1 Introduction

1.1 Context and overview

This *National performance report 2017–18: urban water utilities* (2018 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 2018 Urban NPR compares the performance of 80 utilities and councils (utilities) and five bulk water authorities providing urban water and sewerage services to over 20 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 and analysis for 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 methodologies, 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 2018 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 2018 Urban NPR (including five bulk water authorities) are listed in Appendix C. A summary of utility type by jurisdiction is shown in Table 1.1.

Seventy one of the 85 utilities included in this report provide both reticulated water supply and 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.

[2] National Water Initiative Clauses 75–76

Table 1.1 Utilities reporting in the 2017–18 Urban NPR by size group and jurisdiction.

Jurisdiction	Bulk	Major	Large	Medium	Small	Total
Australian Capital Territory		1				1
New South Wales	2	3		12	13[a]	30
Northern Territory			1		1	2
Queensland	2	4	3	6	7	22
South Australia		1				1
Tasmania		1				1
Victoria	1	4	5	5	2	17
Western Australia		1		1	9	11
Total	**5**	**15**	**9**	**24**	**32**	**85**

[a] Armidale reported for the first time in 2017–18 and is included in this summary. Armidale data are only reported in Part B, since two consecutive years of data are required to feature in Part A results.

1.3 Locations of utilities

The administrative boundaries of all utilities reporting data for the 2018 Urban NPR are shown in Figure 1.1. Further details about the utilities are available from their respective websites.

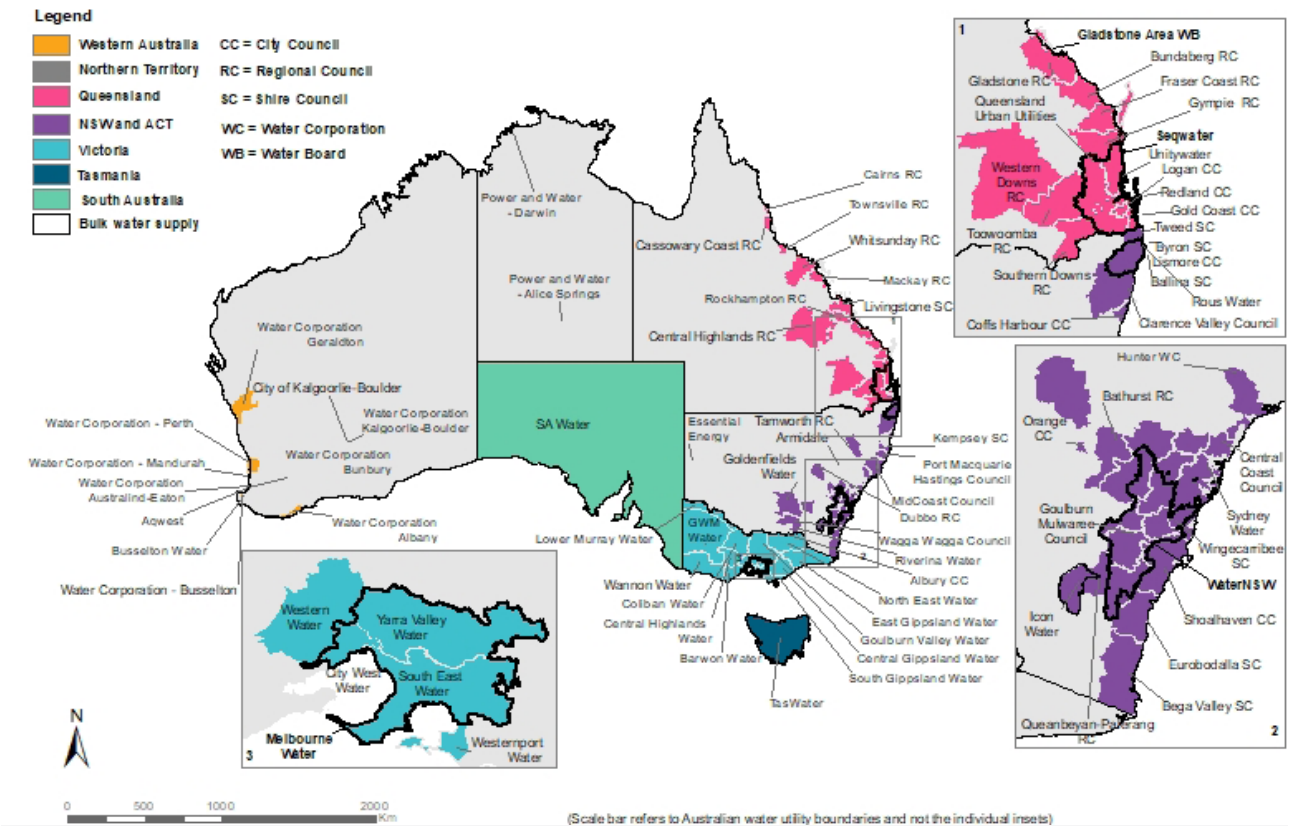

Figure 1.1 The administrative boundaries of all utilities reporting data for 2017–18.

1.4 Key drivers

Key drivers of water utility performance presented in the 2018 Urban NPR include rainfall, temperature, utility size, and sources of water.

Other factors—network density, soil types, the age and condition of infrastructure, and government policy and regulation—also affect performance but are not discussed.

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 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 water sources used (Water resource indicators W1–W7). Persistent dry conditions can trigger thresholds for production from desalination plants and the use of particular groundwater and recycled water sources, which affect operating costs of utilities (Finance indicators F11–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 indicator 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.

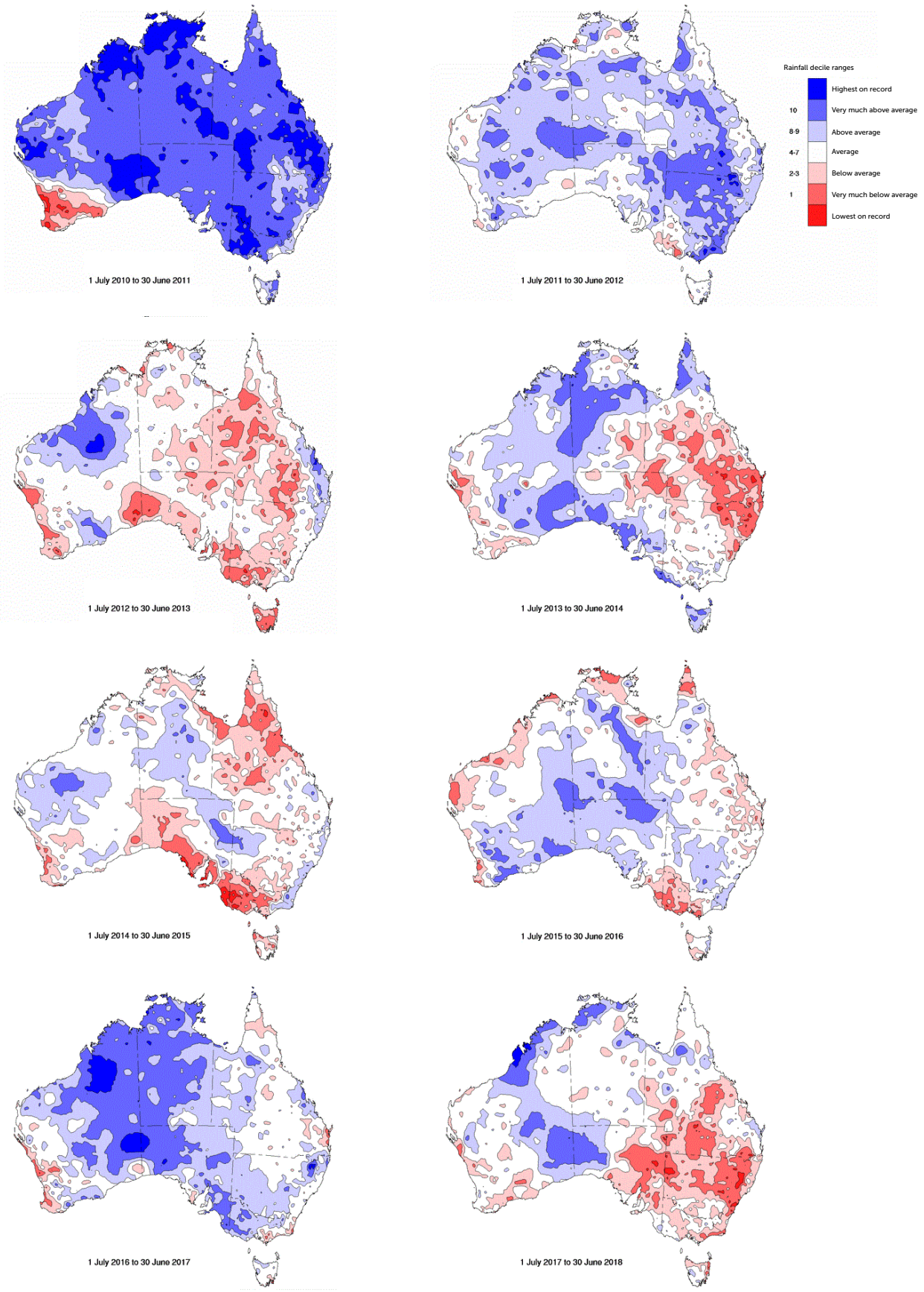

Figure 1.2 Australian 12-month rainfall deciles from 2010–11 to 2017–18.

Note: Decile 1 is the group with the lowest 10 per cent of records; decile 2 the next lowest 10 per cent, and so on, up to decile 10, the highest 10 per cent of records.

Winter 2017

Australia's ninth-lowest winter rainfall, the lowest since 2002, saw an average national rainfall of 36.7 mm—43 per cent lower than the long-term average. Queensland, New South Wales and Western Australia reported the lowest rainfalls, recording 62 per cent, 49 per cent and 43 per cent below the long-term average, respectively. The highest average rainfall, still 17 per cent below its long-term average, was recorded in Tasmania (363.8 mm).

Above-average winter rainfall was restricted to an area of the central Northern Territory, where out-of-season rainfall during the second week of July brought totals in excess of 25 mm over a broad area during what is typically the dry season.

Spring 2017

The average national rainfall for spring was 87.8 mm, 21 per cent above the long-term average. Notable high rainfalls were experienced in South Australia, Queensland and the Northern Territory, who recorded 46 per cent, 38 per cent and 38 per cent above the long-term average, respectively. Drier conditions were observed in Victoria, New South Wales and Tasmania, with rainfalls 14–18 per cent below the long-term average.

The highest spring rainfall was observed in Tasmania (312.4 mm) and the lowest in Western Australia (53.1 mm).

Summer 2017–18

The average national rainfall for summer was 221 mm, 6 per cent above the long-term average.

Summer rainfall was in the lowest 10 per cent of historical observations for much of central inland and western Queensland, with below-average rainfall over most of the region during each month. Summer was the driest on record for some stations in western Queensland, and a number of stations recorded their lowest summer rainfall in several decades.

Autumn 2018

The average national rainfall for autumn was 80.9 mm, 33 per cent below the long-term average.

Rainfall for the season was in the lowest 10 per cent of historical observations for much of the southern mainland. For southern Australia as a whole, autumn rainfall was the second lowest on record. Rainfalls in South Australia, Western Australia and New South Wales were 66 per cent, 62 per cent and 60 per cent below their long-term average, respectively.

Northern Queensland experienced above-average rainfall, while southeast Queensland experienced below-average rainfall.

Winter 2018

Winter rainfall was below average nationally; it was the fourteenth-driest winter on record and the eighth lowest on record for New South Wales. Rainfall for the season was below average for northeastern parts of Western Australia, much of the Northern Territory, the northern and eastern areas of South Australia, most of Queensland and New South Wales, and northern and eastern Victoria.

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 supply; for example, water storage may need to be suspended for some time.
- 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 contributes 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).

Winter 2017

National mean maximum temperatures for winter were the highest on record. More than 90 per cent of Australia reported daytime temperatures in the highest 10 per cent of historical observations. The winter mean temperature was very much above average, being the fifth warmest on record.

Winter mean temperatures were the second warmest on record for Queensland, third warmest for Western Australia, and ninth warmest for the Northern Territory.

Spring 2017

All regions, with the exception South Australia and the Northern Territory, observed mean temperatures for the season among the ten warmest on record. Australia's mean temperature was the sixth warmest on record. Both maximum and minimum temperatures were above to very much above average over the majority of Australia. Much of the southeast was in the highest 10 per cent of historical observations.

Summer 2017–18

All regions except Western Australia observed mean daily temperatures for the season among the tenth warmest on record. Australia's mean temperature was the second-warmest summer on record. Both maximum and minimum temperatures were also very much above average for Australia. Cooler than average summer mean maxima were observed over Western Australia, associated with the very much above average rainfall in this region.

Autumn 2018

The mean temperature for autumn was among the tenth warmest on record for all regions except Tasmania, Queensland, and the Northern Territory. Australia's mean temperature was the fourth warmest on record. Both maximum and minimum temperatures were warmer than average for Australia, particularly maxima, which were the fourth warmest on record. Mean monthly maxima were the warmest on record for much of New South Wales, including Sydney.

Winter 2018

All regions observed above-average mean temperatures. The Northern Territory, South Australia, Queensland and New South Wales were among the ten warmest on record for the season. For Australia as a whole, it was the fifth-warmest winter on record.

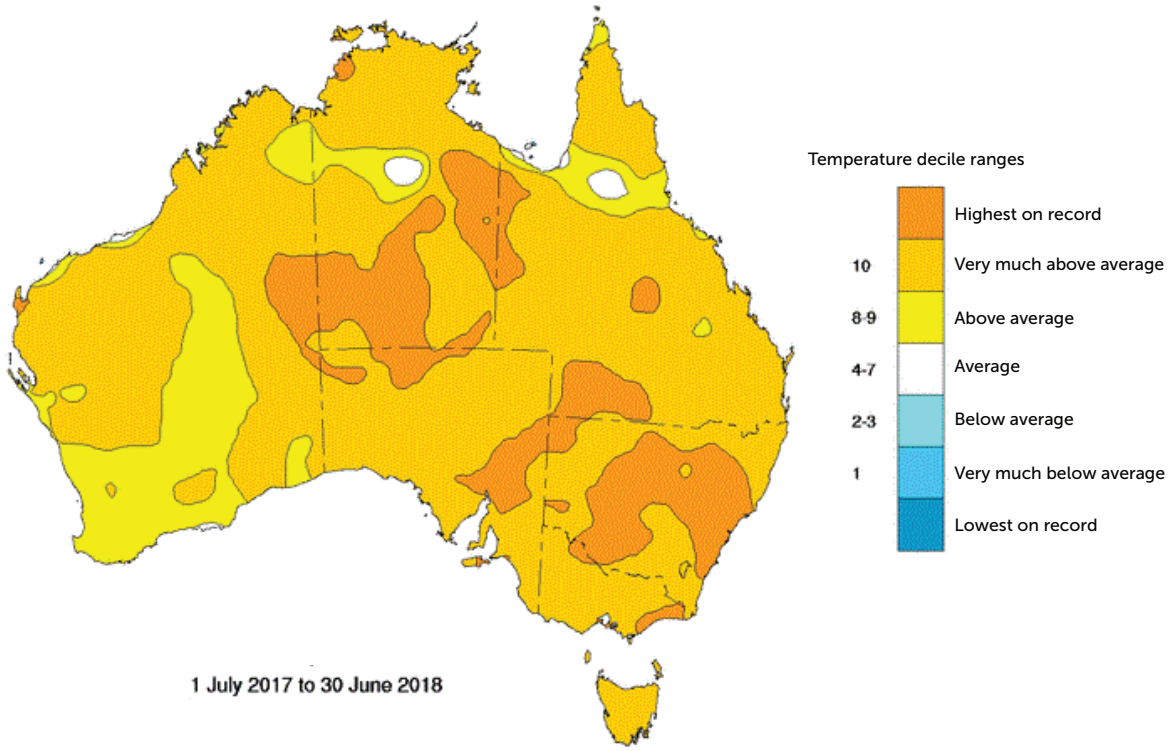

Figure 1.3 Australian 12-month maximum temperature deciles for 2017–18.

1.4.3 Utility size

The size of the 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 a number of 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 (meeting 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 an 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.

Figures 1.4a and 1.4b show the annual supply from different sources of water, and the total supply, for utilities in each State and Territory from 2012–13 to 2017–18. Care should be taken when comparing the total source of water volumes between years, due to the varied interpretations of water sourced from recycling (W4), which has probably led to under-reporting these volumes.

- Water sourced from surface water (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 the desalination of marine water (Water resource indicator W3.1) and groundwater (Water resource indicator W2).
- Surface water extraction has increased proportionally against other sources with increase in water supplied.
- Recycled water is represented by W26 in 2017–18, which is not directly comparable to Water resource indicator W4 used in previous years, as W26 includes environmental flows and does not explicitly include recycled water to agriculture.
- In 2017–18, New South Wales reported lower total water sourced compared to previous years, probably reflecting the drier conditions throughout the region.
- Desalination in New South Wales and Queensland remains minimal, with plants operating in maintenance or 'standby' modes.

Table 1.2 Water source breakdown (W1, W2, W3.1, W4/W26) in each State and Territory, 2012–13 to 2017–18.

2012–13	W1	W2	W3.1	W4	Total water sourced
Australian Capital Territory	47,838	-	-	4,416	52,254
New South Wales	1,037,198	26,252	-	49,239	1,112,689
Northern Territory	37,804	14,113	-	1,027	52,944
Queensland	445,342	16,807	2,805	35,833	500,787
South Australia	110,184	3,153	36,472	5,767	155,576
Tasmania	-	-	-	-	-
Victoria	625,961	9,317	24,850	31,148	691,276
Western Australia	47,490	168,050	-	9,891	225,430

2013–14	W1	W2	W3.1	W4	Total water sourced
Australian Capital Territory	48,731	-	-	4,372	53,103
New South Wales	1,015,485	27,361	-	51,258	1,094,104
Northern Territory	34,396	15,538	-	666	50,600
Queensland	491,938	16,790	1,435	30,275	540,438
South Australia	140,935	11,968	61,023	7,417	221,343
Tasmania	-	-	-	-	-
Victoria	614,514	8,810	-	27,855	651,178
Western Australia	49,732	154,682	-	9,966	214,380

2014–15	W1	W2	W3.1	W4	Total water sourced
Australian Capital Territory	47,114	-	-	4,352	51,466
New South Wales	1,064,788	26,481	-	48,423	1,139,692
Northern Territory	40,530	13,797	-	883	55,210
Queensland	513,371	24,743	1,312	29,753	569,179
South Australia	184,243	11,907	22,830	7,290	226,270
Tasmania	-	-	-	-	-
Victoria	616,385	10,469	-	25,393	652,247
Western Australia	48,075	153,069	119,457	9,871	330,473

2015–16	W1	W2	W3.1	W4	Total water sourced
Australian Capital Territory	50,403	-	-	4,056	54,459
New South Wales	1,127,403	35,487	-	48,784	1,211,674
Northern Territory	38,034	14,199	-	522	52,755
Queensland	523,770	21,820	1,927	32,316	579,833
South Australia	207,541	12,515	7,774	6,972	234,802
Tasmania	77,548	248	-	-	77,796
Victoria	646,109	11,240	-	34,905	692,254
Western Australia	20,445	167,845	138,645	10,771	337,706

2016–17	W1	W2	W3.1	W4	Total water sourced
Australian Capital Territory	49,916	-	-	4,313	54,229
New South Wales	1,054,195	24,661	-	43,954	1,122,810
Northern Territory	34,818	13,252	-	1,002	49,072
Queensland	501,287	23,247	2,000	30,134	556,668
South Australia	186,837	11,767	4,185	6,247	209,036
Tasmania	77,476	237	-	-	77,713
Victoria	655,395	9,339	46,209	15,537	726,480
Western Australia	-8,175	168,476	149,823	9,789	319,913

2017–18	W1	W2	W3.1	W26[a]	Total water sourced
Australian Capital Territory	52,157	-	-	30,296	82,453
New South Wales	948,053	32,321	-	79,198	1,059,572
Northern Territory	38,292	12,780	-	1,597	52,669
Queensland	543,247	28,072	3283	35,025	609,627
South Australia	208,133	12,150	4,332	29,292	253,907
Tasmania	86,893	273	-	5,605	92,771
Victoria	665,311	8,446	14,972	31,485	720,214
Western Australia	86,005	162,558	148,905	16,767	414,235

[a] W26 replaces W4 to represent recycled water sources as W4 was discontinued. Please refer to the reporting handbook for details on difference in indicator definitions between the two.

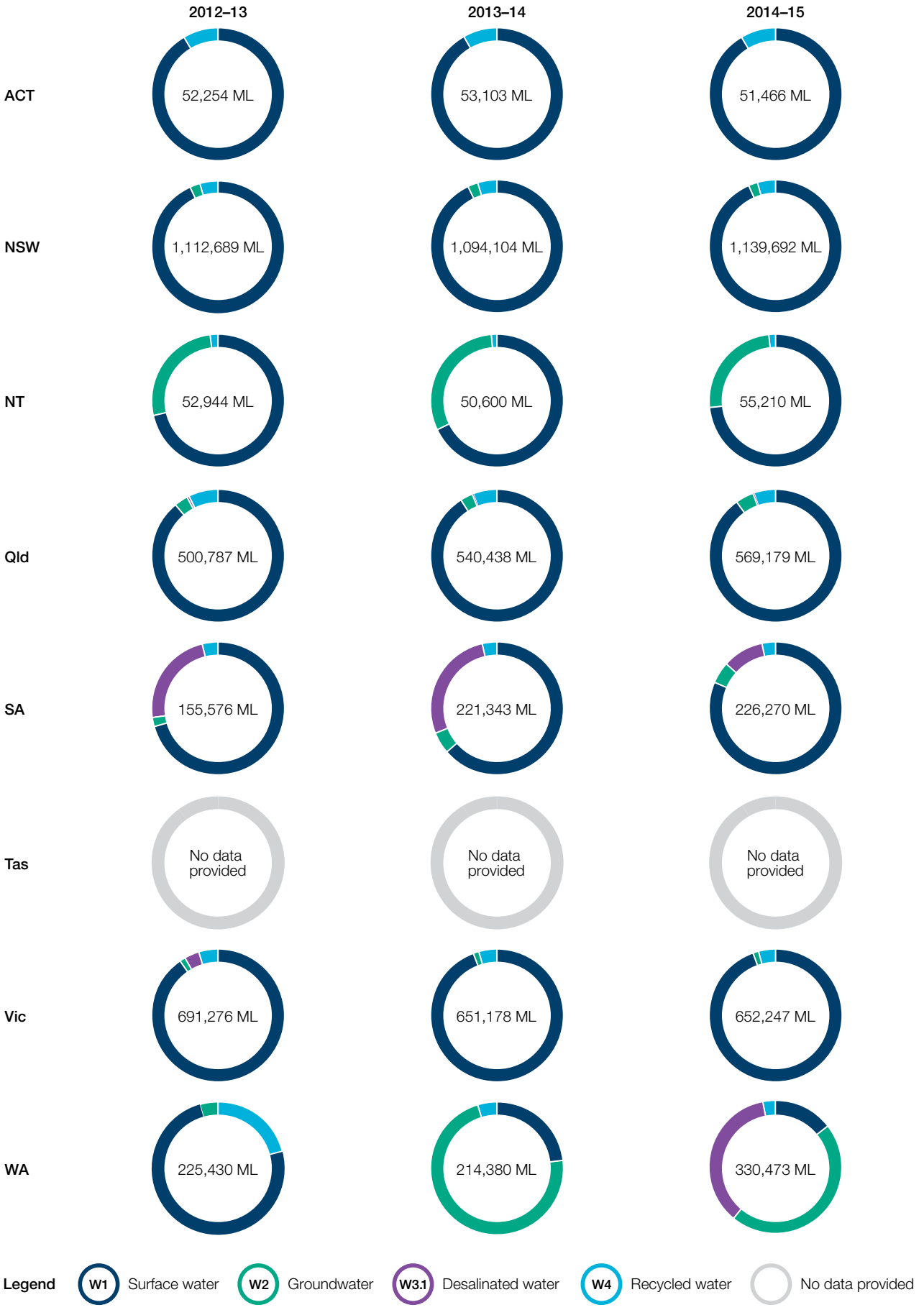

Figure 1.4a Water source breakdown (W1, W2, W3.1, W4) in each State and Territory, 2012–13 to 2014–15.

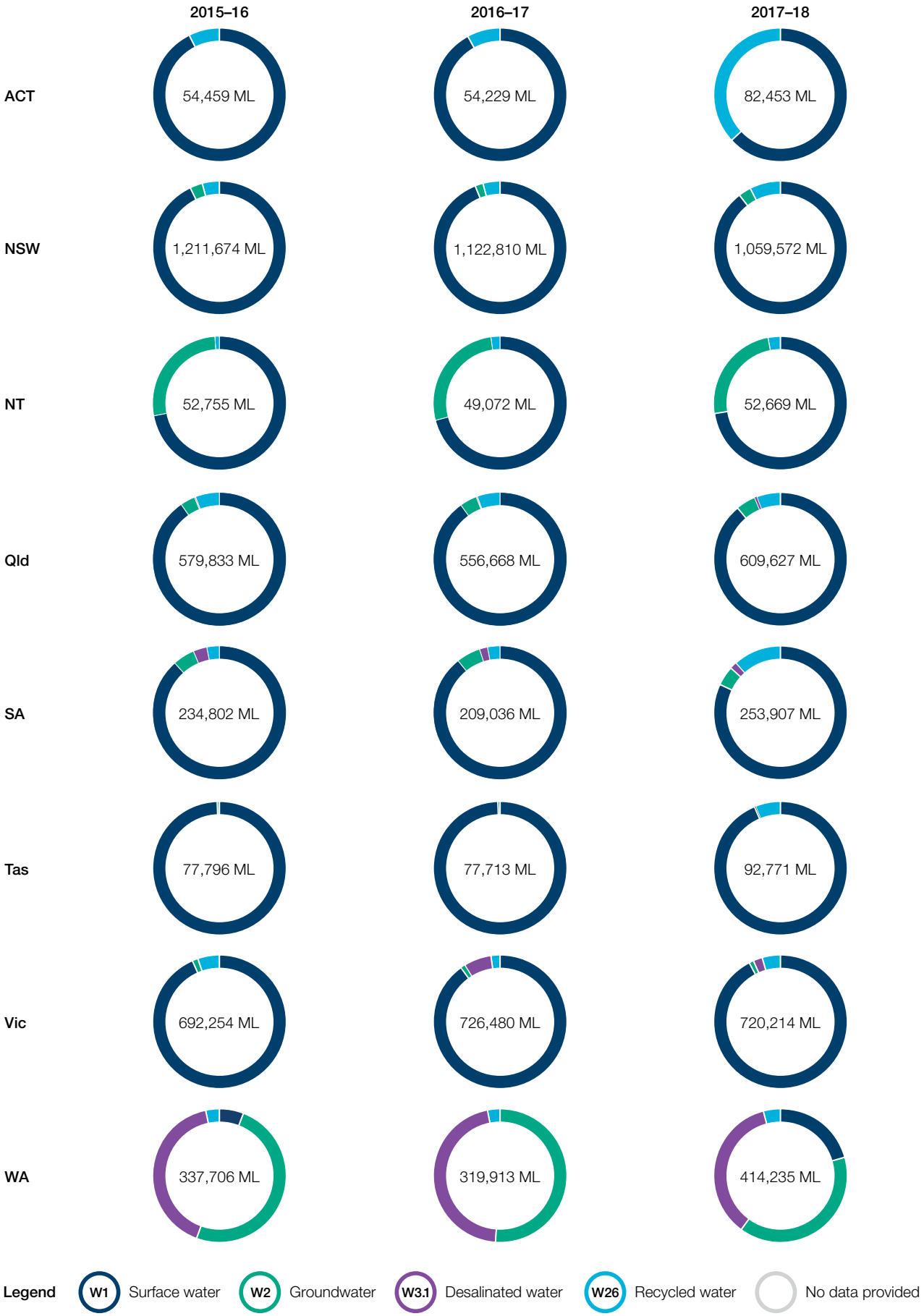

Figure 1.4b Water source breakdown (W1, W2, W3.1, W4/W26) in each State and Territory, 2015–16 to 2017–18.