Annual Water Security Update 2023

Minister's foreword

South Australians have long understood the importance of water to our state's ambitions for sustainable growth, liveability and a healthy environment.

In line with the *Water Industry Act 2012*, this annual update provides an overview of demand and supply across the state and of actions being taken to improve long-term water security under a changing climate. For many water resources in South Australia the observed trend is for declining rainfall, decreasing groundwater levels and reduced flow in our creeks and rivers.

As with the Millennium Drought that ended just over a decade ago, the recent River Murray flooding has provided another powerful reminder of our vulnerability to extreme weather events and a changing climate – and of the need for governments and communities to continue working together to respond and adapt to such challenges.

As we look to the future, the latest climate projections are clear that South Australia can expect hotter days more often, with declining total annual rainfall but with heavier rainfall events. The same is true for the Southern Murray-Darling Basin.

This longer-term outlook reinforces the importance of the State Government's commitment to securing the full range of environmental objectives promised under the *Murray-Darling Basin Plan (2012)*. This includes recovery of the final 450 gigalitres, which remains vital for mitigating the types of environmental and other impacts seen during the Millennium Drought.

At a state level, the South Australian Government is also committed to building on our tradition of robust water planning with measures to encourage greater innovation in water use and management – a tradition that has served our state well.

For example, as part of the Northern Water Supply Project, the State Government has been working with industry to develop a business case for a new and sustainable water supply for the state's Far North and Upper Spencer Gulf areas. This will inform decision-making regarding expansion of the mining sector, as well as the state's Hydrogen Jobs Plan.

There is also increasing recognition of the need for governments to ensure that "all options are on the table" as part of their water planning and investment decision-making. Building on a recent pilot for Barossa, this "all options" approach will be a feature of a 50-year Water Security Strategy being developed for McLaren Vale, which will use foresight-based planning to support innovation and increased resilience under a changing climate.

This "all options" approach will be also important to the State Government's integrated urban water management agenda – as we work with the community to address a range of challenges related to ageing infrastructure, urban development, liveability and climate change.

Another key water priority at both the state and national level will be to overcome historical inequities faced by Aboriginal people in terms of water access and supply.

In more remote communities, this is likely to require innovation in small-scale and affordable water supply technologies. We also need to get better at drawing on First Nations' knowledge for water planning and at helping First Nations to take advantage of the economic opportunities that come from secure access to water.

In our ongoing efforts to ensure South Australia's long-term water security, it is imperative that we draw on all available knowledge and that no communities are left behind.

Hon Susan Close MP
Minister for Climate, Environment and Water

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Introduction

The main climate influence during 2022 was La Niña, which contributed to above average rainfall across much of South Australia. For the Murray–Darling Basin it was the wettest spring on record, which contributed to extensive flooding along the River Murray in South Australia. Longer term trends highlight the increased likelihood of hotter and drier conditions, as well as more frequent extreme weather events of the type South Australia has been experiencing (Government of South Australia, 2022). Population growth and increases in agricultural and industrial production are also expected to place further pressure on South Australia's water resources.

The changing climate and increasing demand for water will require South Australia to continue adapting to ensure the majority of the state's population continues to have high levels of water security[1] over the decades to come.

This will require sustainable and adaptive water resource management, an innovative and competitive water industry, strong collaboration between the water industry and research organisations, fit-for-purpose investment in water infrastructure and technologies, and more integrated urban water management that optimises the use of all available water sources.

A comprehensive understanding of our current water security status and risks is also needed to enable South Australia to continue to adapt and plan for water security challenges. In this context, the *Water Industry Act 2012* requires that a report be prepared by 31 March each year that relates to the state water demand and supply statement (see *Water Security Statement 2022 – Water for Sustainable Growth,* Government of South Australia 2022b). This 2023 report (the *Annual Water Security Update 2023*) is intended to meet this statutory reporting requirement and includes:

- information on urban Adelaide's current and future water security
- a snapshot of water security by region
- detail on how current and future water security risks are being addressed.

The next review and update of the state water demand and supply Statement will coincide with the finalisation of SA Water's Regulatory Business Proposal for the 2024 to 2028 regulatory period.

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

Where did South Australia source its water in 2021–22?

South Australia has a wide range of water sources that are used to supply water, including surface water, groundwater, desalinated water and recycled water. A 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.

Figure 1 shows the volume of water in gigalitres (GL) that was used from prescribed surface water and groundwater resources in 2021–22, as well as the 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.

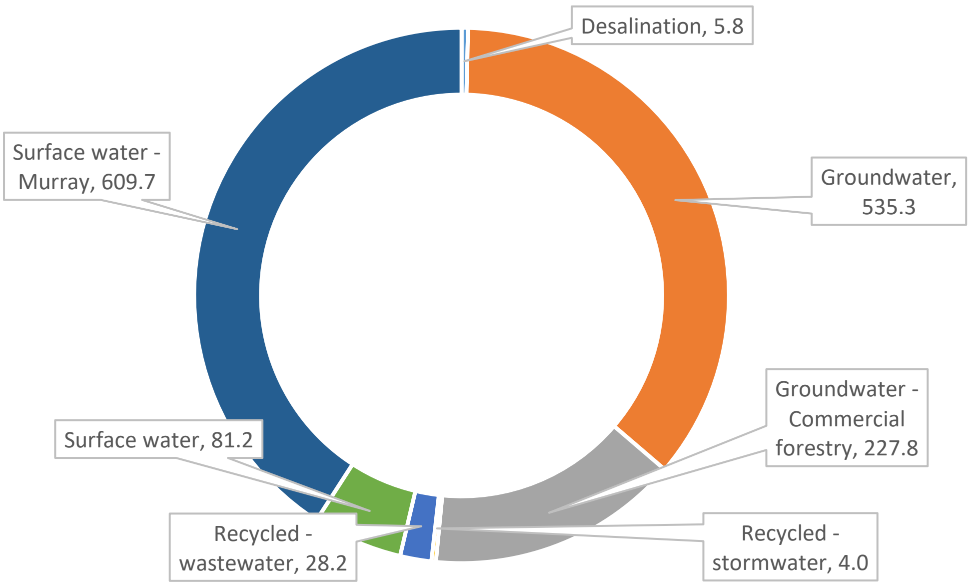

Figure 1: Average annual volume of water used (GL) in South Australia by resource type (2021–22)[2]

Groundwater
Groundwater is an important resource across large areas of South Australia. In 2021–22, 763 GL was used for irrigated agriculture, forestry, domestic supply, stock, mining, industrial applications and irrigation of recreational and sportsgrounds. This volume is 2% higher than the 2015–16 to 2020–21 average annual volume (745 GL).

Surface water
Surface water is, by volume, the next most significant resource. 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 a regulated system with water delivered from 4 major storage dams. River Murray water is transported via pipeline to many locations within South Australia. Figure 2 shows the major pipelines that distribute River Murray water. In 2021–22, 610 GL was used for consumptive purposes from the River Murray and 81 GL from all other prescribed surface waters. These figures are higher than the 2015–16 to 2020–21 average annual volume taken from the River Murray (567 GL) and all other prescribed surface water (68 GL), largely due to increased surface water availability.

[2] Forestry water use is measured each calendar year as opposed to each water use year. In this figure, 2021 forest water use data has been used to represent the 2021 and 2022 water use years, as 2022 forest water use data was not available at the time this report was published.

Recycled water

In 2021–22 approximately 32 GL of water was recycled and used in South Australia. This includes capture and re-use of stormwater and re-use of wastewater. On average over the last five years, 33 GL of water per year has been re-used in South Australia, from 101 GL of wastewater.

Desalinated water

In 2021–22, 5.8 GL of desalinated water was produced by plants operated by SA Water. The Adelaide Desalination Plant located at Lonsdale produced 5.4 GL compared to its capacity of 100 GL per year. A further 0.4 GL was produced by plants servicing regional communities located at Penneshaw, Leigh Creek, Hawker, Indulkana, Kaltjiti (Fregon), Yunyarinyi (Kenmore Park) and Mimili and Yalata. Desalination plants owned and operated by local councils and private individuals also contribute to the volume of desalinated water used in South Australia.

Figure 2: Major pipelines that distribute River Murray water

Water security initiatives and directions

Desalinated water

SA Water has committed to the development of new desalination plants and associated distribution infrastructure on Kangaroo Island and the Eyre Peninsula. On Kangaroo Island, a new seawater desalination plant will be built near Penneshaw to supplement the existing Penneshaw facility and Middle River Reservoir, for enhanced water security. Construction of a major pipeline component is currently underway.

On the Eyre Peninsula, SA Water is working with the community as it progresses plans for a new climate-independent seawater desalination plant to supplement existing groundwater sources to ensure water security for the region into the future. Billy Lights Point has been identified as the preferred location for the 5.3 gigalitre desalination plant to supplement existing groundwater sources to ensure water security for the Eyre Peninsula region into the future. A comprehensive site selection process considered more than 15 potential locations. This decision was informed by technical investigations, feedback from a Marine Science Review Panel, insights gained from extensive community, industry and government consultation and assessment of the cost of construction and operation. A final decision on the plant will be informed by a separate business case being prepared by Infrastructure SA into the Northern Water Supply project which is examining a new and sustainable water supply for the far north and Upper Spencer Gulf.

The Northern Water Supply project is assessing the viability of building a desalination plant and pipelines to meet the increasing demand for water by communities, agriculture and emerging green energy industries in the Upper Spencer Gulf region. $15 million has been allocated to progress the case for the plant's development. The government has also committed $593 million to building a world-leading green hydrogen power station, electrolyser and storage facility near Whyalla, by 2025. This will help South Australia reach the goal of being a 100% renewable energy generator by 2030. Should a desalination plant be constructed in the Upper Spencer Gulf region, the plant may, in the future, supply water to the green hydrogen power station.

Projects are also underway to upgrade the existing non-drinking water supply to the regional towns of Oodnadatta, Marla and Marree to drinking water quality. The existing water networks in these towns are among 19 non-drinking water supplies across South Australia where water is currently only provided for irrigation, livestock, laundry, bathing and flushing toilets. Projects will involve the installation of new reverse osmosis desalination facilities to treat groundwater to a drinking standard. Once completed, the 3 new facilities will join the existing network of 9 reverse osmosis desalination plants across regional and remote South Australia that turn groundwater into a reliable supply of safe, clean drinking water.

In December 2022, a newly fabricated desalination plant was shipped to Oodnadatta, with construction work expected to be underway until May 2023, when focus will move to commissioning the new water treatment facilities and connecting the new supply to homes.

Remote communities

In other regional and remote communities, upgrades to existing water supply systems are planned for the railway towns of Terowie, Yunta and Manna Hill to improve and maintain the water quality throughout each town network. Works include building a new chlorination top-up system at Peterborough, upgrading and replacing elevated water storages, and installing new decontamination systems in Terowie, Yunta and Manna Hill. Kaltiji (Fregon) in the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands and Yalata Community on the west coast of SA both received upgrades to their reverse osmosis water treatment plants during the 2021–22 financial year.

In addition to the above activities, the Department for Environment and Water (DEW) is undertaking a project to improve knowledge of remote community water supplies, needs and risks. The project will focus on remote self-supplied communities. These include communities outside of council areas and remote Aboriginal communities both in and outside council areas. A water security assessment will be completed for approximately 20 remote communities in 2023. The assessment will be used to prioritise on-ground works to improve water security in remote communities.

Integrated water management

In the long term, the current combination of surface water sourced from the River Murray and Mount Lofty Ranges (rainfall dependent supplies) and desalination may not be sufficient to meet Adelaide's need for a secure and resilient water supply in all years. A comparable situation potentially applies in the state's other urban centres.

Ensuring that all options are on the table to meet our future water needs, and that they can be deployed when required, is essential to delivering efficient and secure water supplies over the long term (Infrastructure Australia 2019). In addition to the water security benefits that come from such diversification, a more integrated approach to urban water management also promises to deliver a broader suite of benefits, such as improved amenity, cultural, liveability, public health and environmental outcomes.

DEW has worked with stakeholders to develop an Urban Water Directions Statement (2022) that provides a roadmap for delivering the integrated management of water, wastewater and stormwater in South Australia's towns and cities. Implementation of the strategies outlined in the statement will deliver:

- greener and cooler urban centres that provide amenity and health benefits
- reduced flood risks, protecting people, property and infrastructure
- healthy local environments
- better use of all available water, potentially freeing up water for agriculture and other water dependent industries.

Since the publication of the Water Security Statement in 2022, implementation of several key strategies in the Urban Water Directions Statement have begun. Among these are:

- The convening of an expert panel to recommend clear responsibilities for stormwater drainage systems and funding options.
- The Greening Port Pirie program, being delivered by the Port Pirie Regional Council in collaboration with SA Water, DEW and the Targeted Lead Abatement Program. The program includes several projects to deliver increased greening and water-sensitive urban design in Port Pirie to support dust suppression (for management of lead) and deliver greener, cooler environments.
- The Adelaide Plains Water Allocation Plan (Plan) became operational on 1 July 2022. The Plan sets out the rules for the licensing, allocation and management of groundwater and wells in the area addressed by the plan. This includes rules for managing water that is drained or discharged into aquifers, also known as managed aquifer recharge (MAR). The principles in the Plan enable further storage of water in the aquifers for future use where it is sustainable.

The next stage of the government's integrated urban water management agenda will involve the development of an urban water security plan that addresses water sector governance arrangements that currently limit the integration of mains water, waste water and stormwater supply and management. This plan is scheduled to be complete by the start of SA Water's next regulatory period.

SA Water is currently working with stakeholders and the broader community to develop a Regulatory Business Plan for its next regulatory period, from 2024 to 2028. The plan will detail expenditure proposals for asset management, financing and service delivery for the period. The draft plan must be submitted to the Essential Services Commission of South Australia by August 2023.

Water and Sewerage Supply - Water Industry Act 2012

The *Water Industry Act 2012* (WIA) regulates the water industry and provides consumer protections. A review of the WIA in 2019 recommended a number of amendments to improve the operation of the Act. Recommendations included:

- reducing red tape, including to encourage the use of alternative (recycled) water sources
- improving consumer protections to ensure affordable water supplies for tenants and persons experiencing hardship
- reviewing policy to support competition between providers of drinking water and/or sewerage services.

To reduce red tape the Department for Environment and Water (DEW) is working with other regulators and stakeholders to prepare a number of exemptions from some or all WIA requirements for low-risk activities. It is intended that these exemptions will support diversification of water supplies and complement the directions in the Urban Water Statement related to efficient water regulation.

In 2022 DEW worked with Uniting Communities to explore how affordable access to drinking water could be improved for tenants through access to hardship policies (e.g. payment plans) and dispute resolution processes. Potential legislative amendments are now being considered to deliver results for tenants.

Ensuring continuity of supply is critical to proving a secure water supply to customers. DEW is currently considering how best to ensure that services are maintained in the event of a water industry service provider (drinking water and/or sewerage services) exits the industry.

Community concession schemes assist in the provision of affordable water and sewerage services for a range of charitable and other organisations. To ensure a level playing field across water industry service providers DEW has commenced a review of the community concessions scheme to ensure the scheme appropriately promotes the objectives of the WIA.

Climate change and adaptive management

In line with the priorities identified in the 2022 Water Security Statement, the South Australian Government is investing in projects to better understand the water security risk in a changing climate and improved climate resilience. Knowledge of the most at-risk resources will assist the Government of South Australia to prioritise the delivery of regional water security strategies.

In late 2022, the Barossa Valley Water Security strategy was published and the development of a water security strategy for the McLaren Vale region commenced. The process used to develop water security strategies allows new water supplies, expansion of existing supplies and changing demand profiles to be considered in the context of a changing climate. The water security development process seeks to ensure that infrastructure projects and water management policies complement each other and support the region's water security vision.

Eleven Water Allocation Plans are also currently in development, under review or being amended (Appendix A). The Department for Environment and Water is actively engaging with Landscape Boards to ensure that next generation water allocation plans include adaptive management approaches that facilitate effective and sustainable water resource management in a changing climate.

Basin Plan Implementation

Recent floods notwithstanding (see further below), the majority of climate projections indicate that it will get hotter and drier in the Southern Murray-Darling Basin, with potential for significantly less rainfall and run-off.

This drying outlook reinforces the importance of the State Government's commitment to securing the full range of water recovery and environmental objectives required under the 2012 Murray-Darling Basin Plan. This includes recovery of the final 450 gigalitres, which remains vital for mitigating the types of environmental and other impacts seen during the Millennium Drought, particularly at the lower end of the system.

Drawing on advice from the recently appointed River Murray Commissioner, the State Government will continue to push for full delivery of the Basin Plan. This advocacy will include a greater emphasis on recovering water entitlements through voluntary buy backs to meet outstanding Basin Plan water recovery targets[3]. The Australian Government has already begun to move in this direction, with the recent release of its Strategic Water Purchasing Framework.

First Nations' water interests

Under the National Agreement on Closing the Gap, there is a commitment to develop an Inland Waters Target that will be used to guide national efforts to secure First Nations' access to water entitlements.

As a precursor to finalising a national Inland Waters Target, South Australian Government officials have been engaging with the South Australian Aboriginal Community Controlled Organisation Network (SAACCON) on a potential South Australian approach to addressing the target.

In addition, while opportunities have been taken to incorporate First Nations' cultural objectives in recent updates to water allocation plans, the insights from these processes will be used as a platform for further work with First Nations to co-design an effective state-wide policy to more fully advance First Nations' water interests.

[3] The South Australian Government has already withdrawn its support for the socio-economic criteria agreed by Basin Ministers in 2018, which some Basin jurisdictions have used to impede projects that could have contributed to the 450 GL. To date, only 5 GL of the required 450 GL have been transferred to the Commonwealth Environmental Water Holder.

River Murray flooding

A significant flooding event was experienced along the River Murray over the late spring and summer of 2022–23. An adjusted peak flow of approximately 190 GL per day reached the South Australian border on 23 December 2022, taking into account on-ground measurements of flow during the flood event. This aligned with the forecast flow range of 190–220 GL/day. While the peak flow across the South Australian border was less than the flow during the 1931 flood event (210 GL/day), the water level in the river at many locations was above the water levels of 1931. For example, the water level in Lock 6 above Renmark peaked at 21.32 m AHD (Australian Height Datum) in 2022 and was 21.17 m AHD in 1931. The changed relationship between flow and water level relative to previous flood events is most likely due to changes in the floodplain, river bathymetry, vegetation density and infrastructure.

Table 1: Peak flows for past River Murray floods

Year	Peak Flow	Year	Peak Flow
1956	341 GL/day	1993	112 GL/day
1931	210 GL/day	2016	95 GL/day
1974	182 GL/day	2011	94 GL/day
1975	162 GL/day		

The barrages at the Lower Lakes were fully opened on 2 December 2022 and water levels across the Lakes generally did not reach significant heights other than for brief periods at Milang and a low lying area near Meningie, due to the tides, wind direction, wave activity and less water passing through the barrages than originally anticipated.

The high flows experienced in the late spring and summer of 2022–23 meant that some irrigators had to relocate pumping infrastructure to be able to take water from the river system. In addition, power disconnections meant that some irrigators could not operate pumps unless they had a generator. Works were undertaken to protect critical major water and wastewater assets and systems to maintain water and sewerage services to as many people as possible throughout the flood event. A temporary barrier was constructed in December 2022 to close the connection of Lake Bonney[4] to the River Murray to protect critical wastewater infrastructure that supports up to 4,000 residents in the Barmera, Cobdogla and Loveday townships, as well as the Barmera stormwater network, residential and public property, and road infrastructure including Nappers Bridge.

The flood caused some agricultural land, businesses, homes and shacks along the river to be inundated and communities and businesses were impacted by temporary road and ferry closures and the disconnection to power and sewerage for a period of weeks or months.

The floods brought water quality challenges with high levels of organic matter and low dissolved oxygen levels. As blackwater events[5] and associated fish kills have been reported in New South Wales and Victoria, there is potential for this to occur in South Australia. In terms of drinking water, careful management of water treatment processes and reservoir storages ensured that water quality stayed within compliance targets based on Australian Drinking Water Quality Guidelines, although an earthy taste or smell may have been experienced where water was supplied solely from the river.

Blue-green algae outbreaks occurred in some areas of Lake Bonney, which impacted on some recreational activities. In response, the Berri Barmera Council and the South Australian State Emergency Service installed temporary pumps to aerate areas of the lake.

The reconnection of Lake Bonney to the River Murray commenced on 30 January 2022. The reopening allowed some algae to be drained from the lake and was timed to prevent the flooding of critical assets and damage to cultural heritage sites, while also maximising the opportunity to dilute the higher salinity water that would flow out of the lake. The approach aimed

[4] Lake Bonney is a large, permanent, terminal wetland. The lake is highly saline, as the single, narrow connection to the River Murray at Chambers Creek limits mixing and flushing of the lake.

[5] Blackwater occurs naturally when floods wash leaves, grass and organic cropping material off riverbanks and floodplains into waterways. The breakdown of these organic materials gives the water a blackish colour and a strong, unpleasant smell.

to minimise the impacts of the temporary increase in salinity in the river channel on downstream water users and to reduce the risk of salt remaining in the river system (including the Lower Lakes) well after the high flows recede. Following reopening of the lake, there was a temporary increase in salinity levels between Lake Bonney and Lock 2, reaching a recorded peak of almost 1000 EC at Lock 3, although there were unofficial reports of a significantly higher local salinity reading being recorded by at least one irrigator. Salinity levels following the opening of Lake Bonney were primarily influenced by the rate of water level fall and the volume of flow in the river. Apart from the risk to irrigated agriculture, the flushing of additional salt from the lake has provided environmental benefits, particularly to support freshwater-dependent, aquatic plant and animal species.

Outside of the devastating impact that the flood has had on many properties, businesses and communities, the flow of water across areas of the landscape for the first time in decades will provide a range of benefits for the environment in South Australia including:

- connecting the river with floodplains and wetlands, inundating areas that have been dry for decades
- allowing fish dispersal and movement into new habitats and throughout the Murray–Darling Basin
- providing 'flowing water habitat' to benefit native fish, animals and plants in the River Murray channel that have adapted to a riverine environment, including supporting spawning and recruitment of large native fish
- Widening and deepening of the Murray Mouth, which will enable better exchange of water between the ocean and the Lakes and Coorong
- improving water quality and productivity in the Coorong, providing a food-rich environment for fish and birds including healthy populations of a keystone native plant *Ruppia tuberosa* and stonewort
- providing habitat for birds, frogs and threatened small-bodied native fish species in the Lower Lakes
- removing excess salt from the River Murray floodplains.

Adelaide's water security

Adelaide's water supply

The annual volume of water supplied to urban Adelaide depends on a range of factors including climate conditions, population growth and patterns of use. Temperature and rainfall influence water use, particularly during summer periods when more water is used to water gardens, parks and sportsgrounds. The same factors also influence inflows to our storages.

To ensure metropolitan Adelaide has enough water in the future to meet demands, a diverse range of water sources will need to be used. Adelaide's water supply options currently include: surface water pumped from the River Murray and from multiple catchments and reservoirs in the Mount Lofty Ranges; urban watercourses; rainwater tanks; recycled water (stormwater and wastewater); groundwater; and the Adelaide Desalination Plant.

SA Water currently sources water from the River Murray, the Mount Lofty Ranges Reservoirs and the Adelaide Desalination Plant to meet Adelaide's drinking water requirements. SA Water maintains and operates 10 major metropolitan reservoirs and also looks after the network of pipes, taking water to and from properties.

A number of other water suppliers provide non-drinking water across Adelaide for a range of irrigation and industrial uses.

Adelaide's water use in 2021–22

In 2021–22, urban Adelaide used 153 GL of drinking water, which is comparable to the historical range of 145 to 200 GL per year.

In 2021–22, 88 GL of water was sourced from the River Murray, 60 GL from Mount Lofty Ranges Reservoirs and 5 GL from the Adelaide Desalination Plant to meet urban Adelaide's demand for drinking water. The volume of drinking water supplied to Adelaide by SA Water from these three water sources from 2000–01 to 2021–22 is shown in Figure 3. Urban Adelaide's full water balance for 2021–22 is shown in Figure 4.

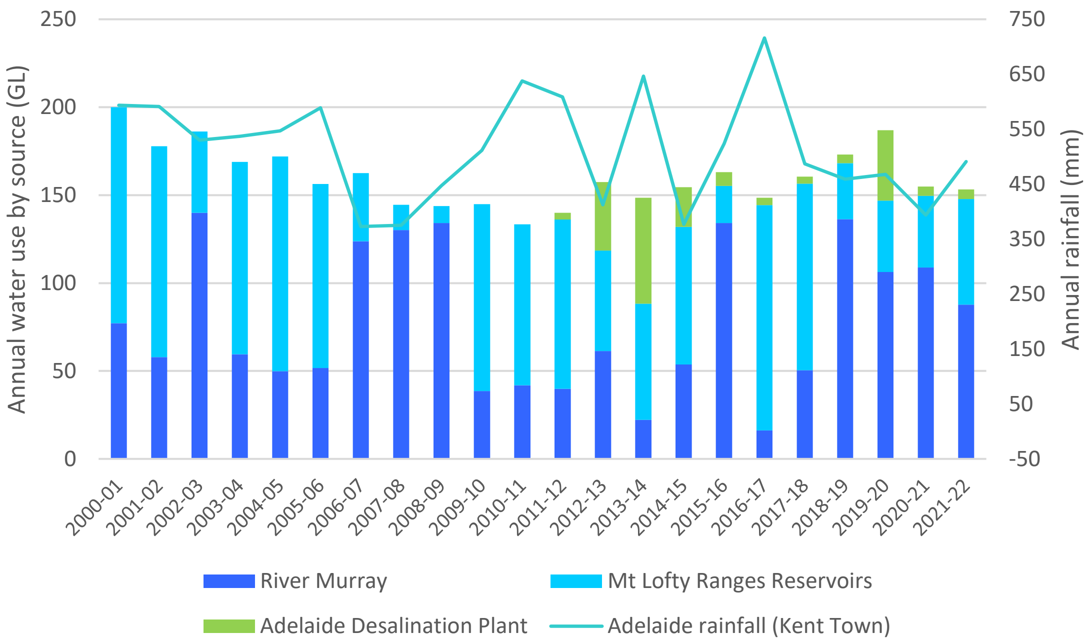

Figure 3: Adelaide's historical use of drinking water by source (SA Water 2022)

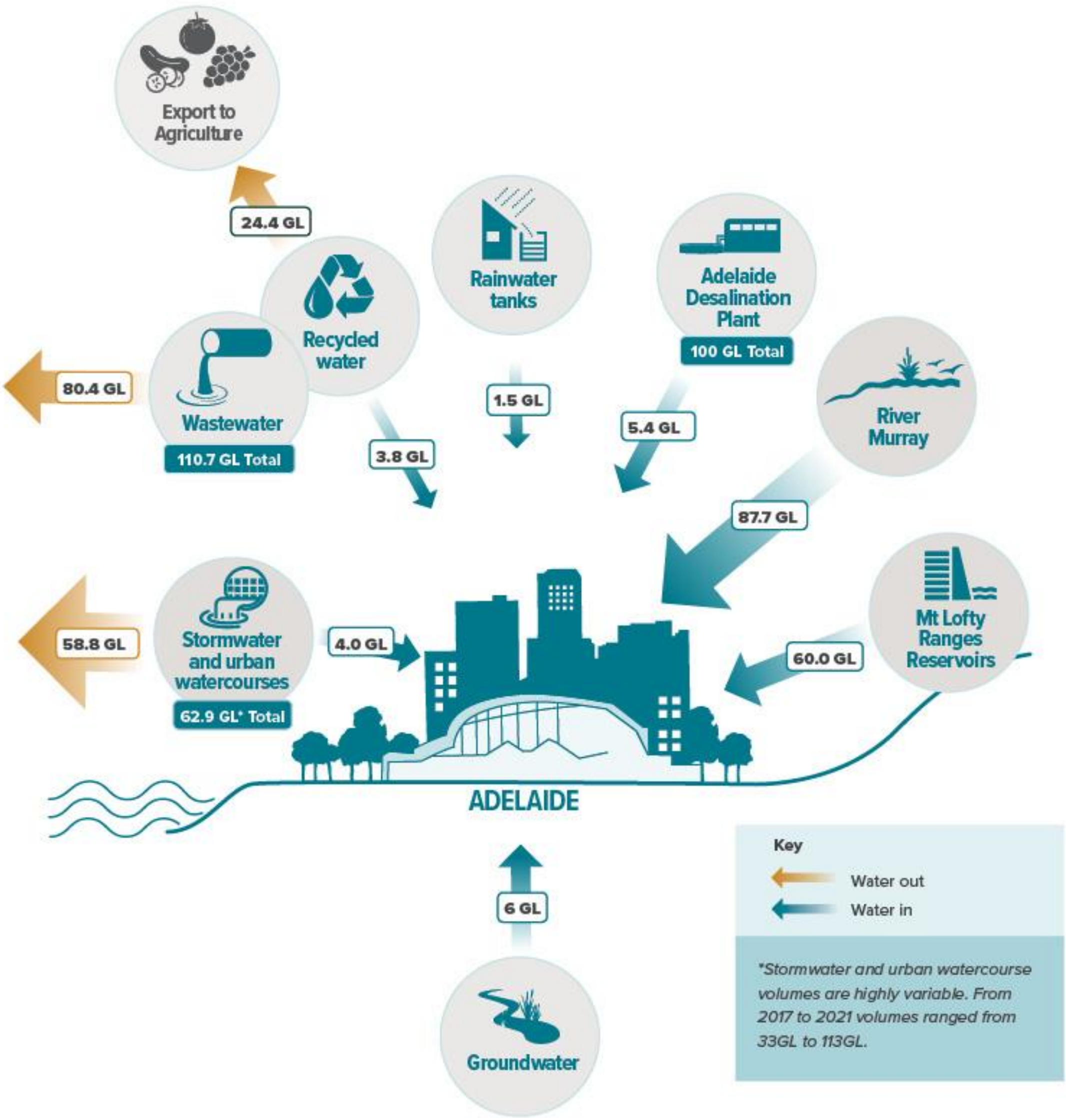

Figure 4: Urban Adelaide's water balance 2021–22

The percentage that each source contributes to Adelaide's water balance has remained similar over the past 5 years. A small amount of recycled water is used in urban Adelaide (3.8 GL in 2021–22), with a far greater amount being exported for use in agriculture (24.4 GL in 2021–22). The volume of water that runs off to the sea is highly variable; over the last 5 years the volume has ranged from 33 GL to 113 GL.

Adelaide's long-term water security outlook in a changing climate

Rainfall in 2022 was higher than average at all sites across Adelaide and the Hills. Despite the wet year in 2022, research from the Bureau of Meteorology and the Commonwealth Scientific and Industrial Research Organisation points to a long-term trend of less rainfall, less run-off into our rivers and storages, more severe and prolonged droughts, and an increase in the intensity and frequency of heavy rainfall events as a result of climate change. These changing climatic conditions will present challenges including changing reliability of groundwater and surface water resources and managing the capture and re-use of stormwater (University of Adelaide 2018).

The Adelaide Desalination Plant (ADP) provides a climate-independent source of water and in full operation can produce up to 100 GL a year. Figure 3 shows that a significant volume of water was produced by the ADP in 2019–20 when production was increased to 40 GL to enable the Australian Government to release the equivalent volume of River Murray water to help drought-affected farmers across the Southern Murray–Darling Basin.

Scenarios can be used to better understand future water security risk. SA Water's most recent evaluation of climate and demand scenarios suggests that, under high emissions climate change and medium population growth scenarios, South Australia will need to access the full 100 GL capacity of the ADP in the driest of years to ensure there is no shortfall drinking water availability in urban Adelaide.

This scenario is based on:

- Adelaide's population reaching 2.27 million people by 2050 (a 28% increase on current population, using mid-range projection)
- projected decreases in rainfall and increases in temperature consistent with a high greenhouse gas emissions scenario (RCP 8.5) (Charles and Fu 2014)
- decreased water availability from the Mount Lofty Ranges, consistent with a high emissions scenario (SRES A2)
- reduced water availability from the River Murray, consistent with a mid-range climate change scenario.

Research is underway to better understand future water security risks as a result of climate change and the effectiveness of different investment pathways under a broad range of scenarios. Research findings will be incorporated into future planning decisions.

Regional water security

Overview

Local groundwater and surface water sources provide water for irrigated agriculture, forestry, domestic supply, stock, mining, industrial applications and irrigation of recreational and sports grounds across many parts of the State. Where there is a high demand for local ground and surface water and there is a need to sustainably manage the resource, the resource is declared and prescribed by Regulation. Once a resource has been prescribed, the taking and use of water is managed via principles detailed in water allocation plans (see Appendix B for location of prescribed water resources).

Areas where there is a high demand for local ground and/or surface water and there is a need to sustainably manage the resource include:

- Limestone Coast
- Riverland and Murraylands
- Mount Lofty Ranges
- McLaren Vale
- Barossa
- Clare Valley
- Adelaide Plains
- Eyre Peninsula
- Far North

The remainder of this report focuses on the prescribed water resources in these regions, with a final section covering non-prescribed areas in other parts of the state.

For the prescribed resources, information on annual water use[6], water resource trends and long-term rainfall trends is presented for each region. The water resource trends presented include 5-year annual recovered groundwater level trends, long-term groundwater salinity trends, long-term annual streamflow trends, and long-term trends in the number of flow days[7]. In the tables below, stable trends are shown in blue, trends that indicate increased water availability or decreased salinity are shown in green, and trends that indicate declining water availability or increasing salinity are shown in red. The direction of the arrow on the coloured box displays the direction of the trend.

Further information on regional water resources is available in annual water resource assessment reports and supporting documents[8].

Across the State, the average annual volume of water used from prescribed resources in each region between 2015–16 and 2021–22, including the minimum and maximum volumes used across those years, is provided in Figure 5. The largest amount of water used each year comes from the groundwater of the South East (614 GL), followed by the surface water of the River Murray (575 GL) and the ground and surface waters of the Mount Lofty Ranges (90 GL).

In some regions, other water sources (water sources other than the local ground and surface waters) are used. In the sections below, other water is discussed where it represents a significant portion of the total water supply.

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[6] Unless otherwise stated, the volume of water used is based on metering data reported to the Department for Environment and Water. Data was sourced from the State Water Register 21/11/2022.

[7] Trend date ranges are detailed below each water resource trend table.

[8] For further information about the location of the water resource units described in this section or trends reported, please refer to the relevant Water Resource Assessment Report on WaterConnect https://www.waterconnect.sa.gov.au/Systems/GSR/Pages/default.aspx or 'Technical information supporting the 2023 surface water (quantity and quality) Environmental Trend and Condition Report Card, Draft DEW Technical report. Department for Environment and Water, Adelaide'.

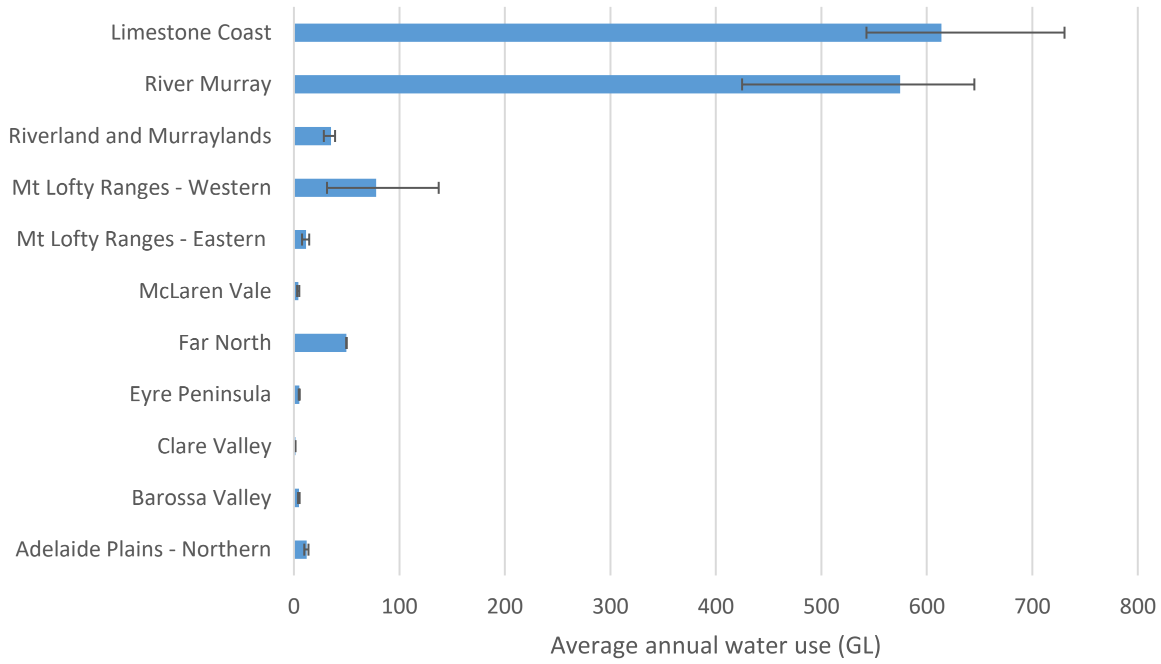

Figure 5: Average annual water use from a prescribed water resource, by region[9] (2015–16 to 2021–22)

[9] 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 as metered use is not currently available. For the Limestone Coast 2021 forest water use data has been used to represent 2021-22 water use.

Limestone Coast

Water in the Limestone Coast region is almost exclusively extracted from prescribed groundwater resources. Water resources in the Limestone Coast are managed under five water allocation plans:

- Lower Limestone Coast
- Tatiara
- Tintinara-Coonalpyn
- Padthaway
- Morambro Creek.

The location of the prescribed areas (which align with water allocation plans) can be seen in Figure 6.

Water use

Groundwater use is shown in Figure 7. Total use has varied between 543 GL and 731 GL for the period 2015–16 to 2021–22. In general, water use patterns reflect rainfall trends: less water is used in higher rainfall years compared to lower rainfall years. Mt Gambier rainfall data is displayed in Figure 7 to provide an indication of the historical relationship between rainfall and water use.

In comparison to groundwater, a negligible amount of surface water is sourced from Morambro Creek. An estimated volume[10] of 0.3 GL was used in the period from 2015–16 to 2021–22. Water was taken in 4 of the 7 years, with the greatest volume of water taken in the 'wet' year of 2016–17.

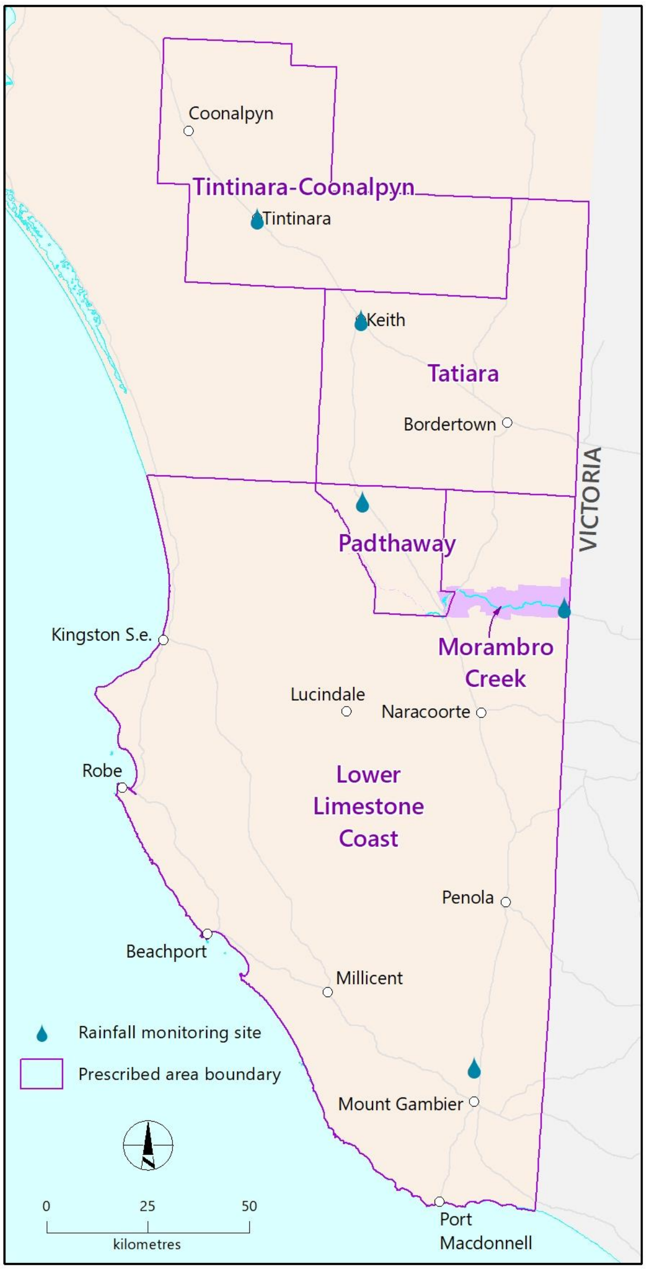

Figure 6: Map of Limestone Coast

[10] Morambro Creek water use is not metered.

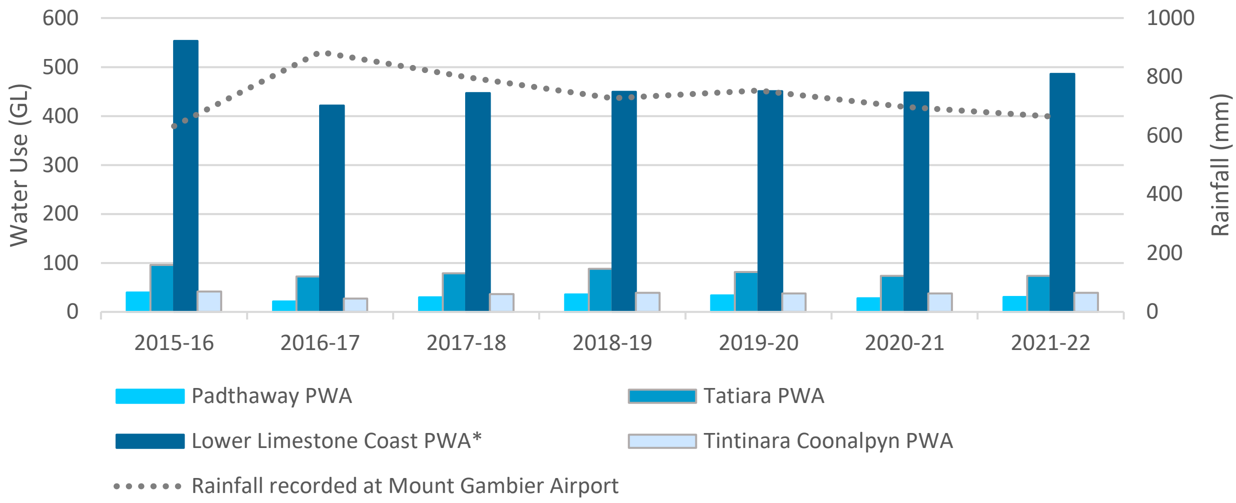

Figure 7: Annual rainfall and groundwater use in the Limestone Coast region, by prescribed water resource (2015–16 to 2021–22)[11]

Water resources

Resource trends for Limestone Coast prescribed water resource areas are shown in Table 2. Except for the southern part of the Lower Limestone Coast region, long-term rainfall data indicates total annual rainfall is declining. Annual recovered water levels (water level to which an aquifer recovers over the course of winter and early spring) have declined over the last 5 years, as has annual streamflow and number of flow days in Morambro Creek. Salinity trends vary across the Limestone Coast region: in Tatiara and Tintinara, stable or declining salinity is being observed; in the Lower Limestone Coast variable trends are evident; in highland areas salinity is increasing; and in lowland areas salinity is decreasing; and in Padthaway salinity is increasing.

[11] Lower Limestone Coast water use totals include water used by commercial forests. Forestry water use is measured each calendar year as opposed to each water use year. In this figure, 2021 forest water use data has been used to represent the 2021 and 2022 water use years, as 2022 forest water use data was not available at the time this report was published.

Table 2: Trends for Limestone Coast prescribed water resources

Lower Limestone Coast – Groundwater	Water level	Salinity	Rainfall
Confined Aquifer	↘	↗	— ↘ *
Unconfined Aquifer Lowlands#	↘	↘	— ↘ *
Unconfined Aquifer Highlands#	↘	↗	— ↘ *
Padthaway – Groundwater	**Water level**	**Salinity**	**Rainfall**
Unconfined Aquifer Flats	↘	↗	↘
Unconfined Aquifer Range	↘	↗	↘
Tatiara – Groundwater	**Water level**	**Salinity**	**Rainfall**
Confined Aquifer	↘	—	↘
Unconfined Aquifer Highlands	↘	—	↘
Unconfined Aquifer Plains	↘	↘	↘
Tintinara-Coonalpyn – Groundwater	**Water level**	**Salinity**	**Rainfall**
Confined Aquifer	↘	—	↘
Unconfined Aquifer Mallee Highlands	↘	—	↘
Unconfined Aquifer Plains	↘	—	↘
Morambro Creek – Surface Water	**Streamflow**	**Flow days**	**Rainfall**
Morambro Creek	↘	↘	↘

The Unconfined Aquifer Lowland is representative of the Comaum, Joanna, Zone 5A, Hynam East, Frances, Beeamma, Bangham, and Western Flat Groundwater Management Areas. All other Groundwater Management Areas are represented by 'Unconfined Aquifer Highlands.'

*The trend in rainfall in the southern part of the Lower Limestone Coast Prescribed Wells Area is stable; in northern parts the trend is declining.

Water Level = Trend in annual recovered groundwater levels over period 2016–17 to 2020–21.

Salinity = Trend in groundwater salinity over period 2011–12 to 2020–21.

Rainfall = Trend in average annual rainfall over period 1970 to 2021 at Marcollat weather station (for Padthaway prescribed area), Keith weather station (for Tatiara), Tintinara weather station (for Tintinara-Coonalpyn) and Mount Gambier Airport weather station (for southern parts of Lower Limestone Coast). Trend in average annual rainfall over period 1986 to 2021 at Frances weather station (for Northern parts of Lower Limestone Coast and Morambro Creek prescribed areas).

Streamflow = Trend in annual streamflow (July to June) over period 1986–2021 at Morambro Creek (A2390531) streamflow monitoring site

Flow Days = Trend in number of flowing days 1986 to 2021 at Morambro Creek (A2390531).

Water security summary

Water use across the last 5 years has been relatively consistent across the Limestone Coast region. However, long-term trends in rainfall, water level, annual streamflow and number of flow days indicate water is becoming less accessible, and in some locations salinity is increasing. The above trends suggest there are increasing risks to the water security of the region. A number of initiatives are underway to help manage water security risks and are described below.

Review and amendment of water allocation plans

A review of the Lower Limestone Coast Water Allocation Plan commenced in late 2022, with an expected completion date of December 2023. Based on the outcomes of the review, amendments may be required to the plan.

The Padthaway Water Allocation Plan is currently under amendment and community consultation will take place as part of the amendment process. The draft plan includes adaptive management principles that will allow groundwater extraction to be managed in response to changes in resource conditions, including as a result of climate change.

The Tatiara Water Allocation Plan is currently being amended and community consultation is planned for 2023. The draft plan includes principles for adaptive management of groundwater, similar to the Padthaway plan.

Understanding climate impacts to support adaptive decision-making

Regional and subregional groundwater models are being developed for the Lower Limestone Coast region. These models will allow multiple future scenarios of water use and climate change to be evaluated. This updated scientific understanding will provide an information base for the development of future adaptive management frameworks.

Monitoring and managing emerging risks

In the Limestone Coast region, the monitoring network for the groundwater-dependent ecosystem is being expanded. In conjunction with the expansion of the monitoring network, investigations into improving water availability for groundwater-dependent ecosystems are underway.

Freshwater in coastal aquifers is vulnerable to salinisation by seawater intrusion due to increasing groundwater extraction and reduced recharge. A project is underway to map the extent and shape of the seawater interface in vulnerable coastal aquifers. Additional monitoring wells have been installed to help develop a more detailed understanding of the freshwater–seawater interface.

Another project is seeking to quantify the demand value of different water uses (for example, irrigated crops, pasture, horticulture, viticulture and forestry) to understand future demand for water in the region.

Aboriginal water interests

The Limestone Coast (LC) Landscape Board is walking with First Nations to investigate how water resource management can incorporate the objectives of First Nations people. To better understand how water planning can support social, cultural and spiritual water needs, the LC Landscape Board, in partnership with the South East Aboriginal Focus Group and Burrandies Aboriginal Corporation, is exploring the delivery of cultural watering activities for the Kungari Waterholes at Kingston. The project is a step towards understanding South East First Nations’ social, cultural and spiritual water use.

Riverland and Murraylands

In the Riverland and Murraylands, the River Murray is the main source of surface water for water users and communities along the river itself. The River Murray is a significant source of water for Adelaide and country towns across South Australia, including the regional townships of Ceduna, Port Lincoln, Whyalla, Port Augusta, Port Pirie, Woomera, Kadina, Murray Bridge and Keith (see Figure 2 for location of major pipelines that transport River Murray water).

Groundwater is also an important source of water in the Riverland and Murraylands region, particularly in the Mallee.

Prescribed water resources in the Riverland and Murraylands region are managed under 4 separate water allocation plans:

- River Murray
- Mallee
- Peake Roby and Sherlock
- Marne Saunders.

The location of the prescribed areas (which align with water allocation plan boundaries) are shown in Figure 8.

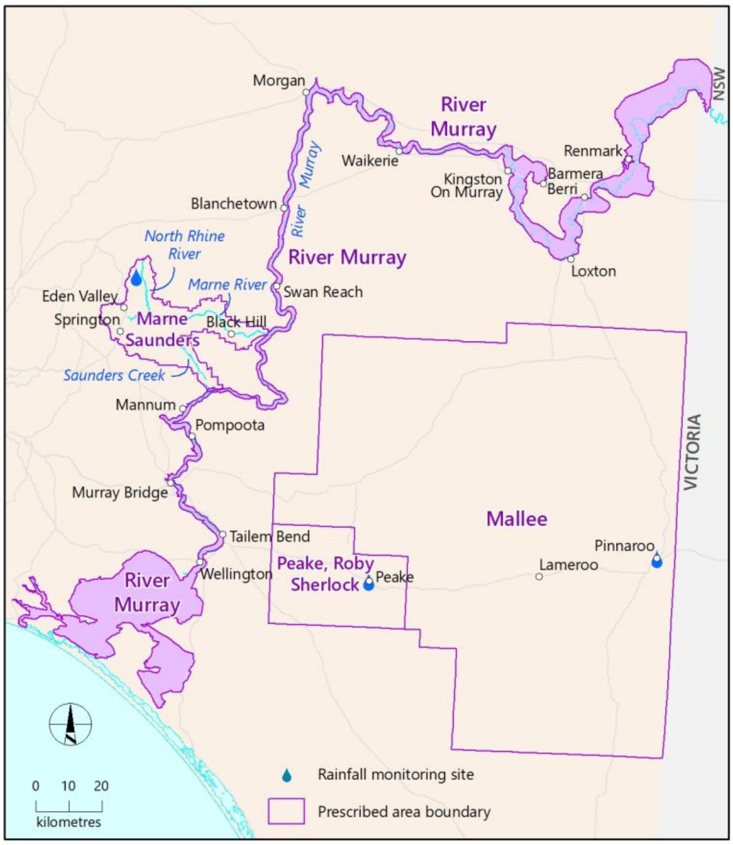

Figure 8: Map of Riverland and Murraylands region

Water use River Murray

Metropolitan Adelaide, country town and irrigation use

The majority of consumptive water sourced from the River Murray is used for irrigation, which in 2021–22 was 454 GL. This figure includes water pumped for use in the Barossa, Clare, Mount Lofty Ranges and Angas Bremer areas. Country town use was 41 GL and metropolitan Adelaide water use was 108 GL (Figure 9, note Basic Rights are not included in irrigation, country town and metropolitan Adelaide use totals).

South Australia continues to comply with its sustainable diversion limit compliance requirements under the Murray–Darling Basin Plan (Basin Plan). The total volume of River Murray water used for irrigation, country town use and metropolitan Adelaide use has ranged from 425 GL to 645 GL over the last 8 years (Figure 9). The current long-term average sustainable diversion limit in South Australia is 542.8 GL per year. Interstate trade and the ability to carry over unused water are important features of the River Murray management framework that ensure water available for consumptive purposes supports high-value production and economic growth.

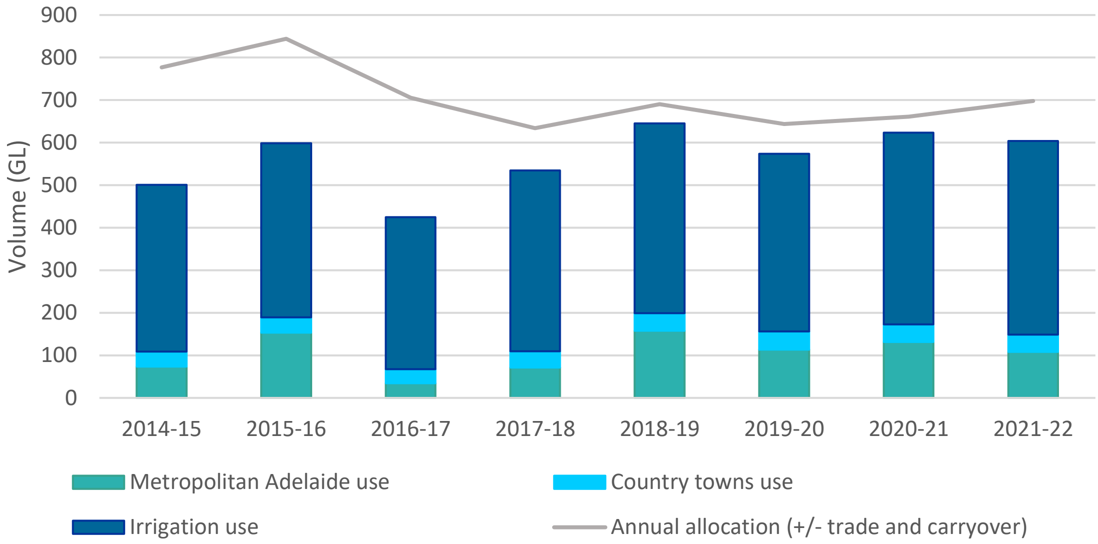

Figure 9: Volume of River Murray water used in South Australia for irrigation, country towns and metropolitan Adelaide [12]

Delivery of environmental water

A significant portion of water that passes into South Australia must be used for the benefit of the environment. The delivery of water for the environment to South Australia in the 2021–22 water year was guided by the 2021–22 Water for the Environment Annual Plan for the South Australian River Murray, the Long-Term Environmental Watering Plan for the South Australian River Murray and the Basin-Wide Environmental Watering Strategy. These documents, together with site-based management plans, describe key ecological targets and objectives for annual water for the environment delivery to South Australia. Water for the environment delivered to South Australia is provided by a number of water holders including the Commonwealth Environmental Water Holder (CEWH), The Living Murray (TLM) program, the South Australian Minister for Climate, Environment and Water and the Victorian Environmental Water Holder (VEWH).

Extensive rainfall across the Murray–Darling Basin in 2021–22 resulted in ongoing elevated flow conditions in the South Australian River Murray commencing mid-July 2021 and persisting for the remainder of the water year. Close to 1,200 GL of water held for the environment and over 5,300 GL of unregulated flows passed across the South Australian border to support environmental outcomes in South Australia.

Highlights from the delivery of water for the environment and unregulated flows in the SA River Murray in 2021–22 include:

- prolonged, elevated in-channel flows for almost the entire water year, resulting in a productive riverine environment that led to successful breeding by native fish
- successful implementation of a Lake Victoria Directed Release action that saw held environmental water used to alter operations of the Lake Victoria storage and enhance flow to South Australia
- over 6,000 GL released from the barrages, supporting improved water levels and salinity in the Coorong South Lagoon for *Ruppia tuberosa*, which forms a critical component of the Coorong habitat and food web
- operation of floodplain regulators on Chowilla, Pike and Katarapko floodplains in conjunction with raising Locks 4, 5 and 6, inundating more than 7,000 hectares of floodplain
- a successful lake level cycle in the Lower Lakes, reducing Lake Albert salinity by approximately 100 electrical conductivity (EC) units
- managing over 100 permanent and ephemeral wetlands, providing important habitat for threatened species.

Water delivery and associated operations were managed through a collaborative effort by multiple state and federal government agencies and non-government organisations.

[12] Basic Rights are not included in irrigation, country town and metropolitan Adelaide use totals. Approximately 6 GL per year is assigned to Basic Rights.

The management and delivery of environmental water in 2021–22 was in accordance with the basin annual watering priorities and Basin Plan requirements.

Specific information about the delivery of water for the environment and the associated outcomes from various site-based and system scale actions will be reported in the South Australian River Murray Water for the Environment Report 2021–22 (Department for Environment and Water in prep.).

Water use Mallee, Peake Roby and Sherlock, and Marne Saunders

Use of groundwater in the Mallee, Peake Roby and Sherlock, and Marne Saunders prescribed areas has ranged from 28 GL to 39 GL over the period 2015–16 to 2021–22 (Figure 10). In general, water use patterns reflect rainfall trends: less water is used in higher rainfall years compared to lower rainfall years. Rainfall varies across the 3 prescribed areas; rainfall data for the Mallee is displayed in Figure 10 to demonstrate the relationship between rainfall and water use.

The volume of surface water used in the Marne Saunders prescribed area has ranged from approximately 0.2 GL to 0.7 GL over the years 2015–16 to 2021–22. As with all surface water resources, surface water can only be accessed when dams and watercourses hold sufficient water.

Water use in the 2021–22 water use year was consistent with historic volumes for all surface and groundwater resources.

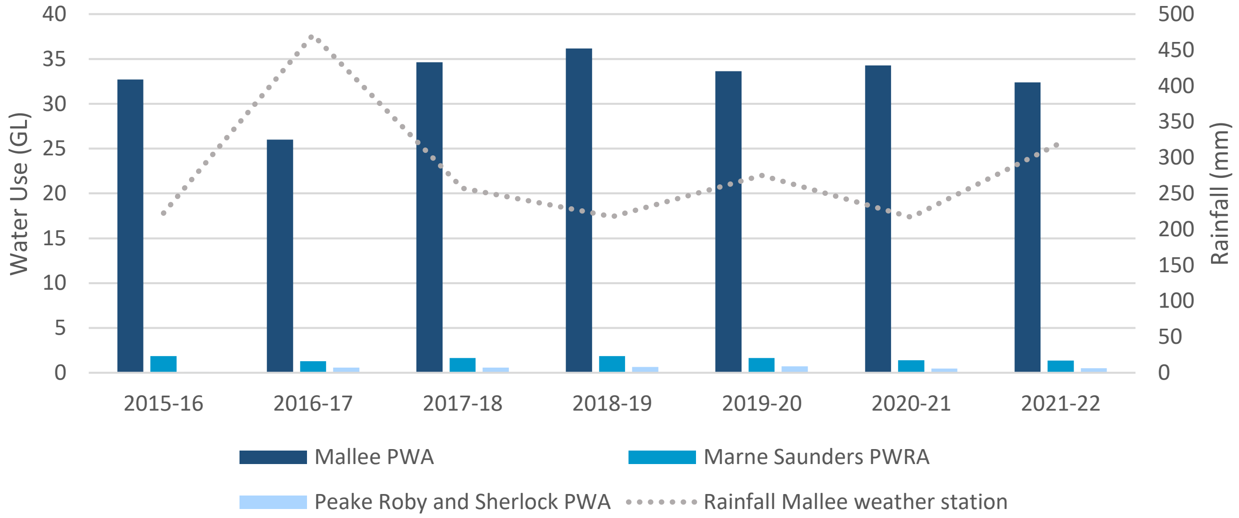

Figure 10: Annual rainfall and groundwater use in the Riverland and Murraylands region, by prescribed water resource (2015–16 to 2021–22)

Water resources

River Murray

Irrigation, regulation and river management (operation of dams, locks and weirs) significantly influence streamflow patterns in the River Murray; for this reason different indicators are shown in Table 3. Allocation (the delivery and availability of South Australia's entitlement) and salinity (achievement of salinity targets at sites defined in the Basin Plan) have been adopted as measures of water quantity and quality. South Australia's full entitlement was delivered and the salinity target was met in 2021-22, hence 'green ticks' are displayed in Table 3.

Rainfall across the Murray–Darling Basin has declined over the period 1900 to 2019 and is expected to continue declining in coming years.

Mallee, Peake, Roby and Sherlock, and Marne Saunders

With the exception of the confined aquifer in the Peake, Roby and Sherlock prescribed area, groundwater levels are declining in the Riverland and Murraylands region. The salinity of groundwater in the region is showing variable trends: declining in the Mallee and Marne Saunders Murray Group Limestone aquifers, stable in Peake, Roby and Sherlock, and increasing in the fractured rock aquifer of Marne Saunders (Table 3). Streamflow and number of flow days in the Marne River and Saunders Creek are showing a declining trend. Rainfall is stable in the Mallee area and declining elsewhere.

Table 3: Trends for Riverland and Murraylands prescribed water resources

River Murray – Surface Water	Allocation	Salinity	Rainfall
	✓	✓	↘
Mallee – Groundwater	**Water level**	**Salinity**	**Rainfall**
Murray Group Limestone	↘	↘	—
Peake, Roby and Sherlock – Groundwater	**Water level**	**Salinity**	**Rainfall**
Confined Aquifer	—	—	↘
Marne Saunders PWRA – Groundwater	**Water level**	**Salinity**	**Rainfall**
Fractured Rock Aquifers	↘	↗	↘
Murray Group Limestone	↘	↘	↘
Marne Saunders – Surface Water	**Streamflow**	**Flow days**	**Rainfall**
Marne River	↘	↘	↘
Saunders Creek	↘	↘	↘

Allocation = Availability and delivery of South Australia's entitlement in 2021-22.
Salinity (River Murray) = Salinity target detailed in the Basin Plan (see https://www.mdba.gov.au/sites/default/files/pubs/mdba-schedule-12-and-basin-plan-implementation-agreement-report-2021-2022.pdf for further information).
Salinity (All other areas) = Trend in groundwater salinity over period 2011–12 to 2020–21, except for Marne Saunders where period is 2012–13 to 2020–21.
Water Level = Trend in annual recovered groundwater levels over period 2016–17 to 2020–21.
Rainfall = Trend in average annual rainfall over period 1979 to 2021 at Pinaroo weather station (for Mallee prescribed area), Peake weather station (for Peake, Roby and Sherlock). Trend in average annual rainfall over period 1986 to 2021 at Keyneton weather station (for Marne Saunders). For River Murray, trend reported in 'Trends and historical conditions in the Murray–Darling Basin. A report prepared for the Murray–Darling Basin Authority by the Bureau of Meteorology, 2020'. Date range 1900 to 2021.
Streamflow = Trend in annual streamflow (July to June) over period 1986 to 2021 at the Marne Gorge (A4260605) and the Saunders Creek (A4261174) streamflow monitoring sites.
Flow Days = Trend in number of flowing days 1986 to 2021 at Marne Gorge (A4260605) and the Saunders Creek (A4261174) streamflow monitoring sites.

Water security summary

River Murray

Given that rainfall is expected to decline across the entire Murray–Darling Basin, implementation of the Basin Plan in full is critical for the water security of all regions that rely on the supply of River Murray water.

South Australia has made significant progress towards full implementation of the Basin Plan including:

- setting of new Sustainable Diversion Limits (SDL) for surface water and groundwater that came into effect from 1 July 2019
- all 3 water resource plans submitted on time and accredited by the federal minister
- all SDL adjustment projects for which South Australia has lead responsibility are either complete or on schedule for completion by the June 2024 deadline
- efficiency measures projects that contribute towards completion of the recovery of the final 450 GL of water for the environment
- meeting our `bridging the gap' water recovery target of 183.8 GL for the environment
- continuing to work with a range of partners and water holders to coordinate the effective delivery of water to our priority assets to achieve our short and long-term environmental outcomes in South Australia.

Implementation of the Basin Plan to date has supported:

- improved connectivity between the Lakes, Coorong and Murray Mouth with 10 years of continuous flow and increased barrage flows, providing critical pathways for movement and recruitment of key diadromous fish species
- improvements in black bream and greenback flounder populations in the Murray estuary and Coorong and small-mouthed hardyhead in the Coorong
- overbank and spring-summer flows, and more localised fast-flowing habitats which may have supported the recruitment and dispersal of Murray cod and an increase in food resources for these fish
- improvements in the abundances, distribution and breeding of Lakes waterbird communities
- managed floodplain inundations that have contributed to improvement in river red gum and black box condition in inundated areas.

Where it has been possible to deliver water recovered under the Basin Plan to the environment, positive outcomes are being observed.

A targeted amendment is currently being made to the River Murray Water Allocation Plan to improve private carryover provisions. Carryover is a drought management measure to keep industries productive in dry years and help maintain resilient communities; it works by increasing the volume of water available for irrigation in dry years through under-use of available water in previous years.

Mallee and Peake, Roby, Sherlock

The declining water level trend being observed in the Mallee prescribed area is within the limits permitted under the Mallee Water Allocation Plan. Due to the slow moving, robust nature of the aquifer and large amount of storage in the Murray Group limestone aquifer, extraction of the full volume permitted under the water allocation plan will lead to a depletion of 15% of the total resource volume of water in storage after 300 years.

The Mallee Water Allocation Plan is currently being amended. When complete, the amended plan will have a greater emphasis on the rights of First Nations people. Active consideration will also be given to the availability of water for critical human water needs, environmental assets and other uses (agriculture, industry, recreational) in a climate where water availability is variable. The Peake, Roby and Sherlock Water Allocation Plan is also being amended.

Marne Saunders

A review of the Marne Saunders Water Allocation Plan was completed in 2019, in which it was determined that no plan amendments were required.

Since then, further decline in the condition of waterways and associated habitats have been observed (Gannon, Whiterod, and Green 2021 and Aboriginal waterway assessments). Given the declining trends, the Murraylands and Riverland Landscape Board is engaging with the community to identify potential mitigating actions. The restoration of low flows is critical for the health of Marne Saunders waterways and associated habitats. The Marne Saunders prescribed area is included in the *Flows for the Future Program*[13].

[13] For more information see Mount Lofty Ranges summary section.

Mount Lofty Ranges

The Mount Lofty Ranges separate the Adelaide Plains from the extensive plains that surround the Murray River. For the purpose of water resource management, the Eastern Mount Lofty Ranges (EMLR) incorporate the eastern slopes of the Mount Lofty Ranges and the Murray Plains. The EMLR include the Angas Bremer Prescribed Wells Area. Ground and surface waters are managed under the EMLR Water Allocation Plan.

The Western Mount Lofty Ranges (WMLR) prescribed area incorporates the western slopes of the Mount Lofty Ranges and extend down to the Fleurieu Peninsula. Ground and surface waters are managed under 2 water allocation plans:

- WMLR
- McLaren Vale.

The McLaren Vale Water Allocation Plan manages groundwater only. The WMLR Water Allocation Plan manages surface and groundwater. Rivers that extend across the Adelaide Plains (Gawler River, Little Para, River Torrens and Onkaparinga) are managed under the WMLR Water Allocation Plan.

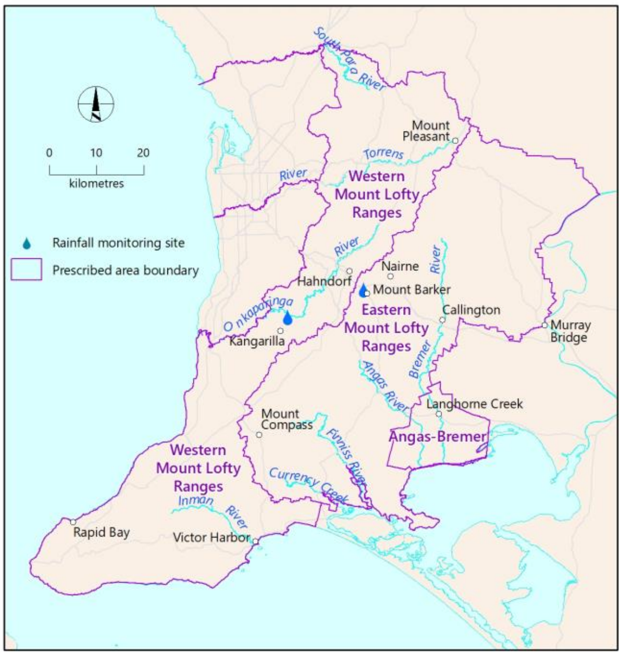

Figure 11: Map of Mount Lofty Ranges region

The location of the EMLR, Angas Bremer and WMLR prescribed resources are shown in Figure 11 (the location of the McLaren Vale Prescribed Wells Area is provided in the relevant section).

Eastern Mount Lofty Ranges water use

Over the last 7 years, the total volume of water used in the EMLR has ranged from 7.7 GL to 14.5 GL; in 2021–22 total water use was 11.8 GL (Figure 12). Groundwater was the predominant water source in the EMLR in 2021–22. 9.1 GL of groundwater was used compared to 2.7 GL of surface water. In general, annual water use patterns reflect annual rainfall trends: less water is used in higher rainfall years compared to lower rainfall years. Annual rainfall data for Mt Barker is displayed in Figure 12 to demonstrate the relationship between rainfall and water use.

The Angas Bremer Prescribed Wells Area falls within the boundary of the EMLR. In this region the use of groundwater is low (on average 1.8 GL per year) compared to the volume of River Murray water used. River Murray water is delivered to the area via a number of pipelines connected to Lake Alexandrina and higher reaches of the River Murray. In the 2021–22 water use year, the Creeks Pipeline Company Limited supplied 13.9 GL of River Murray water to townships, communities and irrigators in Langhorne and Currency creeks. Water sourced from the River Murray is an important water source for the Angas Bremer region.

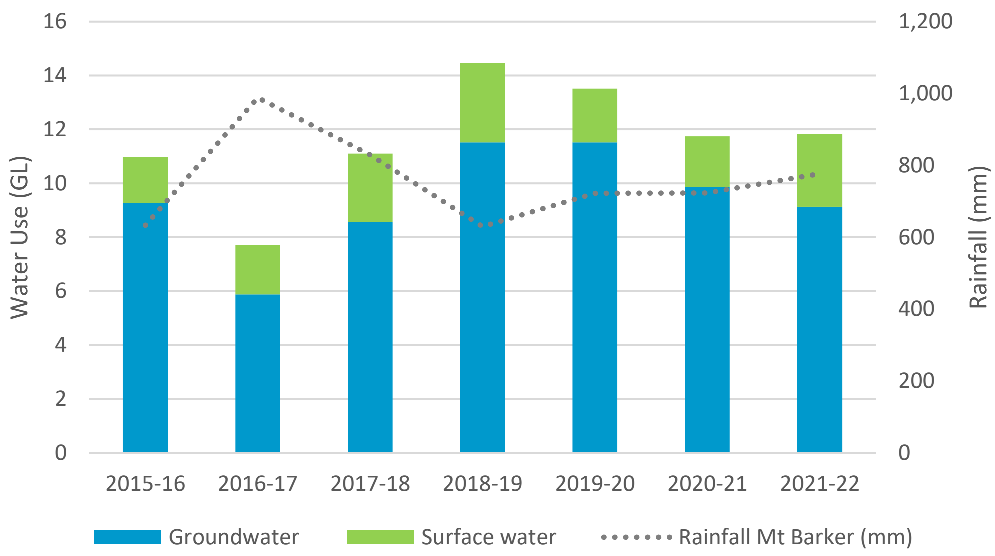

Figure 12: Eastern Mount Lofty Ranges annual rainfall and water use by resource type (2015–16 to 2021–22)[14]

Western Mount Lofty Ranges water use

Over the last 7 years, the total volume of water used in the WMLR has ranged from 31.4 GL to 137.3 GL; in 2021–22 total water use was 89.9 GL (Figure 13). Surface water is the predominant water source in the WMLR, and in 2021–22, 76.3 GL of surface water was used compared to 13.5 GL of ground water. The volume of surface water used in the WMLR is influenced by public water supply; the reservoir catchments in the WMLR prescribed area provide water for public supply purposes. In an average year, 60% of Adelaide's mains water is sourced from the WMLR reservoirs. In 2016–17, this figure increased to 86% (128 GL) and in 2017–18 the percentage was 66% (106 GL). In 2021–22, 39% (60 GL) of Adelaide's water supply was sourced from the reservoir catchments. The influence of public water supply demands can be seen in Figure 13. Rainfall data for Mt Bold is displayed in Figure 13; in general, water use patterns align more closely with public water supply drivers than rainfall, noting that surface water can only be accessed when reservoir catchments, dams and watercourses hold sufficient water.

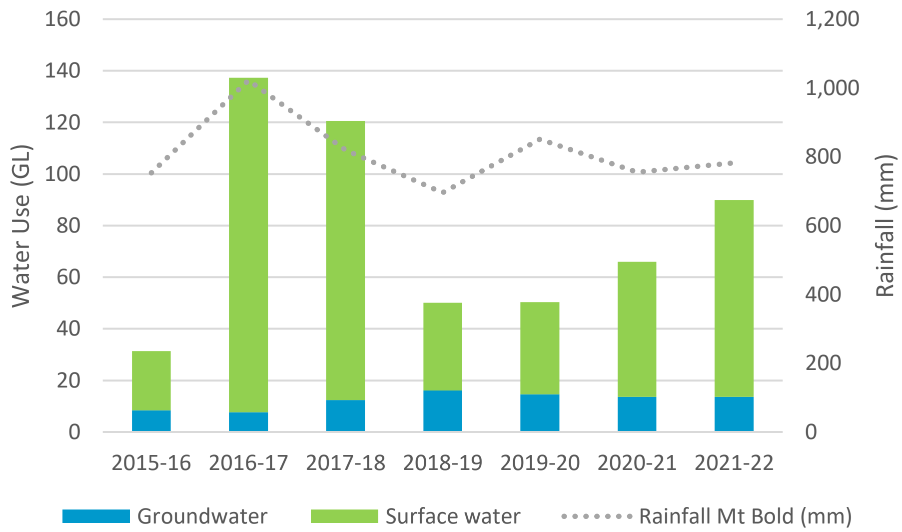

Figure 13: Western Mount Lofty Ranges annual rainfall and water use by resource type (2015–16 to 2021–22)

[14] Groundwater totals include EMLR and Angas Bremer groundwater use. Surface water totals represent the volume of EMLR surface water used in the region (meaning that River Murray water use is not included).

Water resources

Rainfall in the Mount Lofty Ranges over the period 1986 to 2021 is showing 2 distinct trends: stable in the EMLR and declining in the WMLR. Groundwater levels are showing a declining trend across the entire Mount Lofty Ranges except in the WMLR tertiary limestone aquifer where water levels are showing an increasing trend in the Myponga Basin. Variable salinity trends are being observed across the ranges. Streamflow is showing a declining trend for all rivers in the EMLR; the trend in the number of flowing days is stable for the Angas, Finniss and Currency rivers; and the Bremer River is showing a declining trend. In the WMLR, streamflow is showing a declining trend, except for the Inman Valley where streamflow appears to be stable. The trend in the number of flowing days is stable in some catchments (Myponga, Yankalilla and Inman Valley) and declining in others (Torrens and Onkaparinga).

Table 4: Trends for Mount Lofty prescribed water resources

Angas Bremer – Groundwater	Water level	Salinity	Rainfall
Murray Group Limestone	↘ (red)	↗ (red)	— (blue)
EMLR – Groundwater	**Water level**	**Salinity**	**Rainfall**
Fractured Rock	↘ (red)	↘ (green)	— (blue)
Murray Group Limestone	↘ (red)	↗ (red)	— (blue)
Permian Sand Finniss	↘ (red)	↘ (green)	— (blue)
Permian Sand Tookayerta	↘ (red)	↘ (green)	— (blue)
EMLR - Surface Water	**Streamflow**	**Flow days**	**Rainfall**
Angas River	↘ (red)	— (blue)	— (blue)
Bremer River	↘ (red)	↘ (red)	— (blue)
Finniss River	↘ (red)	— (blue)	— (blue)
Currency Creek	↘ (red)	— (blue)	— (blue)
WMLR - Groundwater	**Water level**	**Salinity**	**Rainfall**
Fractured Rock	↘ (red)	— (blue)	↘ (red)
Permian Sand	↘ (red)	NA	↘ (red)
Tertiary Limestone	↗ (green) ↘ (red) *	NA	↘ (red)
WMLR - Surface Water	**Streamflow**	**Flow days**	**Rainfall**
Torrens	↘ (red)	↘ (red)	↘ (red)
Onkaparinga	↘ (red)	↘ (red)	↘ (red)
Myponga	↘ (red)	— (blue)	↘ (red)
Yankalilla	↘ (red)	— (blue)	↘ (red)
Inman Valley	— (blue)	— (blue)	↘ (red)

*The trend in water level in the Myponga Basin of the tertiary limestone aquifer is increasing, and in the Hindmarsh Tiers Basin (of the tertiary limestone aquifer) a declining trend is being observed.

Water Level = Trend in annual recovered groundwater levels over period 2016–17 to 2020–21.

Salinity = Trend in groundwater salinity over period 2011–12 to 2020–21 for Angas Bremer Murray Group Limestone and WMLR Fractured Rock, 2014–15 to 2020–21 for EMLR fractured rock, EMLR Permian Sand Finniss and EMLR Permian Sand Tookayerta, and from 2006–07 to 2020–21 for EMLR Murray Group Limestone.

Rainfall = Trend in average annual rainfall over period 1986 to 2021 at Mount Barker weather station for EMLR and Mt Bold for WMLR.

Streamflow = Trend in annual streamflow (July to June) over period 1986 to 2021 at Finniss River (A4260504), Currency Creek (A4260530), Bremer River (A4260533), and Angas River (A4260503) streamflow monitoring sites – EMLR. Trend in combined streamflow over period 1986 to 2021 for Kersbrook (A5040525), Mount Pleasant (A5040512) and Sixth Creek (A5040523) for Torrens Catchment. Scott Creek (A5030502) and Bakers Gully (A5030503) for Onkaparinga Catchment. Myponga (A5020502), Yankalilla (A5011006) and Inman Valley (A5010503) for Myponga, Yankalilla and Inman Valley catchments respectively.

Flow Days = Trend in number of flowing days 1986 to 2021 at sites described above.

Water security summary

The trends described above highlight that there are some water security risks in the Mount Lofty region. There is an opportunity to address these risks through the review and amendment of the Western and Eastern Mount Lofty Ranges water allocation plans. The review of both plans is currently in progress, and the review and amendment of both plans will occur concurrently. To ensure ecologically sustainable water resource management there will be a need to review progress associated with the securing of low flows. Low flows are small flow events in creeks and rivers that create or maintain water flow through the channel, keeping in-stream habitats wet and pools topped up throughout the year, especially over summer and autumn.

Low flows are critical to ecosystems that depend on water. By keeping refuge pools wet and fresh during drier seasons, low flows allow plants and animals that rely on living in or near water to survive. These organisms can then reproduce and recolonise other areas once higher flows occur. Low flows also connect in-stream pools, enabling the movement of fish and invertebrates up and down the system. Low flows wet up different parts of the stream bed, such as benches and riffles (shallow, fast-flowing sections), which is essential to allow aquatic plants and animals to use these different types of habitats for living, feeding and breeding. Low flows at the break of season also help trigger breeding responses in some native fish species.

Programs have been underway to secure low flows[15] since the adoption of the current water allocation plans. To date more than 400 low flow devices have been fitted across the Mount Lofty Ranges (including the Marne Saunders region), but there is more work to be done. Healthy river systems are a sign of sustainable water use.

[15] https://www.environment.sa.gov.au/topics/water/flows-for-future

McLaren Vale

In McLaren Vale, groundwater and recycled water are important water resources. The McLaren Vale Prescribed Wells Area falls within the boundary of the WMLR; however, groundwater use is managed through the McLaren Vale Water Allocation Plan. The location of the McLaren Vale prescribed area is shown in Figure 14. Recycled water sourced from the Christies Beach wastewater treatment plant is an important water source for the region.

Water use

Over the last 7 years, groundwater use has ranged from 3.0 GL to 5.1 GL. Over the same period, the use of recycled water has ranged from 3.5 GL to 6.1 GL (Figure 15). Recycled water on average makes up 56% of the water used in the McLaren Vale region. In 2021–22 3.9 GL of groundwater and 5.9 GL of recycled water were used. Rainfall data for Willunga is displayed in Figure 15.

Figure 14: Map of McLaren Vale region

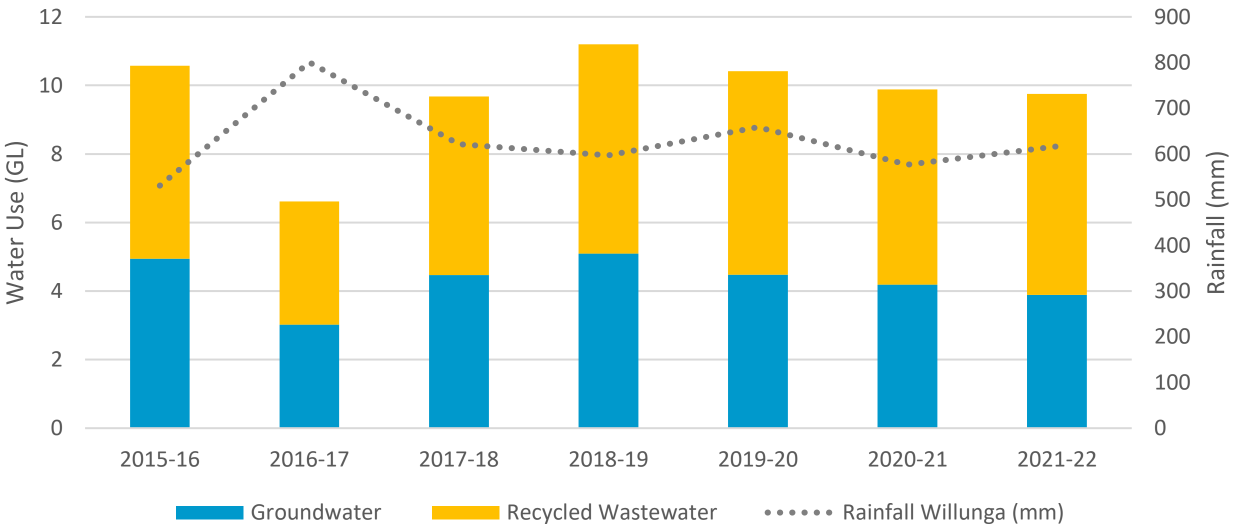

Figure 15: McLaren Vale annual rainfall and water use by resource type (2015–16 to 2021–22)

Water resources

Declining water levels and increasing salinity trends are showing in the majority of monitoring wells for all aquifers. The long-term rainfall trend is stable.

Table 5: Trends for McLaren Vale water resources

McLaren Vale – Groundwater	Water level	Salinity	Rainfall
Fractured Rock	↘	↗	—
Maslin Sands	↘	↗	—
Port Willunga Formation	↘	↗	—

Water Level = Trend in annual recovered groundwater levels over period 2016–17 to 2020–21.

Salinity = Trend in groundwater salinity over period 2006–07 to 2020–21.

Rainfall = Trend in average annual rainfall over period 1980 to 2021 at Willunga weather station.

Water security summary

McLaren Vale is a region where existing water supplies of a suitable quality are likely to be insufficient to meet demand, especially when climate variability is increasing. The Department for Environment and Water is working in partnership with key stakeholders to develop a water security strategy for the region. The strategy will consider pathways for adopting new or augmented supplies from all available water sources.

Alongside the development of a water security strategy, a business case is being developed to determine viability of constructing a new reservoir that could hold up to an additional 1,350 ML of recycled water for irrigation in the region. The Australian Government, through the National Water Grid Authority, is providing $470,000 towards the $500,000 business case, with the remaining funds coming from the South Australian Government and other partners.

There will be an opportunity to ensure water management frameworks provide water for critical human water needs, the environment and other uses in a changing climate when the McLaren Vale Water Allocation Plan is amended.

Barossa

In the Barossa region, prescribed ground and surface water resources as well as water imported from the River Murray are used to meet water needs across the region. Water imported from the River Murray is the main source of water. Prescribed resources are managed through the Barossa Water Allocation Plan. The location of the Barossa prescribed area is shown in Figure 16.

Water use

Over the last 7 years, demand for prescribed surface and groundwater has ranged from 3.9 GL to 5.4 GL. Over the same period, the use of imported River Murray water has ranged from 7.8 GL to 13.7 GL (Figure 17). Imported water on average makes up 70% of the water used in the Barossa region (Figure 17). In 2021–22, 4.3 GL of ground and surface water and 12 GL of imported River Murray water were used. Rainfall data for Tanunda is displayed in Figure 17.

Figure 16: Map of Barossa region

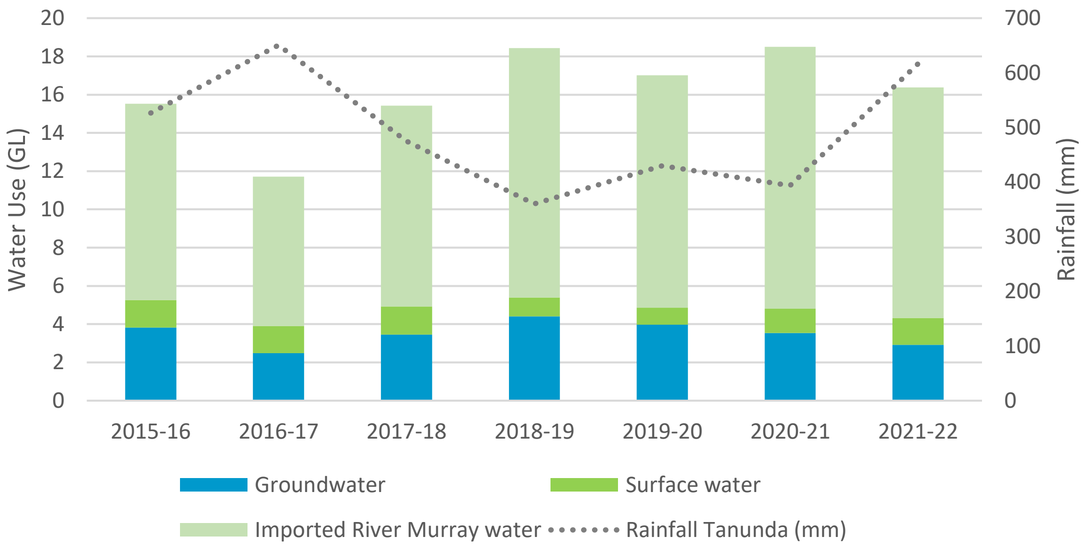

Figure 17: Barossa annual rainfall and water use by resource type (2015–16 to 2021–22)

Water resources

Declining water level and rainfall trends are being observed in the Barossa region. The salinity of the fractured rock aquifer, the primary aquifer used for licensed purposes, and the upper aquifer are showing increasing trends. The salinity trend of the lower aquifer is declining.

Table 6: Trends for Barossa water resources

Barossa – Groundwater	Water level	Salinity	Rainfall
Fractured Rock	↘	↗	↘
Upper Aquifer	↘	↗	↘
Lower Aquifer	↘	↘	↘
Barossa – Surface Water	**Streamflow**	**Flow days**	**Rainfall**
North Para River	↘	↘	↘

Water Level = Trend in annual recovered groundwater levels over period 2016–17 to 2020–21.

Salinity = Trend in groundwater salinity over period 2006–07 to 2020–21.

Rainfall = Trend in average annual rainfall over period 1986 to 2021 at Tanunda weather station.

Streamflow = Trend in annual streamflow (July to June) over period 1986–2021 at Yaldara (A5050502) streamflow monitoring site.

Flow Days = Trend in number of flowing days 1986 to 2021 at Yaldara (A5050502) streamflow monitoring site.

Water security summary

The Barossa is a region where it is likely water supplies of a suitable quality will be insufficient to meet established future demand for water. To address this water security risk, the Department for Environment and Water (DEW) has worked in partnership with key stakeholders to develop a water security plan for the region. The strategy sets out a shared vision for the region's future and includes strategic actions to improve water security in a changing climate in the Barossa out to 2050. The strategy relates to the Barossa Valley and Eden Valley. Under a mid-range climate scenario for the 2050s, it is estimated an additional 8 GL per year (5.7 GL for Barossa Valley and 2.4 GL for Eden Valley) will be needed to ensure on average there is no irrigation shortfall for the existing planted area in the driest years[16].

Since finalising the strategy in November 2022, DEW has worked with key stakeholders to assist with the implementation of the strategy.

Consistent with the water security strategy, new water supply options for the Barossa Valley and Eden Valley have been investigated though the Barossa New Water Project. At the time of publishing, a detailed business case was being considered by the South Australian Government.

The development of the water security strategy prior to the finalisation of the Barossa Water Allocation Plan amendment has facilitated the alignment of water security objectives with water allocation plan principles. For example, principles relating to surface water dams have been reviewed to consider the storage of alternative water supplies and to facilitate environmental outcomes and cultural water objectives identified in the water security strategy. Stakeholder consultation on water allocation amendments has commenced. In an effort to further improve water security, the Northern and Yorke Landscape Board is working with landholders, farming groups and stakeholders to deliver on-ground works, including stock exclusion from watercourses and off-stream water points, to improve water quality in the Wakefield River, Light River, North and South Para rivers and Gawler River catchments.

[16] Barossa Water Security Strategy

Clare Valley

In the Clare Valley, prescribed ground and surface water resources as well as water imported from the River Murray are used to meet water needs across the region. Water imported from the River Murray is the main source of water. Prescribed resources are managed through the Clare Valley Water Allocation Plan. The location of the Clare Valley prescribed area is shown in Figure 18.

Water use

Over the last 7 years, demand for prescribed surface and groundwater has ranged from 1.2 GL to 1.5 GL. Over the same period the use of imported River Murray water has ranged from 1.3 GL to 3.2 GL. Imported water on average makes up 61% of the water used in the Clare region (Figure 19). In 2021–22, 1.5 GL of ground and surface water was used and 2.9 GL of imported River Murray water. Rainfall data for Clare (Calcannia weather station) is displayed in Figure 19 to demonstrate the relationship between rainfall and water use.

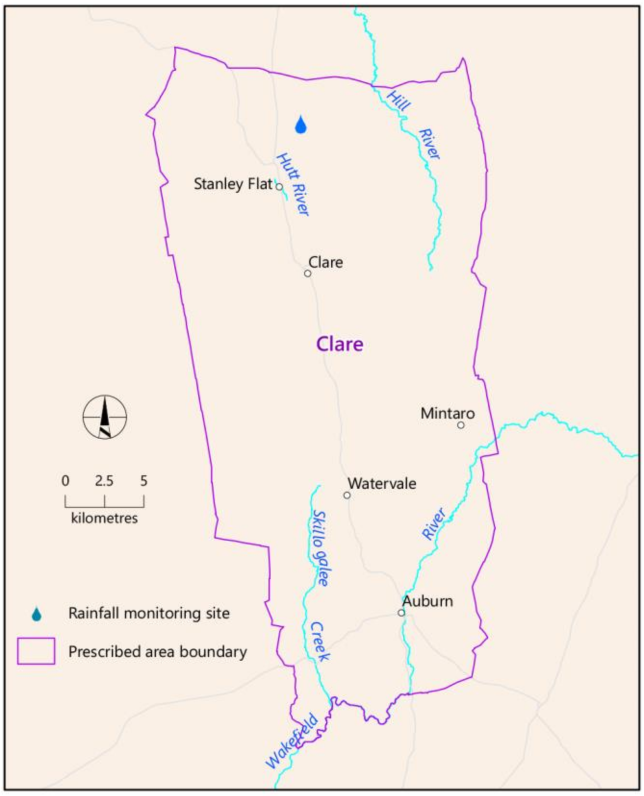

Figure 18: Map of Clare Valley

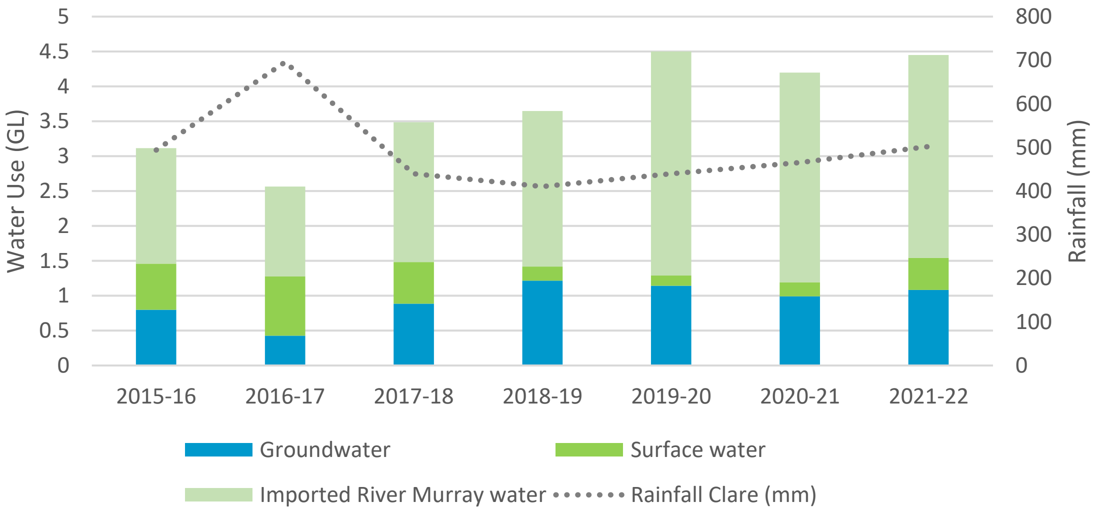

Figure 19: Clare Valley annual rainfall and water use by resource type (2015–16 to 2021–22)

Water resources

Water levels, streamflow and rainfall are all showing declining trends in the Clare Valley. With the exception of the Wakefield River flow days are also declining.

Table 7: Trends for Clare Valley water resources

Clare Valley – Groundwater	Water level	Salinity	Rainfall
Fractured Rock Aquifer	↘	↗	↘
Clare Valley – Surface Water	**Streamflow**	**Flow days**	**Rainfall**
Wakefield River	↘	—	↘
Hill River	↘	↘	↘
Hutt River	↘	↘	↘

Water Level = Trend in annual recovered groundwater levels over period 2016–17 to 2020–21.

Salinity = Trend in groundwater salinity over period 2006–07 to 2020–21.

Rainfall = Trend in average annual rainfall over period 1986 to 2021 at Calcannia weather station.

Streamflow = Trend in annual streamflow (July to June) over period 1986 to 2021 at Wakefield (A5060500), Hill River (A5070500) and Hutt River (A5070501) streamflow monitoring sites.

Flow Days = Trend in number of flowing days 1986 to 2021 at monitoring sites listed above.

Water security summary

There are ongoing water security challenges in the Clare Valley related to both water availability and affordability. Further conversations are required with the Clare community regarding water security. An assessment of water demand and the identification of options for bringing 'new' water to the Clare Valley has recently been completed[17]. The findings of the Clare Valley Water preliminary business case, funded by the National Water Grid Authority, are expected to be considered by the South Australian Government in 2023.

In an effort to further improve catchment health, the Northern and Yorke Landscape Board is working with landholders, farming groups and stakeholders to deliver on-ground works to improve water quality in the Wakefield River catchment in the Clare region.

[17] Clare Valley Water Project

Adelaide Plains

The Adelaide Plains takes in most of the metropolitan Adelaide region. It stretches from Kangaroo Flat in the north, to the Onkaparinga River in the south, to the coast in the west, and to the top of the 'hills face zone' in the east.

Three separate prescribed wells areas make up the Adelaide Plains region (Northern Adelaide Plains, Dry Creek and Central Adelaide). Groundwater resources are managed under a single water allocation plan – the Adelaide Plains Water Allocation Plan. Under the Adelaide Plains Water Allocation Plan, water resources in the Kangaroo Flat region are managed separately to other areas of the Northern Adelaide Plains, hence water use and resource trends are presented for Kangaroo Flat and Northern Adelaide Plains. The location of the prescribed areas is shown in Figure 20. The location of Kangaroo Flat can also be seen on the map.

Surface water is not prescribed in the Adelaide Plains region.

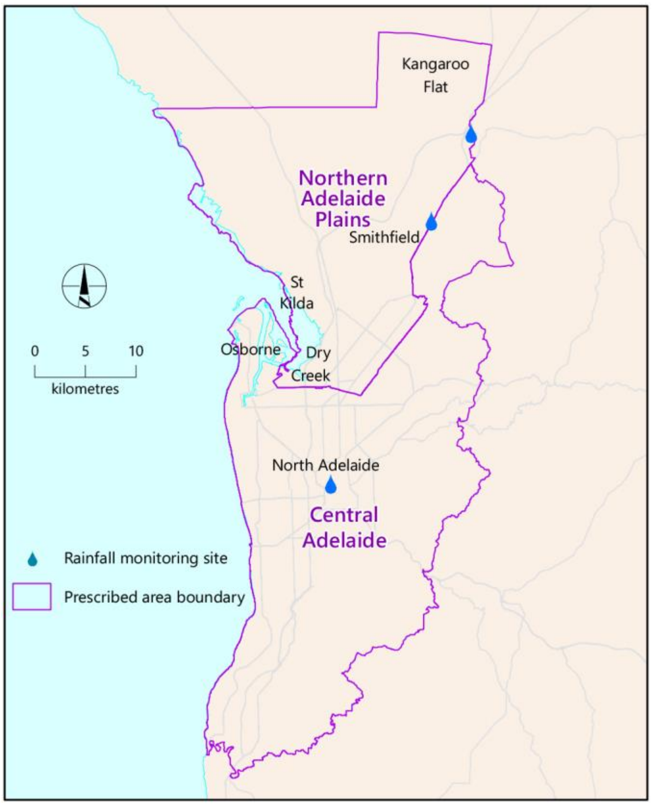

Figure 20: Map of Adelaide Plains region

Water use

Use of groundwater in Dry Creek and the Northern Adelaide Plains (including the Kangaroo Flat region) has ranged from 10.3 GL to 14.5 GL over the period 2015–16 to 2021–22. In the 2021–22 year, 12.0 GL was used (Figure 21). In general, water use patterns reflect rainfall trends: less water is used in higher rainfall years compared to lower rainfall years. Rainfall varies across the 3 prescribed areas. Rainfall data for Smithfield (deemed to represent the Northern Adelaide Plains) is displayed in Figure 21 to demonstrate the relationship between rainfall and water use. In the Adelaide Plains region, the greatest volume of groundwater is used from the aquifers of the Northern Adelaide Plains.

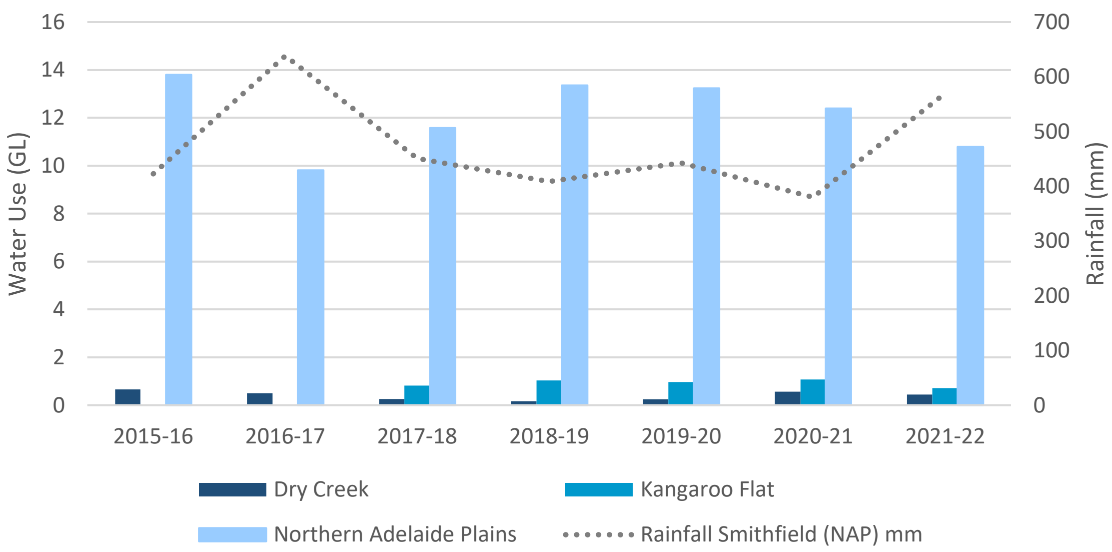

Figure 21: Adelaide Plains annual rainfall and water use by resource (2015–16 to 2021–22)[18]

[18] Central Adelaide water use data is not represented in Figure 21 as comprehensive use records are not currently available. Kangaroo Flat metered water use data is available from 2017–18 onwards.

Water resources

Water level trends are declining in the Northern Adelaide Plains. In Central Adelaide water levels in the T1 aquifer are stable to increasing. Salinity trends are stable across the region. Rainfall in the Northern Adelaide Plains is stable, whereas a declining rainfall trend is being observed in the Central Adelaide Prescribed Wells Area.

Table 8: Trends for Adelaide Plains water resources

Central Adelaide – Groundwater	Water level	Salinity	Rainfall
T1	— ↗ *	—	↘
Kangaroo Flat – Groundwater	**Water level**	**Salinity**	**Rainfall**
T2	↘	—	—
Northern Adelaide – Groundwater	**Water level**	**Salinity**	**Rainfall**
T1	↘	—	—
T2	↘	—	—

*The majority of wells completed in the Central Adelaide T1 aquifer are showing stable or rising trends.

Water Level = Trend in annual recovered groundwater levels over period 2016–17 to 2020–21.

Salinity = Trend in groundwater salinity over period 2010–11 to 2020–21.

Rainfall = Trend in average annual rainfall over period 1970 to 2021 at North Adelaide weather station for Central Adelaide, at Gawler weather station for Kangaroo Flat, and Smithfield weather station for Northern Adelaide Plains.

Water security summary

Declining water levels in the northern part of the Adelaide Plains region present a risk to water security. This risk is addressed in the Adelaide Plains Water Allocation Plan that became operational on 1 July 2022. The Plan replaces the former Northern Adelaide Plains Water Allocation Plan and is the first water allocation plan for the Dry Creek and Central Adelaide prescribed wells areas.

In the newly adopted water allocation plan, the risk presented by declining water level trends is mitigated by the inclusion of an adaptive trigger-level management approach. The adaptive management approach works by limiting the volume of water that can be extracted from the T1 and T2 aquifers, specifically the T1 NAP and the T2 NAP consumptive pools, of the Northern Adelaide Plains (NAP) when the resource is at higher risk. This is achieved through the use of resource condition triggers. The resource condition triggers act as an early warning system that the resource condition limit is at risk of being breached and initiates a management response that greatly reduces the risk of this occurring.

The Adelaide Plains Water Allocation Plan also includes rules for managing water that is drained or discharged into aquifers, also known as managed aquifer recharge (MAR). The principles in the Plan enable further storage of water in the aquifers for future use where it is sustainable and therefore enhance the water security of the region.

The Northern Adelaide Irrigation Scheme is providing additional water security in the region. The scheme delivers recycled water sourced from the Bolivar Wastewater Treatment Plant to irrigators. Recycled water from the Bolivar Wastewater Treatment Plant is a climate-independent water source that is helping to build resilience to drought.

Eyre Peninsula

There are 2 prescribed water resource areas on the Eyre Peninsula – Musgrave and Southern Basins. The fresh groundwater resources in both areas are used for a variety of purposes, but mainly for public water supply, stock and domestic use, irrigation of open spaces and industrial purposes. The location of the prescribed areas can be seen in Figure 22.

Water use

Water use from Musgrave Prescribed Wells Area has ranged from 0.06 GL to 0.09 GL. Use from Southern Basins Prescribed Wells Area has ranged from 5.1 GL to 5.5 GL. In 2021–22 water use was 0.06 GL in Musgrave and 5.3 GL in Southern Basins. Unlike other regions, water use patterns do not closely correlate to annual rainfall volumes. Rainfall varies across the 2 prescribed areas; rainfall data from the Westmere weather station (located approximately 20 km south-west of Port Lincoln) is displayed in Figure 23. In the Eyre Peninsula region, the greatest volume of groundwater is used from the aquifers of the Southern Basins. In 2021-22 year 76% of water used on the Eyre Peninsula was sourced from the River Murray, with 10.7 GL supplied to the township of Whyalla and the remaining 3.4 GL supplied to other Eyre Peninsula towns including Iron Knob, Kimba, Lock, Wudinna, Minnipa, Poochera, Streaky Bay, Smokey Bay and Ceduna.

Figure 22: Map of Eyre Peninsula region

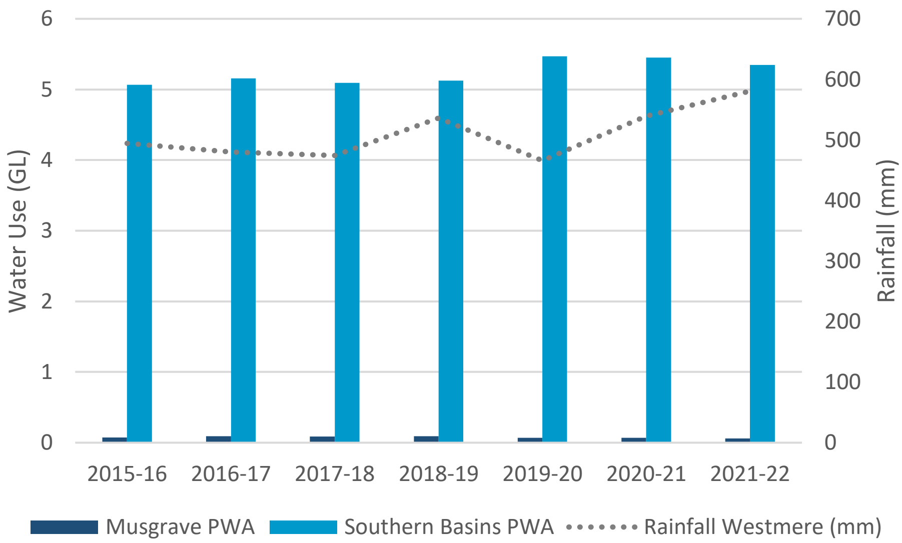

Figure 23: Eyre Peninsula annual rainfall and water use by resource (2015–16 to 2021–22)

Water resources

Rainfall trends across the Eyre Peninsula region are declining. Salinity trends are increasing and, except for the Coffin Bay water resource in the Southern Basins Prescribed Wells Area, water level trends are declining.

Table 9: Trends for Eyre Peninsula water resources

Musgrave – Groundwater	Water level	Salinity	Rainfall
Bramfield	↘	↗	↘
Polda	↘	↗	↘
Southern Basins – Groundwater	**Water level**	**Salinity**	**Rainfall**
Coffin Bay	↗	↗	↘
Lincoln South	↘	↗	↘
Uley South	↘	↗	↘
Uley Wanilla	↘	↗	↘

Water Level = Trend in annual recovered groundwater levels over period 2016–17 to 2020–21.

Salinity = Trend in groundwater salinity over period 2010–11 to 2020–21.

Rainfall = Trend in average annual rainfall over period 1970 to 2021 at Elliston weather station (for Bramfield), from 2010 to 2021 at Polda weather station (for Polda), and from 1970 to 2021 at Westmere weather station for Southern Basins (for Coffin Bay, Lincoln South, Uley South and Wanilla).

Water security summary

Declining water level and rainfall trends represent water security risks to enterprises that rely on dams and/or small freshwater lenses to provide water for stock or to meet critical human water needs. Given the observed trends, the Eyre Peninsula is a region where water supplies of a suitable quality may be insufficient to meet future demand. Water security in the Eyre region will be improved through access to desalinated water.

SA Water and the South Australian Government have identified Billy Lights Point as the preferred location for a 5.3 gigalitre desalination plant to supplement existing groundwater sources to ensure water security for the Eyre Peninsula region into the future. A comprehensive site selection process considered more than 15 potential locations. This decision was informed by technical investigations, feedback from a Marine Science Review Panel, insights gained from extensive community, industry and government consultation and assessment of the cost of construction and operation. A final decision on the plant will be informed by a separate business case being prepared by Infrastructure SA into the Northern Water Supply project which is examining a new and sustainable water supply for the far north and Upper Spencer Gulf.

Elliston is a small coastal town on the west coast of the Eyre Peninsula, north-west of Port Lincoln. The township has a population of approximately 400 people. Public water supply is provided to Elliston from the Bramfield Lens and in recent years water levels have been reaching the critical trigger levels defined in the Southern Basins and Musgrave Water Allocation Plan. This has resulted in significant reductions in annual water allocations. SA Water is completing a body of work to identify and prioritise long-term water security options for Elliston.

Far North

In the Far North the primary source of water is confined groundwater from the Great Artesian Basin (GAB). Groundwater is the principal source of water for commercial, irrigation, industrial, town water supply, domestic, bore-fed wetlands, watering stock, petroleum and mining production purposes. The surface expression of groundwater, for example springs, supports traditional Aboriginal cultural values.

The location of the Far North Prescribed Wells Area is shown in Figure 24.

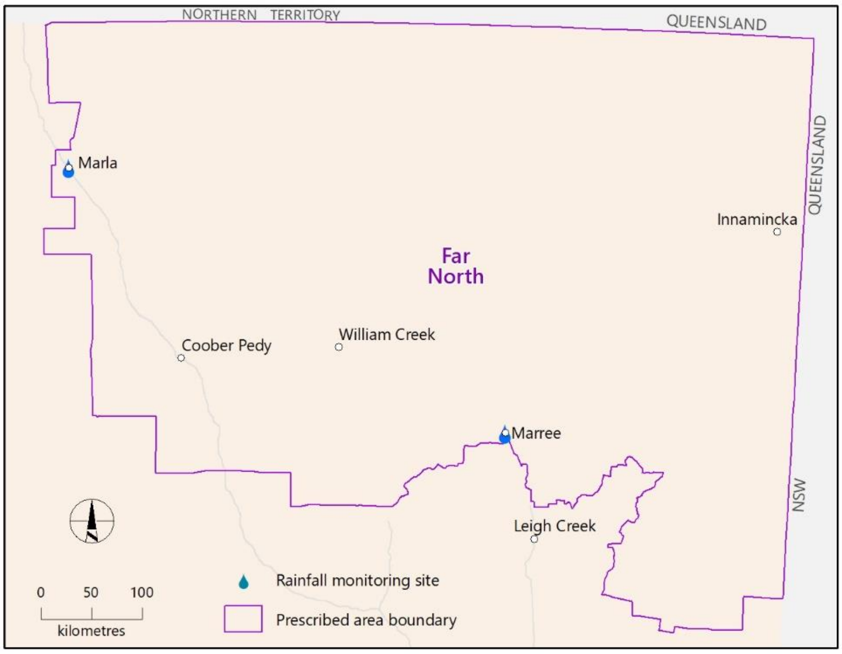

Figure 24: Map of Far North region

Water use

For the Far North, comprehensive metered water use data is not yet available. Water used in mining and petroleum is metered, but water used by pastoralists is not measured. Due to the difficulties experienced by the pastoral industry in relation to metering water use, the South Australia Arid Lands Landscape Board and the Department for Environment and Water are working with pastoralists to identify fit-for-purpose 'water accounting' methods. This information will support the development of a water accounting implementation plan for the Far North Prescribed Wells Area.

The volume of water authorised for use in mining is approximately 26.2 GL. The petroleum industry is authorised to use approximately 24.8 GL (2.9 GL petroleum and 21.9 GL co-produced water). Stock use is estimated to equate to approximately 9.8 GL per year.

Water resources

The water level trend in the GAB (J-K) aquifer is stable to increasing; salinity level trends are stable; and rainfall trends in the north-west part of the prescribed resource are stable while in the southern parts rainfall trends are declining.

Table 10: Trends for Far North water resources

Far North – Groundwater	Water level	Salinity	Rainfall
GAB (J-K) aquifer	 *		 *

*****The majority of wells (68%) have rising or stable water levels**.** The rainfall trend at Marla (representative of the north-west part of the region) is stable, while at Marree (representative of the southern part of the region) the rainfall tend is declining.

Water Level = Trend in annual recovered groundwater levels over period 2016–17 to 2020–21.

Salinity = Trend in groundwater salinity over period 2010–11 to 2020–21.

Rainfall = Trend in average annual rainfall over period 1970 to 2021 at Marree (representative of the southern part of the prescribed area) and Marla (representative of north-west part of the prescribed area).

Water security summary

An updated water allocation plan was adopted in February 2021. 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.

Over the past 2 decades, the state and federal governments and landholders have invested approximately $29 million to repair and restore uncontrolled wells and to close open drains across the GAB to improve the artesian pressure 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.

Although resource trends do not raise concern regarding the security of the GAB aquifer, in the last year it has been demonstrated by the Northern Water Supply project that water was a constraint to economic growth in the region and that there would be environmental and cultural benefits in reducing the draw from the GAB. The development of a business case for the construction of a desalination plant in the Upper Spencer Gulf region (the Northern Water Supply Project) is currently underway.

Another project, the Water and Infrastructure Corridors initiative, is attempting to address water access and productivity constraints to growth by improving knowledge of groundwater resources in targeted regions of South Australia and identifying requirements for developing multi-use infrastructure corridors in priority areas. The findings of this project may be beneficial to the water security of the Far North.

Non-prescribed 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. For these non-prescribed areas, water affecting activities are managed through permits to protect the integrity of the water resources and to minimise the impact of the activities.

The Yorke Peninsula, Kangaroo Island and the Alinytjara Wilurara region (north west third of South Australia) are examples of locations where a permit system is used to protect the integrity of the water resources and to minimise the impact of water affecting activities.

Yorke Peninsula

On the Yorke Peninsula, rural land is largely used for dryland cereal cropping and sheep and cattle grazing. Salt production, mining, fishing and tourism are also important industries for the region. Surface water supplies are limited and almost all groundwater shows high salinity and is not suitable as a supply of drinking water (for humans). While drinking water is supplied to many townships in the region from the River Murray (via the Morgan- Whyalla and Swan Reach Paskeville pipelines), a number of coastal landowners rely on rainwater for drinking water supplies. A desalination plant at Marion Bay supplies water to Marion Bay residents, businesses and visitors to the area. Water affecting activities are managed via the Northern and Yorke Landscape Board Water-Affecting Activities Control Policy.

Alinytjara Wilurara region

The Alinytjara Wilurara (AW) region covers over a quarter of a million square kilometres, stretching from the Northern Territory and West Australian borders south to the Great Australian Bight Marine Park. The primary land tenure is formally recognised Aboriginal Lands and Government Reserves. There are no permanent rivers or creeks in the region and the recharge of groundwater, rock holes, springs and soaks is dependent on infrequent heavy rainfalls. Rock holes and soaks have significance to First Nations as ceremonial, social and trading locations and are central to the health of the remote Aboriginal communities. In the past the presence of water in rock holes and soaks has governed where family groups cluster and travel.

Groundwater remains the predominant water source for Aboriginal settlements. Projects are underway to improve the quality and reliability of supply to communities in the region (see the above under 'Remote Communities' for more information). Water affecting activities in AW region are managed via a permitting system.

Kangaroo Island

On Kangaroo Island, cropping and grazing (predominantly sheep for wool and meat) are the main primary industries. Kangaroo Island relies heavily on surface water captured in farm dams to supply water for stock and domestic needs; the largest reservoir on the Island is part of the Middle River Water Supply System (MRWSS).

Together the MRWSS and the Penneshaw Desalination Plant supply drinking water to approximately half of Kangaroo Island's population. In areas outside of the reticulated water networks, rainwater is the main source for household drinking supplies. As outlined above, a new desalination plant will be built near Penneshaw to supplement the existing Penneshaw facility and Middle River Reservoir. Construction of a major pipeline component was underway at the time this report was published.

Limited good quality groundwater is available on Kangaroo Island.

Water affecting activities are managed on Kangaroo Island via the Kangaroo Island Water Affecting Activity Control Policy.

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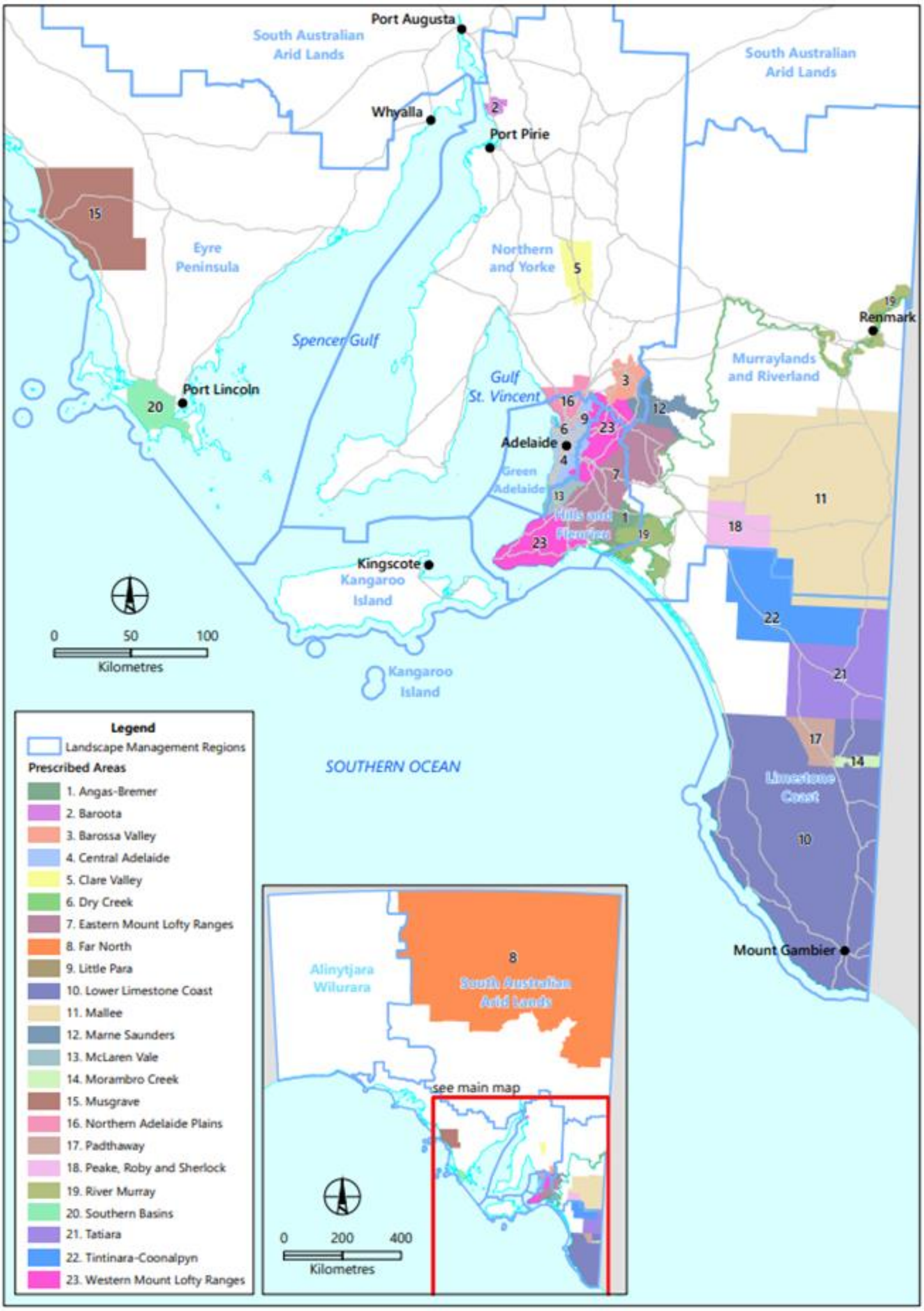
Appendix A: Water allocation plan status and review timeframes

Prescribed Water Resource	Water Allocation Plan (WAP)	Landscape region (primary region in bold)	Adoption date of current WAP	Status*
Far North Prescribed Wells Area	Water Allocation Plan for the Far North Prescribed Wells Area	South Australian Arid Lands	February 2021	Review due by 2031
River Murray Prescribed Watercourse	Water Allocation Plan for the River Murray Prescribed Watercourse	Murraylands & Riverland	April 2020	A targeted amendment is underway; due to be completed in 2023.
Northern Adelaide Plains Prescribed Wells Area (which includes the Kangaroo Flat Prescribed Wells Area)	Adelaide Plains Water Allocation Plan	**Green Adelaide** Northern and Yorke Hills and Fleurieu	July 2022	Review due by 2032
Barossa Prescribed Water Resources Area	Water Allocation Plan - Barossa Prescribed Water Resources Area	Northern & 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 & Yorke	NA	New WAP under development
Morambro Creek Prescribed Water Resources Area	Morambro Creek Water Allocation Plan	Limestone Coast	January 2006	Review due 2023

McLaren Vale Prescribed Wells Area	Water Allocation Plan McLaren Vale Prescribed Wells Area	**Hills & Fleurieu** Green Adelaide	2007	Review completed. Amendment pending.
Peake Roby and Sherlock Prescribed Wells Area	Water Allocation Plan for the Peake Roby and Sherlock Prescribed Wells Area	Murraylands & Riverland	March 2011	Amendment underway
Clare Valley Prescribed Water Resources Area	Water Allocation Plan for the Clare Valley Prescribed Water Resources Area	Northern & Yorke	February 2009	Review due by 2029
Mallee Prescribed Wells Area	Water Allocation Plan for the Mallee Prescribed Wells Area	Murraylands & Riverland	May 2012	Amendment underway
Tintinara – Coonalpyn Prescribed Wells Area	Water Allocation Plan for the Tintinara - Coonalpyn Prescribed Wells Area	Limestone Coast	January 2012	Review due by 2026
Western Mount Lofty Ranges Prescribed Water Resources Area	Water Allocation Plan Western Mount Lofty Ranges	**Hills & Fleurieu** Northern and Yorke Green Adelaide	September 2013	Review in progress
Lower Limestone Coast Prescribed Wells Area	Water Allocation Plan for the Lower Limestone Coast Prescribed Wells Area	Limestone Coast	November 2013	Review in progress and due by the end of 2023.
Eastern Mount Lofty Ranges Prescribed Water Resources Area	Water Allocation Plan Eastern Mount Lofty Ranges	**Hills & Fleurieu** Murraylands and Riverland Northern and Yorke	December 2013	Review in progress
Musgrave Prescribed Wells Area Southern Basins Prescribed Wells Area	Water Allocation for Southern Basins and Musgrave Prescribed Wells Area	Eyre Peninsula	June 2016	Review due by 2026
Marne Saunders Prescribed Water Resources Area	The Water Allocation Plan for the Marne Saunders Prescribed Water Resources Area	**Murraylands & Riverland** Northern and Yorke	January 2010	Review due by 2029

**Status as of 31 March 2023*

Appendix B: Prescribed water resources



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