

Southern Basins PWA

Coffin Bay-A lens

2015 Groundwater level and salinity status report



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ISBN 978-1-925369-80-9

Preferred way to cite this publication

DEWNR, 2016, *Southern Basin PWA Coffin Bay-A lens 2015 Groundwater level and salinity status report*, Government of South Australia, through the Department of Environment, Water and Natural Resources, Adelaide

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2015 Summary



The Southern Basins Prescribed Wells Area (PWA) is located at the southern-most part of the Eyre Peninsula, between Port Lincoln and Coffin Bay in the Eyre Peninsula NRM Region. It is prescribed under South Australia's *Natural Resources Management Act 2004* and a water allocation plan provides for the sustainable use of the groundwater resources. The Coffin Bay–A lens is located in the north-west of the Southern Basins PWA.

Within the Southern Basins PWA, there are two main water-bearing sedimentary sequences that overlie basement rocks: the Quaternary limestone aquifer and the underlying Tertiary sands aquifer. The Quaternary limestone aquifer comprises a generally thin veneer of aeolian sediments of the Bridgewater Formation and is continuous across the PWA. In the current water allocation plan, areas within the Quaternary limestone aquifer that are delineated by groundwater salinity

of less than 1000 mg/L, such as the Coffin Bay–A lens, are described as fresh groundwater lenses. The main source of recharge to the Quaternary limestone aquifer is the direct infiltration of incident rainfall and the direction of groundwater flow is predominantly toward the nearest coastline.

Groundwater levels and salinities in the Southern Basins PWA are highly dependent on recharge from rainfall and any trends in groundwater level or salinity 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 extractions, and these two elements can cause the groundwater levels to fall and salinities to increase. Conversely, above-average rainfall can result in increases in recharge, decreases in extractions and groundwater levels may rise and salinity stabilise or decline. Historical rainfall data indicate that trends of above or below-average rainfall can last for up to 25 years, and that high-intensity rainfall can result in greater and more-rapid water level (i.e. recharge) responses.

The Big Swamp rainfall station (BoM Station 18017), located about 20 km east of the Coffin Bay–A lens, recorded 344 mm of rain in 2014–15. This is greater than 200 mm below the long-term average (Figs 1 and 2) and the third-lowest on record for that station (for the period 1900–2015). Although the five-year average annual rainfall is commensurate with the long-term average (Figs 1 and 2) and despite high rainfall in 2013–14, a trend of declining rainfall over the past five years is evident (Fig. 2). Long-term seasonal rainfall patterns show generally higher rainfall during the winter months and lower rainfall over summer. Notable variations over the past five years include the unusually wet spring and summer of 2010–11, and total monthly rainfall for February 2014 exceeding the long-term average by a factor of three, along with April 2015 total monthly rainfall which doubled the long term average. The 2014–15 water-use year has been particularly dry (especially spring) with seven months recording less than half their long-term monthly-average rainfall, although April recorded double its long-term average.

Licensed groundwater extractions in the Southern Basins PWA occur predominantly from the fresh groundwater lenses that reside within the Quaternary limestone aquifer. Metered extractions from the Coffin Bay–A lens in 2014–15 totalled 116 ML, a 19% increase from the previous water-use year and 11% greater than the five-year average extraction (Fig. 3). This rate of extraction represents 78% of the total 2014–15 allocation of 150 ML for the Coffin Bay–A lens and accounts for only 2% of the total licensed extractions within the Southern Basins PWA.

Monitoring wells in the Coffin Bay–A lens show a positive correlation between groundwater levels and rainfall recorded at the Big Swamp rainfall station. A slight decline in groundwater levels was observed over the period of below-average rainfall between 1992–2008. Above-average rainfall in 2009–10 resulted in a rise in groundwater levels, particularly towards the south-eastern extent of the lens.

In the five years to 2015, three of the seven available monitoring wells show stable groundwater levels with one well showing a rising trend and three wells showing a declining trend (Fig. 4).

Most monitoring wells show reasonably stable salinity levels over the past 20 years, of around 300 to 500 mg/L, with minor rises recorded during a period of below-average rainfall between 2006–09. Most wells show little variation in salinity after 2009. In 2015, salinities range between 340 and 1050 mg/L, and seven out of eight wells show salinity of less than 1000 mg/L (Fig. 5).

In the five years to 2015, six out of eight salinity monitoring wells show a decreasing trend or are stable (Fig. 6). The remaining two salinity monitoring wells show a rising trend. One of these wells, LKW039, has salinity values greater than 1000 mg/L and is rising at a rate of 76 mg/L/y over the past five years. This well is located 50 m downgradient from, and has a similar depth to, a production well used for town water supply that ceased pumping in 2009 due to rises in salinity caused by upconing of deeper groundwater of higher salinity. This upconing of higher salinity groundwater in close proximity to LKW039 is the likely cause of this well's rising salinity.

To determine the status of the Coffin Bay-A lens 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 Coffin Bay-A lens of the Southern Basins PWA has been assigned a green status for 2015:

2015 Status



Positive trends have been observed over the past five years

The 2015 status of the Coffin Bay-A lens is based on:

- most monitoring wells (57%) showing a five-year trend of stable or rising groundwater levels
- most monitoring wells (75%) showing a five-year trend of stable or decreasing salinity.

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

To view the *Southern Basins Prescribed Wells Area Groundwater Level and Salinity Status Report 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 Southern Basins PWA, please visit [Groundwater Data](#) on WaterConnect.

For further details about the Southern Basins Prescribed Wells Area, please see the *Water Allocation Plan for the Southern Basins Prescribed Wells Area* on the Natural Resources Eyre Peninsula [website](#).

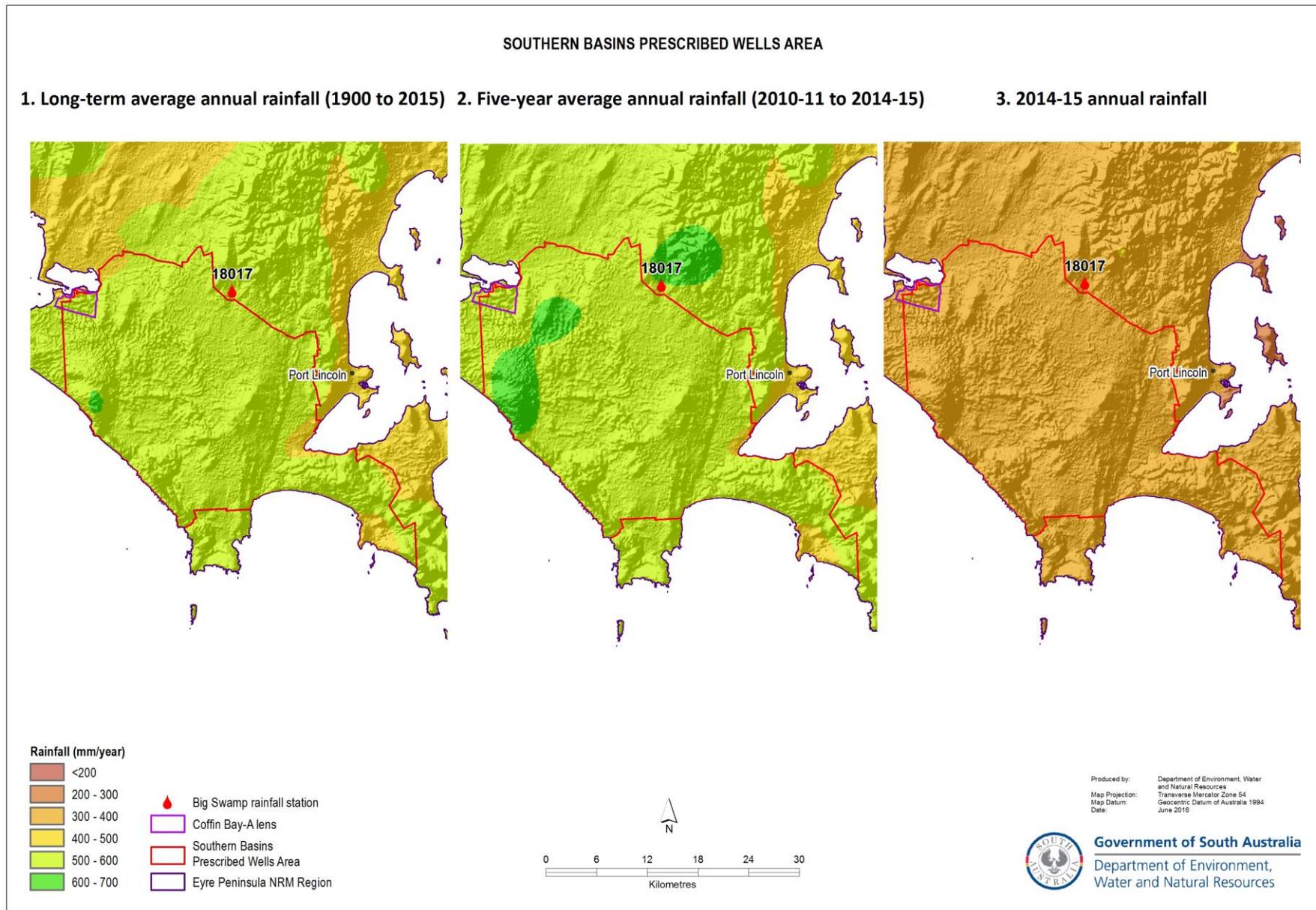


Figure 1. (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall for the 2014–15 water-use year in the Southern Basins Prescribed Wells Area¹

¹ 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

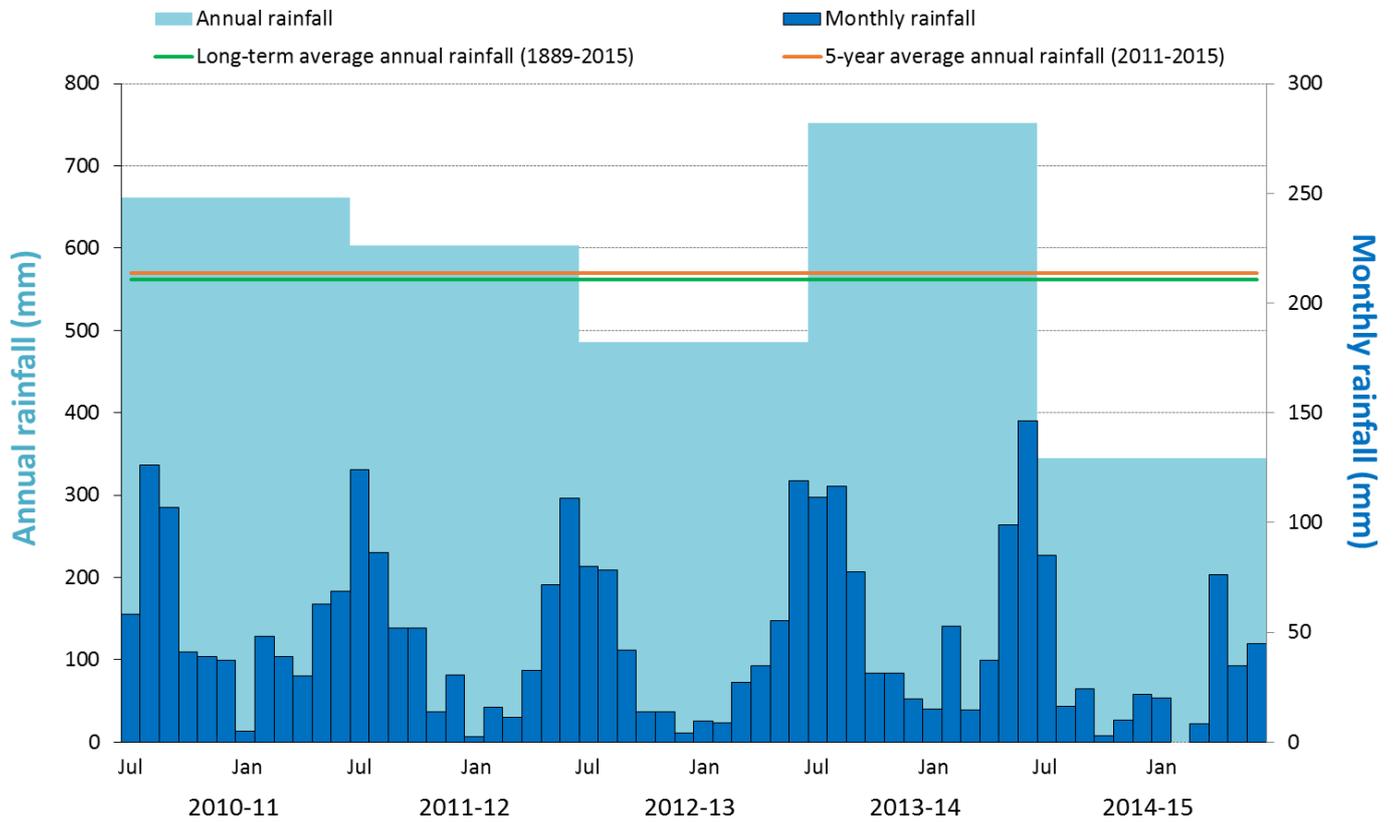


Figure 2. Annual (July–June) and monthly rainfall for the past five water-use years, and the five-year and long-term average annual rainfall recorded at the Big Swamp rainfall station (BoM Station 18017)²

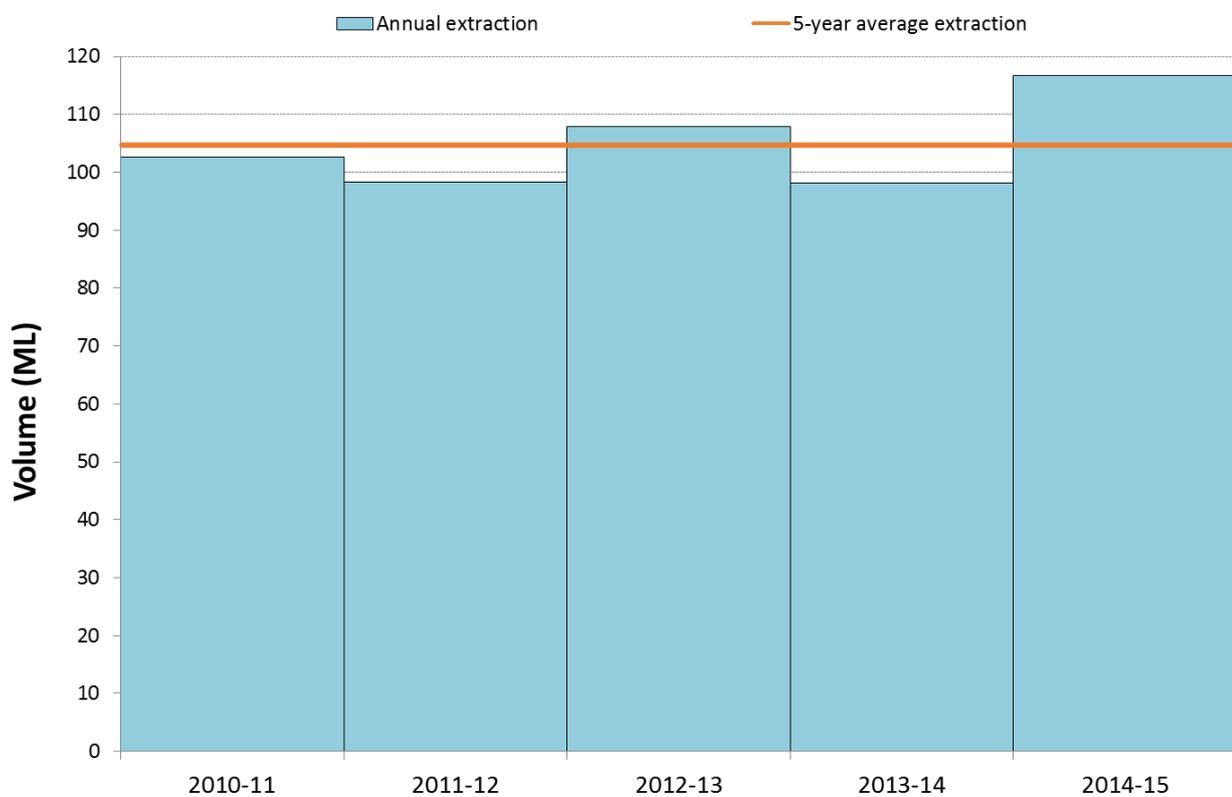


Figure 3. Licensed groundwater extraction volumes for the past five water-use years, for the Coffin Bay-A lens in the Southern Basins Prescribed Wells Area

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 www.longpaddock.qld.gov.au/silo

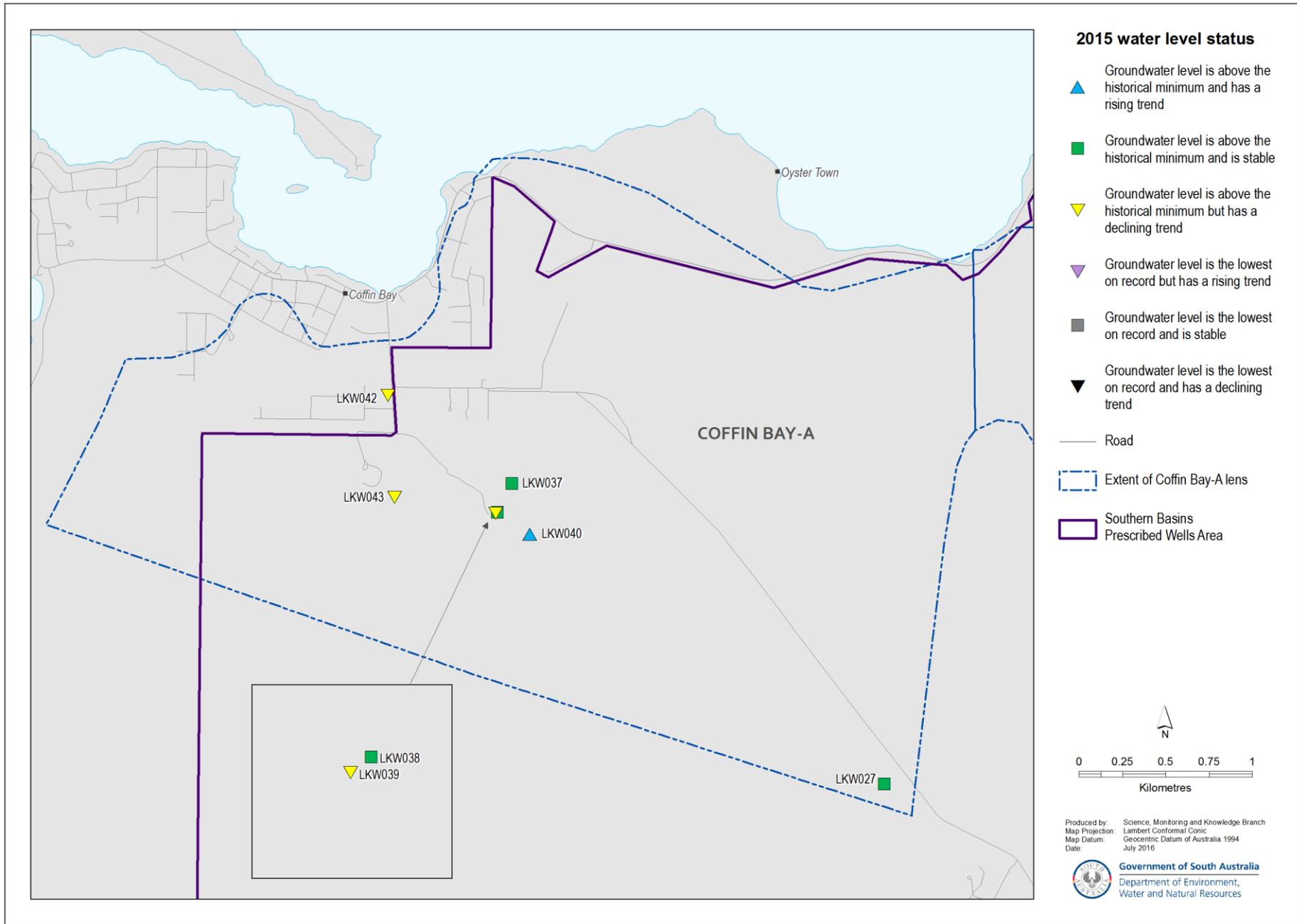


Figure 4. 2015 status of groundwater levels in the Coffin Bay-A lens (Southern Basins Prescribed Wells Area) based on the five-year water level trend from 2011 to 2015

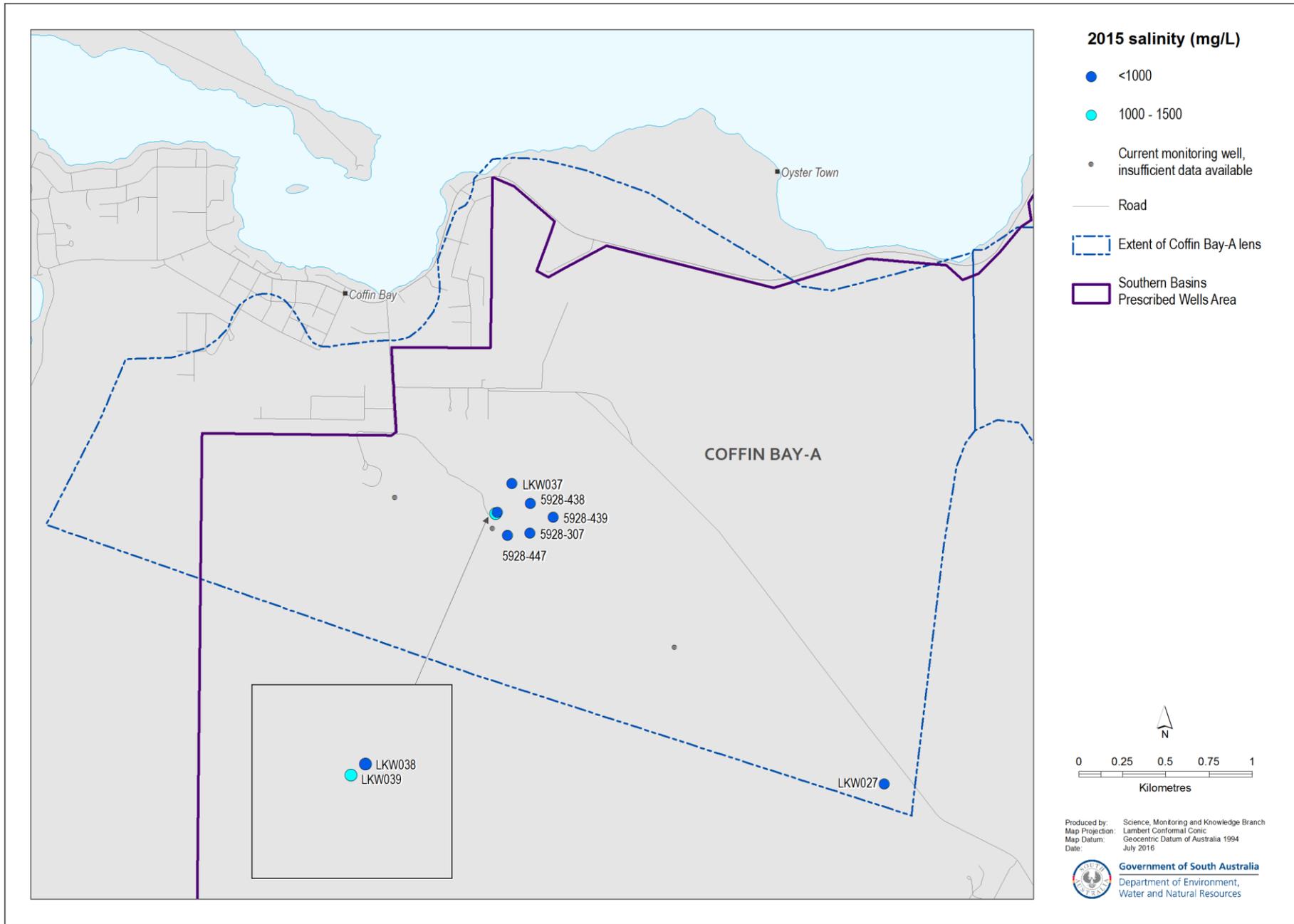


Figure 5. 2015 groundwater salinity of the Coffin Bay-A lens (Southern Basins Prescribed Wells Area)

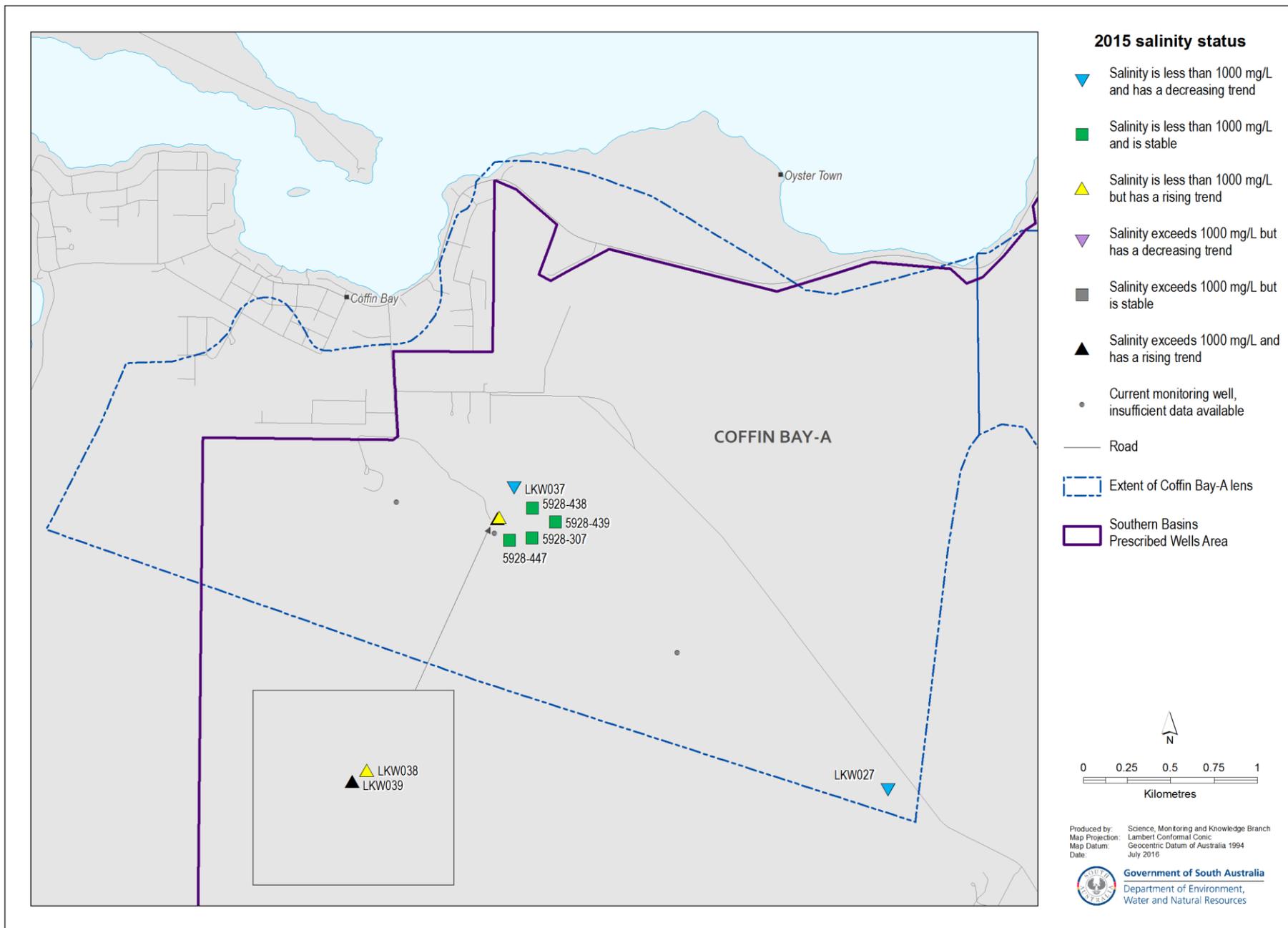


Figure 6. 2015 status of groundwater salinity in the Coffin Bay-A lens (Southern Basins Prescribed Wells Area) based on the five-year trend from 2011 to 2015

