SOUTHERN BASINS PWA

LINCOLN BASIN

Groundwater Level and Salinity Status Report

2012

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

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2012 SUMMARY

The Southern Basins Prescribed Wells Area (PWA) is located at the southern most part of the Eyre Peninsula, approximately 270 km west of Adelaide. 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 Lincoln Basin is located in the south-east 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 lenses A, B and C of the Lincoln Basin, are described as a fresh groundwater lens 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 toward the nearest coastline in the Southern Basins PWA.

Licensed groundwater extractions occur predominantly from the Quaternary limestone aquifer. Metered extractions from the Lincoln Basin (lenses A, B and C) totalled 301 ML in 2011–12, a 32% decrease from the previous water-use year (Fig. 1). This volume of extraction equates to 48% of the total allocation limit of 625 ML for lenses A, B and C of the Lincoln Basin and is 5.5% of the total licensed extractions from the Southern Basins PWA.

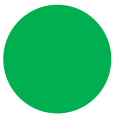
The sustainability of the groundwater resources in the Southern Basins PWA is highly dependent on recharge from rainfall. The historical data has indicated that trends of above or below-average rainfall can last for up to 25 years and greater recharge responses have been observed when rainfall occurs in high-intensity events. The Westmere rainfall station (number 18137) is located in the south of the Southern Basins PWA, about 5 km west of Lincoln-B lens, and recorded 466 mm of rain in 2012. This is more than 100 mm less than the long-term average annual rainfall for that station. The month of June received rainfall significantly above its long-term monthly average, but January, April, July, and September through to December recorded significantly below-average rainfall (Fig. 2).

Long-term groundwater level trends in the Lincoln Basin show a positive correlation to rainfall recorded at the Westmere rainfall station. From 1958, when monitoring began, to 1978, groundwater levels display an overall declining trend, which coincides with generally below-average rainfall over the same period. Spikes in the groundwater level were recorded in some wells in 1968 and are in response to over 1000 mm of rain received that year. Between 1978 and 1984 to 1986, an overall trend of above-average rainfall corresponds with a trend of increasing groundwater levels. After 1984, groundwater levels trended downwards and rainfall was predominantly below-average. A 42% decrease in groundwater extractions in 2008 and above-average rainfall since 2009 resulted in a recovery of groundwater levels. In 2012, 16 wells recorded a decrease in the maximum recovered groundwater level of up to 0.02 m. Additionally, five wells recorded an increase of up to 0.05 m and six wells recorded no change when compared to 2011 water level data (Fig. 3).

In and around lens A of the Lincoln Basin, groundwater salinity rose steadily by up to 570 mg/L between 1959 and 2008. Since 2008, salinities have been quite stable. Salinity of the Quaternary limestone aquifer in and around lens B has also risen over time, with some observation wells recording occasional up-coning of saline groundwater due to low groundwater elevations and higher extraction rates. Long-term increases in salinity in and around lens C are less than 800 mg/L and salinities have been quite

stable since 2008. Salinities of between 800 and 1300 mg/L were recorded in 2012, with those above 1000 mg/L oustisde the known extent of the Lincoln lenses though not all observation wells were sampled (Fig. 4).

The Lincoln Basin of the Southern Basins PWA has been assigned a green status for 2012:

2012 STATUS  "No adverse trends, indicating negligible risk to the resource"

This means that the groundwater status was observed to be stable (i.e. no significant change) or improving over the reporting period. Continuation of these trends favours a very low likelihood of negative impacts on beneficial uses such as drinking water, irrigation or stock watering. The 2012 status for the Lincoln Basin is supported by:

- no significant change in the maximum recovered groundwater levels when compared to 2011 water level data
- no significant change in salinity when compared to 2011 salinity data.

To view the *Southern Basins PWA groundwater level and salinity status report 2011*, which includes background information on hydrogeology, rainfall stations and relevant groundwater-dependent ecosystems, visit WaterConnect.

To view descriptions of all status symbols, click here.

For further details about the Lincoln Basins, please see the Water Allocation Plan for the Southern Basins Prescribed Wells Area.

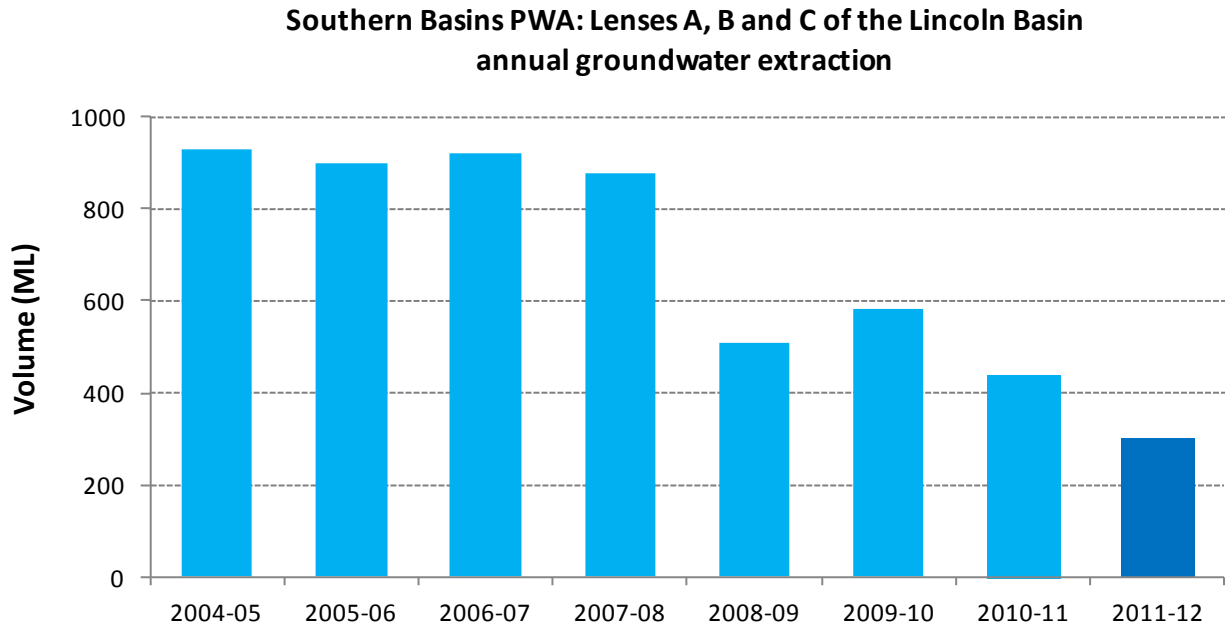


Figure 1. Historical licensed groundwater use for lenses A, B and C of the Lincoln Basin in the Southern Basins Prescribed Wells Area

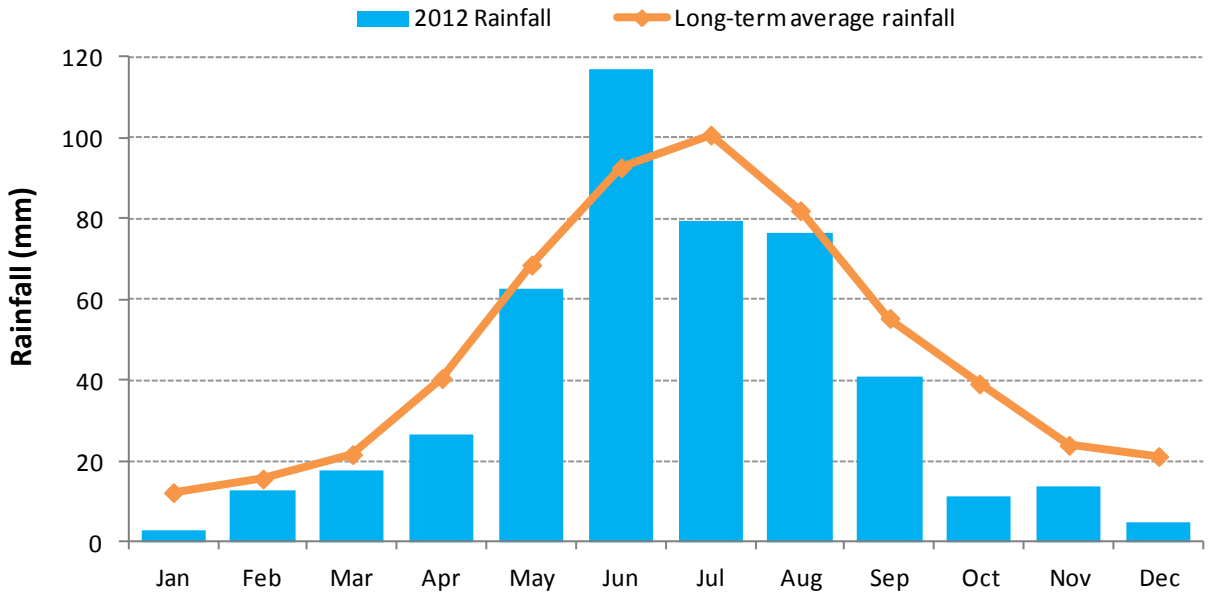


Figure 2. Monthly rainfall (mm) for 2012 and the long-term average monthly rainfall (mm) at the Westmere rainfall station (number 18137) in the Southern Basins Prescribed Wells Area

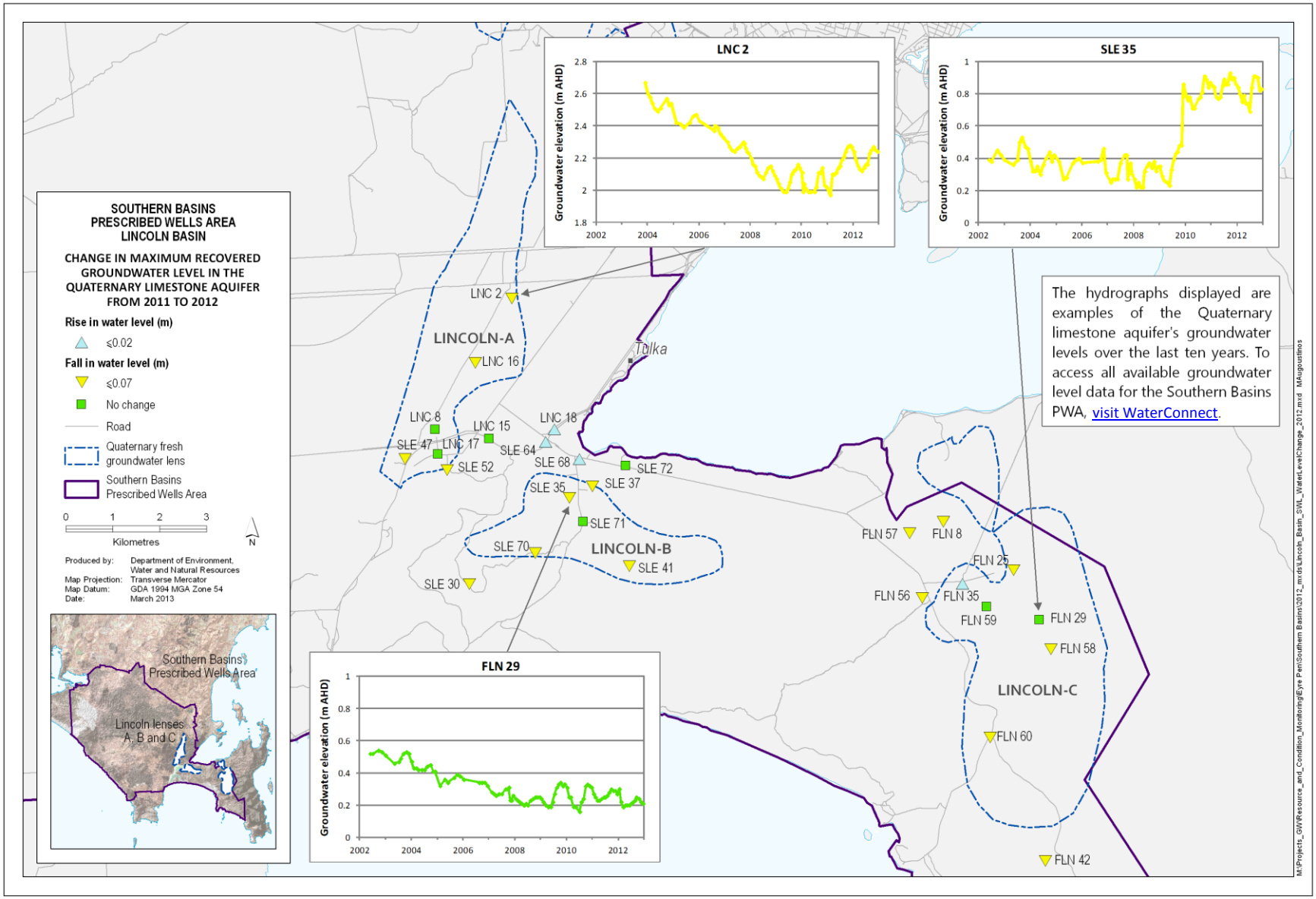


Figure 3. Overall changes in maximum recovered groundwater levels in the Lincoln Basin of the Southern Basins Prescribed Wells Area from 2011 to 2012

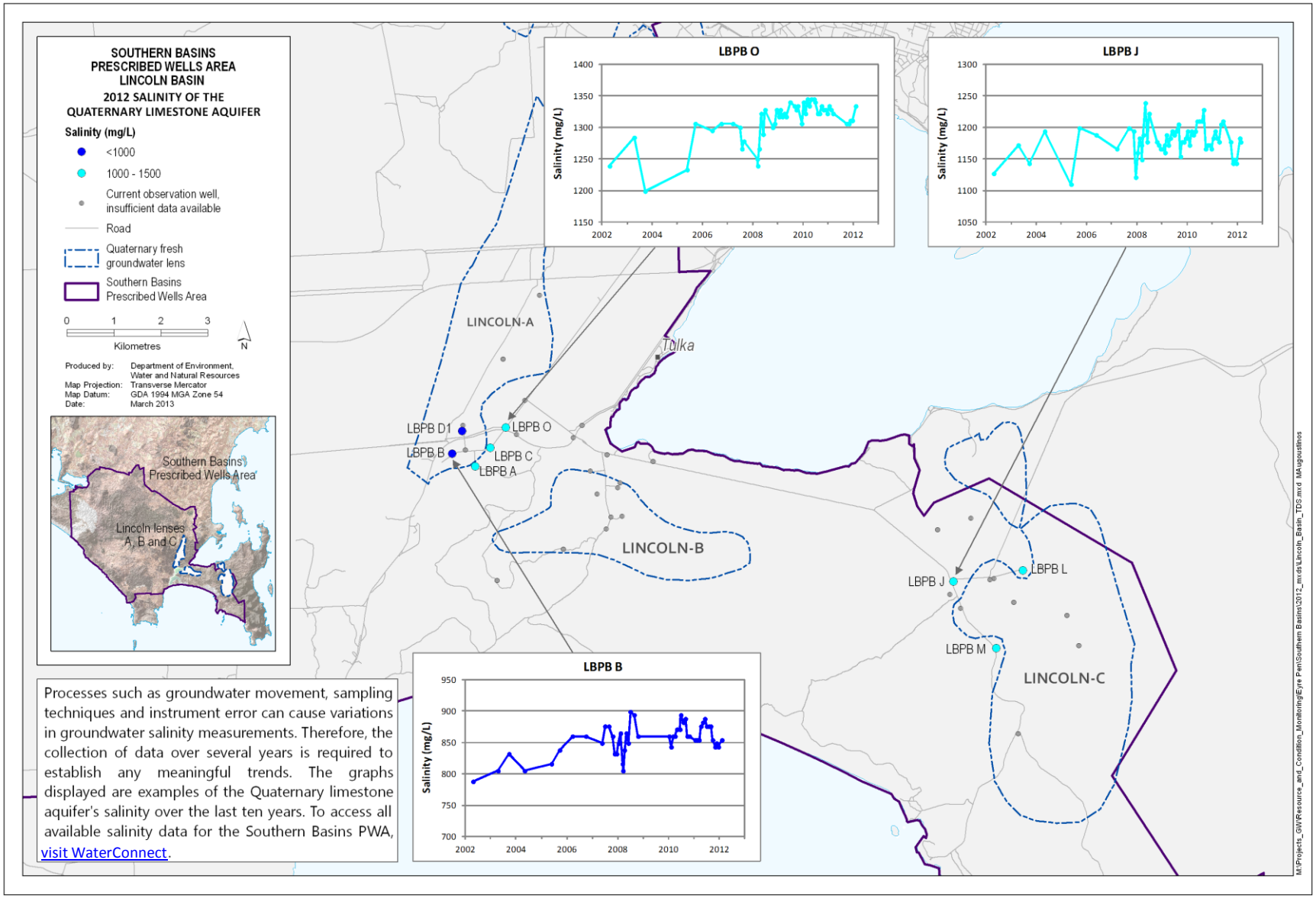


Figure 4. Groundwater salinity of the Lincoln Basin in the Southern Basins Prescribed Wells Area for 2012