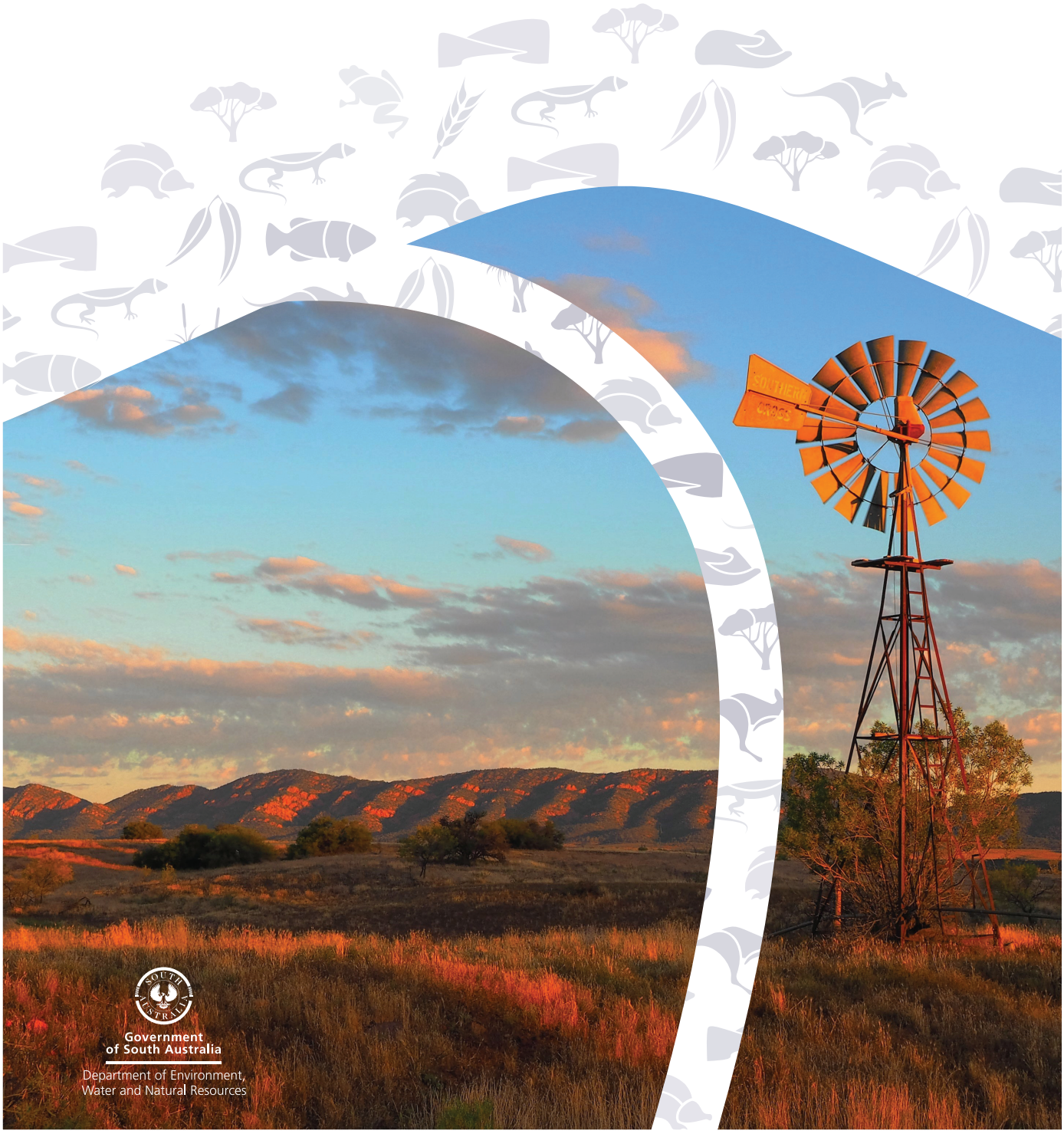
Musgrave PWA
Polda

2016 Groundwater level and salinity status report



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

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	

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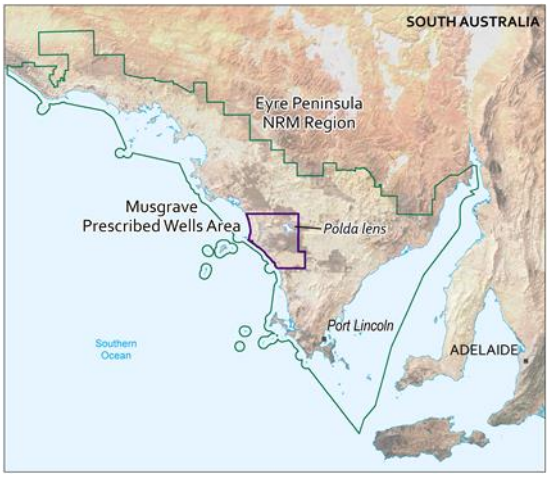
Regional setting



Within the Eyre Peninsula Natural Resources Management Region, the Musgrave Prescribed Wells Area (PWA) is located approximately 120 km north-west of the township of Port Lincoln. It is prescribed under the *Natural Resources Management Act 2004* and a water allocation plan provides for the sustainable use of the groundwater resources. The Polda fresh groundwater lens (herein "Polda") is situated in the north-east of the Musgrave PWA.

Within the Musgrave PWA, there are three main sedimentary sequences containing groundwater that overlie basement rocks: the Quaternary limestone aquifer, the underlying Tertiary sands aquifer, and deeper Jurassic sediments that reside within the Polda Trough. The Quaternary limestone aquifer is the focus of this report and comprises a generally thin veneer of aeolianite sediments of the Bridgewater Formation and is continuous across the PWA. The main source of recharge to the Quaternary limestone aquifer is the direct infiltration of local rainfall and groundwater flow is predominantly in a westerly to south-westerly direction toward the Southern Ocean.

Groundwater levels and salinites in the Musgrave PWA are highly responsive to recharge from rainfall and trends in groundwater level or salinity are primarily climate driven: below-average rainfall results in a reduction in recharge to the aquifers. Below-average summer rainfall can also result in increasing extractions, and these two elements can cause the groundwater levels to fall and salinities to increase. Conversely, above-average rainfall can result in increases in recharge, decreases in extractions and groundwater levels may rise and salinities may stabilise or decline. Historical rainfall data indicate that trends of above or below-average rainfall can last for up to 25 years, and that high-intensity rainfall can result in greater and more-rapid water level (i.e. recharge) responses.

2016 Status

Polda, in the Musgrave 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 Polda is based on:

- most monitoring wells (97%) show a five-year trend of rising or stable groundwater levels
- most monitoring wells (87%) show a five-year trend of decreasing or stable salinity.

Rainfall

The Lock (Terrah Winds) rainfall station (BoM Station 18165), which is located to the south-east of Polda, recorded 430 mm of rainfall in 2015–16 water-use year. This is 14% greater than the long-term annual average rainfall of 376 mm (1900–2016) and 9% greater than the five-year average of 395 mm (Figs 1 and 2). In the 2015–16 water use year, the months of October and December recorded rainfall markedly lower than their respective long-term monthly average, while August, November and June recorded rainfall considerably above their long-term monthly average (Fig. 2). There appears to be a trend of increasing rainfall in the west and south-western parts of the PWA when comparing 2015–16 rainfall with five-year and long-term average annual rainfall (Fig. 1).

Water use

Within Polda, licensed extractions occur from the fresh groundwater lens within the Quaternary limestone aquifer. In 2015–16, metered licensed extractions from Polda totalled 600 kL, which is consistent with the extraction volumes recorded over the past four water-use years and 30% less than the five-year average extraction of 859 kL (Fig. 3).

Groundwater levels

In the five years to 2016, 34 monitoring wells (97%) within Polda monitoring network show a trend of rising or stable groundwater levels. Rates of rise in groundwater levels range between 0.01 and 0.11 m/y with a median of 0.07 m/y. Only one well shows a declining trend of 0.01 m/y, and is located west of the township of Palkagee (Fig. 4).

Groundwater salinity

In 2016, monitoring wells within Polda network show salinities ranging between 400 and 13,600 mg/L, 27 of which (87%) measure less than 3000 mg/L, with a median of 854 mg/L. The remaining four wells show salinities greater than 3000 mg/L and are located west and north of Polda (Fig. 5).

In the five years to 2016, 26 of 30 wells (87%), show a trend of decreasing or stable salinity (Fig. 6). Rates of decrease in salinity range from 16 to 357 mg/L/y with a median of 27 mg/L/y. The remaining four wells (13%) show a rising trend at rates ranging from 36 to 120 mg/L/y and these wells are located generally west of Polda in an area of naturally high groundwater salinity.

More information

To determine the status of Polda for 2016, the trends in groundwater levels and salinities over the past five years (2012 to 2016, 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.

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

To view the *Musgrave Prescribed Wells Area 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 monitoring wells within the Musgrave PWA, please visit Groundwater Data on WaterConnect.

For further details about the Musgrave PWA, please see the *Water Allocation Plan for the Southern Basins and the Musgrave Prescribed Wells Areas* on the Eyre Peninsula Natural Resources website.

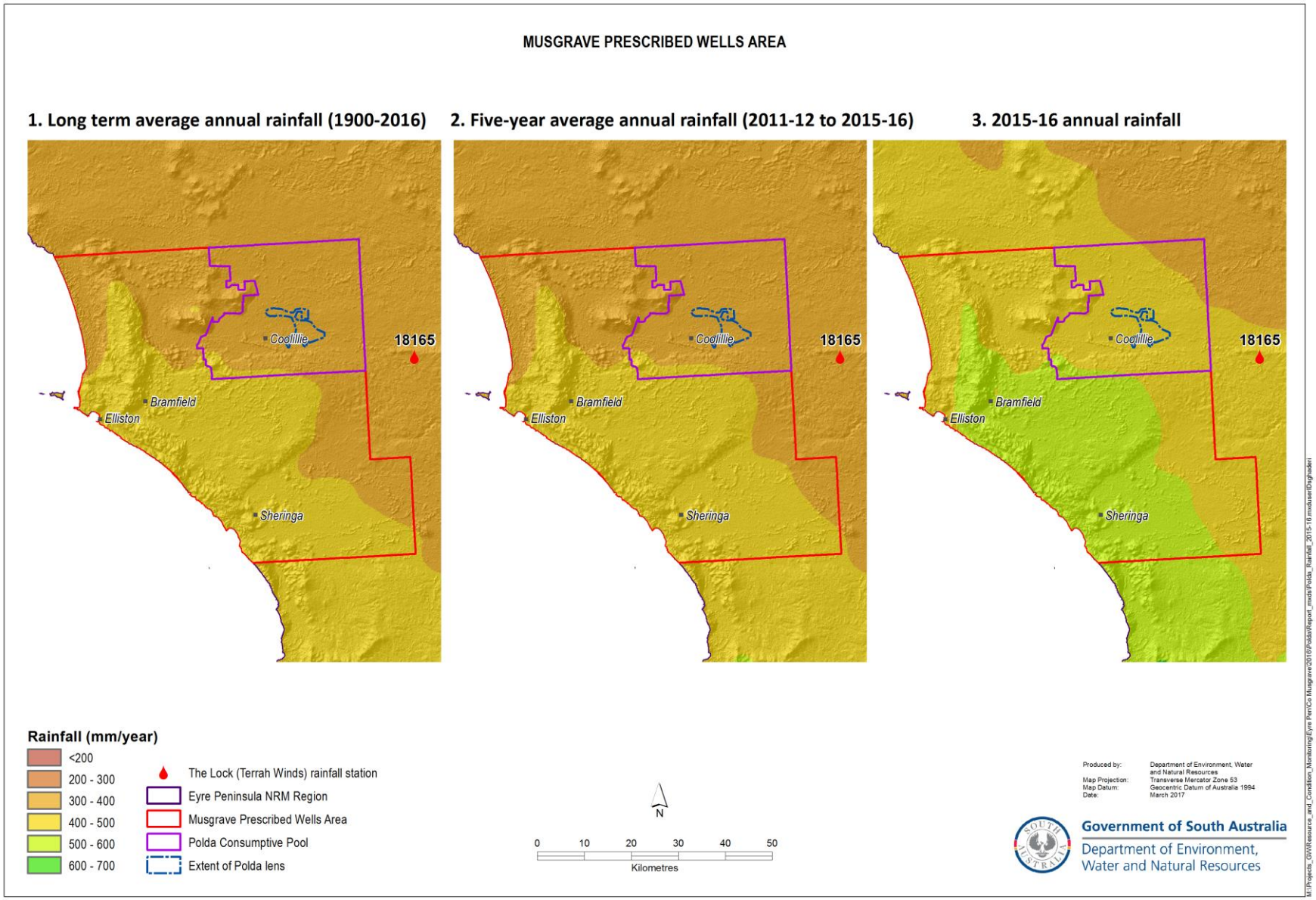


Figure 1. (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall for the 2015–16 water-use year in the Musgrave PWA[1]

[1] 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.

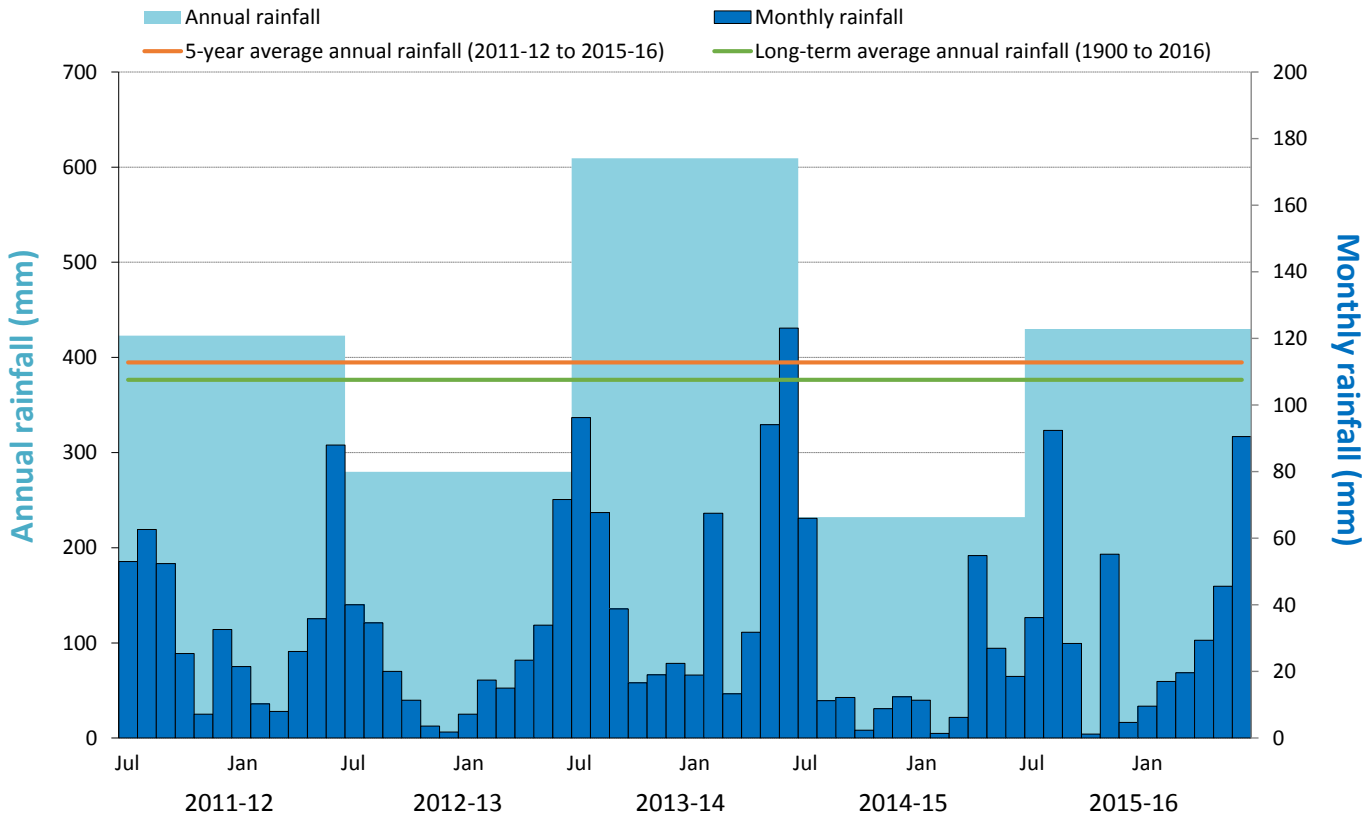


Figure 2. Annual (July–June) and monthly rainfall for the past five water-use years, and the five-year and long-term average annual rainfall recorded at Terrah Winds (BoM Station 18165)[2]

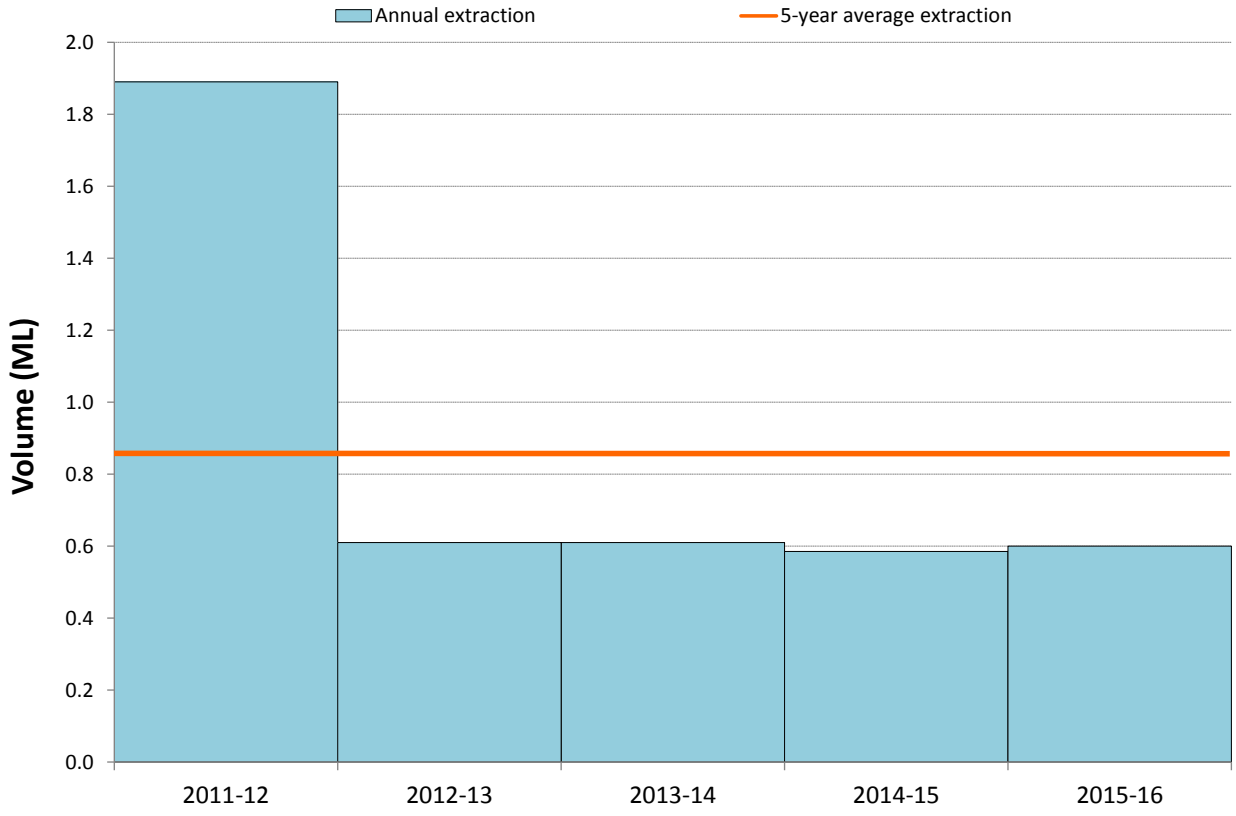


Figure 3. Licensed groundwater extraction volumes for the past five water-use years, from Polda in the Musgrave PWA

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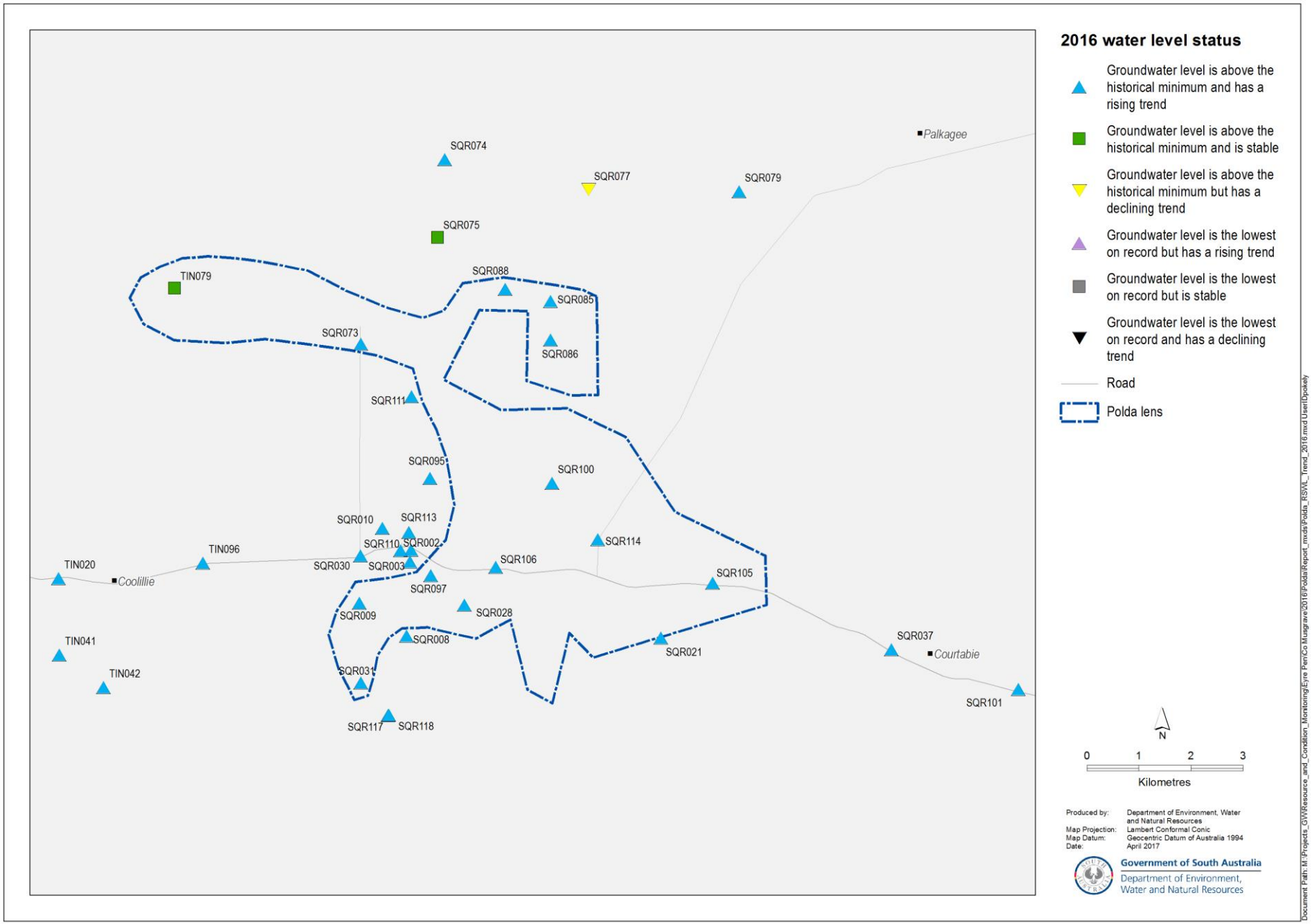

Figure 4. 2016 status of groundwater levels in Polda (Musgrave PWA), based on five-year trends from 2012 to 2016

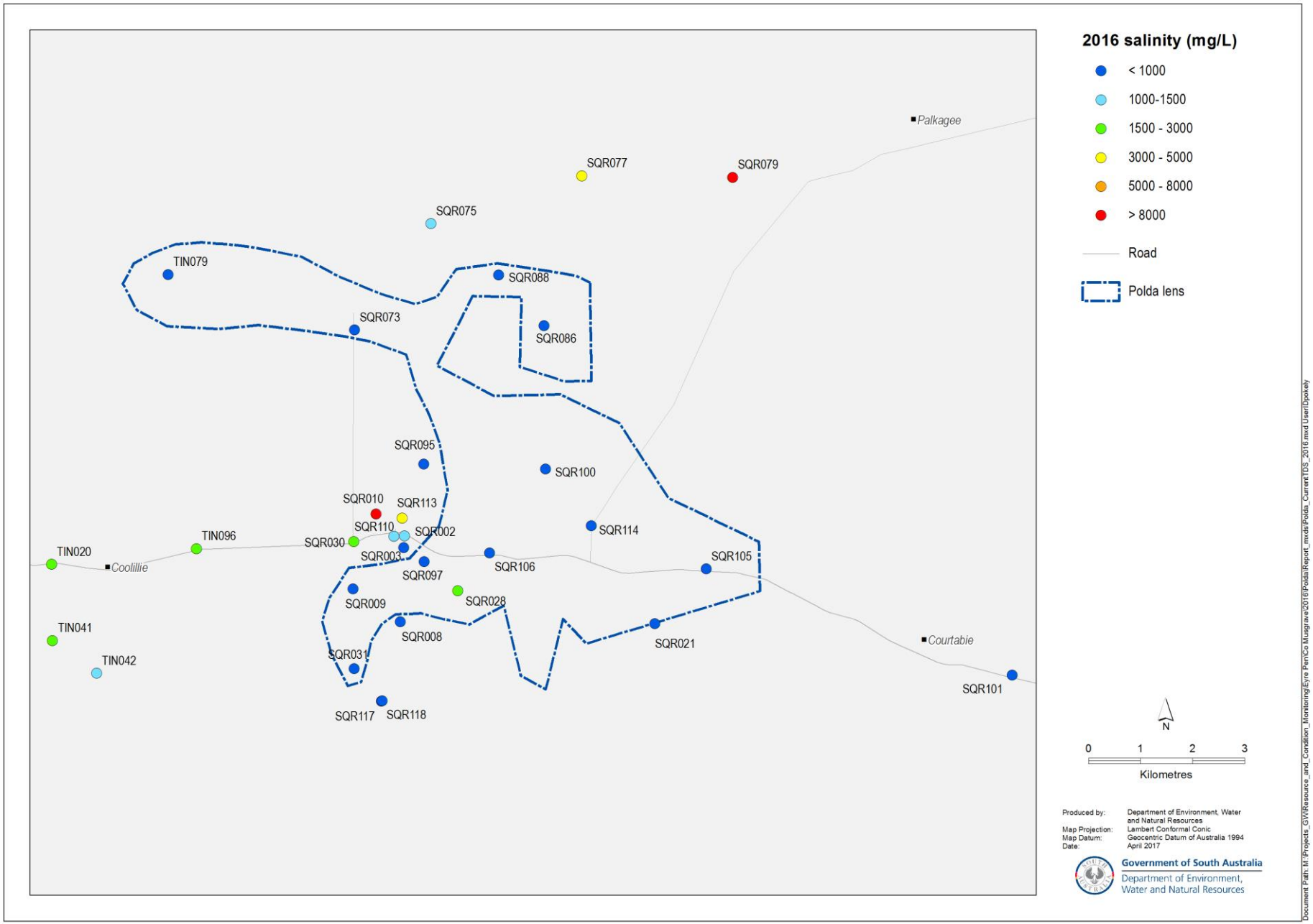

Figure 5. 2016 groundwater salinity of Polda (Musgrave PWA)

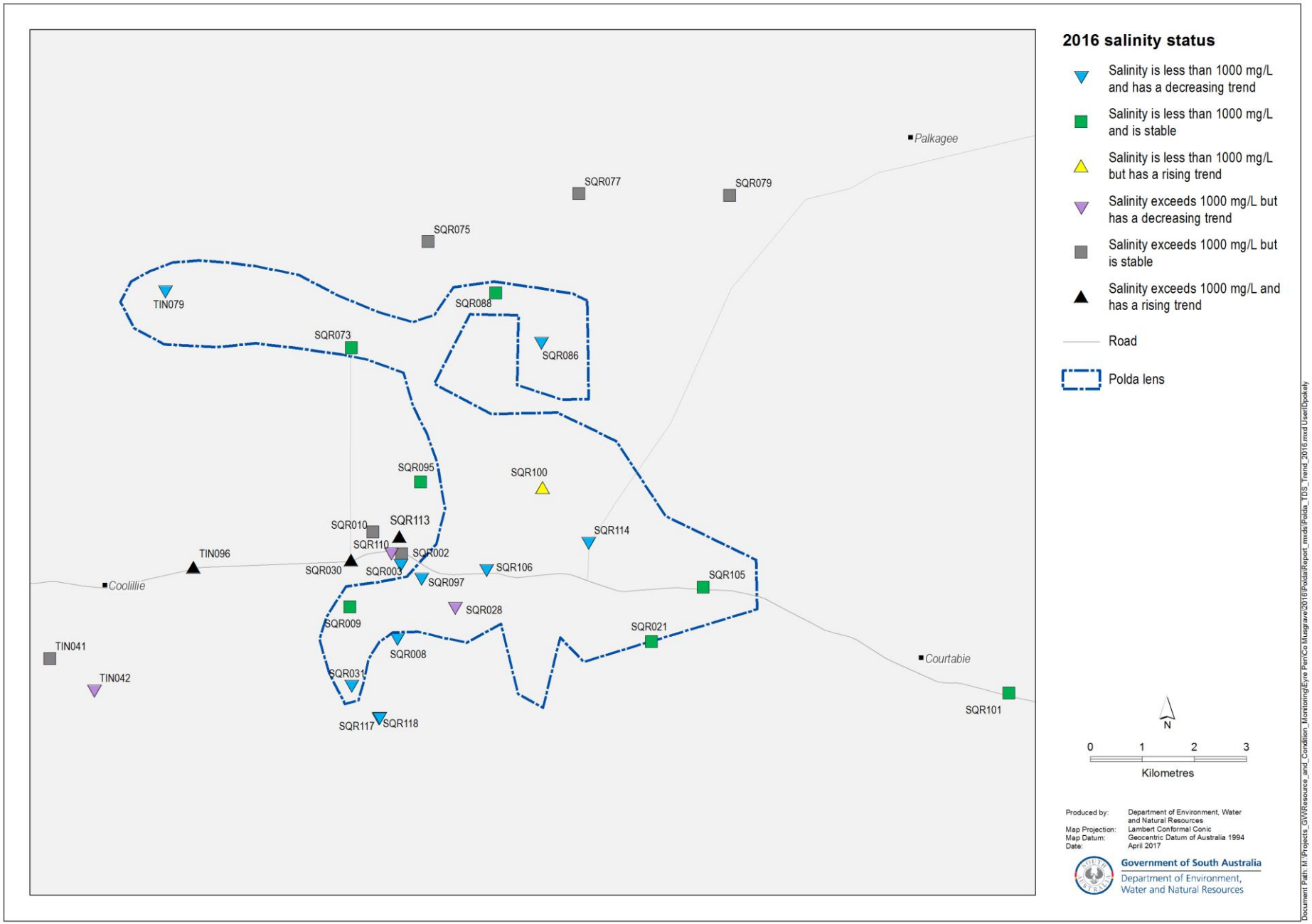

Figure 6. 2016 status of groundwater salinity in Polda (Musgrave PWA), based on five-year trends from 2012 to 2016

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