McLaren Vale PWA Maslin Sands aquifer

2016 Groundwater level and salinity status report



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Regional setting



The McLaren Vale Prescribed Wells Area (PWA) is located approximately 35 km south of Adelaide. It lies within the Adelaide and Mount Lofty Ranges (AMLR) Natural Resources Management Region (location map left). For those groundwater resources located within the adjacent Western Mount Lofty Ranges (WMLR) Prescribed Water Resources Area (PWRA), but outside the McLaren Vale PWA, a separate groundwater level and salinity status report has been prepared and it can be found on the *Water Resource Assessments* page of <u>WaterConnect</u>. Both the McLaren Vale PWA and WMLR PWRA comprise regional-scale groundwater resources, for which groundwater has been prescribed under South Australia's *Natural Resources Management Act 2004*, and in each of these two areas a water allocation plan provides for the sustainable management of the water resources.

Underlying the McLaren Vale PWA is the Willunga Embayment, a

structurally controlled trough containing sedimentary aquifers of Quaternary and Tertiary age that is bounded in the south-east by the Willunga Fault and to the north by basement outcrop. There are four aquifers described within the Willunga Embayment: the Quaternary aquifer; the Port Willunga Formation aquifer; the Maslin Sands aquifer; and the fractured rock aquifer (FRA).

This report focuses on the Tertiary-aged Maslin Sands aquifer that comprises fine to coarse sands and clays. It is unconfined in the north-east of the PWA, and crops out to the north and north-east of McLaren Vale. Further to the south-west, it becomes confined and is separated from the overlying Port Willunga Formation aquifer by the Blanche Point Formation confining layer that comprises low-permeability marine mudstones and limestones. Groundwater flows from the elevated recharge areas in the north-east, toward the south-west. Recharge to the Maslin Sands aquifer is thought to occur where it is unconfined, via infiltration through the soil or by percolation of streamflow in drainage lines.

Rainfall and groundwater extractions are important factors that govern changes in groundwater level and salinity of the Maslin Sands aquifer. Below-average rainfall results in a reduction in recharge to the aquifer. Below-average rainfall can also result in increased irrigation extraction, which may cause the groundwater level 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 may stabilise or decline.

2016 Status

The Maslin Sands aquifer of the McLaren Vale PWA has been assigned a yellow status for 2016:

2016 Status

Minor adverse trends have been observed over the past five years

The 2016 status for the Maslin Sands aquifer is based on:

• most monitoring wells (62%) showing a a five-year declining trend in groundwater levels.

Rainfall

The Willunga rainfall station (BoM Station 23753) is located in the south-eastern area of the Mclaren Vale PWA and recorded 534 mm in the 2015–16 water-use year, which is 17% less than the long-term average annual rainfall of 643 mm (1900–2016) and 6% less than the five-year average of 571 mm (2011–16) (Figs 1 and 2). Although there has been above-average rainfall in two of the past five years, a five-year trend of declining rainfall is evident (Figs 1 and 2). Monthly rainfall data show January to March and May to July recording above-average rainfall, but the remaining months recording totals below their long-term average.

Water use

Licensed groundwater extractions from the Maslin Sands aquifer totalled 715 ML¹ in 2015–16, an increase of 4% from the previous water-use year and 10% greater than the five-year average of 648 ML (Fig. 3). Over the past five water-use years, groundwater extractions have increased as rainfall has declined (Figs 2 and 3). The Maslin Sands aquifer accounted for 14% of the groundwater extracted from the McLaren Vale PWA in 2015–16.

Groundwater level

In the five years to 2016, 62% of wells show a declining trend in groundwater levels (Fig. 4). Rates of decline ranged between 0.04 and 0.90 m/y, with a median of 0.30 m/y. The greatest rates of decline were observed towards the north-east where the aquifer is unconfined. Thirty-eight percent of monitoring wells show either stable water levels or a five-year trend of rising groundwater levels. In 2016, 25% of wells show their lowest groundwater level on record, and these wells are mostly located in the central and northern part of the PWA (Fig. 4).

Groundwater salinity

Groundwater salinity in the Maslin Sands aquifer is generally low across the PWA. The most recently acquired salinity data (2010 to 2014) show a general stable or trend of decreasing salinity across the PWA, with 85% of the wells recording salinities of less than 1500 mg/L. Due to a paucity of salinity data for the Maslin Sands aquifer in 2015 and 2016, salinity has not been used in the assessment of the status of the resource in this report.

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¹ The licenced groundwater use for the 2015–16 water-use year is based on the best data available as of January 2017 and could be subject to change, as some extraction volumes may be in the verification process.

More information

To determine the status of the Maslin Sands aquifer for 2016, the trends 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 <u>Frequently Asked Questions</u> 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 *McLaren Vale PWA Groundwater Level and Salinity Status Report 2009–10*, which includes background information on hydrogeology, rainfall and relevant groundwater-dependent ecosystems, please visit the *Water Resource Assessments* page on <u>WaterConnect</u>.

To view or download groundwater level and salinity data from wells within the McLaren Vale PWA, please visit <u>Groundwater Data</u> on WaterConnect.

For further details about the McLaren Vale PWA, please see the *Water Allocation Plan for the McLaren Vale Prescribed Wells Area* on the Natural Resources Adelaide and Mount Lofty Ranges <u>website</u>.



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 McLaren Vale PWA²

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 Willunga (BoM Station 23753)³



Figure 3.

Licensed groundwater extraction volumes⁴ for the past five water-use years, for the Maslin Sands aquifer

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⁴ The licenced groundwater use for the 2015–16 water-use year is based on the best data available as of January 2017 and could be subject to change, as some extraction volumes may be in the verification process.



Figure 4. 2016 status of groundwater levels in the Maslin Sands aquifer (McLaren Vale PWA) based on five-year trends from 2012 to 2016



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