

Tintinara–Coonalpyn PWA

Unconfined aquifer

2014 Groundwater level and salinity status report



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	

Disclaimer

The Department of Environment, Water and Natural Resources and its employees do not warrant or make any representation regarding the use, or results of the use, of the information contained herein as regards to its correctness, accuracy, reliability, currency or otherwise. The Department of Environment, Water and Natural Resources and its employees expressly disclaims all liability or responsibility to any person using the information or advice. Information contained in this document is correct at the time of writing.



This work is licensed under the Creative Commons Attribution 4.0 International License.

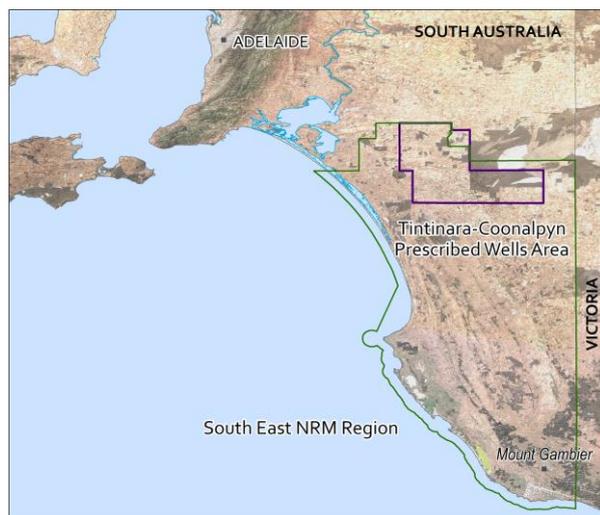
To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.

© Crown in right of the State of South Australia, through the Department of Environment, Water and Natural Resources 2015

ISBN 978-1-922255-69-3

This document is available online at www.waterconnect.sa.gov.au/Systems/GSR/Pages.

2014 Summary



The Tintinara–Coonalpyn Prescribed Wells Area (PWA) is located in the South East NRM Region 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.

Trends in groundwater levels and salinity in the Tintinara–Coonalpyn PWA are primarily climate driven: below-average rainfall results in a reduction in recharge to the aquifers. Below-average summer rainfall can also result in increasing irrigation extractions, and these two elements can cause the groundwater levels to fall and salinity to increase. Conversely, increases in rainfall results in increases in recharge, decreases in irrigation extractions and groundwater levels may rise and salinity stabilise or decline. 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.

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 317 mm of rain in 2014. This is nearly 140 mm less than the long-term average annual rainfall for this station and about 40 mm less than the 2013 rainfall. Both June and July received rainfall above their long-term monthly average. January, March and April rainfalls were roughly at their long-term monthly average, but the rest of the months of the year recorded significantly below-average rainfall (Fig. 1).

Licensed groundwater extractions (excluding stock and domestic use) for the unconfined aquifer in the Tintinara–Coonalpyn PWA for 2013–14 totalled 26 479 ML¹, an increase of 1607 ML (6%) from the previous water-use year (Fig. 2).

On the coastal plain, observation wells in the unconfined aquifer have recorded a long-term decline in groundwater levels since 1994 to 1996. Levels stabilised or increased between 2007 and 2011, declined in 2012 and increased again in 2013.

In 2014, 19 of the 33 observation wells (58%) with sufficient data recorded a decline in the maximum recovered water level when compared to 2013 water level data (Fig. 3). The declines ranged between 0.12 and 0.75 m, with a median of 0.3 m, and are observed in areas of intensive irrigation immediately east of Tintinara and in parts of the highlands. They are likely caused by the increase in extractions from the resource over the 2013–14 summer and reduced recharge due to below-average rainfalls. Thirteen observation wells (39%) show a negligible change in water level (rise or decline of less than 0.1 m) compared to 2013 data. The majority of these observation wells are in the highlands area, where the water table is deeper. A rise in the maximum water level of 0.55 m was

¹ The licensed groundwater use for the 2013–14 water-use year is based on the best data available as of June 2015 and will be subject to change, as approximately ten percent of South East annual water use reports had not been submitted at the time of printing and groundwater extracted for forestry is not included. As such, the total licensed groundwater use will be higher than the volume presented in this report.

recorded in one observation well, however, the well is located in an area of intensive irrigation and the change in water level is likely influenced by the previous year's pumping.

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 2014, salinity was stable, with eight wells with sufficient data available for comparison with 2013 recording a change in salinity of less than 5%. Salinity concentrations ranged between 1900 and 6800 mg/L, with about 40% of monitored wells recording salinity of less than 3000 mg/L (Fig. 4).

The unconfined aquifer of the Tintinara–Coonalpyn PWA has been assigned a yellow status for 2014:

2014 Status



“Gradual adverse changes, indicating low risk to the resource in the medium term”

This means that minor adverse changes in the resource have been observed over the 12-month reporting period. If these conditions were to continue, they are unlikely to negatively impact the beneficial uses of the resource (such as drinking water, irrigation or stock watering) for at least 15 years.

The 2014 status for the unconfined aquifer of the Tintinara–Coonalpyn PWA is supported by:

- an overall decline in the maximum recovered groundwater level in 2014 when compared to 2013 water level data.

To view descriptions of all status symbols, please visit the *Water Resource Assessments* page on [WaterConnect](#).

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 or download groundwater level and salinity data from observation wells within the Tintinara–Coonalpyn PWA, please visit [Groundwater Data](#) on WaterConnect.

For further details about the Tintinara–Coonalpyn PWA, please see the *Tintinara–Coonalpyn Prescribed Wells Area Water Allocation Plan* on the Natural Resources South East [website](#).

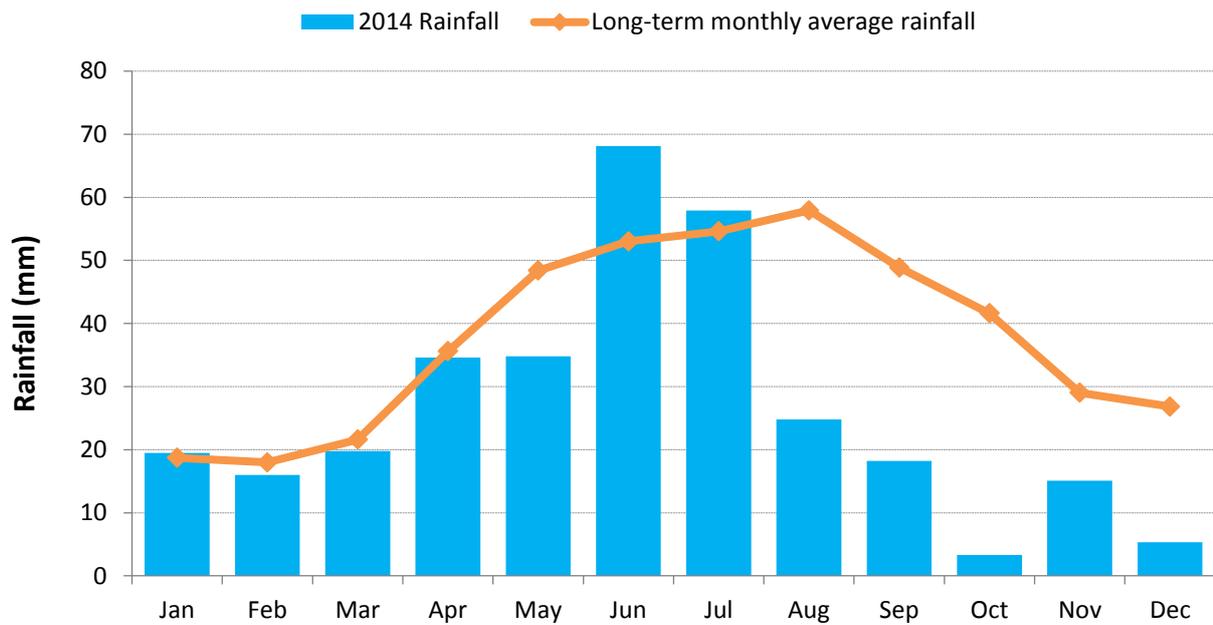


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Tintinara rainfall station (number 25514)² in the Tintinara–Coonalpyn Prescribed Wells Area

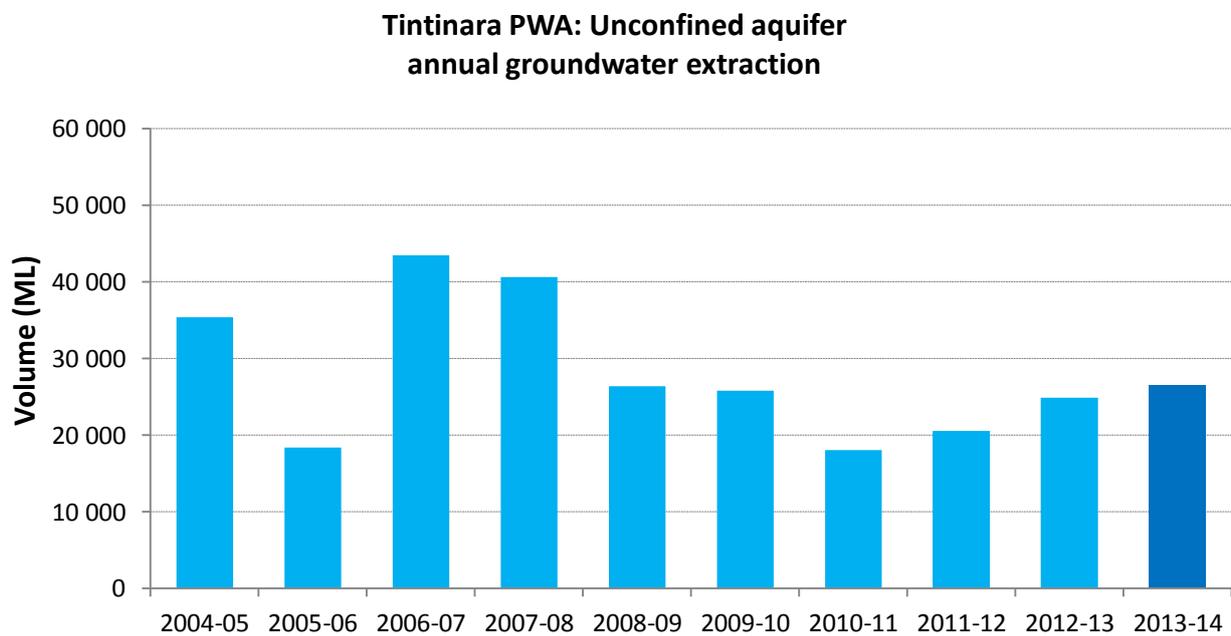


Figure 2. Historical licensed groundwater use³ for the Tintinara–Coonalpyn Prescribed Wells Area

² 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 <https://www.longpaddock.qld.gov.au/silo>

³ Groundwater extracted for forestry is not included.

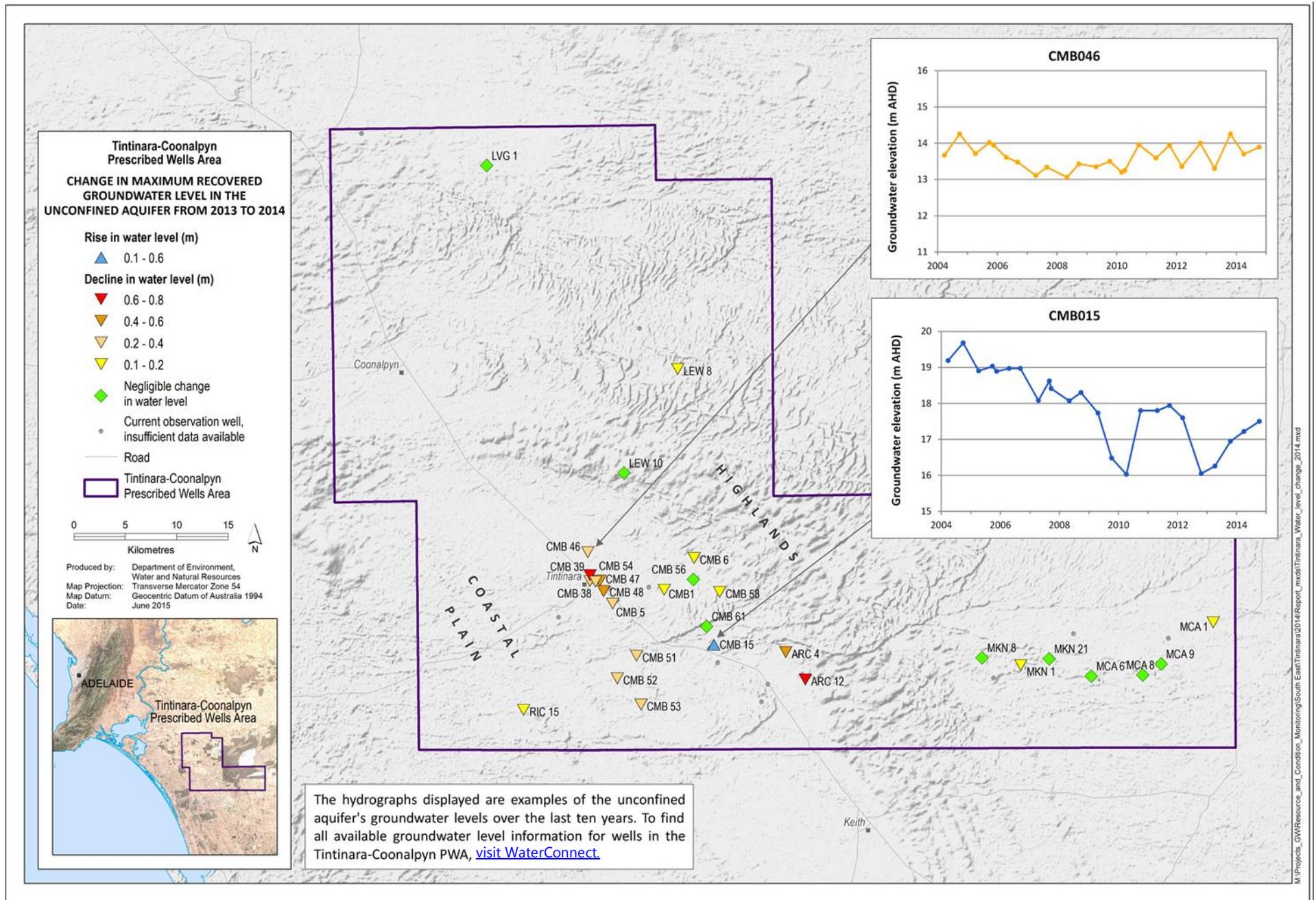


Figure 3. Overall changes in maximum groundwater levels in the unconfined aquifer of the Tintinara–Coonalpyn Prescribed Wells Area from 2013 to 2014

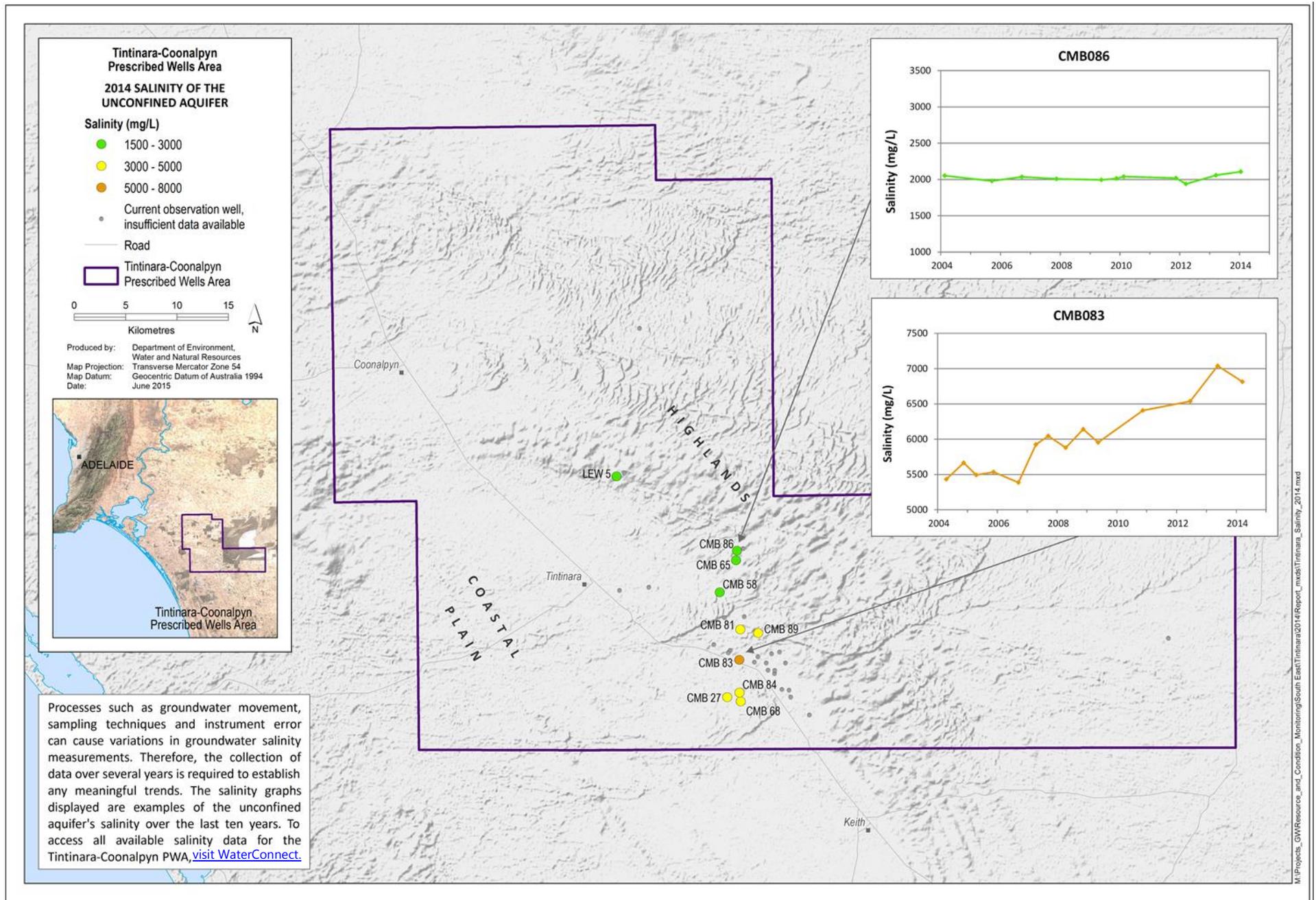


Figure 4. Groundwater salinity of the unconfined aquifer in the Tintinara–Coonalpyn Prescribed Wells Area for 2014