MINUTES of WATER ADVISORY COMMITTEE

Meeting No.5, Thursday 17 June 2021
Murray Bridge Office Board Room

Acknowledgement of Country

We acknowledge Aboriginal people as the First Peoples and Nations of the lands and water we live and work upon, and we pay our respects to their Elders past, present and emerging. We acknowledge and respect the deep spiritual connection and relationship that Aboriginal and Torres Strait Islander people have to Country

Present:

Members: Greg McCarron (Chair), Sheridan Alm*, Rosalie Auricht**,** Anne Jensen, Joanne Pfeiffer, David Zadow, Clem Mason

Board: Di Davidson

Staff: Andrew Meddle, Amy Goodman* and Courtney Rognli (minutes)

Visitor: Theresa Heneker (DEW, Principal Policy Officer)*, Tony Herbert (DEW, Manager – Environmental Water)

Apologies: Rick Hartman

* denotes attendance on Teams

Welcome, Agenda Check, Previous Meeting Minutes

- Chair welcomed the committee and acknowledged the First Nations people
- Chair thanked all for attendance.
- Agenda check – Joanne Pfeiffer identified that she is a part time commissioner for the ERD Court.
- Meeting 4 30th April – need to update the minutes under the Water Market item that DEW are initiating a water market project, and further information will be brought back to the WAC at a future meeting.

Presentation from Tony Herbert – See Attachment

- Tony provided an overview on the Environmental Water outcomes for 2020/21; the annual planning for 2021/22 – addressing different watering priorities; the planning process, how it works, who is involved/consulted, the details of scenarios, and delivery and operations for 2020/21 including the Southern Spring Flow 2020, Weir Pool level manipulation, Pike floodplain, Katarapko floodplain, Chowilla and wetlands.
- The spring pulse was an increase in the flow down the river – i.e. an extra 300 GL delivered to achieve a range of ecological outcomes throughout the River Murray system (see Attachment).
- Tracking of Lamprey had reported that they had travelled as far upstream as Mildura.

Key Points

- Planning is a constant process.
- Expectation for another spring pulse (new normal)
- Detailed assessment and integrated planning.

- Preparation for floodplain operations underway (*subject to approval*).
- Importance of unregulated flows (*E-water highly constrained*).
- E Water programs are underpinned by monitoring and reporting and informed by Traditional Owners, community and scientific advice.

Delivery Capacity – update from Theresa Heneker

- Since reporting to WAC in February 2021 the MDBA and DEW had undertaken a number of community consultation sessions on Delivery Capacity. The sessions provided useful feedback about community concerns, and highlighted the conflation of water availability issues with delivery capacity issues. This highlights the need to provide more information to people about the drivers for certain issues and what the options are to manage those issues.
- DEW is about to start the Water Market consultancy which will cover feedback from water users around water availability for permanent plantings as well as deliverability, carryover and potential impacts on SDL compliance.
- DEW is continuing to work on developing a SA shortfall management plan. The plan is likely to include at a three-tier strategy.
    - Tier one focuses on the unallocated 'buffer' within SAs entitlement
    - Tier two considers delaying delivery of water to users that have material storage options
    - Tier three is a general restriction for other users
- It is important the shortfall plan maps out what options would be implemented under different scenarios. DEW is considering engaging a consultant to facilitate the discussion on the shortfall management plan, and to help gather options.
- In the information sessions there were general comments about "if delivery shortfall is such a low risk, why can't government manage it without impacting irrigators". The response is that while the risk is low, it needs to be discussed and managed. This is particularly important to ensure consistency with other jurisdictions. Need to be working with other states to ensure there is action in other states to manage the increasing risks to delivery capacity – SA needs to have a plan in place to demonstrate that we are taking action. In developing the shortfall management plan there has been discussion about developing 'straw people' to help visualise the options. Theresa is seeking ideas from the WAC about what options could be fleshed out in the shortfall management plan.
- Capacity policy working group – currently Theresa is the SA rep on this group.
- Theresa sought WAC advice on the development of options.

The following feedback was provided by the WAC members

- Options needed to be consistent with risk and able to be implemented administrative, legally and practically.
- Improved water use data would assist with modelling and compliance and this would be supported by departmental meter readers. In time the move to metering telemetry would be important.
- To enforce compliance consider tougher penalties e.g. loss of site use approval
- Consider options based on diversion points type and location (i.e. irrigators, urban water, wetlands, domestic etc.) – mapping will assist in developing scenarios based on these diversion points.
- Irrigation Trusts supply a range of customers including domestic and unplanned shuts downs for any period would be a problem. Current planned shut downs occur during winter months.
- The planning around system shutdowns includes promoting on-farm storage options.
- What level of detail will inter-jurisdictions be looking for in the shortfall management plan – current position is that our plan would need to mirror what we would expect the other jurisdictions to be doing i.e. we would want to know what their options are, how they will implement them, and what penalties might be in place for non-compliance.

Key Points

- SA needs a comprehensive plan that is consistent with other jurisdictions, where risks will be higher than in SA.
- Expect that risk is SA would be higher in the March/April period
- Options must be able to be implemented administratively, legally and practically.
- DEW Water Markets Project will include the Delivery Capacity issue
- Clear and consistent compliance is important for effective implementation.
- Management within Irrigation Trusts will be more complex.
- DEW is open to considering options and welcomes feedback from WAC members

Action: Theresa to provide dot points on draft options/requirements to assist the WAC frame their thinking and feedback.

SA's Water Security Statement

- Greg McCarron brought to the attention of the WAC the release by the SA Government of the Water Security Statement 2021 for public consultation.

Key Points

- The promotion of the Statement and its consultation had missed many in the community including commodity groups.
- The document focussed on reconfirming current scenarios but needs to consider changed water inflows and model scenarios for future availability. What about future risks to water security.
- Future Statements should include water deliverability as well as water security.

Action: Add the Water Security Statement on the WAC forward agenda/work-plan.

OTHER BUSINESS

WAC Board Advice:

- Board meetings include committees reports provided through committee minutes circulated to Board members as well as supported by verbal updates during Board meetings.
- Topics of interest to the WAC should be supported by Board staff to document the WAC views to ensure appropriate reporting to the Board.
- There is no expectation that WAC members are required to prepare briefing papers to facilitate Board communication.
- Minutes will need to include Key Points for Board information.
- Develop a work-plan and allocate time to workshop the emerging/priority issues for the WAC as an improved approach.

Action: add Anne Jensen's paper on issues related to e-watering to the July WAC meeting agenda.

Emerging issues for the WAC:

- Issues related to e-watering
- Full and on-time implementation of the Murray-Darling Basin Plan.
- Water delivery capacity.
- Water literacy program.
- Mallee and PSR Water Allocation Plans.

Action: Amy to facilitate the development of a work-program for the WAC.

Noora Disposal Basin Impacts – Sheridan Alm – see Attachment

- WAC were asked to note an article in the Murray River Pioneer on Wednesday June 16 regarding the Frahn family.
- Concerns that seepage is getting worse, and is being exacerbated by the operation of the disposal basin.
- Frahn's farm borders Noora Basin Salt Interception Scheme (east of Loxton).
- When it was first purchased in 1999, it had three dry salt scalds, it now has five salt pans, three of which have been filled with water for the last 10 years.
- The Frahn's have planted over 35,000 trees in the past 22 years, 10,000 of which directly around the salt pans, to try and stop the seepage.
- Noora Basin, commissioned in 1982, was originally identified as a suitable location due to its low elevation, and because groundwater naturally discharges into the area.
- The Frahn's have sought compensation from State Government, are frustrated by the ongoing process.
- State Government spokesperson has acknowledged the ongoing issue in a statement: "The State Government is aware of the request by the Frahn's, and is continuing to consider its position".
- The statement also goes on to detail the importance of the Basin, and the Interception Scheme, and mentions previous discussions held with neighbouring landholders early on.

Action: Circulate the Murray Pioneer articles on Frahn's property to WAC members

Feedback on Water Calculator – Anne Jensen

- Anne Jensen advised that she had used the new DEW water calculator and felt that it was unclear in its use of terms 'extremely dry' and 'very dry' as the results appeared to be inverse to what she had expected and asked this advice to be passed onto DEW.

Water Availability – Anne Jensen

Action: add emerging information about future water availability scenarios and long-term flow scenarios to the next committee meeting agenda.

Water Efficiency Program – Andrew Meddle

- The Board has been running a program as a service provider to the Australian Government as part of the 450GL water recovery. Over the past 12 months there had been significant delays related to this program. However Andrew was pleased to report that recent changes had seen processing of approvals with a number of projects now approved.

Plantings around the Lakes – Clem Mason

- Work was undertaken on reed planting around the Lower Lakes during the Millennium Drought and has proven to be an effective erosion control method. However this project has dropped away in recent years. This project needs to be finished. This is a great partnership with the Ngarrindjeri Aboriginal Corporation.

MEETING CONCLUSION

Key points from the WAC for advice to the Board:

- The Board should raise with DEW that the availability of accurate and timely water use information is important including for implementation of actions under the water shortfall program. That use of telemetry and consideration of the reintroduction of meter reading by DEW should be considered to ensure that it can be regularly and reliably collected and analysed.

- The Board should provide advice back to DEW that the promotion of the release of the Water Security Statement could have been better to ensure commodity groups adequate time for considered feedback.
- At their July meeting the WAC will be considering what advice should be provided back to the Board on the issues related to environmental water.
- Highlight the issues arising at the Frahn's property near Noora Basin and the WAC's observation that this family might not be getting an appropriate level of engagement from DEW.

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Greg McCarron
Chair
Water Advisory Committee

ACTION ITEMS

No.	Meeting No.	Action	Due Date	Responsibility	Status
1	4	DEW to come to a future meeting to provide an update/seek feedback on the Water Shortfall Plan	June meeting	Theresa Heneker	Completed
2	4	Committee to seek an additional member with knowledge on Mallee groundwater	ASAP	All	On-going
3	2	Investigate whether First Nations are willing to provide the Committee with a copy of their Water Plan		Lyz Rigby	In-hand
4	2	MDBA to provide information on what occurs when SDL offset projects are not completed.		Deana	On-going
5	4	Invite the Minister to a future Water Advisory Committee meeting		Board Chair	In-hand
6	5	Provide WAC members dot points on draft options/requirements in respect water shortfall planning.	July	Theresa Heneker	
7	5	Add the Water Security Statement on the WAC forward agenda/work-plan.		Amy Goodman	
8	5	Add E-water Paper to the July WAC meeting agenda	July	Amy Goodman	
9	5	Facilitate the development of a work-program for the WAC.		Amy Goodman	
10	5	Circulate the Murray Pioneer articles on Frahn's property to WAC members	ASAP		Completed
11	5	Add emerging information about future water availability scenarios and long-term flow scenarios to the next committee meeting agenda	July	Amy Goodman	

Australian Government
Commonwealth Environmental Water Office

Southern Spring Flow 2019

Healthy rivers are vital for community wellbeing, agriculture and our native plants and animals.

As dry conditions continue across the Murray–Darling Basin, water managers are working together to keep the river system healthy.

During winter and spring, water for the environment will add to flows in the Murray River to help provide food for fish and give native plants a drink.

By flushing out leaf litter in the cooler months, the flows aim to reduce the risk of blackwater events, and associated fish deaths, in the summer.

It's important to deliver the flows before it is too late to make a difference.

The flows will provide social and economic benefits for communities along the full length of the river through improved water quality and amenity.

Key facts

The flows will travel over 2000 kilometres from Hume Dam in New South Wales to the Coorong in South Australia.

Two flows are planned:

- A short pulse in August (about 2 weeks) to improve fish, plant and animal health.
- A longer flow (at least 6 weeks) from September will increase food and shelter for wildlife before breeding season, and give some wetlands a much needed drink. This flow will link up with planned environmental flows from the Goulburn River.

Environmental water holders have about 400 gigalitres of water available (carried over from last year). The amount of water used will depend on a range of factors including natural flows and deliveries down the river for other users.

Water for the environment will be added to existing river flows to achieve a targeted peak flow downstream of Yarrawonga of up to 15,000 megalitres/day.

We will work with communities and experts to closely monitor the benefits of the flow to the environment.

WAT435.0719

Why is the water being released?

Even in dry times like we are currently experiencing, natural flows would have replenished the Murray River each year with fresh food and nutrients as they flowed through low lying wetlands, creeks and river red gum forests.

Today the rivers are highly modified, with water captured in dams and weirs. This has decreased the size and variability of natural flows in winter and spring, and interrupted the triggers plants and animals rely on to survive, feed and breed.

Timely release of water is critical to restoring these triggers and help native fish and wetland refuges better cope with the forecast dry conditions.

The need for water varies along the Murray River. Some sites, such as Barmah-Millewa Forest and the Coorong, need water every year.

The Koondrook-Perricoota Forest missed out on water in previous years and is showing signs of stress.

Some areas, such as Gunbower Forest, Hattah Lakes and Chowilla Floodplain, will undergo natural drying phases. In these areas, only discrete wetlands will receive water from the Southern Spring Flow to provide critical refuges for animals to survive the drought.

Sampling at Bunyip Waterhole, Barmah Forest (photo: K. Ward)

Barmah Forest, October 2017 (photo: CEWO)

Who's involved?

The flow is a joint action by the:

- Commonwealth Environmental Water Holder
- Victorian Environmental Water Holder
- NSW Department of Planning, Industry and Environment
- SA Department for Environment and Water
- Murray-Darling Basin Authority as manager of The Living Murray.

The flows are being delivered in close collaboration with river operators and local site managers.

Want to know more?

- Find regular flow updates on the **CEWO's website**: www.environment.gov.au/water/cewo
- **Email**: ewater@environment.gov.au
- **Follow us on Twitter**: @thecewh

Community drop-in information sessions will be held along the Murray River over the coming months.

For details, contact your nearest Local Engagement Officer:

- Anthony Wilson (Albury) 0419 188 430
- Richard Mintern (Mildura) 0437 218 649
- Michelle Campbell (Berri) 0437 064 664

2021/22 Water for the Environment Planning

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I would like to acknowledge the traditional owners of the land on which we meet today and of the lands of the Murray-Darling Basin, and pay my respects to their Elders past and present and extend that respect to other Aboriginal and Torres Strait Islander people who are present today.

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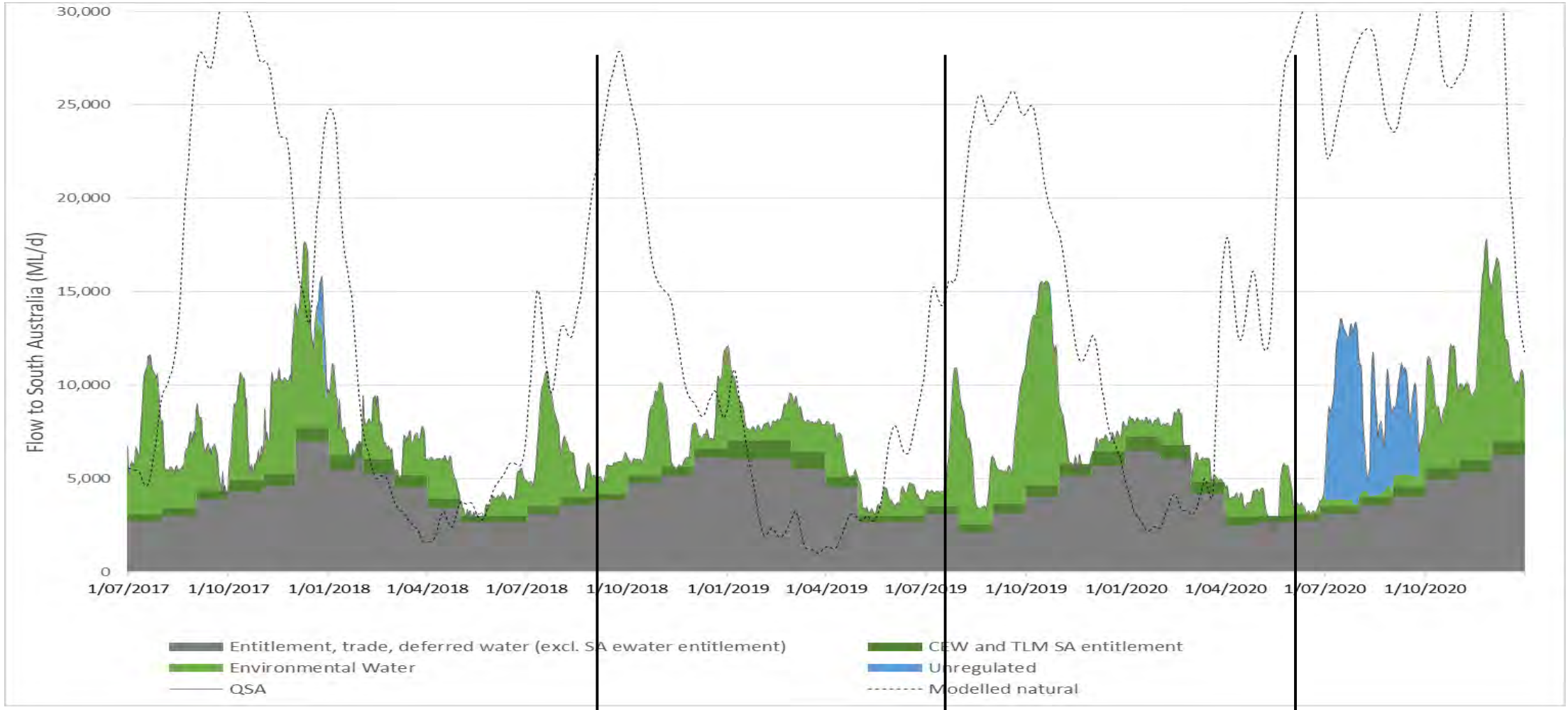
Content

- Outcomes from 2020-21
- Planning process
- Annual planning 2021-22 – watering priorities
- Delivery and operations 2020-21

Delivery Profile – Flow to SA 2017- 2021



- Approx 900 GL in 2020-21
- Living Murray and Commonwealth Environmental Water Holder

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Pulse outcomes 2020/21

- Spring pulse
  - Larger and later than 2019 – 18,000 ML/day
  - Delivery remains constrained
  - Better aligned to flow cued fish and LLCMM needs
  - Increase in channel productivity
- Fish responses – variable
  - Golden & Silver Perch eggs – local spawning?
  - Silver Perch larvae
  - YoY ??
  - Cod – less than previous
- Importance of magnitude, timing & duration
- Benefits of small improvements (extra water) to flow

Southern Spring Flow 2020

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SA Outcomes –weir pools

Weir Pools

- Lock 5 raised up to 46cm and Lock 4 raised to 34cm for in conjunction with floodplain ops.
  - Timing varied to coincide with pulse flows
- Minor weir pool lowering late Nov to Dec in Locks 1, 2 and 4 to support silver perch larvae and boost larval drift.
- Raising at Lock 4 resulted in good conditions for a Murray Hardyhead recruitment (Gurra Lakes) now supporting a large population.

Photo provided by Nathan Creeper, DEW

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SA Outcomes 2020/21 - LLCMM

- Winter unregulated flow - lamprey migration
- Southern spring pulse extended period of high lake levels and flows to the Coorong into January 2021
  - Recruitment of southern pygmy perch and Murray hardyhead
  - Improved habitat in Coorong North Lagoon (lower salinity, increased invertebrates, estuarine fish)
  - No evidence (yet) of black bream recruitment in the Coorong
  - Improved Ruppia germination and flowering – less algae in sth more in nth
- Summer/autumn delivery - all fishways operated and lake levels ~0.60 m AHD
  - YOY congolli and common galaxias migrating upstream
  - Maintained sthn pygmy perch & Murray hh wetland habitat

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4
5
6

SA Outcomes 2020/21 – Pike Floodplain

- First operation of new Pike regulator (raised 0.7m) and 46 cm raising at Lock 5.
- Inundated approximately 500 hectares of the Pike floodplain and 1,000 ha along the Lock 5 River reach.
- Strong response from vegetation, waterbirds (27 spp), and frogs including Southern bell frogs at 12 sites.


2020-11-27
Sentinel and Landsat imagery in your GIS

SA Outcomes 2020/21- Katarapko floodplain

- First operation of new Katarapko regulators. The Splash regulator raised by 2.8 m and 30 cm raising of Lock 4.
- Inundated approximately 550 hectares of the Katarapko floodplain and along the Lock 4 River reach.
- Marked response from vegetation, waterbirds (34 spp including 3 vulnerable species), and 5 species of frogs calling in high numbers.

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SA Outcomes 2020/21- Chowilla

- Pumped delivery to 5 wetland sites in spring/early summer and autumn (Lake Limbra pumping still underway). Total volume ~ 7 GL
  - Strong responses from aquatic, understorey and long-lived vegetation
  - Six frog species recorded across the sites. High abundances. The Southern Bell Frog (Vulnerable, EPBC Act) was heard at all sites.
  - A notable response by wetland and woodland birds.

- 3000+ waterbirds at Gum Flat and Lake Limbra.

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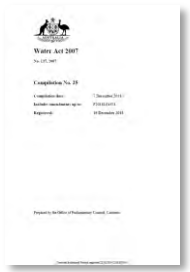
SA Outcomes 2020/21- Wetlands

- Over 90 sites actively managed
  - Pumped wetlands
  - Gravity (pool connected) wetlands
  - Variety of managers and partners involved
    - Landscape Board
    - NFSA
    - RIT *et al.*
  - Strong responses from aquatic, understorey and long-lived vegetation, water birds and frogs

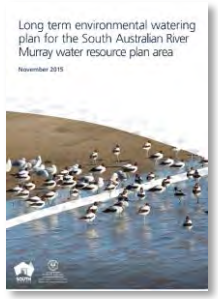
Environmental Water Planning



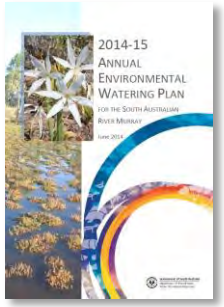
Water Act 2007
Commonwealth Government

Murray Darling Basin Plan
Murray Darling Basin Authority

Basin-wide env watering strategy
Murray Darling Basin Authority



Long-Term Env Watering Plan SA River Murray
SA DEW



Annual SA River Murray Env-Water Plan *and* **SA Annual Env Watering Priorities**
SA DEW

Commonwealth Environmental Water Holder (CEWH)
+
Southern Connected Basin Environmental Watering Committee (SCBEWC) incl. The Living Murray (TLM)

Watering Proposals

1. River Murray Channel
2. Wetlands
3. Chowilla Floodplain & L6
4. Pike Floodplain & L5
5. Katarapko Floodplain & L4
6. Weir Raising/lowering
7. Coorong, Lower Lakes

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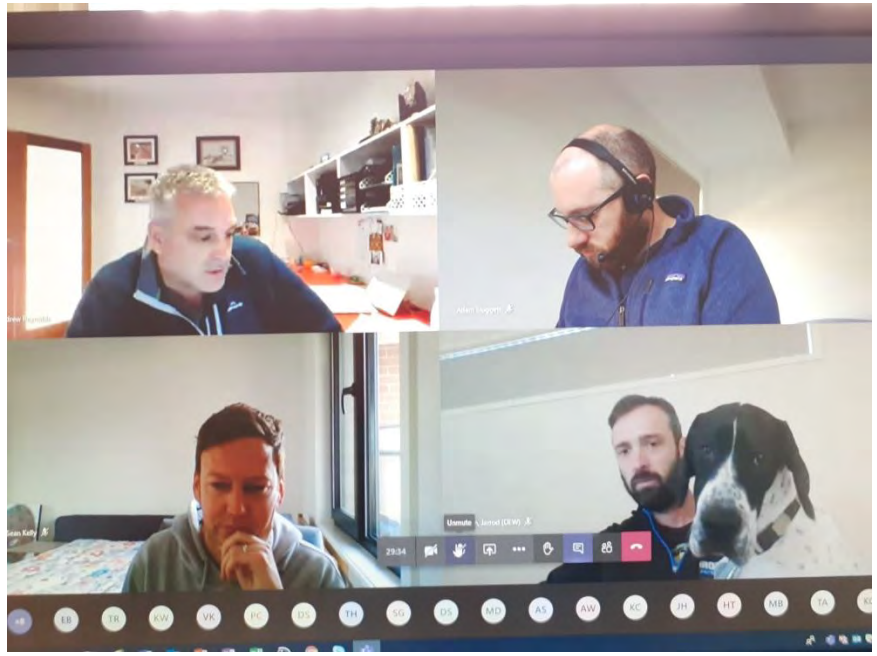
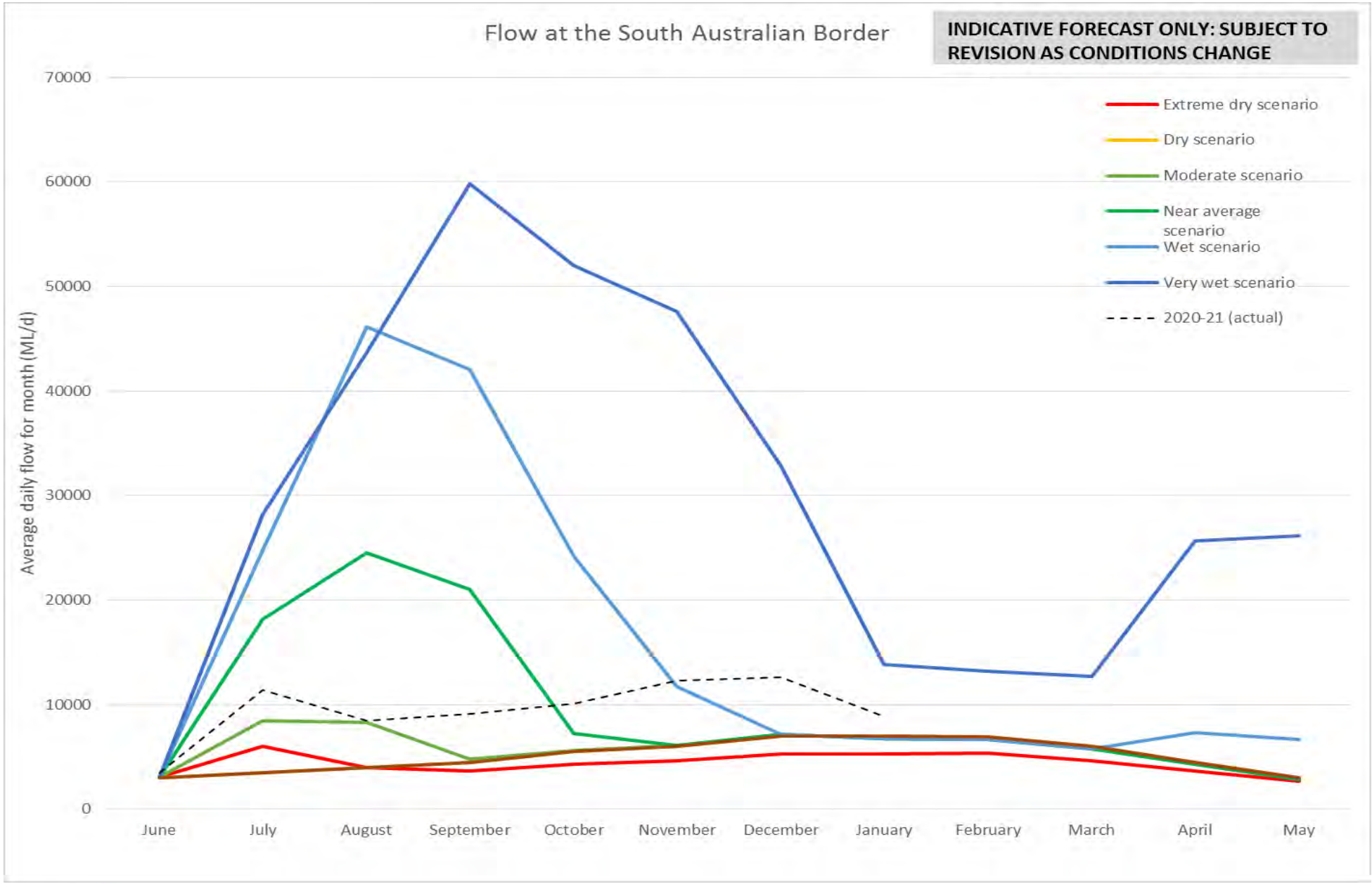
Planning Approach

- Scenario based
  - Water availability
  - Watering history
  - Site conditions
  - Science and community consultation
  - Traditional Owners consultation
  - Modelling & assessment of risk/benefit
  - Local and basin scale
- MDBA coordination
  - Whole of Sthn basin approach
  - Water holders shared planning but independent decisions



E-water Planning Scenarios for 2020/21



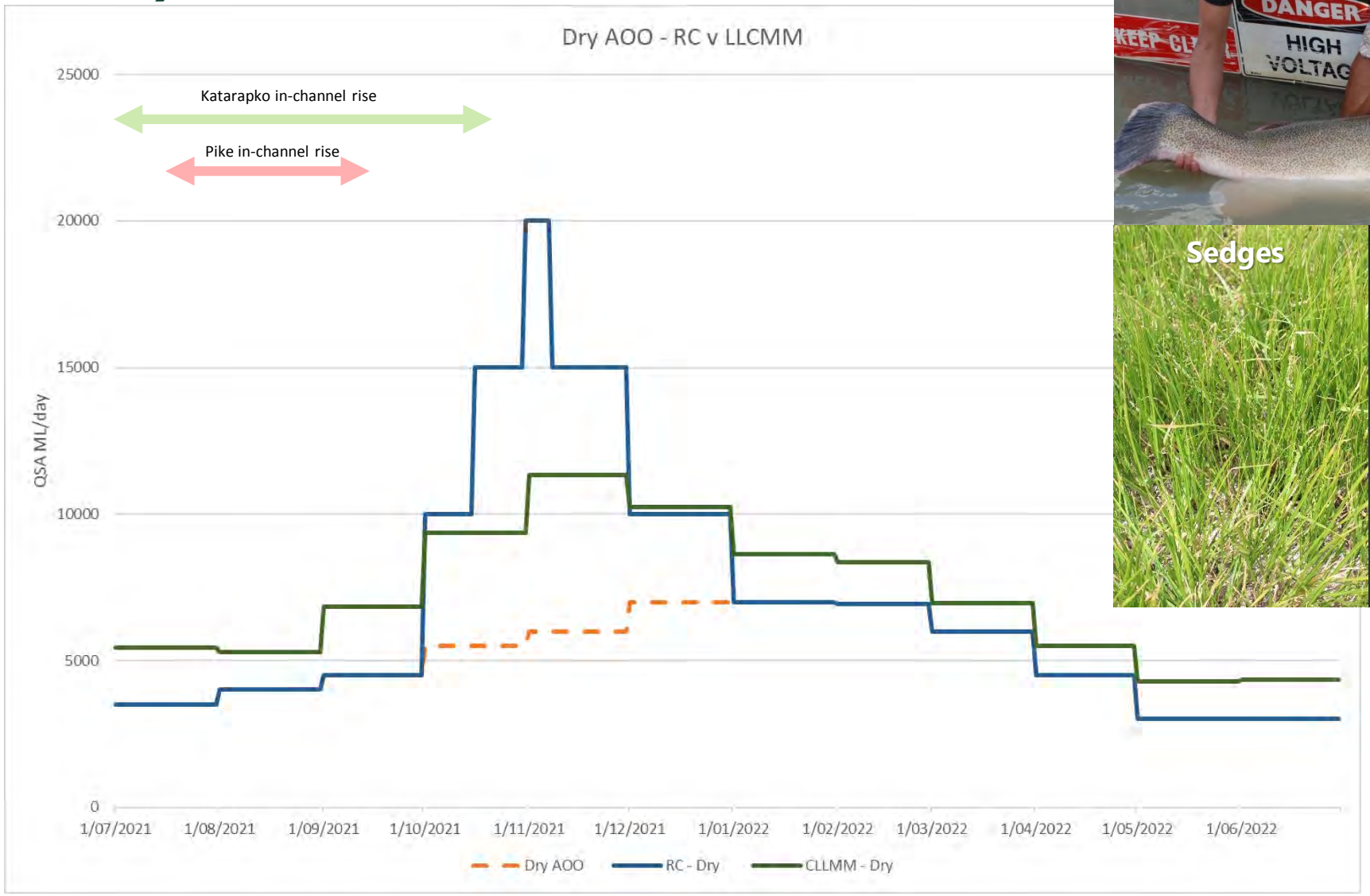
Key planning considerations

- Alignment for efficiency of watering actions
  - Development of a “multi-site” proposal
- Assessment of risks and potential benefits
- Inundation vs in channel hydraulics
  - Timing of operations to avoid in channel pulses

Scenario Planning – Chowilla example

Water Resource Availability Scenario	Potential 2021/22 Chowilla Watering Actions
Dry	Potential pumping to up to 12 priority wetland sites Manage inflows via Pipeclay Ck and Slaney Ck Weirs to optimise flows
Moderate	Potential pumping to up to 12 priority wetland sites Low-mid level inundation up to 19.1m AHD Jul-Nov (options) Weir pool 6: +0.6m (19.85m AHD)
Near Average	Med-high level inundation up to 19.6m AHD Jul-Nov Weir pool 6: +0.6m (19.85m AHD)
Wet	High level inundation up to max extent 19.85m AHD Jul-Dec Weir pool 6: +0.6m (19.85m AHD)

Dry (90%)



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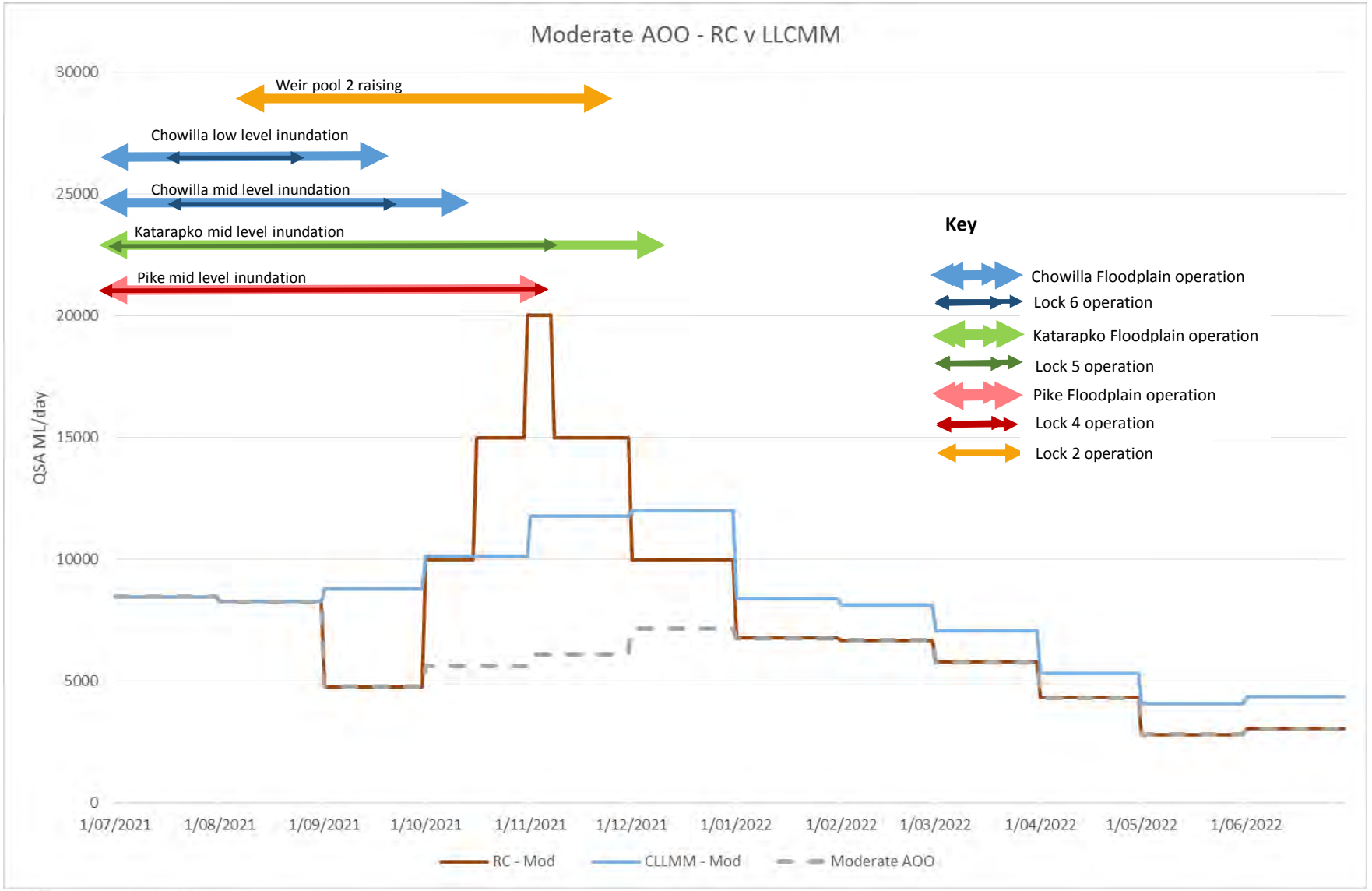
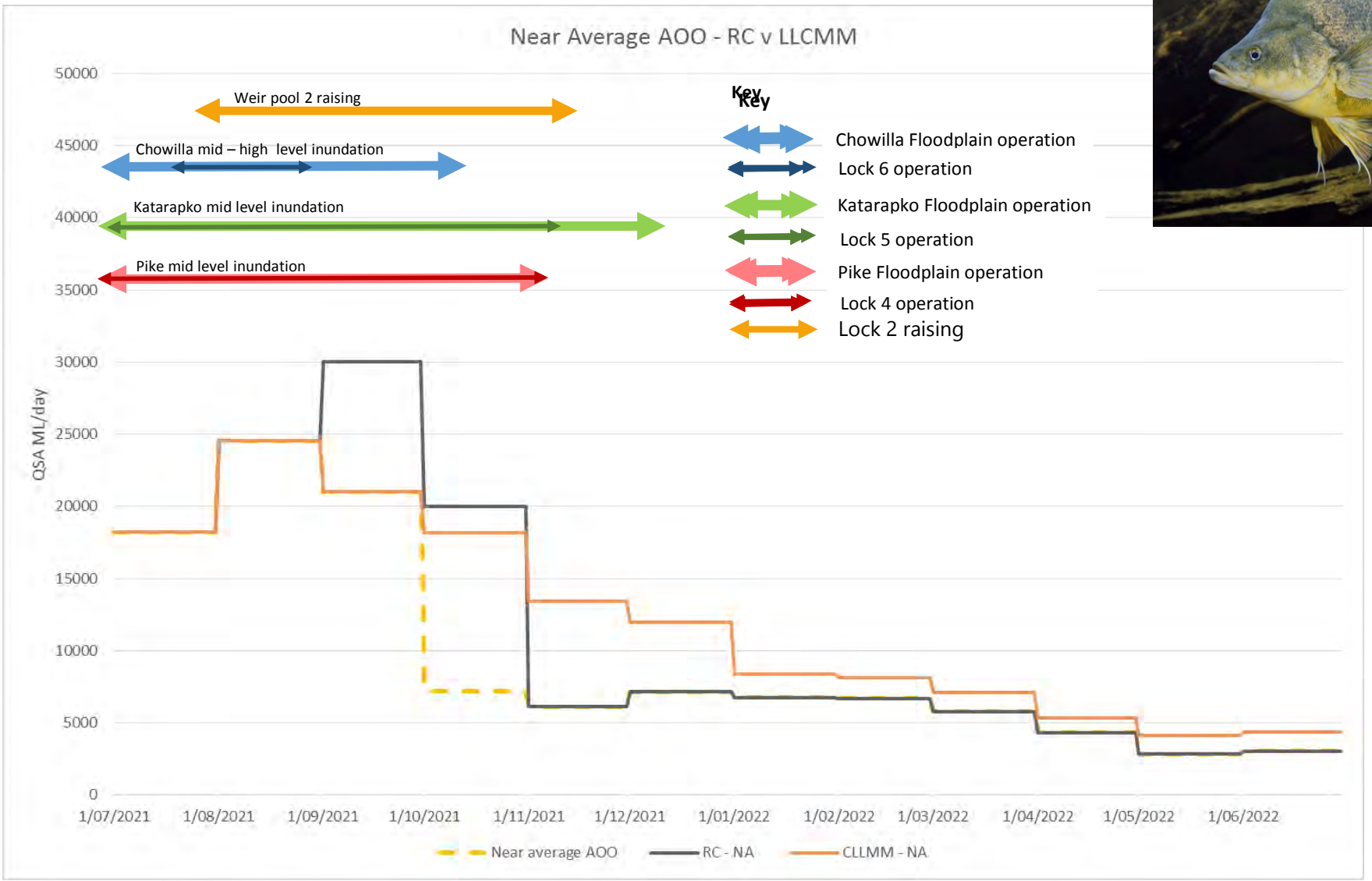
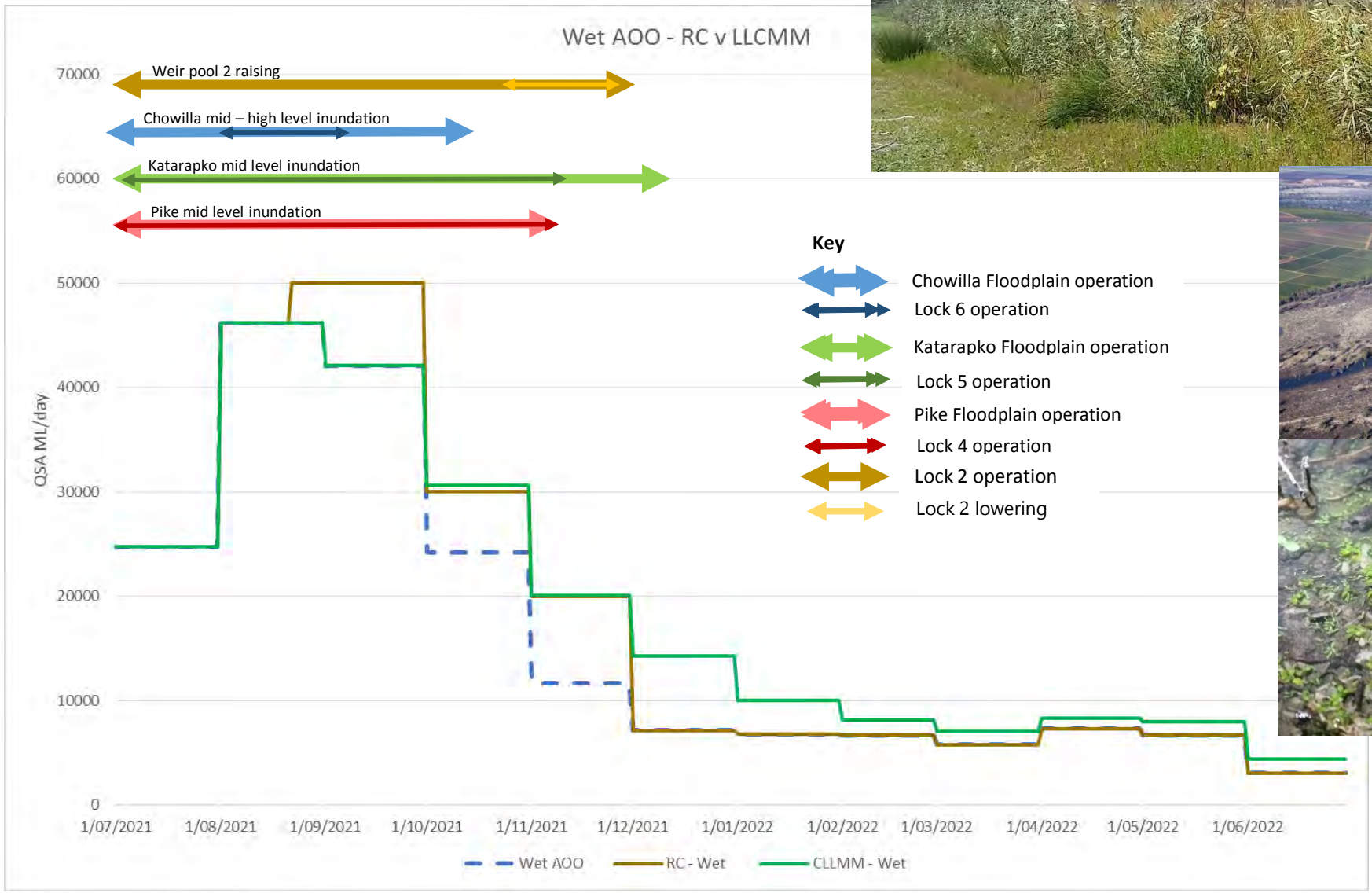
Moderate (75%)


Moderate AOO - RC v LLCMM
Weir pool 2 raising
Chowilla low level inundation
Chowilla mid level inundation
Katarapko mid level inundation
Pike mid level inundation
Key
Chowilla Floodplain operation
Lock 6 operation
Katarapko Floodplain operation
Lock 5 operation
Pike Floodplain operation
Lock 4 operation
Lock 2 operation
QSA ML/day
30000
25000
20000
15000
10000
5000
0
1/07/2021
1/08/2021
1/09/2021
1/10/2021
1/11/2021
1/12/2021
1/01/2022
1/02/2022
1/03/2022
1/04/2022
1/05/2022
1/06/2022
RC - Mod
CLLMM - Mod
Moderate AOO

Near average (50%)



Wet (25%)


Wet AOO - RC v LLCMM
70000
60000
50000
40000
30000
20000
10000
0
QSA ML/day
Weir pool 2 raising
Chowilla mid – high level inundation
Katarapko mid level inundation
Pike mid level inundation
Key
Chowilla Floodplain operation
Lock 6 operation
Katarapko Floodplain operation
Lock 5 operation
Pike Floodplain operation
Lock 4 operation
Lock 2 operation
Lock 2 lowering
1/07/2021
1/08/2021
1/09/2021
1/10/2021
1/11/2021
1/12/2021
1/01/2022
1/02/2022
1/03/2022
1/04/2022
1/05/2022
1/06/2022
Wet AOO
RC - Wet
CLLMM - Wet

Real time planning & operations

- Scenarios never perfect - but prepared for a range of conditions
- Real time event planning as actual flows to SA are different, eg unregulated flows arrive sooner or later than AOO
- Additional modelling based on current forecasts
- Operations working groups
  - Sthn Basin
  - Barrage ops
  - Floodplain ops

Summary

- Planning is in progress - constantly
- Expectation for another spring pulse (new normal)
- Detailed assessment & integrated planning
- Preparation for floodplain ops underway
  - Subject to approval
- Importance of unregulated flows
  - E-water highly constrained
- Underpinned by monitoring and reporting
- Informed by TO, community and scientific advice

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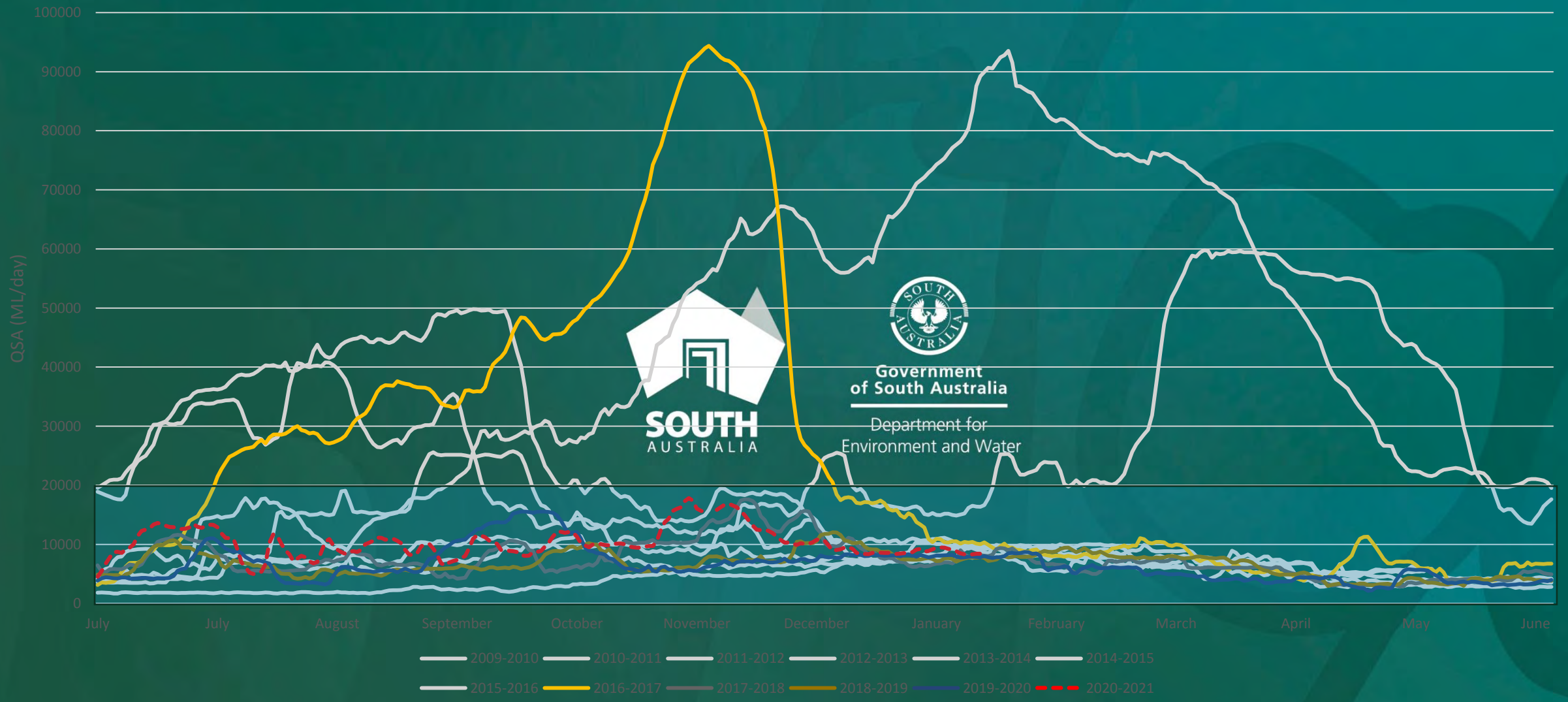
QSA since 2009 – highlighting last 5 years



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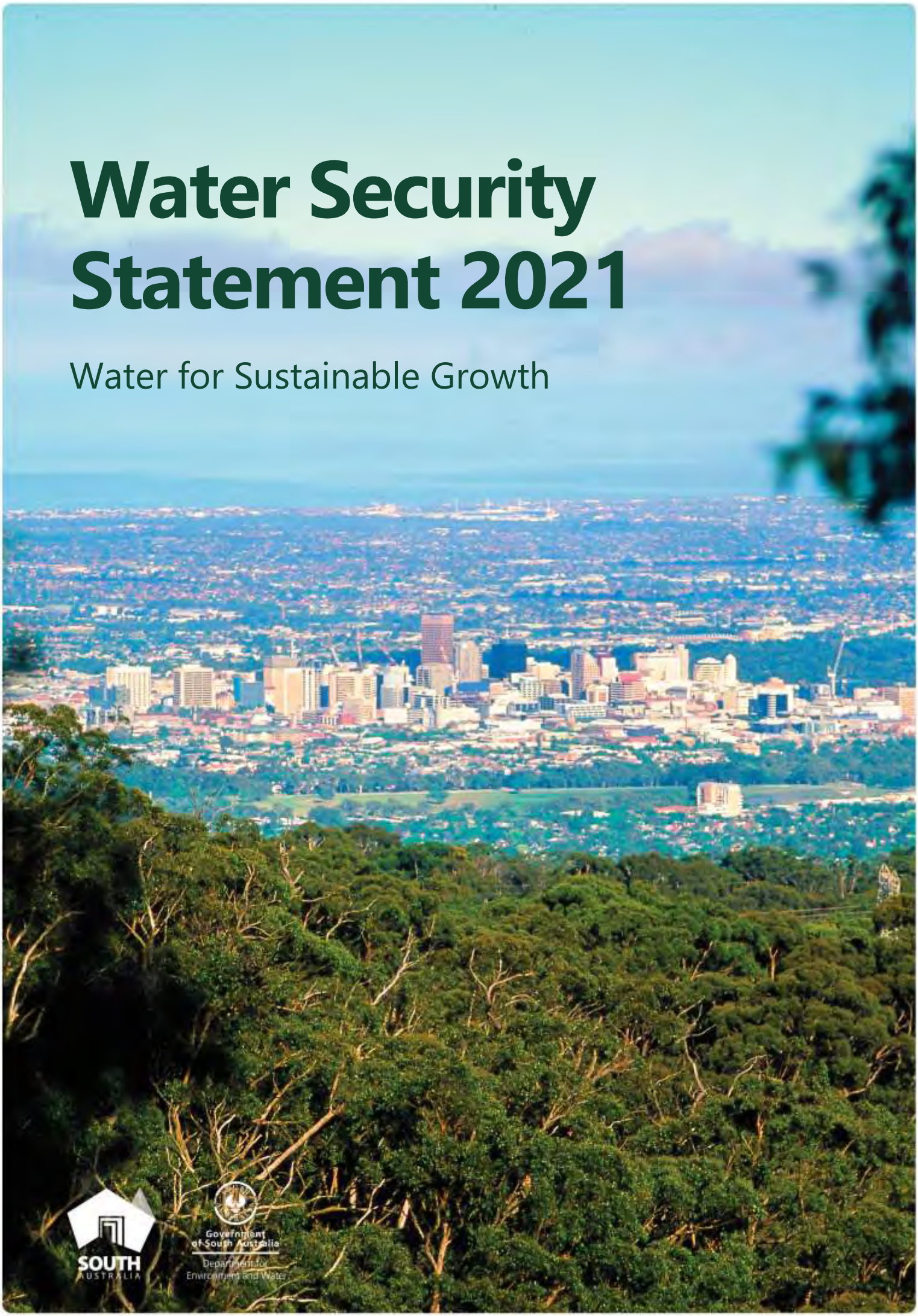
Water Security Statement 2021

Water for Sustainable Growth



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Contents

Executive summary

Water security is about having an acceptable quantity and quality of water for people, communities, industry and the environment that is affordable now and into the future. This is an essential element of sustainable economic growth underpinning all sectors of South Australia's $110 billion economy.

This Water Security Statement provides an overview of water security status for key population centres and water resources across South Australia. While challenges remain in some remote areas, the water-related investments and reforms undertaken across the state over the last decade have provided high levels of water security for the vast majority of the state's population, as compared with the Millennium Drought.

Key recent investments and developments outlined in this statement include:

- improving water affordability by reducing SA Water's rates for South Australian families and businesses
- $138 million for desalination plants on the Eyre Peninsula and Kangaroo Island
- $41 million in remote community water supply upgrades for regional areas including Yunta, Oodnadatta, Maree, Terowie, Marla, and Manna Hill
- $7.9 million to support water services in Aboriginal communities
- $14.7 million of investment in South Australia's water licensing system to enhance users' experience and support more efficient water markets
- investment in innovative water recycling projects, such as the Northern Adelaide and McLaren Vale irrigation systems, to expand recycled water use for horticulture
- locking in a 50 GL improvement in dry year water availability for South Australian River Murray irrigators, by increasing Adelaide's reliance on its other sources, including desalination
- negotiating increased flexibility for SA Water's River Murray license for Adelaide, allowing desalination production to support the trade of water to other River Murray water users
- amending water allocation reductions in the Lower Limestone Coast based on updated science and assessment of risks
- construction of floodplain infrastructure in the Riverland to enable natural flooding to improve floodplain health.

The key challenge now is to build on the state's strong legacy of water investment and reform to grow the South Australian economy in a sustainable way. This Water Security Statement includes ten strategic actions to further enhance water security and meet the state's growth targets, while adapting to a changing climate.

Central to this will be a renewed focus on water security planning, as well as on driving innovation and competition in the water sector and water-dependent industries.

The state government is proposing to work with stakeholders to develop highly targeted water security strategies for those industries or regions where potential water demands are at risk of exceeding available supplies. These strategies will build on traditional water allocation planning processes and link fit-for-purpose water supplies with existing and emerging water demands to support economic growth. In the first instance, this more targeted approach will be trialled in the Barossa Valley and McLaren Vale, where discussions have begun with stakeholders about pathways for adopting new or augmented supplies to meet emerging demands and address climate risk.

As part of a $5.6 million Water and Infrastructure Corridors initiative, the government is also working with the mining and energy sectors to address groundwater knowledge gaps and establish multi-use infrastructure delivery corridors (water, power, transport, communications) in regional South Australia. In addition to supporting further expansion in mining and energy, this work is expected benefit other regional industries and communities.

Noting that Adelaide and the state's major regional centres already have high levels of water security, the government is also proposing to lead a more integrated approach to urban water management. This reflects a view that more can be done to optimise the use of all urban water sources across the state – in a way that supports growth, greening and liveable towns and cities, more efficient water use, as well as the release of water for productive use outside of urban areas.

It is proposed that the next review and update of this Water Security Statement would coincide with the consideration of SA Water's draft Regulatory Business Proposal for the 2024-28 regulatory period. As such, the actions in this statement are the government's overarching water security priorities for the current four year regulatory period, out to 1 July 2024.

Introduction

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

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

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

The statement includes:

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

What is water security?

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

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

Why we need to consider water security

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

Despite some promising rainfall in 2020, Australia and South Australia have experienced a prolonged period of abnormally dry weather over the last few years (BoM, 2020a), which has seen the emergence of a number of water security challenges that the state government is working with local partners to address. Actions being undertaken to address these priorities are detailed in this statement.

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

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

Water security collaboration with Israel

Israel, located on the eastern edge of the Mediterranean Sea in the Middle East, has a semi-arid climate with few sources of water. South Australia shares many similarities with Israel, particularly in regard to climate, significant evaporative losses and water scarcity. Through these challenging conditions, both have a long history of innovation and ingenuity, and are considered leaders in the management of limited water resources in harsh, dry climates. This includes leading the adoption of alternative water practices, such as wastewater recycling and third-wave irrigation efficiencies.

In Israel, water has traditionally been sourced from a combination of groundwater and surface water with more than two-thirds of the available water originating underground. More recently sewerage purification (indirect potable wastewater re-use), floodwater capture in dams (stormwater harvesting), water conservation, rainwater harvesting and desalination have provided alternate water supplies. In most years, nearly half of the country's water supply comes from these alternate water sources. However, challenges still exist, such as ensuring that water quality appropriate for a given end use can be provided, and that the by-products from alternate water supplies, such as hypersaline brine from desalination and sludge from wastewater recycling processes, can be appropriately managed.

With a land mass 1/40th the size of South Australia and a population five times larger, Israel has invested significant resources and effort to balance environmental requirements, water scarcity, increasing demands for domestic use, considerable industrial growth and economic development. Water legislation mandates that all water in Israel is owned by the state and that pricing reflects the actual cost to ensure effective water use. Policies and regulations support the legislative approach to water management and are a catalyst for innovation in the water industry. International standards for water quality and management are also a major driving force in the development of the water industry. Work continues to refine and upgrade regulations and standards to ensure they are based on strong policies underpinned by sound scientific knowledge.

While both South Australia and Israel are effectively managing the available water for security now and into the future, significant opportunities exist to work collaboratively to share innovation, continue to learn and further develop technologies to maximise the potential of water available. With this is mind, the South Australian Government and the Israeli Government signed a Memorandum of Understanding in May 2020 to formalise collaborative arrangements designed to bring together businesses and researchers to further develop technology, approaches and market pathways that provide benefits to both signing governments.

Many other nations are actively investing in their water capabilities to respond to climate change related water impacts. The water industry is becoming one of the fastest growing sectors worldwide and there is the opportunity for South Australia to further establish itself as a world leader in water management. The government continues to work actively across the South Australian water sector to enable new pathways for growth and to form new collaborative partnerships locally and internationally. This work aims to both capture a greater share of the rapidly expanding global market and to ensure the necessary capacity within the state to respond to future challenges.

Growth in a changing climate: We are experiencing hotter and drier conditions as a result of a changing climate (DEW, 2018). Long term projections indicate these trends are likely to continue. It is important that our water resource management accounts for these trends to ensure that we can maintain our water security and support economic growth into the future.

Changes in South Australia's climate

South Australia is becoming hotter and drier, with an increased risk of more frequent and intense heatwaves, bushfires, storms, and floods. 2019 was both the warmest and driest year on record for Australia (BoM 2019). For South Australia, the overall mean temperature was 1.45 °C above average, making it the state's second-warmest year on record. Rainfall for South Australia was 65 per cent below average in 2019, the state's driest year on record. There has been a persistent decline in rainfall in the state's southern agricultural areas. In 2019, large areas of the South Australian pastoral districts received less than 30 mm.

Current projections of the impact of climate change indicate rainfall will continue to decline in most parts of the state and that availability from both surface and groundwater resources in South Australia is likely to decline. Projections developed by the Commonwealth Scientific and Industrial Research Organisation and Bureau of Meteorology for the Murray-Darling Basin indicate that average temperatures will continue to increase in all seasons, more hot days and warm spells are likely, and by late this century winter rainfall will decrease. Changes in temperature and rainfall will likely result in both increases in water demand and reductions in supply.

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

Who is responsible for water security?

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

Figure 1 provides an overview of the relevant legislation and responsibilities in relation to the provision of water security in South Australia.

From a water resource management perspective, the primary responsibility of the South Australian government is to establish and enforce transparent rules based on knowledge of water resources, which ensures sustainable water management and that water available for consumptive use is shared equitably, and its economic potential is maximised. Knowledge of water resources is based on hydrological and ecological science and extensive monitoring. The *Landscape South Australia Act 2019* provides the framework for the management of the state's water resources.

For areas that are prescribed[1] across the state, a licensing system is in place to make sure water is used within sustainable limits set out by a water allocation plan. The water licensing system allows an individual or business to own water entitlements, which provide a share of the available water resource. Volumes may be traded allowing water to move to where it can be used most productively. It is the responsibility of an individual or business to ensure they own sufficient entitlements to meet their water needs, within the framework set by the relevant water allocation plan.

Most businesses' and individuals' water requirements are met by a water retailer. Retailers provide potable water services to 770,000 households and businesses across the state, with SA Water providing services to 99 per cent of those customers. Potable water is required to meet the requirements of the *Safe Drinking Water Act 2011*, while the *Water*

[1] Prescription means the water resource must be sustainably managed to provide security for all water users, now and into the future.

Industry Act 2012 governs all water industry retailers. Water retailers may source their bulk water from allocations they are entitled to receive from water resources or from an independent source of water, such as a desalination plant.

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

Delivering affordable water to South Australians

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

Why a water security statement?

The state government adopted Water for Good in 2009 as the state's overarching water security strategy. Without question, the key investments and actions outlined in Water for Good (Government of South Australia, 2009)[2] placed South Australia in a much stronger position in terms of water security, as compared to the position prior to the Millennium Drought.

More than ten years on, this Water Security Statement takes a forward-looking approach and provides the first statewide snapshot of South Australia's water security since Water for Good. This statement provides the opportunity to take stock of our short and long-term water security, reiterate the importance of water to the community and highlight the actions underway to address existing or emerging water security challenges as part of a renewed water security program.

The state now needs to ensure that its water security planning meets current statutory and planning requirements for balancing business, community and environmental needs for water; supports efficiency, competition and innovation in the water industry; and positions the state to address the increasing challenge of managing water resources in a changing climate.

It is intended that the next comprehensive statewide water security statement will be published in 2024, to coincide with the start of SA Water's next regulatory business period.

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

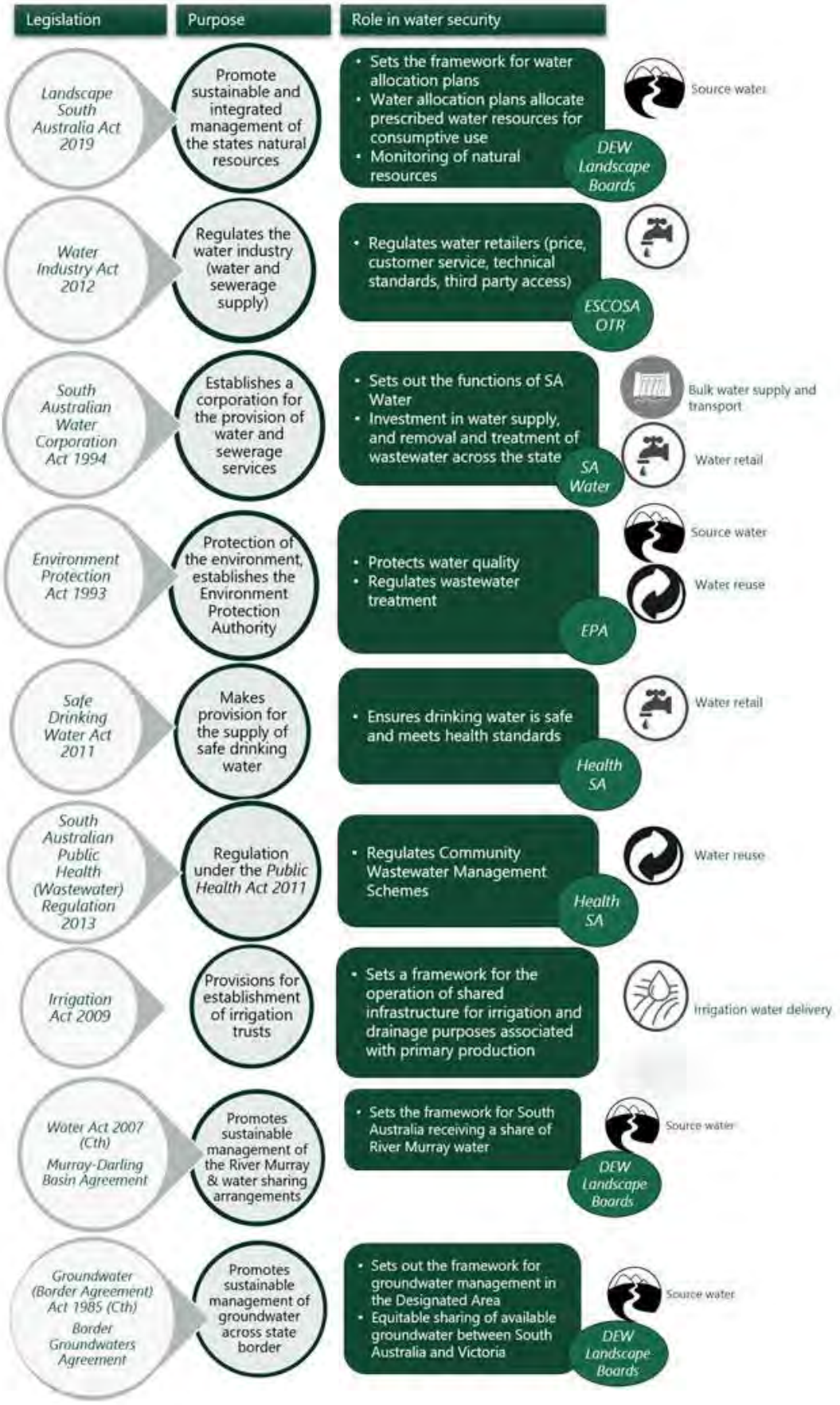

Figure 1: Relevant legislation and responsibilities in relation to the provision of water security services in South Australia.

South Australia's water resources

Where do we get our water from?

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

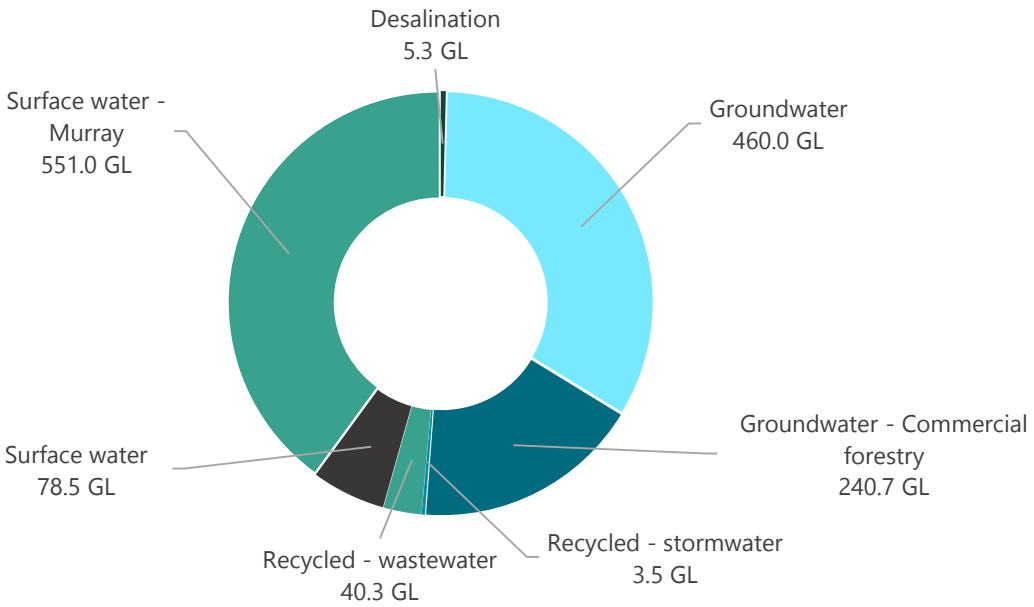

Figure 2: Average annual volume of water used in South Australia by resource type (2015-16 to 2018-19)

Groundwater

Groundwater is an important resource across large areas of South Australia, with an average use of approximately 700 gigalitres (GL) per year[3]. It is used for irrigated horticulture and agriculture, forestry, domestic supply, watering stock, mining, industrial applications (such as beverage manufacture) and irrigation of recreational and sports grounds. Groundwater plays an important role in providing some businesses with water in all years, while for others it is particularly important during dry times, when rainfall and surface water availability is limited. The use of groundwater must be carefully managed because its ability to be replenished is often limited.

Forestry water use

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

Surface water

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

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

Cooper Creek remain unregulated and they flow into South Australia draining large upstream areas of the Lake Eyre Basin, mainly in Queensland. River flows in the Lake Eyre Basin are highly variable.

River Murray

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

The volume of water available to South Australia and other Basin states is determined by the Murray-Darling Basin Authority in accordance with the Murray-Darling Basin Agreement (the Agreement). The water sharing arrangements that we have today have largely been in place for the last 100 years. South Australia receives a maximum annual entitlement (Entitlement) of 1850 GL under the Agreement. South Australia's Entitlement is reduced when conditions are dry and water availability in the River Murray System is limited and it is adjusted for trade. Additional environmental water may flow to South Australia as a result of environmental water being made available by the Commonwealth Environmental Water Holder or as a result of unregulated flows during wet periods.

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

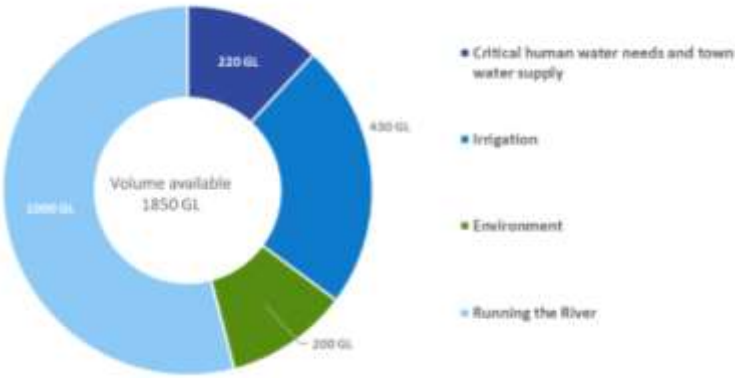

Figure 4: Sharing of River Murray water available to South Australia when South Australia receives its full Entitlement.

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

Recycled water

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

Desalination

Desalinated water is produced by removing the salt and impurities from an existing water source such as seawater, treated wastewater or low quality groundwater. SA Water operates two seawater desalination plants, one at Lonsdale in Adelaide

and one at Penneshaw on Kangaroo Island. New desalination plants and associated distribution infrastructure have been approved for Kangaroo Island and the Eyre Peninsula. Local government and privately operated seawater desalination plants are also located at Marion Bay, and in the Upper Spencer Gulf for mine processing purposes.

Additional desalination plants that treat groundwater to remove salt and impurities to provide local communities with potable water are located across the state, including at Oodnadatta, Hawker, Leigh Creek, Indulkana, Mimili, Kaltjiti (Fregon) and Yunyarinyi (Kenmore Park) on the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands in the far north of South Australia, and at Yalata on the west coast.

Desalination plants enable the supply of safe and clean drinking water that is climate independent, which is particularly important during times of low rainfall and drought. The total capacity of South Australia's desalination plants is greater than 110 GL per year, however, water use from desalination has been a relatively low 5.3 GL per year between 2015-16 and 2018-19 as it is the most expensive source of water in South Australia and is typically only used when other alternatives are not available.

Desalination for Drought Relief

Driven by extreme drought across much of the Murray Darling Basin, and enabled by the linkages between Adelaide's water supply system and the River Murray, production from Adelaide's Desalination Plant was significantly increased in 2019-20 (to 40 GL). This reduced Adelaide's demand from the River Murray and enabled the Australian Government to make the equivalent volume available to drought-affected farmers across the Southern Murray-Darling Basin.

How are water resources managed in South Australia?

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

Prescribed water resources

South Australia has a well-developed system for the management of water resources where there is a high demand for water and there is a need to sustainably manage the resource.

A water allocation plan sets out the rules for managing the take and use of prescribed water resources and is developed in consultation with the community, industry and key stakeholders. Development of a water allocation plan is overseen by a Landscape Board in consultation with the community and is based on the best available science and knowledge of the water resource. Once developed, water allocation plans are adopted by the Minister for Environment and Water. A water allocation plan ensures the needs of the environment are taken into account when determining how much water is made available for consumptive purposes (licensed and non-licensed uses) and how that water may be allocated and traded. Figure 6 shows the location of each of the prescribed water resources in South Australia.

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

Figure 5 shows the volume available for use in 2018-19 from prescribed water resources across the state, with further detail provided in Appendix A.

Non-prescribed water resources

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

For these non-prescribed areas, water affecting activities such as the construction of a well, dam or weir, are managed through permits to protect the integrity of the water resources and to minimise the impact of the activities. Although

permits do not regulate the volume of water that can be taken, other parameters, such as the size and location of a water affecting activity, can be regulated.

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

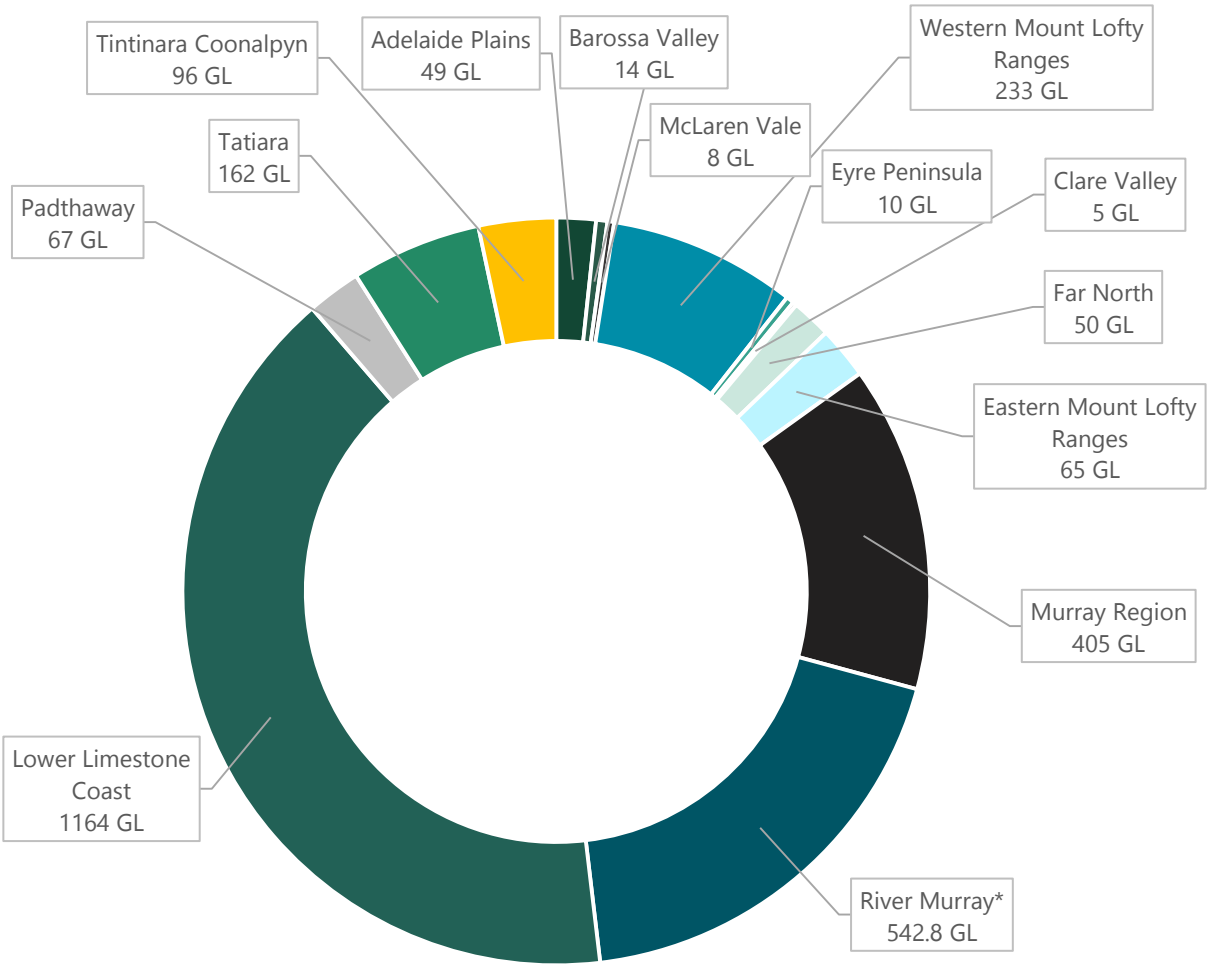

Figure 5: Annual volume available for use from prescribed water resources in South Australia (2018-19)[4]

Water markets

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

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

Water for the environment

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

In prescribed water resources, water allocation plans set out how much water is required for the environment and, in some cases, end of system flow and/or groundwater level targets are established. Environmental water provisions are provided before water is made available for consumptive purposes. Water resources are monitored to ensure they are being used within their sustainable limits, and the environmental water provisions are being met.

South Australia is home to six wetlands internationally recognised for their biodiversity value under the Ramsar Convention, these include Bool Lagoon, Coongie Lakes, Coorong and Lakes Albert and Alexandrina, Riverland, the Banrock Station Wetland Complex, and Piccaninnie Ponds Karst Wetlands.

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

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

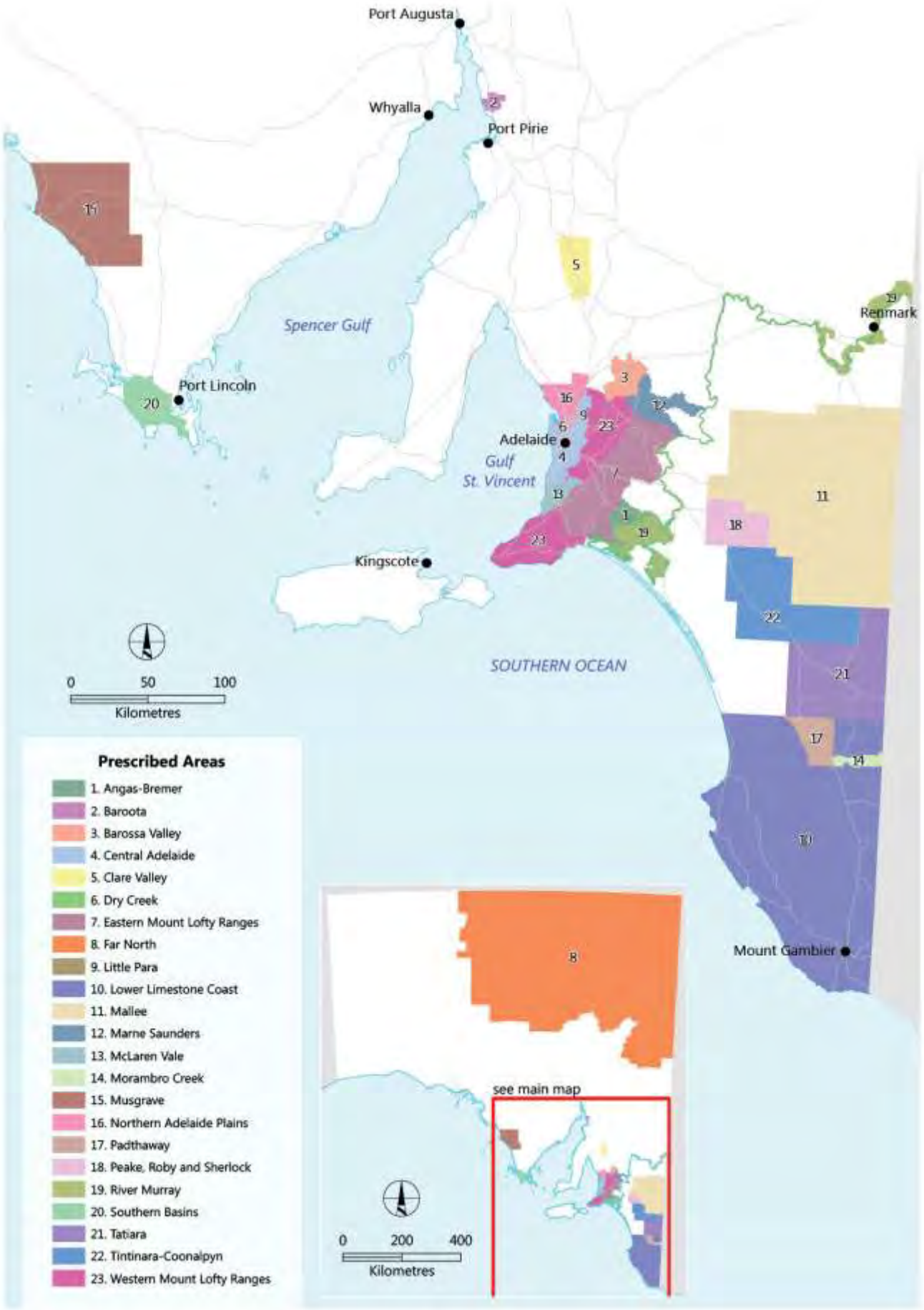

Figure 6: Prescribed water resources in South Australia

Adelaide's water security

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

Water available to meet urban Adelaide's requirements

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

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

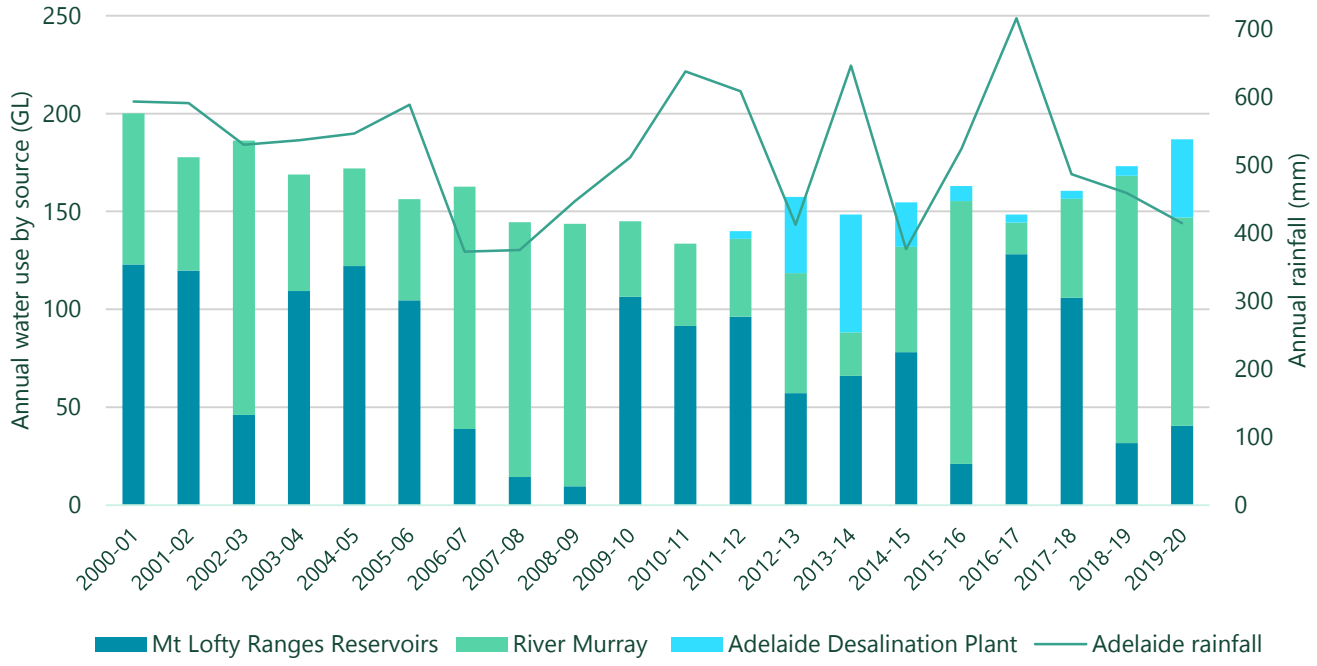

Figure 7: Adelaide's historical water use of potable water - by source (SA Water 2020)

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

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

Figure 8: Adelaide and its water supply sources

Mount Lofty Ranges reservoirs

Adelaide is supplied with water from a series of reservoirs in the Mount Lofty Ranges including Happy Valley, Hope Valley, Kangaroo Creek, Little Para, Millbrook, Mount Bold, South Para and Warren reservoirs (Figure 9). The Mount Lofty Ranges reservoirs have a total capacity of 199 GL, which is enough water to supply Adelaide with drinking water for approximately 12 months. As an example, this is significantly less than Sydney (2582 GL) or Melbourne (1812 GL), whose water supply reservoirs have the capacity to store enough water to meet their demands for at least three years. Increasing reservoir capacity has been considered in the past, however most reservoir catchments are already over-developed and further reservoir development would risk additional impacts on environmental flows, the habitat of endangered species and access to water by primary producers in the region. As well as storing surface water runoff from the Adelaide Hills, the Mount Lofty Ranges reservoirs are used to store water that has been pumped from the River Murray to supplement Adelaide's water supply.

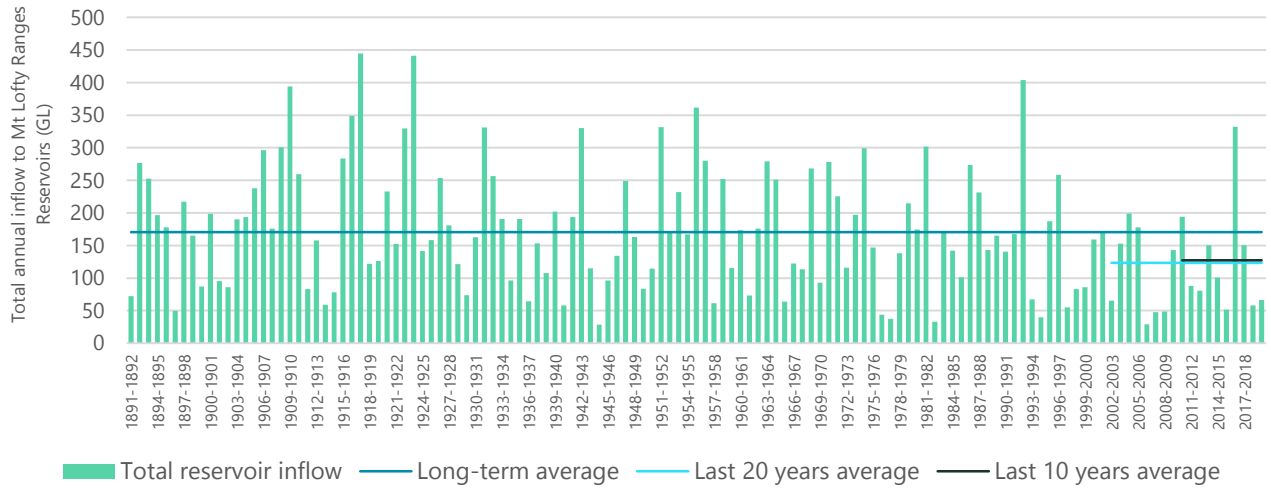

Figure 9: Annual catchment inflows into the Mt Lofty Ranges reservoirs for period 1891-92 to 2019-2020

The River Murray

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

Adelaide Desalination Plant

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

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

[6] South Australia's River Murray Entitlement is up to 1850 GL per year. It is determined by the Murray-Darling Basin Authority in accordance with the Murray-Darling Basin Agreement (2008).

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

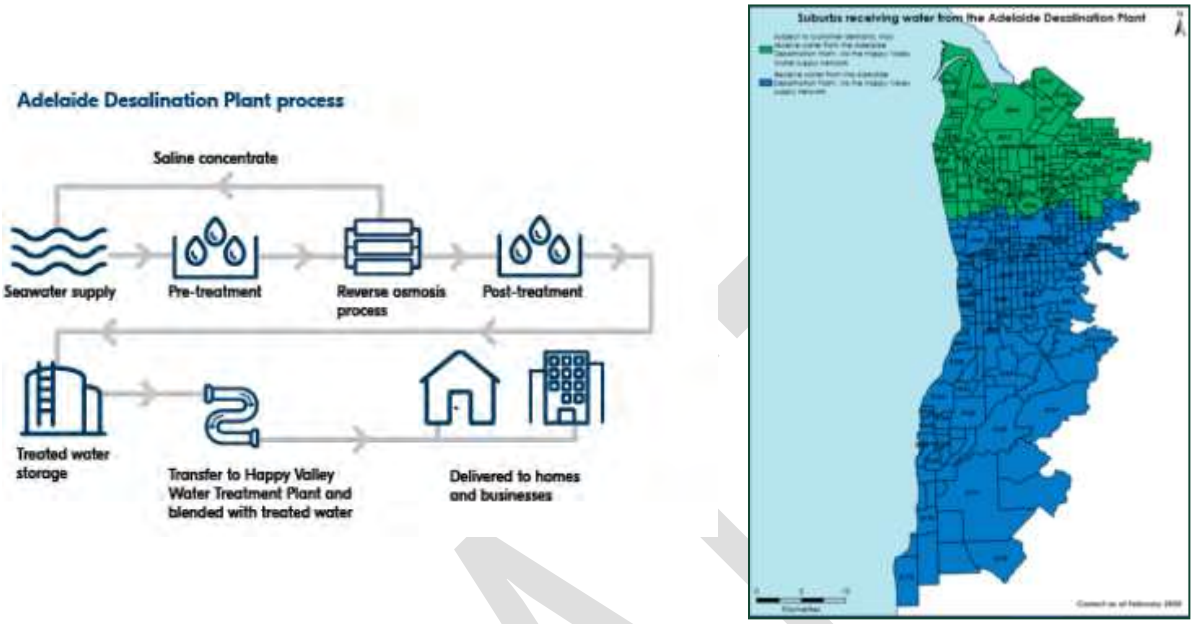

Figure 10: Adelaide Desalination Plant process (left) and extent of distribution (right)

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

Groundwater

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

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

Groundwater use in Adelaide is estimated to be up to 5800 ML per year made up of approximately 400 ML from the shallow aquifers and approximately 5400 ML from the deep aquifers. A draft water allocation plan is currently being prepared for Central Adelaide as well as the Northern Adelaide Plains, which will enable the groundwater to be managed within sustainable limits and water to be traded to support economic development. There is scope for increasing groundwater use in Adelaide to contribute to the city's water security once appropriate investigations have been carried out and suitable water allocation policies have been adopted. It could even be called upon to meet potable demands in a future drought, as last occurred during 1967-68.

Additional sources of water

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

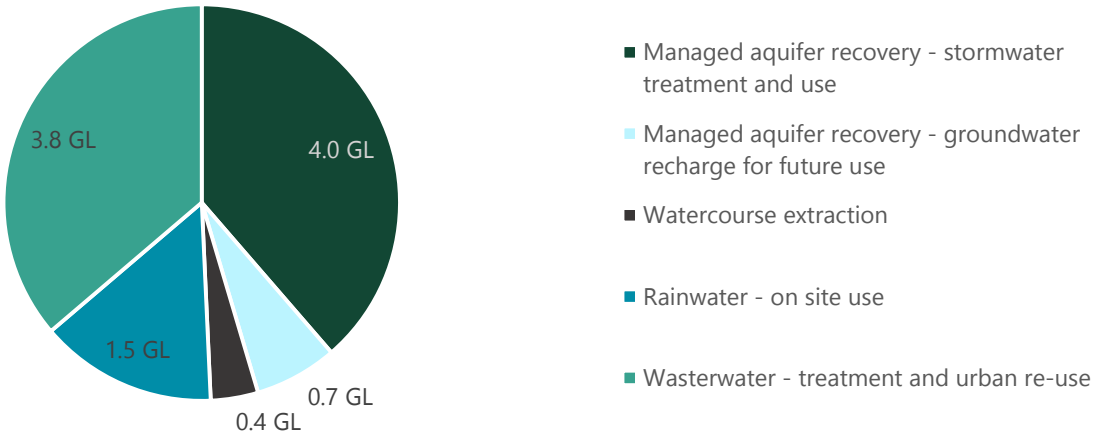

Figure 11: Adelaide's estimated average annual water use, or storage[7] of, stormwater, rainwater and wastewater.

Stormwater

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

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

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

Managed Aquifer Recharge

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

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

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

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

A feasibility study identified six projects which have the potential to offset up to 1.6 GL per year of River Murray water through the expansion of existing alternative water supply schemes. These include both stormwater and treated waste water reuse. The government is now working with scheme owners to develop business cases to advance the most promising projects.

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

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

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

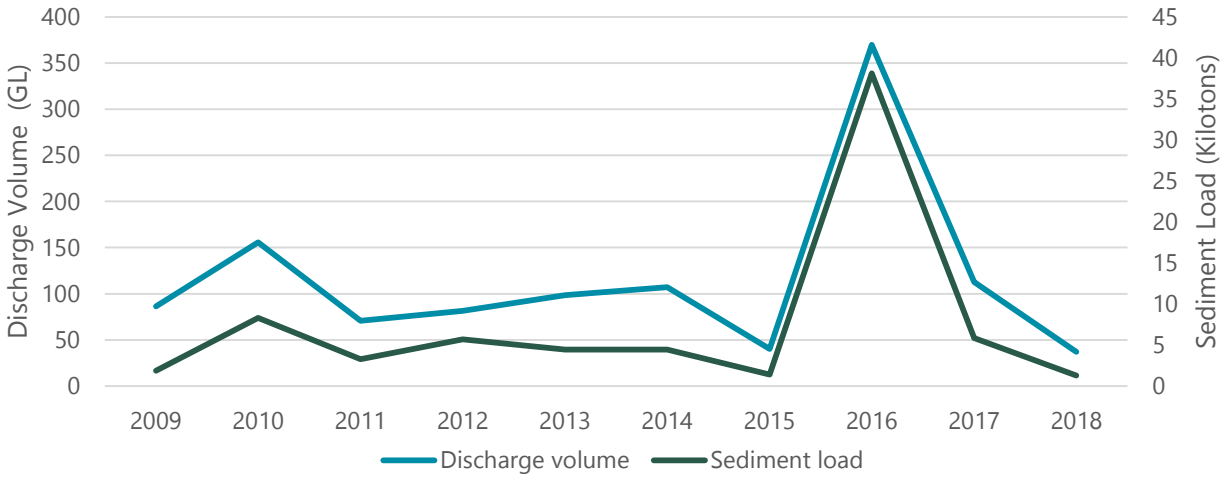

Figure 12: Annual discharge and sediment load to the coastal environment from Adelaide's urban catchments

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

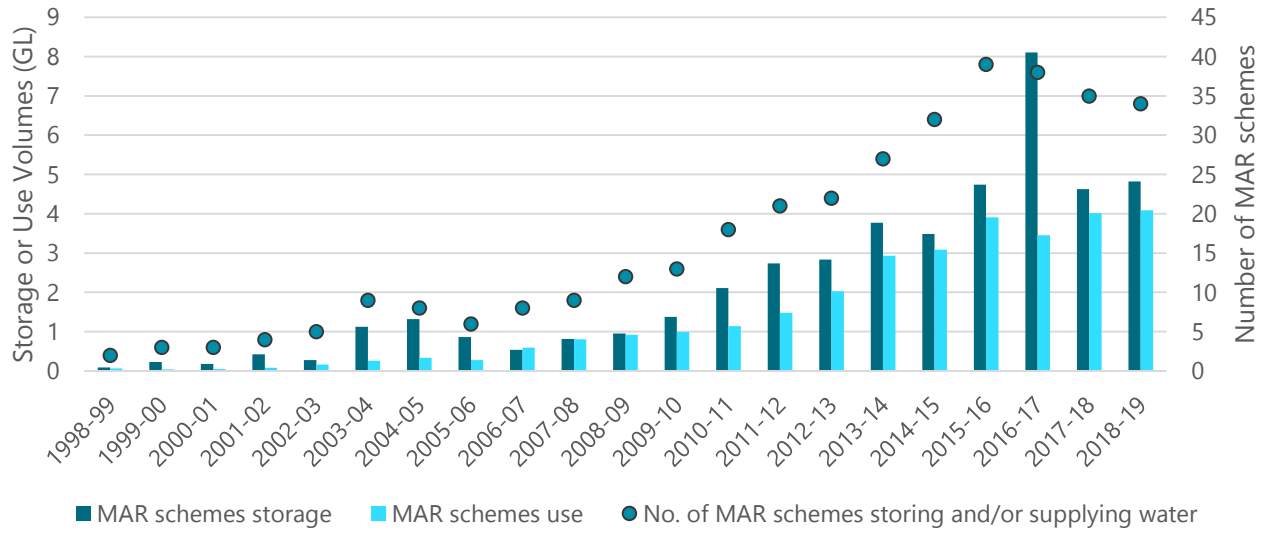

Figure 13: Stormwater managed aquifer recovery scheme groundwater storage and use

Rainwater

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

Wastewater

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

Treated wastewater contributes an average of approximately:

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

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

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

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

Adelaide's water balance

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

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

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

How is urban Adelaide's water distributed?

The Adelaide water supply network is complex and draws from a range of sources including reservoirs, the River Murray and the Adelaide Desalination Plant. In metropolitan Adelaide, water is delivered to customers through an interconnected system with more than 9300 km of water mains and numerous pump stations.

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

How does urban Adelaide use its water?

Average potable water demand in urban Adelaide was approximately 166 GL per year over the last five years, with an estimated additional 10 GL of non-potable demand[8]. The annual variability of demand in Adelaide is primarily driven by weather, with demand being significantly higher in dry years compared to wet years (Irvine et al, 2019)[9]. For a given year, total urban demand is expected to be between 145 and 200 GL per year.

The residential sector represents 77 per cent of SA Water's Adelaide demand with commercial businesses representing seven per cent of demand followed by large institutions at 6 per cent (as per Figure 16), noting that since the Millennium Drought a number of initiatives to reduce the overall demand for water and improve Adelaide's water security have been implemented. These include improving leak detection and repair in the metropolitan water supply system, providing incentives such as rebates to increase the uptake of water efficient devices, more timely and useful information on water bills, and water-wise measures for SA Water customers.

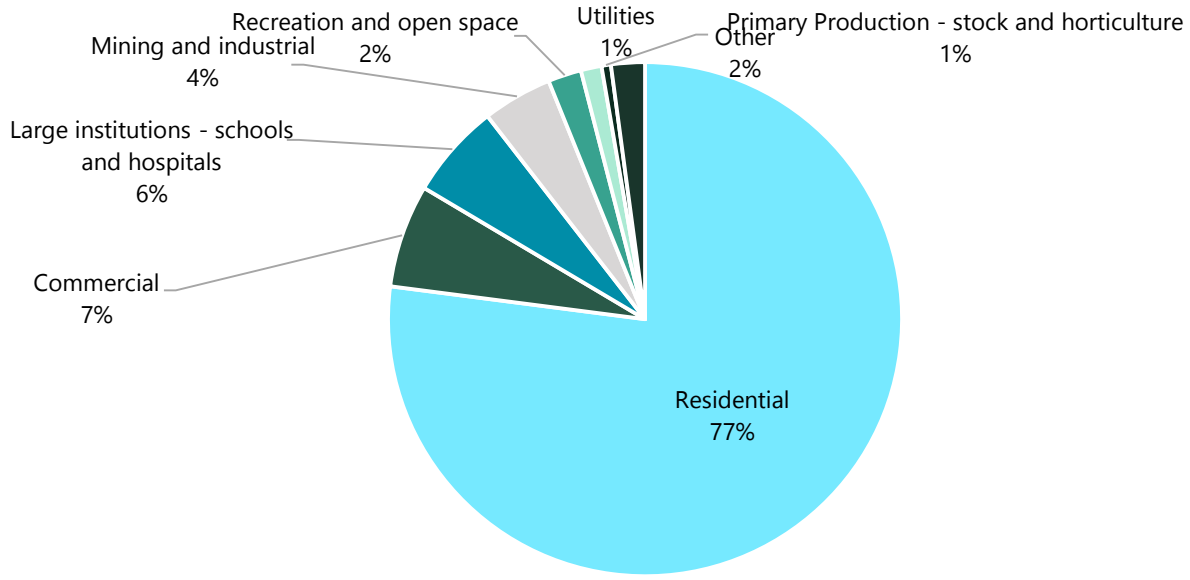

Figure 16: Potable water use in urban Adelaide by demand type (SA Water 2020)

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

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

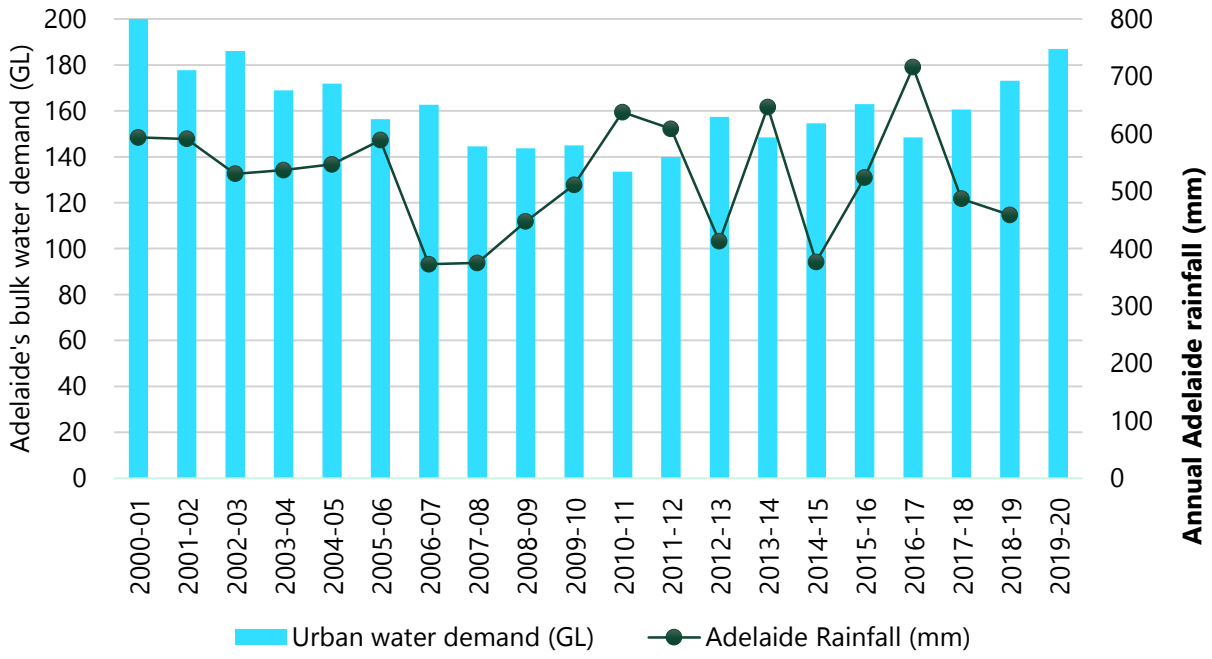

Figure 17: Adelaide's annual potable water demand (SA Water 2020)

How does Adelaide compare?

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

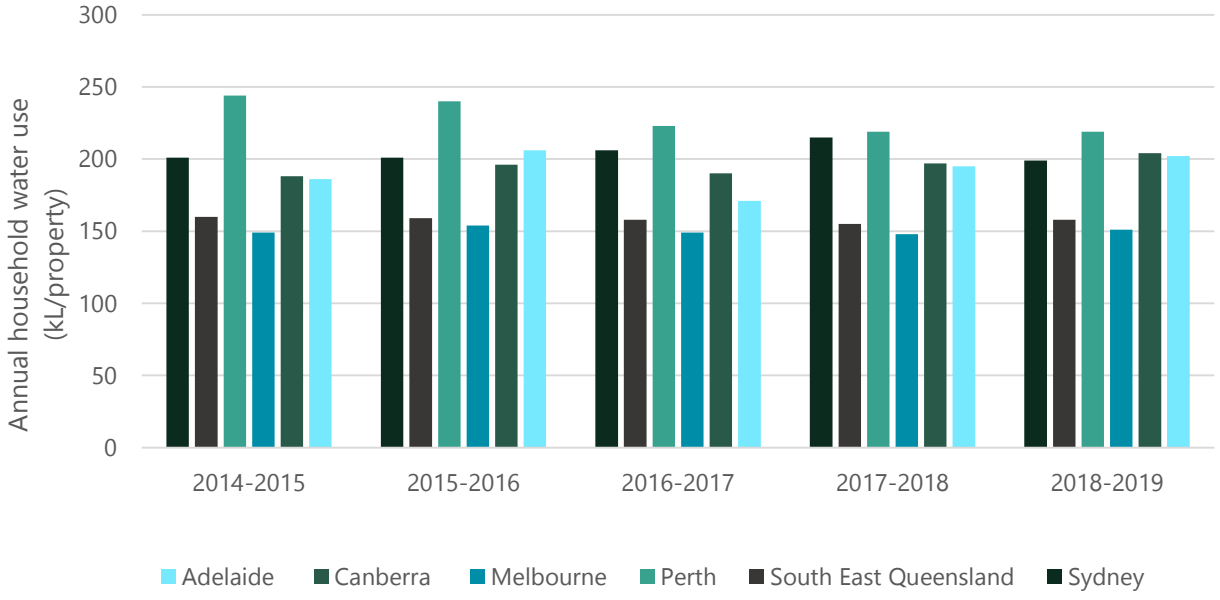

Figure 18: Average annual residential water use in Australian cities (BoM 2020b)

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

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

Table 1: Desalination capacity of Australian cities

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

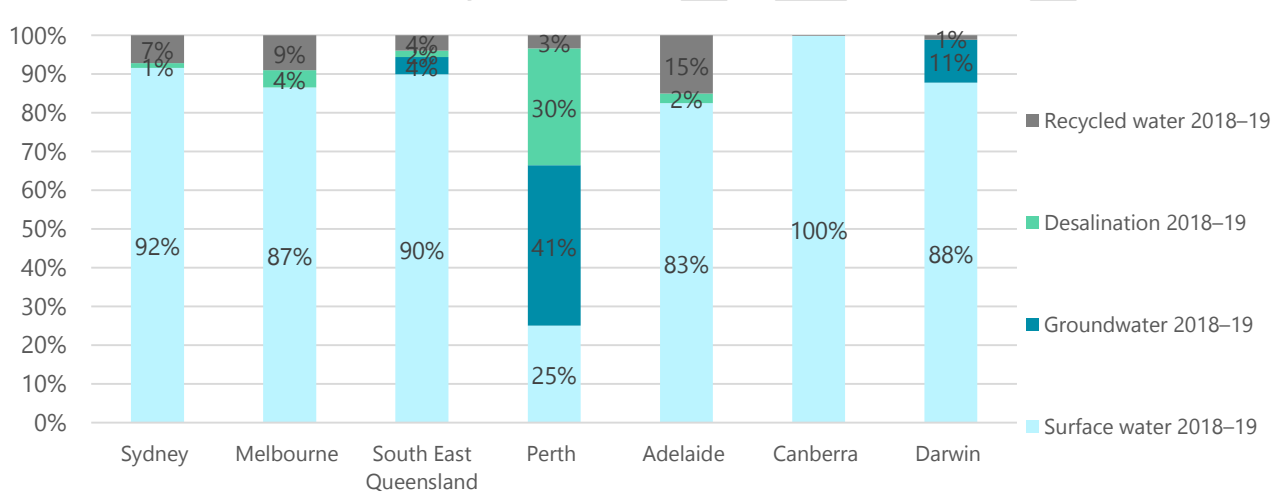

Figure 19: Water supply source for Australian cities (BoM 2020b)[10]

Long-term water security outlook

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

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

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

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

A water-secure, cool and green Adelaide

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

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

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

Given these interdependent challenges, there is a renewed need to adopt an integrated approach to urban water management. The government will work with stakeholders to develop a shared vision for the future of urban water supply, sewerage management and stormwater drainage that drives long-term investment. In particular, an urban water management strategy will need to identify how to best meet the increased water demand that urban greening and cooling may generate, an effective and cooperative approach to the management of urban drainage supported by sustainable funding sources, and prudent and efficient investments in water supply augmentation that maximise the use of all available water sources to provide for future water security.

Regional water security

Overview

Regional water resources provide water for communities, irrigation, industry and mining. Each regional area faces its own unique water security challenges based on the characteristics of the water resources within each region and its existing and future water needs. Water security within regional areas is critical to support existing water industries and to provide for growth. This section focuses on water security within the following key regions:

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

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

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

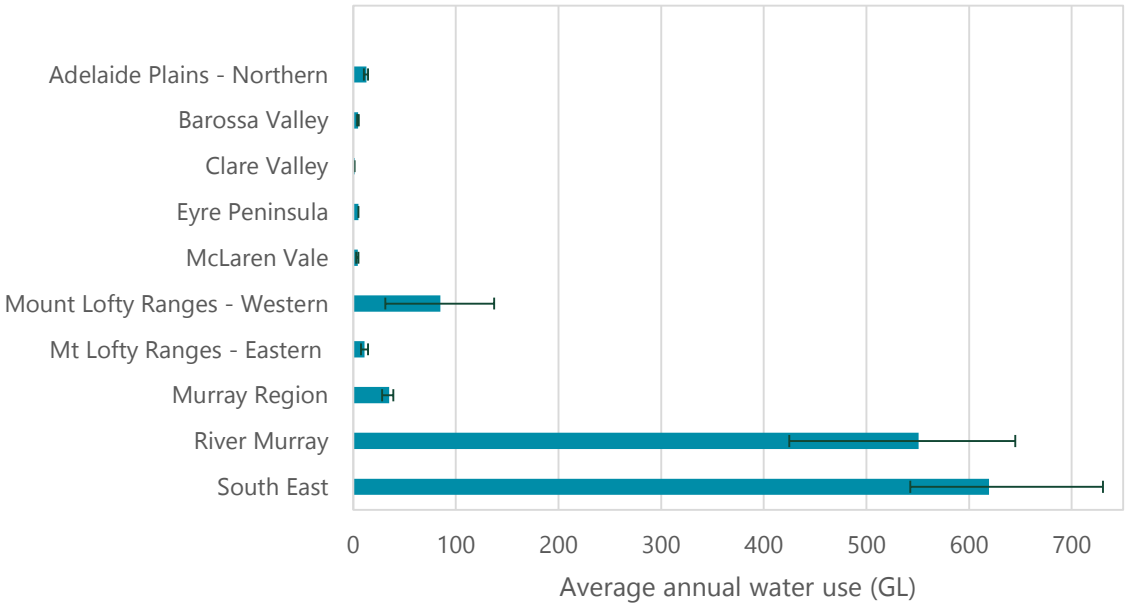

Figure 20: Average annual water use, from a prescribed water resource, by region[11] (2015-16 to 2018-19)

Regional drinking water

Within the overview of each region, the focus is on non-residential demands. SA Water provides drinking water and ensures the water security of the majority of regional South Australians. It manages a drinking water supply network over a very large geographical area. Central to its networks are the major pipelines that deliver water from the River Murray to many parts of South Australia, as well as several minor pipelines, which are locally important. SA Water has the longest mains water supply network of all water utilities in Australia at more than 27,000 km. In regional parts of the state, each area's water mains network has its own unique operational needs based on where water is sourced from, the kind of treatment the water needs to be safe and clean, the type of customers the water is supplied to, and the extent of the distribution system. Figure 21 provides a breakdown of how water supplied by SA Water to its regional customers is used.

[11] Volumes have been aggregated where there is more than one prescribed water resource within a region

In years when not all of the water allocated to SA Water from the River Murray for regional areas is required, any remainder is traded to irrigators.

To maintain and enhance water security for regional communities, SA Water has commenced a $1.6 billion capital investment program to construct new water supplies and distribution infrastructure which will be delivered over the period 2020 to 2024. This program will improve water and sewerage services for South Australians and contribute to enhanced water availability. This will include the construction of new desalination plants at Sleaford Bay and Penneshaw to address water security and supply issues on the Eyre Peninsula and Kangaroo Island respectively. Construction of both desalination plants is expected to be completed in 2022.

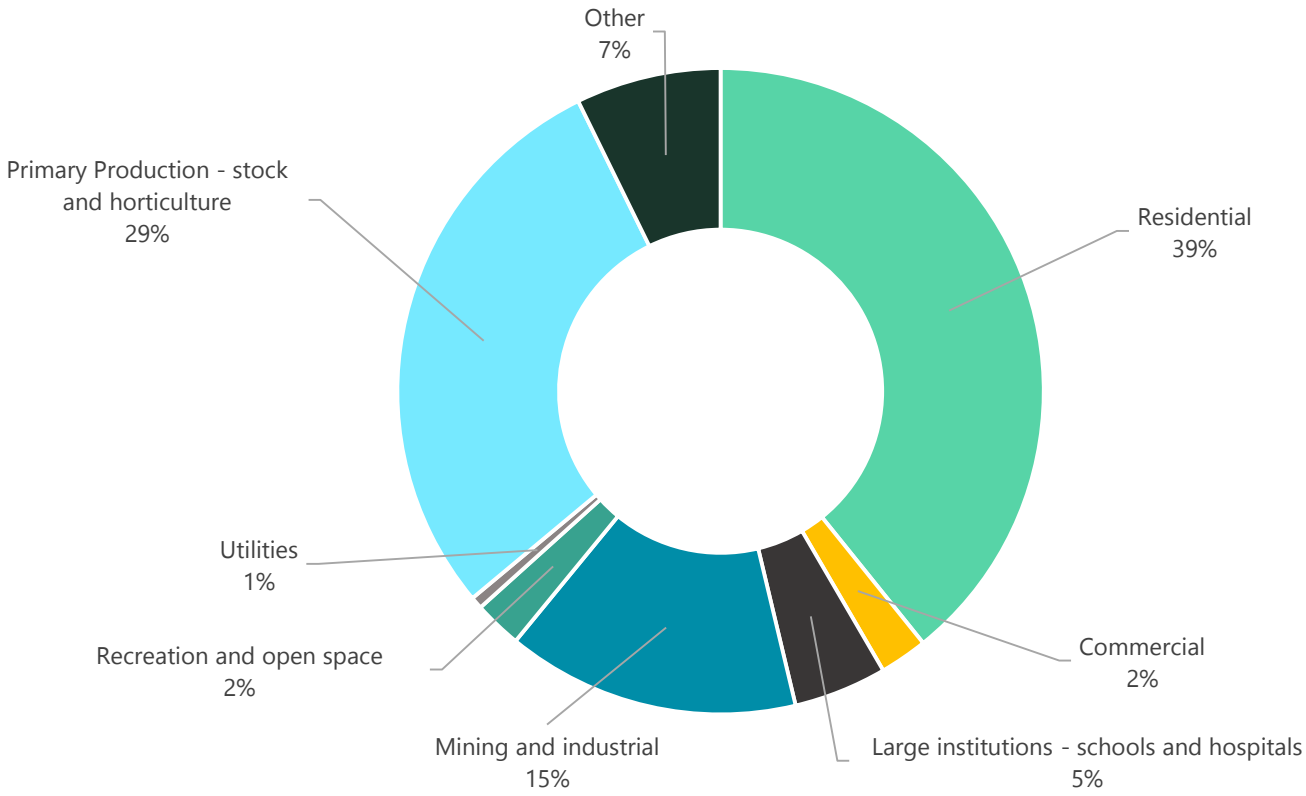

Figure 21: Breakdown of the use of mains water in regional South Australia

Regional water recycling

Recycled wastewater is an important water resource in country areas, being used for a variety of non-potable purposes such as for irrigating community ovals, town reserves and golf courses. SA Water wastewater treatment plants service regional cities and larger towns and through these schemes provide recycled wastewater for non-potable use. As owners and managers of community wastewater management schemes (CWMS), regional councils also play an integral part in water treatment. There are currently 168 non-metropolitan CWMS operating in 44 council areas (several additional schemes are operated in metropolitan council areas). Collectively, as at June 2019, regional council wastewater management systems service almost 90,000 customers, including 80,000 residential customers producing approximately 10 GL of effluent per year. A significant number of CWMS recycle some or all of their wastewater.

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

Regional urban centres

Whyalla, Port Augusta and Port Pirie

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

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

The long-term water security plan for mining and industrial water users, is to continue to supply water from the River Murray through the Morgan to Whyalla Pipeline. Very large increases in demand, however, could require construction of further desalination facilities in the future.

Mount Gambier

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

Murray Bridge

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

Port Lincoln

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

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

Remote communities

Water is essential to the existence of remote communities. Some remote communities have a high degree of water insecurity, largely due to their remote location and reliance on rainfall (which is often very low and sporadic) for water supply. Water supply is challenging - there is often limited existing infrastructure and new infrastructure costs are particularly high due to the lack of suitable local sources of potable quality. Responsibility for water supply varies between communities, with a range of regulated and unregulated supply arrangements. There are approximately 64 remote communities across the north of the state, with a total population of approximately 9440 people (communities vary in size from four people to 4000 in Roxby Downs).

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

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

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

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

In addition, DEW will complete a water security audit and risk assessment for self-supplied remote communities. This will involve confirming the existing water supply arrangements, assessing short and long-term risks so as to better understand future requirements, and identifying investment options to address potential water shortages.

Priority water-dependent regional industries

Water for primary industries

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

In 2017-18, the gross value of irrigated agricultural production in South Australia was $1.9 billion, with $1.2 billion of this generated in the Riverland, followed by Adelaide and the Mount Lofty Ranges ($390 million) and the South East ($312 million). Sustainable agricultural water use supported almost 10,000 businesses, including 3000 irrigation enterprises (ABS, 2018-19). These businesses generated revenues in excess of $10 billion, with the highest value sectors being livestock ($3.2 billion), wine ($2.3 billion), horticulture ($1.8 billion), and dairy ($570 million) (Primary Industries Scorecard 2018-19). In addition, licensed forestry was calculated to have used 240 GL and generated revenue of over $2.2 billion.

Growth State has identified food, wine and agribusiness as one of its nine key growth sectors. An industry-led plan is being developed to improve competitiveness and profitability. It also considers industry growth over the next decade as producers respond to climate change, changing consumer trends and the emergence of new overseas markets. Drought, climate change and the impacts of poor water availability and quality are existential threats to current systems of primary production (NFF, 2017 and Remenyi et al., 2020). Secure access to water is essential for prosperous primary industries. This requires maintaining access to current water resources, development of new sustainable water resources, improved on-farm water use efficiency (through better irrigation equipment and crop management), and the development of new, water-efficient, climate-suitable crops. Whilst financing water infrastructure to improve water availability for primary industries remains a challenge, close consideration needs to be given to the strategic long-term benefits of enhanced agricultural water security that may result from such investment.

Water for energy and mining

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

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

Energy and mining has been identified as a priority sector within Growth State because of its strong potential to meet increasing interstate and global demand, attract investors and leverage comparative advantages. The Energy and Mining Strategy (DEM, 2019) aims for exports for the sector to increase from $5.3 billion in 2018, to $13 billion by 2030. Four priority mineral regions have been identified: the Far North (copper and uranium), Braemar (magnetite), Upper Eyre Peninsula (magnetite and gold), and Coober Pedy to Central Gawler Craton (copper, gold and uranium). In addition, the Hydrogen Action Plan identifies significant opportunities, including a share of the forecast $1.7 billion and 2800 jobs that hydrogen could contribute to the national economy by 2030. These ambitions cannot be realised without secure water sources.

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

State Growth Fund – Water and Infrastructure Corridors

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

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

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

Regional water security status

South East

Most water-dependent activities in the South East region rely on the groundwater sourced from large and, in many areas, relatively fresh aquifers. Annual average use of groundwater is approximately 620 GL and represents around 45 per cent of the water used in South Australia each year, with the majority of the water used for irrigation (~365 GL) and commercial forestry purposes (~240 GL) as per Figure 22. The South East drainage system is a significant regional infrastructure network that diverts surface water from agricultural land to minimise flooding and manage salinity, and, based on salinity, delivers the water as environmental flows to wetlands in the region or discharges it at the coast.

The total value of the agricultural output in the South East is estimated at $1,123 million (ABS, 2016) with production from meat cattle, sheep and other livestock as the largest commodity. Approximately 130,000 ha are irrigated in the South East. The gross value of this irrigated agricultural production is estimated at $311 million (ABS, 2019). The main uses of irrigation water are to produce pasture for stock, wine grapes and potatoes. The region also contains a significant dairy industry and supports industrial uses of water such as timber processing, pulp and paper manufacture, dairy processing, wine making and operation of abattoirs.

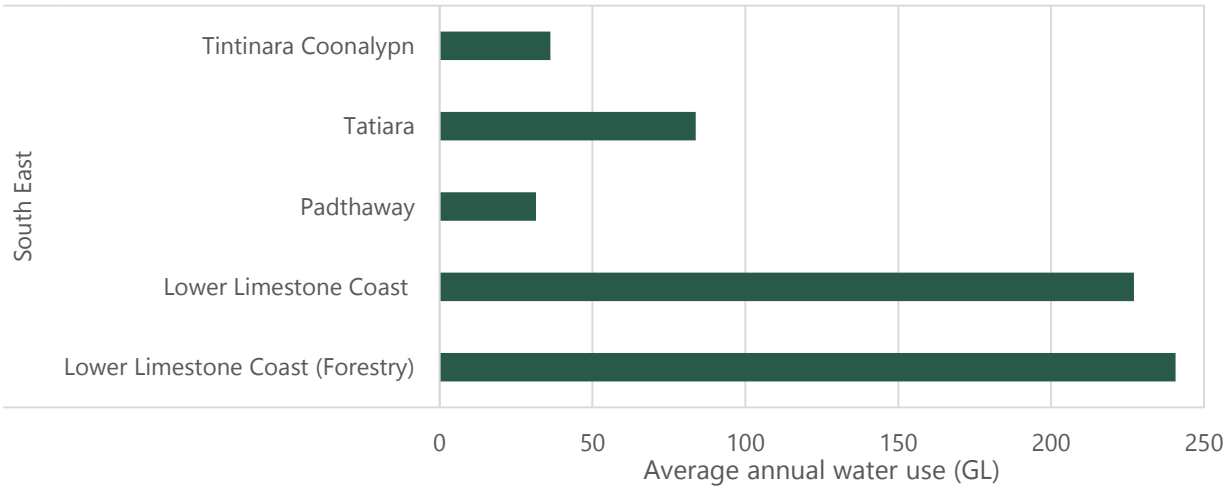

Figure 22: Average annual water use in the South East (2015-16 – 2018-19)

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

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

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

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

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

Improved Water Security for Farmers in the South East

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

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

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

Riverland and Murraylands

The River Murray is the main source of water in the Riverland region and is a significant resource for metropolitan Adelaide and regional towns across the state, as well as Riverland towns themselves. In South Australia, the majority of the water taken from the River Murray is used for primary production. This includes water for the irrigation of crops such as grapes, citrus, stone fruit, almonds, pasture and vegetables as well as water for dairies and other livestock. Other water uses include water supply for towns and metropolitan Adelaide, the environment and recreation.

More water for River Murray irrigators in dry years

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

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

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

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

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

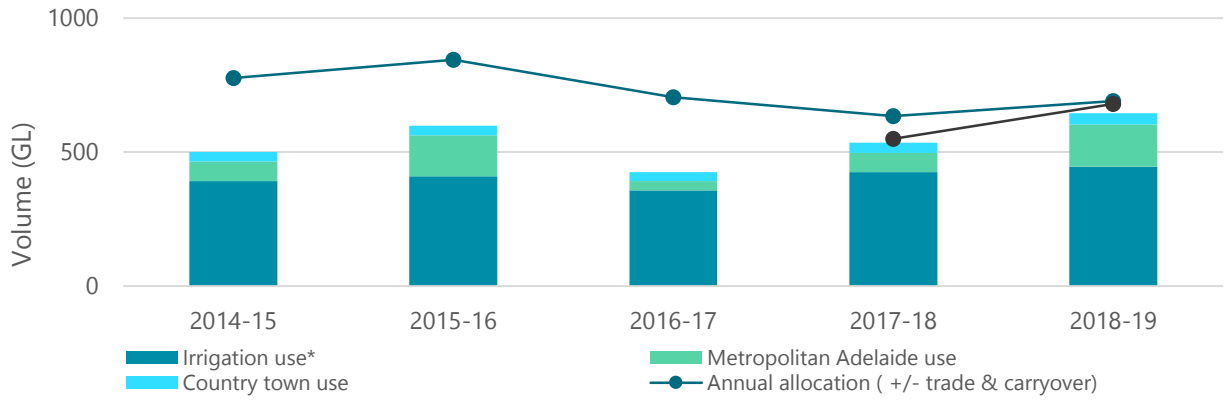

Figure 23: Consumptive water use from the River Murray in South Australia.

Improved River Murray allocation announcements

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

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

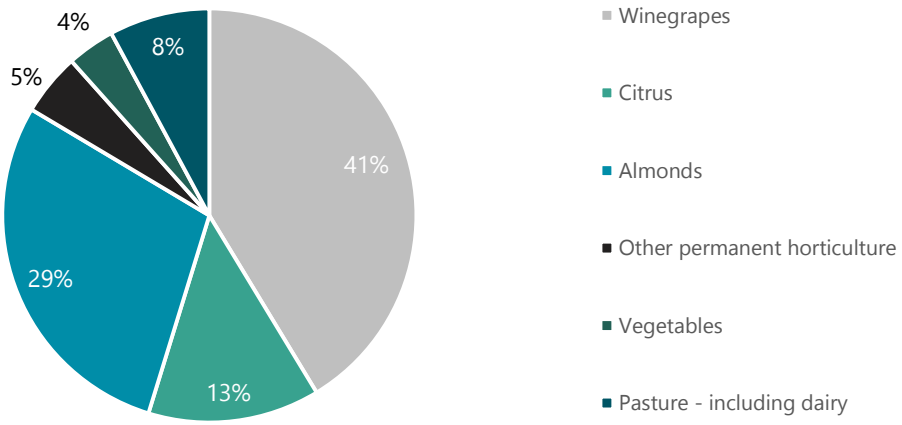

Figure 24: How River Murray irrigation water is used in South Australia (2018-19)

Dry year water availability remains the key restriction on the potential for further permanent horticulture development in the South Australian River Murray and across the whole of the Southern Murray-Darling Basin.

While many towns in the Murray Mallee are also provided with water from the River Murray, a number of townships access groundwater from local aquifers. SA Water supplies water from groundwater resources for public water supply purposes. The groundwater quality varies across the region with the majority of good quality water utilised for the irrigation of crops - primarily potatoes, as well as carrots, onions and olives. Groundwater is also utilised across the region for stock and domestic purposes. Irrigation demand increased rapidly in the Mallee Prescribed Wells Area from 2001 to 2008. Since then, irrigation demand has remained relatively stable with around 7000 ha of crops irrigated. Further development is limited by water quality and suitable soils. To ensure that groundwater resources are managed sustainably, extraction limits are in place within the prescribed wells area.

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

Mount Lofty Ranges

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

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

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

Western Mount Lofty Ranges

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

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

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

Eastern Mount Lofty Ranges

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

The Langhorne Creek wine region is a unique area with access to multiple sources of water. Historically, flood waters from the Bremer River have been used to irrigate properties and natural flooding has been harnessed to support irrigated crops. Local groundwater is another important source of water. Some water users in the area also hold River Murray water licences and access water from Lake Alexandrina. The Creeks Pipeline was constructed during the Millennium Drought to provide River Murray water to provide a more secure source of water during dry conditions when water from Lake Alexandrina may not be accessible or desirable due to low lake levels or high salinity. This has helped provide greater water security to growers in the Langhorne Creek area.

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

McLaren Vale

The McLaren Vale region is a premium wine-producing region with over 7300 ha planted to vines and more than 190 producers, including 80 cellar doors. Traditionally, local groundwater and surface water resources have been used for irrigation, commercial and industrial uses. Groundwater is also used for stock and domestic purposes.

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

Recycled water from the Christies Beach and Aldinga wastewater treatment plants is used for the irrigation of horticultural crops. The water supply scheme was commissioned in 1999 and use of reclaimed water has increased over time. The ability to access an alternative source of water has taken pressure off local groundwater resources and has allowed for irrigated areas to expand. It has also reduced the amount of treated wastewater released to the sea. An average of almost 5000 ML per year of recycled wastewater is currently used, which is approximately 55 per cent of the annual output of the plant (Figure 25).

A new 600 ML storage dam facility has recently been constructed which will increase the availability of recycled water in 2020-21 and further reduce the outflow of treated wastewater to the sea. It is expected that this will result in an additional $5.5 million in grape production for McLaren Vale annually and provide greater security for the future of horticulture in the area. The expansion of the water supply scheme is proposed to provide up to 8100 ML of recycled wastewater annually.

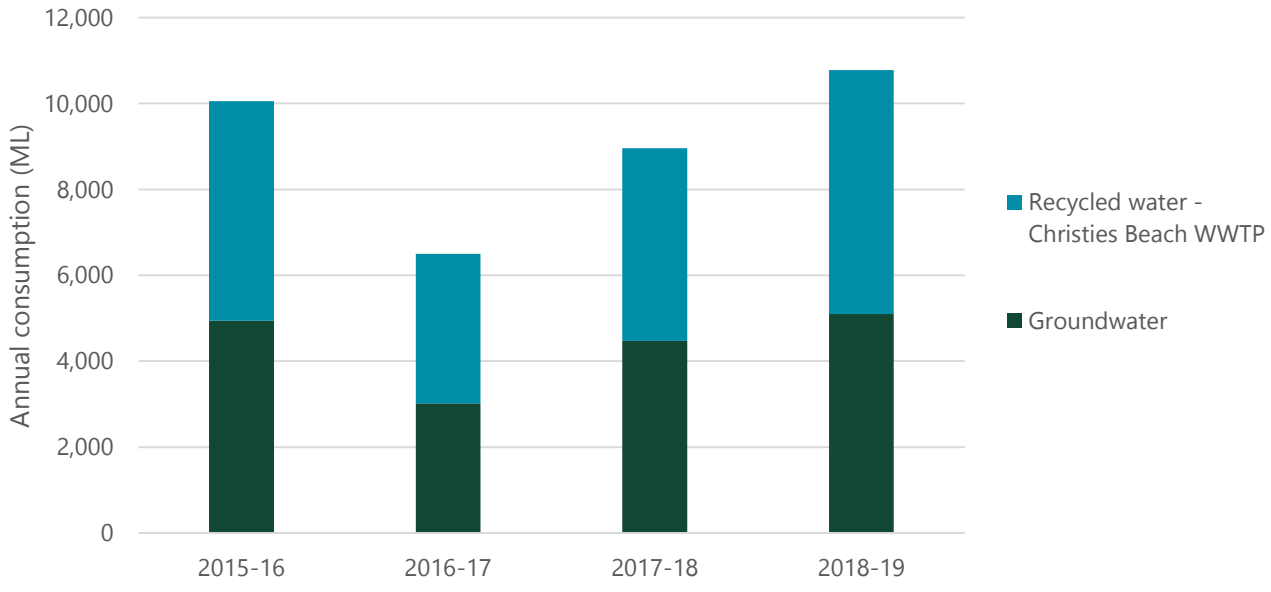

Figure 25: Annual water use within the McLaren Vale region

Barossa Valley

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

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

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

There is the potential for significant further economic growth in the Barossa Valley if growers are able to access secure, affordable and fit-for-purpose water. The government is supporting plans to deliver additional water to the Barossa and Eden valleys. Any such project, however, needs to be market driven and based on robust business case assessment. Initial long-term estimates indicate $292 million for the state's economy and 1000 jobs could be generated through the delivery of 14 GL of reclaimed water from the Bolivar Wastewater Treatment Plant via existing and new infrastructure.

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

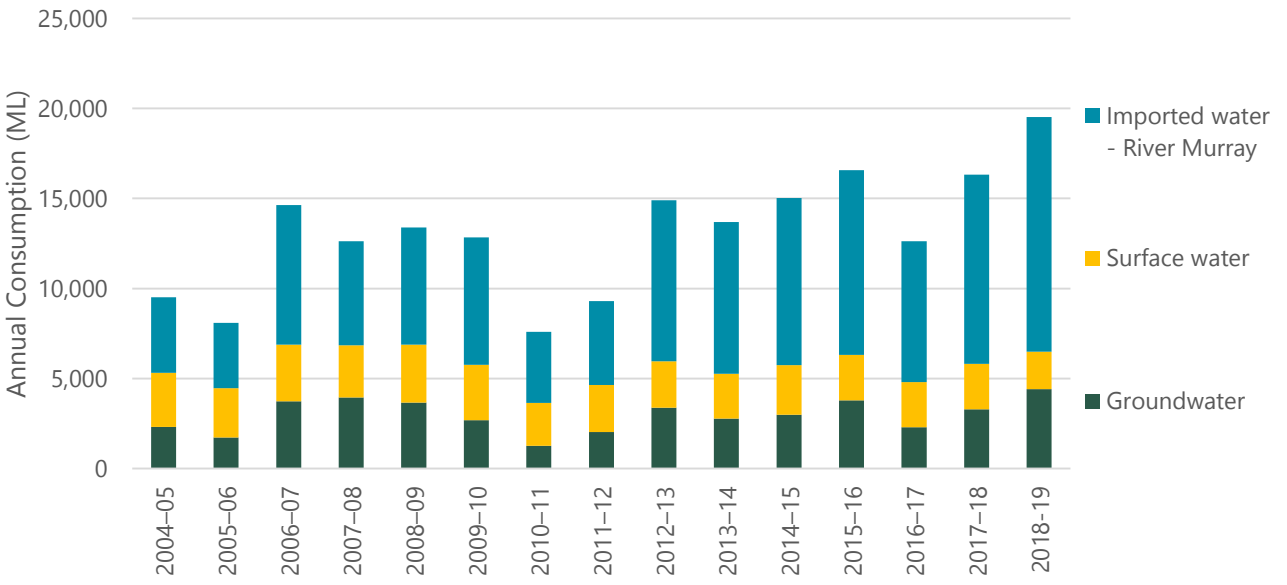

Figure 26: Local and imported water use in the Barossa Valley Prescribed Water Resource Area.

Clare Valley

The Clare Valley is one of the oldest premium wine-producing regions in South Australia with around 5000 ha of irrigated grapevines. Water is also used in the area for grape processing, aquaculture, feedlots and stock and domestic purposes. Water is accessed via surface water, watercourses and groundwater.

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

Water resource availability is a limiting factor to further development in the region. A water allocation plan is in place for the local water resources and there is no capacity to increase volumes allocated above current levels. A total of 4950 ML per year is allocated from surface water, watercourses and groundwater.

Recently, imported water from the River Murray through the Clare Valley Supply Scheme (CVSS) has provided an alternative source of water for irrigation and town water supply. The CVSS has the capacity to provide 7300 ML per year, with around half of that volume available for irrigation.

A feasibility study has recently been announced to explore a secure alternative water source for the Clare Valley. The study will investigate the potential to expand the Northern Adelaide Irrigation Scheme to supply recycled wastewater into the region to improve water security and provide additional growth opportunities.

Northern Adelaide

The Northern Adelaide Plains region is one of the largest vegetable cropping areas in Australia. Water is sourced from groundwater, recycled water and mains water. The region produces approximately 200,000 tonnes of fresh produce and over $300 million in farm gate value annually. Crops such as potatoes, carrots and onions are grown in open fields and there is more than 1000 ha of greenhouses producing primarily tomatoes, cucumbers and capsicums.

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

Northern Adelaide Irrigation Scheme

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

Infrastructure upgrades through NAIS allow an initial additional 12 GL a year of recycled water suitable for irrigation to be sourced from the Bolivar Waste Water Treatment Plant. Access to large volumes of affordable, high security recycled water will further reduce reliance on groundwater and is expected to result in an additional 3000 ha of horticulture production and create more than 3700 jobs. Reduced effluent releases also contribute to improved environmental outcomes in the marine environment.

An investment of $150 million (with $51.6 million of this provided by Australian Government funding) has been made to construct this scheme. During 2020-24, SA Water will invest $24 million in capital expenditure and $2.8 million a year in operating expenditure to complete the scheme and service its customers. The operating expenditure will be offset by revenue generated as customers connect to this climate-independent water source.

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

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

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

Kangaroo Island

Kangaroo Island is characterised by its clean and unspoilt environment offering opportunities for tourism and a range of primary production activities. Cropping and grazing, particularly sheep for wool and meat, are the mainstay of primary production on the island. Other value added products such as wine, cheese, marron, olive oil, free-range chickens and honey provide economic activity that benefits from tourism and Kangaroo Island's green image in export markets. Kangaroo Island supports a permanent population of around 4600 people and over 200,000 visitors annually. The population is centred in the townships of Kingscote, Penneshaw, Parndana and American River.

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

Kangaroo Island is heavily reliant on surface water, typically captured through farm dams. There are 53 surface water catchments on Kangaroo Island. Approximately 5700 km of watercourses move surface water across the region. In many parts of the region rainwater is the main source for household drinking supplies. Limited groundwater is available or used in most locations on Kangaroo Island and is highly variable in quality, quantity and accessibility.

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

Kangaroo Island Council operates Community Wastewater Management Schemes producing in the order of 120 ML per year. Approximately 80 ML per year is reused on sporting grounds, parks and gardens, and there is potential to expand wastewater reuse. There are currently no stormwater capture and reuse schemes on Kangaroo Island. Kangaroo Island Council has, however, commissioned investigations into schemes in Kingscote and Penneshaw.

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

A new 2 ML per day desalination plant and associated distribution infrastructure has been approved for Kangaroo Island and is funded through a combination of state and federal funds. The plant will enhance drinking water security and create hundreds of jobs. The plant and new pipelines will also allow 1000 properties in American River, Baudin Beach, Island Beach and Sapphiretown to connect to a more reliable water source.

[12] Additional volumes are allocated for recharged water.

Eyre Peninsula

The Eyre Peninsula is a large and remote agricultural region, where 55 per cent of the landscape is used for dryland agriculture and 43 per cent is reserved for conservation. The region experiences a dry Mediterranean climate with annual rainfall and evaporation ranges between 250 to 550 mm and 1200 to 2400 mm respectively. Water is sourced primarily from groundwater resources, supplemented with River Murray water supplied via the Iron Knob to Kimba pipeline. The main water uses in the region include public water supply, irrigation, industrial and stock and domestic use.

Eyre Peninsula Desalination Plant

To address water security issues across the Eyre Peninsula and protect the long-term viability of groundwater resources in the Uley Basin, SA Water will construct a 4 GL per year seawater desalination plant. The total capital expenditure to complete construction is $95 million. Construction is scheduled to commence in 2021.

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

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

SA Water is the largest user of water in the prescribed wells area. Potable groundwater is primarily sourced from the Uley South Basin, which supplies over 74 per cent of public water supply on the Eyre Peninsula. Monitoring data shows that the water level in the Uley South lens has been slowly declining, most likely in response to periods of below average and low intensity rainfall, which is reducing the rate of groundwater recharge.

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

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

Far North

In the Far North of South Australia, petroleum, mining and pastoralism account for more than 90 per cent of the water use. The primary source of water is groundwater from the Great Artesian Basin (GAB), one of the world's largest and deepest artesian groundwater basins. Groundwater is the only reliable source of fresh water for central Australia, as rainfall and surface water flows are extremely variable. Groundwater within an area extending across approximately 315,000 km^2 is prescribed through the Far North Prescribed Wells Area. A water allocation plan is in place and is currently in the process of being amended.

The Far North is vast and sparsely populated. Much of the land is leasehold and is utilised for pastoral production, mining, gas and petroleum production, which are vital to South Australia's economy. The GAB springs, essentially surface discharge points of the GAB aquifer, support populations of unique and threatened fauna and flora and are of immense cultural and ecological importance. The Coongie Lakes Ramsar site, a mosaic of floodplain and dunefield areas of approximately 1.9 million ha in size, is located in the north-east of the region. When wet, these incredibly productive habitats support huge numbers of breeding birds.

Water for stock use is currently 9.78 GL per year, equivalent to approximately 15 per cent of the water authorised to be taken from the groundwater resources in the Far North. Historically, water for pastoral use has been through the uncontrolled flow of artesian wells. Over the past two decades, the federal and state governments and landholders have

invested approximately $29 million to repair and restore uncontrolled wells and to close open drains to improve the artesian pressure of the GAB. This investment now sees approximately 49 GL of water being saved every year across the GAB. The Far North Prescribed Wells Area water allocation plan further supports this investment by requiring water taken for pastoral use to be through closed delivery systems.

In nearly all cases, petroleum wells produce a mixture of petroleum and water. This water, mixed with the petroleum, is commonly known as co-produced water and a volume of 29.2 GL per year is currently authorised to be taken from the GAB, with 20.8 GL extracted in 2018-19. A total of 26.2 GL per year is authorised to be taken by the mining industry. This includes water used for product processing and mine dewatering, and includes the water currently authorised for taking by Olympic Dam Mine (15.3 GL per year) under the *Roxby Downs (Indenture Ratification) Act 1982*.

Tourism is also likely to increase in the region. Improvements in town water supplies, including increasing use of secure groundwater supplies, may encourage population growth but will also place further demands on the groundwater resource. Water users will need to find innovative ways to source water that complement the water that is used from the groundwater resources. Although there is potential for further utilisation of the water resource, this must be managed carefully to minimise the impact on the environment, particularly the GAB springs, and other water users. Excessive groundwater use may have unacceptable impacts on the water pressure or levels and affect other users' ability to access the water or reduce natural discharges to sites of cultural or ecological significance.

Strategic priorities for water security and next steps

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

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

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

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

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

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

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

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

South Australian Government strategic priorities for water security

In support of its sustainable growth agenda, the state government proposes to work with industry, key stakeholders and other partners on the following water security actions:

1. **For key water resources or priority growth industries where there is the potential for water demand to exceed available supply, work with stakeholders, including SA Water and local communities to develop highly targeted water security strategies. Consistent with the state's *Climate Change Action Plan*, these strategies will consider projected future water demand and pathways for the adoption of new or augmented supplies from all viable water sources and the use of new water technologies.**

   Ongoing – targeted water security strategies will be developed where evidence shows water supplies will be insufficient to meet established or credible potential demands, including in response to climate risk. Priorities for strategy development will be set in consultation with key stakeholder groups.

2. **As part of a new Climate Change Science and Knowledge Plan, improve the understanding of resource managers, water users and communities of the impacts of climate change on water resources and the reliability of water entitlements, to better inform decisions around current and future water use.**

   Ongoing – as water allocation plans are reviewed or water security strategies are developed.

3. **Building on the *Landscape South Australia Act 2019* reforms and the $15 million upgrade to the state's water licensing system, work with Landscape Boards and key stakeholders to ensure water planning processes operate efficiently, meet the information and other requirements of water users and maximise the productive use of available water resources.**

   From mid-2021 – after finalisation of the three-year forward work plan (see next item) and licensing system upgrade.

4. **Work with Landscape Boards and key stakeholders, including SA Water, to update the rolling three-year forward work plan for statutory water allocation planning to ensure that water resource management continues to be informed by science, that water resources are managed within sustainable limits and that water allocation plans are updated within timeframes that reflect risks to users and water resources.**

   A revised three-year forward work plan will be available for consultation by mid-2021.

5. **In reviewing and updating individual water allocation plans, work proactively with water retailers and other stakeholders to ensure critical human water needs continue to be prioritised appropriately and that water planning processes support the setting of objective water security standards where required.**

   Ongoing – as required to support investment decisions by water retailers or as individual water allocation plans are reviewed and updated

6. **Building on SA Water's planned investments in remote communities out to 2024, further investigate the case for additional water security investments in self-supplied remote communities and continue to support the provision of potable supplies for critical human water needs in exceptional circumstances, where such communities have identified risks to existing supplies.**

   Ongoing – with investigations to inform potential investment opportunities beyond 2024.

7. **Continue to drive full implementation of the Murray-Darling Basin Plan for a healthy River Murray – to meet critical human water needs in Adelaide and SA country towns, maintain vibrant river communities, meet the aspirations of First Nations and sustain internationally important floodplains and wetlands.**

   Ongoing – with the final water recovery milestone under the Basin Plan due to be met by 30 June 2024.

8. **Develop an Urban Water Directions Statement that sets a state framework for optimising the use of all urban water sources – in a way that supports growth, greening and liveable towns and cities, more efficient and cost-effective water use, as well as the release of water for productive use outside of urban areas.**

   Engagement with stakeholders including water retailers and local government will occur in 2021 following release of the first of a series of discussion papers, with a Directions Statement to be completed by the end of 2021.

9. **Progress the findings and recommendations of the review of the *Water Industry Act 2012* to further drive innovation and competition in the water industry sector.**

   From 2021 onwards, following release of the review report.

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

    Overarching strategy to be prepared in consultation with the water sector and water dependent industries, to be finalised by 2021, with implementation ongoing.

Next steps

In addition to pursuing the strategic priorities outlined above, consultation on this draft state-wide Water Security Statement will be undertaken with water retailers and key stakeholder groups in mid-2021 before being finalised and tabled in Parliament later in 2021.

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

The next review and update of this Water Security Statement will coincide with the consideration of SA Water's draft Regulatory Business Proposal for the 2024-28 regulatory period. As such, the proposed actions should be seen as the government's overarching water security priorities for the current four year regulatory period, out to 1 July 2024.

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Glossary

Term	Explanation
Water security	Water security is having an acceptable quantity and quality of water for people, industry, mining and energy, agriculture, forestry and the environment. This requires an acceptable trade-off to be found between reliability of supply and cost for a given end-use.
Prescribed water resource	Prescription is a statutory process, which means the water resource must be sustainably managed to provide security for all water users, including the environment, now and into the future. For water resources that are prescribed across the state, a licensing system is in place to make sure water is allocated and used sustainably, in line with the rules set out by a water allocation plan.
Non-prescribed water resource	Water resources that do not require comprehensive management through a water allocation plan and water licensing system because there is insufficient demand for water, or there is a lower risk to the water resource. For non-prescribed water resources, water affecting activities such as the construction of a well, dam or weir, are managed through permits to protect the integrity of the water resources and the local ecosystems that rely on the water, and to control potential impact of activities.
Bundled water rights	A 'bundled' water licensing system means a licence holder's rights for taking and use of water are authorised in one licence. *In a bundled system the volume of water allocated is the volume held on licence.*
Un-bundled water rights	Unbundling refers to water-related rights being separated from each other. Unbundled rights are granted in separate documents, which can include: • Water access entitlement (water licence): ongoing right to receive a portion of the available water resource • Water allocation: a right to take a specified volume of water in a specified period (not exceeding 12 months) • Water resource works approval: a right to take water at a particular location, it may specify a maximum volume of water that may be taken. • construct, operate and maintain infrastructure to take water • Site use approval: a right to use water at a particular location *Currently, in an un-bundled system the volume of water allocated is a portion of the available resource, based on the number of water access entitlements held and the rules in the relevant water allocation plan. In some prescribed areas the allocation is subject to change based on water availability and/or resource condition triggers.*
Carryover	Unused allocation that is available for use in a future year.
Maximum long-term volume available for use	The total volume of water on water access entitlements (unbundled) or licences (bundled) held for a particular water resource. This does not account for carryover, rollover or trade.
Volume available for use	The total volume allocated plus or minus any volume carried over and/or traded.
Long-term sustainable level of take	The sustainable level of take is how much water, on average, can be used each year from a given water resource for consumptive purposes without having an unacceptable impact on the ecosystems that depend on the water resource.
Water use (consumptive)	The volume of water extracted from a water resource for consumptive purposes. In a small number of low-risk cases, water used is not metered and water use is assumed.

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

Region	2015-16		2016-17		2017-18		2018-19	
	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)
Adelaide Plains	36,475	14,454	37,581	10,304	43,759	12,647	45,564	14,540
Northern Adelaide Plains	**35,625**	**13,799**	**36,731**	**9,809**	**40,488**	**11,573**	**40,488**	**13,346**
Underground water	35,625	13,799	36,731	9,809	40,488	11,573	40,488	13,346
Adelaide Plains	**0**	**0**	**0**	**0**	**0**	**0**	**1,805**	0
Underground water	0	0	0	0	0	0	1,805	0
Dry Creek	**850**	**655**	**850**	**495**	**850**	**254**	**850**	**164**
Underground water	850	655	850	495	850	254	850	164
Kangaroo Flat	**0**	**0**	**0**	**0**	**2,421**	**820**	**2,421**	**1,030**
Underground water	0	0	0	0	2,421	820	2,421	1,030
Barossa and Clare Valley	18,569	6,719	18,215	5,175	18,741	6,413	18,741	6,819
Barossa	**13,766**	**5,260**	**13,423**	**3,900**	**13,870**	**4,931**	**13,870**	**5,401**
Surface water	1,602	308	1,594	537	1,773	579	1,773	270
Underground	8,535	3827	8,449	2,487	8,797	3,457	8,797	4,408
Watercourse	3,629	1123	3,380	876	3,300	895	3,300	723
Clare Valley	**4,803**	**1,459**	**4,792**	**1,275**	**4,871**	**1,482**	**4,871**	**1,418**
Surface water	1,635	419	1,658	501	1,702	556	1,702	182
Underground	2,223	801	2,222	425	2,236	885	2,236	1,217
Watercourse	945	239	912	349	933	41	933	19
Eyre Peninsula	9,362	5,139	9,497	5,249	9,455	5,183	9,351	5,219
Musgrave - Underground	**290**	**73**	**256**	**93**	**256**	**88**	**643**	**92**
Southern Basins - Underground	**9,072**	**5,066**	**9,241**	**5,156**	**9,199**	**5,095**	**8,708**	**5,127**
Far North	49,511		49,518		49,771		49,771	
Underground	49,511	0	49,518	0	49,771	0	49,771	0
McLaren Vale	7,899	4,939	7,765	3,017	8,301	4,471	8,301	5,097
Underground	7,899	4,939	7,765	3,017	8,301	4,471	8,301	5,097

Region	2015-16		2016-17		2017-18		2018-19	
	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)
Mount Lofty Ranges	292,312	44,644	295,730	146,742	299,459	133,962	299,459	66,719
Western Mount Lofty Ranges	**221,968**	**31,381**	**223,530**	**137,263**	**227,506**	**120,555**	**227,506**	**50,046**
Surface water	163,638	21,886	163,722	128,909	163,929	107,050	163,929	32,666
Underground	53,302	8,437	54,780	7,614	58,617	12,342	58,617	16,092
Watercourse	5,028	1,058	5,028	740	4,960	1,163	4,960	1,288
Little Para - Watercourse	**638**	**0**	**638**	**0**	**638**	**0**	**638**	**0**
Eastern Mount Lofty Ranges	**53,062**	**9,264**	**55,628**	**6,779**	**55,659**	**9,629**	**55,659**	**12,393**
Surface water	4,269	575	4,372	636	4,402	1,352	4,402	1,355
Underground	31,726	7,557	33,872	4,947	34,132	7,100	34,132	9,440
Watercourse	17,067	1,132	17,384	1,196	17,125	1,177	17,125	1,598
Angas Bremer - Underground	**10,465**	**1,720**	**9,862**	**933**	**9,516**	**1,479**	**9,516**	**2,075**
Marne Saunders	**6,179**	**2,279**	**6,072**	**1,767**	**6,140**	**2,299**	**6,140**	**2,205**
Surface water	1,428	420	1,415	354	1,424	603	1,424	311
Underground	4,540	1,855	4,460	1,298	4,511	1,644	4,511	1,871
Watercourse	211	4	197	115	205	52	205	23
Murraylands and Riverland	906,796	632,276	768,981	451,480	697,589	570,086	754,353	681,874
River Murray - Watercourse	**844,231**	**599,010**	**705,417**	**424,890**	**634,025**	**534,869**	**690,789**	**645,066**
Mallee - Underground	**60,354**	**32,694**	**61,353**	**26,018**	**61,353**	**34,639**	**61,353**	**36,159**
Peake, Roby Sherlock - Underground	**2,211**	**572**	**2,211**	**572**	**2,211**	**578**	**2,211**	**649**
South East	1,466,695	730,540	1,446,372	542,769	1,488,882	591,769	1,488,882	624,180
Lower Limestone Coast	**1,144,684**	**553,313**	**1,127,704**	**421,372**	**1,163,741**	**446,522**	**1,163,741**	**461,142**
Underground	838,856	283,352	821,647	174,939	857,897	212,514	857,897	237,396
Forestry	305,828	269,961	306,057	246,433	305,844	234,008	305,844	223,746
Padthaway - Underground	**65,547**	**39,508**	**65,055**	**21,619**	**66,948**	**29,610**	**66,948**	**35,516**
Tatiara - Underground	**160,297**	**95,925**	**158,296**	**72,017**	**162,030**	**78,810**	**162,030**	**88,309**

Region	2015-16		2016-17		2017-18		2018-19	
	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)	Allocation (ML)	Use (ML)
Tintinara-Coonalpyn - Underground	**96,154**	**41,794**	**95,304**	**27,491**	**96,150**	**36,675**	**96,150**	**38,997**
Morambro Creek	**13**	**0**	**13**	**270**	**13**	**152**	**13**	**216**
Surface water	12	0	12	0	12	0	12	0
Watercourse	1	0	1	270	1	152	1	216

Appendix B: Water allocation plan status and review timeframes

Water Allocation Plan (WAP)	Landscape region	Adoption date of current WAP	Next review/amendment	Comment
Far North WAP	South Australian Arid Lands	February 2009	Consultation completed in 2020, finalising amendment	The first Far North Prescribed Wells Area WAP was adopted in 2009. An amended water allocation plan has been drafted and was consulted upon in 2020 and is scheduled for adoption in the fourth quarter of 2020.
River Murray WAP	Murraylands and Riverland	April 2020	A targeted amendment is underway	The first generation River Murray WAP was adopted in 2002 and last amended on 15 April 2020. A further amendment process is underway to revise the Environmental Land Management Allocations (ELMA) arrangements.
Adelaide Plains WAP	Green Adelaide	New WAP under development	Finalising draft WAP before formal consultation	The Northern Adelaide Plains WAP was adopted in 2000 and last amended in 2010. The Adelaide Plains WAP, covering the Northern Adelaide Plains, Dry Creek and Central Adelaide Prescribed Wells Areas is currently being developed.
Barossa WAP	Northern and Yorke	June 2009	Amendment underway	The Barossa WAP was most recently reviewed in 2020 and amendments in response to this review are being drafted. Statutory consultation on this updated water allocation plan will be undertaken in 2021.
Tatiara WAP	Limestone Coast	June 2010	Amendment underway	The second generation Tatiara WAP was adopted on 7 June 2010. A review of this WAP was initiated in 2017 and the water allocation plan is currently being amended in response.
Padthaway WAP	Limestone Coast	April 2009	Amendment underway	The second generation Padthaway Prescribed Wells Area WAP was adopted in 2009. A review was undertaken in 2018 and the water allocation plan is currently being amended.
Baroota WAP	Northern and Yorke	NA	WAP currently under development	This resource was prescribed in 2008. A water allocation plan is currently being drafted and is planned to be consulted on in 2021.
Morambro Creek WAP	Limestone Coast	January 2006	2021	The Morambro Creek WAP was adopted in January 2006. The 2010-11 review determined that an amendment was not required at that time. A review of the water allocation plan is due in 2021.
McLaren Vale WAP	Hills and Fleurieu	2007	2021	The second generation McLaren Vale WAP was adopted in February 2007 and reviewed in October 2011. A review is due in 2021, however the WAP may be incorporated into the WMLR WAP as part of a review in 2023.
Peake Roby Sherlock WAP	Murraylands and Riverland	March 2011	2021	The first generation Peake, Roby, Sherlock WAP was adopted on 2 March 2011. Minor changes were made in 2017 to ensure Basin Plan compliance. A review of the water allocation plan is due in 2021.

Clare Valley WAP	Northern and Yorke	February 2009	2024	The second generation Clare Valley WAP was adopted on 4 May 2009. The WAP was reviewed in 2019 and not amended. A further review is being considered by the Northern and Yorke Landscape Board.
Mallee WAP	Murraylands and Riverland	May 2012	2022	The second generation Mallee WAP was adopted on 2 May 2012. Minor changes were made in 2017 to ensure Basin Plan compliance. A review of the WAP is due by May 2022.
Tintinara - Coonalpyn WAP	Limestone Coast	January 2012	2022	The second generation Tintinara Coonalpyn WAP was adopted on 23 April 2012. A review of the WAP is due by April 2022.
WMLR WAP	Hills and Fleurieu	September 2013	2023	The first generation WMLR WAP was adopted on 17 Sept 2013. A review of the water allocation plan is due by September 2023.
Lower Limestone Coast WAP	Limestone Coast	November 2013	2023	The Lower Limestone Coast Prescribed Wells Area WAP was adopted in November 2013 and has been amended three times (2014, 2015, and 2019). A review of the WAP is due by November 2023.
EMLR WAP	Hills and Fleurieu	December 2013	2023	The first generation EMLR WAP was adopted on 17 Dec 2013. Minor changes were made in 2019 to ensure Basin Plan compliance. A review of the WAP is due by December 2023.
Southern Basins and Musgrave WAP	Eyre Peninsula	June 2016	2026	A new Southern Basins and Musgrave WAP was adopted on 28 June 2016. A review of the WAP is due by June 2026.
Marne Saunders WAP	Murraylands and Riverland	January 2010	2030	The first generation Marne-Saunders Prescribed Water Resources Area WAP was adopted in 2010. A 2019 review determined that an amendment was not required at that time. A review of the WAP is due by 2030.

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Interception scheme 'destroying family farm'...

A bit salty

STEPHANIE THOMPSON

The Frahns have planted about 35,000 trees in a bid to manage the salinity on their property due to the neighbouring Noora Basin. PHOTO: Stephanie Thompson

A RIVERLAND family is demanding answers – and compensation – as salinity and seepage continue to destroy their family farm.

The Frahns' farm borders the Noora Basin Salt Interception Scheme – east of Loxton – and when Yvette and Gary Frahn purchased the land in 1999, it had three dry salt scalds.

Mrs Frahn said the property now has five large salt pans, three of which have had water in them for the past 10 years.

"We are unwilling, but integral participants of the interception project," she said.

Mrs Frahn said the family was seeking compensation from the State Government and is frustrated by the ongoing process.

"We understand the incredible importance of the salt interception scheme," she said.

"Without doubt, whatsoever, had they not implemented the interception scheme, we wouldn't have an irrigation industry.

"What we don't like is the fact that they are unwilling to embrace the idea that we are part of the scheme and we pay the price for the scheme."

The Noora Basin, which was commissioned in 1982, is located about 20km east of Loxton and was originally identified as a suitable disposal location due to its low elevation and because groundwater naturally discharges into the area.

Mrs Frahn said seepage from the Noora basin is raising the water table on their farm, pushing the salt to the surface.

"They have been telling us that it's our doing and it's had nothing to do with them and there's no way water could get from the basin to here," she said.

"It's not as though we don't have natural salinity.

"But, that salinity wouldn't have done any damage at all had it not been for the seepage."

In the past 22 years, the Frahns have planted over 35,000 trees, including 10,000 directly around the salt pans, in a bid to manage seepage.

"We are custodians of this land," Mrs Frahn said.

"It's part of our family's belief system to be the best caretakers we can possibly be."

Mrs Frahn said a number of neighbouring properties are also being affected by the basin's impact.

Farming Systems Consultant Chris McDonough wrote a report about the salt scald expansion at the Frahn property.

"There continues to be large increases in bare scald and salt-affected land," he said.

"Soil testing has consistently shown substantial rises in topsoil salinity, well in excess of toxic levels.

"(The) report has highlighted that there are very large land degradation issues occurring at the Frahn property as a direct impact from the Noora Basin Salt Interception Scheme."

Farm business management consultant Mike Krause compiled an economic report in 2019 about the impact of the Noora Basin scheme on the Frahns' Bugle Hut property and found the compensation figure to be substantial.

"The assessment of economic loss has been broken down into past costs incurred by the Frahns, as they have had to manage and learn of the extent of the environmental impact to their Bugle Hut property, and future compensation payment for anticipated economic loss," he said in the report.

Member for Chaffey Tim Whetstone said he took Minister for Environment and Water David Speirs to the property about five years ago.

"I showed him the initial impacts of scalding appearing in some of that dryland country," he said.

"It appears to be getting worse.

"I have continued to work with Frahns and continued to work with both the previous government and am now working with this government."

A State Government spokesperson acknowledged the ongoing issue with the Frahns' Bugle Hut property.

"The State Government is aware of the request for compensation by the Frahns and is continuing to consider its position," the spokesperson said.

"Noora Basin commenced operations in 1982, 17 years before the Frahns purchased their property.

"The risk of potential future salinization of surrounding land was understood when the Basin was established and was discussed with the neighbouring landholders at that time."

The spokesperson said the operation of salt interception scheme had many benefits.

"The operation of salt interception schemes along the River Murray is one of this country's great environmental success stories, with salinity levels in the river and many of its associated wetlands significantly reduced as a result of their operation, with consequential benefits for ecosystem health," the spokesperson said.

"The establishment of the Noora Basin has created a much more diverse and vibrant ecosystem, including vegetation and bird and fish life, than what had existed at that location previously.

"The Noora Basin is also playing a key role in the delivering of environmental outcomes under the Murray-Darling Basin Plan."