PRESCRIBED WELLS AREAS OF THE SOUTH EAST

CONFINED AQUIFER

Groundwater Level and Salinity Status Report

2013

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

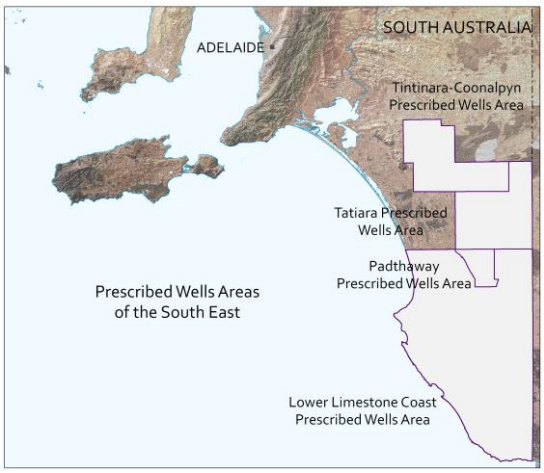
Department of Environment, Water and Natural Resources
25 Grenfell Street, Adelaide
GPO Box 1047, Adelaide SA 5001

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 978-1-922174-93-2

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

2013 SUMMARY



There are four prescribed wells areas (PWA) in the South East of South Australia—Tintinara–Coonalpyn, Tatiara, Padthaway and Lower Limestone Coast. Groundwater in these areas is prescribed under South Australia's *Natural Resources Management Act 2004*. Water allocation plans for each PWA provide for the sustainable use of the groundwater resources.

The prescribed wells areas of the South East are underlain by sediments of the Murray and Gambier Basins that form two aquifer systems: an unconfined aquifer comprising various Quaternary and Tertiary limestones and an underlying Tertiary confined sand aquifer. In the Tintinara–Coonalpyn PWA, the confined aquifer consists of Murray Basin sediments; the Buccleuch Formation on the coastal plain and the Renmark Group in the highlands. The confined aquifer primarily consists of the Renmark Group across the Tatiara PWA as the Buccleuch Formation is relatively thin. In the Lower Limestone Coast PWA, the confined aquifer is comprised of the Dilwyn Formation of the Gambier Basin, the equivalent of the Renmark Group in the Murray Basin. The Dilwyn Formation is generally thin or absent in the Padthaway PWA.

Groundwater in the confined aquifer flows from the topographic high of the Dundas Plateau in Victoria. From there, the groundwater flows radially westward and southward to the coast and northwards to the Murray River. Artesian conditions exist in the west; particularly in the Kingston wellfields and in the south along the coastal areas.

Groundwater extractions (excluding stock and domestic use) from the Tertiary confined sand aquifer in the SE region of South Australia for 2012-13 totalled 18,938 ML which represents an increase of 7% (1,275 ML) 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 Mount Gambier Aero rainfall station (number 26021) is located about 8 km north of Mount Gambier and recorded nearly 834 mm of rain in 2013. This is more than 111 mm above the long-term average annual rainfall for this station. The months of March, May, June and August received rainfall above the long-term monthly average, but January and February recorded well below-average rainfall, the other months recorded roughly average rainfall (Fig. 2). The Keith rainfall station (number 25507), located in the township of Keith recorded 409 mm of rain in 2013. This is 57 mm less than the long-term average annual rainfall for this station. The months of March, May, June and July received rainfall above the long-term monthly average, but the remaining months had significantly below-average rainfall (Fig. 3).

Long-term observations of the confined aquifer indicate that the groundwater elevation is declining at variable rates. The decline in the groundwater elevation has been highest in the areas along the South Australia – Victoria border and the Tintinara–Coonalpyn area. Some areas have shown signs of recovery, particularly the Kingston artesian wellfields.

In 2013, the overall declining water level trend observed in the previous year appeared to lessen. 63 observation wells (57% of wells with sufficient data) recorded a decline in the maximum recovered groundwater elevation of up to 3.2 m when compared to 2012 data (Fig. 4). The largest declines in groundwater elevations occurred predominantly around Tintinara and to the southeast of Kingston. Forty five observation wells displayed an increase of up to 2.0 m and two wells recorded no overall change in groundwater elevation. Rises were observed around Coonalpyn, north of Kingston and between Mount Gambier and Millicent. The overall median change in water levels for the 110 wells with sufficient data was a decline of 0.08 m. The change in the confined potentiometric level could be attributed to the hydrostatic loading and unloading effect from water level changes in the overlying

unconfined aquifer (through variations of the amount of the recharge) and possibly leakage between the confined and unconfined aquifers where the confining layer is thin. Increased or decreased extraction from the confined aquifer, can also contribute to the change in water levels.

Observation wells indicate no major changes in the groundwater salinity of the confined aquifer have occurred over the long term. In 2013, 51% of monitored wells recorded an increase in salinity when compared to 2012 salinity data. The majority of these wells registered minor increases (<5%), with the notable exception of CMB 26, where significant increases in salinity have been observed since the end of 2012. The salinity ranged between 640 and 5550 mg/L, with 84% of the 43 monitored wells recording salinity of less than 1500 mg/L (Fig. 5). The majority of wells with salinity greater than 1500 mg/L are found west of Tintinara and in the north west of Tatiara PWA.

The confined aquifer of the prescribed wells areas of the South East has been assigned a yellow status for 2013:

2013 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 of the resource for at least 15 years. The 2013 status for the confined aquifer of the prescribed wells areas of the South East is supported by:

- an overall slight decline in the maximum recovered groundwater elevation in 2013 when compared to 2012 data.
- no significant change in groundwater salinity when compared to 2012 salinity data.

To view the 2011 groundwater level and salinity status reports for the Tintinara–Coonalpyn, Tatiara, Lower Limestone Coast and Padthaway Prescribed Wells Areas, which include background information on hydrogeology, rainfall and relevant groundwater-dependent ecosystems, and descriptions of all status symbols, please visit the Water Resources page on the WaterConnect website..

For further details about the prescribed wells areas of the South East, please see the water allocation plans.

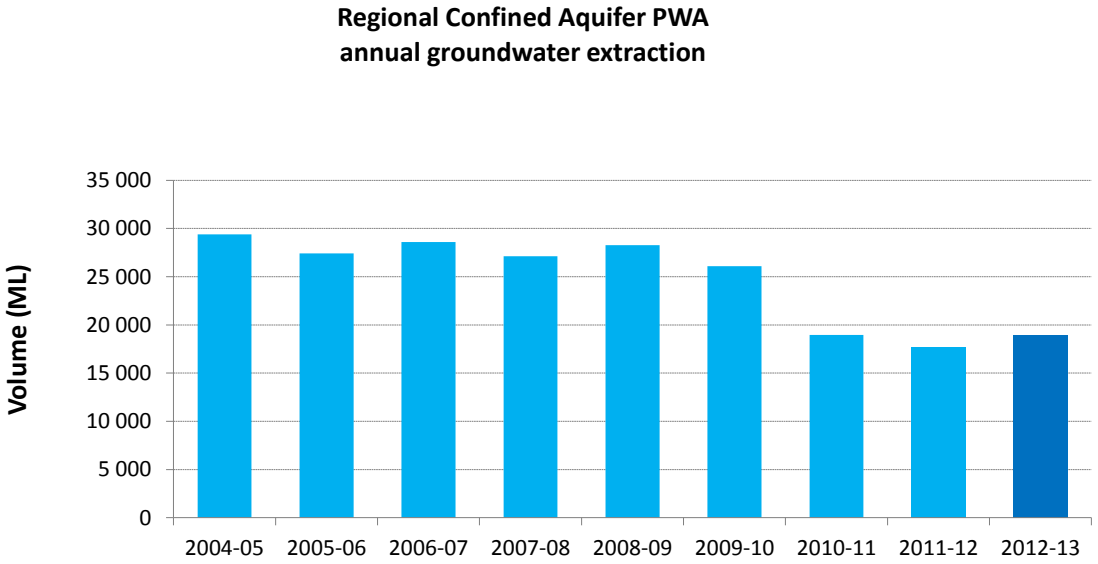


Figure 1. Historical licensed groundwater use for the Tertiary confined aquifer in the SE Region of South Australia

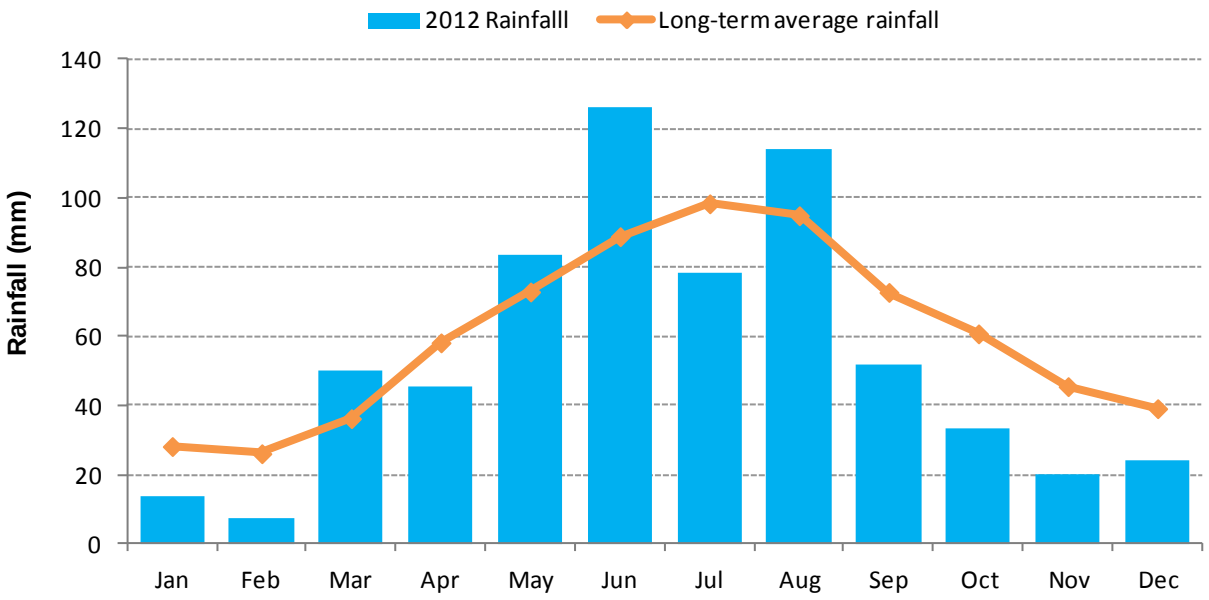


Figure 2. Monthly rainfall (mm) for 2013 and the long-term average monthly rainfall (mm) at the Mt Gambier Aero rainfall station (number 26021) in the prescribed wells areas of the South East

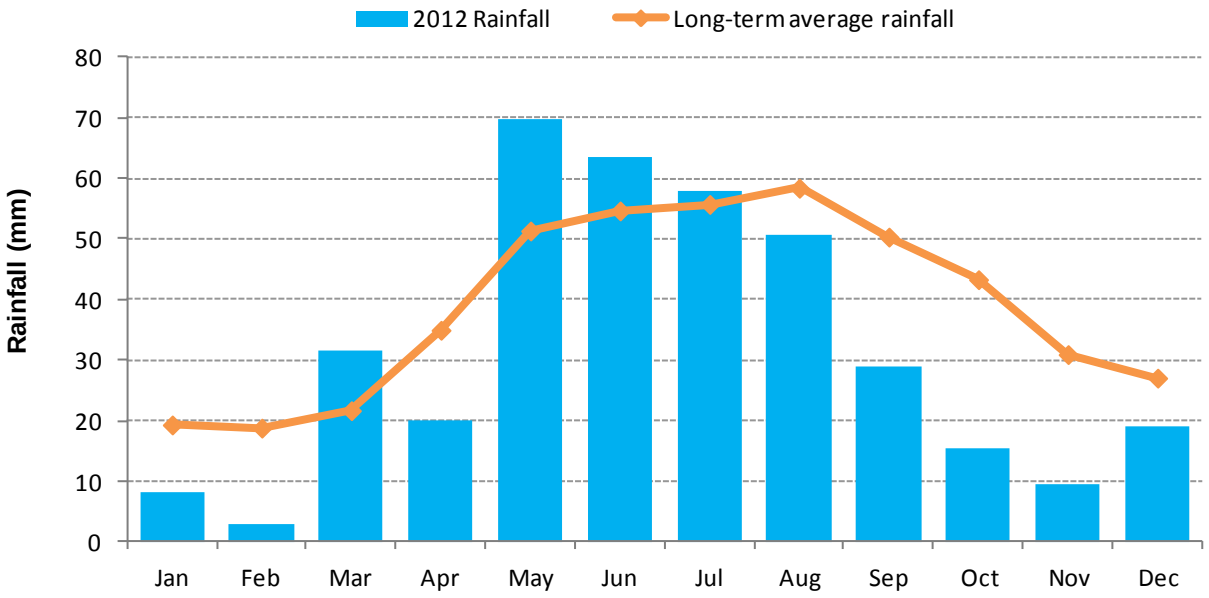


Figure 3. Monthly rainfall (mm) for 2013 and the long-term average monthly rainfall (mm) at the Keith rainfall station (number 25507) in the prescribed wells areas of the South East

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.

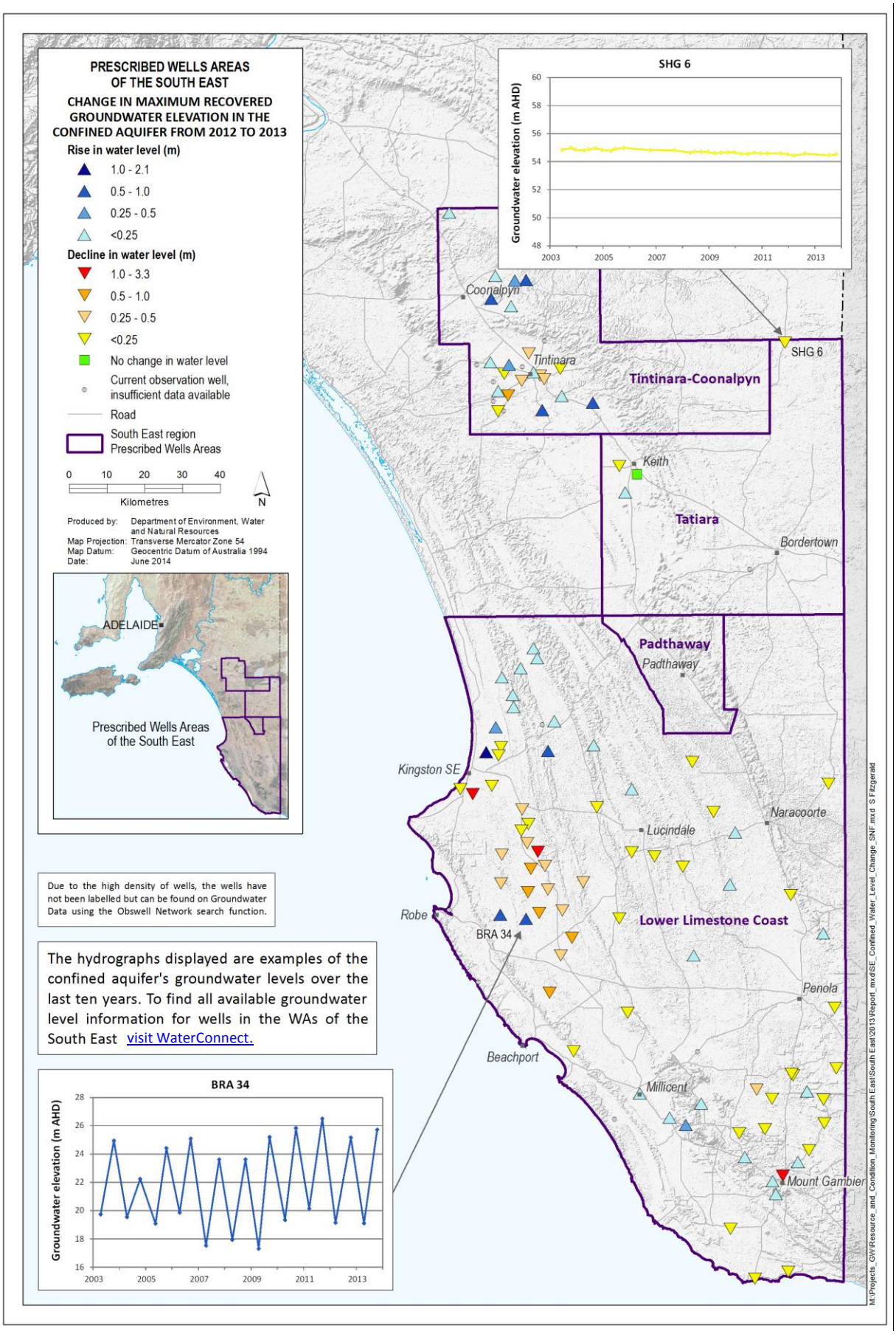


Figure 4. Overall changes in maximum groundwater levels in the confined aquifer of the prescribed wells areas of the South East from 2012 to 2013

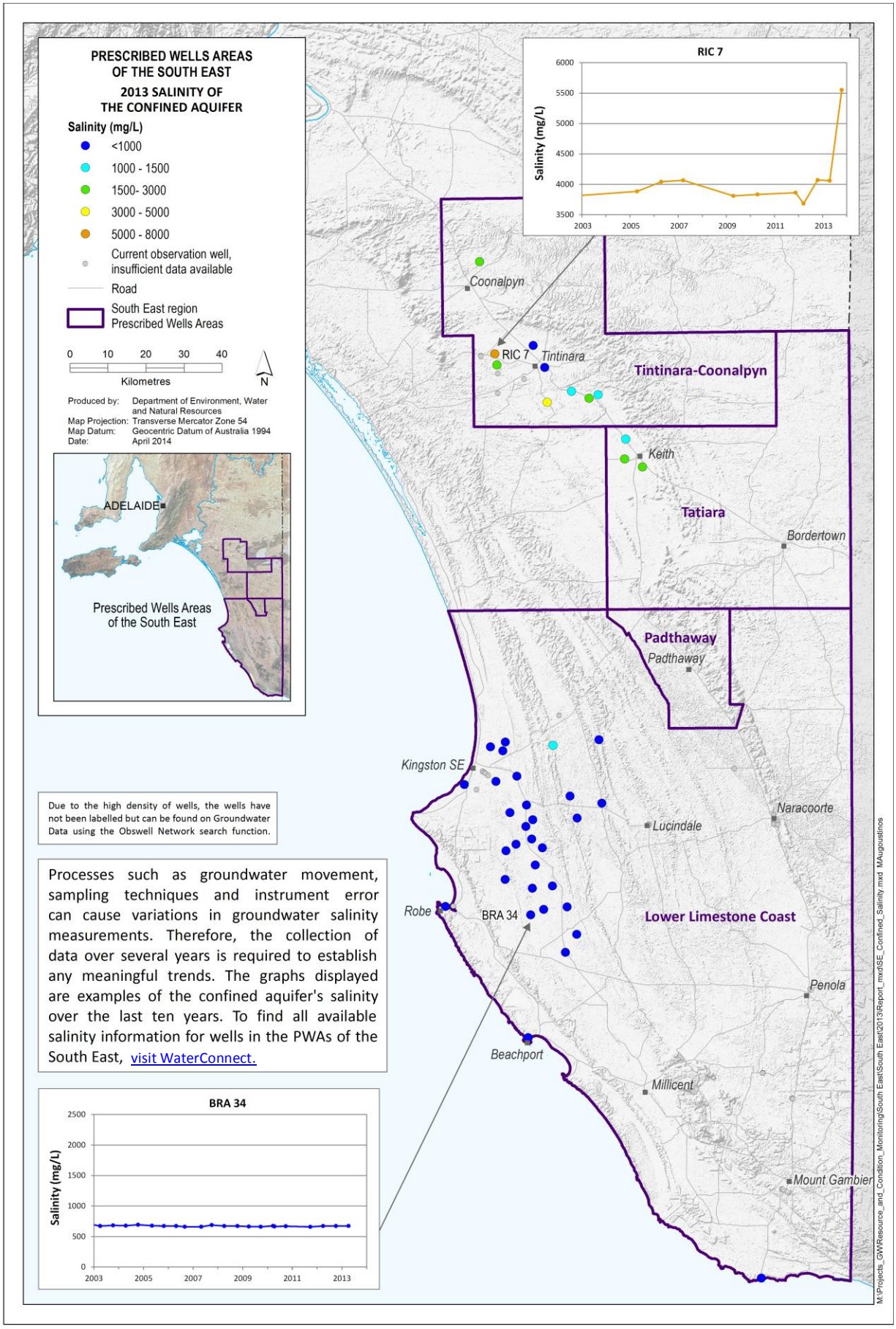


Figure 5. Groundwater salinity of the confined aquifer of the prescribed wells areas of the South East for 2013