1 Introduction

1.1 Context and overview

This *National performance report 2019–20: urban water utilities* (2020 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 2020 Urban NPR compares the performance of 80 utilities and councils (utilities) and five 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 2020 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 85 utilities contributing data to the 2020 Urban NPR (including five bulk water authorities) are listed in Appendix C. Table 1.1 summarises the utility size groups by jurisdiction.

Seventy-one of the 85 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:

- 71 utilities providing water supply and sewerage services;
- five utilities providing only water supply services;
- four utilities providing only sewerage services; and
- five bulk water authorities.

Table 1.1 Utilities reporting in the 2020 Urban NPR by size group and jurisdiction.

Jurisdiction	Bulk	Major	Large	Medium	Small	Total
Australian Capital Territory		1				1
New South Wales	2	3		14	11	30
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**	**12**	**24**	**29**	**85**

[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 2020 Urban NPR. Further details about the utilities are available from the relevant utility websites.

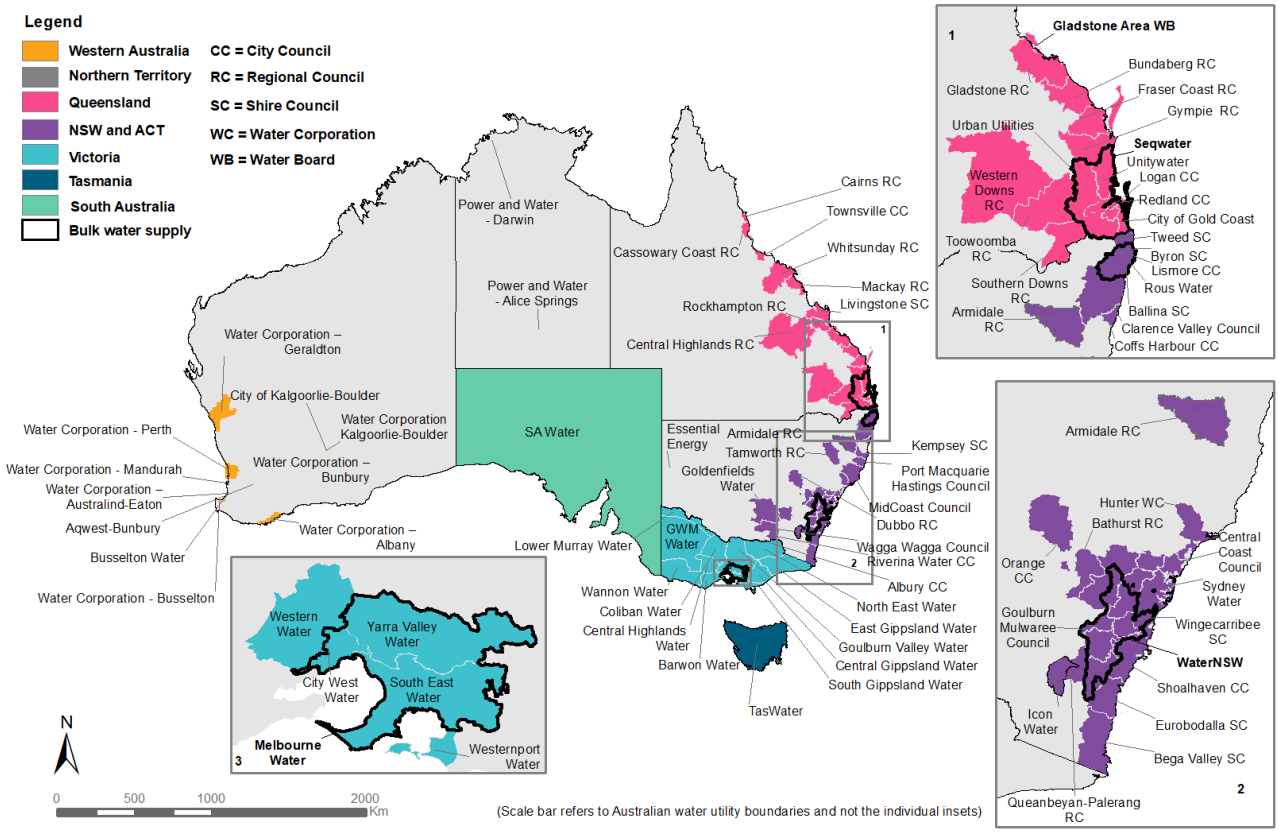

Figure 1.1 The administrative boundaries of all utilities reporting data for 2019–20.

1.4 Key drivers

Key drivers of water utility performance presented in the 2020 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-independent water sources (for example, desalinated or recycled water), the utility may impose water restrictions to conserve water and assure 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 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.

- Wet or dry conditions can affect decisions about the water sources used (Water resource indicators W1–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–F13).
- High 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 2019–20, rainfall was below average across much of Australia (Figure 1.2); it was the sixth-driest year on record. This was the second consecutive year of below-average annual rainfall, and the past 2 years were Australia's second-driest 24-month period on record.

Rainfall was very low during the latter half of 2019. The below-average rainfall throughout July–December 2019 was due to a positive phase of the Indian Ocean Dipole, one of the strongest on record, that influenced Australia's climate during this period (for more information see the Bureau's 2019–20 Climate Report, http://www.bom.gov.au/climate/updates/articles/a037.shtml). There was some rainfall relief during the early part of 2020 as tropical moisture associated with warmer-than-average sea surface temperatures off the northwest coast of Australia moved across the continent and combined with southern cold fronts to produce high rainfall across most of southern Australia.

Heavy rainfall associated with a coastal trough that impacted eastern Australia in early February 2020 contributed to well-above-average rainfall for that month. In the Sydney region, some areas recorded more than 400 mm (almost half the annual average) in one week during the event. The total February rainfall was the region's highest monthly total in more than 60 years.

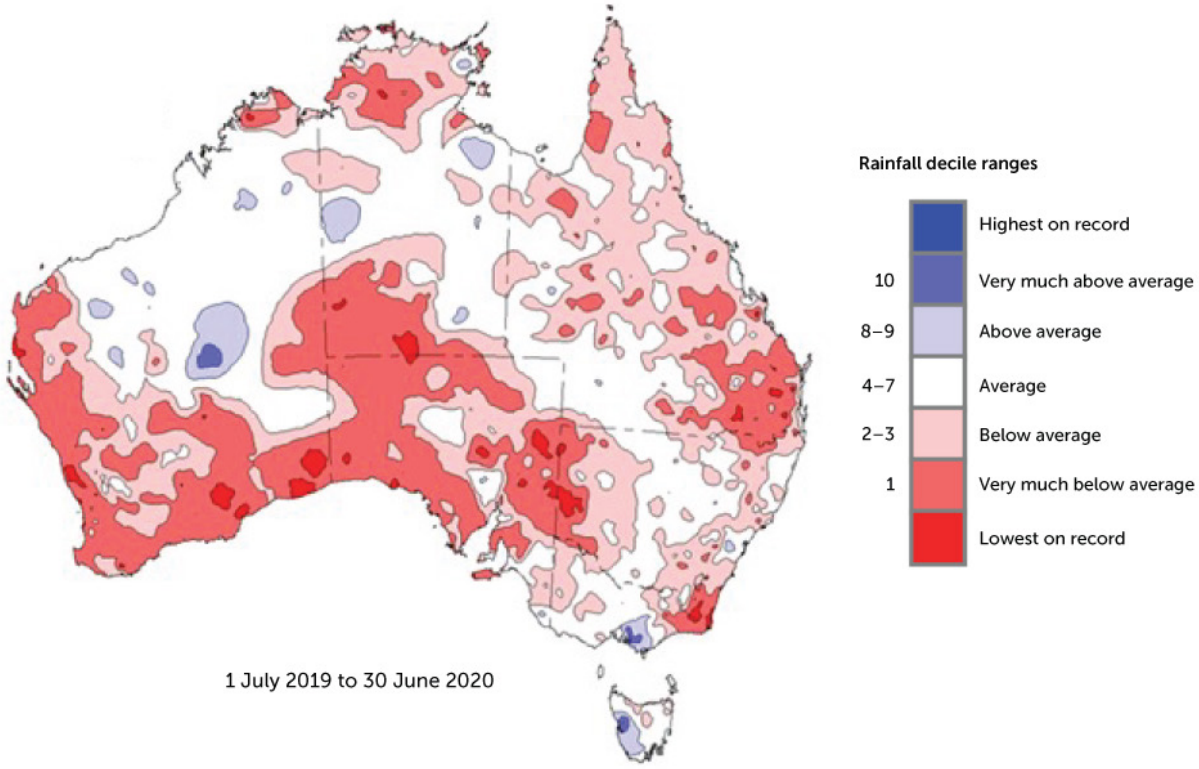

Figure 1.2 Rainfall decile map for 2019–20 (based on all years of data since 1900).

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 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–W7) and the level of the 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–F13).
- Changes in temperature can affect the quality of treated water. 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–H5) and the need for treatment, which affects the operational costs of a utility (Finance indicators F11–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).

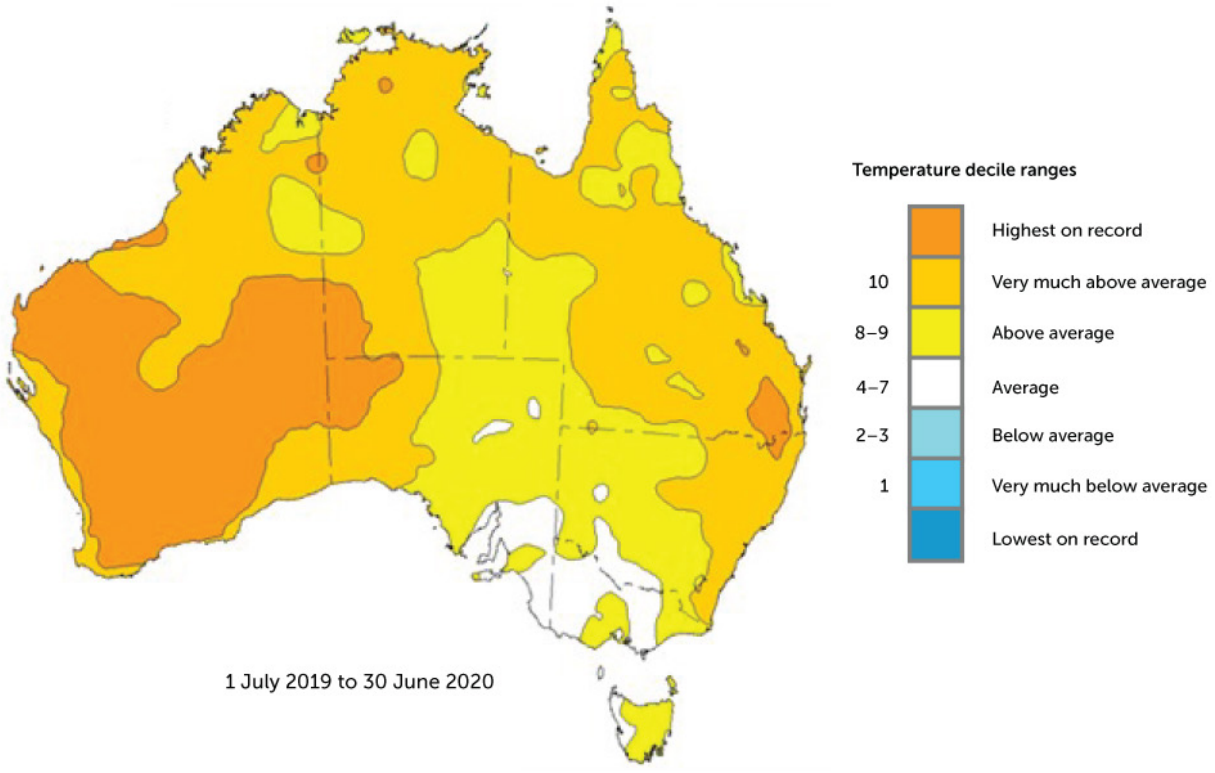

Figure 1.3 Mean daily temperature deciles for 2019–20 (based on all years of data since 1910).

In 2019–20, Australia experienced its third-warmest year on record, behind only 2015–16 and 2018–19. The consecutive very warm years resulted in Australia's warmest 24-month and 36-month periods on record (for more information see the Bureau's 2019–20 Climate Report, http://www.bom.gov.au/climate/updates/articles/a037.shtml).

Daytime temperatures were particularly warm in 2019–20. Large areas in the west and east of the country experienced their highest mean maximum temperature on record. Night-time temperatures tended to be closer to average but were still the highest on record over parts of Western Australia. Some long-term sites in Western Australia had their warmest days and warmest nights on record, including Kalgoorlie–Boulder, Meekatharra, and Onslow airports.

Overall, mean daily temperatures were above to very much above average across most of Australia (Figure 1.3), largely driven by the warmer-than-average daytime temperatures. Mean daily temperatures were the highest on record over the entire southwestern part of Australia.

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 for each utility 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 2014–15 to 2019–20.

- 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).

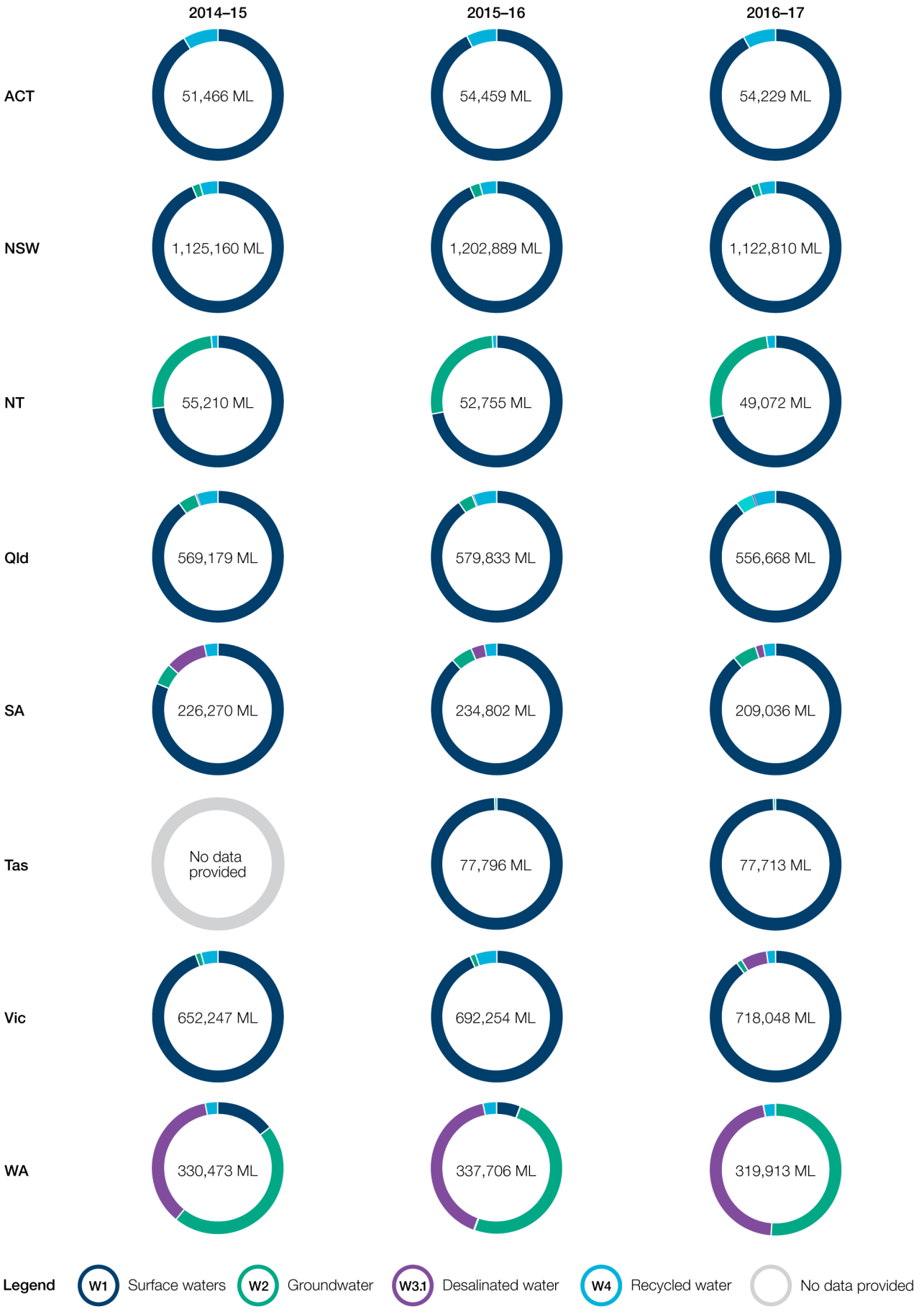

Figure 1.4a **Water source breakdown (W1, W2, W3.1, W4/W26) in each State and Territory, 2014–15 to 2016–17.**

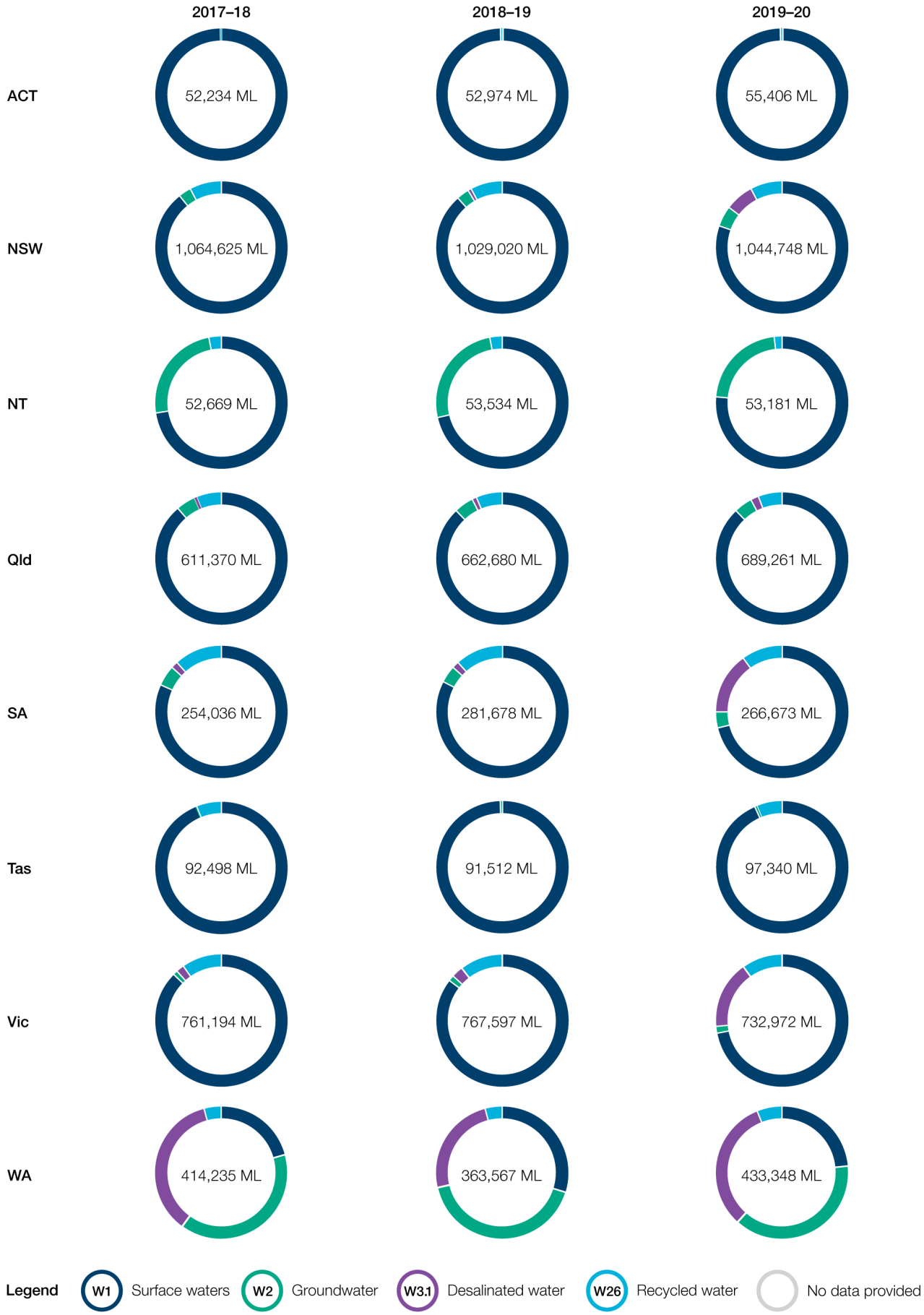

Figure 1.4b **Water source breakdown (W1, W2, W3.1, W4/W26) in each State and Territory, 2017–18 to 2019–20.**

- In 2019–20, total water sourced across the country from all four categories increased by 2 per cent following a second consecutive year of below-average annual rainfall and very warm temperatures.
- Total surface water extraction decreased across the country; Victoria and South Australia reported the highest percentage decrease from the 2018–19 reporting year (19 per cent and 18 per cent, respectively).
- Volume of water sourced from groundwater across the country increased by 12 per cent from 2018–19. New South Wales reported the highest percentage increase (62 per cent).
- Volume of water sourced from desalinated water in 2019–20 increased significantly from 2018–19 in all states with desalination plants. This increase coincided with the drought and declining water storages. New South Wales sourced 7 per cent of its total water from desalinated water in 2019–20 compared to 0.8 per cent in 2018–19. In South Australia and Victoria, desalinated water accounted for 15 per cent and 16 per cent of total water sourced respectively in 2019–20 (up from 1.8 per cent and 3 per cent in 2018–19). As in previous years, Western Australia sourced the highest volume of water from desalination.
- Total volume of recycled water supplied across the country increased slightly (by 1.2 per cent) from 2018–19. Western Australia reported the highest percentage increase (78 per cent) from last year and the Northern Territory the highest percentage decrease (38 per cent). As in previous years, New South Wales and Victoria supplied the highest volume of recycled water.