

Southern Basins PWA

Coffin Bay-A lens

2014 Groundwater level and salinity status report



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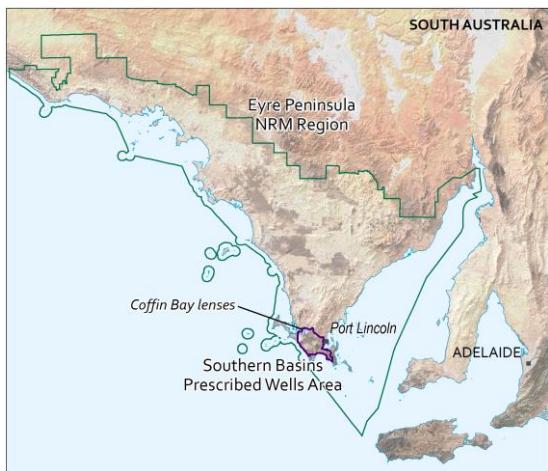
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2014 Summary



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 northwest of the Southern Basins PWA.

Within the Southern Basins PWA there are two main sedimentary sequences containing groundwater that overlie basement rocks: the Quaternary limestone aquifer and the underlying Tertiary sands aquifer. The Quaternary limestone aquifer comprises a generally thin veneer of aeolianite sediments of the Bridgewater Formation and is continuous across the PWA. Areas within the Quaternary limestone aquifer defined by salinity of less than 1000 mg/L, such as the Coffin Bay-A lens, are described as fresh groundwater lenses in

the current water allocation plan. The main source of recharge to the Quaternary limestone aquifer is the direct infiltration of rainfall, and groundwater flow is predominantly towards the nearest coastline in the Southern Basins PWA.

The condition of the groundwater resources in the Southern Basins PWA is highly dependent on recharge from rainfall, with trends in groundwater levels and salinity 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 salinity to increase. Conversely, increases in rainfall results 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 greater recharge responses have been observed when rainfall occurs in high-intensity events.

The Big Swamp rainfall station (number 18017), located about 20 km east of the Coffin Bay-A lens, recorded an annual rainfall of 524 mm for 2014. This is only 33 mm below the long-term (1898–2014) average of 557 mm, but nearly 120 mm less than that recorded in 2013. February rainfall was around three times greater than average, while May and June rainfall was approximately 50% greater than average. Rainfall was well below-average between August and November (Fig. 1).

Licensed groundwater extractions in the Southern Basins PWA occur predominantly from the Quaternary limestone aquifer. Metered extractions from the Coffin Bay-A lens totalled 98 ML in 2013–14, a 9% decrease from the previous water-use year (Fig. 2). This volume of extraction equates to 88% of the total 2013–14 allocation limit of 112 ML for the Coffin Bay-A lens and is 2% of the total licensed extractions from the Quaternary limestone aquifer in the whole PWA.

Long-term groundwater level trends in the Coffin Bay-A lens show a positive correlation to rainfall recorded at the Big Swamp rainfall station, with a slight drop in levels recorded over the period of below-average rainfall from 1992 to 2008. Above-average rainfall in 2009 and 2010 resulted in a recovery of groundwater levels.

In 2014, all eight observation wells with monitoring data showed a decline in the maximum recovered groundwater level (the highest recorded groundwater level over the year, usually following winter rainfall) ranging up to 0.45 m (Fig. 3), with a median decline of 0.19 m. This may be due to less recharge occurring because of less rainfall received compared with 2013. This also follows a significant rise in groundwater levels during 2013 as a result of above-average rainfall. Despite the overall decline, the maximum recovered groundwater levels in 2014 continue the longer-term stable or rising trends observed since 2009–10.

Within the Coffin Bay-A lens, groundwater salinity has been reasonably stable over the last 20 years at around 300 to 500 mg/L. In 2014, eight of the ten wells monitored recorded a salinity of less than 1000 mg/L, with the remaining two recording salinity under 1500 mg/L (Fig. 4). A total of four wells were available for comparison with 2013 measurements and reveal an overall decrease in salinity levels of 6% in 2014.

Large variability in some salinity samples collected from the Coffin Bay-A lens has previously been observed and is thought to be caused by the method of collection. Salinity samples are collected using two methods: bailing and pumping. Salinity measurements of groundwater samples collected by pumping, after a minimum of three well volumes have been discharged, show little variation

and are considered to be representative of the aquifer's salinity. Samples collected by bailer show large variations in salinity; consequently, these samples are considered unreliable and are not included in the salinity analysis described herein.

The observation well LKW039 recorded a salinity of over 1000 mg/L in 2014 and has shown a marked increase in salinity between 1985, when the well was installed, and 2008, when regular salinity sampling using pumping methods began. This well is located 50 m downgradient from, and at a similar depth to, a production well for town water supply that was abandoned due to increases in salinity caused by upconing of deeper groundwater of higher salinity. The salinity increase caused by upconing in the production well is likely to have influenced the higher salinity recorded in LKW039.

The Coffin Bay-A lens of the Southern Basins 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 status have been observed over the 12-month reporting period. If these conditions were to continue, they are unlikely to negatively impact the beneficial use of the resource (such as drinking water, irrigation or stock watering) for at least 15 years.

The 2014 status for the Coffin Bay A-lens is supported by:

- all wells recording a decline in the maximum recovered groundwater level when compared with 2013 data.

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 observation wells within the Southern Basins Prescribed Wells Area, 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](#).

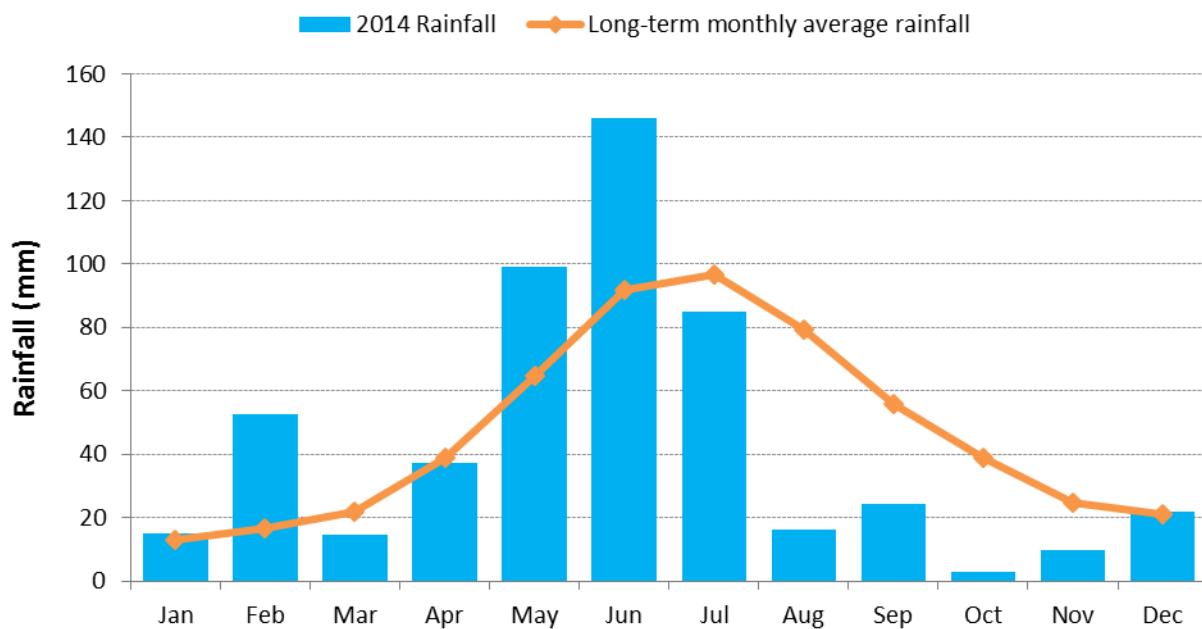


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Big Swamp rainfall station¹ (number 18017) in the Southern Basins Prescribed Wells Area

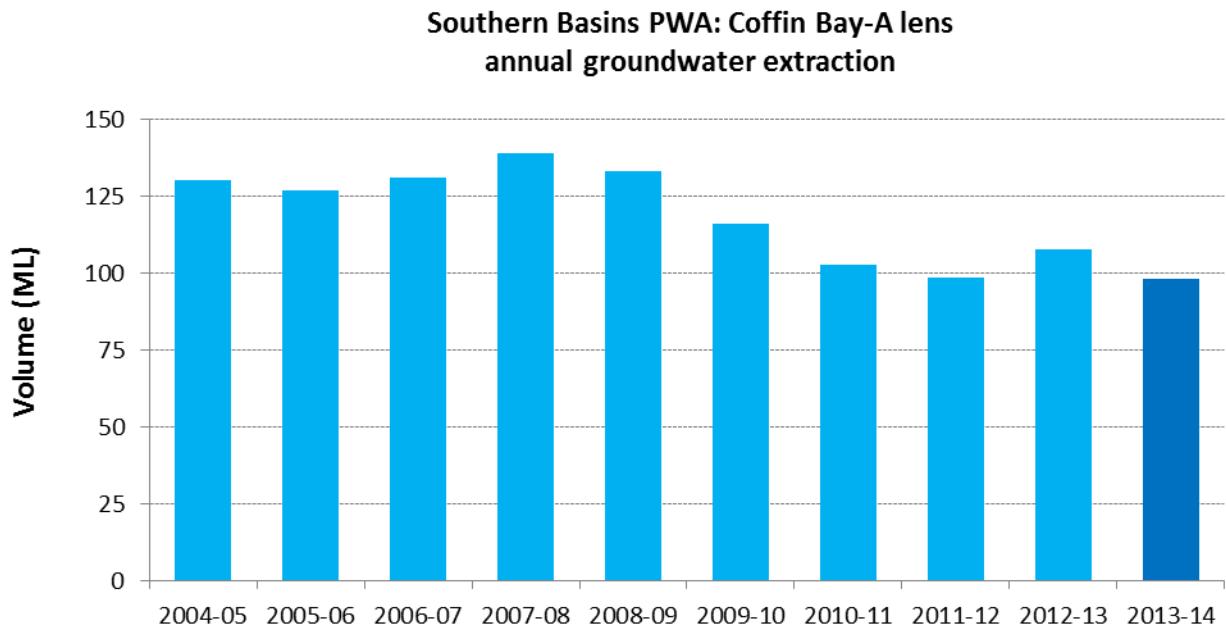


Figure 2. Historical licensed groundwater use for the Coffin Bay-A lens of the Southern Basins Prescribed Wells Area

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

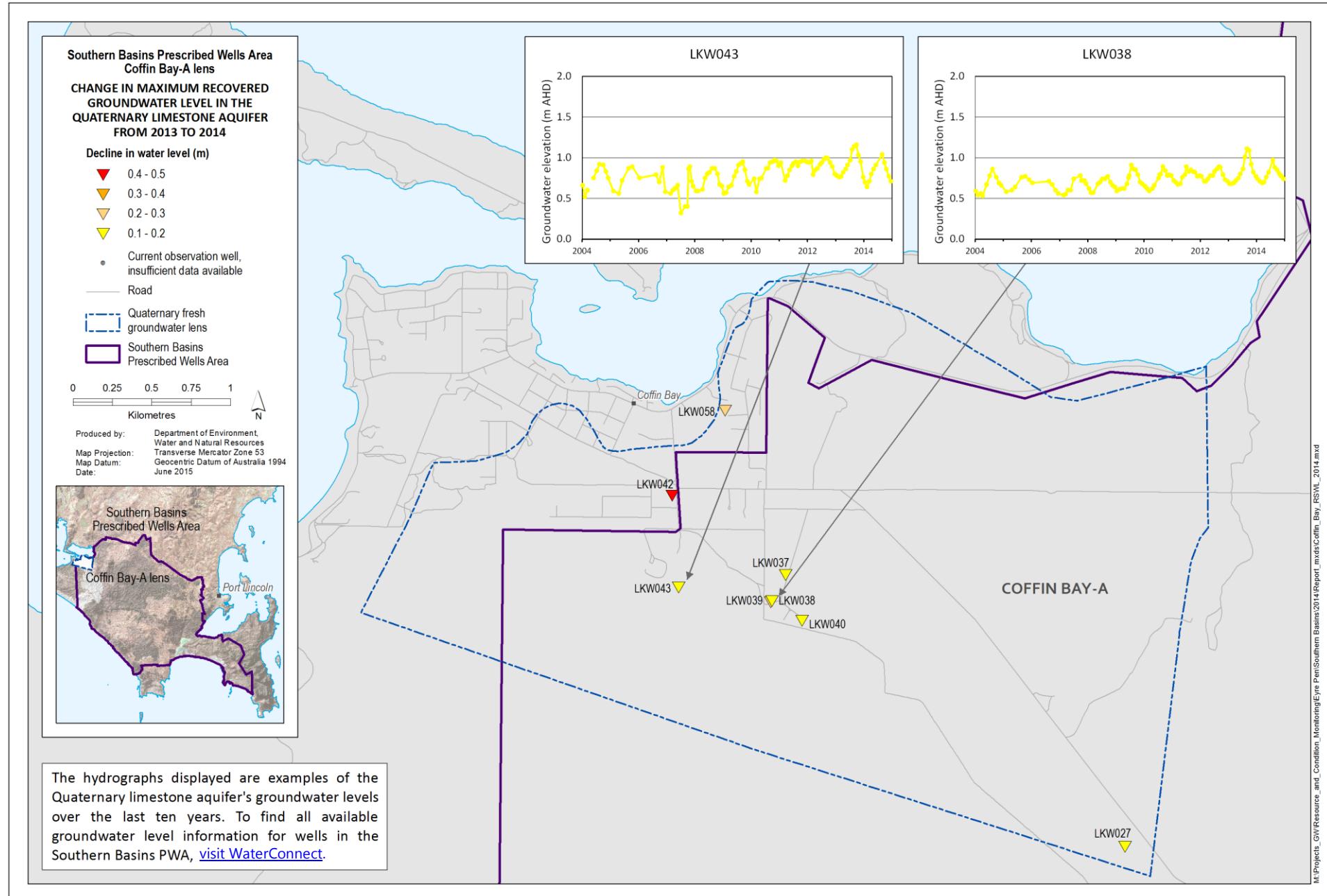


Figure 3. Overall changes in maximum groundwater levels in the Coffin Bay-A lens of the Southern Basins Prescribed Wells Area from 2013 to 2014

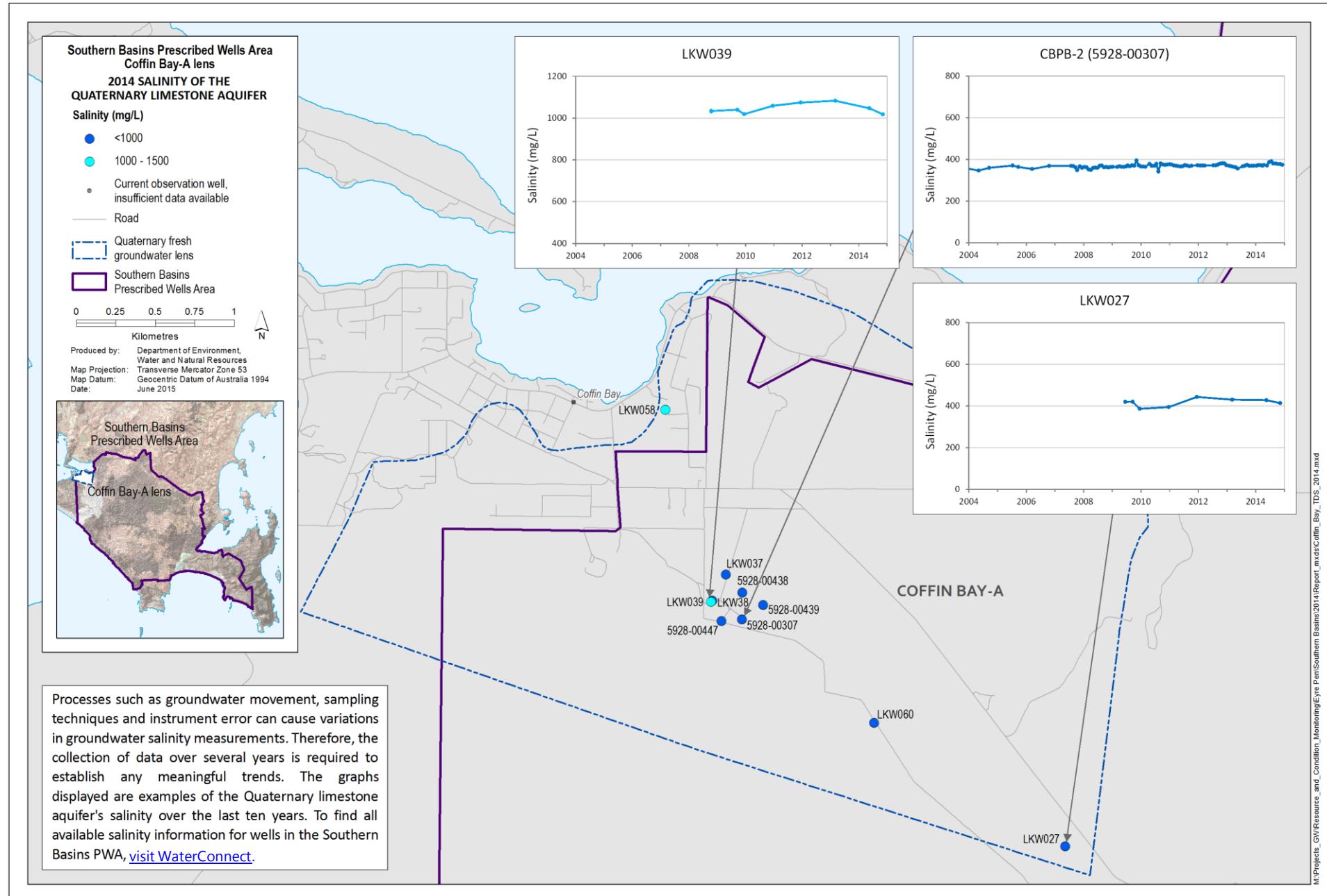


Figure 4. Groundwater salinity of the Coffin Bay-A lens in the Southern Basins Prescribed Wells Area for 2014