1 Introduction

1.1 Context and overview

This *National performance report 2021–22: urban water utilities* (2022 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 2022 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 the 2022 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 2022 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.

City West Water and Western Water merged on 1 July 2021 creating Greater Western Water. Mount Barker District Council reported for the first time in the small size group.

[2] National Water Initiative clauses 75–76

Table 1.1 Utilities reporting in the 2022 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	2
Tasmania		1				1
Victoria	1	4	5	5	1	16
Western Australia		1	1		9	11
Total	**5**	**15**	**12**	**23**	**31**	**86**

1.3 Locations of utilities

Figure 1.1 shows the administrative boundaries of all utilities reporting data for the 2022 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]

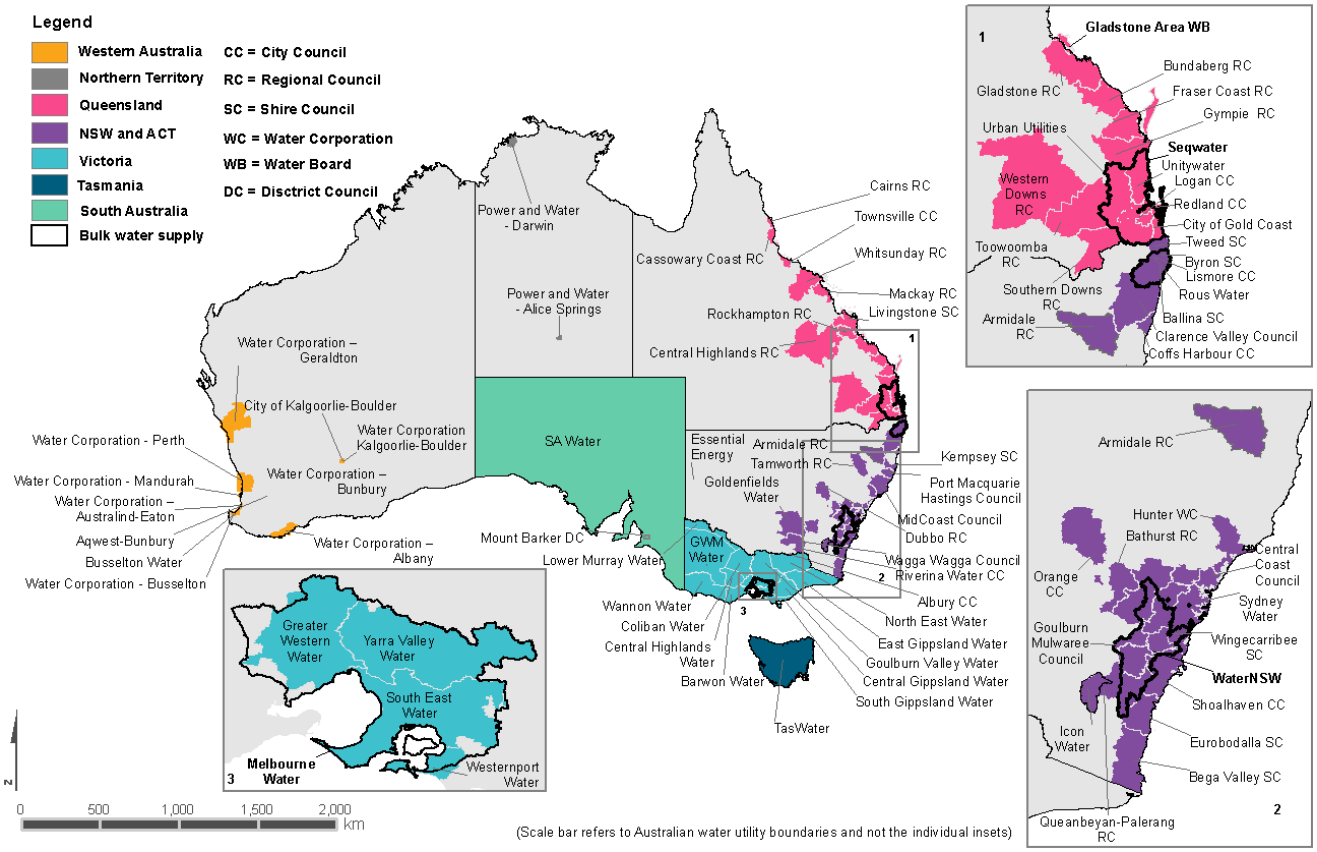

Figure 1.1 The administrative boundaries of all utilities reporting data for 2021–22

[3] Maps of cities and towns serviced by SA Water are available in SA Water's 2021–22 annual report pp 6. 2021-22-Annual-Report-2022.pdf (sawater.com.au)

1.4 Key drivers

Key drivers of water utility performance presented in the 2022 Urban NPR include rainfall, temperature, utility size and sources of water.

Other factors also affect performance but are not discussed in detail. This includes:

- network density
- soil types
- the age and condition of infrastructure
- impacts of the COVID-19 pandemic
- government policy and regulation.

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.
- 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). Also, to mitigate against the risk of variable raw water quality due to the ongoing severe wet weather and possible flooding condition, the utility might decide to use more desalination water (increasing W3.1).
- 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 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 2021–22, Australia's total rainfall was 9% above average (above the 1961–90 average, at 509.4 mm) compared to all observations since national records began in 1900. Rainfall for the financial year was above average for much of the eastern mainland states, pastoral South Australia, and Central Australia (Figure 1.2). Rainfall was highest on record for parts of south-eastern Queensland and north-east New South Wales.

In November 2021, rainfall was 124% above average for Australia as a whole, making it the wettest November on record, surpassing the previous record set in November 1973. Rainfall was above or very much above average for most of mainland Australia.

November 2021 was also Australia's wettest on record, with more than twice the long-term national average November rainfall, and flooding across large areas of New South Wales and Queensland from November into December. Periods of flooding occurred across the eastern mainland multiple times during the first half of 2022.

For New South Wales, area-average rainfall for autumn was the highest since 1990 and the seventh-wettest on record. More information is available in the Bureau's 2021–22 Climate Report. In contrast, rainfall during August 2021 was 39% below average for Australia with most parts of the mainland south of the tropics recording below average rainfall.

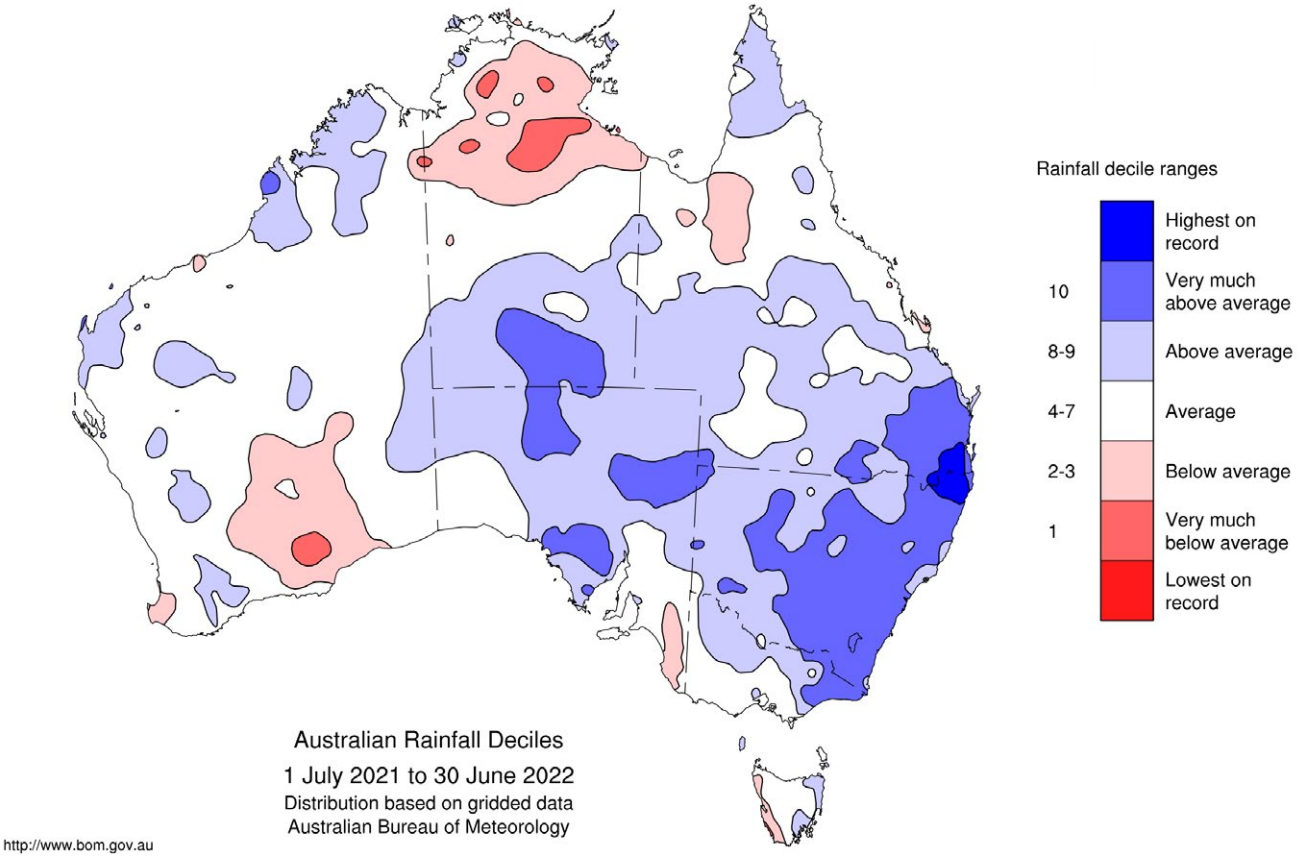

Figure 1.2 Rainfall decile map for 2021–22 (based on all years of data since 1900)

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 to 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 and the treatment cost.
- 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 affect 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).

In 2021–22, the mean daily temperature was 0.96 °C above the 1961–90 average, the 8th-warmest financial year on record since records commenced in 1910. Annual mean temperatures were above to very much above average across most of Australia (Figure 1.3). The mean annual minimum temperature was the 5th-warmest on record for Australia, at 0.91 °C above average. While the mean annual maximum temperature was 1.00 °C above average, it placed outside the 10 warmest on record. Both mean annual maximum and minimum temperatures were above average for much of Australia, and record-warm for parts of northern Australia. Mean annual maximum temperatures were cooler than average for parts of eastern New South Wales (for more information see the Bureau's 2021–22 Climate Report).

Warmth was widespread and persistent through much of 2021–22, with the Australian mean temperature amongst the 10 warmest on record for July, August, December, March and April. November bucked the trend, the only month during July 2021 to June 2022 with a cooler than average mean temperature (−0.64 °C), with record-high rainfall contributing to it being Australia's coolest November since 1999.

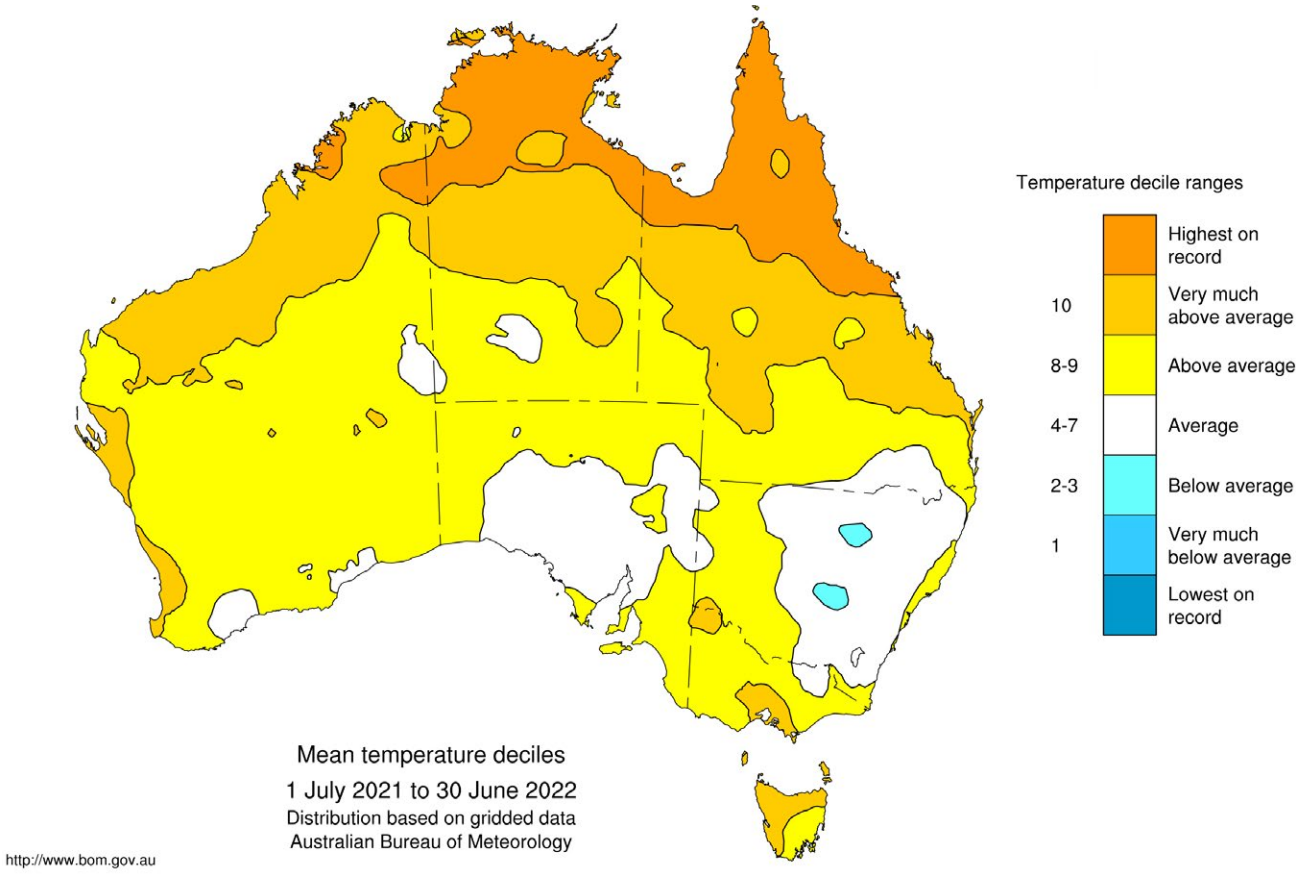

Figure 1.3 Mean daily temperature deciles for 2021–22 (based on all years of data since 1910)

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 climate variability). Financial, environmental and social factors reduce the feasibility of developing additional traditional sources of water also considering that most suitable dam sites have already been developed. 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 2017–18 to 2021–22.

- 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),
- In 2021–22, total water sourced nationally slightly increased by 3%, driven by a 5% increase in water sourced from surface water. With above-average rainfall and increased surface water available in storages in many parts of the country, there was a shift towards surface water sourced, with a decline in total water sourced from groundwater (6%) and desalinated water (10%).
- The national increase in total surface water supplied (5%) can be mostly attributed to a 23% increase in surface water supplied in Western Australia. Surface water supplied to Northern Territory, Queensland, Victoria and Tasmania also increased compared to 2020–21. The Australian Capital Territory and New South Wales reported decreases in surface water supplied compared to 2020–21, with New South Wales reporting the highest percentage decrease (8%).
- The volume of water sourced from groundwater across the country decreased by 6% from 2020–21. Except Tasmania and Victoria with a small increase of 9% and 2%, all other states recorded a decrease in water sourced from groundwater compared to 2020–21. Similar to last year, New South Wales reported the highest percentage decrease (19%) in water sourced from groundwater compared to 2020–21.
- The volume of water sourced from desalinated water in 2021–22 decreased (10%) for the second time since 2019-20. This follows the 18% decrease reported in the 2020-21 financial year. Tasmania didn't source any water from the desalination of marine water this year after reporting a small volume of 10 megalitres in 2020–21. All other states reported a decrease in the volume of water sourced from desalinated water in 2021–22. This decrease coincided with increased surface water availability. For the first time, Victoria exceeded Western Australia and sourced the highest volume of water from desalination. This is as a result of a decrease in the volume of water sourced from desalinated water in Western Australia.
- The total volume of recycled water supplied across the country increased slightly (by 2%) from 2020–21.

Water source breakdown (W1, W2, W3.1, W4/W26) in each state and territory in ML, 2017–18 to 2021–22

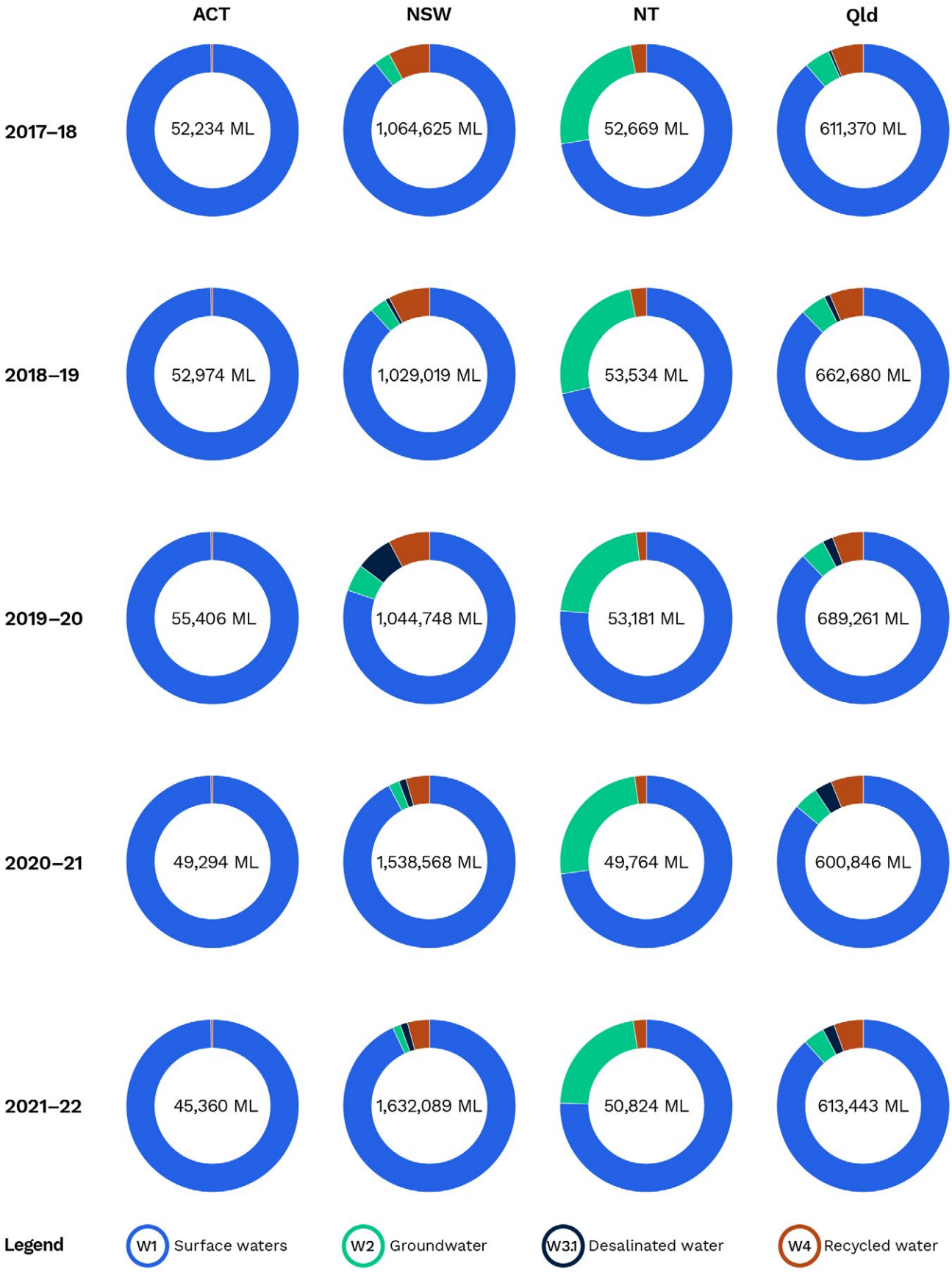

Figure 1.4a Water source breakdown in each state and territory, 2017–18 to 2021–22

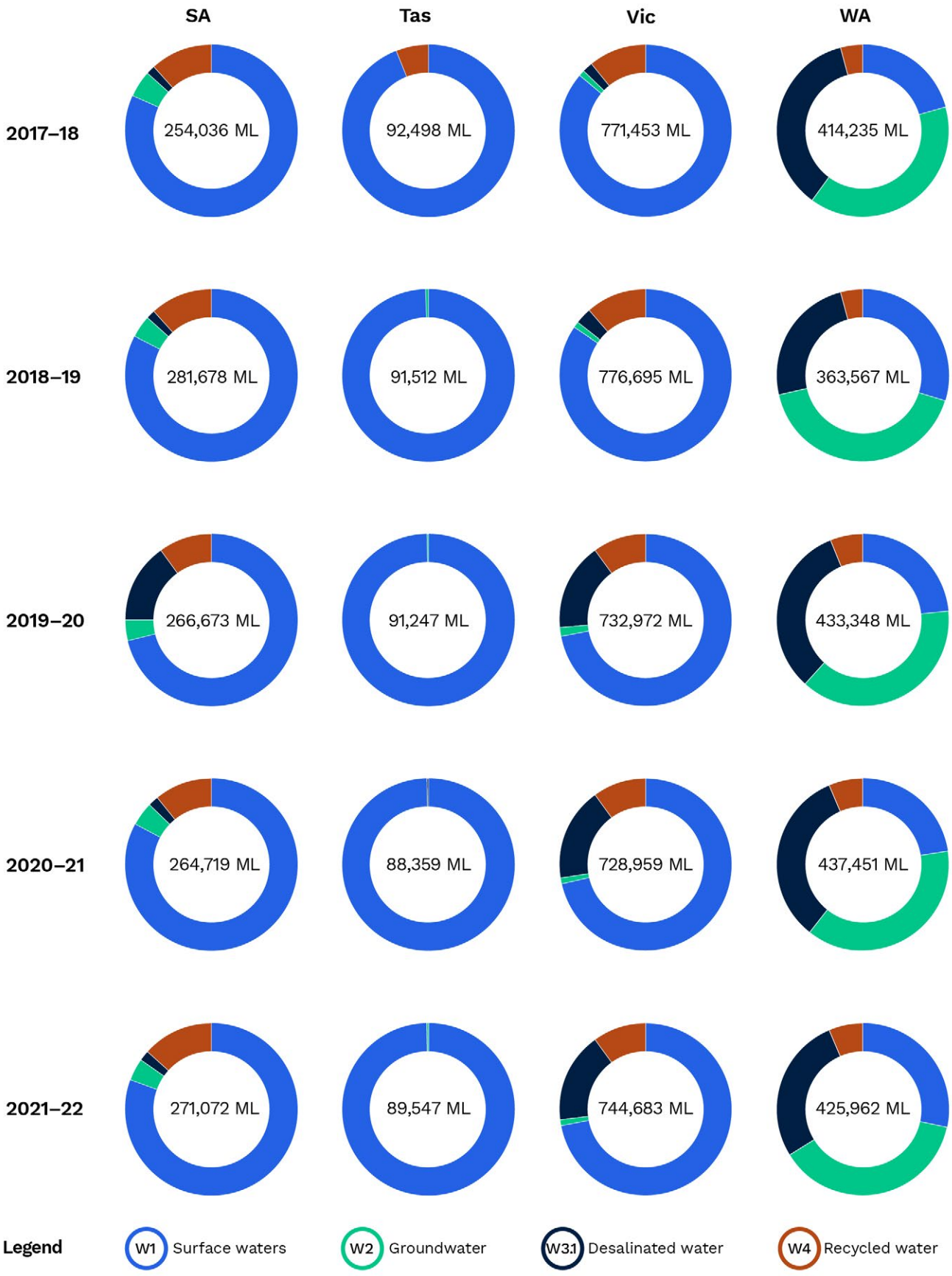

Figure 1.4b Water source breakdown in each state and territory, 2017–18 to 2021–22