

Prescribed Wells Areas of the South East

Confined aquifer

2015 Groundwater level and salinity status report



Department of Environment, Water and Natural Resources
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	

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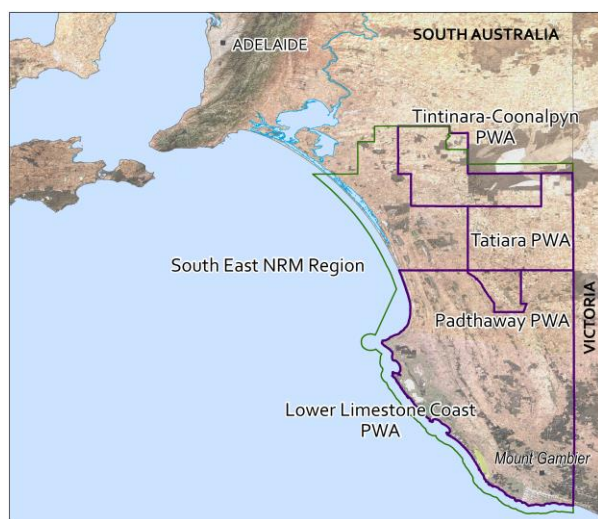
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2015 Summary



There are four prescribed wells areas in the South East NRM Region 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 prescribed wells area (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 calcareous sandstones and limestones and an underlying confined Tertiary non-calcareous quartz sand aquifer. In the Tintinara–Coonalpyn PWA, the confined aquifer consists of Murray Basin sediments—the fossiliferous clay and marl 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, which is 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 is recharged from the topographic high of the Dundas Plateau in Victoria (Fig. 5). From there, the groundwater flows radially westward and southward to the coast and northward to the Murray River. Artesian conditions exist in the west, particularly in the Kingston artesian wellfields, and in the south along the coastal areas (Fig. 5).

Despite being a confined aquifer that does not receive direct recharge from local rainfall, the intensity and timing of rainfall and related variations in rates of groundwater extraction may have an effect on groundwater pressure levels and salinities in the confined aquifer. For example, if the South East NRM Region experienced above-average rainfall, this could result in less groundwater being extracted from the confined aquifer for irrigation purposes and therefore smaller declines in groundwater pressure levels and stable or improved salinities. Conversely, below-average rainfall may result in increased rates of groundwater extraction that could cause groundwater pressure levels to fall and salinity to increase.

The Mount Gambier Aerodrome rainfall station (BoM Station 26021), located about 8 km north of Mount Gambier, recorded 506 mm of rainfall in the 2014–15 water-use year, more than 200 mm less than the long-term average of 712 mm (1900–2015) and the sixth lowest rainfall total on record for that station (Figs. 1 and 2). The five-year average annual rainfall of 755 mm (2010–11 to 2014–15) is higher than the long-term average, though a trend of declining rainfall over the past five years is evident despite the high rainfall in 2013–14 (Fig. 2). Long-term seasonal rainfall patterns show generally higher rainfall during the winter months and lower rainfall over summer. Notable seasonal variations over the past five years include the unusually wet spring and summer of 2010–11, the dry spring–summer of 2012–13, and the wet summer and autumn–winter of 2013–14. The 2014–15 water-use year has been particularly dry, with five months recording less than half their long-term monthly-average rainfall, although May recorded almost twice its average.

Keith rainfall station (BoM station 25507), located in the west of the Tatiara PWA, recorded 276 mm of rainfall in the 2014–15 water-use year. This is considerably lower than the long-term average annual rainfall of 460 mm (1900–2015) and the five-year average annual rainfall of 426 mm (Figs 1 and 3). A decline in annual rainfall can be seen over the past five years (Fig. 3). Keith recorded similar seasonal variations as Mount Gambier, however seven months in the 2014–15 water-use year recorded less than half their long-term monthly-average rainfall, with January and November recording almost twice their average.

Licensed groundwater extractions (excluding stock and domestic use) from the confined aquifer totalled 28 314 ML¹ in 2014–15, an increase of 44% from the previous water-use year and 31% more than the five-year average annual extraction (Fig. 4). This volume

¹ The licensed groundwater use for the 2014–15 water-use year is based on the best data available as of February 2016 and may be subject to change, as approximately three percent of South East annual water use reports had not been submitted at that time. As such, the total licensed groundwater use may be higher than the volume presented in this report.

of extraction represents 44% of the total allocation limit for the confined aquifer and accounts for 14% of the total licensed extractions within the South East PWAs.

Long-term monitoring of the confined aquifer shows that the groundwater pressure level is declining at variable rates, with significant long-term decline in the Tintinara–Coonalpyn area and the Kingston artesian irrigation area. However, some areas have shown signs of recent recovery, including the Kingston artesian wellfields.

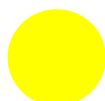
In the five years to 2015, pressure level trends in the Lower Limestone Coast PWA have been variable, with 59% of monitoring wells showing a declining trend, 32% a rising trend and the remaining 10% stable levels (Fig. 5). Declines in pressure levels ranged between 0.02 and 0.8 m/y with a median 0.07 m/y and are mainly found around Tintinara, in the Tatiara PWA, and between Bald Hill and Naracoorte and Penola and Mount Gambier. Rises in pressure level range from 0.1 to 3.8 m/y with a median of 0.6 m/y and are primarily located around Coonalpyn and in a strip stretching from Kingston to Mount Gambier. It should be noted that 20% of wells recorded their lowest groundwater pressure level on record in 2015.

Long-term monitoring data indicate no major changes in the groundwater salinity of the confined aquifer have occurred. Most monitoring wells (91%) recorded a salinity of less than 1500 mg/L in 2015 (Fig. 6). The one well that exceeds 1500 mg/L is located in the Tintinara–Coonalpyn PWA and has a salinity of 2938 mg/L. In the five years to 2015, nearly all monitoring wells with sufficient data show stable salinity (Fig. 7). One well recorded a rising salinity trend, though it is only at a rate of 18 mg/L/y.

To determine the status of the confined aquifer for 2015, the trends in groundwater level and salinity over the past five years (2011 to 2015, inclusive) were analysed. This is a new approach, in contrast to the year-to-year assessments that have been used in past *Groundwater level and salinity status reports*. Please visit the [Frequently Asked Questions](#) on the *Water Resource Assessments* page on WaterConnect for a detailed explanation of the new method of status assessment.

The confined aquifer has been assigned a yellow status for 2015:

2015 Status



Minor adverse trends have been observed over the past five years

The 2015 status for the confined aquifer is based on:

- most monitoring wells (59%) show a minor five-year trend of declining groundwater pressure levels.

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

To view the *Tintinara–Coonalpyn, Tatiara, Lower Limestone Coast and Padthaway PWAs Groundwater Level and Salinity Status Reports 2011*, which includes background information on hydrogeology, location of rainfall stations and relevant groundwater-dependent ecosystems, please visit the *Water Resource Assessments* page on [WaterConnect](#).

To view or download groundwater level and salinity data from monitoring wells within the South East PWAs, please visit [Groundwater Data](#) on WaterConnect.

For further details about the South East PWAs, please see the relevant water allocation plans on the Natural Resources South East [website](#).

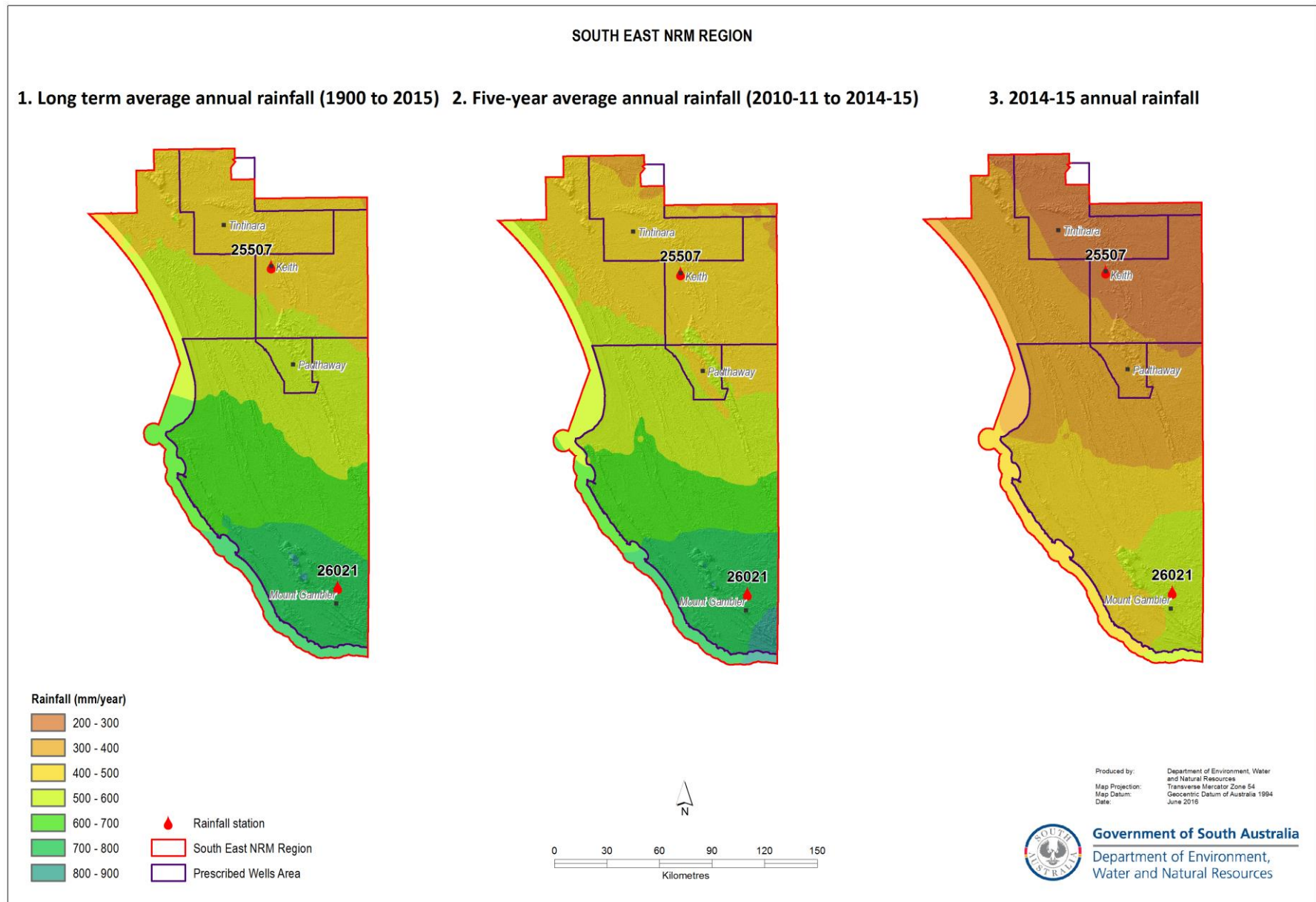


Figure 1. (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall for the 2014–15 water-use year in the South East NRM Region²

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 www.longpaddock.qld.gov.au/silo.

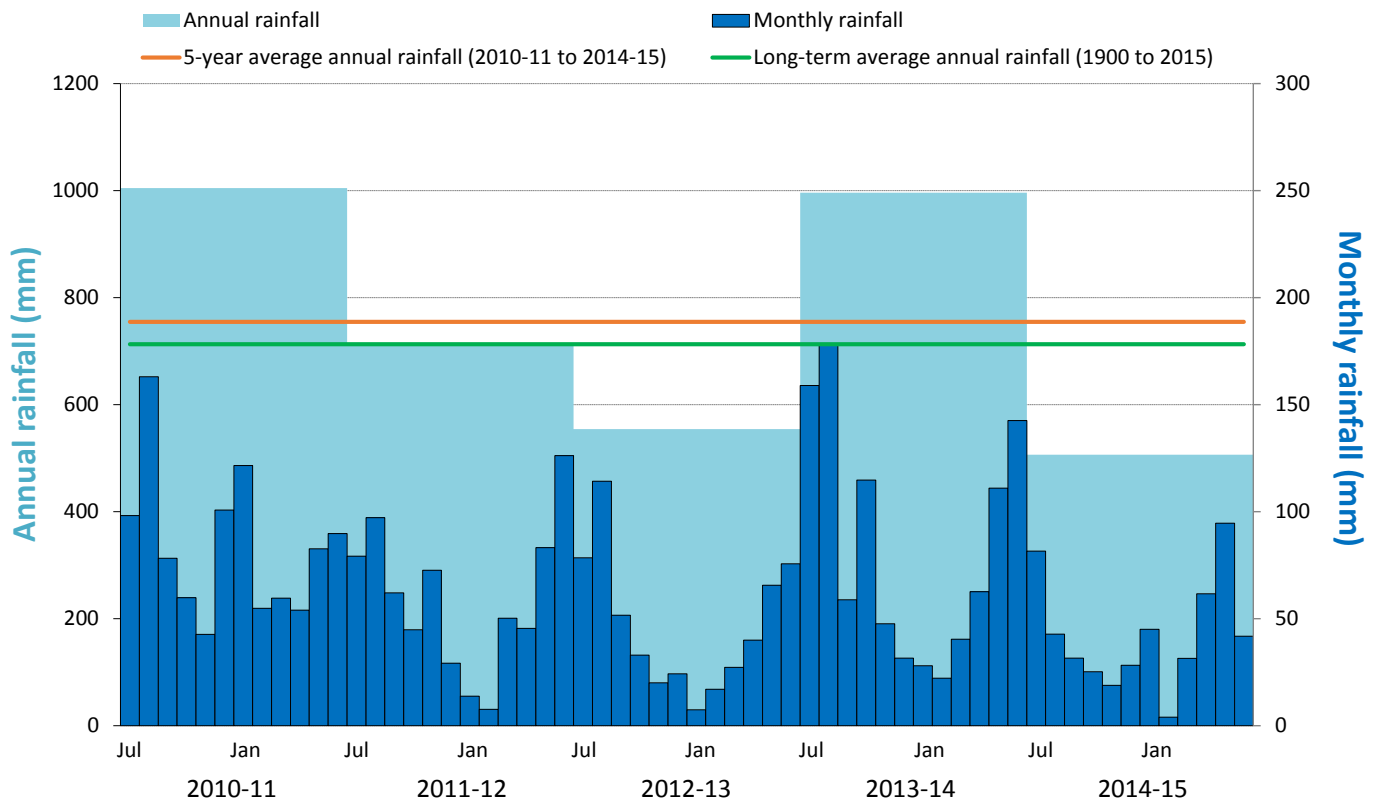


Figure 2. Annual (July–June) and monthly rainfall for the past five-years water-use, and the five-year and long-term average annual rainfall recorded at Mount Gambier Aerodrome (BoM Station 26021)³

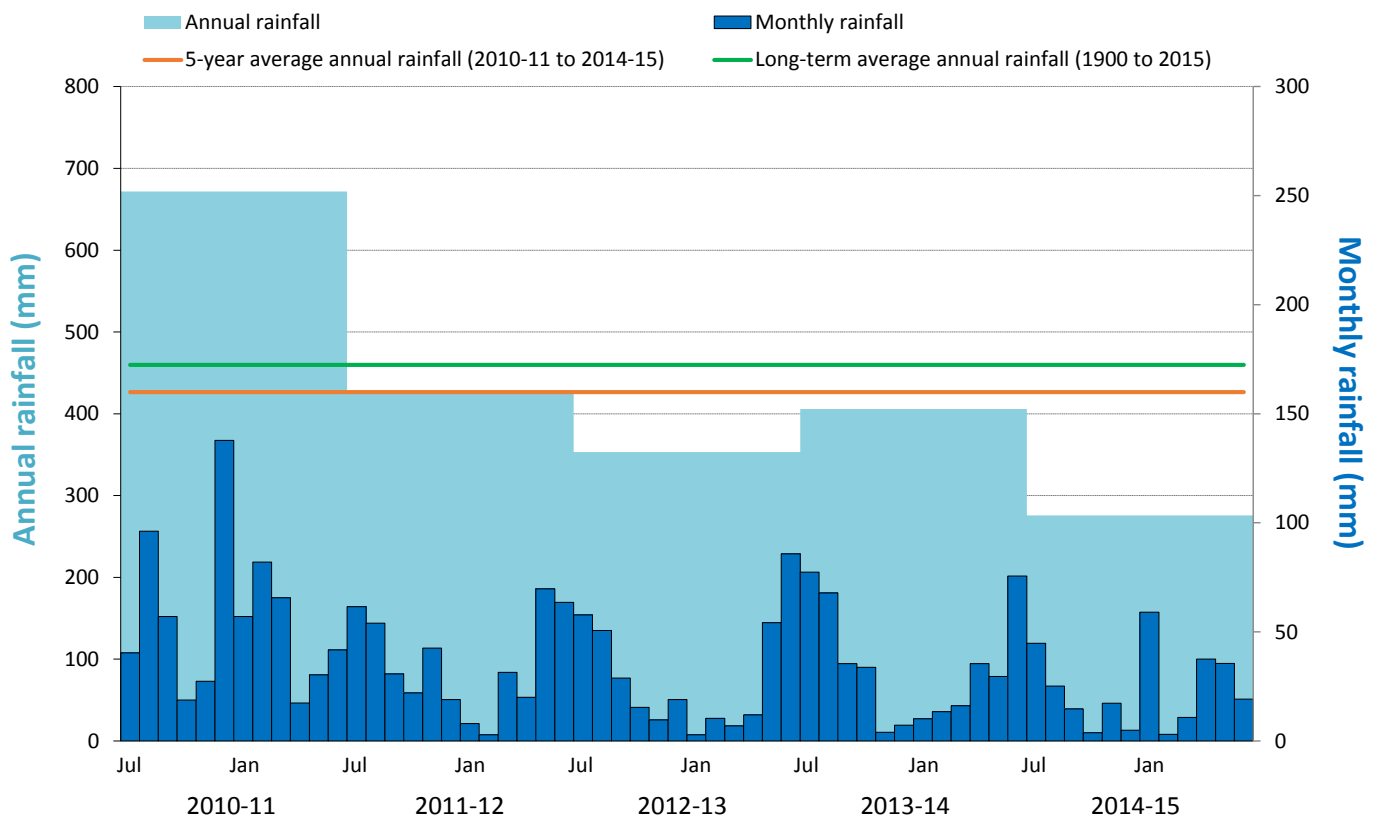


Figure 3. Annual (July–June) and monthly rainfall for the past five-years water-use, and the five-years and long-term average annual rainfall recorded at Keith (BoM Station 25507)²

³ 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.

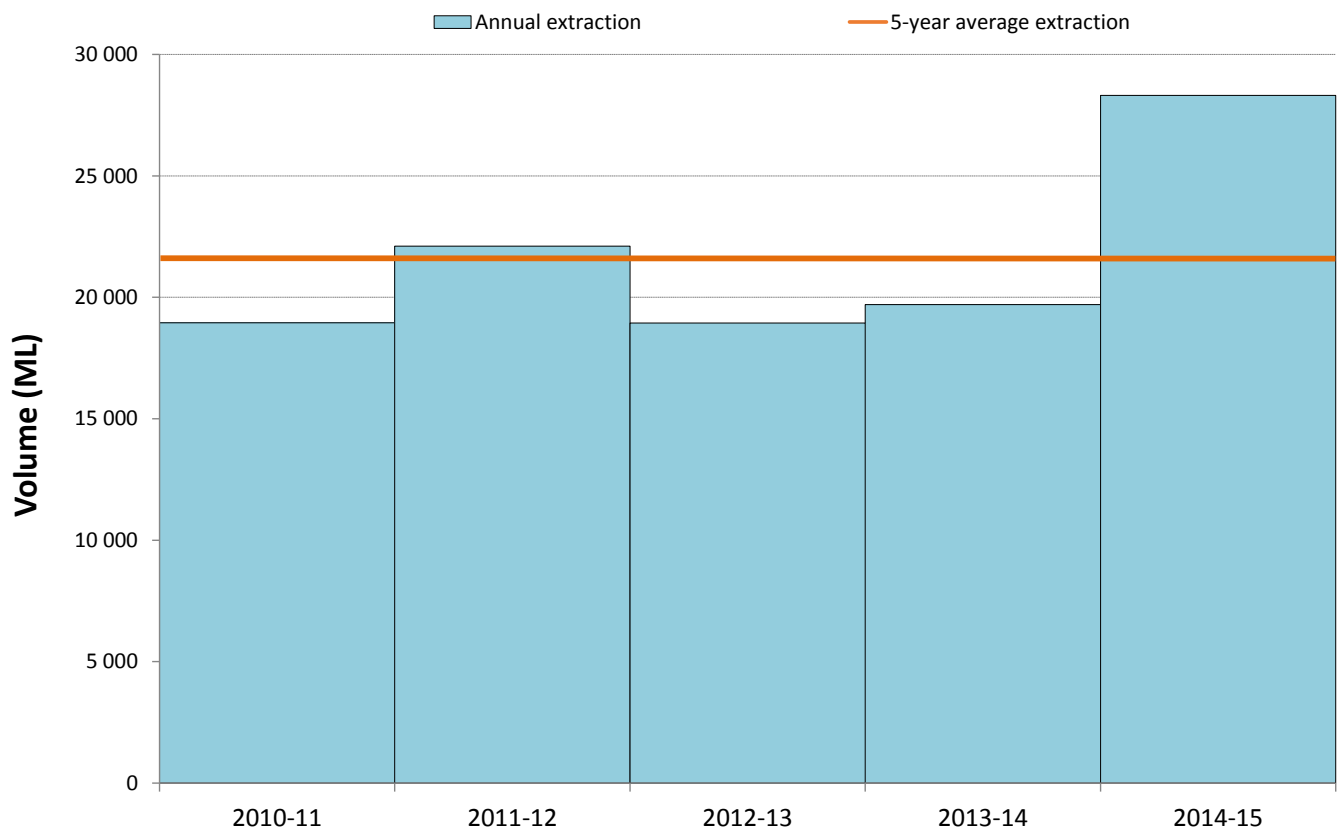


Figure 4. Licensed groundwater extraction volumes⁴ for the past five-years water-use years, for the confined aquifer of the Prescribed Wells Areas of the South East

⁴ The licensed groundwater use for the 2014–15 water-use year is based on the best data available as of February 2016 and may be subject to change, as approximately three percent of South East annual water use reports had not been submitted at that time. As such, the total licensed groundwater use may be higher than the volume presented in this report.

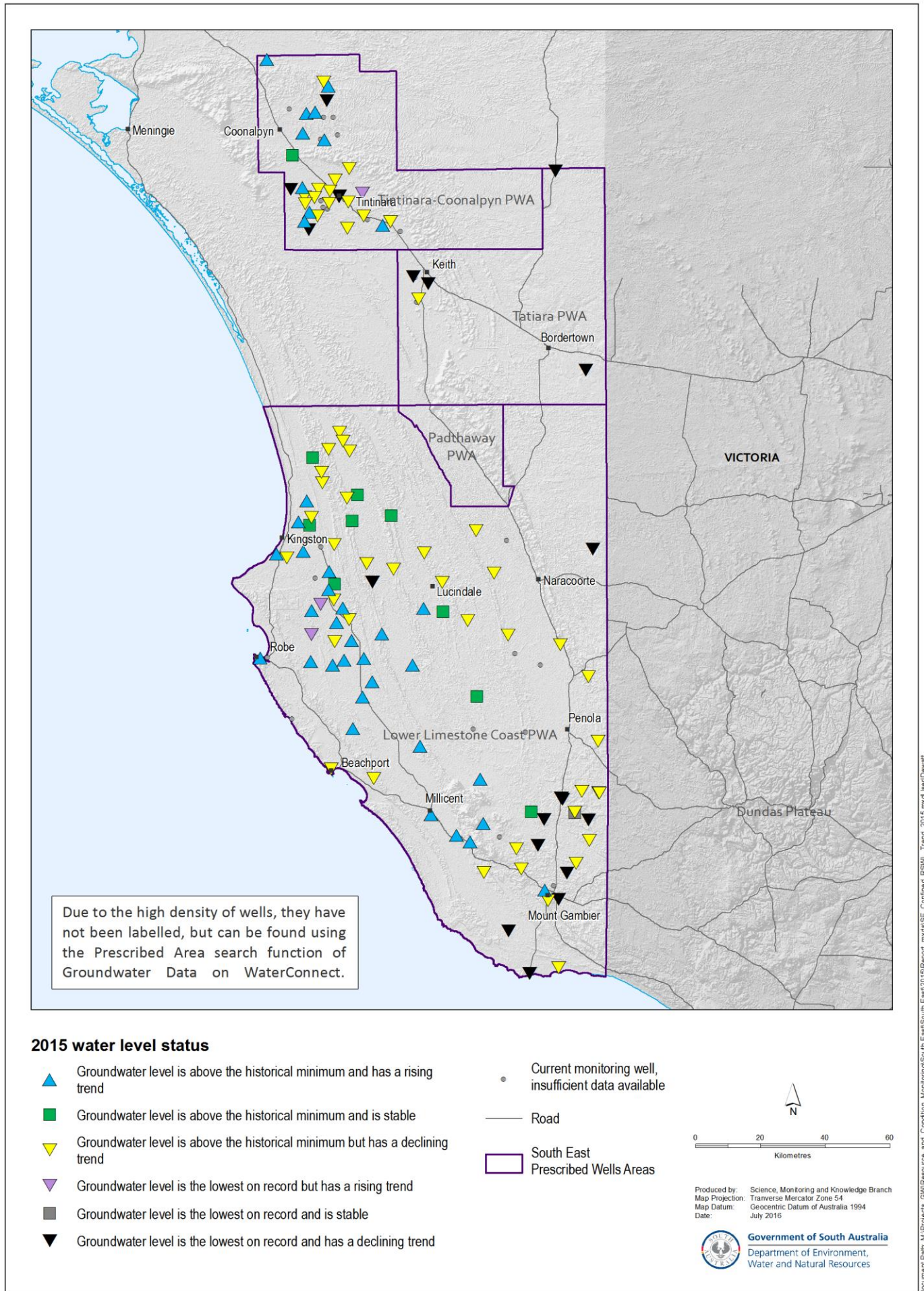


Figure 5. 2015 status of groundwater levels in the confined aquifer (South East Prescribed Wells Areas) based on the five-year trend from 2011 to 2015

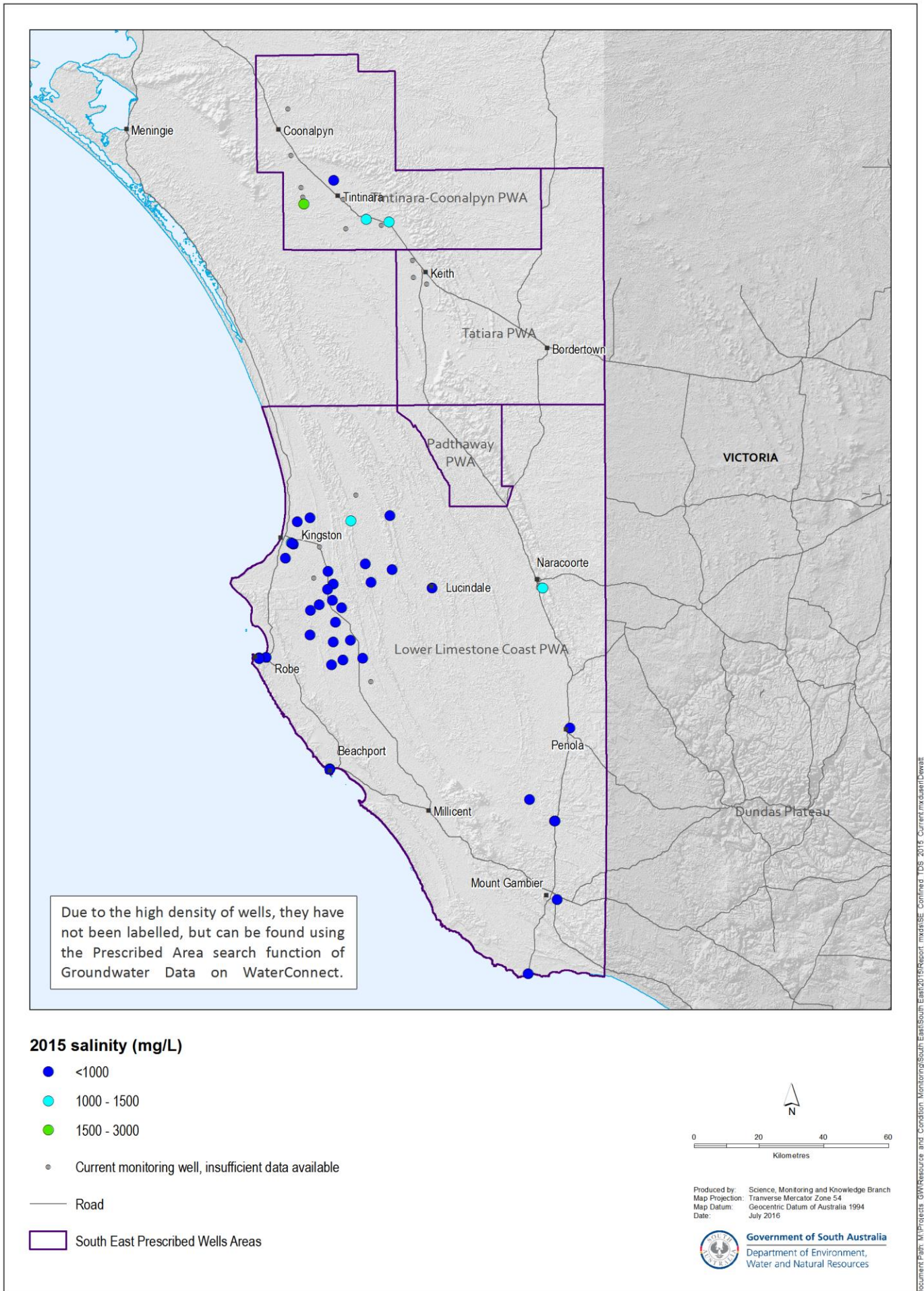


Figure 6. 2015 groundwater salinity in the confined aquifer (South East Prescribed Wells Areas)

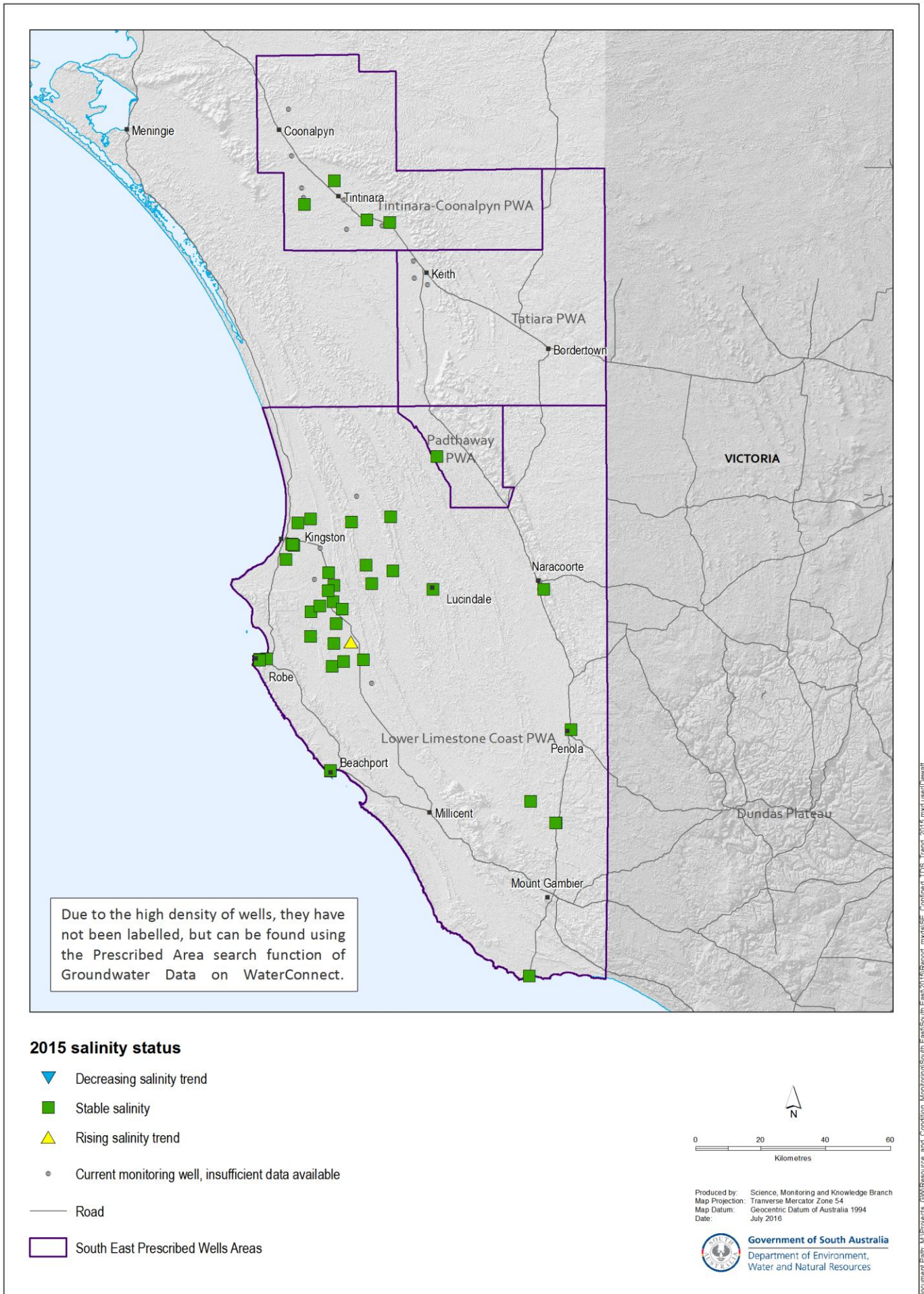


Figure 7. 2015 status of groundwater salinity in the confined aquifer (South East Prescribed Wells Areas) based on the five-year trend from 2011 to 2015

