

Issues and management options

This Information Sheet presents potential options for managing the water resources of Barossa to inform community discussion regarding future water management. The Landscape Board is seeking input into the objectives and management options to be considered in the preparation of an amended Barossa Water Allocation Plan (the Plan).

Water management objectives and options will be discussed at a community webinar on 24 January 2023. A draft Plan will be released for formal consultation later in 2023.

The management options presented in this paper have been prepared to guide discussion and are not agreed policy positions. There may be other options that haven't been included in this paper - it will be possible to explore other options at the workshop.

If you are unable to attend the webinar on Tuesday 24 January 2023, you can have your say by completing a survey or submitting your feedback via our yourSAy consultation: <https://yoursay.sa.gov.au/barossa-wap-amendment>

What we have heard so far

We have been speaking with community members during the development of the Barossa Water Security Strategy (discussed in Information Sheet #1) and via our Water Allocation Plan Advisory Group. Many community members have raised concerns around the limited flows through the region's waterways during recent years of reduced rainfall.

We have heard that:

- improving flows through the system is important for many reasons:
 - to maintain amenity and environmental values
 - to maintain cultural values
 - to maintain access to water for industry
 - to ensure more equitable sharing of water resources
- Rising groundwater salinity is of concern and it is having an impact on crops and soil health when used for irrigation

Information sheets

A package of information will assist in discussions at the [webinar on 24 January 2023](#). The information sheets provide background details and set out the issues Barossa water resources are facing and what the Plan can do to manage those issues:

- #1 – Introduction and Background
- #2 – Unbundled Water Rights
- #3 – Surface Water and Groundwater
- #4 – Ecological Summary
- #5 – Issues and Management Options.**

What are the risks of doing nothing?

If no action is taken to address the impacts of climate change and extractions on surface water and groundwater resources, it is expected that the reliability of water will continue to decline, as will cultural and amenity values and the health of ecosystems.

There is the potential that extractions will increase over time and water availability will decrease, which could lead to water use that is not sustainable over the longer-term. Irrigation demand increases during dry years, which can exacerbate the impacts of decreased rainfall on streamflow and groundwater recharge.

We will continue to experience a variable climate into the future, including wet years from time to time. The projected long-term trend, however is for a decline in rainfall and runoff and higher temperatures.

Risks to surface water

The level of dam development and the volumes extracted from watercourses is impacting on flows through the system. Lower-than-average streamflow was recorded during 2019-20 and long-term data trends show a decline in streamflow.

The recent period of dry years has seen the ceasing of flows in some watercourses that have previously always flowed. In dry periods dams take longer to fill and spill. This changing flow pattern is impacting on local ecosystems and also impacts on other water users with dams further down the catchment receiving minimal flow.

Management options that only target the use of surface water (eg through managing allocations) is unlikely to provide sufficient improvements in flow regimes as the water infrastructure itself is impacting on how often dams fill and spill. Complementary actions to return environmental flows are likely to be a more effective option.

Risks to groundwater and baseflow

Some groundwater wells are already showing signs of declining water levels and increasing salinity. In 2020, more than 90% of monitoring wells showed below-average or lowest-on-record water levels. Five-year trends indicate the majority of wells show declining water levels. If this trend continues, it will become more difficult to access groundwater of a suitable quality for use.

For the confined lower aquifer, maintaining pressure levels is important so that the aquifer doesn't become unconfined.

Groundwater also provides baseflow, which is particularly important for maintaining permanent pools in watercourses. It will be important to identify options to manage these risks and issues via water allocation plan policies, alongside other water-related projects underway.

Risks to ecosystems

Ecosystems have been significantly impacted by recent dry years, compounding the long-term impacts of reduced flows as a result of the high level of dam development. The combination of the predicted reduction in rainfall and hotter temperatures is expected to reduce runoff, reduce recharge of groundwater and increase irrigation demand, and without intervention will result in further ecological decline. Management options that protect flows through catchments and protect baseflow will be important for ecosystem health.

Due to the challenges arising from changing climate conditions, it will be important to identify options to manage these risks and issues via water allocation plan policies, alongside other water-related projects underway.

The challenges

The Barossa has recently experienced several below average rainfall years which has impacted on runoff, streamflow and recharge of groundwater. We will continue to collect data to better understand the long-term outlook for the area and allow for better assessment of future management options.

Given the high degree of uncertainty regarding future water availability building flexibility into the Plan will be important. It is important that there is transparency around what may happen under certain conditions, so water users can plan ahead and make decisions around their water supplies.

Options that could be included in the amended Plan are discussed further below.

Objectives

Draft objectives have been developed for discussion at the workshop. **The table below sets out proposed objectives and how they could be met via policies in the Plan.** These relate to the management options set out in the next sections below. The final objectives and management options will be guided by discussion with community members and licence holders.

Objective	Broad approaches under consideration
1. Ensure that surface, watercourse and underground water resources are managed within acceptable resource condition limits	- Identify acceptable resource condition limits for different resource types - Set these limits at existing levels of development meaning no new allocations and no net increase in dam storage - Where appropriate identify proposed course of action if resource condition limits reached
2. Maximise security of access to native water resources for current and future users within resource constraints	- Existing entitlements retained - Use of variable annual allocations if required rather than permanent reductions - Protective buffers around existing wells
3. Support the resilience of water-dependent ecosystems and their functionality	- Identify the current water dependent ecosystems and define their functionality - Identify key ecological resource conditions that are considered unacceptable - Identify potential courses of action if these conditions occur - Increased monitoring to better understand ecological response to water management policies/WAP principals as well as changing climatic patterns
4. Provide for the flexible and variable use of water in response to seasonal climatic variability and availability	- Flexible licence structure to allow for variable allocations - If required use of variable allocations rather than permanent changes to entitlements
5. Provide the ability to respond to declining resource condition at an appropriate scale	- Looking to refine current broad management zones to a more localised scale. - Surface/watercourse water primarily catchment based - Underground water primarily based on groundwater resource type
6. Recognise and incorporate First Nations cultural water interests	Ongoing discussions with Kurna, Peramangk and Ngadjuri representatives to incorporate cultural perspectives and input into the plan.

Management options

This section sets out considerations for the management of surface water, ecosystems and groundwater to contribute to meeting the objectives for the Plan.

All options included in this paper are presented for discussion and the Board will be seeking community thoughts on potential approaches. No decision has been made on the preferred options and community input will assist in refining the options for inclusion in an amended Plan.

Options 1-4 are deemed the most suitable to consider for inclusion in the amended Plan. Options 5-8 are included for information and are considered more suitable to progress outside of the Plan or at a later date. All options are presented for discussion.

Surface water and ecosystem management options

As set out in Information Sheet #3 and #4, the surface water resources and ecosystems of Barossa are stressed and climate change is likely to exacerbate risks.

The main risks that need to be managed are:

- The impacts of the capture and use from existing dams and watercourse extractions on flow regimes
- Potential reduced capacity of the surface water resource due to a long-term declining trend in rainfall

Considerations for surface water (including watercourses) and environmental management have included:

- Establishing a number of surface water management zones based on the main sub-catchments across the area
- Establish upper extraction limits for each zone equal to the total current volume allocated resulting in no new surface water/watercourse water volumes being available, in recognition of the likely long-term decline in surface water availability
- Allow no net increase in dam capacity as the level of dam development is already very high
- As an exception to the above, include a specific policy allowing for capture and re-use of additional runoff generated as stormwater from urban development, similar to policies in neighbouring water allocation plans (the pre-development runoff volume would need to remain in the system but volumes above that could be taken and used)

- Allow transfers of allocations within management zones (subject to assessment) but no transfers between zones

Groundwater management options

As set out in Information Sheet #3, recent below-average rainfall has resulted in reduced recharge in shallow aquifers, and combined with increased water extractions, can cause groundwater levels to decline in deeper confined aquifers.

The main risks that need to be managed are:

- Declining groundwater levels from reduced rainfall and levels of use (all aquifers)
- Increasing salinity from extraction (all aquifers)
- Pressure level changes and recovery due to levels of use (confined lower aquifer)
- Protecting baseflow to maintain permanent pools

Considerations for groundwater management have included:

- Establishing a number of groundwater management zones based on aquifer and the issue to be addressed (eg water level)
- Establish upper extraction limits for each zone equal to the total current volume allocated resulting in no new groundwater volumes being available
- Allow transfers of allocations within management zones (subject to assessment) but no transfers between zones
- Use of buffer distances between new wells or increased extraction points, to protect existing wells or groundwater-dependent ecosystems (eg when an allocation is transferred)

More information

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Option	How it would work	Advantages and disadvantages	Why might this be a good option?	Related Objective
Options that could be progressed in the amended Plan				
1. Include thresholds that represent 'unacceptable' resource condition (Surface water and Groundwater)	A safety net could be included in the Plan that would instigate a response should 'unacceptable' resource condition thresholds be reached. The response could be to further investigate the cause of the threshold being reached and what management options would rectify the issue, or specify in the Plan what the management response would be (for example Option 2 or 3 below) For surface water – resource condition would be based on observed flow regime and the condition of permanent pools throughout the system. For groundwater – resource condition would be based on water levels, salinity or pressure level changes (confined lower aquifer).	<i>Advantages</i> This would provide a level of protection so that a response would be instigated if thresholds were reached. If the response was to review the cause of the thresholds being reached and to identify the most appropriate action to take at that time, this would provide flexibility to ensure the most effective action is taken based on the information available at the time (which may be improved from what we know now). <i>Disadvantages/challenges</i> It is difficult to know exactly how to respond while the climate is in a dynamic state of change. Not including a response may also further exacerbate risks to long-term access to water resources.	This may be a good option to include in the Plan in conjunction with other options presented in this table.	1, 3 and 6

Option	How it would work	Advantages and disadvantages	Why might this be a good option?	Related Objective
Options that could be progressed in the amended Plan				
2.Adaptive allocations in line with resource capacity and condition – act when resource condition thresholds are reached (Surface water and Groundwater)	The annual volume of water allocated to licensees could be varied from time to time, for example when a resource condition threshold is reached, as per Option 1, or following a year (or number of years) when rainfall is significantly below average. This could initially be implemented in targeted management zones where resource condition is already at risk. The permanent right to access water (water access entitlement) would not change – but the annual volume allocated could vary when needed to protect the resource.	<i>Advantages</i> This would better reflect the availability of water in dry years and share the reduced capacity more fairly with the environment. In wetter years, allocations would not need to be reduced. This would signal to water users that there may not be enough water in the system to meet full allocation requirements in all years. This response would protect long-term and equitable access to sustainable water resources into the future. This would provide transparency to water users about what will happen to allocations under specified conditions (i.e. below average rainfall/threshold being reached) This option can be targeted to management zones with a high level of risk to resource condition <i>Disadvantages/challenges</i> Many water users are not using their full allocation so in practice this option may not actually affect the level of use that year. This option would impact most on water users who use their full allocation (or close to it) each year. This option alone is unlikely to increase flows through the system (as the number, location and size of dams is the main factor impacting on flows). If specific allocation reductions are detailed in the Plan while the climate is in a state of dynamic change, there isn't as much flexibility to respond differently if it is deemed the allocation reduction won't be effective in addressing the risks at the time.	This may be a good option to progress alongside other activities within or outside of the Plan (for example, Option 1 above). It would also protect against extractions increasing to unsustainable levels in the long-term. It would reflect the variable conditions that are likely in future as a result of a changing climate. It is noted that flexibility and certainty need to be balanced - flexibility in the management response will be important as we collect more data around climate and resource condition, and certainty is important for licensees so they can plan ahead.	1, 2, 3, 4, 5 and 6

Option	How it would work	Advantages and disadvantages	Why might this be a good option?	Related Objective
Options that could be progressed in the amended Plan				
3. Require the provision of additional flows through the system (Surface water only)	Additional flows could be provided either via allowing flows to pass around dams and watercourse extractions or through targeted environmental flow releases (e.g. sites where delivery of controlled environmental flows is identified to support the condition of downstream water-dependent ecosystems).	<i>Advantages</i> This option has the potential to facilitate significant improvement in flows through the system, particularly low flow metrics, which would help to address the key risk facing surface water resources and ecosystems. This would partially manage the impacts of large storages. The option is scalable – could start with the highest impact locations first. Has the potential to provide groundwater recharge. Releases using existing structures or minor temporary infrastructure could be implemented relatively inexpensively. This option can be implemented voluntarily. <i>Disadvantages/challenges</i> New permanent infrastructure to release or bypass flows could be expensive. Releases could involve complex planning and coordination, and be challenging to implement in practice. This option could impact on security of supply particularly in very dry years when only minimal flows are being experienced.	Modelling indicates that this option (alongside dam removals – Option 7) would have the most significant positive impact on flow conditions. Initially, general principles could be included encouraging voluntary actions. This option could also be included as a mandatory response should resource condition thresholds be breached. This option would be further enhanced via complementary programs outside of the Plan.	1, 2, 3 and 6
4. Threshold flow rates for watercourse extractions (Surface water only)	Specified flows could remain in watercourses by requiring that volumes can only be extracted from watercourses when flows reach a specified threshold	<i>Advantages</i> This would have direct benefits to the volume and timing of flows in watercourses. It would also address the impacts of large blocking structures on some watercourses. <i>Disadvantages/challenges</i> This could be seen as inequitable if the same requirement to let threshold flows pass is not introduced for other dams in catchments. This option could impact on security of supply particularly in very dry years when only minimal flows are being experienced.	Modelling indicates that this option would have positive benefits for flows through watercourses. This option has been successful in other prescribed water areas. Initially, general principles could be included with a body of work to confirm the appropriate threshold flow rates for management zones. This could be a first step in more broadly requiring that threshold flows be passed around both watercourse extraction points and dams in catchments.	1, 2, 3 and 6

Option	How it would work	Advantages and disadvantages	Why might this be a good option?	Related Objective
Other options considered				
5. Encourage voluntary actions that may improve flows via activities outside of the Plan (Surface water only)	Environmental objectives are identified but no direct policy within the Plan – work with landholders to voluntarily return flows to the system	<i>Advantages</i> This could progress immediately without needing to amend the surface water policies in the Plan. <i>Disadvantages/challenges</i> This option would not put in place any provisions to manage the known risks to the resource, such as the risk of extractions increasing over time to levels that may be unsustainable. If actions are not written into a legal document (the Plan), there are no grounds to enforce action if no improvements are seen.	Projects outside of the Plan could have positive benefits if uptake is high and if they are focussed on returning flows. This may be a good option to progress alongside some protections in the Plan (for example, Option 1 or 2). <i>On its own, this option is unlikely to be adequate to manage risks facing surface water resources and ecosystems.</i>	2, 3 and 6
6. Reduce water access entitlements to reflect reduced capacity of the resource (Surface water and Groundwater)	The volume of water that licensees are authorised to take (their 'share' of the resource) would be permanently reduced to align with the reduced availability of water in recent years	<i>Advantages</i> This option would reflect that the capacity of the resource is reducing, and leave more water in the system. This would share the reduced capacity of the resource more fairly with the environment. <i>Disadvantages/challenges</i> It is not clear whether, for surface water, the resource capacity has permanently changed or whether it will recover. This option would impact on licensees but would not necessarily increase flows through the system (as the number, location and size of dams is the main factor impacting on flows).	It may not be necessary to reduce water access entitlements if other options set out in this table are implemented and successful in managing issues. <i>This option may be better considered at a later date, when more is known about the long-term trend in rainfall and resource capacity.</i>	1 and 3

Option	How it would work	Advantages and disadvantages	Why might this be a good option?	Related Objective
Other options considered				
7. Dam volume reductions (Surface water only)	The size of dams in catchments could be reduced to return flows to the system	<i>Advantages</i> If large dams, and dams having the largest impact on flows, were reduced in size, this would directly improve the volume and timing of flows through the system. This option would directly address the biggest issue impacting on flows through the system. <i>Disadvantages/challenges</i> The Plan is unable to specifically target individual dams and require that they be reduced in size. This could impact on the security of supply for landholders who reduce the size of their dams (noting that some dams are significantly larger in volume than the allocations associated with those dams). The same benefits could be achieved via environmental flow releases or via passing flows around dams.	Modelling indicates that this option would have positive benefits for flows through catchments. While this would be difficult to legally enforce via the Plan, it could be undertaken voluntarily or via other water-related projects. <i>It is noted that this option has been highlighted in the Barossa Water Security Strategy as an action that would have significant benefit to flows through the system.</i>	1, 3 and 6
8. Dam removals (Surface water only)	Dams could be removed to return flows to the system – either voluntarily or through mandates	<i>Advantages</i> If large dams, and dams having a significant impact on flows, were removed, this would directly and significantly improve the volume and timing of flows through the system. <i>Disadvantages/challenges</i> This could impact on the security of supply for landholders who remove their dams. It would be most successful in conjunction with the supply of alternative water sources.	Modelling indicates that this option (alongside requiring the provision of additional flows through the system – Option 3) would have the most significant positive impact on flow conditions. Through the development of the Barossa Water Security Strategy it was identified that mandatory dam removals should be a ‘last resort’ – if dam reductions or dam removals were not achieved voluntarily or via other water-related projects over the next few years. <i>It is noted that this option has been highlighted in the Barossa Water Security Strategy as an action that would have significant benefit to flows through the system.</i> <i>The Barossa New Water Project is also progressing to investigate providing alternative water supplies to Barossa.</i>	1, 3 and 6