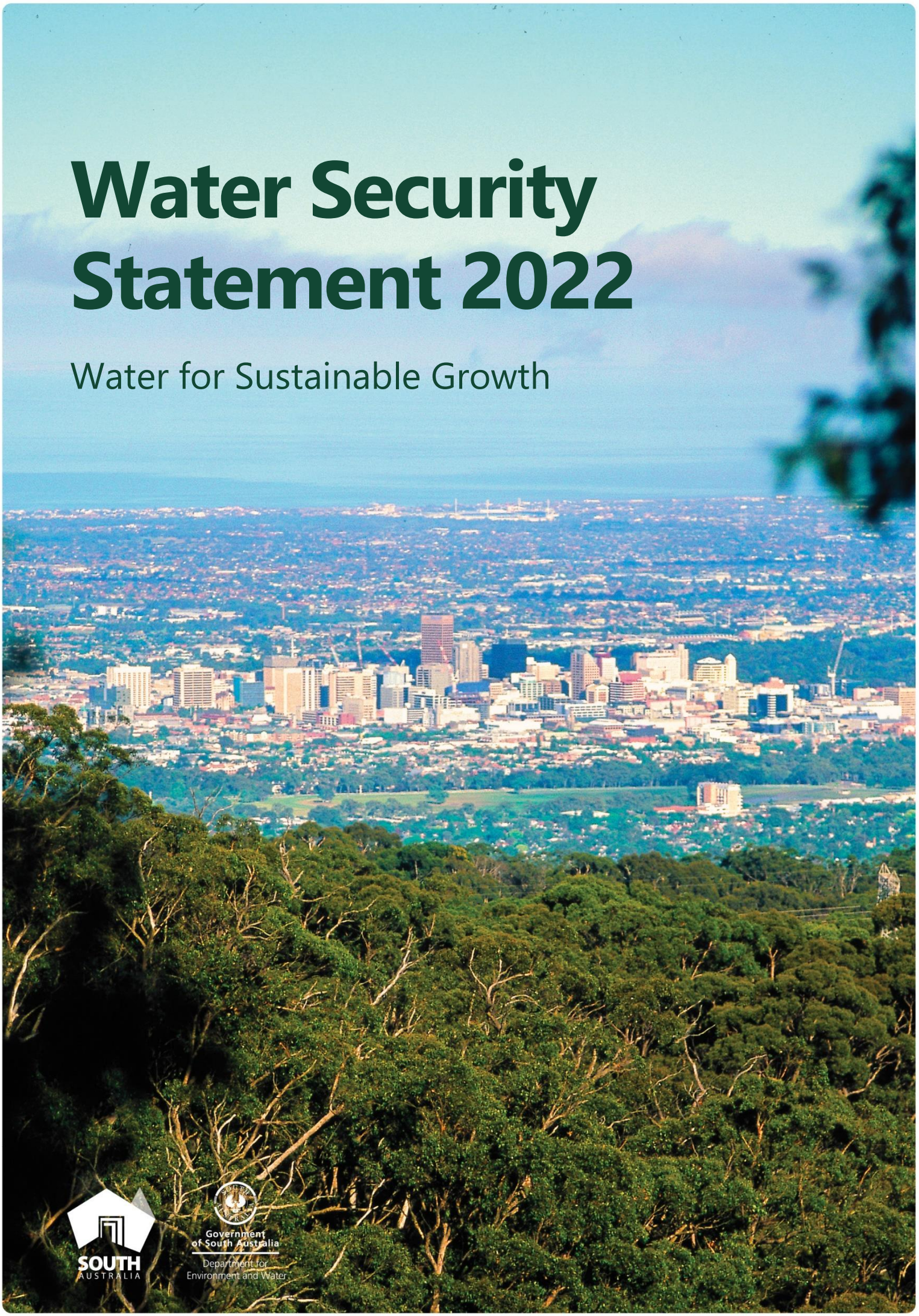
Water Security Statement 2022

Water for Sustainable Growth



SOUTH AUSTRALIA

Government of South Australia

Department for Environment and Water

Contents

Minister's foreword

I'm pleased to present the South Australian Government's 2022 Water Security Statement.

The South Australian Government understands the importance of water to the state. It provides the foundation of our economy and is essential for households, First Nations' cultural purposes and the environment.

This statement provides a timely opportunity to take stock. We currently have a high degree of water security across much of the state thanks to investment in water infrastructure and responsible water resource management. However, in a changing climate we must innovate and adapt to ensure that our water management is ecologically sustainable and that water is available for economic growth.

Water security is an essential element of sustainable economic growth and water related investments are critical to achieving the state's three per cent economic growth target.

Recognising this, we are supporting future investment by developing business cases for the provision of recycled water from Bolivar to the Barossa and for new water supplies for the Eden Valley and for the Clare Valley. In the north of the state we are partnering with the mining and energy sectors to address knowledge gaps and stimulate water infrastructure investment that drives economic growth.

We are also investing in improving water security for households and businesses across the state, with commitments to new desalination plants on Kangaroo Island and the Eyre Peninsula and water supply upgrades for regional areas including Yunta, Oodnadatta, Maree, Terowie, Marla, and Manna Hill. At the same time, the government has improved water affordability by reducing SA Water's rates for South Australian families and businesses.

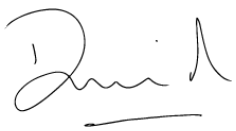
There are significant benefits associated with blue and green spaces, with water contributing to our liveability, activity and overall wellbeing. In metropolitan areas we are working towards a cooler, greener, wilder and climate-resilient Adelaide, which will be an important part of realising our vision for Adelaide as a National Park City, the second National Park City internationally after London. A range of reservoirs in both Adelaide and in regional South Australia have also been opened, while carefully managing water quality.

We continue to drive full implementation of the Murray-Darling Basin Plan to achieve a healthy River Murray, which will help ensure that we are able to meet critical human water needs for over 90% of South Australians. Since coming into government, we have worked hard to improve the health of the River Murray, Coorong and Lower Lakes. Massive investment in environmental infrastructure along the SA River Murray now enables floodplains to once again be inundated to support ecological outcomes and I am excited by the investment to restore the health and vitality of the Coorong to get this precious place back on track.

In the coming years, the state government will continue to support water related investment to increase our climate resilience. This includes water recycling projects (that build on recent experience in Northern Adelaide and McLaren Vale), integrated urban water management, the roll out of greener and cooler neighbourhoods and investment in understanding climate impacts on water security.

The South Australian Government's Water Security Statement outlines our approach to enhancing water security. It includes the development of targeted water security strategies and is part of a long-term and strategic approach to be implemented in partnership with community and business.

I look forward to seeing it unfold.



Hon. David Speirs, MP
Minister for Environment and Water

Executive summary

This Water Security Statement (the statement) has been prepared to meet the water planning requirements of the *Water Industry Act 2012* and includes an overview of South Australia's water supplies and demands and its strategic priorities for ensuring long-term water security.

Water security means having an acceptable quantity and quality of water for people, industry, agriculture and the environment, now and into the future.

As our climate changes and demand for water increases, effective water security planning will help us prepare for future climate risks and make the most of all available sources of water. Such planning is vital for maintaining vibrant communities and healthy ecosystems and is a critical enabler of sustainable growth in key sectors of South Australia's $110 billion economy.

As outlined in this statement, water-related investments and reforms undertaken across the state over the last decade have provided high levels of water security for the vast majority of the state's population, as compared with the Millennium Drought.

Key recent investments and developments outlined in this statement include:

- improving water affordability by reducing SA Water's rates for South Australian families and businesses
- $138 million for desalination plants on the Eyre Peninsula and Kangaroo Island
- $41 million in remote community water supply upgrades for regional areas including Yunta, Oodnadatta, Maree, Terowie, Marla, and Manna Hill
- $7.9 million to support water services in Aboriginal communities
- $14.7 million of investment in South Australia's water licensing system to enhance users' experience and support more efficient water markets
- investment in innovative water recycling projects, such as the Northern Adelaide and McLaren Vale irrigation systems, to expand recycled water use for horticulture and viticulture
- $5.6 million Water and Infrastructure Corridors initiative, partnering with the mining and energy sectors to address groundwater knowledge gaps and establish a framework for multi-use infrastructure
- with National Water Grid Fund support, developing business cases for the provision of recycled water from Bolivar to the Barossa region and raw water to Eden Valley, as well as for the delivery of new water infrastructure in the Clare Valley region
- locking in a 50 GL improvement in dry year water availability for South Australian River Murray irrigators, by increasing Adelaide's reliance on its other sources, including desalination
- negotiating increased flexibility for SA Water's River Murray licence for Adelaide, allowing desalination production to support the trade of water to other River Murray water users
- reviewing and modifying water allocation reductions in the Lower Limestone Coast based on updated science and assessment of risks
- construction of flood plain infrastructure in the Riverland to enable increased environmental watering to improve flood plain health.

The key challenge now is to build on the state's strong legacy of water investment and reform to: ensure all South Australians' critical human water needs are able to be met; ensure equitable access to water resources, including for First Nations peoples; protect the environment into the future; and sustainably grow the South Australian economy.

As a key element of its water security planning agenda, the state government is proposing to partner with stakeholders to develop targeted water security strategies *for key water resources, communities or industries* – where evidence shows water supplies of a suitable quality will be insufficient to meet established or credible potential demands, including in response to climate risk. These strategies will build on traditional water allocation planning processes and link fit-for-purpose water supplies with existing and emerging water demands to support economic growth. The most recent example of this more targeted approach is in the Barossa and Eden Valleys, where discussions have begun with stakeholders about their vision for a water-secure future and strategic pathways to achieving it.

This statement includes 10 state-level strategic priorities that are enabling and will contribute to enhancing water security and meeting the state's growth targets. The priorities have been developed in consultation with stakeholders and are summarised below:

1. **Climate resilience** – investing in understanding climate impacts to support adaptive decision-making and increase resilience.
2. **Water as an enabler of sustainable growth** – in partnership with key stakeholders, developing targeted water security strategies for key water resources, communities and industries.
3. **Ecologically sustainable water resource management** – ensuring water resource management is ecologically sustainable and that water allocation plans are updated within timeframes that reflect statutory requirements and risks to users and water resources.
4. **Provision of critical human water needs** – ensuring that the critical human water needs of all South Australians are able to be met, including in remote communities.
5. **Murray–Darling Basin Plan** – continuing to drive full implementation of the Murray-Darling Basin Plan to achieve a healthy River Murray, to meet critical human water needs for over 90% of South Australians, maintain vibrant river communities, meet the aspirations of First Nations peoples, and sustain internationally important floodplains and wetlands.
6. **Aboriginal water interests** – ensuring First Nations have equitable access to water resources for cultural purposes, including economic purposes.
7. **Integrated urban water management** – developing and implementing an Urban Water Directions Statement that sets a framework for optimising the use of all urban water sources in a way that supports growth, greening and liveable towns and cities; efficient and cost-effective water use; and the release of recycled water for productive use outside urban areas.
8. **Innovation and competition in the water industry** – implementing the recommendations of the 2021 review of the *Water Industry Act 2012* to drive innovation and competition in the water industry.
9. **Data, analytics and insights for the digital water future** – investing in data management, analytics and decision support tools to efficiently monitor and manage emerging water risks and opportunities, increase transparency and support timely decision-making.
10. **Growing the South Australian water sector** – working with the South Australian water sector, including water retailers and the research, innovation and education sectors, to build the state's capacity to respond to future water challenges across the economy and capture a greater share of an expanding global market for water technologies and services.

The next review and update of this Water Security Statement will coincide with the consideration of SA Water's draft Regulatory Business Proposal for the 2024 to 2028 regulatory period. As such, the 10 state-level priorities in this statement are the government's overarching water security priorities for the current 4-year regulatory period, to 1 July 2024.

Introduction

Water use is increasing across the world as populations grow and agricultural and industrial production increases. Combined with climate change, which is likely to result in reduced water availability in many regions, these factors are affecting the ability of water resources to meet demands. Given the challenges posed by our climate and geography, South Australia has long recognised the short and long-term risks posed to water security. However, the state has a history of adapting well to manage its water challenges and is now well positioned to build on its capabilities to help address such challenges internationally.

Responding to future water challenges will require a comprehensive understanding of our current water security status, the likely future state of our water security under plausible climate and economic growth scenarios, and a clear plan to overcome the challenges and realise opportunities for sustainable growth. Implementing the plan will require a dynamic water industry, collaboration with research organisations, investment in infrastructure and innovative technologies, and integrated water management approaches that ensure our ongoing resilience in a changing climate.

The state government is responsible for the sustainable management of South Australia's water resources and is committed to ensuring that water availability supports economic growth. This statement shares the government's vision for a water-secure South Australia, whereby the state has the water needed for a prosperous and healthy society and thriving ecosystems.

The statement includes:

- an overview of South Australia's water resources and how they are managed
- information on Adelaide's current and future water security
- a snapshot of water security by region
- further detail on how we are addressing current and future statewide water security priorities.

What is water security?

Water security means having an acceptable quantity and quality of water for people, industry, agriculture and the environment, now and into the future.

This requires the sustainable management of groundwater and surface water resources; water resources to be shared fairly and efficiently; recycled water to contribute to appropriate water security outcomes; an acceptable trade-off to be found between reliability of supply and cost for a given end use; and resilience in a changing climate.

Why we need to consider water security

South Australia is often referred to as the 'driest state on the driest inhabited continent'. We have dealt with this challenge through significant investment in water infrastructure and world-leading water resource management to ensure we have a high degree of water security across much of the state. For example, Adelaide's access to a diverse portfolio of water supply options ensures that its drinking water supply is secure until around 2050. Significant investment has also been undertaken or is planned by SA Water in many regional areas, including for its customers in remote communities.

A number of water security challenges have emerged in recent years that the state government is working with local partners to address. Actions being undertaken to address these priorities are detailed in this statement. Further challenges will also be faced as our climate changes and as water demand increases, and the priorities set out at the end of this document will contribute to addressing these challenges.

Water for people and communities: Safe, secure and affordable access to water is essential for people and communities.

Safe drinking water is critical for health and wellbeing and, as our climate gets hotter and drier, water will be increasingly important for greening, cooling and liveability in our towns and cities.

While the majority of the state's population have high levels of water security, ensuring that all South Australians' critical human water needs are met is a key priority, including for remote communities. Water is also intrinsically linked to Aboriginal people's spiritual, social, cultural and economic practices.

Delivering affordable water to South Australians

SA Water and the government are responsible for setting retail prices that are consistent with the Essential Services Commission of South Australia's allowed revenues. Since 1 July 2020, SA families and businesses have saved hundreds of dollars each year on their water bills. In 2020–21, an average household saved around $200 each year, while an average business saved $1,350 compared to 2019–20.

Water for the environment: Water is essential to maintaining healthy water-dependent ecosystems across South Australia. Wetlands, flood plains, watercourses and groundwater-dependent ecosystems support biodiversity, including nationally and internationally important flora and fauna, and provide ecosystem services that underpin our way of life. Healthy ecosystems provide a multitude of benefits to people, communities and the economy.

The *Landscape South Australia Act 2019* sets the legislative framework for managing water for the environment. In prescribed water resource areas, environmental water provisions are determined before allocations for consumptive purposes are provided. This ensures ecosystems remain healthy, which enables social, cultural, biodiversity and economic benefits to be realised.

Water for growth: Growth State is the South Australian Government's plan for economic growth. It responds to the needs of industry and focuses on building South Australia as a place to invest, expand a business or create a new one. It provides a framework to develop and maintain momentum in economic reform and build a stronger, brighter future. Sustained economic growth can only be realised if the necessary water is available.

The South Australian water sector is a critical foundation of the economy and is essential for the ongoing competitiveness of all the state's growth industries. Building on past success in water management, there is the opportunity for South Australia to further establish itself as a world leader in water innovations. This could result in direct economic benefits from improved water use productivity across the economy and increased international trade from, and inward investment in, the local water industry.

Water security in a changing climate: We are experiencing hotter and drier conditions with more frequent and intense extreme weather events as a result of a changing climate (DEW 2018). Long-term projections indicate these trends are likely to continue. It is important that our water resource management accounts for these changes to ensure that we can maintain water security for our communities, environment and economy into the future.

Who is responsible for water security?

Responsibility for water security is shared between public and private entities involved in the regulation, management, treatment, distribution and use of water. Ensuring long-term water security requires stakeholders and the community to agree upon what is acceptable in terms of water quality, quantity, cost and reliability, and to ensure that those requirements can be met now and into the future for a given location and purpose. Figure 1 provides an overview of the relevant legislation and responsibilities in relation to the provision of water security in South Australia.

From a water resource management perspective, the primary responsibility of the South Australian Government is to establish and enforce transparent rules based on knowledge of water resources, with such knowledge being based on hydrological and ecological science and extensive monitoring. This ensures that water is managed sustainably and equitably and that its economic potential is maximised.

The *Landscape South Australia Act 2019* provides the framework for managing the state's water resources. For water resources that are prescribed by regulation under that Act, a licensing system is put in place to make sure water is used within sustainable limits, as set out by a water allocation plan. The water licensing system allows an individual or business to own water entitlements, which provide a share of the available water resource in the form of a water allocation volume. Water entitlement or allocation volumes may be traded, allowing water to move to where it can be used most productively. It is the responsibility of an individual or business to ensure they have access to sufficient volumes to meet their water needs, within the framework set by the relevant water allocation plan.

Most businesses' and individuals' water requirements are met by a water retailer. Retailers provide potable water services to 770,000 households and businesses across the state, with SA Water providing services to 99% of those customers. Potable water is required to meet the requirements of the *Safe Drinking Water Act 2011*, while the *Water Industry Act 2012* governs all water industry retailers. Water retailers may source their bulk water from allocations they are entitled to receive from water resources or from an independent source of water, such as a desalination plant.

The Essential Services Commission of South Australia is an independent regulator that issues water retail licences to water and sewerage service retailers, sets minimum standards to protect consumers, and carries out price determinations to ensure customers pay a fair and reasonable price for the services they receive.

Why a water security statement?

The state government adopted Water for Good in 2009 (Government of South Australia 2009)[1] as the state's overarching water security strategy. Without question, the key investments and actions outlined in Water for Good placed South Australia in a much stronger position in terms of water security, compared to its position prior to the Millennium Drought.

More than 10 years on, this statement provides the first statewide snapshot of South Australia's water security since Water for Good and has been prepared to meet the water planning requirements of the *Water Industry Act 2012*.

As such, it includes an overview of South Australia's water resources, water supplies and demands, and near-term strategic priorities relevant to ensuring our long-term water security. It is intended that the next comprehensive statewide water security statement will be published in 2024, to coincide with the start of SA Water's next regulatory business period.

[1] Including construction of the Adelaide desalination plant, enhanced stormwater and wastewater capture and recycling, and implementation of the Murray–Darling Basin Plan.

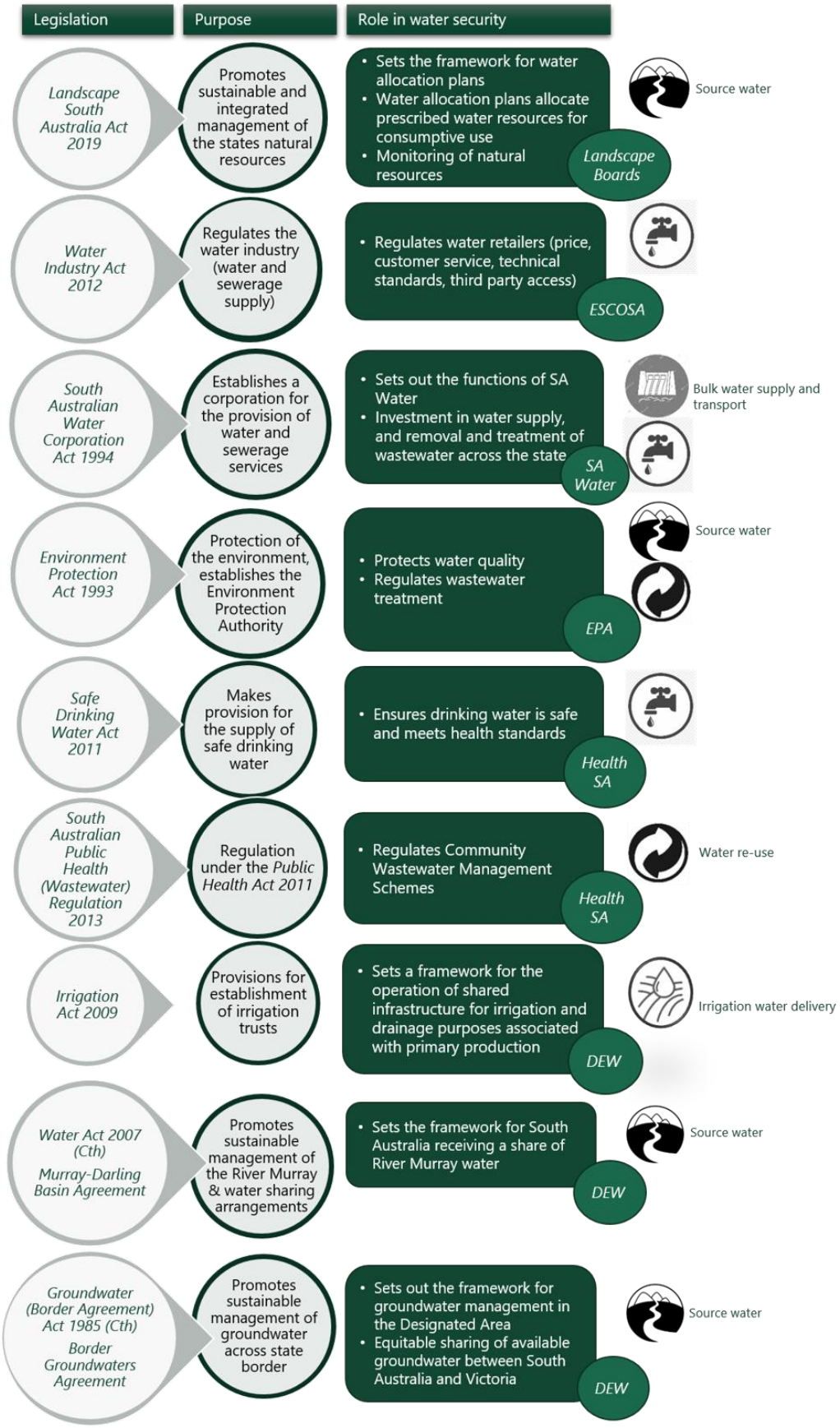


Figure 1: Relevant legislation and responsibilities in relation to the provision of water security services in South Australia

Water resource management in South Australia

Where do we get our water from?

South Australia has a wide range of water sources that are used to supply water including surface water, groundwater, desalinated water, and recycled stormwater and wastewater. Figure 2 outlines the average volume of water in gigalitres (GL) that was used from prescribed surface water and groundwater resources between 2014–15 and 2018–19, as well as the average water use from recycled sources and desalination. Relatively small additional volumes are also used from groundwater sources in non-prescribed areas and via direct rainfall capture using rainwater tanks; however, this use is not actively monitored.

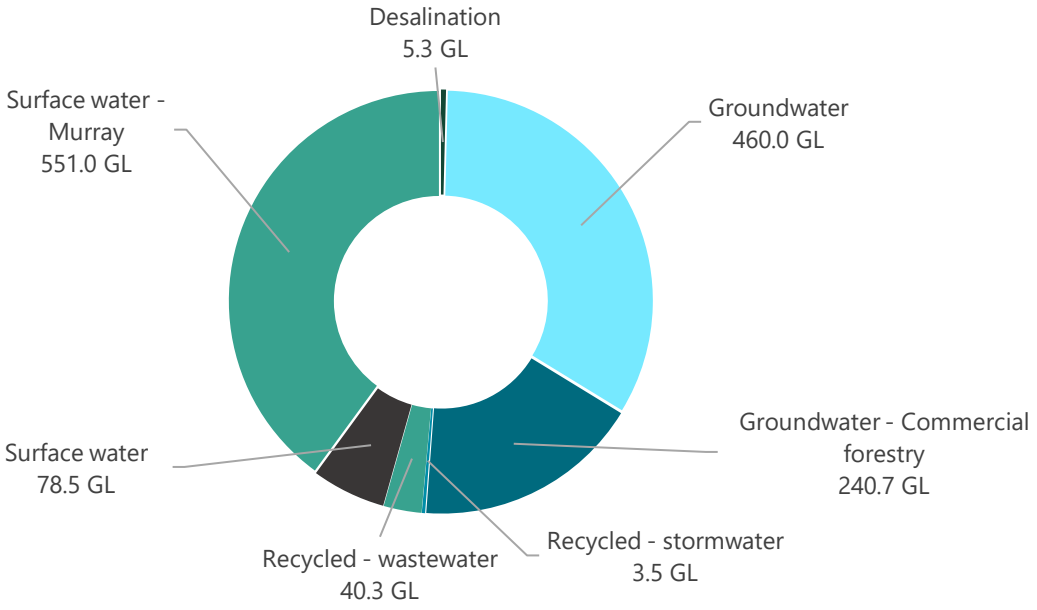


Figure 2: Average annual volume of water used in South Australia by resource type (2015–16 to 2018–19)

Groundwater

Groundwater is an important resource across large areas of South Australia, with an average use of approximately 700 GL per year[2]. It is used for irrigated horticulture and agriculture, forestry, domestic supply, watering stock, mining, industrial applications (such as beverage manufacture) and irrigation of recreational and sports grounds. Groundwater plays an important role in providing some businesses with water in all years, while for others it is particularly important during dry times, when rainfall and surface water availability is limited. The use of groundwater must be carefully managed because its ability to be replenished is often limited.

Forestry water use

Groundwater supports large areas of commercial forestry in South Australia, particularly in the South East. Forestry's water use is estimated at over 240 GL per year. Water use by commercial forestry is managed in coordination with other groundwater use due to the large impact forestry can have on local water availability.

Surface water

Surface water is the water in our streams, rivers, lakes, dams and wetlands. Surface water is replenished by rain or when groundwater discharges to the surface. Due to our dry climate, South Australia's surface water systems are mainly ephemeral, flowing in response to rainfall events. The exception is the River Murray, which is more regulated due to the large number of dams, locks and weirs within the Murray–Darling Basin. As the largest source of surface water in South Australia, it is discussed separately below. Significant watercourses near Adelaide include the Gawler, South Para, North Para, Torrens, Onkaparinga and Inman rivers. On Kangaroo Island, Middle River is an important source of water for both drinking water supply and agriculture. In the Far North, the Diamantina-Warburton River System and Cooper Creek remain unregulated and they flow into South Australia, draining large upstream areas of the Lake Eyre Basin, mainly in Queensland. River flows

[2] This includes 460 GL of licensed groundwater use from the South East, Mount Lofty Ranges, Murray Region, Northern Adelaide Plains, Barossa, Clare Valley, Eyre Peninsula and the estimated 240 GL used by licensed commercial forestry plantations. Groundwater use in the Far North is not currently available, but a volume of 49 GL is licensed.

in the Lake Eyre Basin are highly variable and characterised by the 'boom and bust' dynamics of arid and semi-arid environments. These variable, largely unregulated flows are vital for the health and ecology of the system.

River Murray

The River Murray is essential to the economic, social, cultural and environmental wellbeing of South Australians. An average of 135 GL of water per year from the River Murray was used by Adelaide and regional towns across the state and approximately 400 GL for irrigated agriculture between 2014–15 and 2018–19.

The volume of water available to South Australia and other Basin states is determined by the Murray–Darling Basin Authority in accordance with the Murray–Darling Basin Agreement (the Agreement). The water sharing arrangements that we have today, as set out in the Agreement, have largely been in place for the last 100 years. South Australia receives a maximum annual entitlement (Entitlement) of 1,850 GL under the Agreement. South Australia's Entitlement is reduced when conditions are dry and water availability in the River Murray System is limited and it is adjusted for trade. Additional environmental water may flow to South Australia as a result of environmental water being made available by the Commonwealth Environmental Water Holder or as a result of unregulated flows during wet periods.

Figure 3: Geographical extent of the Northern and Southern basins within the Murray–Darling Basin (source: MDBA)

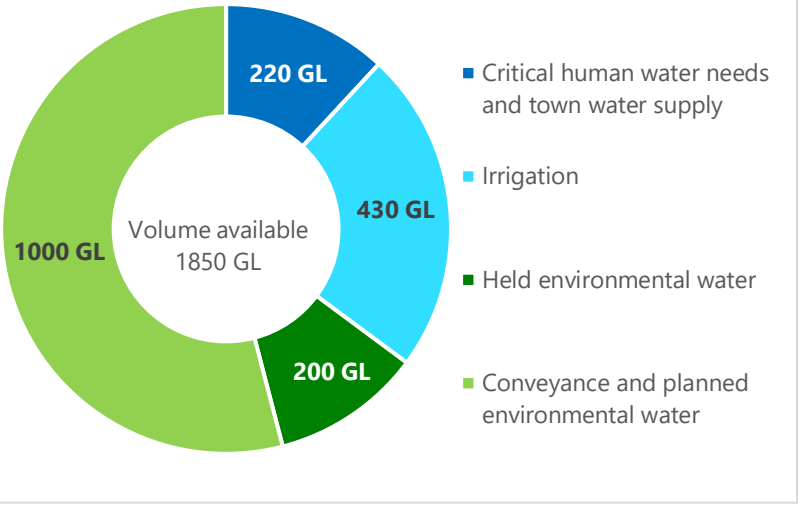


Figure 4: Share of River Murray water available to South Australia when South Australia receives its full Entitlement

The Murray–Darling Basin Plan (the Basin Plan) establishes safeguards for the provision of critical human water needs and sets sustainable diversion limits on how much water can be used for consumptive purposes (urban, industrial and agricultural) in the Murray–Darling Basin to ensure enough water is available for the environment. See Figure 3 for the geographical extent of the Basin. Each sustainable diversion limit sets long-term annual average limits on how much water can be used for consumptive purposes within a defined geographical area. The long-term average sustainable diversion limit in South Australia is 542.8 GL per year. Water available to South Australia from the River Murray is shared in accordance with the requirements of the Water Allocation Plan for the River Murray Prescribed Watercourse and the South Australian River Murray Water Resource Plan. Figure 4 outlines how River Murray water is shared when the state's full Entitlement under the Agreement is received.

Recycled water

South Australia is a national and global leader in stormwater and wastewater recycling (DEW 2020b). More than 34 GL of water is recycled and used each year in South Australia. Stormwater recycling involves capturing stormwater runoff, storing it and re-using it in a 'fit-for-purpose' way. This often involves capturing and storing water in wetlands, injecting it into a groundwater aquifer, and pumping it out of the aquifer to irrigate parks and gardens. Wastewater is also treated and recycled; for example, recycled water from the Bolivar, Glenelg, Christies Beach and Aldinga wastewater treatment plants is used to irrigate crops, parks and gardens.

Desalination

Desalinated water is produced by removing the salt and impurities from an existing water source such as seawater, treated wastewater or low quality groundwater. SA Water operates 2 seawater desalination plants, one at Lonsdale in Adelaide and one at Penneshaw on Kangaroo Island. New desalination plants and associated distribution infrastructure have been approved for Kangaroo Island and the Eyre Peninsula. Local government and privately operated seawater desalination plants are also located at Marion Bay, and in the Upper Spencer Gulf for mine processing purposes.

Additional desalination plants that treat groundwater to remove salt and impurities to provide local communities with potable water are located across the state, including at Oodnadatta, Hawker, Leigh Creek, Indulkana, Mimili, Kaltjiti (Fregon) and Yunyarinyi (Kenmore Park) on the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands in the far north of South Australia, and at Yalata on the west coast. Desalination plants enable the supply of safe and clean drinking water that is climate independent, which is particularly important during times of low rainfall and drought. In addition there are an increasing number of small desalination plants being used for stock water supply or irrigation at the farm scale. The total capacity of South Australia's desalination plants is greater than 110 GL per year. However, water use from desalination has been a relatively low 5.3 GL per year between 2015–16 and 2018–19 as it is the most expensive source of water in South Australia and is typically only used when other alternatives are not available.

Water for people and communities

SA Water is the largest water retailer in South Australia and supplies secure and affordable water supplies to most of the state. There are a total of 68 licensed water industry entities, regulated under the *Water Industry Act 2012*, that provide drinking water, non-potable water and sewerage services to customers across South Australia. The *Australian Drinking Water Guidelines (2011)* mandate the quality of drinking water required to avoid negative water-related health impacts.

The *Water Industry Act 2012* is an Act to regulate the water and sewerage industry. It governs all water industry entities that provide retail services to South Australian customers. A key driver for the introduction of the Act was the opportunity for independent regulation of the industry to protect the needs of customers, public health and the environment and provide opportunities for new participants in the industry. The water industry is made up of 68 licensed water industry entities. Collectively, the retailers licensed under the Act provide drinking water services to approximately 770,000 customers and sewerage services to approximately 693,000 customers across South Australia[3]. The Act was recently reviewed and a number of recommendations were made that would improve the regulation of the water industry.

In addition to the review of the *Water Industry Act 2012*, the Treasurer established an inquiry into water pricing in South Australia. The focus was specifically around the reasonableness of the opening value of SA Water's water services Regulated Asset Base (the accumulation of the value of investments that a service provider has made in its network, also known as the "RAB"). Following this review, and as part of the recently completed RD20 process, the value of the water RAB has been adjusted downwards, which was reflected in significant price cuts for SA Water customers from 1 July 2020.

Opening reservoirs for recreation

The South Australian government and SA Water have recently opened a number of reservoirs for visitors to enjoy. Careful planning has underpinned the opening of reservoirs to ensure that recreational use of the reservoirs does not impact on water supply. Opening of reservoirs has provided valuable additional open space for communities to enjoy, which has been particularly important as people have used local open space more during the COVID-19 pandemic.

To ensure improvements in water supply to regional and remote communities, the state government has also committed to investing $41 million in remote community water supply upgrades, along with a further $7.9 million to be spent on the maintenance and replacement of water assets in Aboriginal communities. In addition, work to further investigate the case for additional water security investments in self-supplied remote communities is a priority of the state government, as set out in the strategic priorities section of this document. A stocktake of self-supplied remote communities will enable water security risks to be identified and options for ongoing supplies to be considered. A water security standard will also be developed to guide investment decisions.

There remain challenges to water supplies in regional and remote communities due to low rainfall in some areas, high capital and maintenance costs, and the inability to pay the costs of water supply. These are discussed further in the

[3] For a full list of licensed water industry retailers, see: https://www.escosa.sa.gov.au/industry/water/licensing/licence-register

Regional Water Security section of this document. The state government is investing in improving access to drinking water in a number of regional communities during the 2020–24 regulatory period, and work to further investigate the case for additional water security investments in self-supplied remote communities beyond 2024 is a priority.

Aboriginal water interests

Aboriginal peoples' spiritual, social, cultural and economic practices are intrinsically linked to their lands and waters.

The state government acknowledges that more needs to be done to overcome historical impediments experienced by Aboriginal people in statutory water allocation planning processes, which have left many Aboriginal people without substantive water rights, especially those rights required to advance economic interests.

In recognition of the disadvantage and inequality experienced by Aboriginal and Torres Strait Islander peoples, the *National Agreement on Closing the Gap* is in place. Priority reforms and targets aim to help governments and Aboriginal communities work together to improve the lives of Aboriginal people. The *National Agreement on Closing the Gap* includes a commitment to develop the following targets:

1) Community infrastructure – this target will measure progress towards parity in infrastructure, essential services (including potable water supply) and environmental health and conditions.

2) Inland waters – this target will measure progress towards securing Aboriginal and Torres Strait Islander interests in water bodies inland from the coastal zone under state and territory water rights regimes.

In addition to the *Closing the Gap* reforms, the state government is working with other governments towards a renewed National Water Initiative (NWI), which includes efforts to improve Aboriginal peoples' access to water and enhance economic and cultural outcomes.

The state government is committed to engaging with Aboriginal communities on the development and implementation of reforms under both *Closing the Gap* and the NWI. A dedicated national Committee on Aboriginal Water Interests has also been set up for the purpose of advising governments on these reform agendas and the state government is working closely with this committee.

Water for the environment

Healthy water-dependent ecosystems provide important services including improving water quality, capturing carbon and providing habitat for a range of nationally and internationally listed flora and fauna. The health of our waterways and aquifers in turn impacts on our ability to enjoy and use the water resources now and into the future.

South Australia is home to 6 wetlands internationally recognised for their biodiversity value under the Ramsar Convention. These are Bool and Hacks Lagoons, Coongie Lakes, Coorong and Lakes Albert and Alexandrina, Riverland, Banrock Station Wetland Complex, and Piccaninnie Ponds Karst Wetlands.

In the River Murray, water for the environment supports important wetlands and floodplains. It also flushes salt from the system, which improves water quality for all water users. River Murray water entitlements have been recovered for the environment under the Basin Plan and The Living Murray program. Water allocated against these entitlements is used to provide environmental benefits, giving the environment the same security of supply as other water users.

Groundwater resources support various groundwater-dependent ecosystems, including the springs of the Great Artesian Basin and wetlands in the Lower Limestone Coast region (e.g. Bool and Hacks Lagoons).

Increasing demand and climate change will put pressure on the environment and it is important to monitor, plan for and respond to future changes. Water planning will remain important to strike the right balance between using water for economic benefit and ensuring the health of our ecosystems.

How are water resources managed in South Australia?

The level of management required for a water resource is informed by a risk-based approach that considers the likelihood and consequences of the quantity and quality of that resource deteriorating. If a water resource is considered vulnerable or at risk, then that water resource is prescribed under the *Landscape South Australia Act 2019*. For prescribed water resources, a water allocation plan is developed to ensure that water is set aside for the environment and that the take and

use of water is sustainable. The management approach for prescribed and non-prescribed water resources is outlined below.

Landscape and water planning framework

Regional landscape boards are responsible under the *Landscape South Australia Act 2019* for managing the landscapes and water resources within their region. The boards undertake, promote and integrate the management of natural resources, with particular reference to land management, water resource management and pest animal and plant control, to build resilience in the face of change and facilitate integrated landscape management and biodiversity conservation.

Landscape boards work with Aboriginal communities, farmers, land managers and local communities to determine how best to sustainably manage the natural resources within their region, with priorities for landscape management set out in regional landscape plans. These plans identify what the community values about the region's landscapes and what needs to be done to ensure the health, productivity and resilience of landscapes. Water allocation plans and water affecting activity control policies are also developed by landscape boards to manage the water resources within the region.

Prescribed water resources

South Australia has a well-developed framework for managing water resources. Where there is a high demand for water and there is a need to sustainably manage the resource, the resource is prescribed and water allocation plans are prepared that set out principles to ensure the taking and use of water is sustainable. A water allocation plan ensures the needs of the environment are taken into account when determining how much water is made available for consumptive purposes (licensed and non-licensed uses) and how that water may be allocated and traded.

Water allocation plans are developed by regional landscape boards in collaboration with water users, key stakeholders and communities. The plans articulate how best to manage the risks to water resources and how water resources should be shared, based on the best available science and knowledge of the water resource. Community views are taken into account before water allocation plans are finalised and approved by the Minister for Environment and Water. Figure 5 shows the location of each of the prescribed water resources in South Australia.

Once a water allocation plan is in place, water users may apply for a licence to take the water, subject to the rules of the water allocation plan. A water access entitlement provides an ongoing right to individuals and businesses to receive an annual share (allocation) or volume of the available water resources. Water availability and allocations may vary over time, based on the nature of the water resource.

Figure 6 shows the volume available for use in 2018–19 from prescribed water resources across the state, with further detail provided in Appendix A.

Water allocation plans must be comprehensively reviewed at least once every 10 years. A review considers whether the plan has been successful in terms of the intended outcomes and whether it remains appropriate or requires amendment. The status of water allocation plans across the state and timeframes for their review are set out in Appendix B.

In the future, water allocation plans will need to be flexible enough to adapt to changing resource condition from time to time. As our knowledge about the impacts of climate change evolves, our planning will need to take that information into account to make sure water is managed for environmental, social, cultural and economic outcomes.

Environmental water provisions

Environmental water provisions are provided before water is made available for consumptive purposes. Water resources are monitored and limits on take enforced to ensure they are being used within their sustainable limits and environmental water provisions are met.

Water allocation plans must include information about the water that is to be set aside for the environment, including about the quantity and quality of that water, the time when that water is expected to be made available, and the type and extent of the ecosystems to which it is to be provided. An assessment of the capacity of the water resource to meet environmental water requirements must also be provided along with a statement of the environmental outcomes expected as a result.

Environmental water requirements are those that must be met in order to sustain the ecological values of ecosystems that depend on the water resource, including their processes and biodiversity, at a low level of risk.

Different water allocation plans provide water for the environment in different ways. For example:

- *River Murray*: Consistent with the requirements of the Basin Plan, environmental outcomes are achieved through a combination of planned and held environmental water. Water management rules ensure planned environmental water is preserved for the environment and is not used for any other purpose. Held environmental water refers to water entitlements from which allocations are used to achieve environmental outcomes. Water historically held for consumptive purposes has been recovered for the environment across the basin.
- *Eastern and Western Mount Lofty Ranges:* In these regions, water allocation plans have provisions for returning low flows to the environment. Low flows are critical for water-dependent ecosystems and have historically been interrupted by dam development and watercourse extractions. Through the implementation of low flow restoration, instead of water only reaching the environment when dams 'fill and spill', a portion of flows are provided to the environment by diverting them around dams. This recognises that the timing of flows is important, not just the volume of flows. It enables a greater volume of water to be allocated to other water users than if low flows were not being provided.
- *Far North:* The water allocation plan for the Far North manages the take and use of water to protect the environment by using buffer zones around groundwater-dependent ecosystems. For Great Artesian Basin springs, this is to maintain the pressure in the aquifer that provides water to the springs. Rather than capping the overall volume of water that can be taken, rules specify where and how much water can be taken, as this is a practical way to effectively protect these unique outback ecosystems.

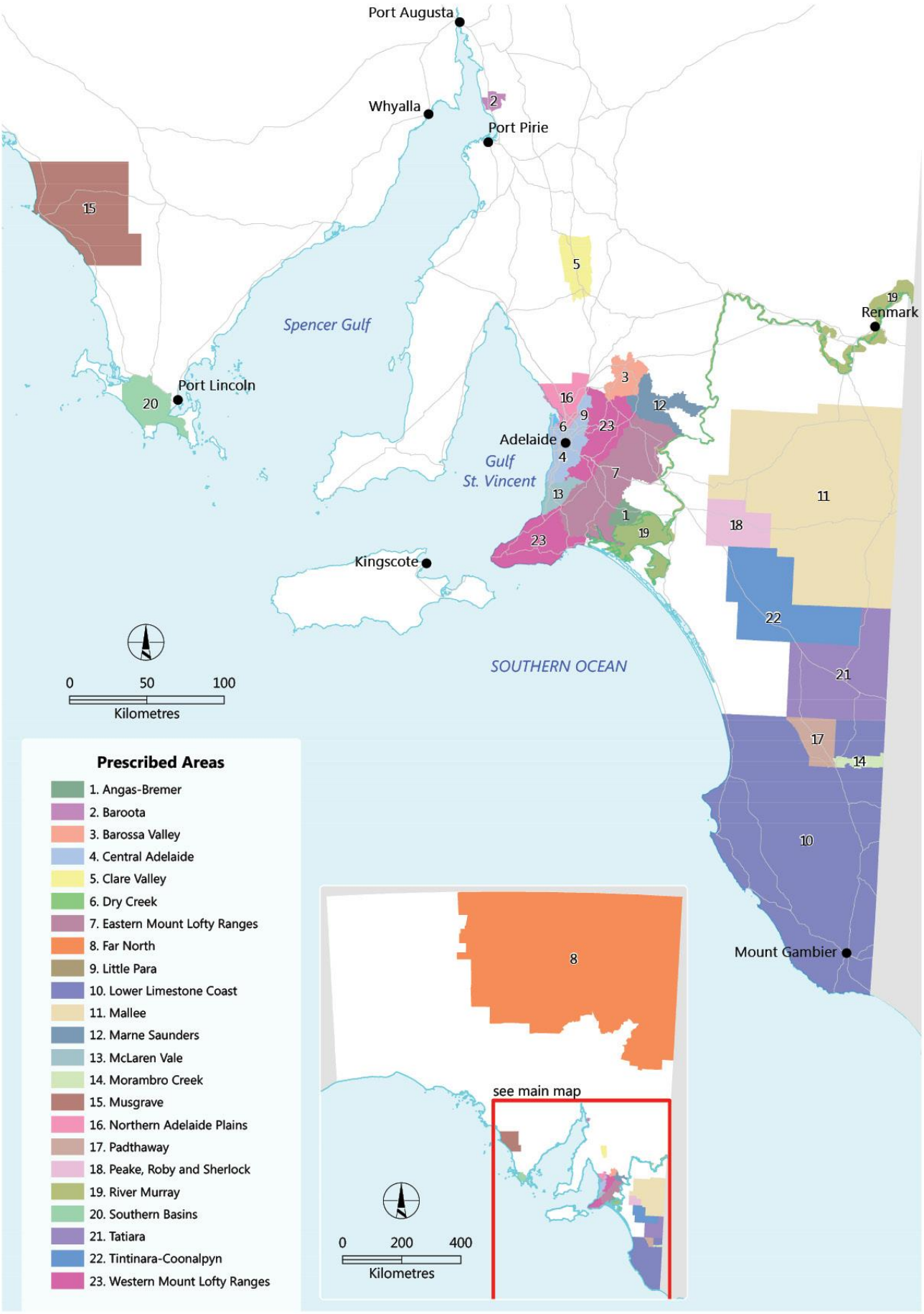


Figure 5: Prescribed water resources in South Australia

Incorporating Aboriginal values and needs into water allocation plans

In supporting ecologically sustainable development, the new Landscape SA Act is clear about the requirement to integrate traditional Aboriginal knowledge into decision making.

Regional landscape boards are increasingly engaging with First Nations in water management to ensure Aboriginal water values and needs are considered in water allocation planning and natural resource management more broadly.

Six of South Australia's water allocation plans include detailed information about Aboriginal water interests and needs, and include Aboriginal water-related objectives developed by Aboriginal people in that region. Five of these water allocation plans relate to the water resources of the Murray–Darling Basin in South Australia and are accredited under the Basin Plan.

The Water Allocation Plan for the Far North Prescribed Wells Area includes the objective of supporting Aboriginal people's water interests by providing access to the resource via a 'cultural water consumptive pool'. Water from the consumptive pool is available to be used by an Aboriginal person for personal, domestic, cultural, spiritual or non-commercial communal needs. For other water resources, a statewide authorisation is in place to take water for 'Aboriginal social, cultural or spiritual purposes'.

In addition to recognising Aboriginal values and needs for water in water allocation plans, an objective for Aboriginal people is to own water entitlements that can be used for cultural, spiritual and economic uses. The state government and regional landscape boards will continue to work with Aboriginal people to progress opportunities to access water entitlements for these purposes, including as part of government responses to *Closing the Gap* and an updated *National Water Initiative*.

Water markets

Water markets are a management tool that offer the opportunity for water to be traded to efficiently support high value production and economic development. Water markets, however, need good information about the availability and price of water. The Department for Environment and Water is committed to improving the efficiency and effectiveness of all water trade markets in South Australia and is continuing work on a range of initiatives to improve information provision and reduce barriers to trade. Water users across the state will benefit from a $14.7 million investment that is reforming South Australia's water licensing system and improving water trading. When the system is operational it will reduce transaction costs, cut red tape and support more efficient business decision-making for parties seeking to trade and invest in water. The provision of an enhanced water register will also improve the ability to use water entitlements as collateral for loans.

Non-prescribed water resources

There are extensive areas of South Australia where comprehensive management through a water allocation plan and water licensing system is not required because there is not sufficient demand for water, or there is a low risk to the water resources. There are considerable groundwater resources that have higher salinities or brackish water that are not being extensively used in the Eyre Peninsula, Upper South East, the Murray Basin and the Mid North.

For these non-prescribed areas, water affecting activities, such as the construction of a well, dam or weir, are managed through permits to protect the integrity of the water resources and to minimise the impact of the activities. Although permits do not regulate the volume of water that can be taken, other parameters, such as the size and location of a water affecting activity, can be regulated.

Emerging desalination technologies, combined with low-cost renewable energy, may make it economically viable to desalinate brackish water to a standard suitable for irrigation and other economic purposes, such as mining. This is an area of active research and development. Cost-effective, carbon-neutral desalination would potentially enable greater access to a resource that has historically been unused and provide another source of valuable water to support communities and economic development.

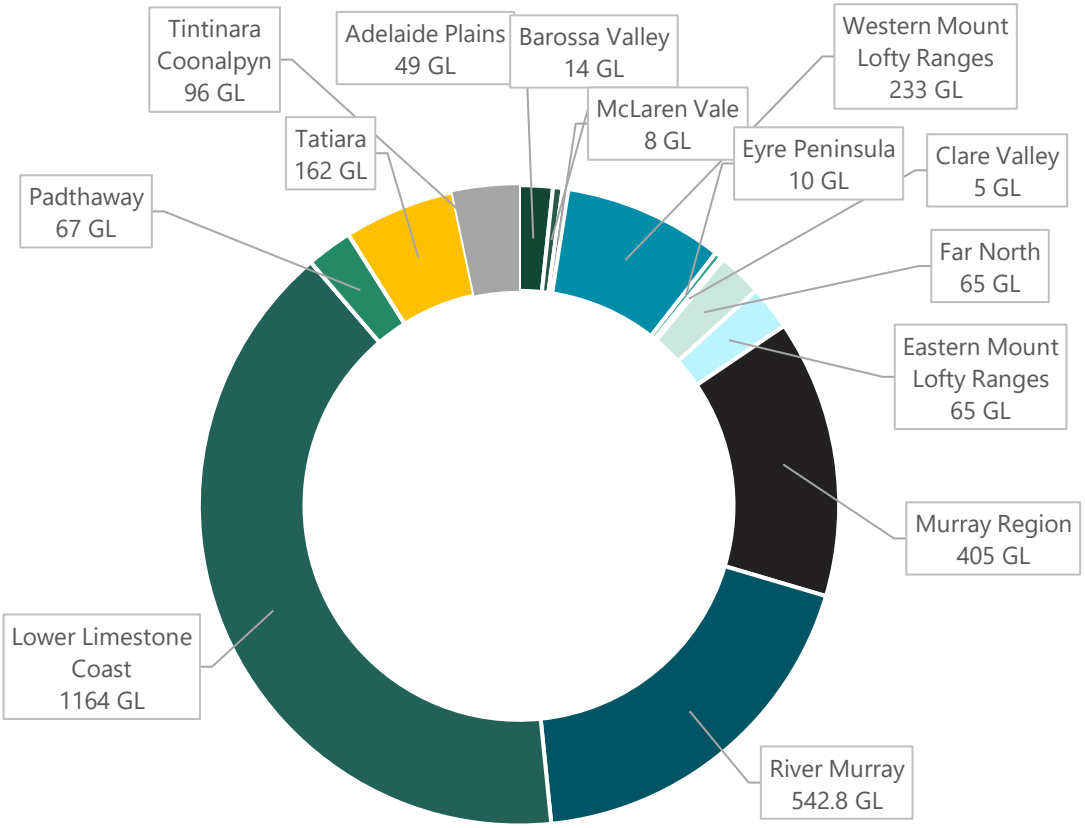


Figure 6: Annual volume available for use from prescribed water resources in South Australia (2018–19)[4]

Water management in a changing climate

South Australians are faced with complex challenges due to climate change, including reduced average rainfall, intensification of storm events, and more frequent and severe heatwaves, bushfires and drought. Changes are already being felt by South Australia's communities, environment and economy and these changes are projected to continue in the long term. While the state's water security is already being influenced by climate change, it is important that our water resource management takes these trends into account to ensure we can maintain our water security now and into the future.

In 2019 Australia experienced its warmest and driest year on record. For South Australia, the overall mean temperature was 1.45 °C above average, making it the state's second-warmest year on record. Rainfall for South Australia was 65% below average, the state's driest year on record. There has also been a persistent decline in rainfall in the state's southern agricultural areas. In 2019, large areas of the South Australian pastoral districts received less than 30 mm. Current projections of the impact of climate change indicate rainfall will continue to decline in most parts of the state and that water availability from both surface and groundwater resources in South Australia is likely to decline (BoM 2020a).

Some changes to our climate are now inevitable regardless of the emission reduction activities that are implemented (DEW 2021). Adapting well will support the state's ability to respond flexibly to uncertainty in the timing and magnitude of changes and is essential to ensure our environment, businesses and communities have the resilience to cope with these changes. Part of this resilience is recognising that the volume of water available for allocation each year may vary and that the business models of those reliant on water availability may need to evolve in response. This needs to be accompanied by the provision of accurate and timely risk-based information.

[4] The Murray–Darling Basin Plan establishes a long-term average sustainable diversion limit of 542.8 GL per year from the River Murray in South Australia. Trade into or out of South Australia each year affects the volume available. Approximately an additional 200 GL of South Australian consumptive entitlements are held for the environment.

In recent years, much has already been done to improve water management as South Australians diversify water sources, improve water use efficiency and find innovative ways to harvest and re-use water while sustaining our environment. This adaptation will become even more important as the state's climate continues to change.

The state government proposes to work with resource managers, industry, key stakeholders, communities and other water users to improve the understanding of climate change to support adaptive water decision-making. This particularly relates to projected changes in water availability and the corresponding impacts on people, communities, water resources, the environment, industries and the reliability of entitlements. Through this work, South Australia will be better able to proactively plan for the impacts of climate change.

Projected changes in inflows to Mount Bold Reservoir

The SA Climate Ready climate projections have been used to investigate the likely impacts of future rainfall changes on the annual flow of water into the Mount Bold Reservoir – Adelaide's largest public water supply reservoir. The projections are for significant declines in average inflows to the reservoir. A large range of future rainfall scenarios under climate change were considered, which resulted in declines of 24% (median) in the period 2036–65, and 33% (median) in the period 2056–85, compared to inflows during 1986–2005 (Westra et al. 2014).

Adelaide’s water security

Adelaide has a high degree of water security as a result of its diverse portfolio of supply options, highly networked water distribution system, high proportion of climate-independent water sources, highly capable water sector, and public awareness of the challenges of drought and need to carefully manage water. This section provides further information relevant to Adelaide's current and future water security.

Water available to meet urban Adelaide's requirements

Adelaide's diverse portfolio of water supply options includes multiple reservoirs, stormwater, wastewater, groundwater, the River Murray and the Adelaide Desalination Plant. It is this combination of resources that provides a high degree of water security for urban Adelaide.

SA Water is Adelaide's major water retailer and only supplier of drinking water. Local councils and a small number of private companies supply non-potable water for irrigation and non-potable household purposes such as toilet flushing. Figure 7 shows the volume of water supplied from each of the sources available to Adelaide by SA Water. Further information on water supplied from each of Adelaide's key water resources is provided in this section.

Figure 8 outlines the location of Adelaide's major water supply sources, water distribution mains, the metropolitan boundary, surrounding environment and food production areas, and the McLaren Vale and Barossa Valley character preservation districts[5].

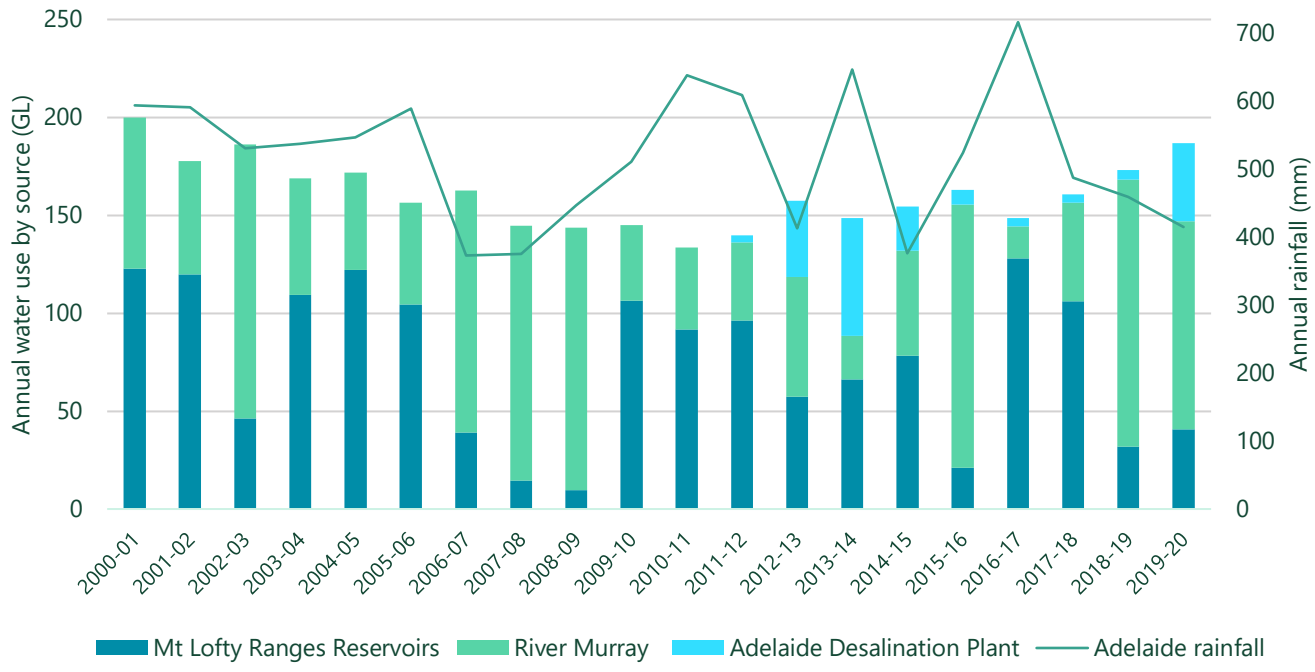


Figure 7: Adelaide's historical use of potable water by source (SA Water 2020)

[5] Metropolitan Adelaide (*Development Act 1993*), planned urban boundary to 2045 and environment and food production areas (30 Year Plan for Greater Adelaide (2017)), McLaren Vale and Barossa Valley character preservation districts (*Character Preservation Act 2012*).

Figure 8: Adelaide and its water supply sources

Mount Lofty Ranges reservoirs

Adelaide is supplied with water from a series of reservoirs in the Mount Lofty Ranges, including Happy Valley, Hope Valley, Kangaroo Creek, Little Para, Millbrook, Mount Bold, South Para and Warren reservoirs (Figure 9). The Mount Lofty Ranges reservoirs have a total capacity of 199 GL, which is enough water to supply Adelaide with drinking water for approximately 12 months. As an example, this is significantly less than Sydney (2,582 GL) or Melbourne (1,812 GL), where the water supply reservoirs have the capacity to store enough water to meet their demands for at least 3 years. Increasing reservoir capacity has been considered in the past; however, most reservoir catchments are already overdeveloped, and further reservoir development would risk additional impacts on environmental flows, the habitat of endangered species and access to water by primary producers in the region. As well as storing surface water runoff from the Adelaide Hills, the Mount Lofty Ranges reservoirs are used to store water that has been pumped from the River Murray to supplement Adelaide's water supply.

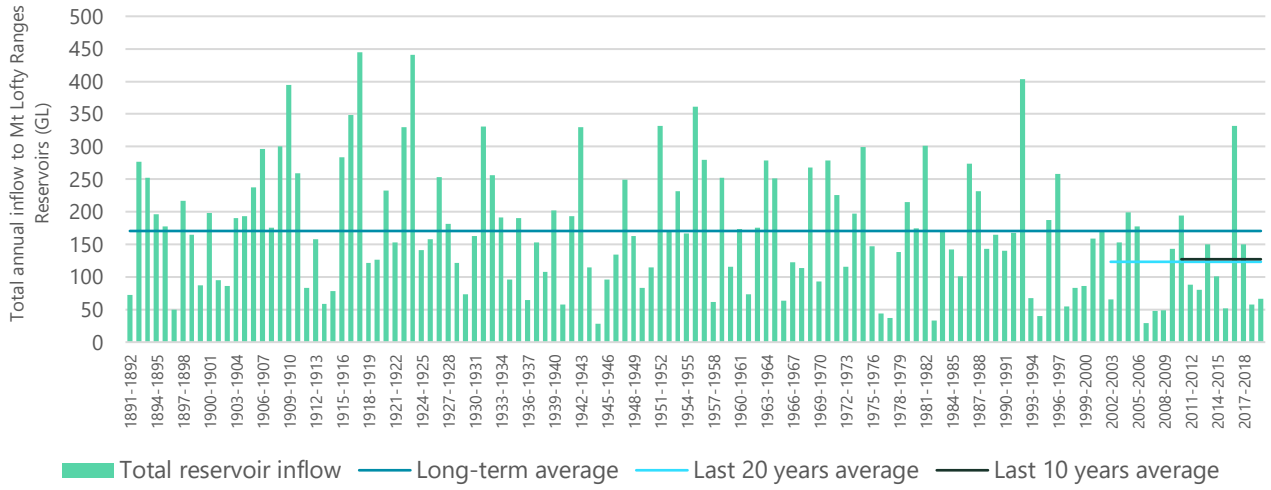


Figure 9: Annual catchment inflows into the Mt Lofty Ranges reservoirs for period 1891–92 to 2019–20

The River Murray

When it is dry in the Mount Lofty Ranges, Adelaide sources most of its water from the River Murray. The Murray–Darling Basin Agreement defines the rules for how water in the River Murray is shared between Queensland, New South Wales, Victoria, the Australian Capital Territory and South Australia. Up to 204 GL is available from the River Murray to meet critical human water needs across South Australia, including up to 150 GL for metropolitan Adelaide, with the remainder being for regional areas. The 150 GL can be made available from a combination of water from South Australia's Entitlement[6] and water held in River Murray storage dams (in Victoria and NSW), specifically set aside to meet critical human water needs in South Australia in dry periods.

Adelaide Desalination Plant

The Adelaide Desalination Plant was constructed to safeguard urban water supplies and ensure that sufficient water is available to meet Adelaide's needs in extremely dry years. The plant was built following the Millennium Drought to provide a source of water which is not dependent on rainfall.

The Adelaide Desalination Plant has been delivering drinking water since 2011. Water produced by the Adelaide Desalination Plant is pumped along an 11 km transfer pipeline to storage tanks at the Happy Valley Water Treatment Plant, where it is blended with treated water from the Happy Valley reservoir. Drinking water produced at the Adelaide Desalination Plant can be provided to customers from Aldinga in the south, to Elizabeth in the north (as per Figure 10). In full operation, the plant can produce up to 100 GL a year. The plant's water production capacity is extremely flexible, ranging from as low as 10% (30 ML a day) to as high as 100% (300 ML a day). This flexibility means production can be aligned with water availability from other sources and efficiently meet supply requirements. When other water sources are plentiful, the service life and value of the facility is maximised and electricity costs minimised by switching to a minimum production mode.

[6] South Australia's River Murray Entitlement is up to 1,850 GL per year. It is determined by the Murray–Darling Basin Authority in accordance with the Murray–Darling Basin Agreement (2008).

The water security provided by the Adelaide Desalination Plant has enabled Adelaide to reduce its reliance on the River Murray in dry years. When South Australian irrigators are on allocations of less than 100%, the water available from the Adelaide Desalination Plant and other sources enables these allocations to be increased by up to 8%. In addition, in some years, such as 2019–20, there may be excess desalination plant capacity that is not required to meet Adelaide's demands. This may provide the opportunity to release additional River Murray water to other water users in the Murray–Darling Basin.

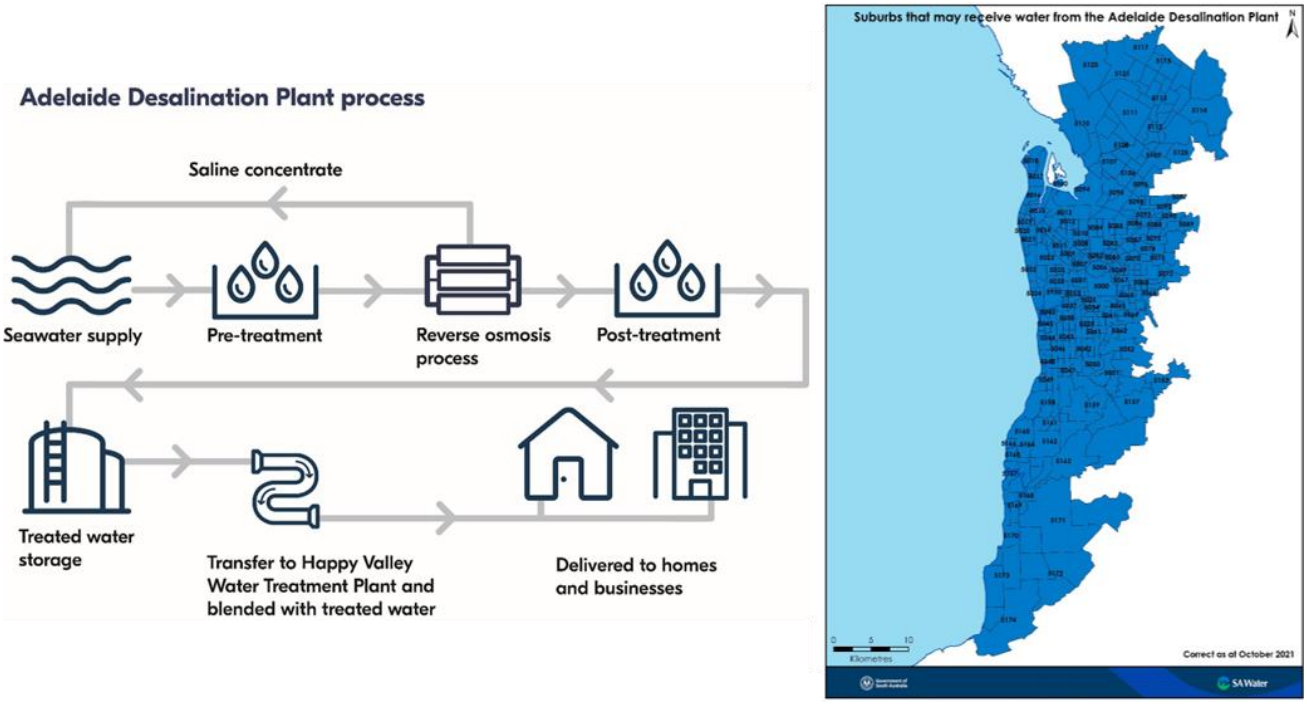


Figure 10: Adelaide Desalination Plant process (left) and extent of distribution (right)

In a historic agreement between the South Australian and Australian governments, Adelaide's Desalination Plant increased production to 40 GL in 2019–20, enabling the Australian Government to release the equivalent volume to help drought-affected farmers across the Southern Murray–Darling Basin. As part of this deal, there was no adverse impact on Adelaide's water supply, no adverse impact on South Australian River Murray irrigators, no adverse impact on Adelaide's water prices and no adverse impact on environmental flows to South Australia.

Groundwater

Groundwater is an important water resource for Adelaide and has been accessed since the earliest days of the city of Adelaide. Groundwater was critical for the development of horticulture on the Adelaide Plains, which now occurs mainly on the northern and southern fringes of the metropolitan area with groundwater still the primary water source.

Most of the Adelaide metropolitan area overlies sedimentary aquifers that extend to 600 m below the surface. These aquifers comprise shallow 'Quaternary' aquifers of about 30 m below ground, and deeper 'Tertiary' aquifers that are confined and are about 100 m below ground. The shallow aquifers tend to be small and localised. Where these exist, some residents use groundwater that they pump from bores at their homes for watering gardens. Water from the larger, deeper aquifers is used for industry (including beverage production and linen washing) and for irrigating public parks and gardens, golf courses, sports fields and school grounds.

Groundwater use in Adelaide is estimated to be up to 5,800 ML per year made up of approximately 400 ML from the shallow aquifers and approximately 5,400 ML from the deep aquifers. Statutory consultation has been initiated on a draft water allocation plan for Central Adelaide and the Northern Adelaide Plains, which will enable the groundwater to be managed within sustainable limits and water to be traded to support economic development. There is likely to be scope for increasing groundwater use in Adelaide to contribute to the city's water security once appropriate investigations have been carried out and suitable water allocation policies have been adopted. Groundwater could even be called upon to meet potable demands in a future drought, as last occurred during 1967–68.

Additional sources of water

In our urban environment, the use of rainwater and treated stormwater and wastewater helps to decrease water demand from Adelaide's reservoirs. It also helps reduce sediment and nutrient-filled water flowing into the marine environment. On average, these sources provide approximately 10 to 12 GL per year of non-potable water across metropolitan Adelaide, as per Figure 11.

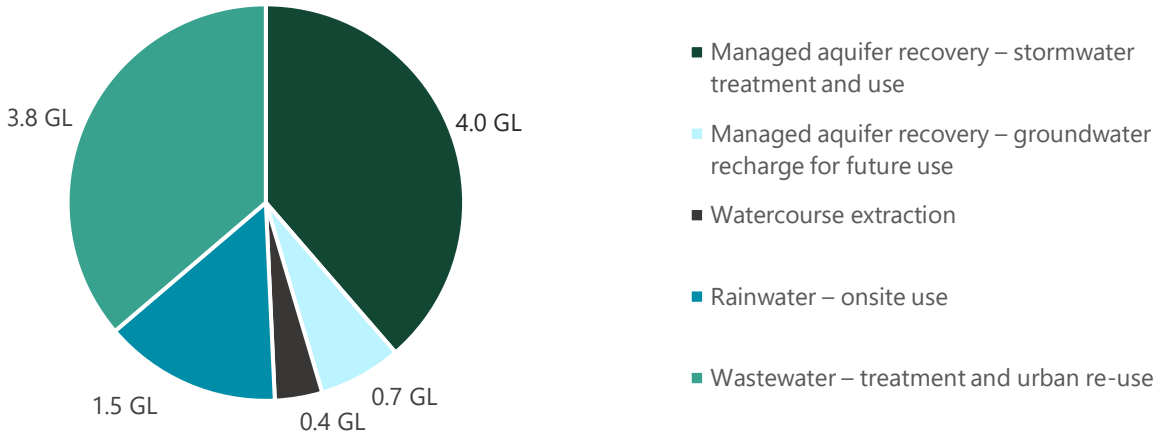


Figure 11: Adelaide's estimated average annual water use, or storage[7] of, stormwater, rainwater and wastewater

Stormwater

Stormwater is the water that enters Adelaide's urban drains and creeks after rainfall events. It is both runoff from urban catchments and water that enters Adelaide's waterways from upstream catchments. The quantity and quality of stormwater runoff can vary significantly between years and between seasons, as per Figure 12. This variability significantly impacts on the ability to effectively harvest and treat stormwater for consumptive purposes.

South Australia is internationally recognised as a leader in the collection, treatment, storage and use of stormwater for non-potable purposes through managed aquifer recharge (MAR) (DEW 2020b).

More than 40 stormwater MAR schemes have been built since the year 2000, mainly by local councils. The total stormwater harvesting capacity of existing MAR schemes is about 17 GL per year, although the volume of MAR scheme stormwater being used is currently less than the capacity due to the variable source water quality and challenges in aligning supply and demand. In 2018–19, MAR schemes stored about 4.5 GL of stormwater in Adelaide's groundwater system and withdrew just over 4.0 GL for use.

Managed aquifer recharge

MAR is the deliberate recharge of water to aquifers for subsequent recovery for beneficial use.

Stormwater MAR schemes often include wetlands for treating harvested stormwater. Many of these wetlands offer additional benefits including flood mitigation, improved biodiversity and new recreational opportunities.

Urban water projects to reduce Adelaide's demand from the River Murray

DEW has been working with stakeholders to identify opportunities to substitute River Murray water use with alternative sources, to improve the health of the River Murray.

A feasibility study on opportunities to more effectively utilise Adelaide's recycled water, stormwater capture and re-use networks was completed in 2020–21. The government is now working with scheme owners to develop business cases to advance the most promising projects.

[7] In some cases, stormwater may be captured, treated and stored for use at a future time.

The volume of both MAR scheme storage and use is gradually rising, as per Figure 13, noting the volume stored in 2016 (which was a wet year) stands out when compared to recent drier years. It is anticipated that the total storage and use volumes will continue to increase as existing MAR schemes progress towards their design capacity and new demand opportunities are identified.

Successfully integrating MAR into a city's water supply portfolio requires careful management of water quality risks. Increased networking of existing and future stormwater recycling schemes has the potential to improve the reliability of supply and strengthen the case for investment in recycled water. A water allocation plan is currently being developed to manage the groundwater resources of the Adelaide Plains. Under the proposed water allocation plan, a MAR water licence would be issued to a MAR scheme operator. This would provide access to an allocation of water based on the volume recharged into the aquifer, allowing for the water recharged to be recovered at a future time.

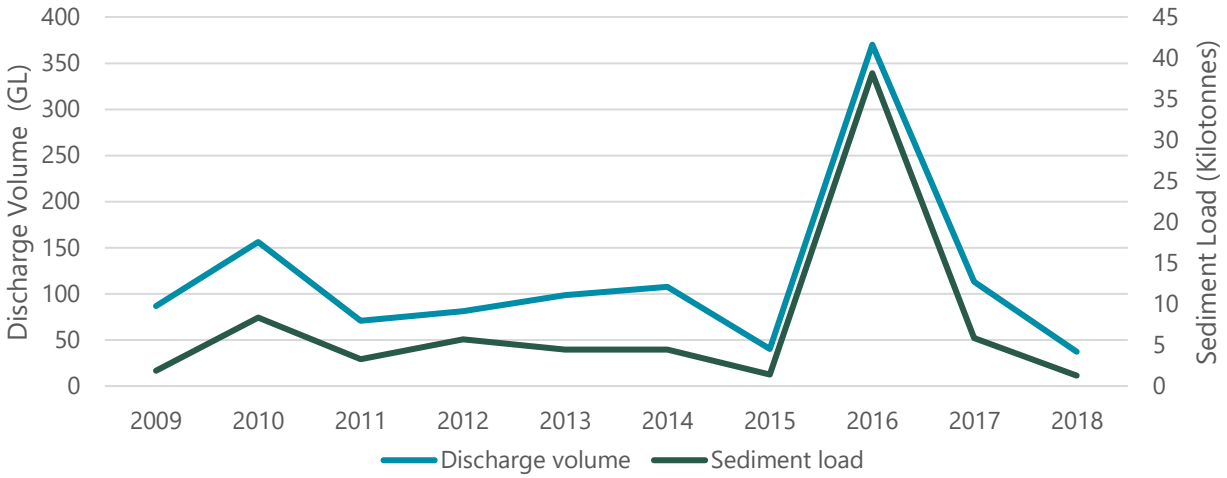


Figure 12: Annual discharge and sediment load to the coastal environment from Adelaide's urban catchments

While stormwater MAR schemes primarily harvest stormwater in Adelaide, some direct extraction from urban watercourses also occurs. The average annual take from urban reaches of the River Torrens is in the order of 0.4 GL per year and is typically used for summer irrigation. Water extraction from the Torrens, Gawler, Little Para and Onkaparinga rivers (across the plains) is licensed under the Western Mount Lofty Ranges Water Allocation Plan.

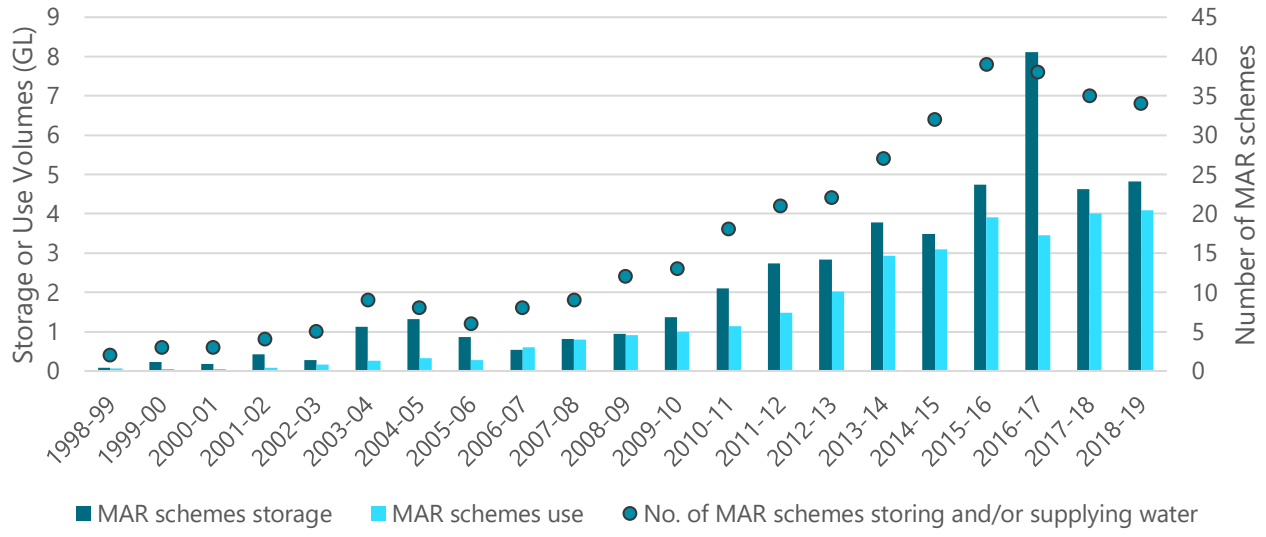


Figure 13: Stormwater managed aquifer recovery scheme groundwater storage and use

Rainwater

Rainwater tanks are a popular source of water for many South Australians. In Adelaide, approximately 44% of dwellings have a rainwater tank. Domestic rainwater use is not metered but the average annual use in Adelaide is estimated to be 1 to 2 GL. Actual use will vary from year to year depending on the amount and timing of rainfall. Rainwater tanks remain a practical way that households and some businesses can reduce their consumption of mains water, especially when plumbed into a house or business.

Wastewater

On average, a total of 30 GL per year is re-used from metropolitan Adelaide's sewerage treatment plants, which is approximately 30% of the total output of 99 GL per year. However, as per Figure 14, there is significant month by month variability.

Treated wastewater contributes an average of approximately:

- 3.5 GL per year from Bolivar and Glenelg wastewater treatment plants for non-potable urban uses, primarily for watering parks and reserves
- 26.5 GL per year from Bolivar, Christies Beach and Aldinga wastewater treatment plants to the Northern Adelaide Plains and McLaren Vale for horticultural and viticulture uses.

Treated wastewater is an important water source as its availability is relatively consistent and predictable, not significantly dependent on rainfall and not in competition with the environment. Distribution of recycled wastewater to the Northern Adelaide Irrigation Scheme is increasing the overall use of Adelaide's recycled water as well as supporting food production. The potential for further expansion to the Barossa region is currently being explored.

It has been demonstrated that under certain conditions it is cost effective to recycle wastewater and use it for non-potable purposes. Challenges persist in using winter outputs when agricultural and recreational demands are low. Any expansion requires significant investment in treatment, storage and distribution infrastructure, and therefore each proposal needs to be considered on a case-by-case basis. While it has not been actively explored by state government to date, indirect potable re-use could be another potential future option to reduce Adelaide's reliance on surface water from the Mount Lofty Ranges and River Murray.

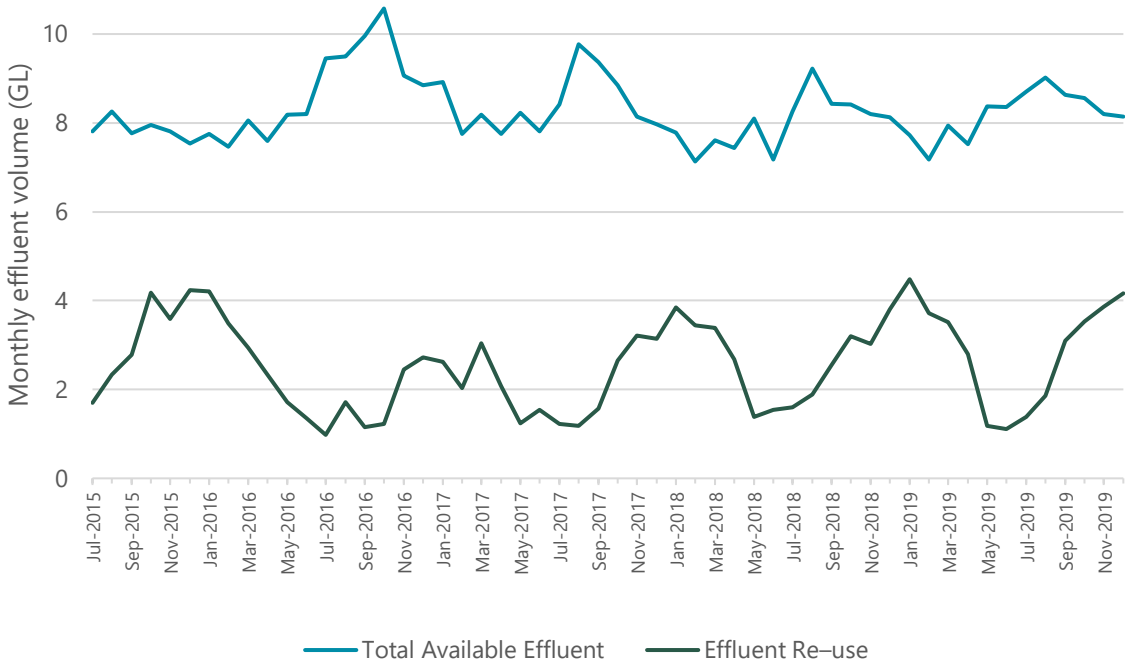


Figure 14: Adelaide's monthly effluent availability and non-potable re-use

Adelaide's water balance

The diverse range of water supply options available to urban Adelaide provide varying volumes of potable and non-potable water from year to year. This diversity provides flexibility to use sources in the most efficient manner based on the volume available from each source and its cost. Figure 15 provides a water balance showing the average volumes used annually in Adelaide from its portfolio of sources and the volumes released to the sea, over a 4-year period from 2015–16 to 2019–20.

Climate-independent sources, such as the Adelaide Desalination Plant, will be increasingly important in dry years when other sources, like the River Murray and Mount Lofty Ranges reservoirs, may be impacted by reduced rainfall and runoff. Stormwater and urban watercourse volumes are highly variable and significantly reduced in dry years, but wastewater effluent volumes are far less variable.

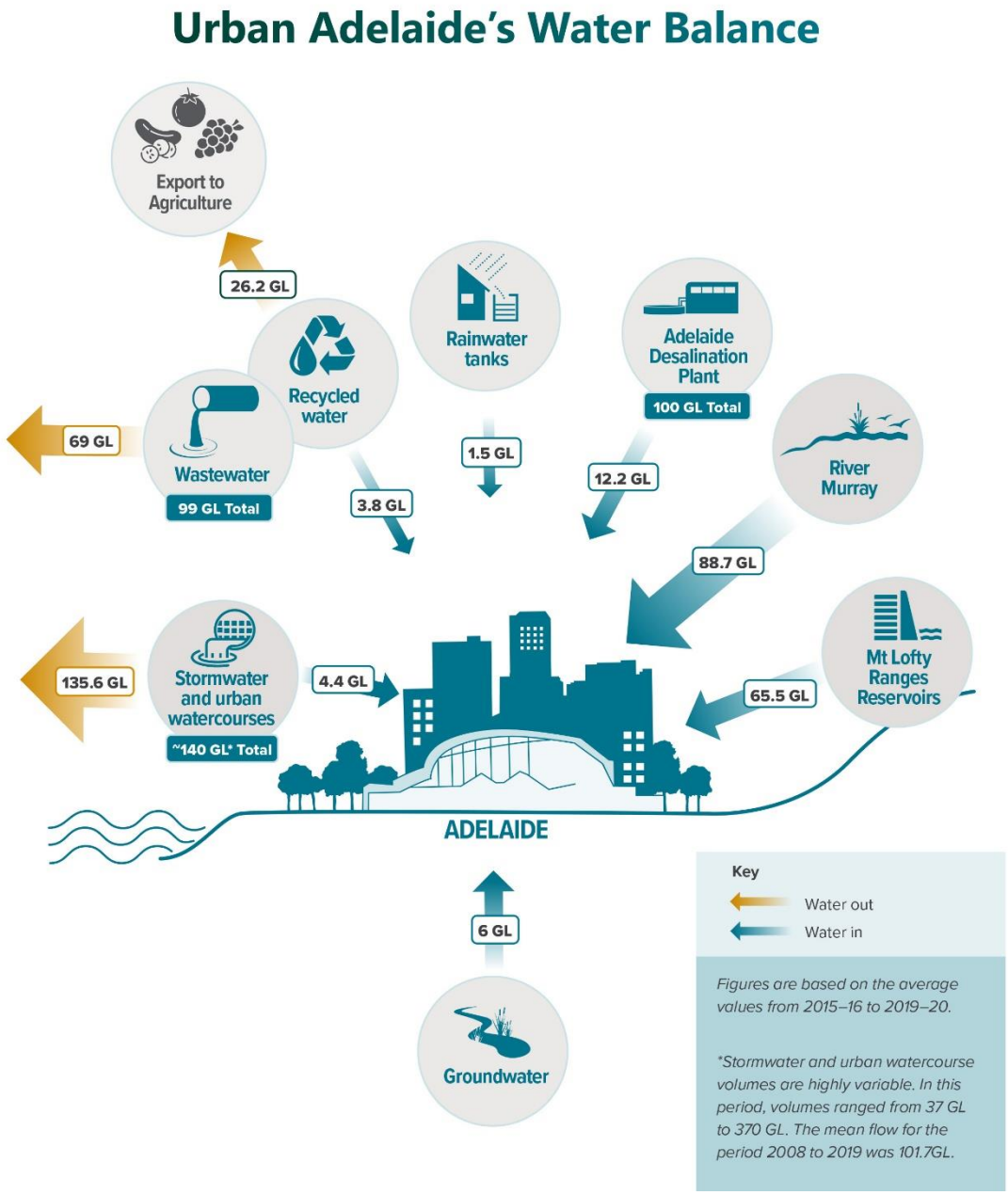


Figure 15: Adelaide's average annual water use from 2015–16 to 2019–20

How is urban Adelaide's water distributed?

The Adelaide water supply network is complex and draws from a range of sources including reservoirs, the River Murray and the Adelaide Desalination Plant. In metropolitan Adelaide, water is delivered to customers through an interconnected system with more than 9,300 km of water mains and numerous pump stations.

The North South Interconnection System was constructed after the Millennium Drought to improve the resilience of Adelaide's water supply. It gives Adelaide a more flexible water distribution system, which ensures that any supply shortages in the northern system can be alleviated by the movement of large volumes of water from the south of the city.

How does urban Adelaide use its water?

Average potable water demand in urban Adelaide was approximately 166 GL per year over the last 5 years, with an estimated additional 10 GL of non-potable demand[8]. The annual variability of demand in Adelaide is primarily driven by weather, with demand being significantly higher in dry years compared to wet years (Irvine et al. 2019). For a given year, total urban demand is expected to be between 145 and 200 GL.

Residents represent 77% of SA Water's Adelaide demand, commercial businesses 7%, and large institutions 6% (as per Figure 16). Since the Millennium Drought a number of initiatives to reduce the overall demand for water and improve Adelaide's water security have been implemented. These include improving leak detection and repair in the metropolitan water supply system, providing incentives such as rebates to increase the uptake of water-efficient devices, more timely and useful information on water bills, and waterwise measures for SA Water customers.

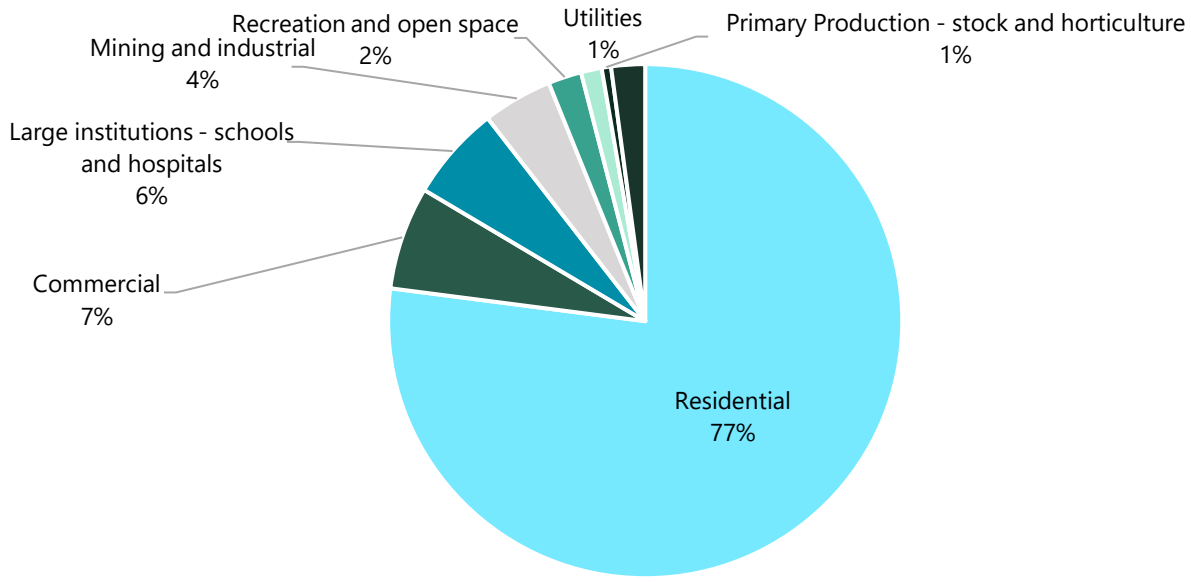


Figure 16: Potable water use in urban Adelaide by demand type (SA Water 2020)

The good habits developed, such as washing the car on the lawn rather than the driveway and taking shorter showers, have continued, and water use per capita has not increased significantly since water restrictions were lifted in late 2010. In addition, urban infill continues to progress at a rapid rate, resulting in a more dense urban environment and less outdoor watering. Household appliances continue to be replaced by more efficient ones at the end of their life span. Single-flush toilets, inefficient washing machines, dishwashers and shower heads are no longer supplied in Australia. Irrigation efficiency practices and infrastructure introduced to schools, sports fields, and council parks and gardens have also continued since the drought.

[8] This does not include agricultural water demands in Northern Adelaide or McLaren Vale.

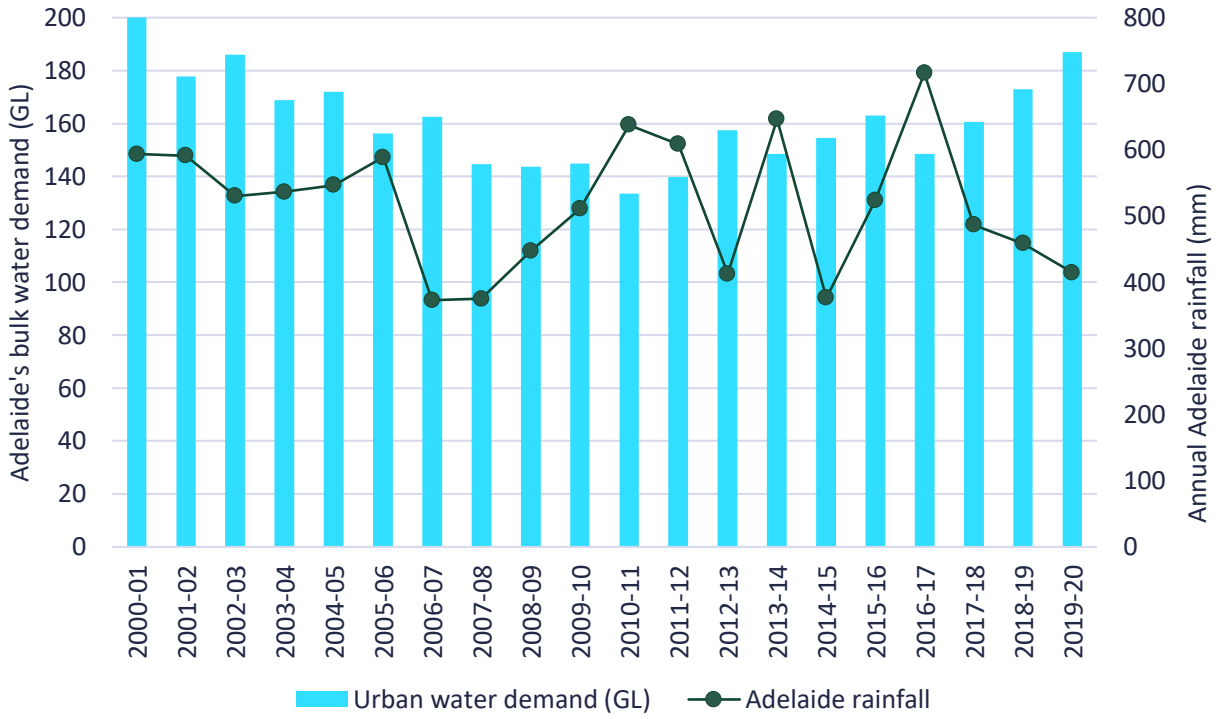


Figure 17: Adelaide's annual potable water demand (SA Water 2020)

How does Adelaide compare?

Rainfall was below average or very much below average for most of Australia in 2018–19, and much of the country experienced significantly above-average temperatures. During this dry and hot year, Adelaide's household water consumption was 202 kL per household, compared with the 5-year average of 192 kL per household. Household water use in Adelaide was similar to that in Canberra and Sydney but approximately 30% above levels of use in Melbourne and south-east Queensland, as per Figure 18.

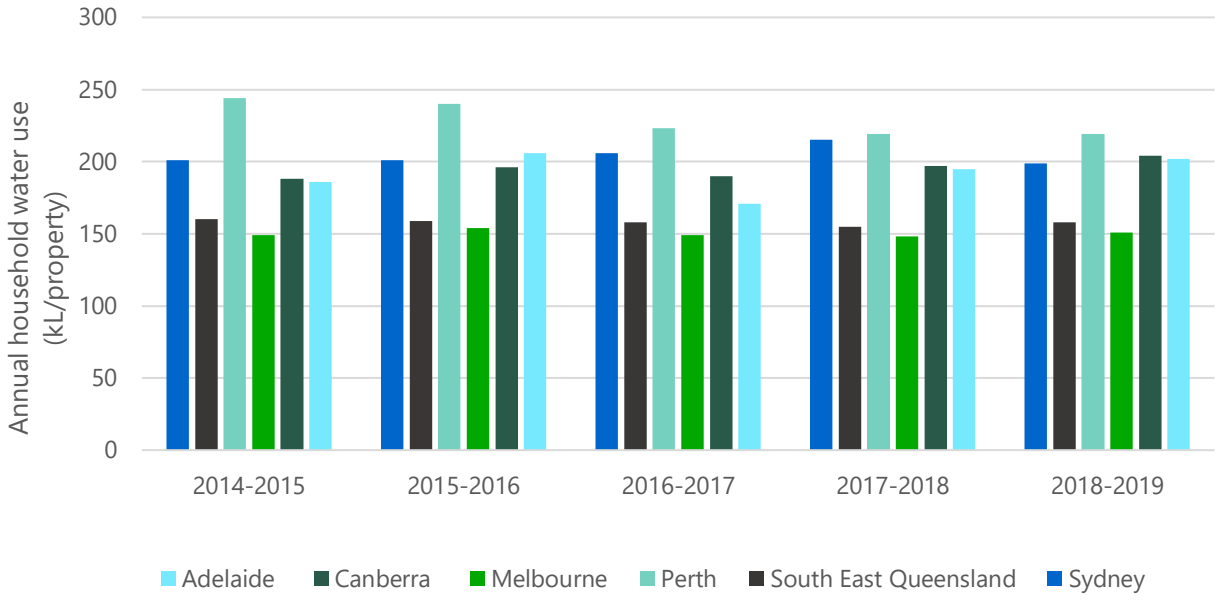


Figure 18: Average annual residential water use in Australian cities (BoM 2020b)

Cities across Australia are increasing their ability to supply water from climate-independent sources. All capital cities, except Darwin, Hobart and Canberra, have constructed desalination plants since the Millennium Drought. Adelaide and

Perth have the capacity to meet approximately 50% of their demand from desalination. While Melbourne and Sydney sourced higher volumes of recycled water than Adelaide in both 2017–18 and 2018–19, Adelaide continues to meet the highest proportion of its demand from recycled water (Figure 19). Adelaide can meet the highest proportion of its dry year demand from climate-independent sources (Desalination 50%, Recycled 15%). This is at least as good as any other Australian capital city.

Table 1: Desalination capacity of Australian cities

City	Plant	Capacity (GL per year)	Capacity to meet 2018–19 demand
Adelaide	Adelaide Desalination Plant	100	50% of Adelaide
Gold Coast	Gold Coast Desalination Plant	45	12% of SE Queensland
Melbourne	Victorian Desalination Plant	150	30% of Melbourne
Perth	Southern Desalination Plant Perth Desalination Plant	45 100	50% of Perth
Sydney	Sydney Desalination Plant	90	15% of Sydney

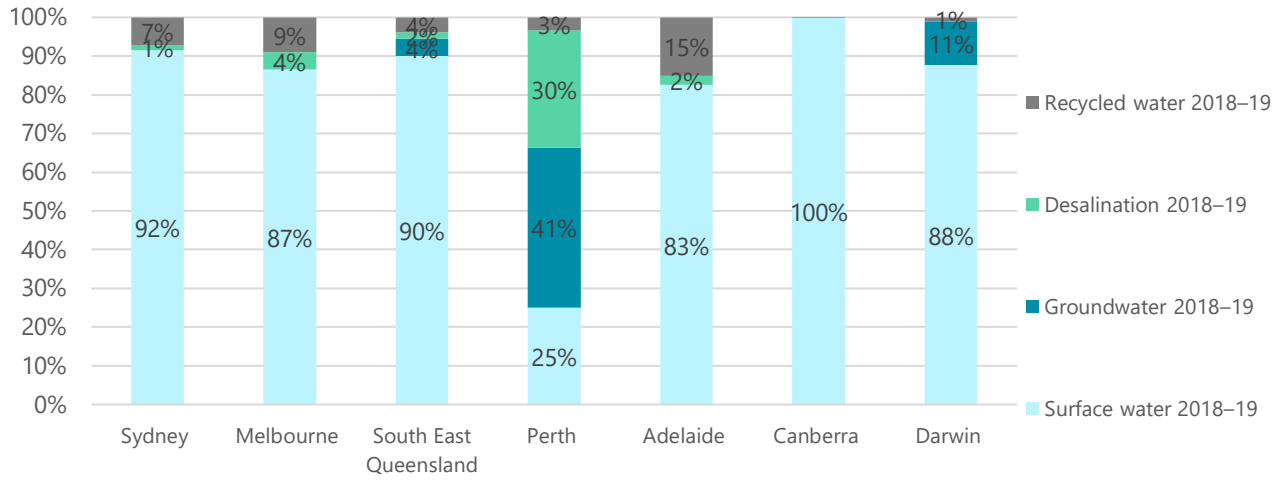


Figure 19: Water supply source for Australian cities (BoM 2020b)[9]

Long-term water security outlook in a changing climate

Adelaide's existing water sources are likely sufficient to enable economic growth to 2050, without significant augmentation, under a high-end emissions and mid-range population growth scenario. There will, however, likely be an increase in use of the Adelaide Desalination Plant to meet Adelaide's future water security requirements.

Future climate and demand scenarios suggest that by 2050 the maximum demand on the desalination plant during dry conditions would still be less than 65 GL per year (compared with its 100 GL per year capacity). This scenario assumed future water demand in Adelaide was based on a population of 1.85 million people (a 25% increase on current) and projected decreases in rainfall and increases in temperature consistent with a high greenhouse gas emissions scenario (RCP 8.5) (Charles and Fu 2014). It assumed water availability from the Mount Lofty Ranges would reduce based on a reduction in inflows consistent with a high emissions scenario (SRES A2). For the River Murray, flow was assumed to reduce consistent with a mid-range climate change scenario. Further research and planning is required to better understand the

[9] Recycled water figures for Adelaide include recycled water from Bolivar, Christies Beach and Aldinga wastewater treatment plants used in urban Adelaide as well as water used for viticulture and horticulture in Northern Adelaide and McLaren Vale.

potential water security adaptation pathways for all available water resources under a broad range of climate change scenarios.

A water-secure, cool and green Adelaide

Adelaide currently has a high degree of water security. However, ensuring its future water security will not be without challenges. One such challenge will be balancing the future water needs of a green Adelaide (an effective adaptation to reduce the impact of increasing summer temperatures) with other water demands. Integrated management of the full urban water cycle brings with it the potential to deliver positive community, economic and environmental outcomes. Successful, integrated urban water management requires community support and cooperation across sectors and institutions.

Urban water management will need to adapt to meet projected future challenges, including:

- a drying and warming climate that will reduce reliability of supply from traditional climate-dependent water sources while increasing demand to support greening and cooling initiatives
- higher flood risk from increased rainfall intensity, sea level rise and urban densification
- ageing infrastructure requiring near-term maintenance, upgrade or replacement.

Given these interdependent challenges, there is a renewed need to adopt an integrated approach to urban water management. The government will work with stakeholders to develop a shared vision for the future of urban water supply, sewerage management and stormwater drainage that drives long-term investment. In particular, an urban water management strategy will need to identify:

- how to best meet the increased water demand that urban greening and cooling may generate
- an effective and cooperative approach to the management of urban drainage supported by sustainable funding sources
- prudent and efficient investments in water supply augmentation that maximise the use of all available water sources to provide for future water security.

Adelaide as a National Park City

Adelaide has recently become the second National Park City after London – improving liveability through a better connection between people and nature.

The National Park City concept is based on a re-thinking of the traditional nature and purpose of a 'National Park' and how it can be applied in the context of urban landscapes. The concept recognises the unique ecology of cities, and the many health, wellbeing, biodiversity and economic outcomes that can be experienced through promoting a better connection between people and nature.

The National Park City area will cover all of Greater Adelaide. Maintaining sufficient quantities of fit-for-purpose water to support urban greening and cooling will be an important part of realising this National Park City vision.

Already considered as one of the most liveable cities in the world, National Park City status will generate national and international attention and help greater Adelaide become recognised globally as an exceptional place to live, work and play.

Regional water security

Overview

Regional water resources provide water for communities, irrigation, industry and mining, as well as supporting important local ecosystems. Each regional area faces its own unique water security challenges based on the characteristics of the region's water resources and its existing and future water needs. Water security in regional areas is critical to support existing water-dependent industries and to provide for growth, while also sustaining the local environment. The later part of this section focuses on water security in the following regions:

- South East
- Riverland and Murraylands
- Mount Lofty Ranges
- McLaren Vale
- Barossa
- Clare Valley
- Northern Adelaide
- Kangaroo Island
- Eyre Peninsula
- Far North

Water allocation plans are in place for the prescribed water resources in each region. A summary of the average annual volume of water used in each region between 2015–16 and 2018–19, including the minimum and maximum volumes used across those years, is provided in Figure 20. The volume of water used is based on the metering data reported to DEW. For a small number of cases, where metered water use is not available, assumed use is included as per the relevant water allocation plan. Detailed information on annual use for the prescribed areas in each region is provided at Appendix A.

For both the Far North and the Adelaide Plains, metered water use data is not yet available. The largest amount of water used each year comes from the groundwater of the South East (620 GL), and the surface water of the River Murray (551 GL) and the Mount Lofty Ranges (96 GL).

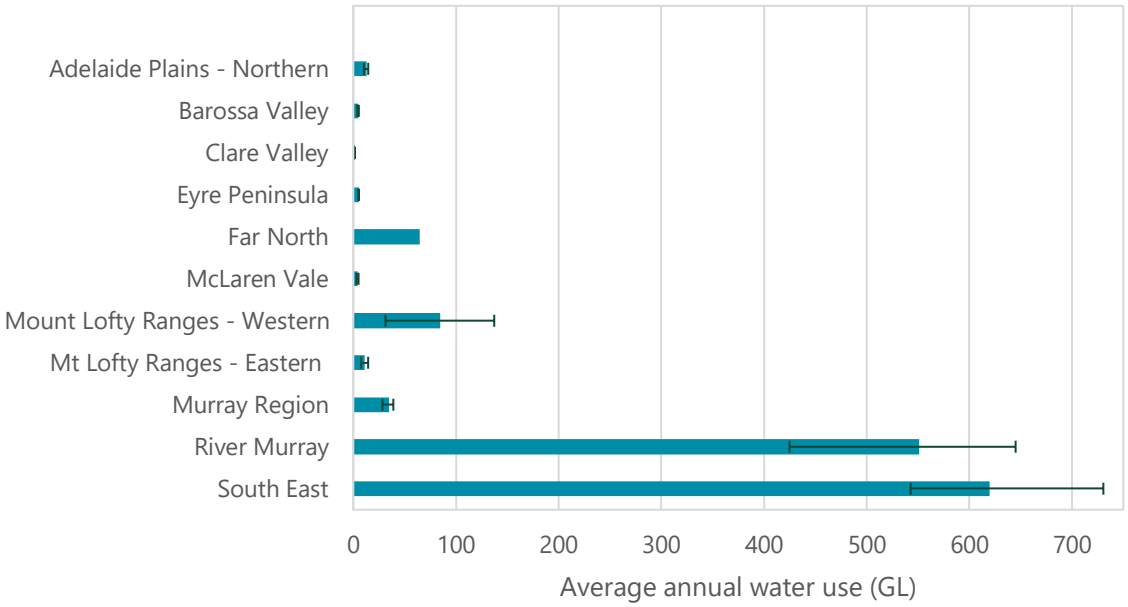


Figure 20: Average annual water use, from a prescribed water resource, by region[10] (2015–16 to 2018–19)

Regional drinking water

In the overview of each region, the focus is on non-residential demands. SA Water provides drinking water and ensures the water security of the majority of regional South Australians. It manages a drinking water supply network over a very large geographical area. Central to its networks are the major pipelines that deliver water from the River Murray to many parts of South Australia, as well as several minor pipelines, which are locally important. SA Water has the longest mains water supply network of all water utilities in Australia at more than 27,000 km. In regional parts of the state, each area's water mains network has its own unique operational needs based on where water is sourced from, the kind of treatment the water needs to be safe and clean, the type of customers the water is supplied to, and the extent of the distribution system.

[10] Volumes have been aggregated where there is more than one prescribed water resource in a region. In the Far North, this is the volume authorised for take. Metered use is not currently available; however, a meter implementation plan will be developed that recognises on-ground regional implementation issues such as high pressure and temperature bores.

Figure 21 provides a breakdown of how water supplied by SA Water to its regional customers is used. In years when not all of the water allocated to SA Water from the River Murray for regional areas is required, any remainder is traded to irrigators.

To maintain and enhance water security for regional communities, SA Water has commenced a $1.6 billion capital investment program to provide new water supplies and construct distribution infrastructure that will be delivered over the period 2020 to 2024. This program will improve water and sewerage services for South Australians and contribute to enhanced water availability. It will include new desalination plants at Penneshaw and near Port Lincoln (exact location to be confirmed) to address water security and supply issues on Kangaroo Island and the Eyre Peninsula respectively.

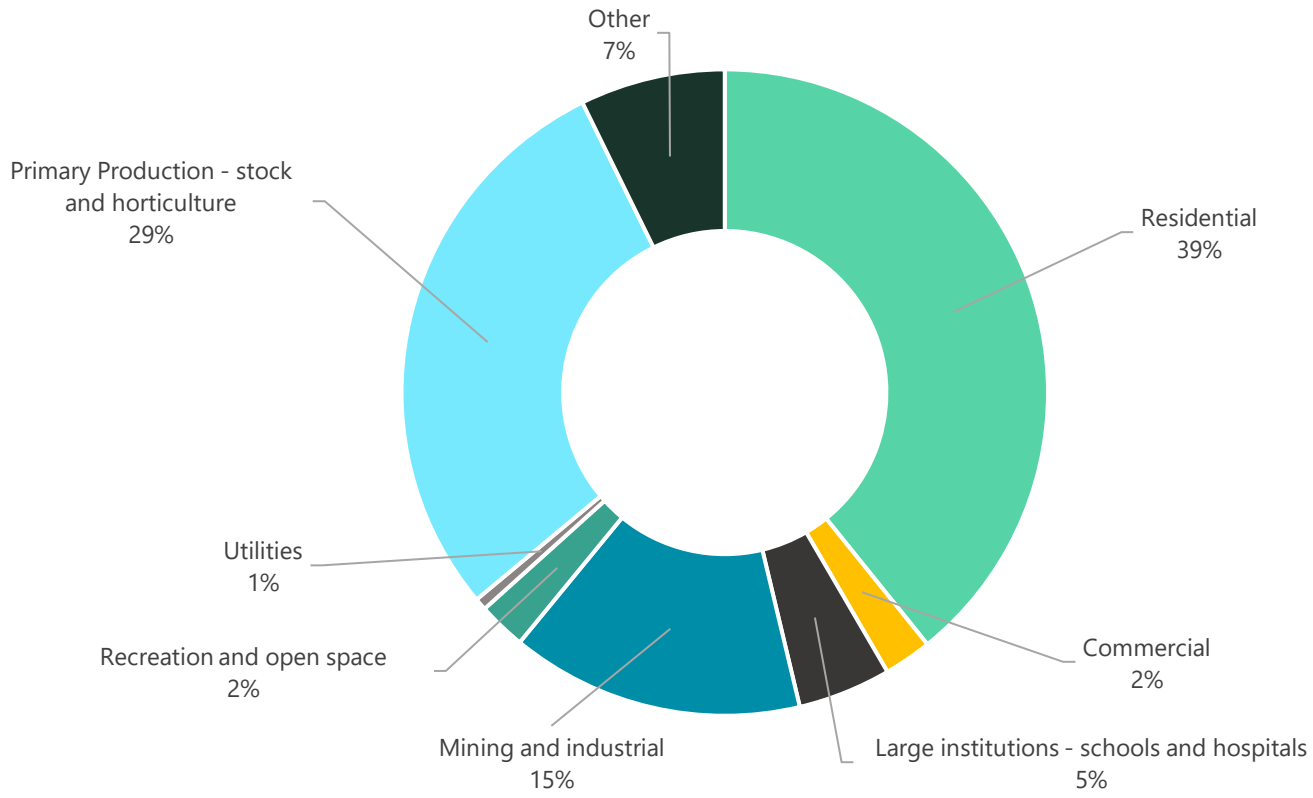


Figure 21: Breakdown of the use of mains water in regional South Australia

Regional water recycling

Recycled wastewater is an important water resource in country areas, being used for a variety of non-potable purposes such as irrigating community ovals, town reserves and golf courses. SA Water wastewater treatment plants service regional cities and larger towns and provide recycled wastewater for non-potable use. As owners and managers of community wastewater management systems (CWMS), regional councils also play an integral part in water treatment. There are currently 168 non-metropolitan CWMS operating in 44 council areas (several additional schemes are operated in metropolitan council areas). Regional councils service almost 90,000 customers, including 80,000 residential customers producing approximately 10 GL of effluent per year. A significant number of CWMS recycle some or all of their wastewater.

In addition to SA Water and local council-managed wastewater schemes, almost 80 wastewater management schemes exist in regional areas that are owned by other entities such as private companies. These include wastewater schemes servicing mining companies, agribusinesses and private developments. A number of these recycle some wastewater.

Regional water security and climate change

Water supplies in much of regional South Australia are sourced from local groundwater and surface water resources, which are vulnerable to changes in rainfall patterns and higher temperatures. In many cases, investigations already undertaken into the likely impacts of climate change on some of South Australia's regional water resources indicate a high degree of vulnerability (DEW 2020a). Further work is being done to gain a greater understanding of how climate change will impact each regional area and its water security.

Just as important is an analysis of how changes to water infrastructure or water resource management can be used to overcome the impacts of climate change. A research partnership with the University of Adelaide has been established to enable this type of analysis to address some of the state's priority water resource knowledge gaps. This work will help to inform targeted water security strategies and water planning processes now and into the future.

Regional urban centres

Whyalla, Port Augusta and Port Pirie

SA Water supplies the large urban centre of Whyalla with water from the River Murray via the Morgan to Whyalla Pipeline. Demand for water in this region continues to grow with the expansion of industry in this area. Whyalla (population 21,700) uses 7.8 GL per year, largely for industrial purposes.

Water is also supplied from the River Murray to Port Augusta (population 12,900) and Port Pirie (population 14,100). Port Augusta uses approximately 2.6 GL per year, with the main uses being residential, institutions and primary production. Port Pirie uses about 3.4 GL per year; the main uses are industrial and residential.

Mount Gambier

Mount Gambier (population 26,700) is the second-largest city in South Australia. SA Water supplies its residents with groundwater accessed through the Blue Lake (a crater lake that intercepts the upper aquifer), with an alternative supply available from a confined aquifer deep below the city. The city uses approximately 3.3 GL per year, while the demand from the broader South East supplied by SA Water is approximately 5.5 GL per year. Should demand increase, there are possible options to develop a nearby bore field. Investigations will be undertaken prior to July 2024 to determine the best location for any potential new infrastructure.

Murray Bridge

SA Water supplies the town of Murray Bridge (population 18,000) with water from the River Murray. Murray Bridge uses approximately 3.2 GL per year, with over half this volume used for residential purposes, followed by primary production and industrial use. Any increase in demand will be met from the River Murray within existing licensed volumes.

Port Lincoln

Port Lincoln (population 15,600) is the largest residential centre on the Eyre Peninsula, using an average of 2.5 GL per year. SA Water supplies water to customers on Eyre Peninsula via a pipeline from the River Murray through Iron Knob, and from the local groundwater systems.

Demands in this region are largely steady with some growth in the Iron Knob area from industrial activity. To provide capacity for growth and address climate risks, SA Water has begun the process to construct a seawater desalination plant on lower Eyre Peninsula. Once the desalination plant is in operation, pumping from groundwater will be reduced; however, groundwater will continue to play a significant part in the water supply mix. Improvements in the use of reclaimed water within mines are also reducing the amount of groundwater needed in the supply mix for mining activities.

Remote communities

Water is essential to the existence of remote communities. Some remote communities have a high degree of water insecurity, largely due to their remoteness and reliance on rainfall (which is often very low and sporadic) for water supply. Water supply is challenging – there is often limited existing infrastructure and new infrastructure costs are particularly high due to the lack of suitable local sources of potable quality. Responsibility for water supply varies between communities, with a range of regulated and unregulated supply arrangements. There are approximately 64 remote communities across the north of the state, with a total population of approximately 9,440 people (communities vary in size from 4 people to 4,000 in Roxby Downs).

There are a wide range of water supply arrangements in place to support both potable and non-potable supplies across these communities. Most commonly, water supplied is from treated groundwater, access to an SA Water mains pipeline or from rainwater. There are also a variety of water retail arrangements, with some serviced by local government (for example, Coober Pedy), some serviced by SA Water, and some self-managed supplies.

As part of the 2020–24 SA Water regulatory determination process, the South Australian Government will invest $41 million in remote community water supply upgrades. As a result of this investment, SA Water will upgrade the water supply to a potable standard in the regional areas of Yunta, Oodnadatta, Maree, Terowie, Marla, and Manna Hill. The

upgrades will provide drinking water to nearly 350 properties across South Australia. A further $7.9 million will be spent to support the maintenance and replacement of water assets in Aboriginal communities.

For those remote communities that are 'self-supplied', the state government will also continue to subsidise emergency water carting in exceptional circumstances, where a community has identified that its existing potable supply is at risk.

In addition, DEW has begun a water security audit and risk assessment for self-supplied remote communities. This will involve confirming the existing water supply arrangements, assessing short and long-term risks so as to better understand future requirements, and developing a basic level of safe and reliable water services for self-supplied remote communities.

Priority water-dependent regional industries

Water for primary industries

Sustainable access to water enables primary industries to make a significant contribution to the state's economy. Primary production is the largest consumptive user of water in the state and comprises thousands of small and medium businesses. The largest agricultural water users in South Australia are the horticulture, viticulture, dairy, forestry and livestock sectors. South Australia's food and wine industries are a vital part of the state's economy and there are major opportunities for growth locally, nationally and overseas.

There are also opportunities for growth in the forestry sector as global demand for wood fibre increases. The South East, in particular, is well placed to meet growing demand due to its suitable climate and topography. The Green Triangle Forest Industry Strategic Plan (GT Forest Industry 2019) aims to plant an additional 200 million trees, invest in increased local processing and manufacturing, and sequester an additional 100 tonnes of CO_2 equivalent by 2030.

In 2017–18, the gross value of irrigated agricultural production in South Australia was $1.9 billion, with $1.2 billion of this generated in the Riverland, followed by Adelaide and the Mount Lofty Ranges ($390 million) and the South East ($312 million). Sustainable agricultural water use supported almost 10,000 businesses, including 3,000 irrigation enterprises (ABS 2019). These businesses generated revenues in excess of $10 billion, with the highest value sectors being livestock ($3.2 billion), wine ($2.3 billion), horticulture ($1.8 billion), and dairy ($570 million) (PIRSA 2019). In addition, licensed forestry was calculated to have used 240 GL and generated revenue of over $2.2 billion. Irrigated agriculture also supports value-adding and service industries, such as packing sheds and food processing.

Growth State: Our Plan for Prosperity recognises food, wine and agribusiness as the state's largest export sector, largest manufacturing sector, and the largest economic contributor and employer of the state's 9 Growth State Sectors. An industry-led plan has been developed to improve competitiveness and profitability. It also considers industry growth over the next decade as producers respond to climate change, changing consumer trends and the emergence of new overseas markets. Drought, climate change and the impacts of poor water availability and quality are existential threats to current systems of primary production (NFF 2017; Remenyi et al. 2019). Secure access to water is essential for prosperous primary industries. This requires maintaining access to current water resources, development of new sustainable water resources, improved on-farm water use efficiency (through better irrigation equipment and crop management), and the development of new, water-efficient, climate-suitable crops. While financing water infrastructure to improve water availability for primary industries remains a challenge, close consideration needs to be given to the strategic long-term benefits of enhanced agricultural water security that may result from such investment.

Water for energy and mining

Energy and mining is an important sector with significant growth potential in the state. The energy and mining sector contributes $8.7 billion, or about 8%, of the state's annual gross domestic product (DEM 2019). South Australia has an abundance of natural assets including significant deposits of copper, gold, iron ore, uranium, graphite and petroleum. This includes Olympic Dam, which is one of the world's most significant deposits of copper, gold, silver and uranium.

Approximately 110 GL per year is used in the mining and energy sectors in South Australia. Water use for mining includes usage for mine sites, dust suppression, drilling and hydraulic fracturing, separating ore, cooling and mineral processing, and dewatering. Water for mining and industrial use does not necessarily need to be drinking quality, depending on what it is being used for, so various sources can be used including onsite re-use, saline groundwater and recycled water.

Energy and mining has been identified as a priority sector within Growth State because of its strong potential to meet increasing interstate and global demand, attract investors and leverage comparative advantages. The Energy and Mining Strategy (DEM 2019) aims for exports for the sector to increase from $5.3 billion in 2018, to $13 billion by 2030. Four priority mineral regions have been identified: the Far North (copper and uranium), Braemar (magnetite), Upper Eyre

Peninsula (magnetite and gold), and Coober Pedy to Central Gawler Craton (copper, gold and uranium). In addition, the Hydrogen Action Plan identifies significant opportunities, including a share of the forecast $1.7 billion and 2,800 jobs that hydrogen could contribute to the national economy by 2030. These ambitions cannot be realised without secure water sources.

For those areas that are not prescribed, there is no requirement to hold a water licence to extract water for mining. However, there may be requirements for water affecting activity permits, as well as other planning approvals. Mining approvals may also contain conditions requiring monitoring of the water resource and provisions for minimising the impacts on neighbouring water users and the environment.

State Growth Fund – Water and Infrastructure Corridors

Demand for water in mining will increase as the sector grows. The mining industry and government are collaborating on innovative ways to ensure the necessary water is available to meet the state's growth objectives. As part of its $5.6 million Water and Infrastructure Corridors initiative, the government is aiming to address regional groundwater knowledge gaps to support regional mining, energy and other industry development and support the establishment of multi-use infrastructure delivery corridors (water, power, transport, communications) in regional South Australia.

The groundwater assessment phase will focus on the northern corridor linking the Carapateena and Olympic Dam and Prominent Hill mines and other potential mines in this copper prospective corridor and test a palaeovalley (old river bed) groundwater source option in the Braemar magnetite iron ore province. This information will be used to develop a strategy for water use in the region and contribute to the infrastructure corridor phase.

The infrastructure corridor phase will investigate and develop a business case and commercial model for establishing a pilot for a multi-use infrastructure corridor. It will review existing policy and regulatory mechanisms and commercial procurement and access pathways to establish infrastructure corridors.

Regional water security status

South East

Most water-dependent activities in the South East region rely on the groundwater sourced from large and, in many areas, relatively fresh aquifers. Annual average use of groundwater is approximately 620 GL and represents about 45% of the water used in South Australia each year, with the majority of the water used for irrigation (~365 GL) and commercial forestry purposes (~240 GL) as per Figure 22.

Surface water in the region is from rainfall or a result of groundwater discharging to the surface. The region is very flat and there are few creeks or river systems. Historically, surface water pooled and formed broad swamps, and in very wet years, overflowed onto flood plains before being directed to the north towards the Coorong. The South East drainage system is a significant regional infrastructure network that diverts surface water from agricultural land to minimise flooding and manage salinity to maintain the productivity of the land. Based on salinity, surface water is delivered as environmental flows to wetlands in the region or is discharged at the coast. Groundwater and surface water are managed separately, which is challenging as the sources are in constant exchange with each other and are integrated parts of the regional water system (SE NRM Board 2019).

The total value of agricultural output in the South East is estimated at $1,123 million (ABS 2019) with production from meat cattle, sheep and other livestock as the largest commodity. Approximately 130,000 ha are irrigated in the South East. The gross value of this irrigated agricultural production is estimated at $311 million (ABS 2019). The main uses of irrigation water are to produce pasture for stock, wine grapes and potatoes. The region also contains a significant dairy industry and supports industrial uses of water such as timber processing, pulp and paper manufacture, dairy processing, wine making and operation of abattoirs.

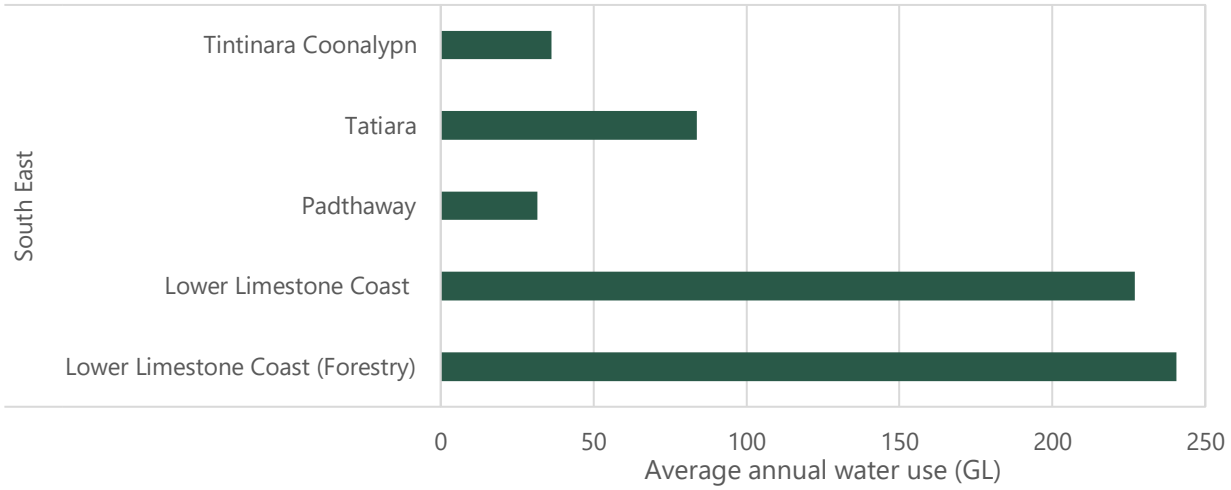


Figure 22: Average annual water use in the South East (2015–16 to 2018–19)

The lower South East is part of one of the largest commercial forestry areas in Australia (the Green Triangle, which is shared with western Victoria) with over 130,000 ha of forest plantation (2018). Water use by the forestry industry is accounted for and managed through a licensing system and is estimated at 240 GL per year. The production value of the forest industry was $334 million for 2017–18, while the processed value was over $2 billion (PIRSA 2019). The potential for growth of the forestry industry is recognised in Growth State, under the Food, Wine and Agribusiness Plan for Growth.

Bool and Hacks Lagoons Ramsar site is one of the most important wetland areas remaining in the South East. The wetlands provide major drought refuge and breeding habitat for waterbirds and act as a buffer storage basin in the regional drainage system. The Piccaninnie Ponds Karst Wetlands Ramsar site is one of the few remaining permanent freshwater wetlands in the lower South East and is believed to be a drought refuge. Spring pools and creeks of the lower South East, especially Ewens Ponds, Mosquito Creek and Henry Creek, are important stream refuges for threatened native fish.

The South East is home to an estimated 67,000 people. SA Water uses localised groundwater from the confined and unconfined aquifers of the South East to provide many towns' water supply, in addition to a pipeline from Tailem Bend to Keith that supplies water from the River Murray. Not all towns are supplied with water by SA Water. Some communities are self-sufficient, using groundwater and rainwater tanks. Outside the urban areas, most properties extract water for stock and domestic purposes from private bores, although in high salinity areas rural properties must rely on reticulated water for both stock watering and household purposes. Collection of roof runoff is also a frequent source of domestic water supply. Stormwater is collected in many urban areas and recharged to the groundwater through natural runaway holes or artificial recharge points.

At a regional level, groundwater use is significantly less than the volume of water allocated for use each year. This is a reflection of the fact that the upper unconfined aquifer in the western part of the South East region has groundwater of high salinity with limited options for use, while the eastern and southern parts have been heavily used historically. As a result, use is concentrated in the better water quality parts of the region such as the Coonawarra, Wrattonbully and Padthaway wine regions, the areas under commercial forest and a large dairy farming sector, with some areas at risk of potential overuse and others already showing declining trends. Based on current technology, there is limited capacity for use of the high salinity water in the region, and limited capacity for new allocations of water from the region's aquifers. However, there are opportunities for new development through the trading of unused allocations and changes to the purpose of use of water, such as the conversion of allocations for commercial forestry to irrigation and vice versa.

Where groundwater is located within 20 km of the South Australian and Victorian border, the *Border Groundwaters Agreement 1985* is in place to ensure the cooperative and equitable management of the shared groundwater resources. Extraction limits within the border zone are set under provisions in the agreement, and management arrangements in both states must be in line with the agreement.

Improved water security for farmers in the South East

As part of the government's commitment to improved water security for farmers in the South East, reductions to allocations for irrigation and forestry were put on hold while the science underpinning the reductions was reviewed.

The review found that a considerable body of evidence underpins the water plan and made recommendations relating to the risk assessment scheduled in the plan. The 2019 risk assessment found that in some areas the risks to water users and high-value ecosystems remained high, while it had reduced in other areas. The reductions scheduled in the plan have been adjusted accordingly. The risk assessment also identified 2 new areas of concern where irrigation is impacting seasonally on coastal ecosystems.

Risks to the South East's water resources are managed through policy set out in water allocation plans. The South Australian Government and the Limestone Coast Landscape Board are engaging with irrigators in high-risk areas to identify options to sustainably manage this important groundwater resource.

Riverland and Murraylands

The River Murray is the main source of water in the Riverland region and is a significant resource for metropolitan Adelaide and regional towns across the state, as well as Riverland towns themselves. In South Australia, the majority of the water taken from the River Murray is used for primary production. The Riverland is a major horticultural region and is well known for producing wine, citrus, stone fruit, almonds, pasture and vegetables. Water is also used for livestock. Other water uses include water supply for towns and metropolitan Adelaide, the environment and recreation.

The water resources in this region support significant aquatic habitats along the entire length of the River Murray to the Murray Mouth, including the Riverland (including Chowilla Floodplain), Banrock Station Wetland Complex, and Coorong and Lakes Alexandrina and Albert Wetland Ramsar sites. The region provides a significant habitat for waterbirds, including migratory shorebirds and a number of threatened and endangered species, for native fish species and for ecologically significant, water-dependent vegetation species and communities.

More water for River Murray irrigators in dry years

The Adelaide Desalination Plant was built to safeguard urban water supplies and ensure sufficient water is available to meet Adelaide's needs in extreme dry years. The plant also makes a major difference to how water is shared between all SA River Murray water users in dry years. By reducing Adelaide's reliance on the River Murray, up to an additional 50 GL of available Murray water has been released to holders of SA irrigation licences, which would not be possible without the insurance provided by the plant. This boosts irrigation allocations by up to 8% and applies when irrigators are on allocations of less than 100% and critical human water needs have been secured.

Building on the success of the Australian Government's recent *Water for Fodder* program, the state is also seeking to lock in more permanent trading flexibility for SA Water's River Murray licence for Adelaide, which would allow desalination production to support allocation trade to other River Murray water users.

Key reforms have improved the way River Murray water is managed in South Australia. Implementation of the Basin Plan provides many benefits, including the protection and delivery of critical human water needs, water trade, securing the quality of our River Murray water supply and providing water for the environment. It helps to ensure the environmental needs of the basin's rivers, wetlands and flood plains are protected, while sustaining food production and communities throughout the basin.

South Australia's storage right now enables the state to defer and store water in the upper River Murray storages to meet critical human water needs or private carryover. South Australia's carryover policy allows water users to carry over water from one year to the next, during a sequence of dry years. A water allocation framework has been integrated into the River Murray Water Allocation Plan that improves the reliability of South Australian River Murray irrigation entitlements.

Figure 23 outlines the volume of water that has been used from the River Murray each year over the last 5 years compared to the volume allocated (adjusted for trade).

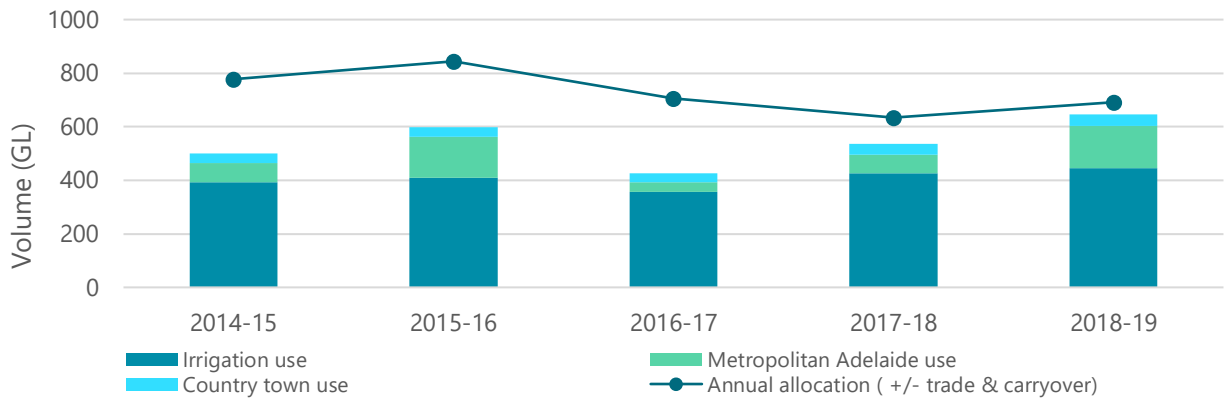


Figure 23: Consumptive water use from the River Murray in South Australia

Improved River Murray allocation announcements

Early information about water availability is being provided to River Murray water users to provide better information to irrigators to help with business planning. Regular and early advice on projected water allocations for the water year ahead is especially important when opening allocations are likely to be less than 100%. Regular updates are provided to water users, including scenarios showing the likelihood of allocation improvements, to assist in making decisions about their water use and purchases.

Irrigation demands from the River Murray in South Australia range from 400 to 450 GL per year and approximately 85% of the irrigation demand is from permanent horticulture. The area of irrigation along the River Murray in South Australia remained relatively stable between 2009 and 2019 (50,650 ha in 2009 versus 49,900 ha in 2019). Crop types, however, have changed with a decrease in the area of wine grapes, citrus and stone fruit and an increase in nut crops, particularly almonds. In 2009, wine grapes represented the largest horticultural water user (51%), followed by almonds (17%) and citrus (17%). By 2019, wine grapes had reduced but still remain the largest water user (41%) (Figure 24). However, almonds (29%) now use significantly more water than citrus (13%).

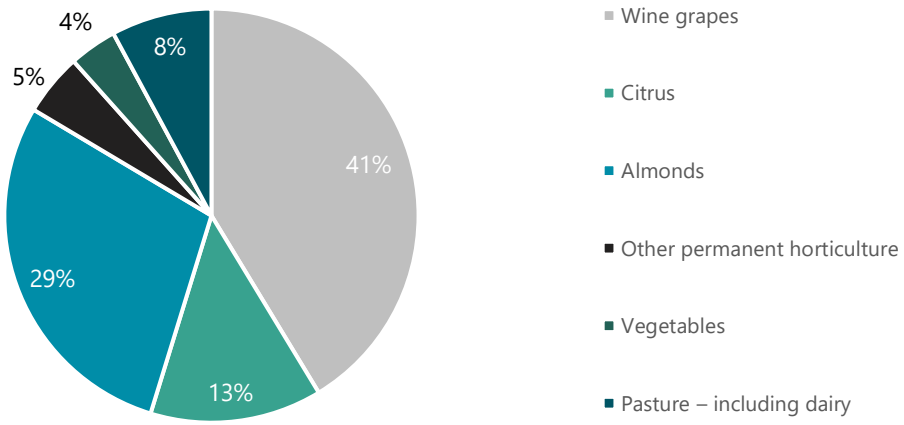


Figure 24: How River Murray irrigation water is used in South Australia (2018–19)

Water availability in a dry year remains the key restriction on the potential for further permanent horticulture development in the South Australian River Murray and across the whole of the southern Murray–Darling Basin.

While many towns in the Murray Mallee are also provided with water from the River Murray, a number of townships access groundwater from local aquifers. SA Water and local councils supply water from groundwater resources for public water supply purposes. The groundwater quality varies across the region with the majority of good quality water used for irrigating crops – primarily potatoes, as well as carrots, onions and olives. Groundwater is also used across the region for stock and domestic purposes. Irrigation demand increased rapidly in the Mallee Prescribed Wells Area from 2001 to 2008. Since then, irrigation demand has remained relatively stable with around 7,000 ha of crops irrigated. Further development is limited by water quality and suitable soils. To ensure that groundwater resources are managed sustainably, extraction limits are in place within the prescribed wells area.

As per the South East region, where the groundwater resources are located within 20 km of the South Australian–Victorian border, management and extraction limits must be in line with the provisions of the *Border Groundwaters Agreement 1985*.

Mount Lofty Ranges

The Mount Lofty Ranges is defined by 2 prescribed water resource areas – the Eastern Mount Lofty Ranges (EMLR) and the Western Mount Lofty Ranges (WMLR). The EMLR incorporates the eastern slopes of the Mount Lofty Ranges and the Murray Plains, and the WMLR incorporates the western slopes of the Mount Lofty Ranges and extends down to the Fleurieu Peninsula. While there are many similarities between the 2 areas, including the water management approach, the different climate and water resource availability result in different industries and levels of use in each region.

Irrigated agriculture from the Mount Lofty Ranges region produces a total estimated farmgate value of $260 million annually, consisting primarily of wine grapes, fruit and nuts and vegetables (ABS 2019).

Surface water runoff, watercourse flows and underground water all contribute to the needs of water-dependent ecosystems in the region. Important habitats in the region include the critically endangered Swamps of the Fleurieu Peninsula ecological community and wetlands in the Central Hills.

Western Mount Lofty Ranges

The Western Mount Lofty Ranges area is home to approximately 211,000 people. Irrigated crops include pasture, wine grapes, apple and cherry orchards and vegetables. There are also about 12,400 ha of commercial plantation forestry within the area. Water is also used for the irrigation of gardens, ovals and turf. Domestic water supply is sourced from SA Water's mains water, wells and dams across the area. In addition to local use, the water resources of the WMLR area provide water for public water supply purposes with the reservoir catchments providing 60% of metropolitan Adelaide's mains water in an average year.

Water in the area is sourced from groundwater and surface water, which are prescribed and managed through the WMLR Water Allocation Plan. Significant dam development and watercourse extractions throughout the region have impacted on the ability to meet environmental water requirements in the area. To address the risk to environmental water requirements, a sustainable extraction limit of 25% of the surface water resource capacity is in place, with an additional requirement to provide low flows (flows received at critical times in the season, historically disrupted through dam development). A program to return a more natural flow regime is being implemented in key catchments across the WMLR area so environmental water needs can be delivered. Returning low flows means it has been possible to allocate larger volumes for consumptive use (in line with existing levels of use) than if the program was not in place, while still maintaining environmental condition at an acceptable level of risk. There is no new surface water available for allocation and limited opportunity for new watercourse or groundwater allocation.

Pressure on water resources is expected to come from increased peri-urban expansion and increased demand for irrigation, mining and possibly forestry. New water demands generally will need to be met through increased efficiency, transfer of existing allocations or alternative water sources.

Eastern Mount Lofty Ranges

Grazing and cropping are the main land uses in the region with irrigated horticulture and pasture production accounting for approximately 7% of the land use. Pasture and wine grapes are the predominant irrigated crops; fruit and nut trees, vegetables, lucerne, turf, flowers and berries are also grown in the area. Other intensive uses include urban areas, mining, industrial and manufacturing. Forestry makes up around 2% of land use in the Eastern Mount Lofty Ranges area. The majority of water supply for townships is via SA Water mains network, with the exception of a few towns that are supplied via underground water by SA Water or private water supply schemes. Dams, watercourses and wells across the region provide water for stock and domestic purposes.

The Langhorne Creek wine region is a unique area with access to multiple sources of water. Historically, flood waters from the Bremer River have been used to irrigate crops. Natural flooding has proven effective for managing salt accumulation in the root zones of plants (as a result of efficient irrigation practices) as well as providing essential environmental flows to the now stranded red gum swamps located on the flood plain. Local groundwater is another important source of water. Managed aquifer recharge occurs to store water during times of high water availability – this reduces evaporative losses and reduces groundwater salinity. Policies are in place to manage local risks of rising shallow water tables by requiring the planting of deep rooted perennial vegetation. Some water users in the area also hold River Murray water licences and access water from Lake Alexandrina. The Creeks Pipeline was constructed during the Millennium Drought to provide a more secure source of water from the River Murray during dry conditions when water from Lake Alexandrina may not be accessible or desirable due to low lake levels or high salinity. Access to a diverse range of water sources has helped provide greater water security to growers in the Langhorne Creek area.

Water in the area is sourced from groundwater, surface water and watercourse water, which are prescribed and managed through the EMLR Water Allocation Plan. There are a number of larger watercourses and dam development is significant, particularly in the hills areas. Groundwater is sourced from fractured rock aquifers in the hills areas, as well as sedimentary aquifers on the plains and in some valleys in the hills. As in the WMLR area, dam development and watercourse extractions have significantly changed flow patterns, and a program to return low flows to the environment is underway. Similar to the WMLR area, this means it has been possible to allocate larger volumes for consumptive use than if the program was not in place, while still maintaining environmental condition at an acceptable level of risk.

McLaren Vale

The McLaren Vale region is a premium wine-producing region with over 7,300 ha planted to vines and more than 190 producers, including 80 cellar doors. Traditionally, local groundwater and surface water resources have been used for irrigation, commercial and industrial uses. Groundwater is also used for stock and domestic purposes.

Information on the groundwater-dependent ecosystems in this area is limited. However, it points to the seeps and springs from the fractured rock aquifer being important in the Sellicks Hill range, southern bank of the Onkaparinga Gorge near Chapel Hill, the permanently flowing reach of Wirra Creek, and permanent pools in Pedler Creek. In the Blewitt Springs/Kangarilla area and Willunga Basin Plain, the aquifer is shallow and directly supports wetlands and vegetation remnants, such as the California Road wetland, Aldinga Scrub and the coastal lagoons at Maslin Creek and Pedler Creek.

Recycled water from the Christies Beach and Aldinga wastewater treatment plants is used to irrigate horticultural crops. The water supply scheme was commissioned in 1999 and use of reclaimed water has increased over time. The ability to access an alternative source of water has taken pressure off local groundwater resources and has enabled irrigated areas to expand. It has also reduced the amount of treated wastewater released to the sea. An average of almost 5,000 ML of recycled wastewater is currently used per year, which is approximately 55% of the annual output of the plant (Figure 25).

A new 600 ML storage dam has recently been constructed, which will increase the availability of recycled water in 2020–21 and further reduce the outflow of treated wastewater to the sea. It is expected that this will result in an additional $5.5 million in annual grape production for McLaren Vale and provide greater security for the future of horticulture in the area. The expansion of the water supply scheme is proposed to provide up to 8,100 ML of recycled wastewater annually.

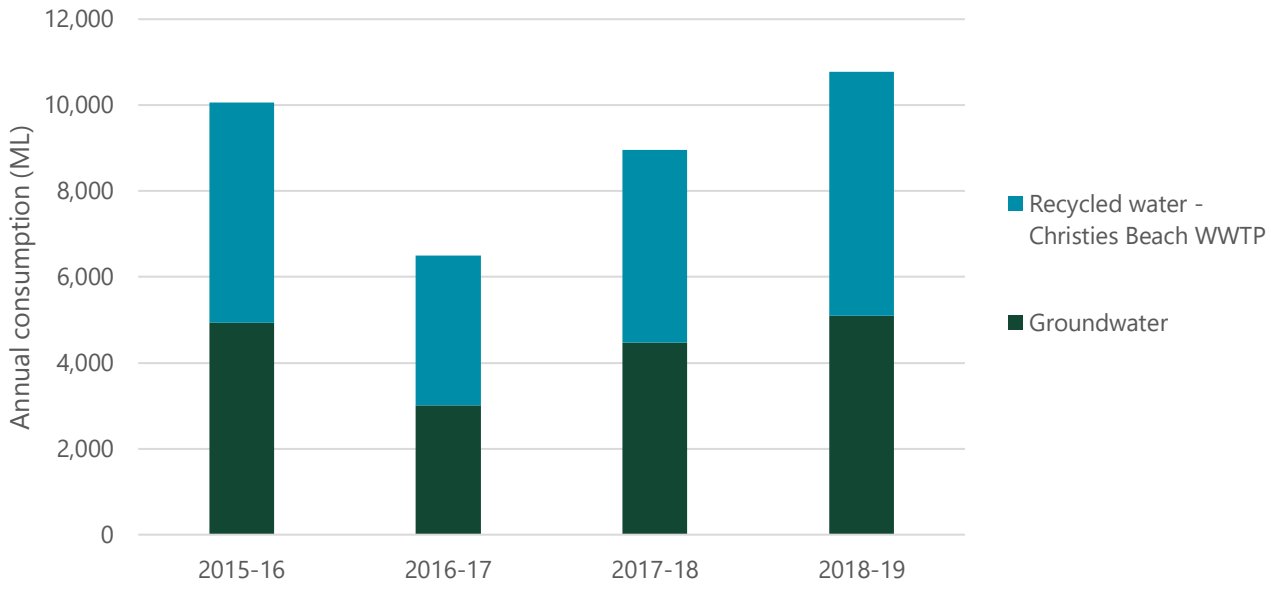


Figure 25: Annual water use in the McLaren Vale region

Barossa

The Barossa is a world-class premium wine and food region and is home to approximately 170 wine companies and 550 independent grape growers. The Barossa's approximately 14,000 ha of vineyards is around 10% of Australia's national total. The Barossa on average accounts for 27% of the total value of the South Australian grape and wine sector.

The water-dependent ecosystems in the Barossa include watercourses, riparian zones, wetlands and flood plains, and may depend on surface, watercourse and/or underground water. With some exceptions, the water-dependent ecosystems in the Barossa Prescribed Water Resources Area are in poor condition. Jacob Creek is the area of most ecological value. It is a permanently flowing reach that, due to its low population of predators and generally undisturbed habitat, is home to a permanent population of mountain galaxias.

Irrigation is an essential element of the success of the Barossa Valley. Local ground and surface water, as well as recycled and imported water, support irrigated viticulture and horticulture in the region. Over the last 10 years, overall water use has increased significantly, largely as a result of an increase in the use of imported water. Over the last 5 years, on average twice as much imported water has been used in the Barossa Valley compared to local surface and groundwater (as shown in Figure 26). Barossa Infrastructure Ltd can supply over 11 GL per year of non-potable water to irrigators in the Barossa. Water is sourced from the River Murray (via SA Water's Mannum to Adelaide Pipeline), the Warren Reservoir and recycled water from the Nuriootpa CWMS. Imported water is available to supplement rainfall and increase the resilience of vineyards in years of drought. The increasing irrigation demand is driven by increasing irrigation rates, which enable premium fruit to be grown as temperature increases and rainfall reduces, as well as by the expansion of irrigated area.

There is potential for significant further economic growth in the Barossa Valley if growers are able to access secure, affordable and fit-for-purpose water. The government is supporting plans to deliver additional water to the Barossa and Eden valleys[11]. Any such project, however, needs to be market driven and based on robust business case assessment. Investigations underway include the supply of additional water to Eden Valley via the Mannum to Adelaide Pipeline and bringing recycled water into the Barossa from the Bolivar Wastewater Treatment Plant. Initial long-term estimates indicate $292 million for the state's economy and 1,000 jobs could be generated through the delivery of 8 GL of reclaimed water from the Bolivar Wastewater Treatment Plant via existing and new infrastructure.

As well as reducing the Barossa's reliance on the River Murray, supplementing winter and spring rainfall with fit-for-purpose reclaimed water from the Bolivar Wastewater Treatment Plant will enable the region's wine grape growers to deliver a more consistent, high quality yield from year to year in a sustainable manner.

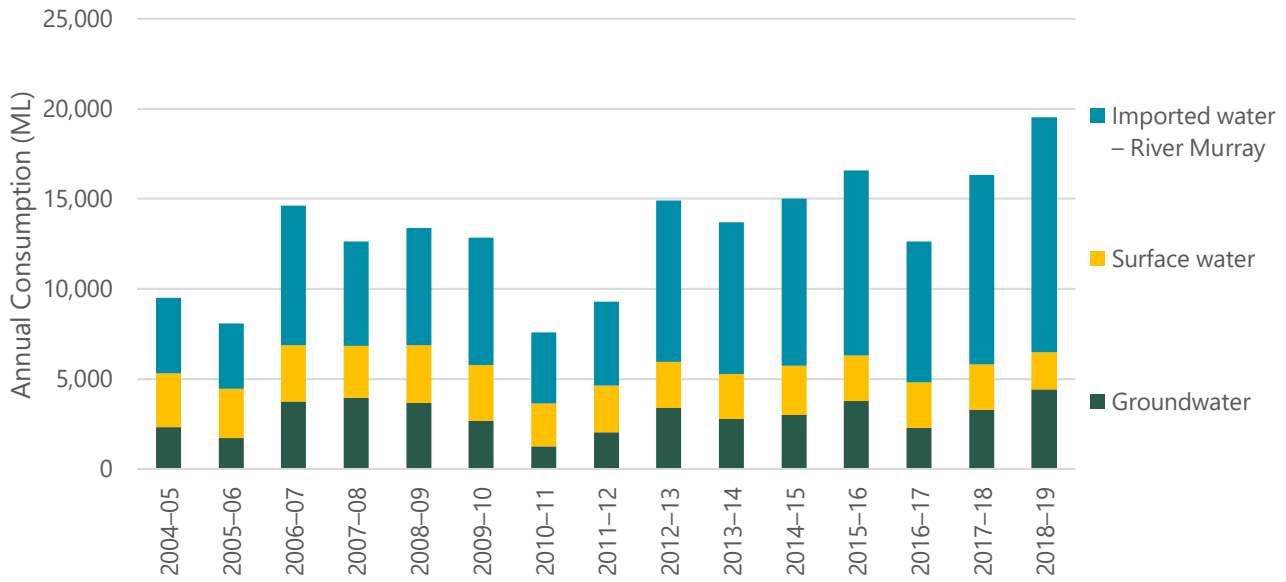


Figure 26: Local and imported water use in the Barossa Valley Prescribed Water Resources Area

[11] The Eden Valley is located within the Marne Saunders Prescribed Water Resources Area, and surface and groundwater resources are managed via the Water Allocation Plan for the Marne Saunders PWRA.

Alongside the investigations to bring more water into the Barossa and Eden valleys, DEW is trialling a targeted water security planning approach in the Barossa. This work recognises the impact of dry conditions experienced in the Barossa and Eden valleys in recent years, coincides with the timing of the review of the Barossa Water Allocation Plan and ensures that the water supply options being investigated are part of a broader water security strategy. Lessons learnt from this process will inform future water security planning work across the state.

Clare Valley

The Clare Valley is one of the oldest premium wine-producing regions in South Australia with around 5,000 ha of irrigated grapevines. Water is also used for grape processing, aquaculture, feedlots and stock, and domestic purposes. Water is accessed via surface water, watercourses and groundwater.

Although the name suggests a single valley, the region is actually made up of numerous small catchments in what has been described as an elevated plateau. Many of the watercourses of the Prescribed Area are ephemeral, with permanent groundwater-fed pools. Some of the groundwater moving through the area forms a baseflow to streams, and this plays an important role in maintaining permanent pools during dry periods and Skillogalee Creek, the only watercourse that flows year-round.

Water resource availability is a limiting factor for further development in the region. A water allocation plan is in place for the local water resources and there is no capacity to increase volumes allocated above current levels. A total of 4,950 ML per year is allocated from surface water, watercourses and groundwater.

Recently, imported water from the River Murray through the Clare Valley Supply Scheme (CVSS) has provided an alternative source of water for irrigation and town water supply. The CVSS has the capacity to provide 7,300 ML per year, with about half of that volume available for irrigation.

Funding for a business case for new water infrastructure for the Clare Valley has recently been announced. This funding will investigate the potential to bring more water into the region to improve water security and provide additional growth opportunities.

Northern Adelaide

The Northern Adelaide Plains region is one of the largest vegetable cropping areas in Australia. Water is sourced from groundwater, recycled water and mains water. The region produces approximately 200,000 tonnes of fresh produce and over $300 million in farmgate value annually. Crops such as potatoes, carrots and onions are grown in open fields and more than 1,000 ha of greenhouses produce primarily tomatoes, cucumbers and capsicums.

Information on the extent of groundwater-dependent ecosystems in the Northern Adelaide Plains Prescribed Wells Area is limited. There are no known ecosystems that depend on the deep Tertiary aquifers of the Northern Adelaide Plains Prescribed Wells Area. However, it is likely that ecosystems associated with the Gawler River and Little Para River and the estuarine wetland of Buckland Park have a level of dependence on the shallow groundwater aquifers of the region.

Groundwater is managed through the Northern Adelaide Plains Water Allocation Plan, which is currently being reviewed, with a total of 26 GL[12] of native groundwater allocated. Groundwater resources are fully allocated, and expansion of irrigated crops can only occur through the trading of unused allocations consistent with rules in the water allocation plan.

Recycled water has been accessed from the Bolivar Wastewater Treatment Plant through the Virginia Pipeline Scheme since 1999. The recycled water was initially provided to growers to supplement groundwater use due to declining groundwater levels and increasing salinity. The additional 20 GL of recycled water made available allowed horticultural production to expand and reduced the reliance on groundwater. The scheme also helped to reduce the amount of waste water being released to the environment via the St Vincent Gulf.

[12] Additional volumes are allocated for recharged water.

Northern Adelaide Irrigation Scheme

The South Australian Government has recently invested in the Northern Adelaide Irrigation Scheme (NAIS) to expand the recycled water use scheme in the region. This will allow the Northern Adelaide Plains region to grow its horticulture industry and transform it into a national leader in intensive, high-tech food production. This development enables South Australia to be competitive in export markets and drive employment growth, attracting new skills and talent to the state.

Infrastructure upgrades through NAIS enable an additional 12 GL a year of recycled water suitable for irrigation to be sourced from the Bolivar Wastewater Treatment Plant. Access to large volumes of affordable, high security recycled water will further reduce reliance on groundwater and is anticipated to support an additional 3,000 ha of horticulture production and create more than 3,700 jobs when at full production. Reduced effluent releases also contribute to improved environmental outcomes in the marine environment.

An investment of $155.6 million ($45.6 million provided by the Australian Government) has been made to construct this scheme. During 2020–24, SA Water will invest $24 million in capital expenditure and $2.8 million a year in operating expenditure to complete the scheme and service its customers. The operating expenditure will be offset by revenue generated as customers connect to this climate-independent water source.

Further expansion is under investigation. If it is economically feasible, a second stage to supply recycled water to the Barossa region could bring the total additional volume supplied from the Bolivar Wastewater Treatment Plant to over 20 GL a year.

Kangaroo Island

Kangaroo Island is characterised by its clean and unspoilt environment, offering opportunities for tourism and a range of primary production activities. Cropping and grazing, particularly sheep for wool and meat, are the mainstay of primary production on the island. Other value-added products such as wine, cheese, marron, olive oil, free-range chickens and honey provide economic activity that benefits from tourism and Kangaroo Island's green image in export markets. Kangaroo Island supports a permanent population of around 4,600 people and more than 200,000 visitors annually. The population is centred in the townships of Kingscote, Penneshaw, Parndana and American River.

Catchments on the western end of Kangaroo Island in Flinders Chase National Park, including Rocky River and Breakneck River, were largely in pristine condition prior to the 2020 bushfires. Most catchments outside Flinders Chase National Park are in an agricultural landscape, but typically have wide riparian zones that buffer the impacts of agricultural practices. Fifteen wetland systems across the region are nationally significant. These include Murray Lagoon, Birchmore Lagoon, D'Estrees Bay, Lake Ada, Cygnet Estuary and American River wetland system. The bushfires in early 2020 significantly impacted most catchments, resulting in a significant increase in sediment input with corresponding smothering and simplification of instream habitat, and significant impact on instream fauna such as fish and macroinvertebrates.

Kangaroo Island relies heavily on surface water, typically captured through farm dams. There are 53 surface water catchments on Kangaroo Island. Approximately 5,700 km of watercourses move surface water across the region. In many parts of the region, rainwater is the main source for household drinking supplies. Limited groundwater is available or used in most locations on Kangaroo Island and is highly variable in quality, quantity and accessibility.

SA Water provides reticulated water within the bounds of the Middle River Water Supply System and from the Penneshaw Desalination Plant on Dudley Peninsula. The independent systems supply water to around half of Kangaroo Island's population. In addition, the community also sources drinking and non-drinking water from catchment runoff harvested in private dams, wastewater re-use, small-scale bores and small-scale desalination plants.

Kangaroo Island Council operates CWMS that produce in the order of 120 ML per year. Approximately 80 ML per year is re-used on sportsgrounds, parks and gardens, and there is potential to expand wastewater re-use. There are currently no stormwater capture and re-use schemes on the island. Kangaroo Island Council has, however, commissioned investigations into schemes in Kingscote and Penneshaw.

Kangaroo Island is already feeling the impact of climate change with increasing temperatures and reducing annual average rainfall. The 2020 bushfires saw much of the island affected, including the Middle River Water Treatment Plant and most of the Middle River Reservoir's catchment. In the immediate aftermath of the bushfires, temporary filtration plants were required. The vegetation in the catchment of the Middle River Reservoir is now experiencing regrowth. This is helping to manage the quality of runoff water entering the reservoir, which ultimately supports long-term drinking water quality.

A new 2 ML per day desalination plant and associated distribution infrastructure has been approved for Kangaroo Island and is funded through a combination of state and federal funds. The plant will enhance drinking water security and create hundreds of jobs. The plant and new pipelines will also enable 1,000 properties in American River, Baudin Beach, Island Beach and Sapphiretown to connect to a more reliable water source.

Eyre Peninsula

The Eyre Peninsula is a large and remote agricultural region, where 55% of the landscape is used for dryland agriculture and 43% is reserved for conservation. Water is sourced primarily from groundwater resources, supplemented with River Murray water supplied via the Iron Knob to Kimba Pipeline. The principal water uses in the region include public water supply, irrigation, industrial, stock and domestic use.

Eyre Peninsula Desalination Plant

To address water security issues across the Eyre Peninsula and protect the long-term viability of groundwater resources in the Uley Basin, SA Water will construct a 4 GL per year seawater desalination plant.

Groundwater is of variable quality and quantity across the region. Most of the groundwater resources in the region are saline, including large saline wetland complexes, brackish creeks and saline aquifers. Fresh groundwater is generally confined to discrete areas within limestone aquifers, which occur in the southern and western extents of the region. Groundwater-dependent wetlands include saline wetlands (for example, Lake Newland and Sleaford Mere), freshwater-brackish wetlands (for example, Myrtle Swamp – near Elliston, and Lake Hamilton), and springs such as the Weepra Spring at Lake Newland. Sleaford Mere, Lake Newland and Lake Hamilton are nationally significant and provide habitat for a number of species of waterfowls and wading birds. Other groundwater-dependent ecosystems have not been as well mapped.

Most of the region's fresh groundwater is prescribed and the taking and use of water is managed through the water allocation plan for the Southern Basins and Musgrave Prescribed Wells Areas. The main objective of the water allocation plan is to share water between public water supply and groundwater-dependent ecosystems, as several aquifers support wetlands of national importance.

SA Water is the largest user of water in the prescribed wells area. Potable groundwater is primarily sourced from the Uley South Basin, which supplies over 92% of public water supply on the Eyre Peninsula (excluding Whyalla). Monitoring data shows that the water level in the Uley South lens has been slowly declining. Public water supply for Elliston is sourced from the groundwater in the Bramfield Basin, where the water level has also been slowly declining in recent years, which appears to be due to a drying climate. SA Water is considering options to secure a long-term water supply, including the potential to extend the existing Polda to Lock trunk main to Elliston, in order to source water from either the River Murray or Uley South Basin for Elliston.

In non-prescribed areas, there is no management regime to limit the volume of take. However, water affecting permits provide controls on the location and construction of wells to ensure potentially unacceptable third party and ecological impacts are managed. Watercourses are generally confined to the southern and eastern parts of the region. Most watercourses are ephemeral, experience peak flows during winter, and often cease flowing by late spring or early summer.

There is potential for increased demand for water on the Eyre Peninsula from mining, production of hydrogen energy, tourism and population growth.

Far North

In the Far North of South Australia, petroleum, mining and pastoralism account for more than 90% of the water use. The primary source of water is groundwater from the Great Artesian Basin (GAB), one of the world's largest and deepest artesian groundwater basins. Groundwater is the only reliable source of water for central Australia, as rainfall and surface water flows are extremely variable. Groundwater across a 315,000 km^2 area is prescribed through the Far North Prescribed Wells Area. A water allocation plan is in place to manage the taking and use of groundwater in the prescribed wells area, including ensuring the natural discharge of groundwater through springs is maintained to support Aboriginal cultural values and ecological values.

The Far North is vast and sparsely populated. Much of the land is leasehold[13] and is used for pastoral production, mining, gas and petroleum production, which are vital to South Australia's economy. The GAB springs, which are surface discharge points of the GAB aquifer as a result of the artesian pressure, support populations of unique and threatened fauna and flora. The springs are also of immense cultural, social, heritage and ecological importance to Aboriginal people. The community of native species dependent on natural discharge of groundwater from the GAB are listed as endangered on the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth). They are considered a Matter of National Environmental Significance for which the highest level of protection from threatening processes is afforded. The Coongie Lakes Ramsar site is part of a mosaic of flood plain and dunefield areas (approximately 1.9 million ha) in the Lake Eyre Basin in the north-east of the region. When wet, these incredibly productive habitats support huge numbers of breeding birds, fish, frogs and invertebrates.

Water authorised for stock use is currently 9.78 GL per year, equivalent to approximately 15% of the water authorised to be taken from the groundwater resources in the Far North. Historically, water for pastoral use has been through the uncontrolled flow of artesian wells across the GAB states and territory. Over the past 2 decades, the federal and state governments and landholders have invested approximately $29 million to repair and restore uncontrolled wells and to close open drains across the GAB in South Australia to improve the artesian pressure of the GAB. This investment now sees approximately 49 GL of water being saved every year across the South Australian portion of the GAB. In South Australia, the Far North Water Allocation Plan further supports this investment by requiring water taken for pastoral use to be through closed delivery systems.

In nearly all cases, petroleum wells produce a mixture of petroleum and water. This water, mixed with the petroleum, is commonly known as co-produced water. A volume of 21.9 GL per year is currently authorised to be taken from the groundwater resources in the Far North (approximately 34% of the total authorised use), and 20.8 GL was extracted in 2018–19. A total of 26.2 GL per year is authorised to be taken by the mining industry, and includes the water currently authorised for taking by Olympic Dam Mine (15.3 GL per year). While the water taken by Olympic Dam is authorised for use under the *Roxby Downs (Indenture Ratification) Act 1982* rather than a water licence under the *Landscape South Australia Act 2019*, it is accounted for in the total demand for water in the Far North Water Allocation Plan.

A potential increase in tourism in the region, particularly with the recent restrictions on overseas travel, as well as improvements in town water supplies may increase the use of groundwater by this sector. Although there is potential for further use of the groundwater resource, this must be managed carefully to minimise the impact on the environment, particularly the GAB springs, and other water users. The provisions of the Far North Water Allocation Plan aim to ensure that groundwater use does not have unacceptable impacts on the water pressure or levels that would affect other users' ability to access the water or reduce natural discharges to sites of cultural or ecological significance.

If there is insufficient groundwater available to meet demand, then innovative ways to source water may need to be found to complement groundwater resources. In this respect, in its early stage proposal to Infrastructure Australia on 'Water security for industry in Far North South Australia', the South Australian government has highlighted the importance of identifying options for new sustainable water sources, such as improved bore access and desalination, including associated pipeline and distribution infrastructure.

13 An agreement under which an area of Crown land is held on condition that it is used for the breeding of livestock.

Strategic priorities for water security and next steps

This Water Security Statement provides an overview of water security status for key population centres and water resources across South Australia. While challenges remain in some remote areas, the water-related investments and reforms undertaken across the state over the last decade have provided high levels of water security for the vast majority of the state's population, as compared with the Millennium Drought. More recently, our water security infrastructure and institutions have withstood the challenges presented by the 2017 to 2019 drought, bushfires and COVID-19.

The challenge now is to build on this strong legacy of water investment and reform to grow the state's economy in a sustainable way. If we are to meet the state's growth targets while adapting to a changing climate, there needs to be a renewed focus on water security planning, as well as on driving innovation and competition in the water sector and water-dependent industries.

Water will be one of the key enablers for achieving the state's target for 3% economic growth, as set out in *Growth State: Our Plan for Prosperity*. Many of the priority industry sectors identified in Growth State – such as food, wine and agribusiness, and energy and mining – can only achieve their growth potential if they have reliable and competitively priced access to water.

Adaptive water management also remains central to the state government's Climate Change Action Plan and its green and liveable cities agenda, as hotter and drier conditions and growing demands put increasing pressures on our water resources.

Planning for such conditions and exploring climate-resilient water sources will be critical if we are to safeguard water supplies for our industries and communities, as well as for our environment. This requires ongoing investment in our understanding and management of the state's water resources, in a way that supports public and private-sector decision-making about the use of water and facilitates its highest value use within sustainable limits.

For some key water resources and water-dependent industries, this ongoing management will need to be supplemented by highly targeted water security planning. This will involve working with stakeholders to assess current and emerging demands against potential water availability, including the opportunity for new or augmented water supplies or the adoption of new technologies. This targeted water security planning will be in addition to traditional water planning and management and will be driven at the whole-of-government level in partnership with key stakeholders.

Water security also remains a pressing national and global issue. If the South Australian water sector can rise to the challenges presented by growth and climate change, then it has the opportunity to further position itself as a leader in water management and innovation. It will be able to influence national debates about a renewed *National Water Initiative* and take advantage of major federal funding opportunities in water-related infrastructure.

As countries respond to climate change, South Australia must also position itself to capture a greater share of the global market for water services. If we are successful, then this will not only support our Growth State objectives but also build greater capacity within the state to respond to our own future water and climate challenges.

South Australian Government strategic priorities for water security and next steps

In support of its sustainable growth agenda, the state government proposes to work with industry, key stakeholders and other partners on the water security strategic priorities set out below.

It is expected that implementation of a number of the strategic priorities will be informed by ongoing national negotiations about a potentially renewed *National Water Initiative*.

The next review and update of this Water Security Statement will coincide with the consideration of SA Water's draft Regulatory Business Proposal for the 2024 to 2028 regulatory period. As such, the priorities below should be seen as the government's overarching water security priorities for the current 4-year regulatory period, to 1 July 2024.

1. **Climate resilience**
   Invest in understanding climate impacts to support adaptive decision-making and increase resilience.

   Consistent with the South Australian Government Climate Change Action Plan 2021–2025, this will include work with scientific experts, resource managers and water users to better understand projected changes in water availability and the impacts on communities, key industries, the environment and water entitlement reliability. This work program will complement statutory water allocation planning, as well as the development of more targeted water security strategies, where required.

2. **Water as an enabler of sustainable economic growth**
In partnership with key stakeholders, develop targeted water security strategies for key water resources, communities and industries.

Targeted water security strategies will be developed where evidence shows water supplies of a suitable quality will be insufficient to meet established or credible potential demands, including in response to climate risk. These strategies will consider projected future water demand and pathways for adopting new or augmented supplies from all viable water sources, including new water-use technologies. Initial projects include a Barossa Water Security Strategy and the Water and Infrastructure Corridors initiative. Additional priorities for strategy development will be set in consultation with key industry and other stakeholder groups.

3. **Ecologically sustainable water resource management**
Ensure water resource management is ecologically sustainable and that water allocation plans are updated within timeframes that reflect statutory requirements and risks to users and water resources.

This requires water planning that considers the capacity of a water resource to meet environmental water requirements now and into the future; is informed by ongoing monitoring; and is supported by active compliance arrangements. This builds on the *Landscape South Australia Act 2019* reforms and includes working with industry, landscape boards, First Nations and other key stakeholders to ensure water planning processes operate efficiently and effectively.

4. **Provision of critical human water needs**
Ensure that the critical human water needs of all South Australians are able to be met, including in remote communities.

Critical human water needs will be prioritised appropriately in reviews and updates of individual water allocation plans. Water planning and investment processes will also be strengthened to support the implementation of objective water security standards for critical human water needs. In self-supplied remote communities, this includes investigating the case for additional water security investments beyond 2024. This is in addition to supporting the provision of potable supplies to such communities in exceptional circumstances, where they have identified immediate risks to existing supplies.

5. **Murray–Darling Basin Plan**
Continue to drive full implementation of the Murray–Darling Basin Plan to achieve a healthy River Murray – to meet critical human water needs for over 90% of South Australians, maintain vibrant river communities, meet the aspirations of First Nations peoples, and sustain internationally important floodplains and wetlands.

The next water recovery milestone under the Basin Plan is due to be met by 30 June 2024, with a full review of the Basin Plan due by 2026.

6. **Aboriginal water interests**
Ensure First Nations have equitable access to water resources for cultural purposes, including economic purposes.

Aboriginal water interests will be addressed through improvements in potable water supply, integrating First Nations' cultural water knowledge into water resource planning and management, and working with Aboriginal people to progress opportunities to hold water entitlements for cultural, spiritual and economic purposes.

7. **Integrated urban water management**
Develop and implement an Urban Water Directions Statement that sets a state framework for optimising the use of all urban water sources in a way that supports growth, greening and liveable towns and cities; efficient and cost-effective water use; and the release of recycled water for productive use outside urban areas.

Engagement with stakeholders, including water retailers and local government, is occurring following release of a series of discussion papers, with a Directions Statement to be completed in 2021–22.

8. **Innovation and competition in the water industry**
Implement the recommendations of the 2021 review of the Water Industry Act 2012 to drive innovation and competition in the water industry.

Key issues include the role of pricing and price setting in an efficient and competitive water industry; pricing methodologies to maximise efficient uptake of access arrangements; regulation of drainage services; consideration of tenants as customers; and fit-for-purpose regulation through clear licensing and exemption arrangements.

9. **Data, analytics and insights for the digital water future**
Invest in data management, analytics and decision support tools to efficiently monitor and manage emerging water risks and opportunities, increase transparency and support timely decision-making.

This builds on upgrades to the state's water licensing system that are currently being undertaken; improved water registry arrangements; updated surface water information management system; new online River Murray water calculator; and improved access to geoscientific, mineral and groundwater data to support investment in SA. These investments will facilitate secure, efficient water trade; minimise transaction costs and increase investor confidence by enabling people to register their ownership and interests; improve water literacy; and enable faster access to real-time data.

10. **Growing the South Australian water sector**

Work with the South Australian water sector, including water retailers and the research, innovation and education sectors, to build the state's capacity to respond to future water challenges across the economy and capture a greater share of an expanding global market for water technologies and services.

An overarching strategy is being prepared in consultation with the water sector and water-dependent industries and will be finalised in 2021–22.

References

ABS (Australian Bureau of Statistics) (2019) Gross value of irrigated agricultural production, South Australia and NRM regions–2017–18 [TableBuilder], ABS website.

Australian Government (July 2020) *National Agreement on Closing the Gap*, Closing the Gap website.

BoM (Bureau of Meteorology) (2020a) Rainfall deficiencies, BoM website.

BoM (2020b) Urban national performance report, BoM website.

Charles SP and Fu G (2014) Statistically downscaled projections for South Australia – Task 3 CSIRO Final Report, Goyder Institute for Water Research Technical Report Series No. 15/1, Adelaide, South Australia.

DEM (Department for Energy and Mining) (2019) Sustainably growing energy and mining in South Australia, DEM website.

DEW (2018) South Australian trend and condition report cards 2018, DEW website.

DEW (2020a) Climate Change Science and Knowledge Plan for South Australia: Ensuring an evidence base to support a climate smart South Australia, DEW website.

DEW (2020b) Water capabilities South Australia: smart water solutions for liveability, the environment, and a strong economy, DEW website.

DEW (2021) South Australian Government Climate Change Action Plan 2021 – 2025, DEW website.

Government of South Australia (2009) Water For Good: A plan to ensure our water future to 2050, DEW website.

GT Forest Industry (September 2019) Green Triangle Forest Industry Strategic plan, GT Forest Industry website.

Infrastructure Australia (2018) Infrastructure Decision-making Principles, Infrastructure Australia website.

Irvine M, Sanderson O, Trenbirth M and Kotz S (2019) 'The new normal – water use trends in South Australia following the Millennium Drought' *Ozwater*.

NFF (National Farmers' Federation) (2017) Climate Policy. National Farmers' Federation website.

PIRSA (Primary Industries and Regions South Australia) (2019) Primary industries scorecard 2018–19, PIRSA website.

Remenyi TA, Rollins DA, Love PT, Earl NO, Bindo NL and Harris RMB (2019) *Australia's wine future: a climate atlas*, University of Tasmania, Hobart, Tasmania.

SA Water (2020) SA Water Database - Metropolitan Adelaide Bulk Water Demand [data set].

SE NRM Board (South East Natural Resources Management Board) and South Eastern Water Conservation and Drainage Board (2019) *South East Drainage and Wetlands Strategy 2019*, Landscape South Australia Limestone Coast website.

Westra S, Thyer M, Leonard M, Kavetski D and Lambert M (2014) *Impacts of Climate Change on Surface Water in the Onkaparinga Catchment*, Goyder Institute for Water Research website.

Glossary

Term	Explanation
Carryover	Unused allocation that is available for use in a future year, subject to specific rules.
Held Environmental Water	Water available under a water access right or held on a water licence for the purpose of achieving environmental outcomes.
Non-prescribed water resource	These are water resources that do not require comprehensive management through a water allocation plan and water licensing system because there is insufficient demand for water, or there is a lower risk to the water resource. For non-prescribed water resources, water affecting activities such as the construction of a well, dam or weir are managed through permits to protect the integrity of the water resources and the local ecosystems that rely on the water, and to control potential impact of activities.
Planned Environmental Water	Water that is committed or preserved for achieving environmental outcomes through a plan or legislation, and cannot be used for any other purpose.
Prescribed water resource	Prescription is a statutory process, which means the water resource must be sustainably managed to provide security for all water users, including the environment, now and into the future. For water resources that are prescribed across the state, a licensing system is in place to make sure water is allocated and used sustainably, in line with the rules set out by a water allocation plan.
Volume available for use	The total volume allocated plus or minus any volume carried over and/or traded.
Water Resource Plan	A plan that provides for the management of a water resource plan area that is either (i) accredited under section 63, or (ii) adopted under section 69, of the *Water Resources Act 2007* (Cwth). Water resource plan areas are specified in the Basin Plan. South Australia has three water resource plan areas: • South Australian River Murray (includes the surface waters and floodplain of the River Murray and Lakes Alexandrina and Albert) • Eastern Mount Lofty Ranges (includes the groundwater and surface waters of the Eastern Mount Lofty Ranges (EMLR) and Marne Saunders prescribed water resources areas) • South Australian Murray Region (includes the groundwater and surface water in the remainder of the South Australian Murray-Darling Basin including the Coorong and an extensive area north of the River Murray, excluding the EMLR).
Water security	Water security is having an acceptable quantity and quality of water for people, industry, mining and energy, agriculture, forestry and the environment. This requires an acceptable trade-off to be found between reliability of supply and cost for a given end use.
Water use (consumptive)	The volume of water extracted from a water resource for consumptive purposes. In a small number of low-risk cases, water used is not metered and water use is assumed.

Appendix A: Allocation and use by region and prescribed water resource

The table below sets out the volume of water allocated and the volume used between 2015-16 and 2018-19, by prescribed water resource area[14]. In the majority of areas, allocations are fully subscribed. Areas where there is 'zero' use reflect areas where meters are currently being installed. In future years, use will be recorded and reported. There is a general trend for use to be significantly below the allocated volume – reasons for this vary between regions and water resources. In some cases, water quality or yield impacts on use. In others, the availability of the resource and access to water may have been impacted by climatic conditions, particularly over the last few years when many regions have experienced low rainfall. The information is provided as a general overview of water use per region.

Table 2: Allocation and use by region and prescribed water resource

	2015–16		2016–17		2017–18		2018–19	
Region	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)
Adelaide Plains	36,475	14,454	37,581	10,304	43,759	12,647	45,564	14,540
Central Adelaide – Groundwater	**0**	**0**	**0**	**0**	**0**	**0**	**1,805**	**0**
Dry Creek – Groundwater	**850**	**655**	**850**	**495**	**850**	**254**	**850**	**164**
Kangaroo Flat – Groundwater	**0**	**0**	**0**	**0**	**2,421**	**820**	**2,421**	**1,030**
Northern Adelaide Plains – Groundwater	**35,625**	**13,799**	**36,731**	**9,809**	**40,488**	**11,573**	**40,488**	**13,346**
Barossa and Clare Valley	18,569	6,719	18,215	5,175	18,741	6,413	18,741	6,819
Barossa	**13,766**	**5,260**	**13,423**	**3,900**	**13,870**	**4,931**	**13,870**	**5,401**
Surface water	1,602	308	1,594	537	1,773	579	1,773	270
Groundwater	8,535	3827	8,449	2,487	8,797	3,457	8,797	4,408
Watercourse	3,629	1123	3,380	876	3,300	895	3,300	723
Clare Valley	**4,803**	**1,459**	**4,792**	**1,275**	**4,871**	**1,482**	**4,871**	**1,418**
Surface water	1,635	419	1,658	501	1,702	556	1,702	182
Groundwater	2,223	801	2,222	425	2,236	885	2,236	1,217
Watercourse	945	239	912	349	933	41	933	19
Eyre Peninsula	9,362	5,139	9,497	5,249	9,455	5,183	9,351	5,219
Musgrave – Groundwater	**290**	**73**	**256**	**93**	**256**	**88**	**643**	**92**
Southern Basins – Groundwater	**9,072**	**5,066**	**9,241**	**5,156**	**9,199**	**5,095**	**8,708**	**5,127**

[14] Allocations in this table are the total of all allocation volumes for that year, including carryover volumes, rollover volumes and recharge volumes.

Region	2015–16		2016–17		2017–18		2018–19	
	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)
Far North	49,511		49,518		49,771		49,771	
Groundwater	49,511	0	49,518	0	49,771	0	49,771	0
McLaren Vale	7,899	4,939	7,765	3,017	8,301	4,471	8,301	5,097
Groundwater	7,899	4,939	7,765	3,017	8,301	4,471	8,301	5,097
Mount Lofty Ranges	286,133	42,365	289,658	144,975	293,319	131,663	293,319	64,514
Angas Bremer – Groundwater	**10,465**	**1,720**	**9,862**	**933**	**9,516**	**1,479**	**9,516**	**2,075**
Eastern Mount Lofty Ranges	**53,062**	**9,264**	**55,628**	**6,779**	**55,659**	**9,629**	**55,659**	**12,393**
Surface water	4,269	575	4,372	636	4,402	1,352	4,402	1,355
Groundwater	31,726	7,557	33,872	4,947	34,132	7,100	34,132	9,440
Watercourse	17,067	1,132	17,384	1,196	17,125	1,177	17,125	1,598
Little Para – Watercourse	**638**	**0**	**638**	**0**	**638**	**0**	**638**	**0**
Western Mount Lofty Ranges	**221,968**	**31,381**	**223,530**	**137,263**	**227,506**	**120,555**	**227,506**	**50,046**
Surface water	163,638	21,886	163,722	128,909	163,929	107,050	163,929	32,666
Groundwater	53,302	8,437	54,780	7,614	58,617	12,342	58,617	16,092
Watercourse	5,028	1,058	5,028	740	4,960	1,163	4,960	1,288
Murraylands and Riverland	912,975	634,556	775,053	453,247	703,729	572,385	760,493	684,079
Mallee – Groundwater	**60,354**	**32,694**	**61,353**	**26,018**	**61,353**	**34,639**	**61,353**	**36,159**
Marne Saunders	**6,179**	**2,280**	**6,072**	**1,767**	**6,140**	**2,299**	**6,140**	**2,205**
Surface water	1,428	421	1,415	354	1,424	603	1,424	311
Groundwater	4,540	1,855	4,460	1,298	4,511	1,644	4,511	1,871
Watercourse	211	4	197	115	205	52	205	23
Peake, Roby Sherlock – Groundwater	**2,211**	**572**	**2,211**	**572**	**2,211**	**578**	**2,211**	**649**
River Murray – Watercourse	**844,231**	**599,010**	**705,417**	**424,890**	**634,025**	**534,869**	**690,789**	**645,066**

Region	2015–16		2016–17		2017–18		2018–19	
	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)
South East	1,466,695	730,540	1,446,372	542,769	1,488,882	591,769	1,488,882	624,180
Lower Limestone Coast	**1,144,684**	**553,313**	**1,127,704**	**421,372**	**1,163,741**	**446,522**	**1,163,741**	**461,142**
Groundwater	838,856	283,352	821,647	174,939	857,897	212,514	857,897	237,396
Forestry	305,828	269,961	306,057	246,433	305,844	234,008	305,844	223,746
Morambro Creek	**13**	**0**	**13**	**270**	**13**	**152**	**13**	**216**
Surface water	12	0	12	0	12	0	12	0
Watercourse[15]	1	0	1	270	1	152	1	216
Padthaway – Groundwater	**65,547**	**39,508**	**65,055**	**21,619**	**66,948**	**29,610**	**66,948**	**35,516**
Tatiara – Groundwater	**160,297**	**95,925**	**158,296**	**72,017**	**162,030**	**78,810**	**162,030**	**88,309**
Tintinara-Coonalpyn – Groundwater	**96,154**	**41,794**	**95,304**	**27,491**	**96,150**	**36,675**	**96,150**	**38,997**

[15] Water is allocated based on a share of the resource, rather than a volume. Water is only allocated when there is water in the creek.

Appendix B: Water allocation plan status and review timeframes (as at time of publishing)

Table 3: Water allocation plan status and review timeframes

Prescribed water resource	Water Allocation Plan (WAP)	Landscape region (primary region in bold)	Adoption date of current WAP	Next review / amendment
Far North Prescribed Wells Area	Water Allocation Plan for the Far North Prescribed Wells Area	South Australian Arid Lands	February 2021	2031
River Murray Prescribed Watercourse	Water Allocation Plan for the River Murray Prescribed Watercourse	Murraylands and Riverland	April 2020	A targeted amendment is underway
Northern Adelaide Plains Prescribed Wells Area (which includes the Kangaroo Flat Prescribed Wells Area) Dry Creek Prescribed Wells Area Central Adelaide Prescribed Wells Area	Adelaide Plains Water Allocation Plan	**Green Adelaide** Northern and Yorke Hills and Fleurieu	New WAP under development	Review due 10 years following adoption of new WAP
Barossa Prescribed Water Resources Area	Water Allocation Plan - Barossa Prescribed Water Resources Area	Northern and Yorke	June 2009	Amendment underway
Tatiara Prescribed Wells Area	Tatiara Water Allocation Plan	Limestone Coast	June 2010	Amendment underway
Padthaway Prescribed Wells Area	Water Allocation Plan for the Padthaway Prescribed Wells Area	Limestone Coast	April 2009	Amendment underway
Baroota Prescribed Water Resources Area	Water Allocation Plan for the Baroota Prescribed Water Resources Area	Northern and Yorke	New WAP under development	Review due 10 years following adoption of new WAP
Morambro Creek Prescribed Water Resources Area	Morambro Creek Water Allocation Plan	Limestone Coast	January 2006	2021
McLaren Vale Prescribed Wells Area	Water Allocation Plan McLaren Vale Prescribed Wells Area	**Hills and Fleurieu** Green Adelaide	2007	2021

Prescribed water resource	Water Allocation Plan (WAP)	Landscape region (primary region in bold)	Adoption date of current WAP	Next review / amendment
Peake, Roby and Sherlock Prescribed Wells Area	Water Allocation Plan for the Peake, Roby Sherlock Prescribed Wells Area	Murraylands and Riverland	March 2011	2021
Clare Valley Prescribed Water Resources Area	Water Allocation Plan for the Clare Valley Prescribed Water Resources Area	Northern and Yorke	February 2009	2029
Mallee Prescribed Wells Area	Water Allocation Plan for the Mallee Prescribed Wells Area	Murraylands and Riverland	May 2012	2022
Tintinara Coonalpyn Prescribed Wells Area	Water Allocation Plan for the Tintinara Coonalpyn Prescribed Wells Area	Limestone Coast	January 2012	2022
Western Mount Lofty Ranges Prescribed Water Resources Area Little Para Proclaimed Watercourse	Water Allocation Plan Western Mount Lofty Ranges	**Hills and Fleurieu** Northern and Yorke Green Adelaide	September 2013	2023
Lower Limestone Coast Prescribed Wells Area	Water Allocation Plan for the Lower Limestone Coast Prescribed Wells Area	Limestone Coast	November 2013	2023
Eastern Mount Lofty Ranges Prescribed Water Resources Area (which includes the Angas Bremer Prescribed Wells Area)	Water Allocation Plan Eastern Mount Lofty Ranges	**Hills and Fleurieu** Murraylands and Riverland Northern and Yorke	December 2013	2023
Musgrave Prescribed Wells Area Southern Basins Prescribed Wells Area	Water Allocation Plan for the Southern Basins and Musgrave Prescribed Wells Area	Eyre Peninsula	June 2016	2026
Marne Saunders Prescribed Water Resources Area	The Water Allocation Plan for the Marne Saunders Prescribed Water Resources Area	**Murraylands and Riverland** Northern and Yorke	January 2010	2030

Published by the Government of South Australia
February 2022

Government of South Australia