

McLaren Vale PWA

Port Willunga Formation aquifer

2015 Groundwater level and salinity status report



Department of Environment, Water and Natural Resources
GPO Box 1047, Adelaide SA 5001

Telephone	National	(08) 8463 6946
	International	+61 8 8463 6946
Fax	National	(08) 8463 6999
	International	+61 8 8463 6999
Website	www.environment.sa.gov.au	

Disclaimer

The Department of Environment, Water and Natural Resources and its employees do not warrant or make any representation regarding the use, or results of the use, of the information contained herein as regards to its correctness, accuracy, reliability, currency or otherwise. The Department of Environment, Water and Natural Resources and its employees expressly disclaims all liability or responsibility to any person using the information or advice. Information contained in this document is correct at the time of writing.



This work is licensed under the Creative Commons Attribution 4.0 International License.

To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>

© Crown in right of the State of South Australia, through the Department of Environment, Water and Natural Resources 2016

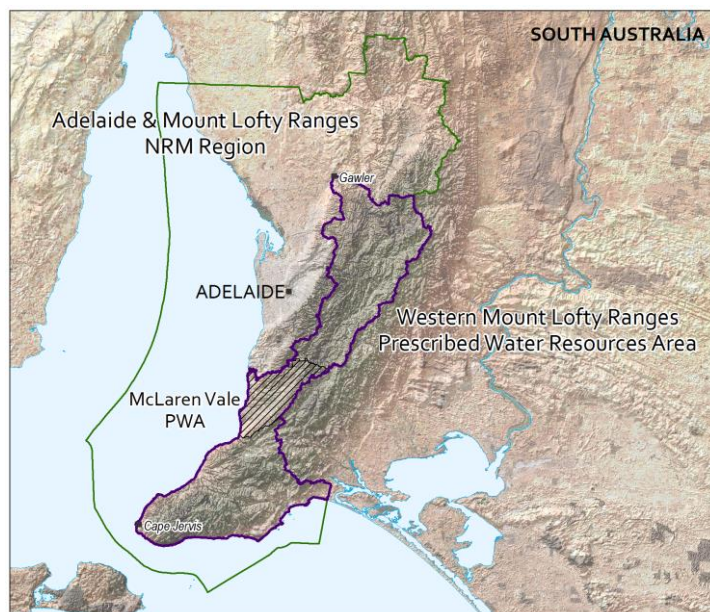
ISBN 978-1-925369-89-2

Preferred way to cite this publication

DEWNR, 2016, *McLaren Vale PWA Port Willunga Formation aquifer 2015 Groundwater level and salinity status report*, Government of South Australia, through the Department of Environment, Water and Natural Resources, Adelaide

Download this document at www.waterconnect.sa.gov.au

2015 Summary



The McLaren Vale Prescribed Wells Area (PWA) is located approximately 35 km south of Adelaide within the Adelaide and Mount Lofty Ranges NRM Region. It is a regional-scale resource for which groundwater has been prescribed under South Australia's *Natural Resources Management Act 2004* and a water allocation plan provides for sustainable management of the water resources. The McLaren Vale Prescribed Wells Area (PWA) is located within the boundary of the Western Mount Lofty Ranges Prescribed Water Resources Area (WMLR PWRA) and separate groundwater level and salinity status report that has been prepared for this PWRA can be found on the *Water Resource Assessments* page of [WaterConnect](#).

Underlying the McLaren Vale PWA is the Willunga Embayment, a structurally controlled trough containing sedimentary groundwater systems of Quaternary and Tertiary age that is bounded in the south-east by the

Willunga Fault and to the north by basement outcrop. This report focuses on the Tertiary-aged Port Willunga Formation aquifer, which is a coarse-grained sandy limestone overlain by younger Quaternary aquifers and underlain by the Tertiary-aged Maslin Sands aquifer and the older fractured rock aquifers. Groundwater within the Port Willunga Formation aquifer typically flows from the higher elevations in the north-east in a south-westerly direction toward the coast. Recharge to the aquifer occurs from direct recharge from incident rainfall where it is unconfined in its northern extent near McLaren Vale and McLaren Flat, and from streamflow recharge in drainage lines at or near the Willunga Fault. Lateral throughflow from the fractured rock aquifer, across the Willunga Fault, may also provide recharge to the aquifer.

Groundwater level and salinity trends within the Port Willunga Formation are primarily climate driven: below-average rainfall results in reduced recharge to the aquifer. Below-average rainfall can also lead to increased extractions for irrigation, which can cause groundwater level to fall and salinity to increase. Conversely, higher rainfall may result in increased recharge and decreased irrigation extraction. This may cause the groundwater level to rise, allowing salinity to stabilise or decline.

The Willunga rainfall station (BoM Station 23753) recorded 414 mm in the 2014–15 water-use year, nearly 230 mm less than the long-term average annual rainfall (1900–2015) of 641 mm and nearly 180 mm less than the five-yearly average of 592 mm (Figs 1 and 2). Though there have been sporadic instances of above average rainfall over the past five years, there is a general declining trend in rainfall for this time period (Fig. 2).

Licensed groundwater extractions (excluding stock and domestic use) from the Port Willunga Formation aquifer totalled 2789 ML¹ in 2014–15, an increase of 9% on the previous water-use year (Fig. 3). Groundwater extraction has increased over the past five water-use years as rainfall has declined (Figs 2 and 3).

Long-term monitoring records show groundwater levels in the Port Willunga Formation aquifer have declined by up to 5 m since 1993. In the five years to 2015, 83% of monitoring wells recorded a continuing trend of declining groundwater levels (Fig. 4), ranging between 0.1 and 0.7 m/y. Just over half of monitoring wells recorded their lowest groundwater level in 2015, and are located in the eastern half of the aquifer extent where it is unconfined and the most irrigation occurs (Fig. 4). Despite the declines since 1993, and the continued decline over the past five years, the aquifer has a saturated thickness of around 40 to 140 m, suggesting low risk to the aquifer in the medium term.

Groundwater salinity in the Port Willunga Formation aquifer is generally fresh, with most monitoring wells recording salinities below 1500 mg/L. Long-term monitoring recorded a decline in salinity from the late 1980s to 2006 followed by an increase in salinity between 2006 and 2010. A number of monitoring wells recorded salinity trends that seem to be closely related to trends in rainfall,

¹ The licenced groundwater use for the 2014–15 water-use year is based on the best data available as of March 2016 and could be subject to change, as some extraction volumes may be in the process of being verified.

with the decline in salinity since 2010 a likely response to higher winter rainfall in 2009 and 2010. Some wells also show a seasonal fluctuation in salinity with higher salinity in the summer months than in the winter. Some wells show a continued rising salinity trend.

Due to a lack of salinity data for 2015, the salinity distribution for 2014 is shown in Figure 5. The freshest groundwater (less than 1000 mg/L) is found between Willunga, McLaren Vale and McLaren Flat. Higher-salinity groundwater is generally found at the south-western and north-eastern extents of the aquifer. In the five years to 2014, 90% of monitoring wells show a trend of declining or stable salinity, while the remainder are experiencing rising salinity (Fig. 6).

To determine the status of the Port Willunga Formation aquifer 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 more detail on the current method of evaluating the status of groundwater resources.

The Port Willunga Formation aquifer of the McLaren Vale PWA has been assigned a yellow status for 2015:

2015 Status Minor adverse trends have been observed over the past five years

The 2015 status for the Port Willunga Formation aquifer is based on:

- most monitoring wells (83%) showing a five-year declining groundwater level trend.

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 [WaterConnect](#).

To view or download groundwater level and salinity data from monitoring wells within the McLaren Vale PWA, please visit [Groundwater Data](#) 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 Adelaide and Natural Resources Mount Lofty Ranges [website](#).

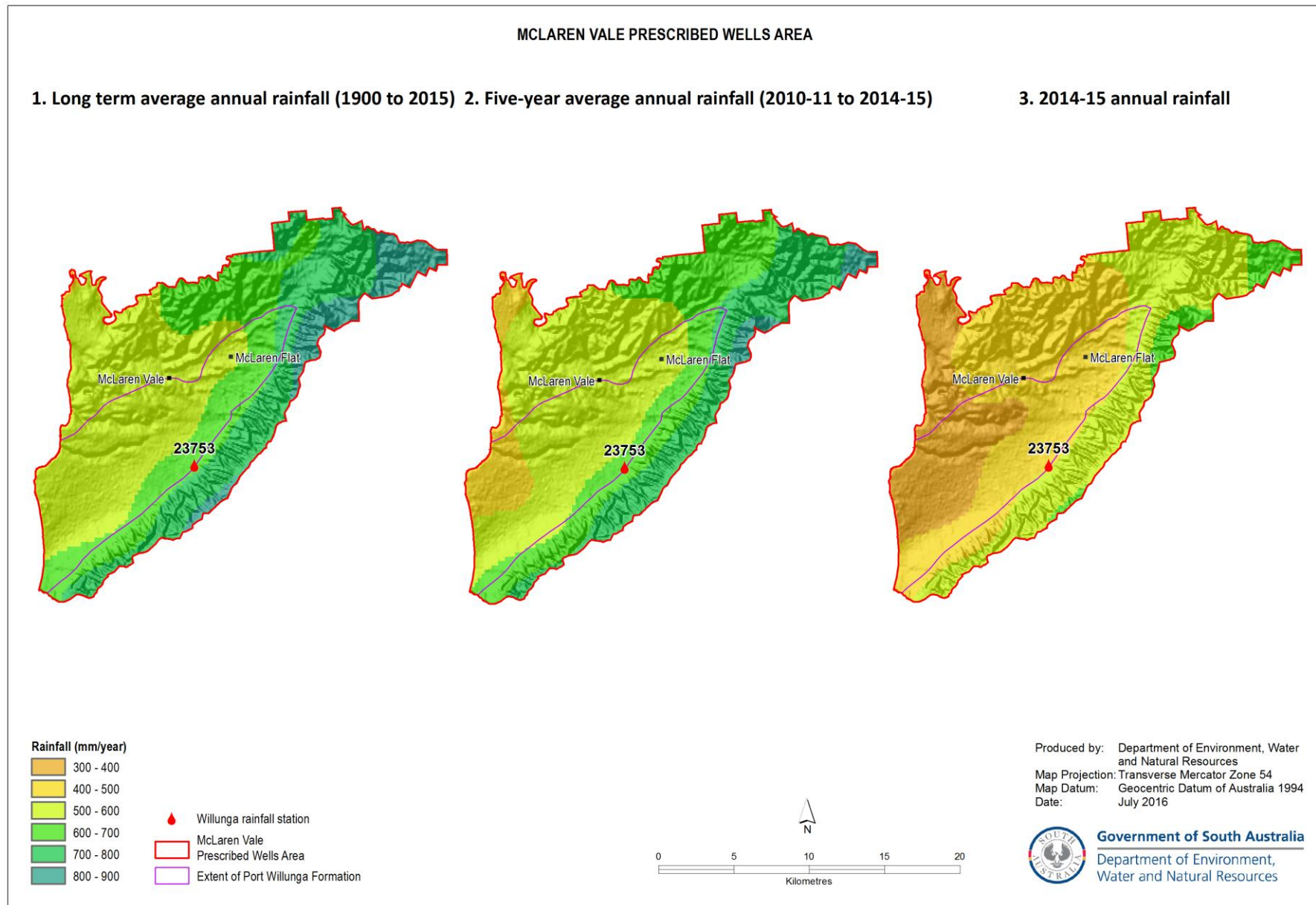


Figure 1. (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall for the 2014–15 water-use year in the McLaren Vale Prescribed Wells Area²

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.

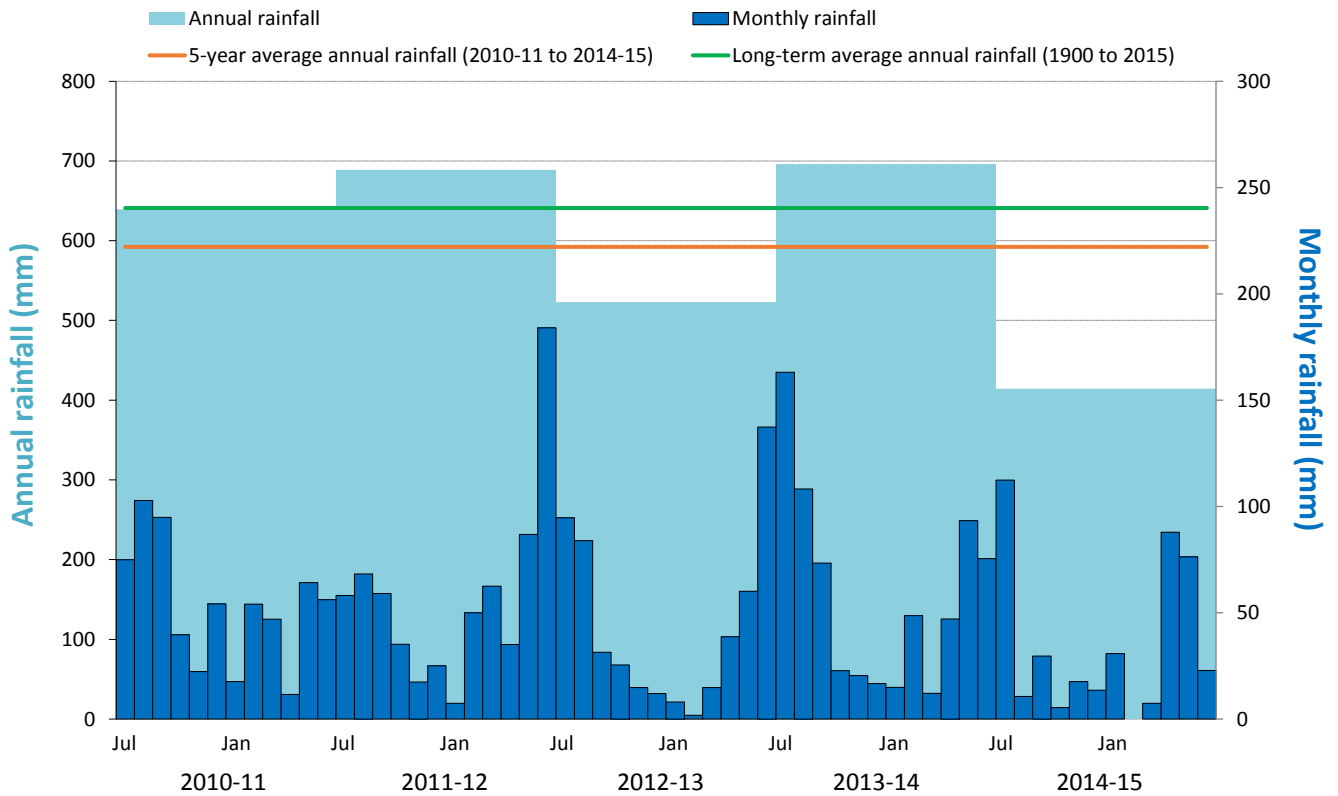


Figure 2. Annual (July–June) and monthly rainfall for the past five water-use years, and the five-yearly and long-term average annual rainfall recorded at Willunga (BoM Station 23753)³

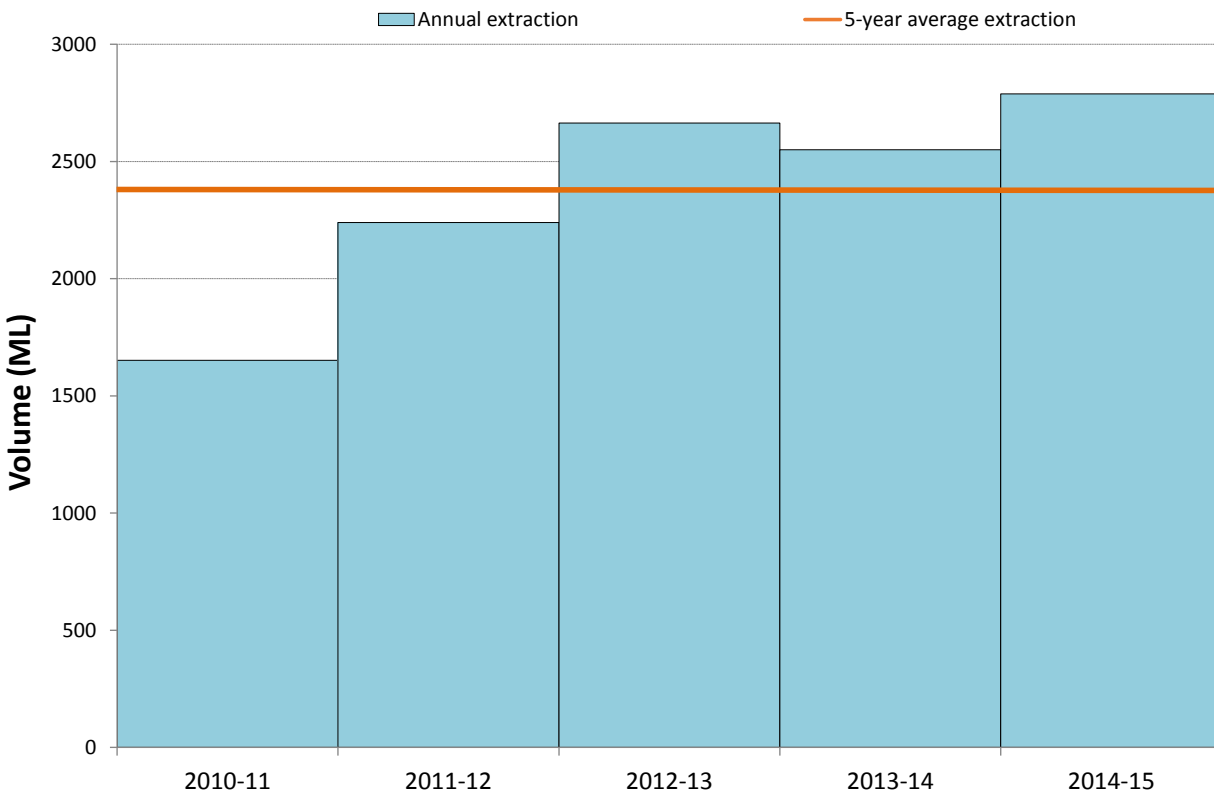


Figure 3. Licensed groundwater extraction volumes⁴ from the Port Willunga Formation aquifer for the past five water-use years

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.

⁴ The licenced groundwater use for the 2014–15 water-use year is based on the best data available as of March 2016 and could be subject to change, as some extraction volumes may be in the process of being verified.

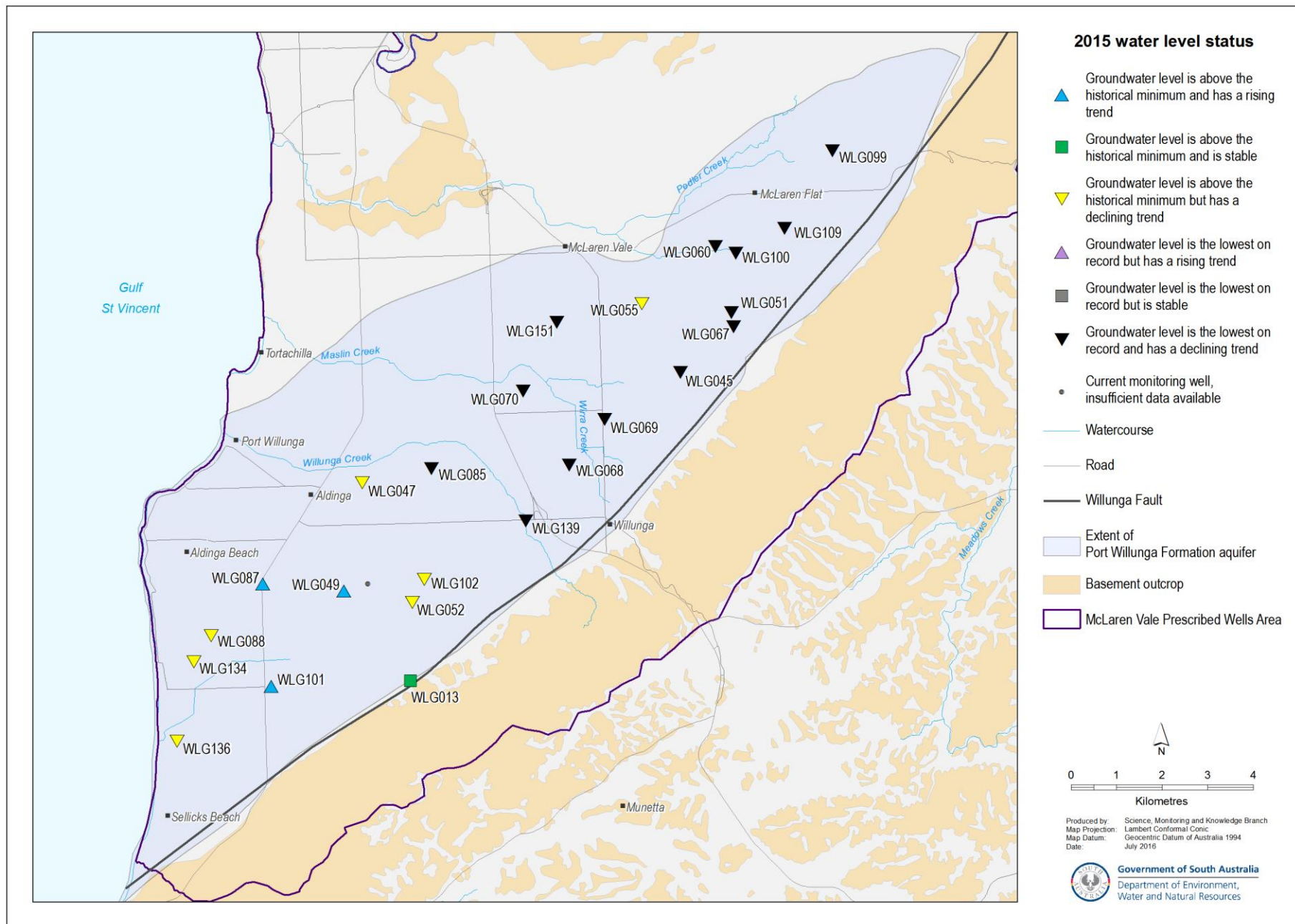


Figure 4. 2015 status of the water level in the Port Willunga Formation aquifer (McLaren Vale Prescribed Wells Area) based on the five-year groundwater level trend from 2011 to 2015

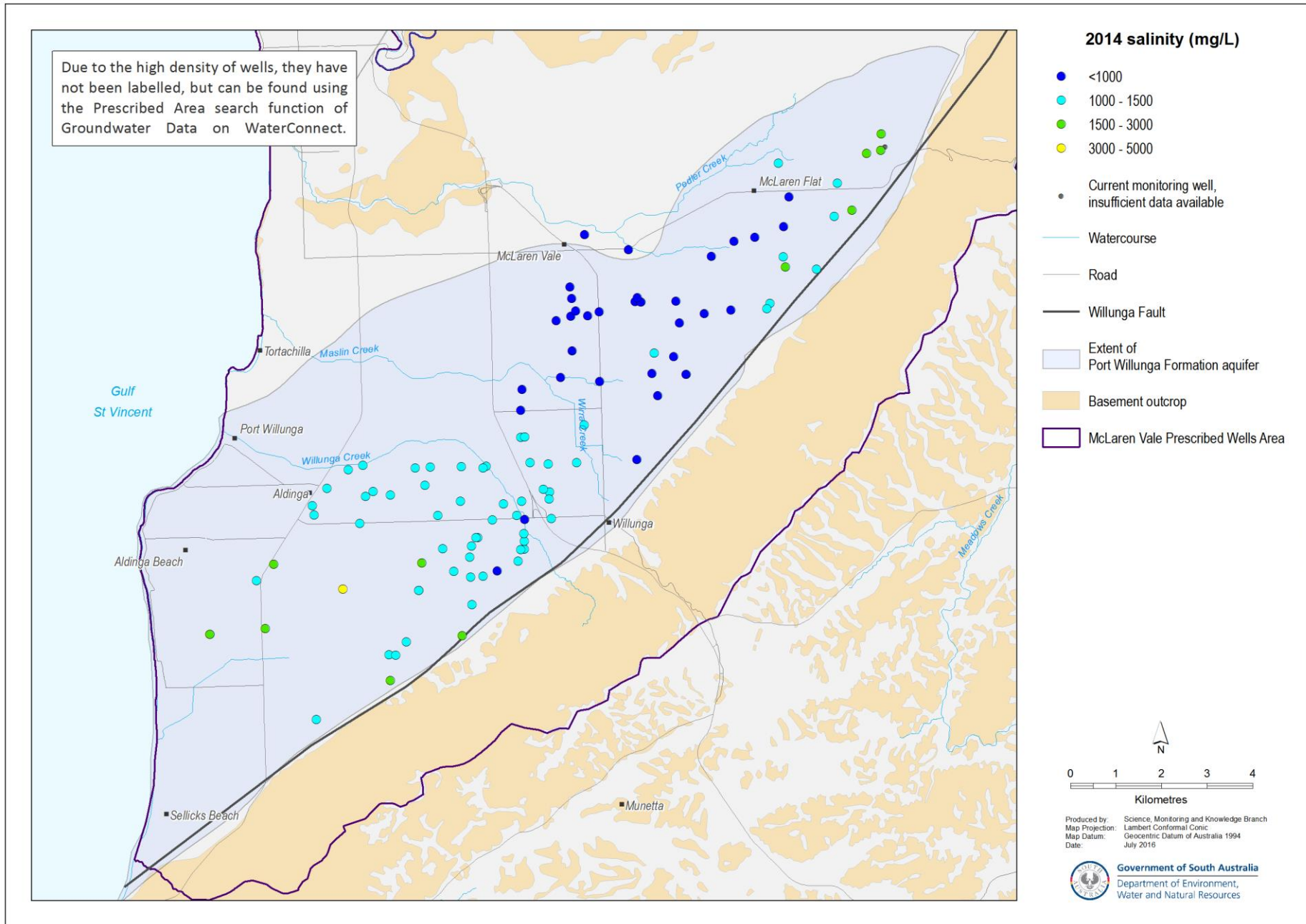


Figure 5. 2014 groundwater salinity of the Port Willunga Formation aquifer (McLaren Vale Prescribed Wells Area)

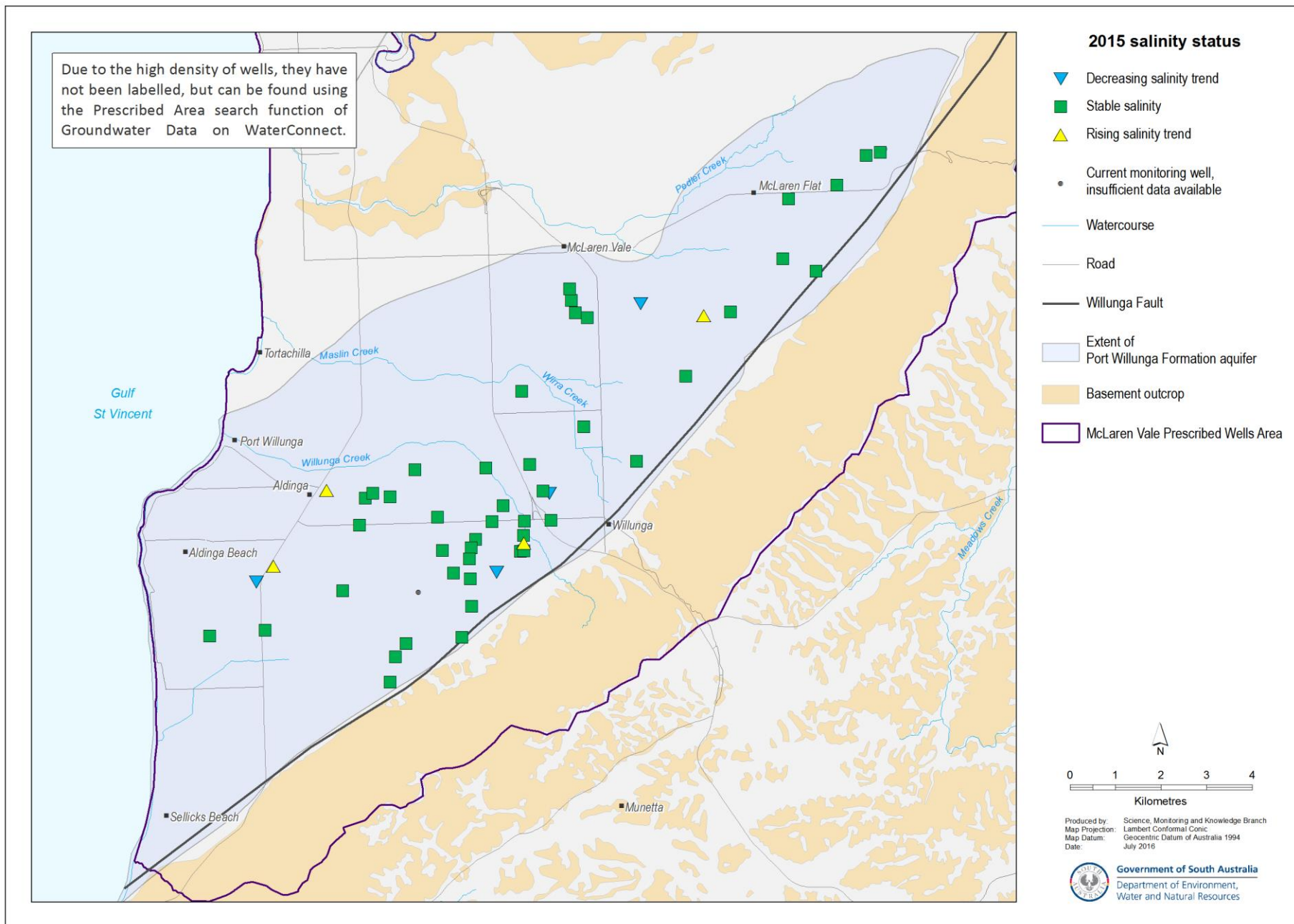


Figure 6. 2015 status of groundwater salinity in the Port Willunga Formation aquifer (McLaren Vale Prescribed Wells Area) based on the five-year trend from 2010 to 2014

