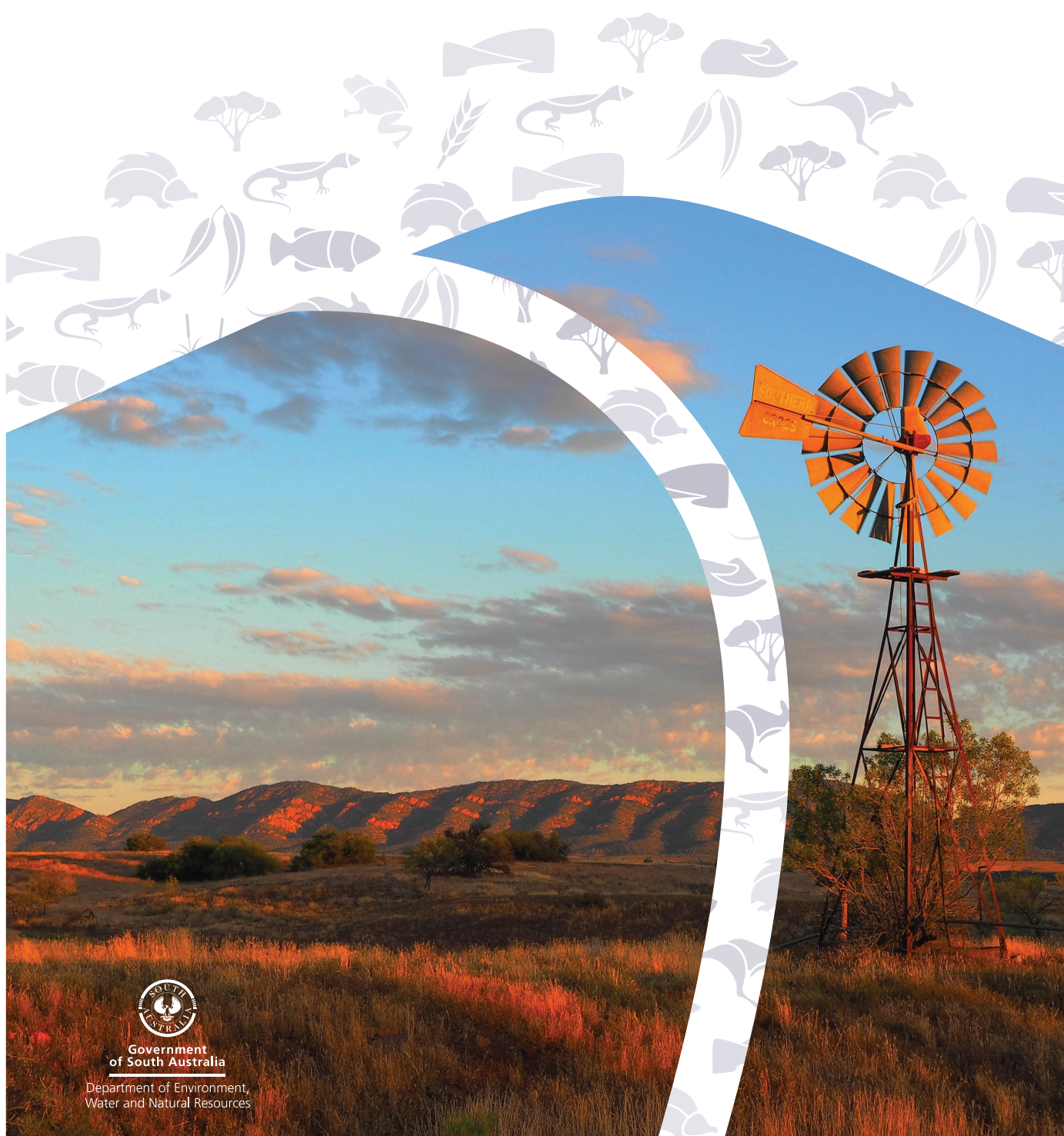


Mallee PWA

Murray Group Limestone aquifer

2016 Groundwater level and salinity status report



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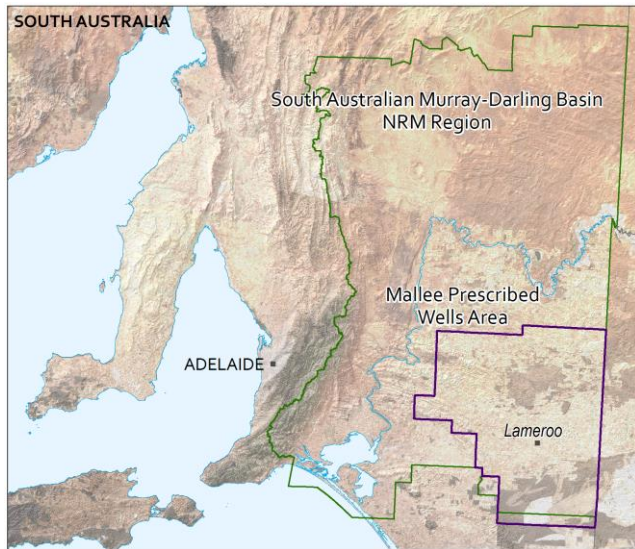
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Regional setting



The Mallee Prescribed Wells Area (PWA) is located around 150 km east of Adelaide in the South Australian Murray-Darling Basin Natural Resources Management Region and is underlain by sediments of the Murray Basin. It is a regional-scale resource for which groundwater resources are prescribed under the South Australia's *Natural Resources Management Act 2004*. A water allocation plan provides for the sustainable management of the groundwater resources.

There are three main aquifers in the Mallee PWA, namely the confined Renmark Group aquifer, the semi-confined Murray Group Limestone (MGL) aquifer and the unconfined Pliocene sands aquifer. The MGL aquifer, which is the focus of this report, comprises a consolidated, highly fossiliferous, fine to coarse, bioclastic limestone that has an average thickness of around 100 m. The MGL aquifer is recharged in south-west Victoria (broadly to the south-east of the

Mallee PWA), with groundwater movement away from the recharge area in directions towards the north, north-west and west of the Mallee PWA. All licensed groundwater extractions in the Mallee PWA are from the MGL aquifer, towards the north-east of the PWA where the aquifer is primarily confined.

The intensity and timing of rainfall and subsequent extraction practices can have an effect on groundwater levels and salinity in the MGL aquifer. For example, if the region experienced above-average rainfall during typically dry summer months, this could result in less groundwater being extracted from the aquifer for irrigation and therefore smaller declines (or possibly increases) in groundwater pressure levels and stable or decreasing salinity.

2016 Status

The Murray Group Limestone aquifer of the Mallee PWA 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 Murray Group Limestone aquifer is based on:

- most monitoring wells (71%) show a five-year trend of rising or stable groundwater pressure levels
- all monitoring wells show stable salinities over the past five-years.

Rainfall

The Pinnaroo rainfall station (BoM Station 25015) is located within the Mallee PWA and recorded 270 mm of rainfall in the 2015–16 water-use year (July to June). This is 19% less than long-term average annual rainfall (1900 to 2016) of 334 mm, 11% less than the five-year average annual rainfall of 304 mm (2011–16) and 2% less than the previous year rainfall of 275 mm (Figs 1 and 2). Monthly rainfall data show that June and July are above their respective long-term monthly average rainfall, but the remaining months are below their long-term average.

Water use

In 2015–16, licensed extractions totalled 32,697¹ ML, a decrease of 5% from the previous water-use year and 2% less than the five-year average of 33,318 ML (Fig. 3). Rates of extraction show a negative correlation with rainfall (Figs 2 and 3).

Groundwater pressure levels

In the five years to 2016, from a total of 69 monitoring wells, 36 wells (52%) show a trend of rising groundwater pressure levels and 14 wells (20%) show stable pressure levels. Rises in pressure levels ranged between 0.03 and 1.45 m/y, with a median of 0.31 m/y (Fig. 4). The remaining 19 monitoring wells (28%) show a trend of declining groundwater pressure levels. It should be noted that 10% of all monitoring wells show their lowest level on record in 2016. Rises and falls in groundwater level in wells that are in close proximity to one another reflect changes in the location and intensity of irrigation extractions due to the practice of crop rotation.

Groundwater salinity

In 2016, salinities ranged between 626 and 3460 mg/L, with 39% of the 28 monitored wells showing salinities of less than 1500 mg/L (Fig. 5). These wells are mostly located around Lamerloo, Parilla, Pinnaroo and Peebinga. As groundwater is an important source of water in the Mallee PWA, increases in salinity may pose a risk to industries that rely on low-salinity groundwater. In the five years to 2016, all monitoring wells show stable salinity (Fig. 6).

¹ The licensed groundwater use and managed aquifer recharge volumes for the 2015–16 water-use year are based on the best data available as of February 2017 and may be subject to change, as some extraction volumes are in the process of being verified.

Groundwater condition limits

The Water Allocation Plan (WAP) for the Mallee PWA has identified resource condition limits for the MGL aquifer that apply to the Designated Border Zones and the Parilla Red Management Area. These limits are designed to give early warning of adverse trends in groundwater pressure levels and salinity that may impact on users of the resource.

Water pressure levels: As stated in the WAP, each year groundwater levels need to recover to within a prescribed threshold water level, relative to the previous year's maximum recovered water level. If this threshold is not reached for two consecutive years, in more than 50% of monitoring wells within each zone or area, then an investigation is triggered. The threshold recovery levels vary for each zone and area: 65 cm for Border Zones 9A and 11A (Hundred McGorriery and Hundred Peebinga); 50 cm for Border Zone 10A; and 25 cm for the Parilla Red Management Area (outside Designated Area). In 2015–16, recovery to within the threshold water levels has occurred for more than 50% of wells in all zones (Table 1) and as such, the resource conditions limits have not been exceeded.

Table 1. Groundwater pressure level condition limits for the Mallee PWA for 2014–15 and 2015–16

Management Area or Border Zone	No. ObsWells	2014–15		2015–16	
		Did not recover to within threshold	Recovered to within threshold	Did not recover to within threshold	Recovered to within threshold
9A	1	0%	100%	0%	100%
10A	22	5%	95%	5%	95%
11A-MCG	8	0%	100%	0%	100%
11A-PEB	10	0%	100%	10%	90%
Parilla Red M.A.	9	44%	56%	11%	89%

Salinity: As stated in the WAP, if the rate of increase in groundwater salinity in the MGL confined aquifer measures greater than 2% per year for five consecutive years, across at least 50% of monitoring wells, then an investigation is triggered. In 2015–16, half of all salinity monitoring wells have not shown five consecutive years of salinity increases greater than 2%, which indicates that the resource conditions limits have not been exceeded.

More information

To determine the status of the MGL aquifer for 2016, the trends in groundwater levels and salinities 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 *Mallee 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 download groundwater level and salinity data from monitoring wells within the Mallee PWA, please visit the *Groundwater Data* page under the Data Systems tab on [WaterConnect](#).

For further details on the Mallee PWA, please see The Water Allocation Plan for the Mallee Prescribed Wells Area on the Natural Resources SA Murray-Darling Basin [website](#).

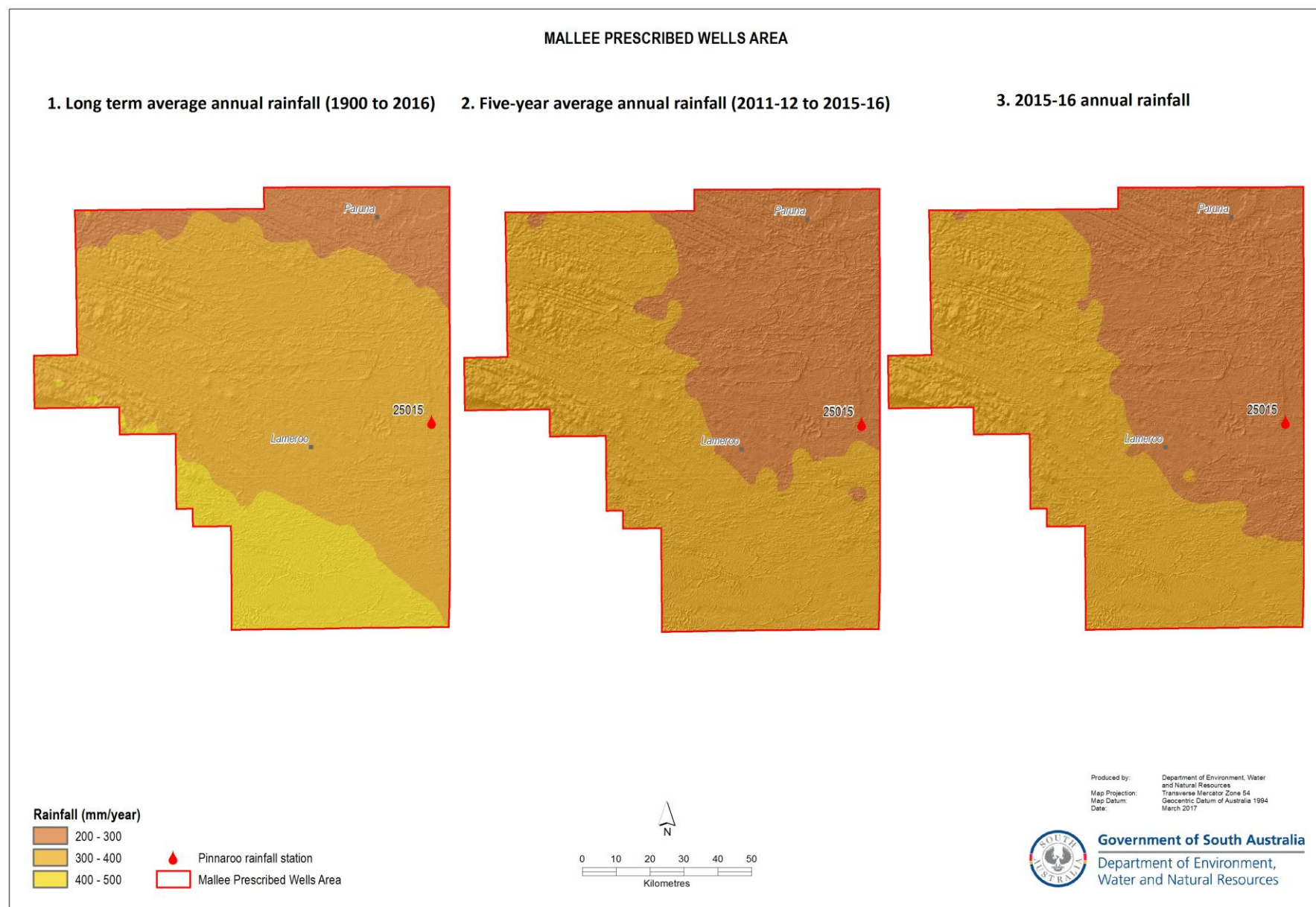


Figure 1. (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall for the 2015–16 water-use year in Mallee PWA²

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.

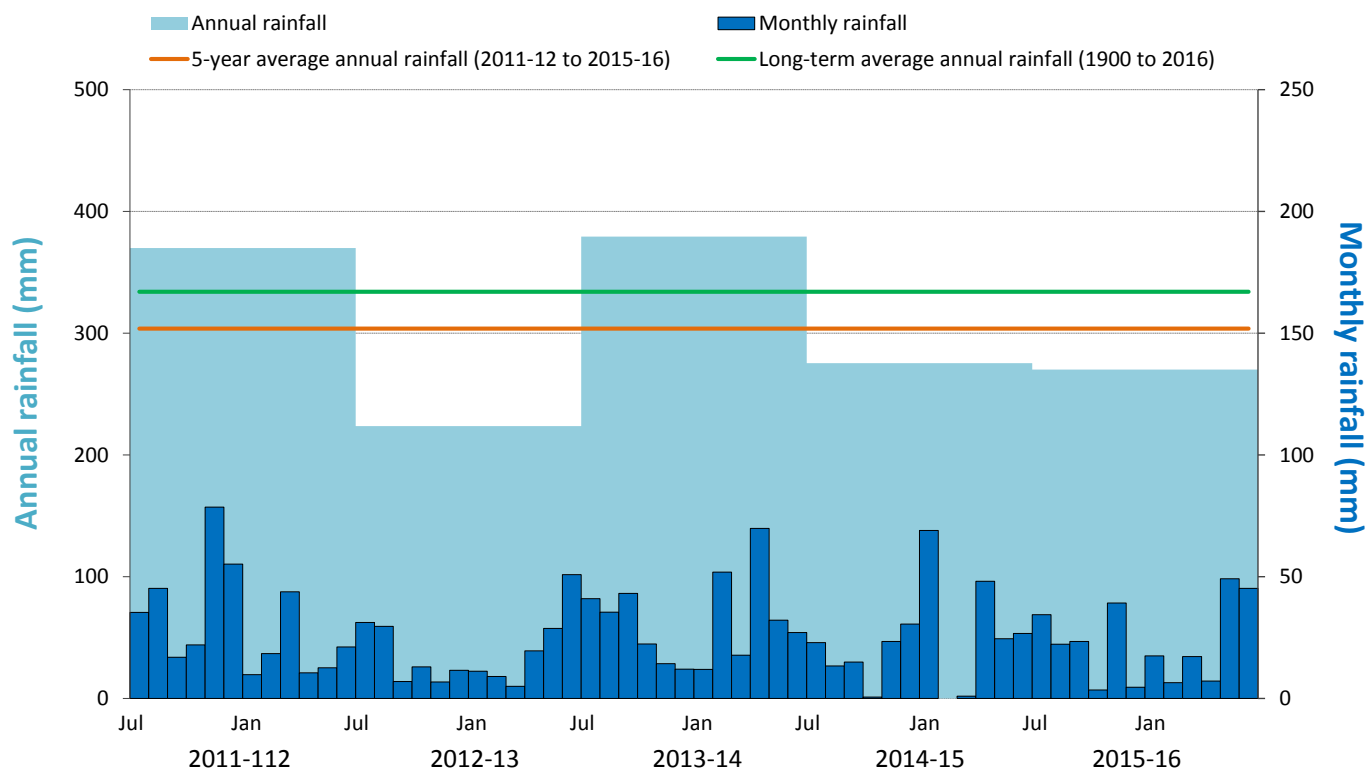


Figure 2. Annual (July–June) and monthly rainfall for the past five water-use years, and the five-year and long-term average annual rainfall recorded at Pinnaroo (BoM Station 25015)³

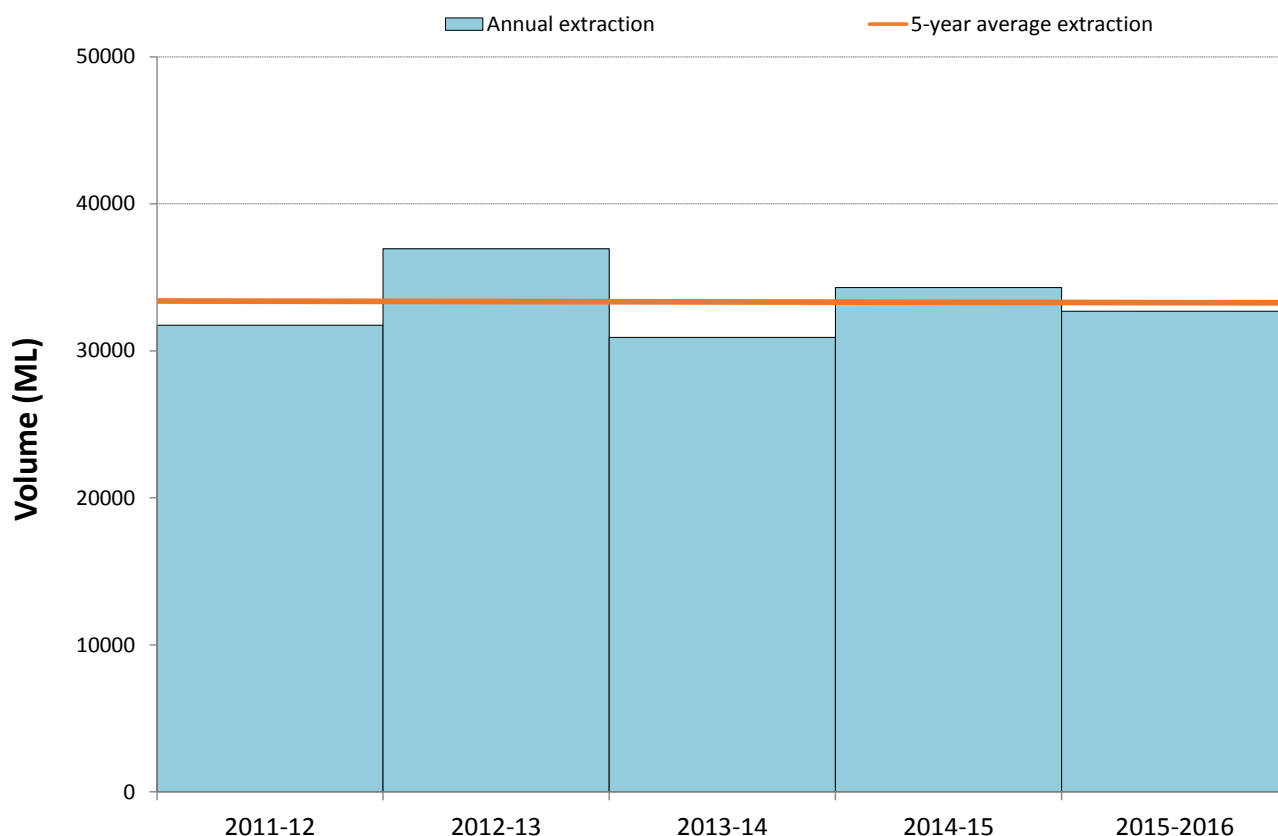


Figure 3. Licensed groundwater extraction volumes⁴ for the past five water-use years, for the Murray Group Limestone aquifer (Mallee PWA)

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 licensed groundwater use volumes for the 2015–16 water-use year are based on the best data available as of February 2017 and may be subject to change, as some extraction volumes are in the process of being verified.

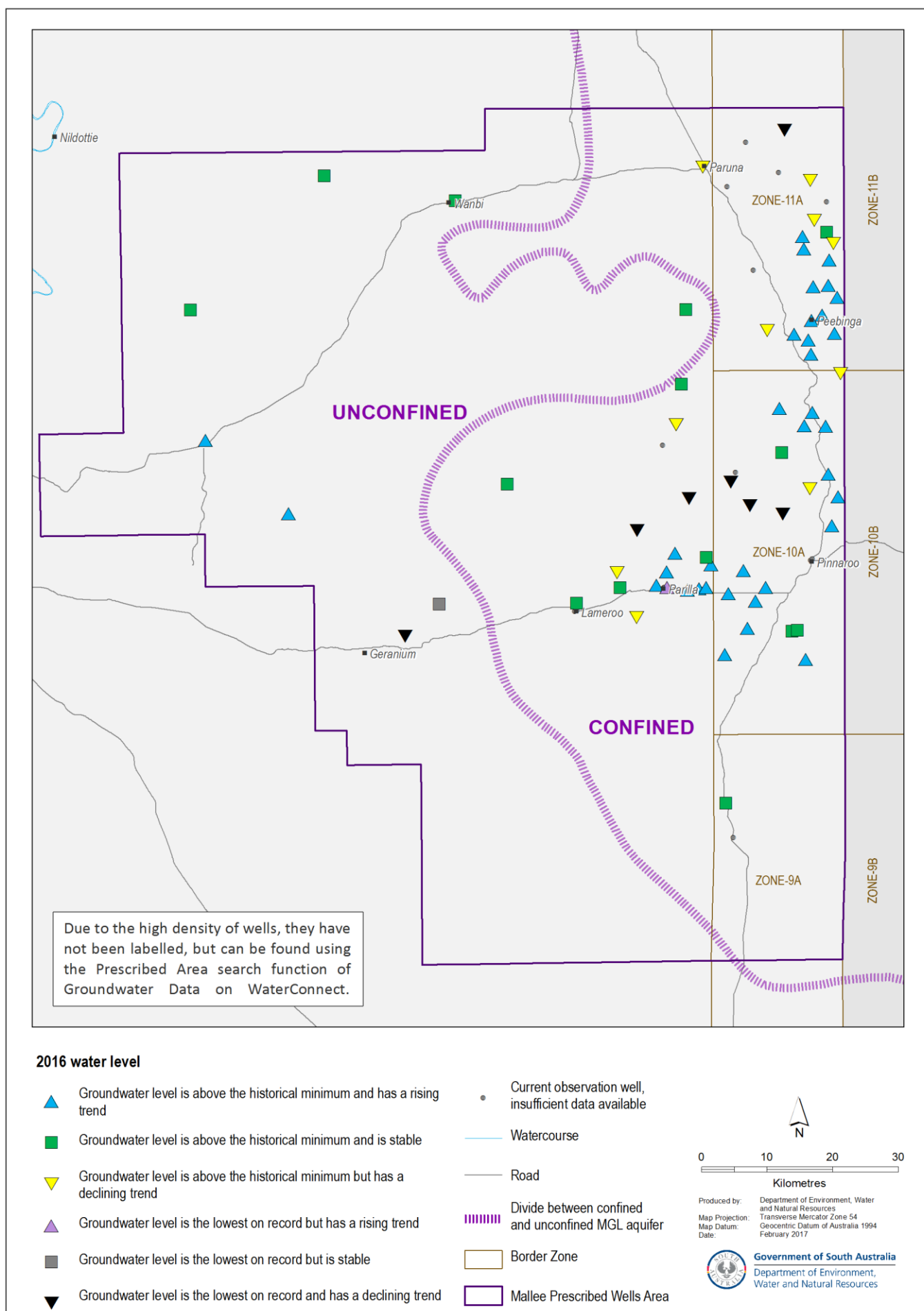


Figure 4. 2016 status of the groundwater levels in the Murray Group Limestone aquifer (Mallee PWA), based on the five-year trend from 2012 to 2016

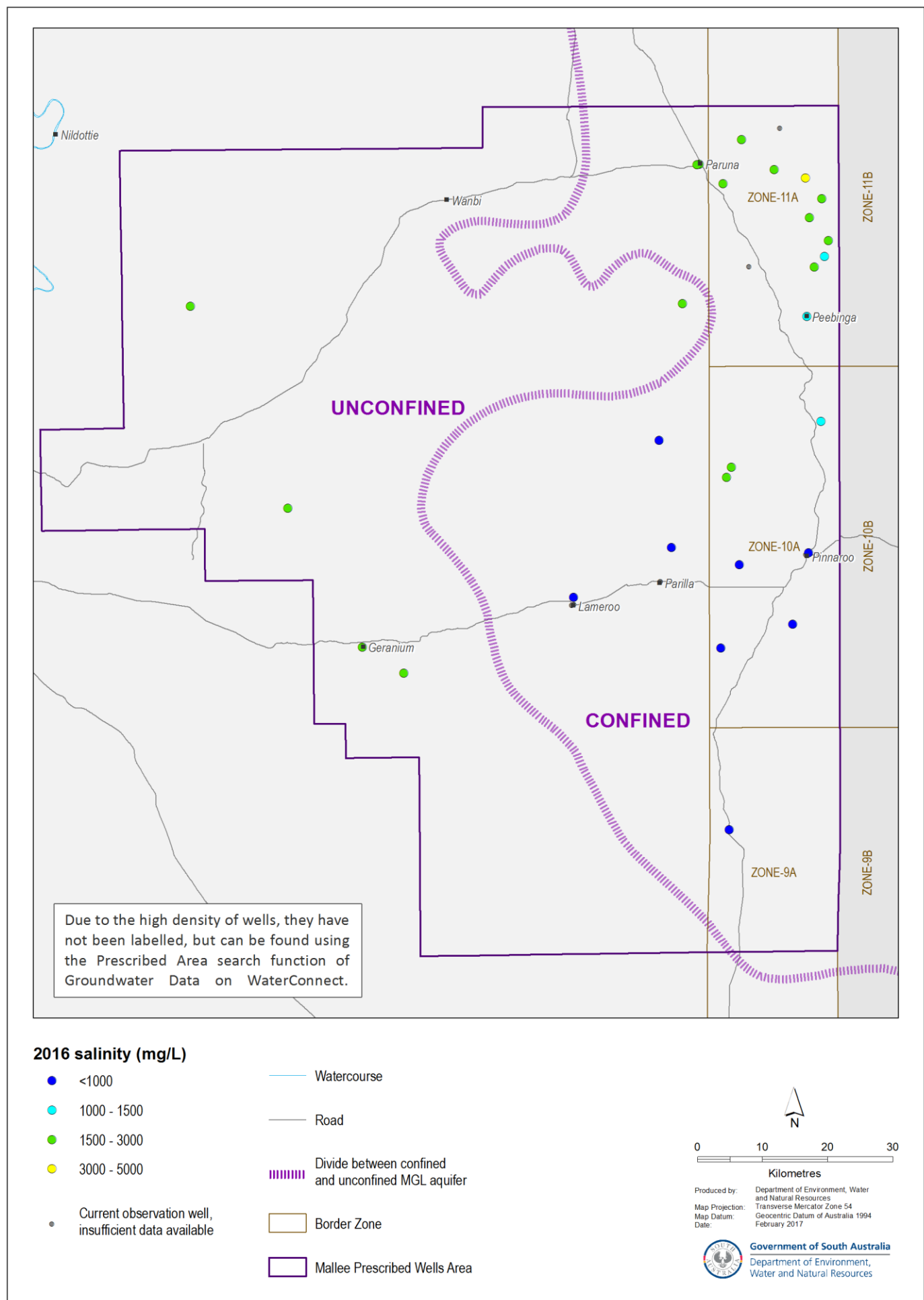


Figure 5. 2016 groundwater salinity of the Murray Group Limestone aquifer (Mallee PWA)

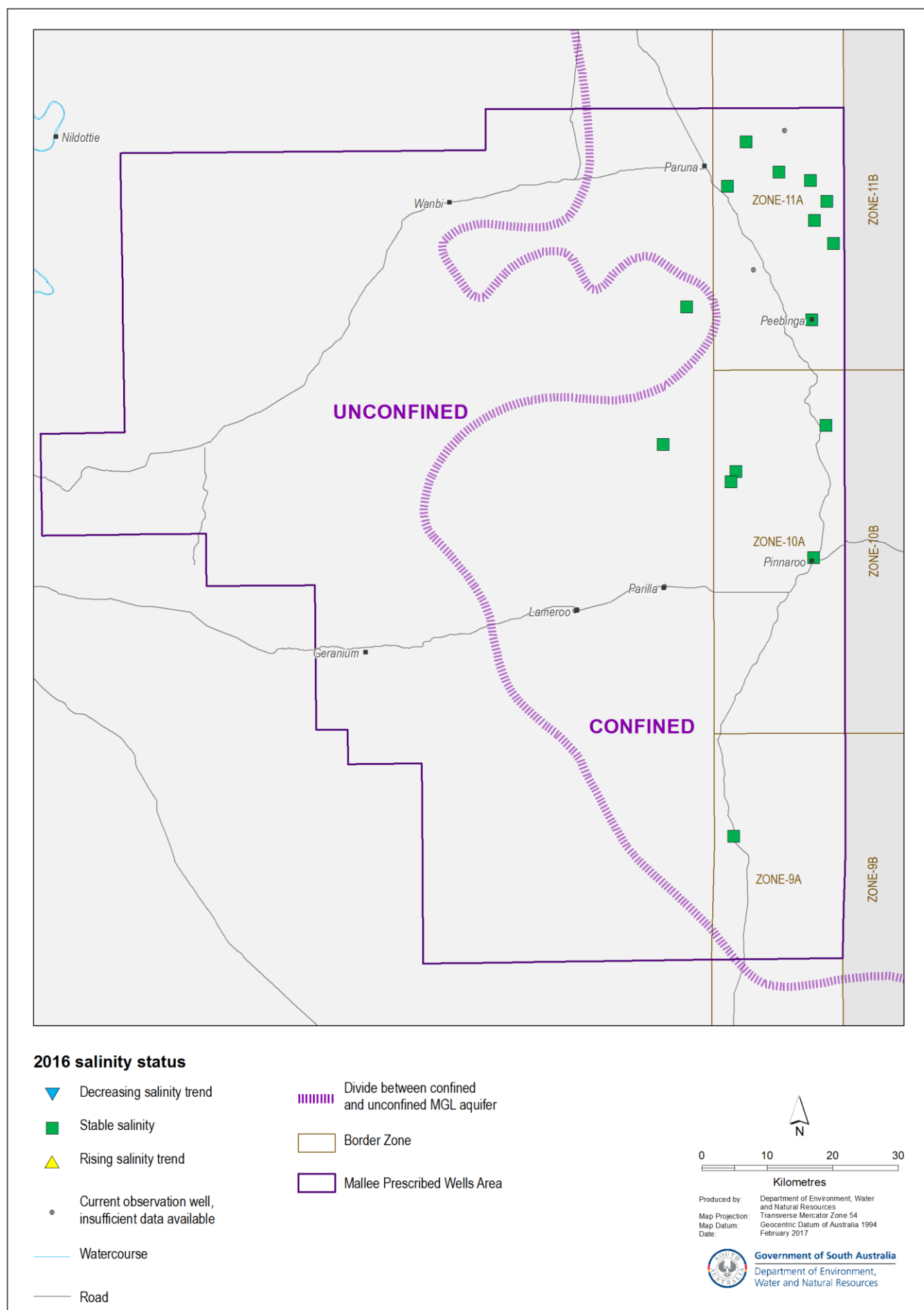


Figure 6. 2016 status of salinity in the Murray Group Limestone aquifer (Mallee PWA), based on the five-year trend from 2012 to 2016



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