1 Introduction

1.1 Context and overview

This *National performance report 2022–23: urban water utilities* (2023 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 2023 Urban NPR compares the performance of 81 utilities and councils (utilities) and 5 bulk water authorities that provide urban water and sewerage services to over 25 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 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 2023 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 (including 5 bulk water authorities) contributing data to the 2023 Urban NPR 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.

There were no changes in the number of utilities reporting to the NPR framework in 2022–23 compared to 2021–22. However, the financial data for 8 utilities in regional New South Wales (specifically Goulburn Mulwaree Council, Kempsey Shire Council, Lismore City Council, MidCoast Council, Orange City Council, Queanbeyan-Palerang Regional Council, Shoalhaven City Council and Snowy Monaro Regional Council) were unavailable at the time of report preparation. Consequently, this data is not included in the analysis of this report.

[2] National Water Initiative clauses 75–76

Table 1.1 Utilities reporting in the 2023 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	5	4	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**	**13**	**22**	**31**	**86**

1.3 Locations of utilities

Figure 1.1 shows the administrative boundaries of all utilities reporting data for the 2023 Urban NPR. Further details about the utilities are available from the relevant utility websites. While the 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]

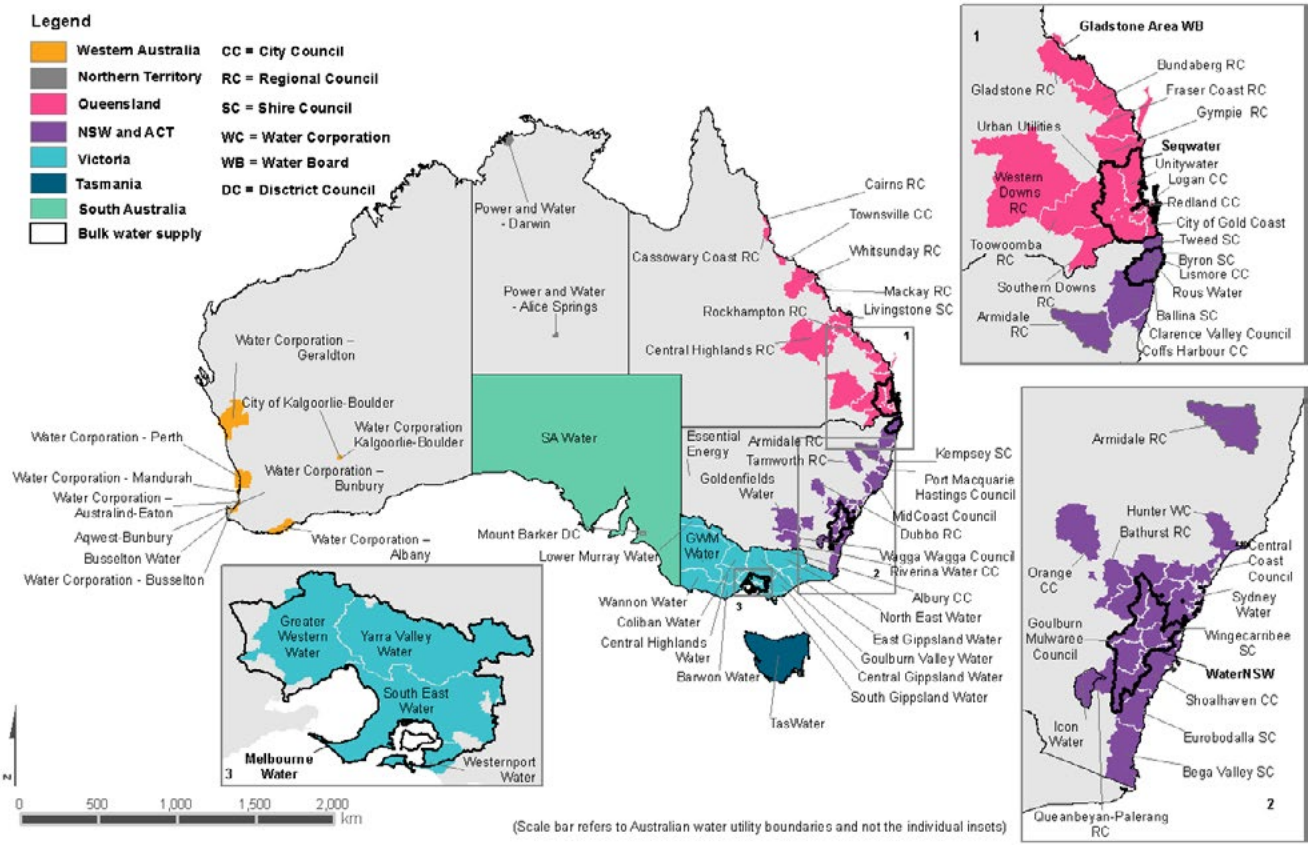

Figure 1.1 The administrative boundaries of all utilities reporting data for 2022–23

[3] Maps of cities and towns serviced by SA Water are available in SA Water's 2022–23 annual report p.9. 2022-23-SA-Water-Annual-Report.pdf (sawater.com.au)

1.4 Key drivers

Key drivers of water utility performance presented in the 2023 Urban NPR include rainfall, temperature, utility size and sources of water.

Other factors also affect performance but are not discussed in detail. These include:

- network density
- soil types
- the age and condition of infrastructure
- impacts of the COVID-19 pandemic
- geographic location and remoteness
- 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 conditions, 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 2022–23, Australia's total rainfall was 32% above the 1961–90 average, (at 612.6 mm, the seventh wettest year on record) compared to all observations since national records began in 1900. Rainfall for the financial year (Figure 1.2) was above average for much of Australia – very much above average for the northern and south-eastern mainland as well as the east coast of Tasmania. Some parts of northern Queensland, small parts of Northern Territory and the north of Western Australia experienced the highest rainfall on record. However, rainfall was below average for south-eastern Queensland, north-eastern New South Wales, south-western Tasmania, and some scattered areas in the west of Western Australia.

Winter, spring and summer rainfalls were all above average for Australia with the spring rainfall being the second wettest on record (behind spring 2010). However, the autumn rainfall was 10.1% below average for the whole Australia. September, October and November rainfalls were respectively the fifth, second and 10th highest on record for Australia while May 2023 was an exceptionally dry month for Australia. Below

average rainfall was also observed in western Tasmania, south and west Gippsland in Victoria, south-western and north-western Western Australia, the northern half of the New South Wales coast and south-eastern Queensland.

More information is available in the Bureau's 2022–23 Climate and Water Statement.

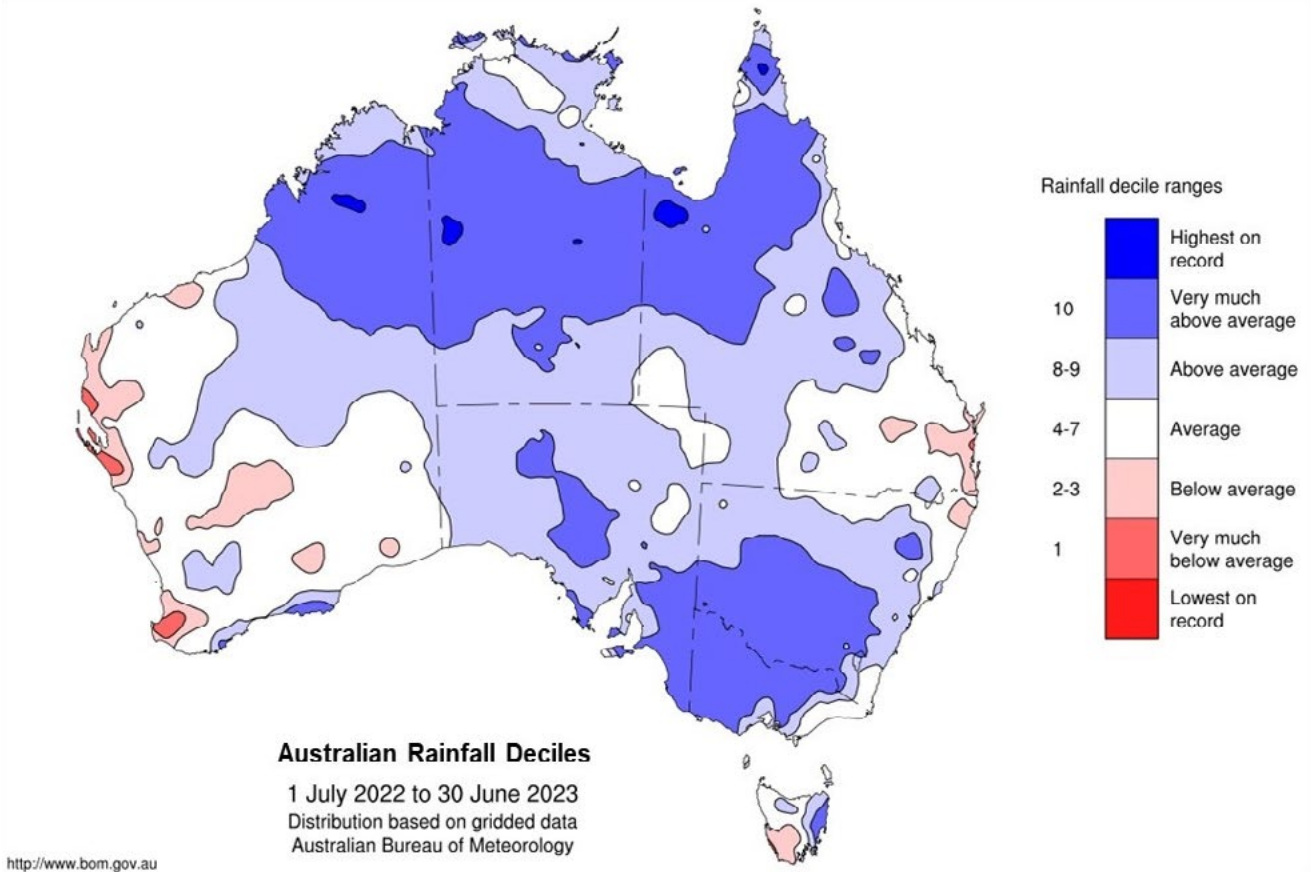

Figure 1.2 Rainfall decile map for 2022–23 (based on all years of data since 1900)

1.4.2 Temperature

Temperature can affect utility performance in many ways.

- 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 bushfires. Emergency deployments can affect operating expenditure (Finance indicators F11, F12 andF13). 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 the availability of water supply and the cost of treatment.
- Extended periods of heat or cold can affect the quality of water sources and supply, and in turn, 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, trees will seek out moisture and their roots can enter the sewer system, causing blockages and breaks (Asset indicators A14, A15), and increasing the number of water main breaks (Asset indicator A8).

In 2022–23, the mean daily temperature was 0.13°C above the 1961–90 average across the country. The mean maximum and minimum temperatures were 0.10°C and 0.16°C warmer than average, respectively. The annual mean temperature was close to average across most of mainland Australia (Figure 1.3). Mean temperature was above average for northern Queensland and the Northern Territory and some parts of south-eastern Western Australia as well as Tasmania. Mean temperature was below average across inland New South Wales, the Northern Territory and parts of north-east and southern Western Australia.

The national mean temperature for winter, spring and summer was above the 1961–90 average, while the national mean temperature for autumn was equal to the 1961–90 average, the coolest autumn since 2012. For autumn, the national mean maximum temperature was 0.39°C above average, while the national mean minimum temperature was 0.40°C below average, the coolest since 2015 and 2012 respectively. October 2022 and April 2023 had the lowest national mean temperature and were recorded as the coolest months since 2016 and 2015, respectively, whereas June 2023 was recorded as the seventh warmest on record for the whole of Australia.

More information is available in the Bureau's 2022–23 Climate and Water Statement.

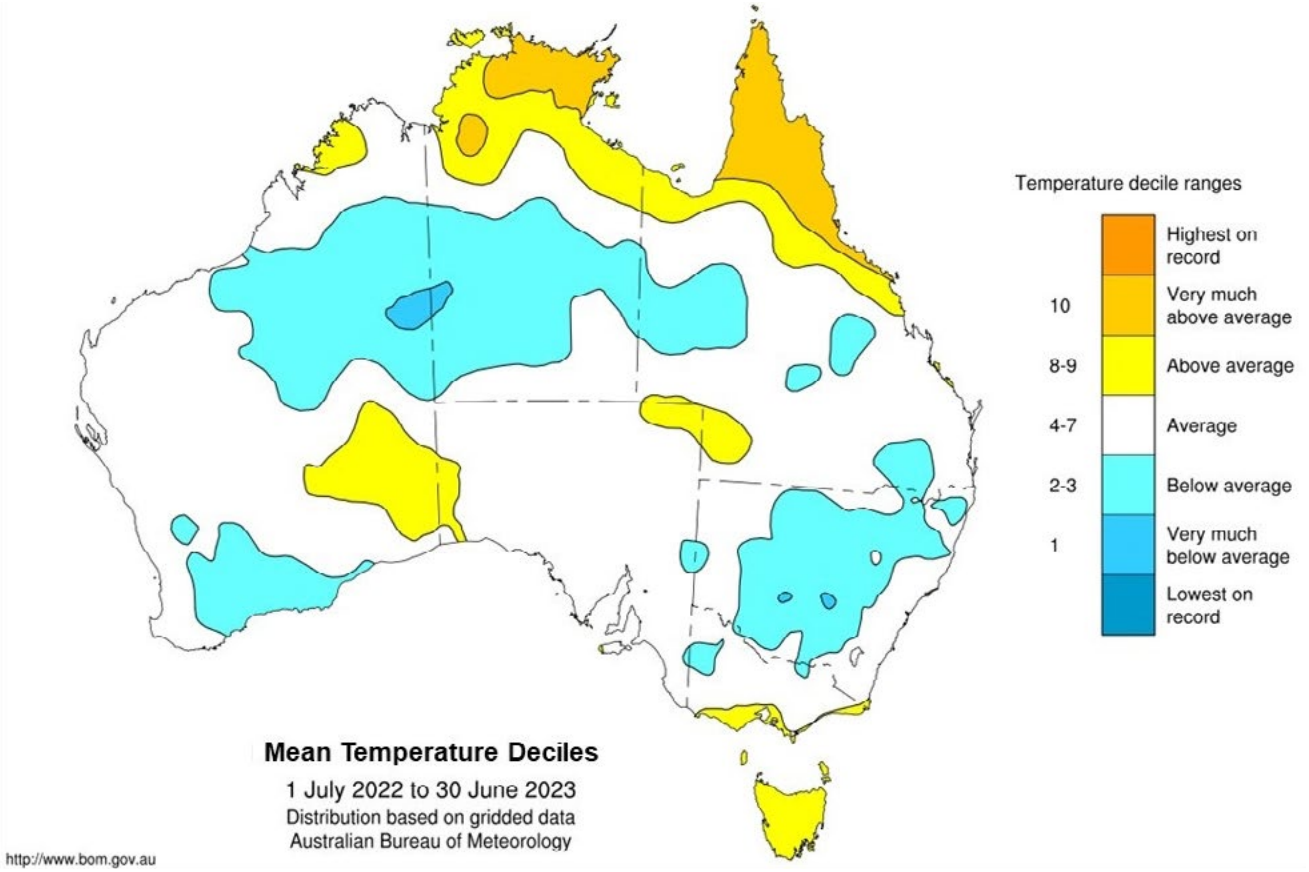

Figure 1.3 Mean daily temperature deciles for 2022–23 (based on all years of data since 1910)

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 may be 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 especially 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 major sources of water, and the total supply, for utilities in each state and territory from 2018–19 to 2022–23.

- 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 (representing 82% of the total water sourced from major sources of water) except Western Australia, where most of the water (more than 40%) is sourced from groundwater (Water resource indicator W2).
- In 2022–23, total water sourced nationally decreased by 7%, mainly driven by the 37% decrease in water sourced from desalinated water. Above to very much above average rainfall in south-eastern Australia generated high inflows specifically in the Melbourne Water catchments. As a result, the need for desalinated water to supply demands in Victoria during 2022–23 was significantly reduced.
- The total surface water sourced on the national scale decreased by 5%, primarily influenced by a 19% decrease in the volume of surface water sourced in New South Wales. This decline was largely due to deteriorated water quality resulting from significant flood events in July 2022. Consequently, the primary source of drinking water shifted towards desalinated water, leading to a subsequent decrease in the overall volume of water supplied from surface sources.

- The volume of water sourced from surface water in the Northern Territory, South Australia and Tasmania experienced a slight increase of 1%. Additionally, there was a 5% increase reported in the Australian Capital Territory. Compared to 2021–22, Victoria reported the highest increase (26%) in sourcing its supplies from surface water resources, which was attributed to above to very-much above average rainfall and surface water availability in storages.
- The volume of water sourced from groundwater across the country increased by 4% from 2021–22, mainly driven by a 14% increase in Queensland due to low surface water availability in southern and south-eastern parts resulting in a shift towards groundwater resources in those areas. This was followed by New South Wales and Western Australia with 2% and 4% increases, respectively, in their total water sourced from groundwater. The total water sourced from groundwater in other states and territories decreased from the previous year. Compared to 2021–22, the Northern Territory reported the highest decrease (14%) in water sourced from groundwater.
- The volume of water sourced from desalinated water (Water resource indicator W3.1) in 2022–23 decreased (37%) for the third time since 2019–20 (18% decrease in 2020–21, and 10% decrease in 2021–22). The decrease was mainly driven by a 97% decrease in desalinated water sourced in Victoria as a result of higher surface water availability to supply demand. In the current year, as in the previous year, Tasmania, the Northern Territory and the Australian Capital Territory didn't source any water from the desalination of marine water. New South Wales was the only state to report an increase in the use of desalinated water, with nearly 3 times higher volume of water sourced from desalination than the previous year. This surge in usage was primarily driven by the low quality of surface water necessitating a greater reliance on desalination for supply.
- The volume of water sourced from recycled water (Water resource indicator W4/W26) in 2022–23 decreased slightly (2%). The decrease is mainly driven by 38% and 29% decreases in recycled water sourced in South Australia and the Australian Capital Territory, respectively. The Northern Territory and Victoria also reported slight decreases in total water sourced from recycled water (4% and 1% respectively). New South Wales, Western Australia and Queensland reported increases in the recycled water sourced. The increases and decreases can be attributed to the surface water availability in each state and the shift to using major sources of water to supply demands. Queensland reported the highest increase (14%) in water sourced from recycled water in the current year.

Water source breakdown (W1, W2, W3.1, W26) in each state and territory in ML, 2018–19 to 2022–23

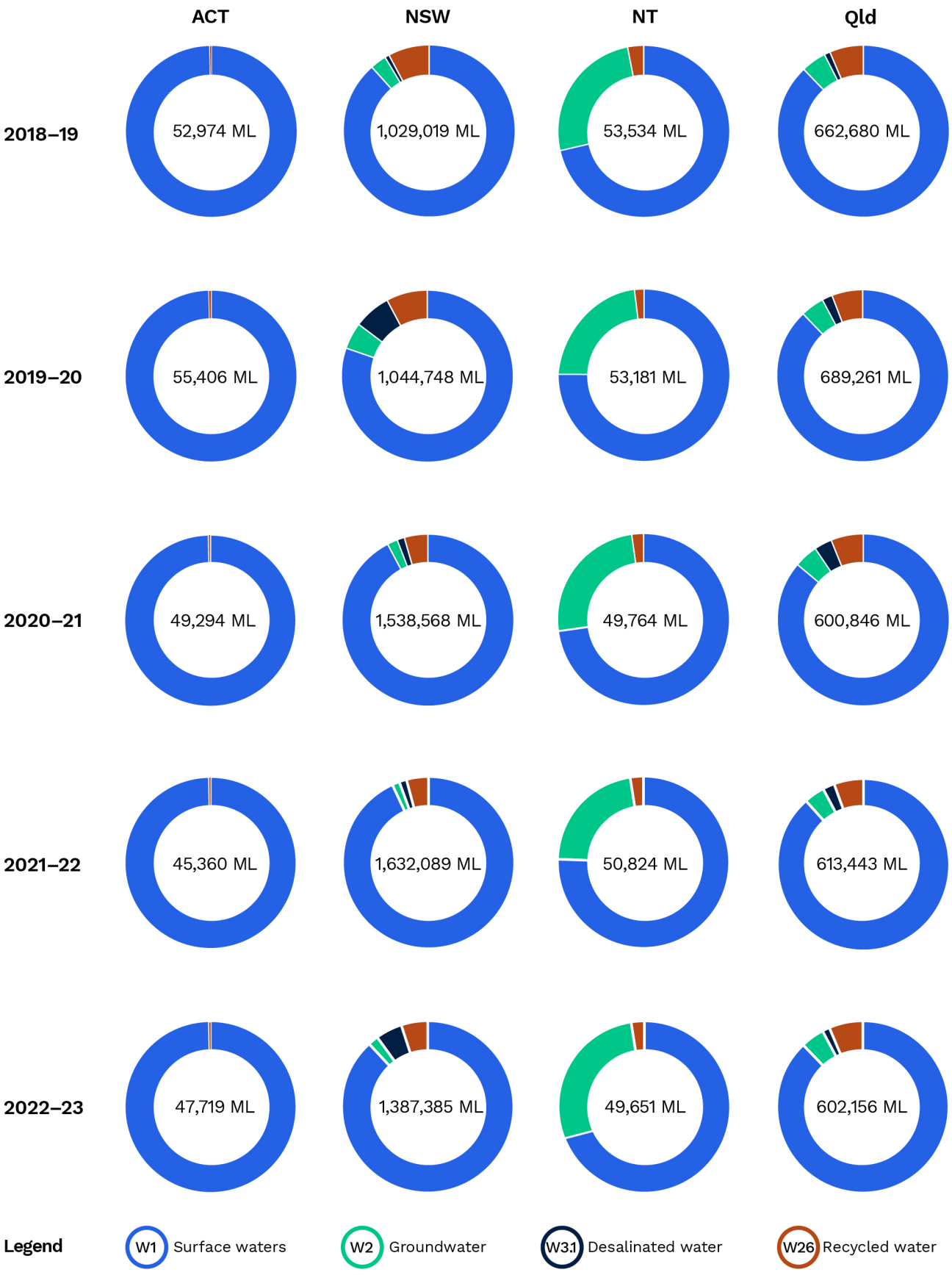

Figure 1.4a Water source breakdown in each state and territory, 2018–19 to 2022–23

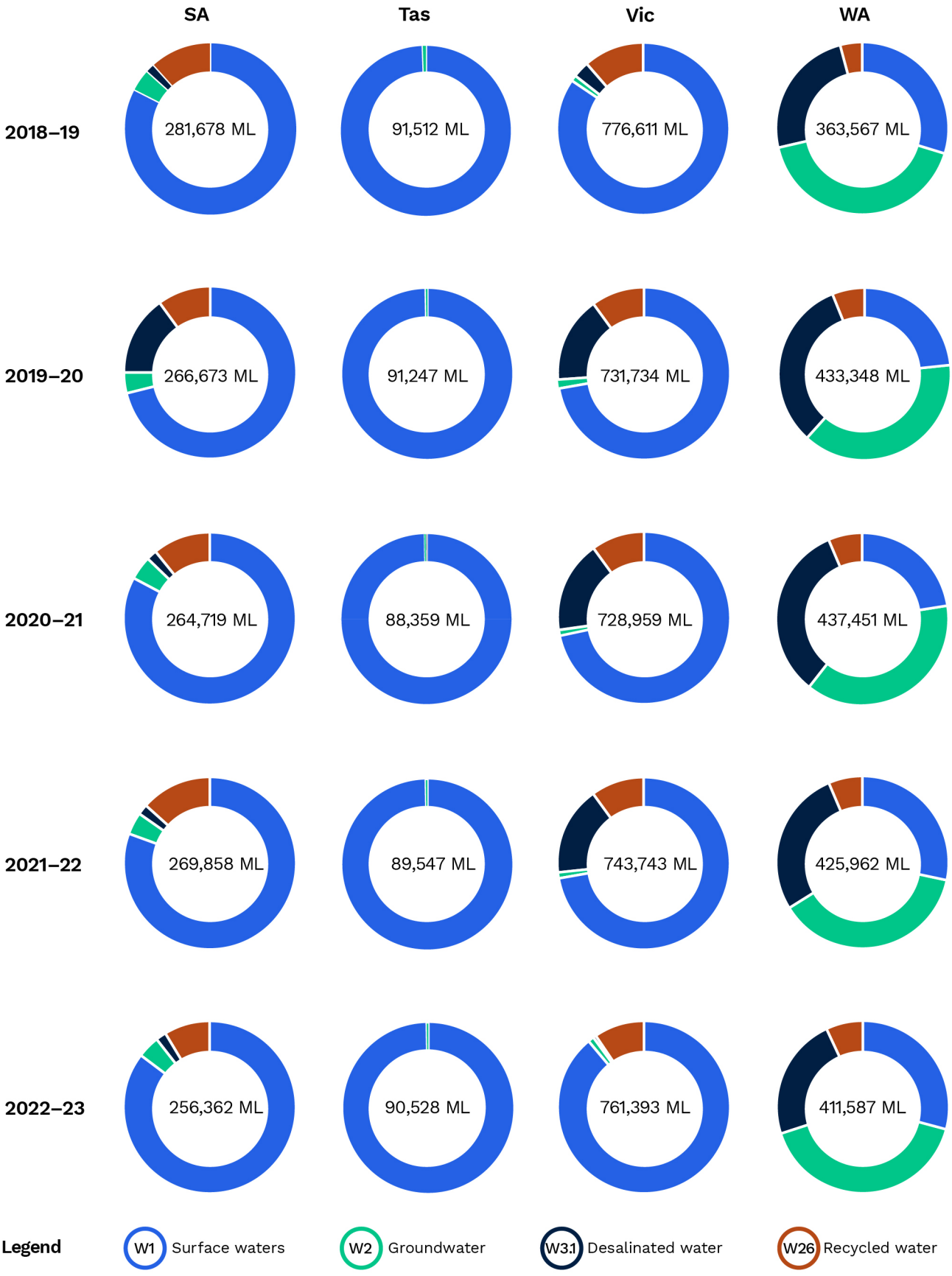

Figure 1.4b Water source breakdown in each state and territory, 2018–19 to 2022–23