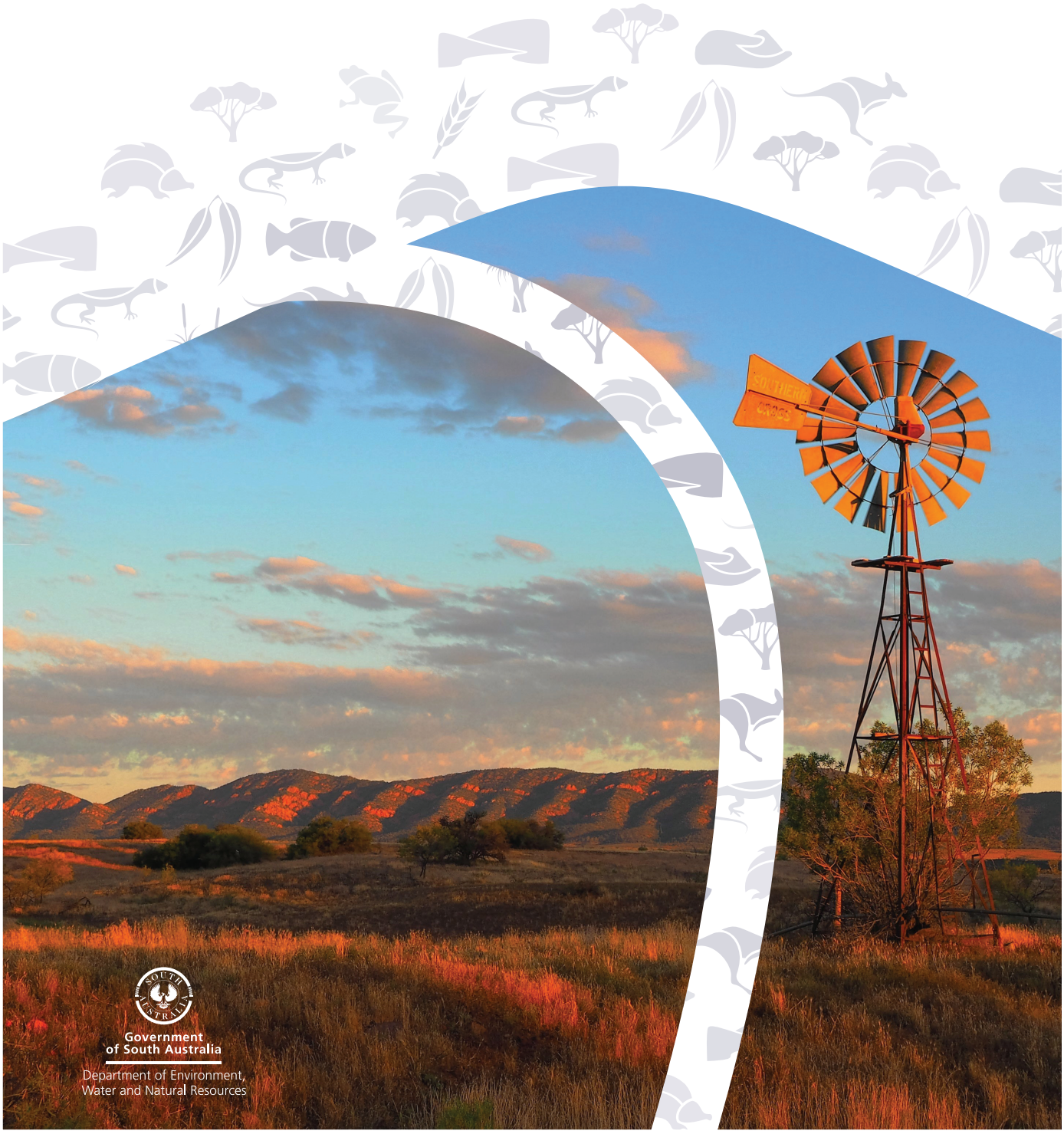
Western Mount Lofty Ranges PWRA Permian Sand aquifer

2016 Groundwater level and salinity status report



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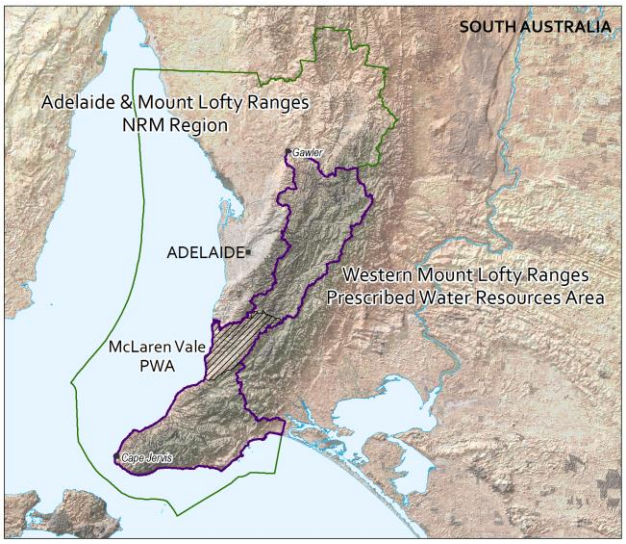
Regional setting



The Western Mount Lofty Ranges (WMLR) Prescribed Water Resources Area (PWRA) is located within the Adelaide and Mount Lofty Ranges Natural Resources Management Region and covers an area of approximately 2750 km^2, stretching from Cape Jervis on the south coast to Gawler in the north. It is a regional-scale resource for which groundwater, surface water and watercourse water are prescribed under *South Australia's Natural Resources Management Act 2004* and a water allocation plan provides for the sustainable use of these resources. The McLaren Vale Prescribed Wells Area (PWA), located within the boundaries of the WMLR PWRA, is managed separately and a separate groundwater level and salinity status report that has been prepared for this PWA can be found on the WaterConnect website.

There are three main sedimentary groundwater systems within the WMLR PWRA: the Permian Sand, Tertiary limestone and Quaternary aquifers. This report focuses on the Permian Sand aquifer, which is found only on the Fleurieu Peninsula, toward the south of the PWRA in the Myponga and Hindmarsh Tiers Basins (Fig. 1). Also known as the Cape Jervis Formation, it consists of unconsolidated sands, silts and clays with occasional gravel beds. This aquifer is generally low-yielding, except in the northern Myponga Basin where the Tertiary limestone aquifer, which otherwise overlies the Permian Sand aquifer, is absent. Here, the aquifer shows generally good yields and low salinity; however, high clay content in some areas can lead to lower yields and higher salinities.

Rainfall and groundwater extractions are important factors that govern changes in groundwater level and salinity of the Permian Sand aquifer. Below-average rainfall results in a reduction in recharge to the aquifer. Below-average summer rainfall can also result in increased irrigation extraction, which may cause groundwater levels to fall and salinity to increase. Conversely, increased rainfall may result in increased recharge and decreased irrigation extraction. This may cause groundwater levels to rise, and salinity to stabilise or decrease.

2016 Status

The Permian Sand aquifer of the Western Mount Lofty Ranges PWRA has been assigned a green status for 2016:

2016 Status  Positive trends have been observed over the past five years

The 2016 status for the Permian Sand aquifer is based on:

- all monitoring wells show a five-year trend of rising groundwater levels in the Myponga Basin
- all monitoring wells show a five-year trend of stable groundwater level in the Hindmarsh Tiers Basin.

Rainfall

The Hindmarsh Valley rainfall station (BoM Station 23823) was used for rainfall analysis due to its central location within the Hindmarsh Tiers Basin (Fig. 1). In the 2015–16 water-use year, 796 mm of rainfall was recorded, which is 15% less than the long-term average of 941 mm (1900–2016) and commensurate with the five-year average of 815 mm (Figs 1 and 2). A trend of declining rainfall is evident when compared with the long term average (Fig. 1). In 2015-16, eight months recorded rainfall which is below their long-term averages, but January, February, May and June recorded rainfall which is greater than their respective monthly averages.

Water use

The Western Mount Lofty Ranges PWRA has a total extraction limit of 69 193 ML across all aquifers of the PWRA, of which 56 045 ML has been allocated. In previous years, water usage were estimated based on land-use survey of irrigated properties and the theoretical irrigation requirements for various crops; as such, these data are not suitable to perform five-year trend analysis. More recently, changes in the way water is managed across the region have required licensed water users to measure their water use. By 2015–16, 47% of water licensees had installed water meters and submitted water usage data. Metered extractions totalled 7277 ML for all aquifers within the WMLR PWRA, which represents 11% of the PWRA's total extraction limit[1]. Within the Permian Sand aquifer metered extractions totalled 725 ML.

Groundwater levels

In the five years to 2016, all monitoring wells within the Myponga Basin show a trend of rising water levels. Although two of these monitoring wells (MYP007 and MYP027) show their lowest level on record in 2016, the five-year trend is still rising for both of these wells. Rises in groundwater levels range between 0.02 and 0.17 m/y with a median of 0.05 m/y. Also, two monitoring wells in the Hindmarsh Tiers Basin show stable groundwater levels over the past five years (Fig. 3).

Groundwater salinity

Groundwater salinity of the Permian Sand aquifer is not regularly measured. Due to the paucity of salinity data, salinity has not been used when assessing the status of the resource in this report. However, the salinity of the Permian Sand aquifer within the Myponga and Hindmarsh Tiers Basins typically measures less than 1000 mg/L.

[1] The licensed groundwater extraction volume for the 2015–16 water-use year is based on the best data available as of March 2017 and may be subject to change, as some extraction volumes are in the process of being verified; installation of water meters by licensed users is still in progress across the WMLR PWRA.

More information

To determine the status of the Permian Sand aquifer for 2016, the trend in groundwater levels over the past five years (2012 to 2016, inclusive) were analysed, 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 more detail on the current method of evaluating the status of groundwater resources.

To view descriptions for all status symbols, please visit the *Water Resource Assessments* page on WaterConnect.

To view the W*estern Mount Lofty Ranges PWRA Groundwater Level and Salinity Status Report 2011*, which includes background information on hydrogeology, rainfall 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 Western Mount Lofty Ranges PWRA, please visit Groundwater Data on WaterConnect.

For further details about the Western Mount Lofty Ranges PWRA, please see the *Water Allocation Plan for the Western Mount Lofty Ranges* on the Natural Resources SA Murray-Darling Basin website.

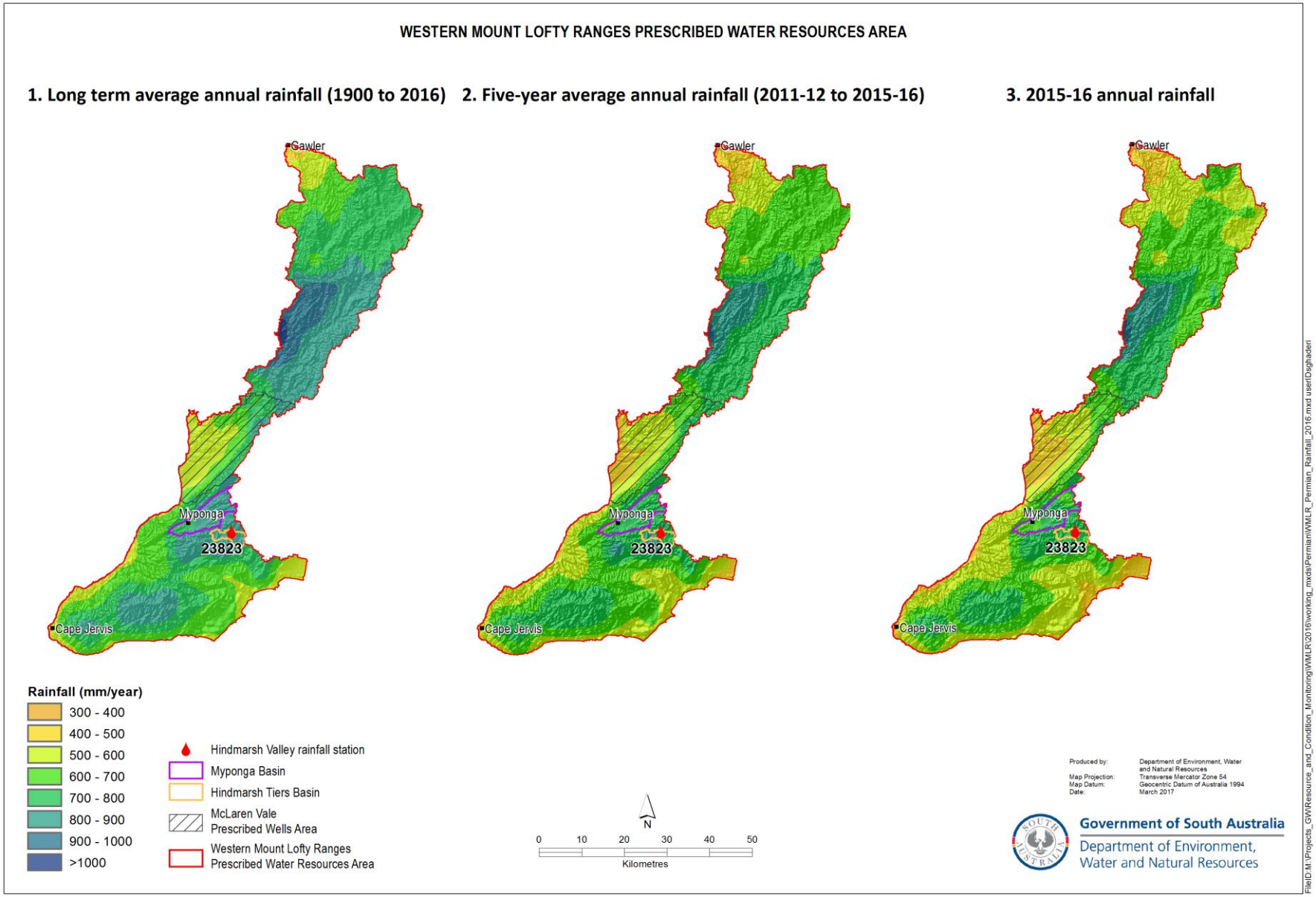


Figure 1. (1) Long-term and (2) five-year average annual rainfall and (3) annual rainfall for the 2015–16 water-use year in the Western Mount Lofty Ranges PWRA[2]

[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.

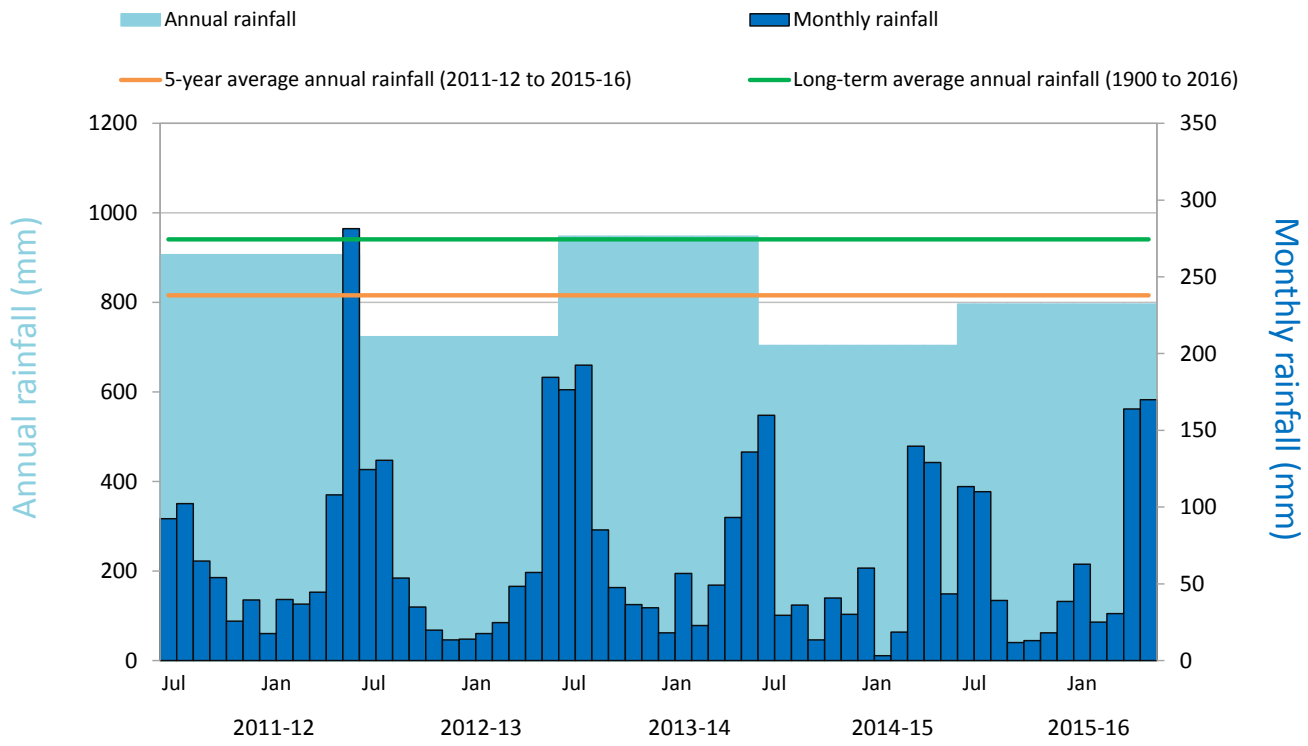


Figure 2. Annual (July–June) and monthly rainfall for the past five water-use years, and the five-year and long-term average annual rainfall recorded at Hindmarsh Valley (BoM Station 23823)[3]

[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.

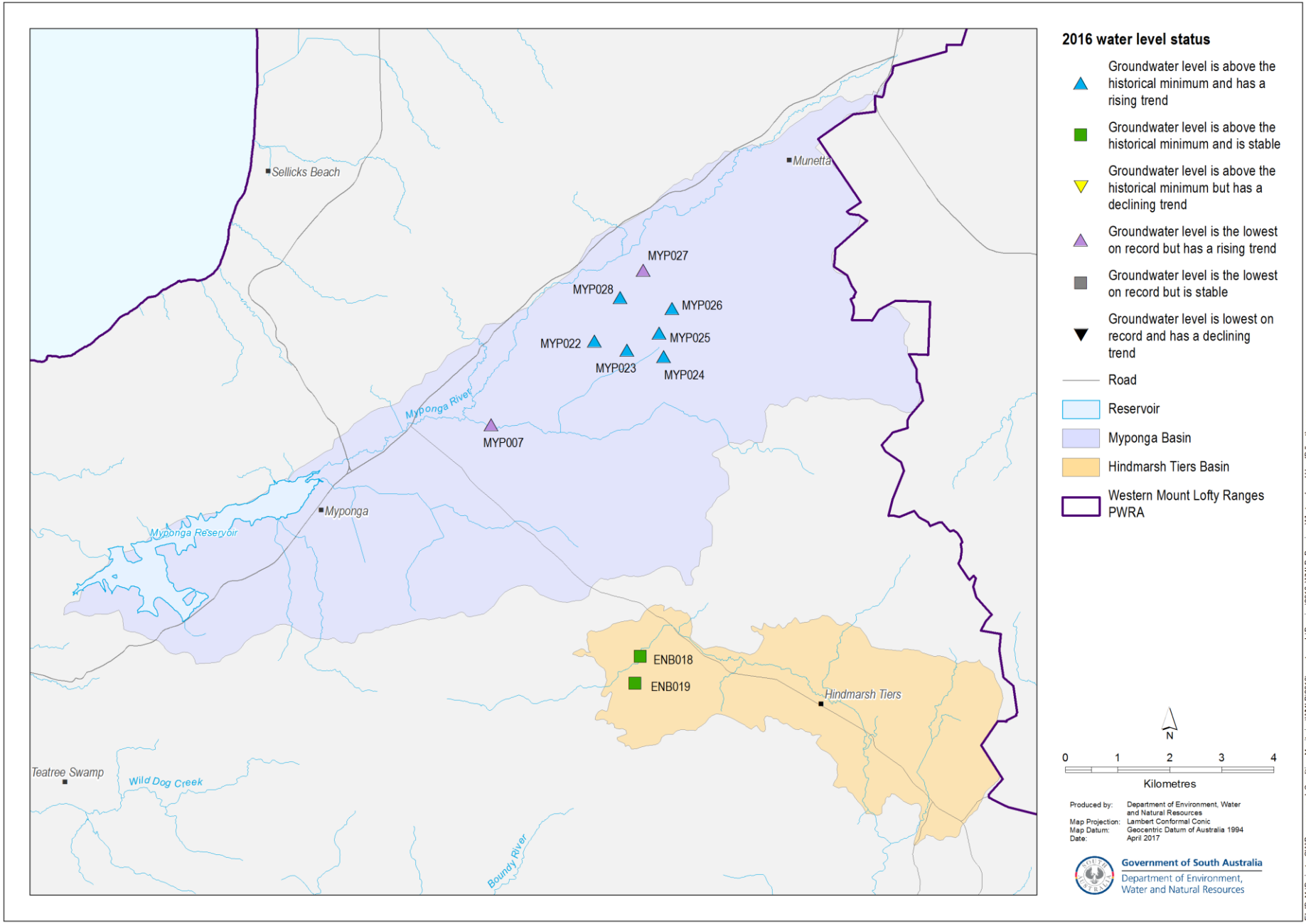


Figure 3. 2016 status of groundwater levels in the Permian Sand aquifer (Western Mount Lofty Ranges PWRA) based on five-year trends from 2012 to 2016

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