2012 STATUS

"Gradual adverse trends, indicating low risk to the resource in the medium term"

This means that gradual adverse trends in the resource status have been observed over the reporting period. Continuation of these trends is unlikely to negatively impact the beneficial use of the resource for at least 15 years. The 2012 status for the unconfined aquifer of the Tintinara–Coonalpyn PWA is supported by:

- an overall decline in the maximum recovered groundwater level in 2012 when compared to 2011 water level data.

To view the *Tintinara–Coonalpyn PWA groundwater level and salinity status report 2011*, which includes background information on hydrogeology, rainfall and relevant groundwater-dependent ecosystems, visit WaterConnect.

To view descriptions of all status symbols, click here.

For further details about the Tatiara PWA, please see the Tintinara–Coonalpyn Water Allocation Plan.

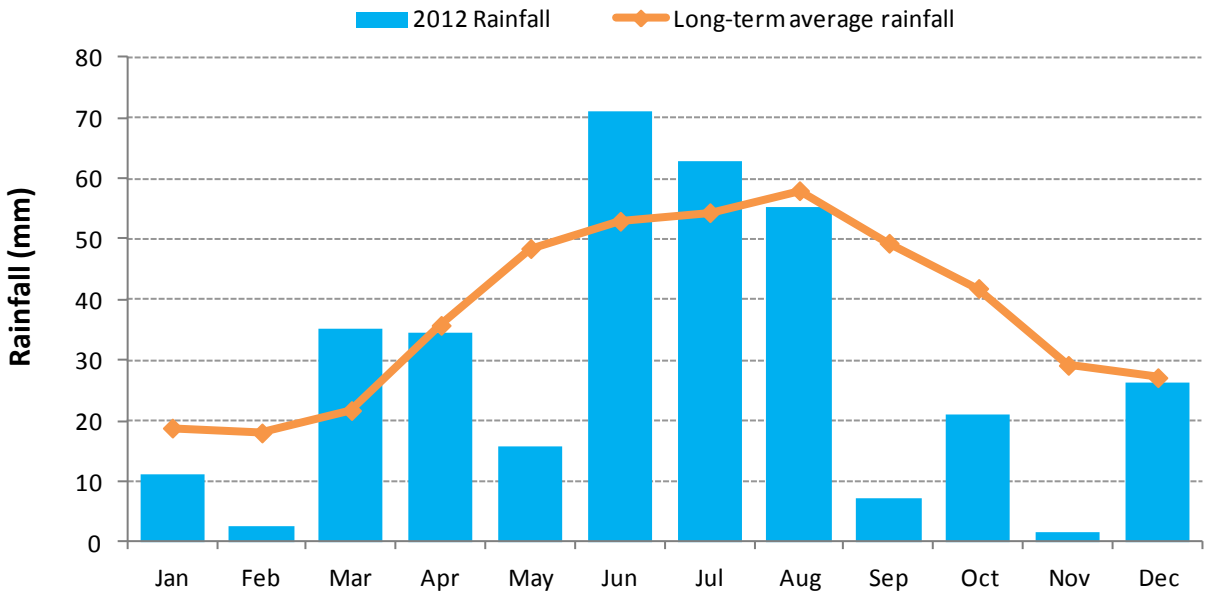


Figure 1. Monthly rainfall (mm) for 2012 and the long-term average monthly rainfall (mm) at the Tintinara rainfall station (number 25514) in the Tintinara–Coonalpyn Prescribed Wells Area

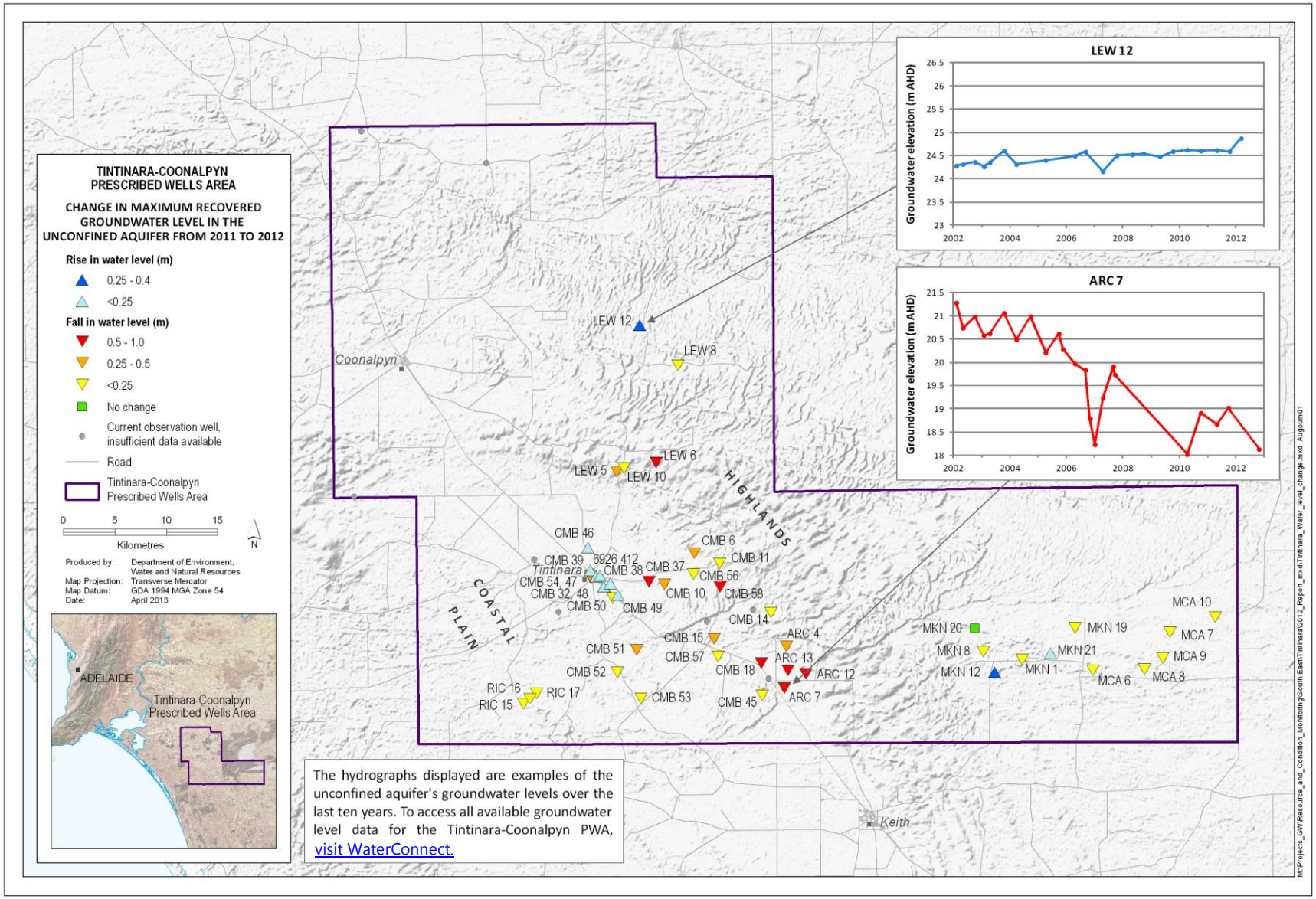


Figure 2. Overall changes in maximum groundwater levels in the unconfined aquifer of the Tintinara–Coonalpyn Prescribed Wells Area from 2011 to 2012

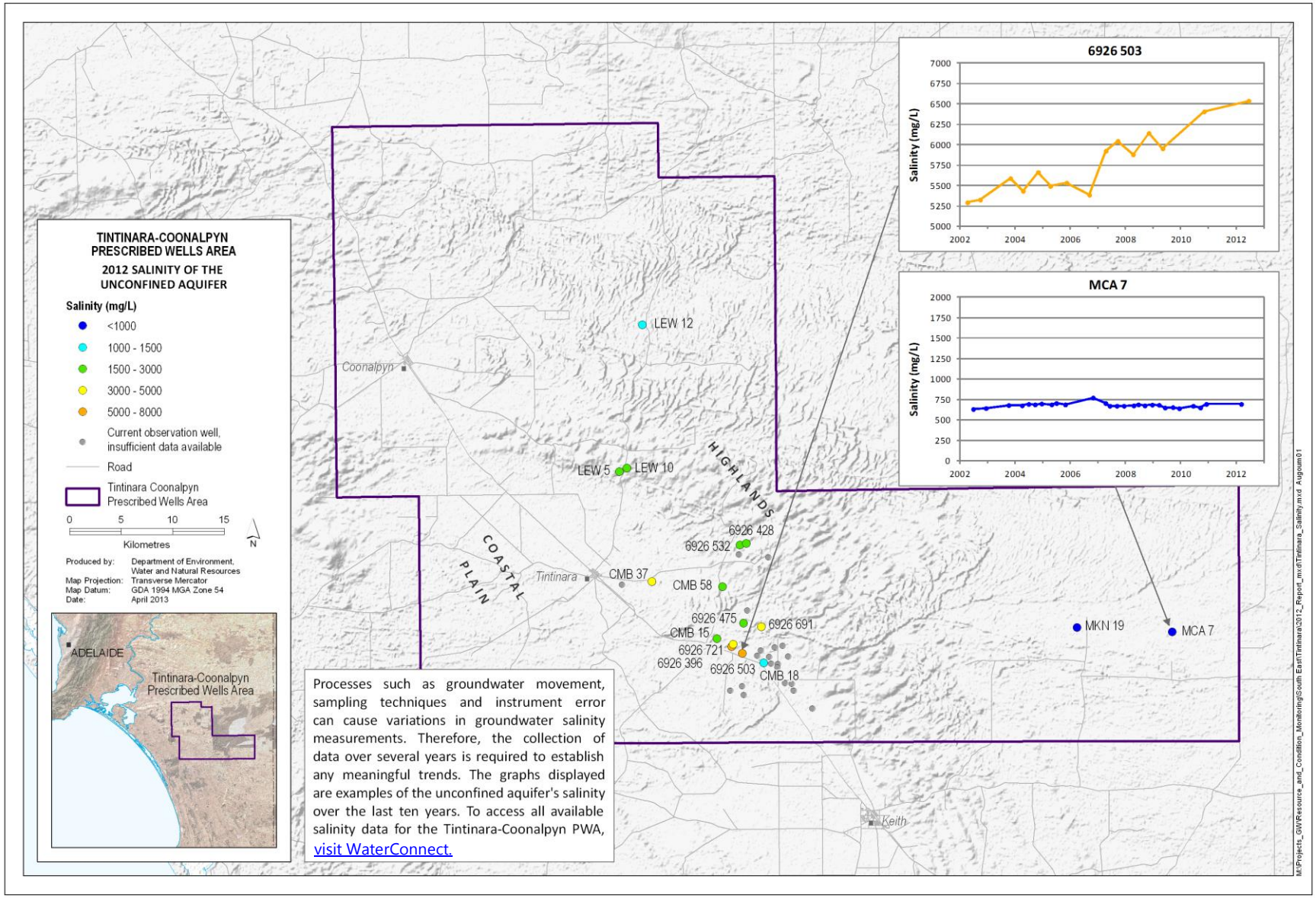


Figure 3. Groundwater salinity of the unconfined aquifer in the Tintinara–Coonalpyn Prescribed Wells Area for 2012