1 Introduction

1.1 Context and overview

This *National performance report 2020–21: urban water utilities* (2021 Urban NPR) supports the commitments made by states and territories under the National Water Initiative (NWI) to report publicly and independently on the performance of water utilities.[2]

The 2021 Urban NPR compares the performance of 81 utilities and councils (utilities) and 5 bulk water authorities providing urban water and sewerage services to over 23 million people across Australia. It is produced by the Bureau of Meteorology (the Bureau) in conjunction with state and territory governments and the Water Services Association of Australia.

Part A of this report provides commentary on and analysis of key indicators that apply to retail and distribution utilities (the major urban centre analysis in Chapter 2 includes performance data for bulk water suppliers). Part B of this report contains data for the full set of 166 indicators that are reported on by urban water utilities and bulk water authorities for all reporting years.

The analysis and commentary provide a context for each indicator, discuss changes in reporting methods, and highlight trends within and/or between different utility groups. The utilities are grouped according to the number of properties they are connected to, as explained in 'A guide to this report'.

The commentary and analysis in this 2021 Urban NPR are not intended to be a comprehensive explanation of every reported indicator. They present some of the more apparent trends or differences between years and utilities. Most of the information is sourced from publicly available sources, such as annual reports, regulatory decisions and utility websites.

1.2 Reporting

The 86 utilities contributing data to the 2021 Urban NPR (including 5 bulk water authorities) are listed in Appendix C. Table 1.1 summarises the utility size groups by jurisdiction.

Seventy-two of the 86 utilities included in this report provide both reticulated water supply and wastewater (sewerage) services. The remaining utilities provide only water supply or sewerage services. In summary, the report includes data for:

- 72 utilities providing water supply and sewerage services
- 5 utilities providing only water supply services
- 4 utilities providing only sewerage services
- 5 bulk water authorities.

Snowy Monaro Regional Council reported for the first time (in the Small size group).

Table 1.1 Utilities reporting in the 2021 Urban NPR by size group and jurisdiction

Jurisdiction	Bulk	Major	Large	Medium	Small	Total
Australian Capital Territory		1				1
New South Wales	2	3	1	13	12	31
Northern Territory			1		1	2
Queensland	2	4	4	5	7	22
South Australia		1				1
Tasmania		1				1
Victoria	1	4	6	5	1	17
Western Australia		1	1		9	11
Total	**5**	**15**	**13**	**23**	**30**	**86**

[2] National Water Initiative clauses 75–76

1.3 Locations of utilities

Figure 1.1 shows the administrative boundaries of all utilities reporting data for the 2021 Urban NPR. Further details about the utilities are available from the relevant utility websites. While SA Water Corporation provides services across South Australia, it does not provide water and wastewater services to all communities, which are also serviced by councils and private entities.[3]

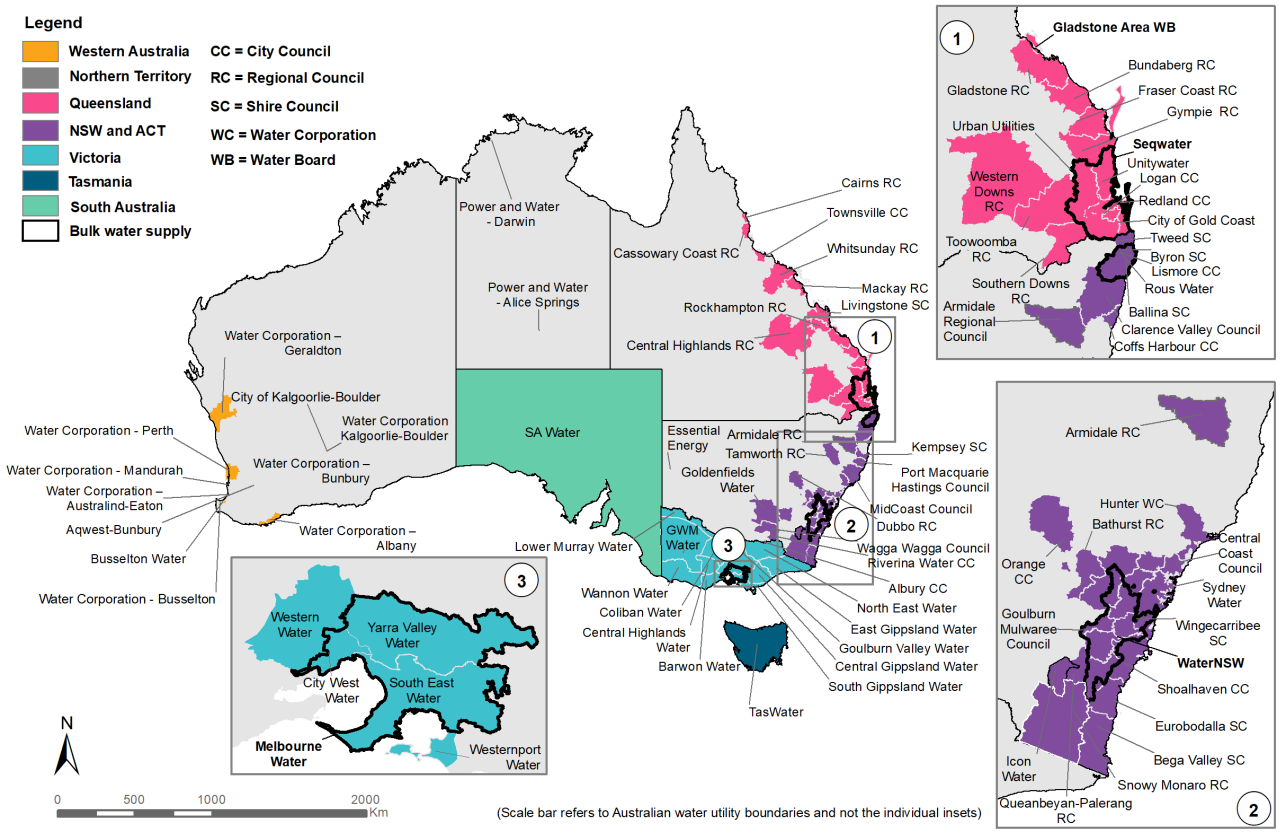

Figure 1.1 The administrative boundaries of all utilities reporting data for 2020–21

1.4 Key drivers

Key drivers of water utility performance presented in the 2021 Urban NPR include rainfall, temperature, utility size and sources of water.

Other factors – network density, soil types, the age and condition of infrastructure, impacts of the COVID-19 pandemic, and government policy and regulation – also affect performance but are not discussed in detail.

1.4.1 Rainfall

Rainfall can affect utility performance in many ways.

- Significant droughts with prolonged periods of low rainfall can stress urban water supply systems. Depending on the severity of the drought, security of the system and availability of climate-resilient water sources (for example, desalinated or recycled water), the utility may impose water restrictions to conserve water and ensure continuity of the water supply.
- Wet or dry conditions can affect demand for outdoor watering, resulting in a change in the volume of urban water and recycled water supplied to residents, councils and parklands to be used for outdoor leisure activities such as golf courses (Water resource indicators W12, W26). Changes in water consumption affect the revenue collected by utilities, their profitability, and the strength of their water-usage pricing signal.

[3] Maps of cities and towns serviced by SA Water are available in SA Water's 2020–21 annual report pp. 15–19. https://www.sawater.com.au/__data/assets/pdf_file/0010/589078/SA-Water-2020-21-Annual-Report.pdf

- Wet or dry conditions can affect decisions about the water sources used (Water resource indicators W1 to W7). Persistent dry conditions can trigger thresholds for production from desalination plants and the use of groundwater and recycled water sources, which affect the operating costs of utilities (Finance indicators F11 to F13).
- Increased rainfall can result in infiltration of water into sewer systems, which can increase the volume of sewage to be pumped and treated, increasing the operating costs of utilities (Finance indicators F12, F13) and also greenhouse gas emissions from sewage (Environment indicators E10, E12). Additional rainfall and sewer infiltration can also result in additional sewer overflows, especially during heavy rainfall.
- Extreme wet or dry conditions can cause expansion and shrinking of reactive clay soils in some parts of Australia. This can result in ground movement causing an increase in water or sewer main breaks (Asset indicators A8, A14) – especially when conditions fluctuate rapidly from wet to dry or dry to wet. In periods of more consistent rainfall, the soils maintain more even moisture levels, resulting in less ground movement.

In 2020–21, Australia's total rainfall was 10% above average (Figure 1.2). It was the wettest financial year for Australia since 2016–17 after 3 drier-than-average financial years. The latter included 2019–20 and 2018–19, which were the third- and fourth-driest financial years since national records began in 1900.

In December 2020, rainfall was above or very much above average for much of the country. That month was Australia's third-wettest December on record due to a number of tropical lows affecting the north-west of the country and a slow-moving low pressure system on the east coast (for more information see the Bureau's 2020–21 Climate Report, http://www.bom.gov.au/climate/updates/articles/a039.shtml). March 2021 was also very wet, with rainfall for New South Wales more than double the March average, and the second-wettest March on record for the state, behind March 1956. In contrast, rainfall during April 2021 was very low for the south-eastern mainland, with New South Wales experiencing its ninth-driest April on record and South Australia its seventh driest.

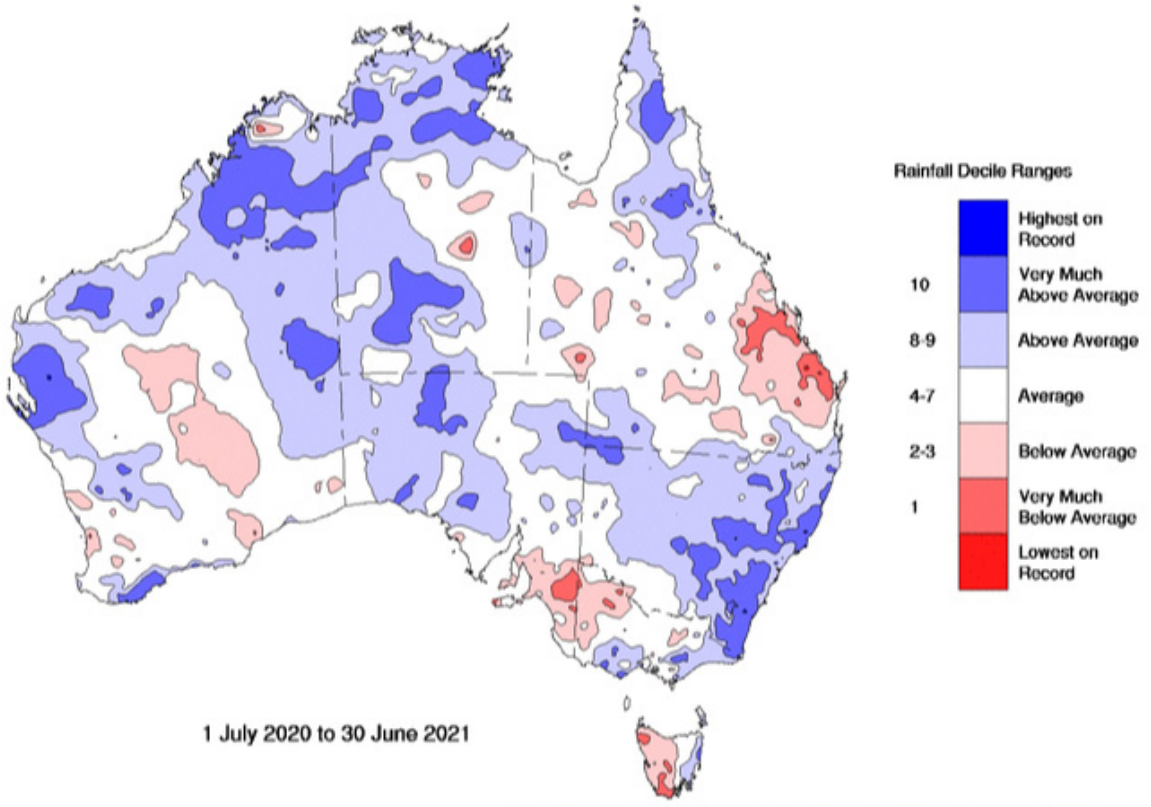

Figure 1.2 Rainfall decile map for 2020–21 (based on all years of data since 1900)

1.4.2 Temperature

There are many relationships between temperature and utility performance.

- Temperature can influence demand, particularly residential and non-residential outdoor demand. Prolonged periods of above-average temperatures can result in increased potable and recycled water (Water resource indicators W12, W26, W27) supply to residents, councils, and parklands to be used for outdoor leisure activities such as golf courses. Changes in water consumption affect the revenue collected by water utilities, their profitability (Finance indicators F3, F24), and the strength of their water-usage pricing signal (Finance indicator F4).
- Hot weather can increase the risk of bushfires, resulting in resources being deployed to protect water supply catchments and mitigate the impacts of a bushfire. Emergency deployments can affect operating expenditure (Finance indicators F11–F13). When responding to a bushfire, temporary water restrictions may be put in place to ensure the availability of supply and to meet firefighting requirements during extreme fire weather. These restrictions can affect the volume of water supplied by a utility and its operating cost and revenue. Poor water quality in a burnt catchment can affect water available for supply.
- Extended periods of heat or cold can affect the quality of water sources and supply, and thus decisions about water sources used (Water resource indicators W1 to W7) and the level of treatment required. For example, a heatwave can contribute to the decline in dissolved oxygen levels in a waterbody and can trigger the need to supply water from an alternative source, or increase water treatment, which affects the operating costs of utilities (Finance indicators F11 to F13).
- Changes in temperature can affect the quality of treated water as biological processes are particularly sensitive to extremes of heat or cold and rapid fluctuations in temperature. These events can have consequences for the quality of water supplied (Health indicators H1 to H5) and the need for treatment, which affects the operational costs of a utility (Finance indicators F11 to F13).
- Extended hot conditions cause dry soil conditions. Consequently, many trees will seek out moisture, and their roots can enter the sewer system, causing blockages and breaks (Asset indicators A14, A15), as well as increasing the number of water main breaks (Asset indicator A8).

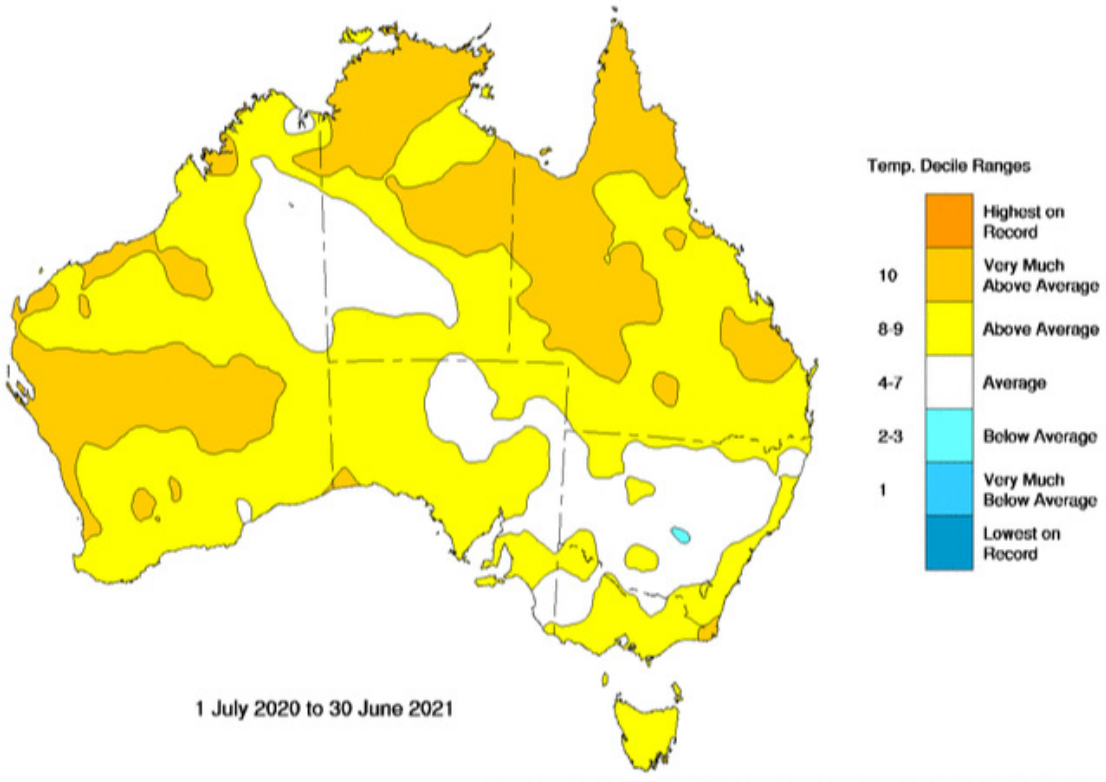

Figure 1.3 Mean daily temperature deciles for 2020–21 (based on all years of data since 1910)

In 2020–21, mean daily temperatures were above to very much above average across most of Australia (Figure 1.3). Large areas in north Queensland, far eastern Victoria and the western part of Australia experienced very much above average temperatures, both daytime and night-time. However, in 2020–21, Australia was cooler than the preceding 3 financial years, which were each among the 5 warmest financial years since national records began in 1910. The 2020–21 financial year was just outside the 10 warmest financial years on record. The mean temperature anomaly was 0.83 °C above the 1961–90 average, and both daytime and night-time temperatures were warmer than average (for more information see the Bureau's 2020–21 Climate Report, http://www.bom.gov.au/climate/updates/articles/a039.shtml). Warm conditions were widespread and persistent throughout the early part of 2020–21, with November 2020 being the warmest on record. In November, large areas of the country experienced daily maximum temperatures more than 10 °C above average over a number of days (Smithville in New South Wales and Birdsville Airport in Queensland recorded 4 consecutive days above 46 °C).

1.4.3 Utility size

The size of a utility's customer base influences its performance on a range of indicators. This relationship may be causal, coincidental or due to a related matter (for example, larger utilities are subject to price regulation, unlike smaller utilities).

1.4.4 Sources of water

Two important drivers of performance are the sources of water used by a utility and the geographical relationship between the source and the urban centre it supplies. The combination and interaction of these drivers serve to create wide variations in engineering, operations and social challenges between utilities across the country.

The sources of water available to a utility are an important driver of several key performance indicators. For example, the cost of treating water to an acceptable standard and supplying it to users affects the revenue collected by water utilities, their profitability (Finance indicators F3, F24), and the strength of their water-usage pricing signal (Finance indicator F4).

Traditionally, Australians have relied on surface water and, to a lesser extent, groundwater to meet their urban consumption needs. The increased demand for urban water – resulting in a need to further develop and maintain ongoing water supply – is driven by many factors, including population growth and the reliability and security of existing sources (predominantly driven by water quality and climatic variability). Financial, environmental and social factors reduce the feasibility of developing additional traditional sources of water. In response to this situation, utilities and bulk water authorities across the country are developing non-traditional supply sources – such as desalinated and recycled water – while continuing to explore options for harvesting stormwater and rainwater.

The diversification of water sources affects the performance of utilities by increasing the cost to treat water to an acceptable standard (to meet regulatory requirements) and to supply multiple water types to end users. For example, water from a 'protected' or 'closed' storage catchment is usually higher quality than water from an 'open' storage catchment and requires less treatment, which reduces the cost of supply.

The quality of water from groundwater sources varies greatly depending on the type and depth of the aquifer and has a significant impact on the extraction and treatment processes used and subsequent infrastructure and operational costs. Urban water supplied from recycled sources typically requires dual-pipe supply systems to separate recycled water from potable water, incurring greater infrastructure costs.

Figure 1.4 shows the annual supply from different sources of water, and the total supply, for utilities in each state and territory from 2016–17 to 2020–21.

- Water sourced from surface waters (that is, rivers, streams, and dams; Water resource indicator W1) is the dominant water source in all states and territories except Western Australia, where most of the water is sourced from groundwater (Water resource indicator W2) and desalinated marine water (Water resource indicator W3.1).

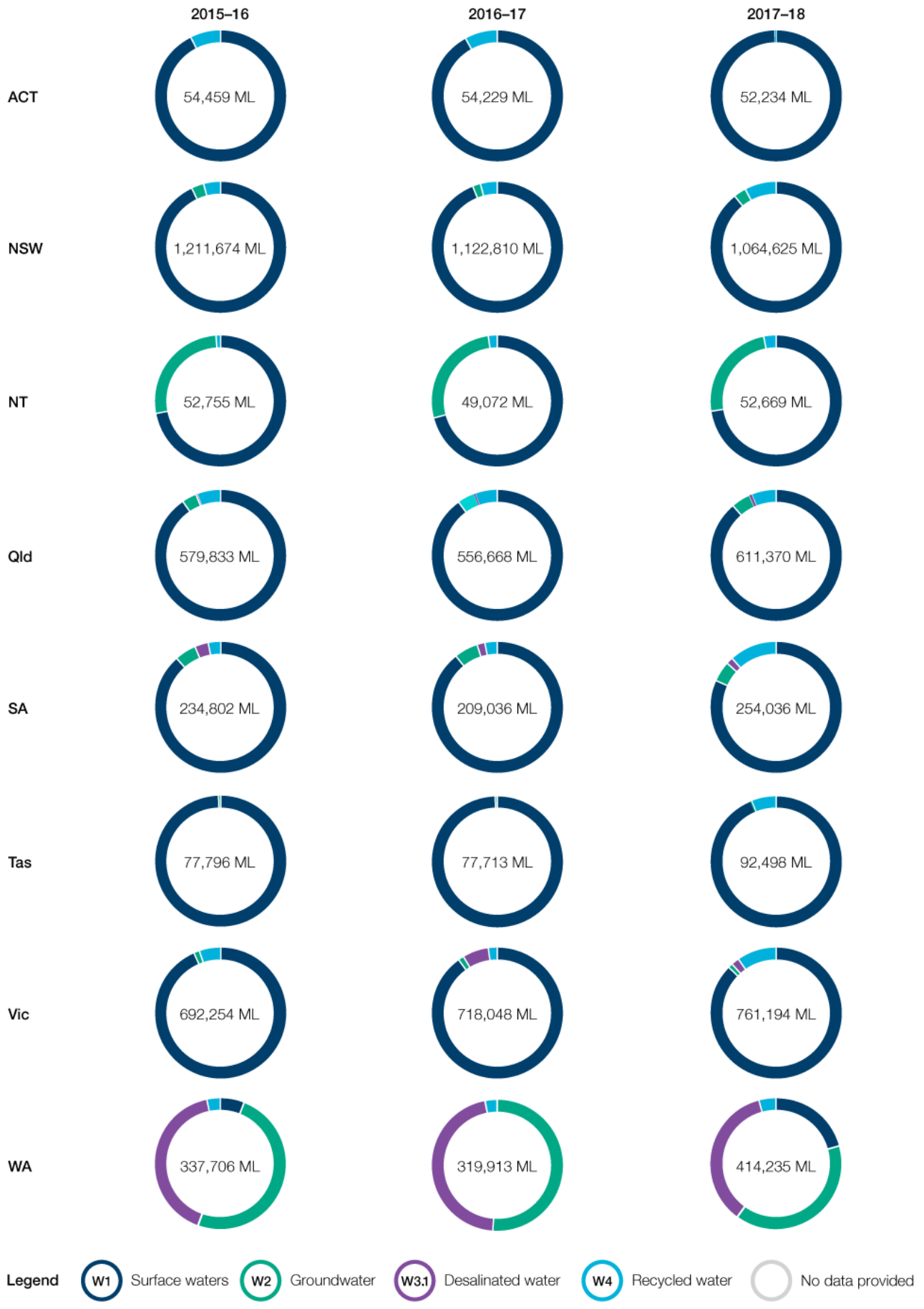

Figure 1.4a **Water source breakdown (W1, W2, W3.1, W4/W26) in each state and territory, 2015–16 to 2017–18**

Note: W26 replaced W4 to represent recycled water sources as W4 was discontinued. Please refer to the reporting handbook for details on the definition of W26.

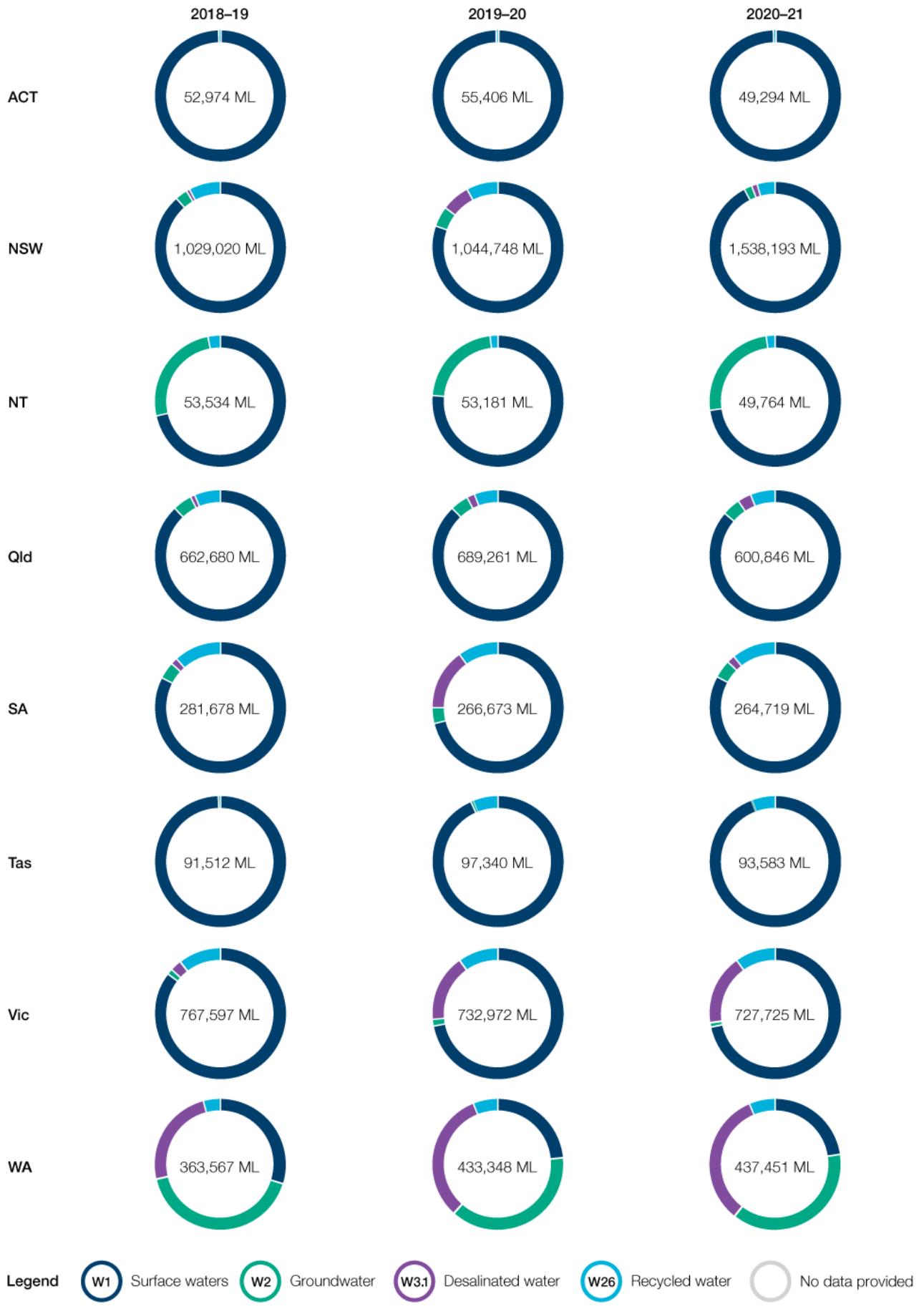

Figure 1.4b **Water source breakdown (W1, W2, W3.1, W4/W26) in each state and territory, 2018–19 to 2020–21**

Note: W26 replaced W4 to represent recycled water sources as W4 was discontinued. Please refer to the reporting handbook for details on the definition of W26.

- In 2020–21, total water sourced nationally increased by 11.5%, driven by a 20% increase in water sourced from surface water. With above-average rainfall and increased surface water available in storages, there was a shift towards surface water sourced, with a decline in total water sourced from other sources.
- The national increase in total surface water extraction can be attributed to a 69% increase in surface water supplied in New South Wales and a 16% increase in South Australia. All other states reported a decrease in surface water supplied compared to 2019–20, with Queensland reporting the highest percentage decrease (15%).
- The volume of water sourced from groundwater across the country decreased by 8% from 2019–20. New South Wales reported the highest percentage decrease (37%). South Australia, the Northern Territory and Western Australia all recorded small increases in water sourced from groundwater compared to 2019–20.
- The volume of water sourced from desalinated water in 2020–21 decreased significantly from 2019–20; South Australia and New South Wales reported decreases of 87% and 72%, respectively. This decrease coincided with increased surface water availability. For South Australia, it also reflects that in 2019–20, Adelaide's desalination plant was used to facilitate the Australian Government's Water for Fodder program[4], which helped farmers maintain their breeding stock during the drought. In 2020–21, water sourced from desalination was no longer needed for that purpose. Queensland reported a 40% increase compared to 2019–20, but this increase came from a relatively low base as desalinated water only accounted for 3% of the total water sourced for Queensland in 2020–21. As in previous years, Western Australia sourced the highest volume of water from desalination.
- Total volume of recycled water supplied across the country decreased slightly (by 6%) from 2019–20.

[4] https://www.agriculture.gov.au/water/mdb/programs/basin-wide/water-for-fodder