TINTINARA–COONALPYN PWA

UNCONFINED AQUIFER

Groundwater Level and Salinity Status Report

2013

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

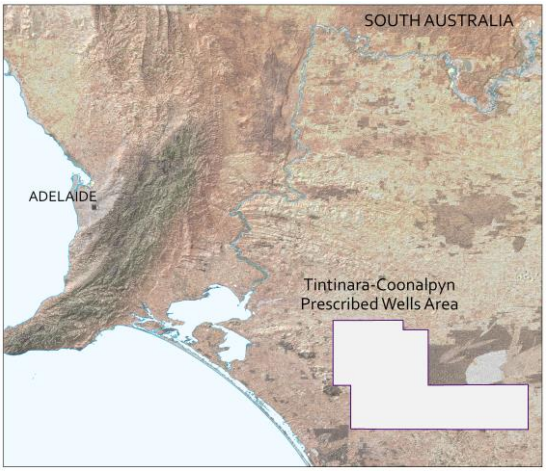
Department of Environment, Water and Natural Resources
25 Grenfell Street, Adelaide
GPO Box 1047, Adelaide SA 5001

Telephone National (08) 8463 6946
International +61 8 8463 6946
Fax National(08) 8463 6999
International +61 8 8463 6999
Website www.environment.sa.gov.au

ISBN 978-1-922174-94-9

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

2013 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.

Groundwater extractions (excluding stock and domestic use) for the Tertiary Limestone aquifer in the Tintinara PWA for 2012-13 totalled 24 872 ML which represents an increase of 5102 ML (26%) from the previous year (Fig. 1).

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 371 mm of rain in 2013. This is 84 mm less than the long-term average annual rainfall for this station. Both July and August received rainfall significantly above their long-term monthly average. May and October rainfalls were roughly at their long-term monthly average, but the remaining months recorded significantly below-average rainfall (Fig. 2). 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 2011, before again seeing a declining trend in 2012.

In 2013, 67% of the 35 observation wells with sufficient data recorded a rise in the maximum recovered water level of up to 0.35 m when compared to 2012 water level data (Fig. 3). Considering the increased extraction from the resource over the 2012-13 summer, this trend is likely to be due to recharge factors. In the coastal plain area, the two months of significantly above average rainfall in 2013 are likely to have assisted in the recovery of water levels, and in the highland areas where the watertable is deep, the recovery may be attributed to a lag in recharge from previous years. The remaining observation wells displayed a decline of mostly < 0.25 m. The declines in groundwater levels are observed in areas of intensive irrigation immediately east of Tintinara and in parts of the highlands, and are likely the result of the increase in extractions.

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 2013, salinity ranged between 660 and 3984 mg/L and seven of ten wells with sufficient data recorded a decrease in salinity when compared to 2012 salinity data. About 75% of monitored wells recorded salinity of less than 3000 mg/L (Fig. 4).

The unconfined aquifer of the Tintinara–Coonalpyn PWA has been assigned a green status for 2013:

2013 STATUS  "No adverse trends, indicating negligible risk to the resource"

This means that the overall condition of the groundwater resource condition during the reporting period was observed to be stable, i.e. no significant change, or improving. Continuation of these trends favours a very low likelihood of negative impacts on beneficial use. The 2012 status for the unconfined aquifer of the Tintinara–Coonalpyn PWA is supported by:

- An overall increase in the maximum recovered groundwater level in 2013 when compared to 2012 water level data
- An overall decrease in salinity in 2013 when compared to 2012 levels.

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, and descriptions of all status symbols, please visit the Water Resources page on the website. For further details about the Tatiara PWA, please see the Tintinara–Coonalpyn Water Allocation Plan.

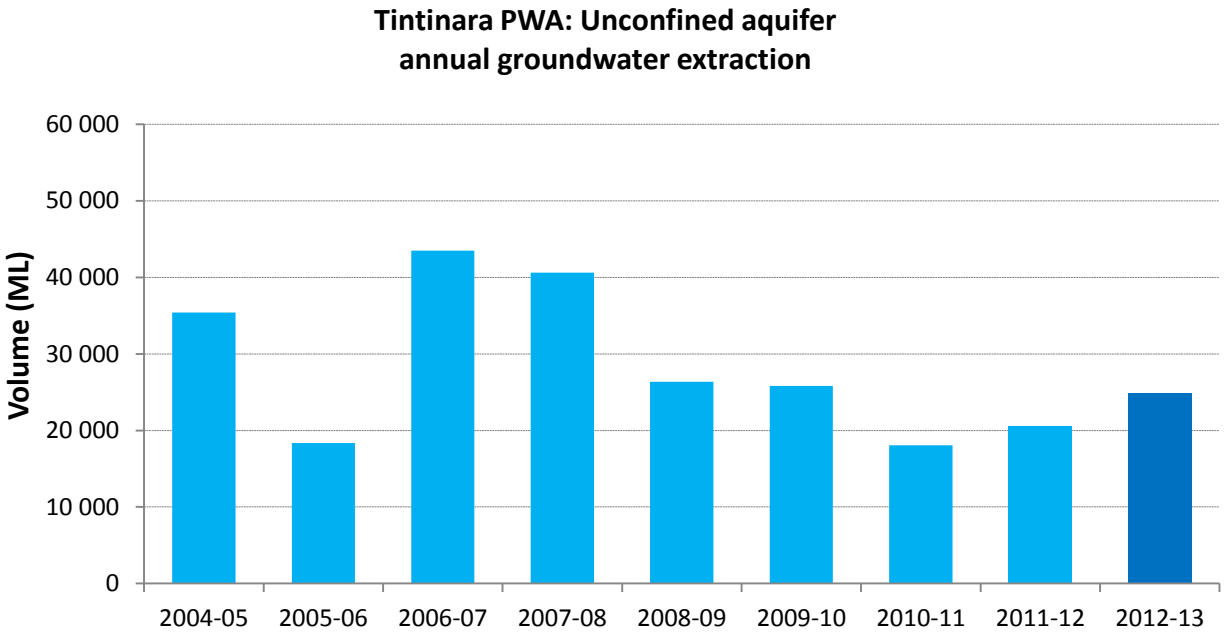


Figure 1. Historical licensed groundwater use for the Tintinara PWA

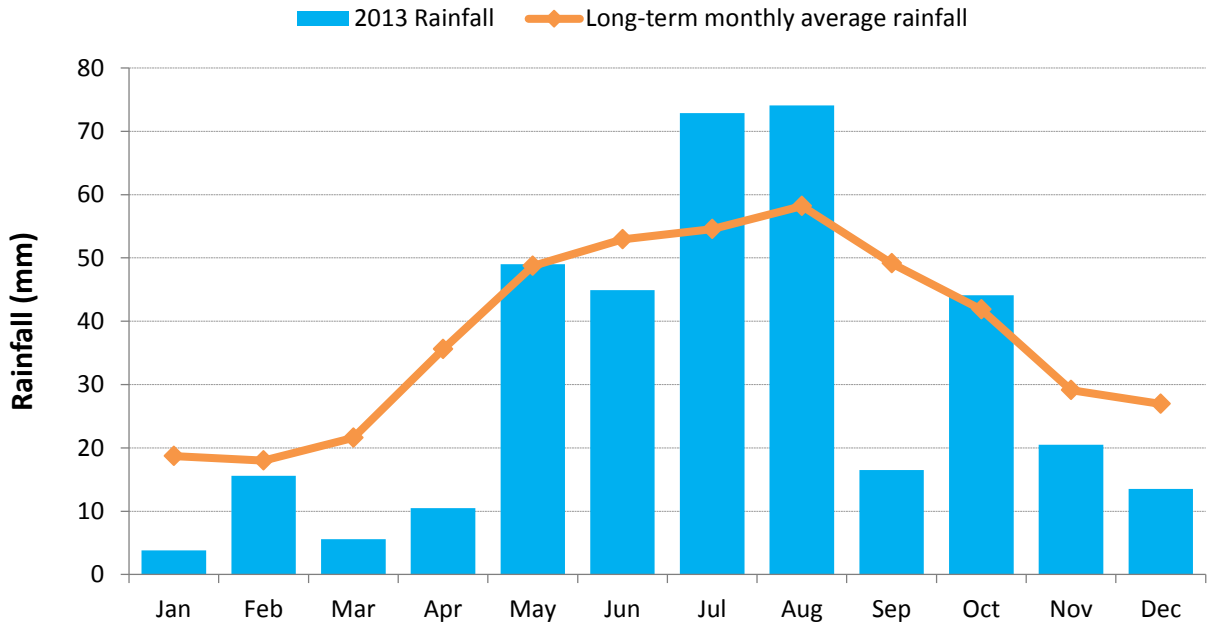


Figure 2. Monthly rainfall (mm) for 2013 and the long-term average monthly rainfall (mm) at the Tintinara rainfall station (number 25514) in the Tintinara–Coonalpyn PWA

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.

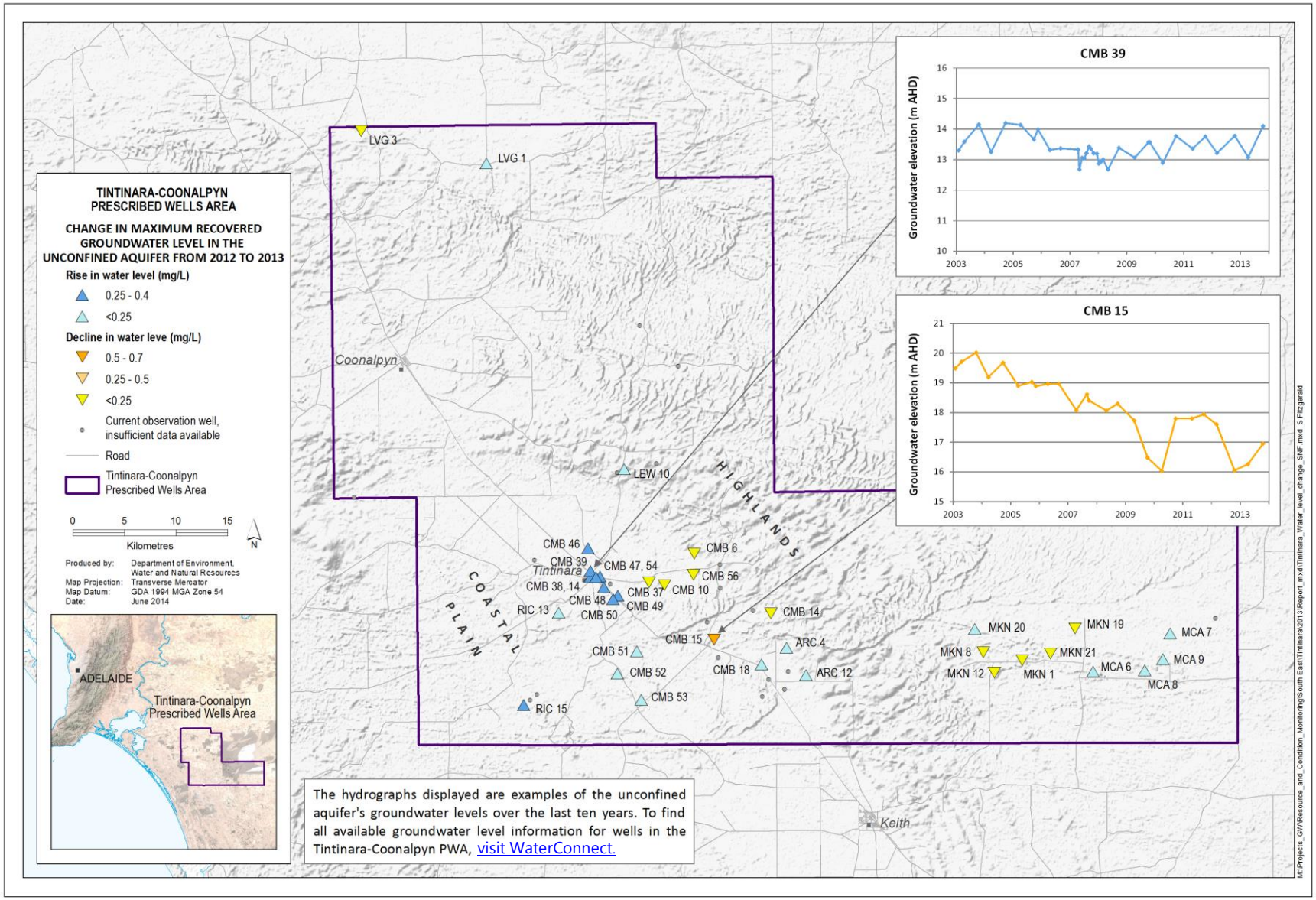


Figure 3. Overall changes in maximum groundwater levels in the unconfined aquifer of the Tintinara–Coonalpyn PWA from 2012 to 2013

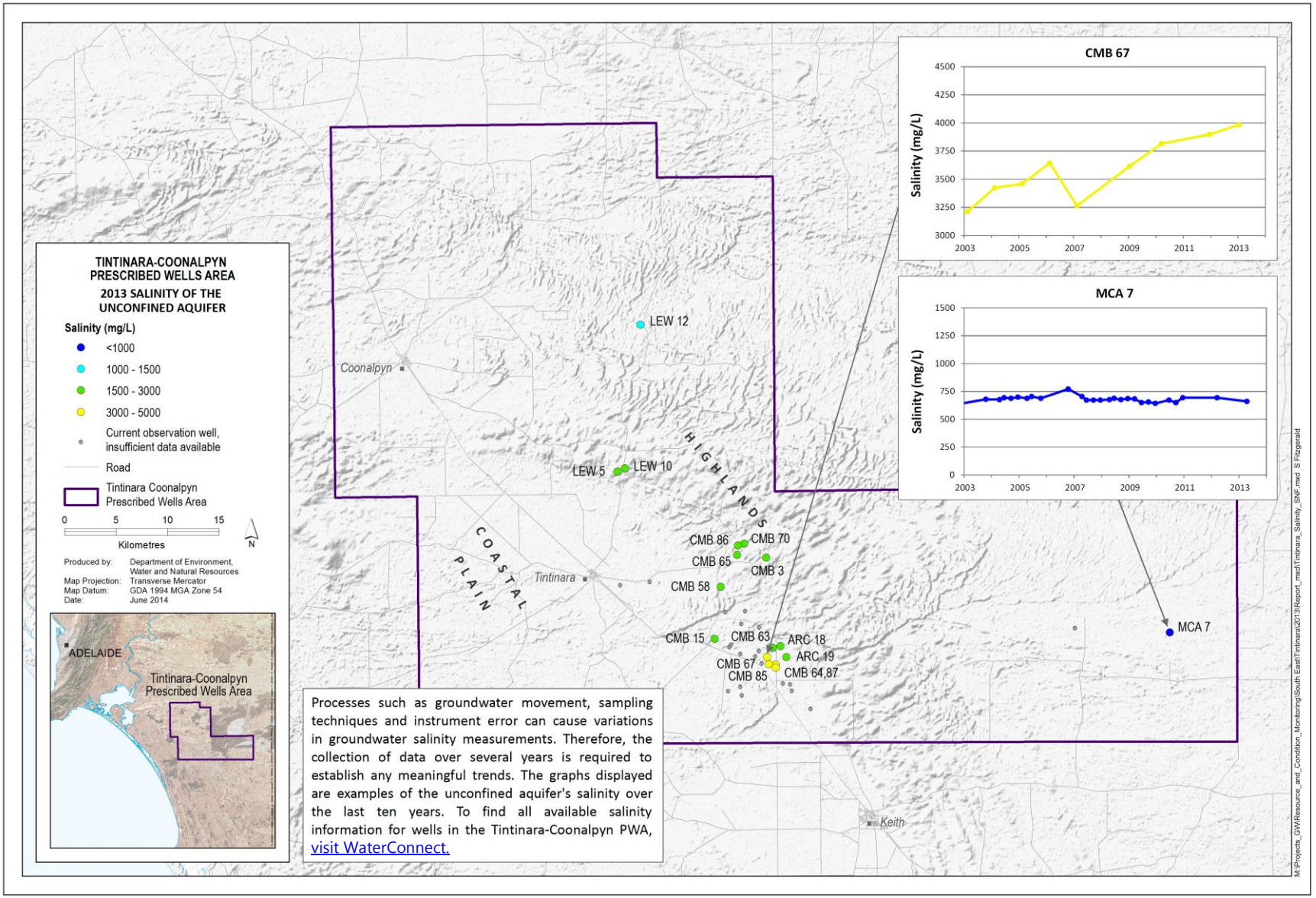


Figure 4. Groundwater salinity of the unconfined aquifer in the Tintinara–Coonalpyn PWA for 2013