

Adaptive Management of the Groundwater Resources on Eyre Peninsula

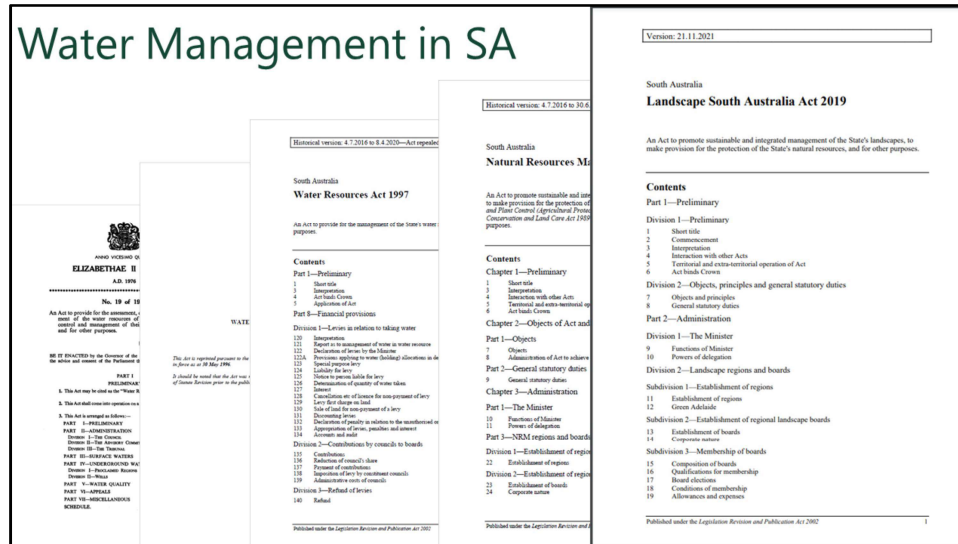
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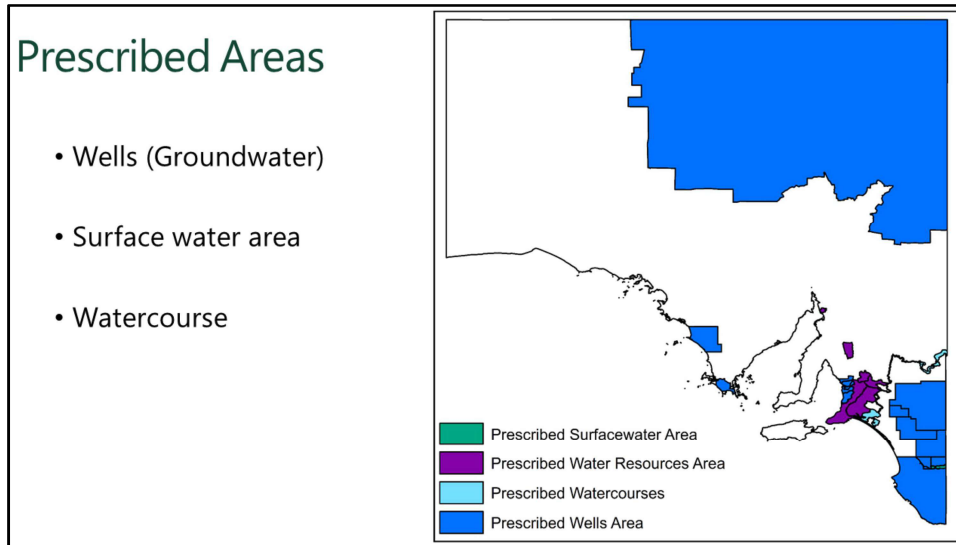
Government of South Australia
Department for Environment
and Water



Over time the direction for how water management should be undertaken in South Australia has been guided by the relevant legislation, being:

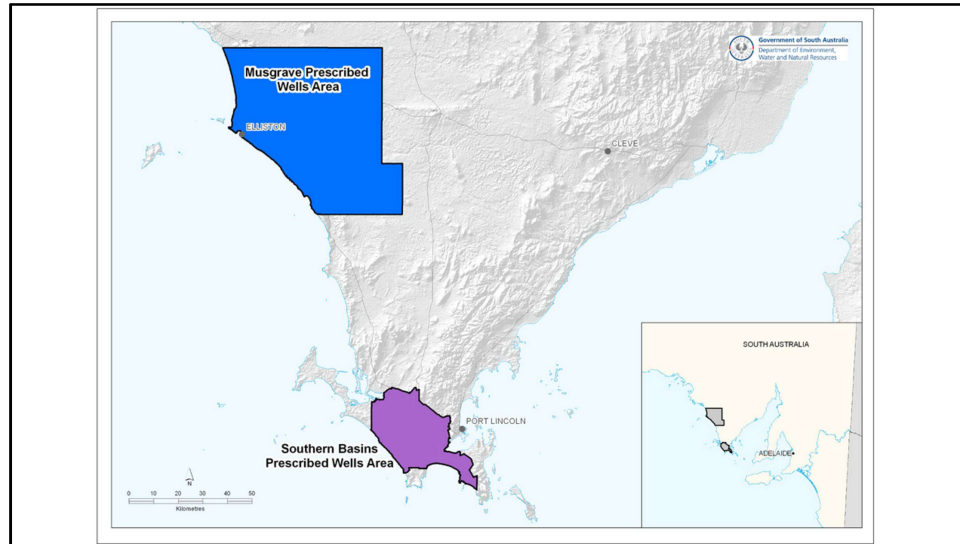
- the 1976 Water Resources Act
- the 1990 Water Resources Act
- the 1997 Water Resources Act
- the 2004 Natural Resources Management Act and
- the 2019 Landscape South Australia Act

In South Australia, no one “owns” water but the Government has the legal right to manage it for the good of the environment and the community.

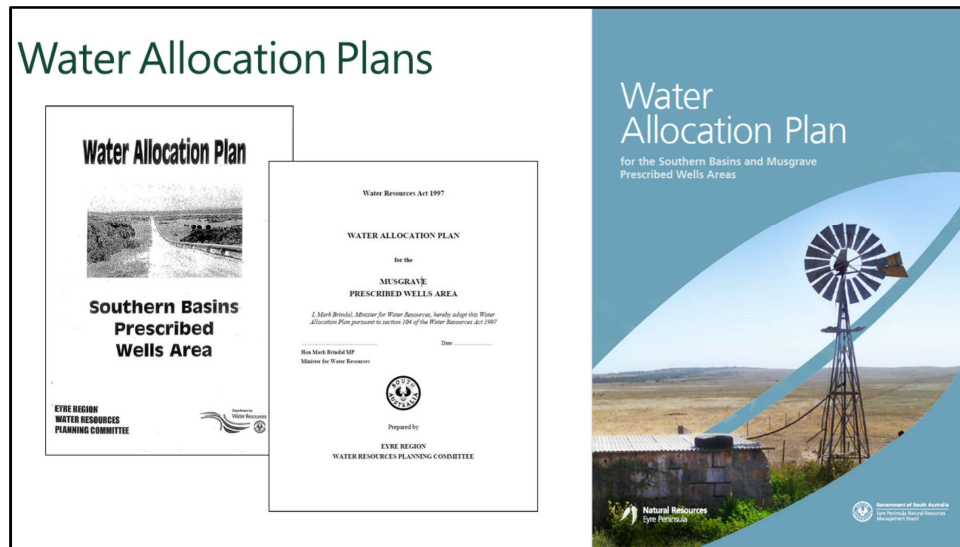


The legislation enables a water resource to be 'prescribed' by regulation when the water use in an area is at a level at which regulatory control is needed to ensure a sustainable rate of extraction and to maintain water dependent ecosystems. Once a resource is prescribed, the taking of water from the resource (with some exclusions) is managed through a property rights system that allows ownership of access to water via water licences. As a property right, water rights are separate from land ownership and access rights to water can be traded (bought and sold).

There are currently 28 prescribed areas in South Australia.



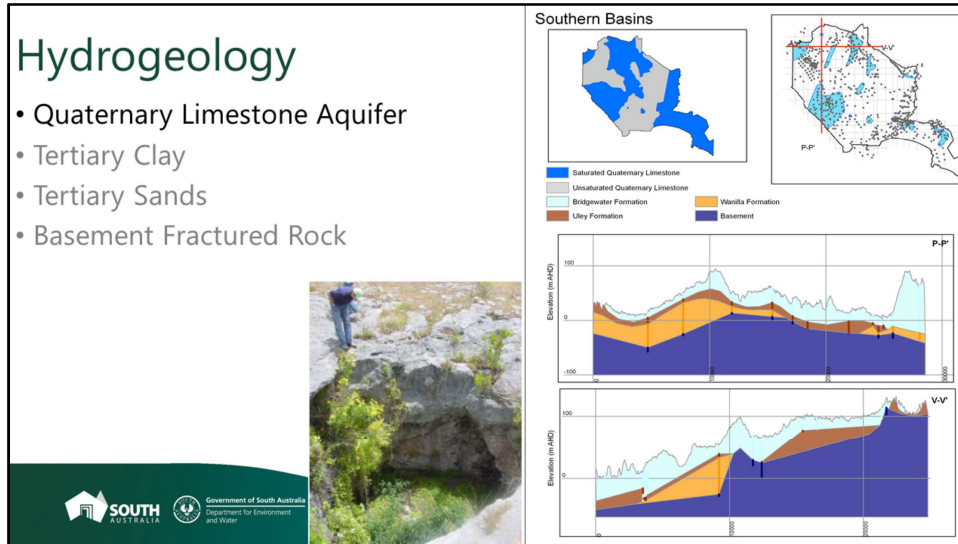
The two prescribed areas I will discuss today, the Southern Basins and Musgrave Prescribed Wells Areas, are located on the Eyre Peninsula.



Water Allocation Plans provide the framework for sustainable management of these resources by taking into account the competing environmental, social and economic demands for groundwater. In South Australia, a Water Allocation Plan is a legal document which sets out the rules for managing the take and use of a prescribed water resource and is developed by a regional resource management authority under the *Landscape South Australia Act 2019*, with input from the community, industry and key stakeholders.

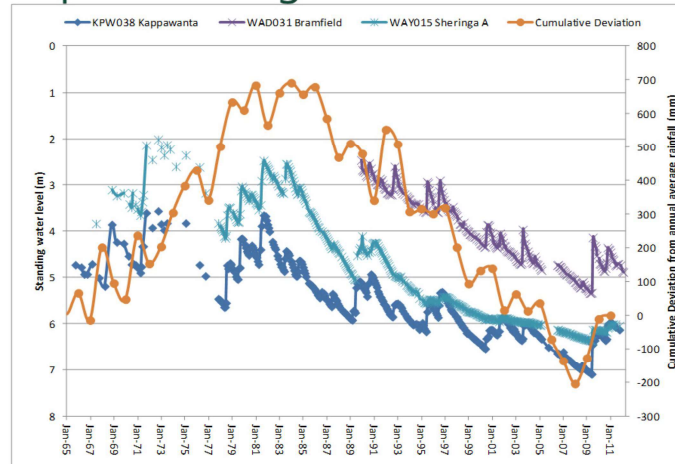
The Southern Basins and Musgrave PWAs had their first Water Allocation Plans adopted in 2000. Each Water Allocation Plan is reviewed within 10 years of its adoption to ensure the management principles are effective and the resource is being managed sustainably in light of the latest available science and monitoring data.

As such, the approach to adaptively managing these water resources discussed today is what informed the development of the 2016 Water Allocation Plan which combined both areas into a single plan.



The region is characterised by karstic limestone aquifers, underlain by tertiary and basement resources. Given the absence of any surface water resources, groundwater from within the limestone aquifer is the principal source of water for town water supply, irrigation, and stock and domestic purposes.

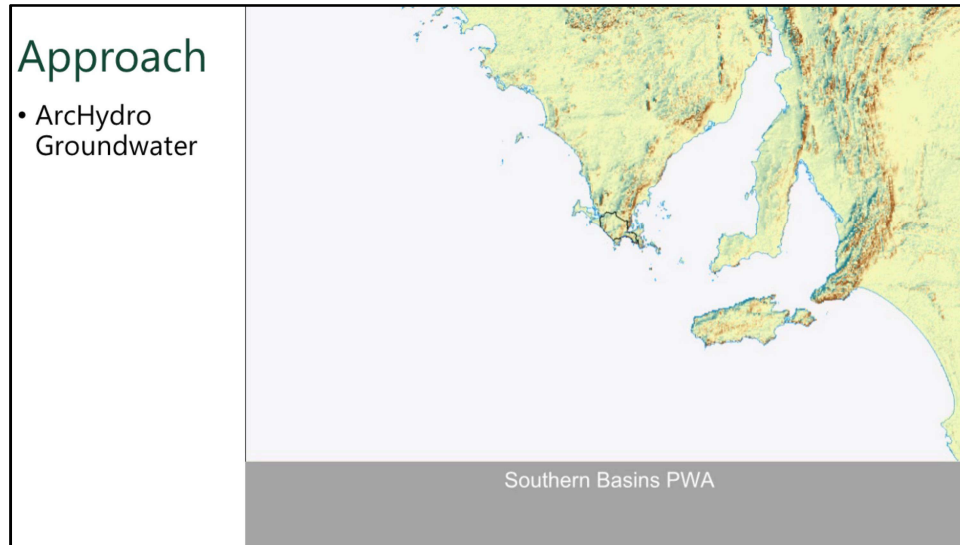
Why Adaptive Management?



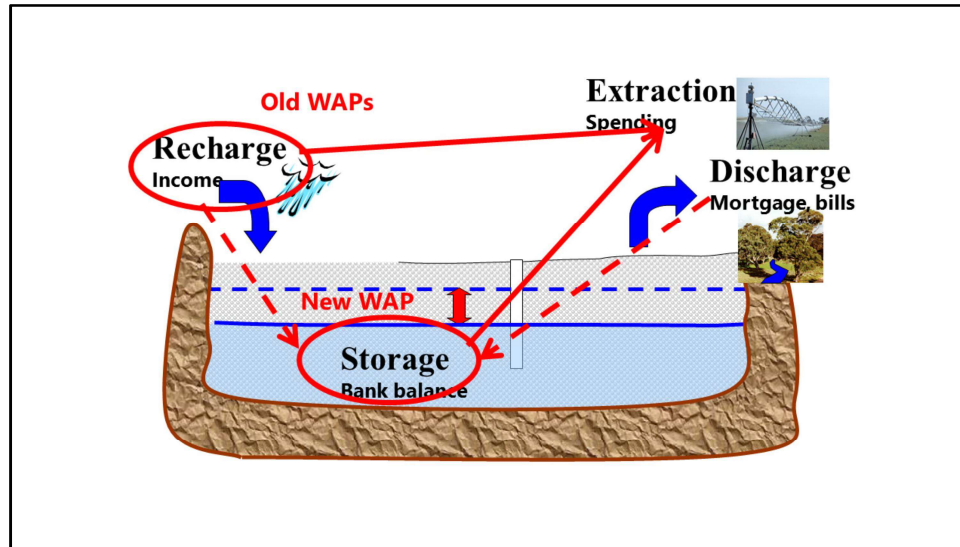
South Australia is the driest state in the driest inhabited continent in the world. The majority of the state is characterised by an arid to semi-arid climate, with 96% of the state receiving less than 500 mm of rain each year.

On the Eyre Peninsula, recharge and groundwater storage is known to vary strongly in response to changes in climatic conditions and therefore an effective adaptive management process is essential for sustainable water resource management.

Given the high reliance of the groundwater resource on rainfall, we needed an approach to manage the volume of water which could be taken from the resource in periods of below average rainfall to ensure longevity of the resource.

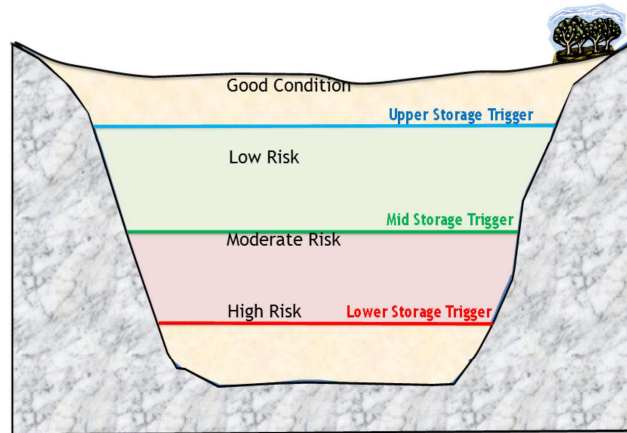


Arc Hydro groundwater, a GIS plugin was used to produce 3d representation of the relevant fresh water lenses used for water extraction. From the information obtained from aquifer structure and water levels, the volume of storage in each resource was able to be determine – how the level of storage changes over time is what the WAP uses to determine allocation volumes.



If you think about the aquifer like a bank balance where the recharge is your income, the discharge is your non-negotiable payments such as your mortgage and bills, this includes things like natural outflows or water required to continue to flow to GDEs, then extraction is like your discretionary spending, the shopping sprees, nice dinners out etc. The old plan looked at the recharge and determined the extraction without taking into account what was in storage or what the natural discharges are, whereas the new plan looks at what is in storage to determine what can be extracted, which inherently takes into account the recharge and the natural discharges. This approach is much more responsive to changes in rainfall and hence recharge and storage.

Triggers determine allocation



Three levels of triggers were identified:

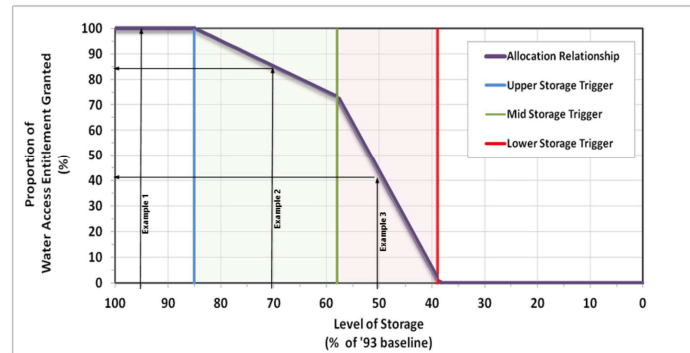
If the resource storage is above the Upper Storage Trigger, things are good and people can take their full licenced volume

When the storage level is between the Upper Storage Trigger and the Mid Storage Trigger the resources is considered to be at low risk and so the percentage of allocation available reduces proportionally as the storage level declines.

When the Mid storage trigger is reached, the risk becomes moderate and this is where the allocations start to decrease at a higher rate in relation to the change in storage, until the lower storage trigger is reached.

When the lower storage trigger is reached, no water is made available for licensed purposes in order to ensure natural discharges from the resource are able to be maintained.

<i>Example 1:</i>	Level of Storage:	95%	Volume of water available for allocation:	100%	Allocation:	<u>1.0 kilolitres/share</u>
<i>Example 2:</i>	Level of Storage:	70%	Volume of water available for allocation:	85%	Allocation:	<u>0.85 kilolitres/share</u>
<i>Example 3:</i>	Level of Storage:	50%	Volume of water available for allocation:	42%	Allocation:	<u>0.42 kilolitres/share</u>



For example

Want to know more?

- Come and have a chat, or read:
- Technical Report 1 -
https://www.waterconnect.sa.gov.au/Content/Publications/DEW/DFW_TR_2012_15.pdf
- Technical Report 2 -
https://www.waterconnect.sa.gov.au/Content/Publications/DEW/DEWNR_TR_2013_19_web.pdf
- Water Allocation Plan -
https://cdn.environment.sa.gov.au/landscape/docs/ep/water_allocation_plan_southern_basins_musgrave_pwas_web.pdf

Questions?



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