Opportunities for improving the SA River Murray Allocation Announcement Information and Process

An independent review

A report prepared for the South Australian Department for Environment and Water

12 April 2021

AITHER

About this report

This report has been prepared for the South Australian Department for Environment and Water (DEW).

This report presents the key findings and recommendations from a review of the effectiveness of the South Australian River Murray allocation announcement process. In recent years, DEW has made improvements to the allocation statement process that have generally been well received by irrigators. In turn, this review focused on identifying a second set of recommendations that will enable DEW to continue to improve the allocation announcement process and the information it provides irrigators.

The scope of the review was limited to the information provided in the allocation statements and the effectiveness of the communication techniques used. Review and analysis of the accuracy of the underlying inputs that inform the water allocation statements, such as modelling and water availability assessments provided to DEW, was beyond the scope of this review. A full assessment of all elements of water allocation policy and announcements was also beyond the scope of this review.

Citation

Aither 2021, Opportunities for improving the SA River Murray Allocation Announcement Information and Process: An independent review. Melbourne, Aither Pty Ltd.

Cover image: Aerial view of orchards, South Australia.

Disclaimer

The information contained in this publication is intended for general use to assist public knowledge and discussion and to help improve the management of water resources. Aither makes no warranties or guarantees, expressed or implied, in relation to any information provided in this report. Information in Aither's water markets reports does not constitute: financial product advice (as that term is defined in section 766B of the *Corporations Act (Cth) 2001*); a warranty or guarantee in respect to the performance of an investment or as to the solvency of a person, entity or any debt; or legal advice, and should not be relied upon as such.

Aither relies on data obtained from multiple third-party sources. Consequently, any information in this report shall be subject to the accuracy and limitations of data obtained from third-party sources. To the full extent permitted by law, Aither excludes all liability for any loss or damage howsoever arising suffered by the Client or any third party, whether as a result of the Client or third party's reliance on the accuracy or otherwise of the information presented herein.

Any individual or entity relying on the information presented in this report should be aware that water markets can be volatile and can be affected by factors not considered in the analysis such as government policy, regulation, climate and commodity prices. Individuals and entities should exercise their own skill and judgement in applying the information presented herein to decision-making.

For information on this report

Please contact: Chris Olszak

Mobile: +61 425 707 170

Email: chris.olszak@aither.com.au

Contents

Tables

Figures

Executive Summary

The South Australian Government is committed to ensuring that water users are receiving the best available information about the projected minimum opening allocations in the River Murray and allocation outlooks. This review shows that the current allocation announcement process is working well and providing valuable information to market participants at suitable time intervals. It also shows that there are additional practical actions the Department for Environment and Water (DEW) can take over the short and medium term to further improve the products that it produces for water users.

There are two recommendations that Aither believes DEW should implement in time for the 2021-22 water year. These are:

- **Recommendation 1:** Consistently provide a spectrum of opening allocation outlooks every year and in all pre-season announcements. In pre-season announcements, opening allocation outlooks should include outcomes associated with improved inflow scenarios from the worst case. The spectrum should span from an extreme dry to a wet scenario.
- **Recommendation 2:** Amend graphical presentation of scenarios. At a minimum, the existing graphical presentation of the scenarios needs to be updated to reflect Recommendation 1. But DEW could develop and test alternative graphical approaches throughout the allocation statements to improve the clarity of communication in collaboration with water users.

There are 14 other recommendations for DEW's consideration. The large number of recommendations should not be interpreted as a need for fundamental changes to the announcement process or information provided. The announcement process DEW used in 2019-20 and 2020-21 was effective in managing allocation announcements in two very dry years and has generally been well received by irrigators. Rather, the recommendations should be viewed as a portfolio of options with which DEW can continuously improve the allocation information it provides so it supports the development of water literacy across water users.

Key findings

Recent changes to the South Australian River Murray allocation announcement process enabled DEW to provide better and more timely allocation information during two very dry years when a robust process was needed more than ever.

The allocation announcement process DEW used in 2019-20 and 2020-21 responds to two clear messages from water users during the consultation for the current Water Allocation Plan for the River Murray Prescribed Watercourse. Irrigators wanted information as early as possible; and irrigators did not want allocations to go backwards.[1]

In the past, pre-season allocation announcements were generally ad hoc, with announcements being made in any of the pre-season months between March and June. In 2019-20 and 2020-21, DEW

[1] Many irrigators remember the 2006-07 water year when 80 per cent allocations were announced and then reduced to 60 per cent due to actual inflows being less than initial assumptions.

released pre-season announcements every month starting in mid-April, and then fortnightly during the water year until allocations reached 100 per cent.

DEW has also adopted a conservative approach to allocation announcements. A projected minimum opening allocation is announced which is based on the worst case forecast of water availability for the next water year provided by the Murray-Darling Basin Authority (MDBA). This effectively manages the risk of allocations 'going backwards'. DEW has also introduced official allocation statements that provide irrigators with a range of useful water market information, including rainfall outlooks from the Bureau of Meteorology and brief explanatory details about SA's water sharing arrangements and the modelling approaches used to provide allocation outlooks. In general, these improvements have been well received by water users.

Implementation of the new process in 2019-20 and 2020-21 was particularly timely because a robust allocation announcement process is most critical during dry conditions. Generally, SA River Murray High Security entitlements are highly reliable. Since the Millennium drought ended, allocations to Class 3 and Class 8 entitlements have opened at less than 100 per cent in only three years; two of which were 2019-20 and 2020-21. However, some stakeholders have raised concerns about the 2020-21 allocation announcements because of the large difference between the original projected minimum opening allocation of 2 per cent (announced in mid-April 2020), and the actual opening allocation of 54 per cent (announced on the 1 July 2020). Recommendation 1 – providing a spectrum of potential opening allocation outcomes – is targeted at addressing this issue.

The pre-season allocation statements should include scenario based information that shows how water availability conditions may change between the announcement date and 1 July each year.

To help irrigators make informed business planning decisions, they need water allocation information that is as accurate as possible. But future projections are inherently uncertain. Communicating this inherent uncertainty while providing information that is useable is a key challenge for all basin state governments.

Locking in an approach[2] that provides irrigators with a range of possible opening allocation outcomes allows DEW to retain its existing approach of announcing a projected minimum opening allocation, while improving the usefulness of the allocation information. That is, by providing a range of opening allocation outcomes, the actual opening allocation will likely fall within this range. This approach effectively manages the risk of allocations 'going backwards' if conditions do not improve and maintains alignment with SA's new carryover policy. Providing a spectrum of opening allocation outlooks will also bring the SA River Murray High Security pre-season allocation announcements in line with the Victorian announcements for River Murray high reliability water shares.

End-of-season allocations are also important for irrigators business planning purposes. In years when SA River Murray allocations do not open on 100 per cent, irrigators will be looking closely at the forecast timing of when allocations will reach 100 per cent. In 2019-20, SA DEW's pre-season and early-season scenarios aligned with the actual timing of when allocations reached 100 per cent, but in 2020-21 allocations reached 100 per cent earlier than provided for in any of the forecast scenarios.

In 2020-21, the wettest scenario presented was 25 per cent. If a wetter scenario had been included, the conditions that eventuated may have been picked up in the pre-season allocation statements. The

[2] In the mid-April 2019 allocation statement, DEW provided a range of opening allocations (only extreme dry, dry and average scenarios), but this approach was not used in 2020-21.

scenarios presented in the allocation statements should be selected to ensure that irrigators have access to the best available information that supports accurate water budgeting.

The high priority water users place on allocation announcements means allocation statements are key documents DEW should use to improve the transparency of water allocation policies.

Recent high-profile reviews have identified a common theme: that there is opportunity to improve irrigators' knowledge and understanding of water allocation policies, and the transparency of water market information. Given the high priority irrigators place on water allocation announcements, the allocation statements are critical documents that basin states can use to improve water market transparency. In DEW's existing allocation statements, there is already a considerable amount of water allocation information. The challenge though is that the details currently provided are likely insufficient to provide readers with a sound understanding of the underlying water allocation policies and allocation announcement processes. In some cases, irrigators are unable to verify the information on which DEW has relied for the allocation announcements (e.g., MDBA's water availability assessments are not publicly available). That is, for irrigators to derive full value from the allocation statements, they require other knowledge and understanding of how to navigate and interpret information held elsewhere. Notwithstanding this challenge, the SA State Water Calculator DEW has developed is a useful tool that supports water market transparency. One of the recommendations is for the State Water Calculator to be finalised and released as soon as possible.

DEW has an opportunity to further improve the clarity and effectiveness of water allocation information so irrigators can make more informed business decisions.

This review has found that DEW's allocation statements include a wide range of useful information for irrigators. However, this information could be better synthesised into a clear commentary that is easily understood by people who are not familiar with water allocation policies, probabilistic modelling, and how to integrate information from multiple sources.

Thus, there is an opportunity for DEW to further improve the provision of water allocation information based on best practice communication techniques that support the development of irrigator water literacy. Achieving the balance between providing information that irrigators can easily apply to business planning decisions and effectively communicating the uncertain nature of allocation outlooks will be a key challenge. However, this challenge can be overcome by working with an independent communication specialist who is skilled in communicating technical information (including uncertainty and managing risk) while also ensuring it is suitable for the target audience.

While there is scope for DEW to refine and improve the ways in which it communicates allocation information, these improvements should be paired with a broader extension program to increase irrigator water literacy via other mediums.

Alongside the new allocation announcement process, DEW partnered with industry bodies to provide six information sessions for irrigators in the lead up to the 2019-20 water year, to help them better understand the new approach and plan for the year ahead. In May 2019, DEW provided two follow-up face-to-face drop-in sessions in Murray Bridge and Loxton. In April 2020, ahead of the first announcement, an online webinar was delivered to help irrigators prepare for 2020-21.

Such information sessions are likely an important tool for DEW to continue to support irrigators with their business planning decisions. The medium – face-to-face vs webinar – is likely less important than

when the information sessions are held. There is merit in DEW working with industry bodies to provide an annual programme of information sessions that includes one session either on the day of the first allocation announcement (mid-April) or in the week following, as well as follow-up sessions in the pre-season months. These sessions could be a mix of online and in-person.

Snapshot of the recommended actions and next steps

Aither's 16 recommendations provide DEW with options about ways that the River Murray allocation announcement information and process can be improved. The recommendations have been structured to represent reasonably discrete actions to provide DEW with as much flexibility as possible about which recommendations to implement and when based on available resources.

Figure 1 (next page) presents a snapshot of the recommendations in terms of the relative benefit or impact that each recommendation could provide in terms of improving the allocation information DEW releases against the relative ease of implementation. This visualisation should be considered a preliminary assessment and is intended as a starting point to aid conversations about the merits of each recommendation. Figure 1 shows that:

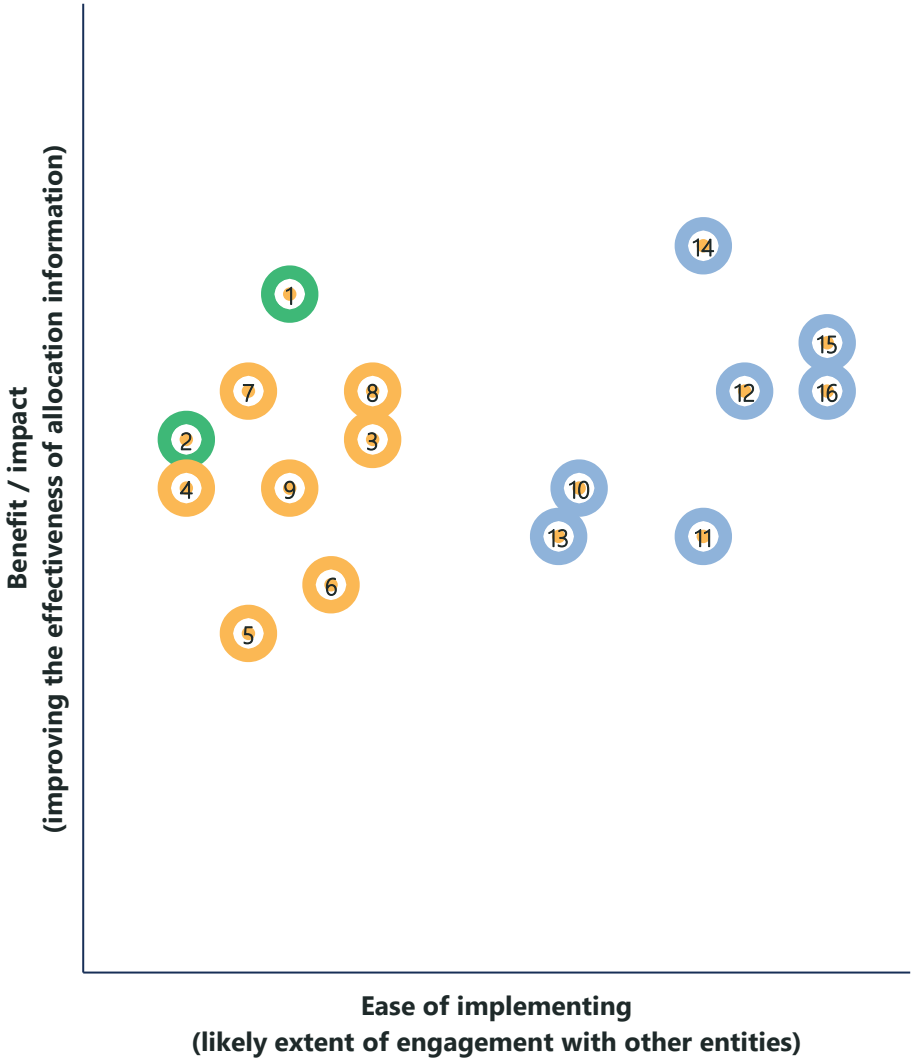
- There are 2 **must do recommendations** that DEW should implement before the 2021-22 allocation announcements. These actions will enable DEW to address the main issue a range of stakeholders have raised about the announcement process used for the 2020-21 water year: the discrepancy between the 2 per cent projected minimum opening allocation announced in April and actual opening allocations on 1 July 2020 at 54 per cent.
- There are 7 **short term recommendations**. These recommendations can likely be implemented relatively easily subject to available resources (i.e., by the first pre-season announcement for 2021-22). Typically, these actions are reliant only on decisions and action from DEW.
- There are 7 **medium term recommendations**. These recommendations are more strategic in nature and will improve the water allocation information and process over the medium term. Typically, these recommendations require collaboration with other organisations and basin state governments (*circa* 12 months and beyond the 2021-22 water year).

The next step for DEW is to consider each recommended action in the context of available resources and develop an implementation plan that identifies which recommendations will be actioned, how and by when the actions will be undertaken.

Note on the proposed recommendations

The recommendations proposed in this report have been considered in light of the following key principles of best practice water allocation processes and announcements:

- Only allocate water on the basis of known water availability. This aligns with SA's conservative approach to announcing projected minimum opening allocations.
- Providing early advice and information about potential allocation outcomes is worthwhile. How early information can be released is determined by the availability of data and alignment with other processes.



Must do
1 - Consistently provide a spectrum of opening allocation outlooks every year and in all pre-season announcements.
2 – Amend graphical presentation of scenarios.
Short term
3 – Clarify the allocation announcement process and improve explanation of the relevance of the water allocation plan.
4 – Improve visualisations of water available.
5 – Retain allocation announcement statements in a central online repository.
6 – Develop a standard template for allocation statements.
7 – Finalise and release Version 1 of the State Water Calculator as soon as possible.
8 – Release the Personal Water Calculator by April 2021.
9 – Review the approach used to select develop allocation outlook scenarios.
Medium term
10 – Work with the MDBA and basin states to make the water availability assessments publicly available.
11 – Review outlook scenario definitions and nomenclature.
12 – Engage an independent communication specialist.
13 – Provide synthesised discussion of the scenarios and supporting data / information included in allocation statements.
14 – Work with industry to deliver an annual program of water literacy workshops.
15 – Integrate climate projections into water availability assessments.
16 – Work with MDBA and basin states to develop tri-state water calculator.

Figure 1: Prioritisation matrix for recommended actions DEW can implement to further improve the water allocation announcement information and process.

1. Introduction

1.1. What is the purpose of this report?

This report presents the key findings and recommendations from the 2020-21 review of the South Australian River Murray allocation announcement process. The South Australian Department for Environment and Water (DEW) will use the recommendations to develop an implementation plan for continuing to adapt and improve the allocation statement information and process.

DEW engaged Aither to complete the review. Aither is an advisory firm that helps governments and businesses make better decisions about water, infrastructure, and the environment.

1.2. Why was the review commissioned?

The South Australian Government is committed to giving greater support to South Australian River Murray irrigators to help them in their forward planning. This commitment has two elements:

- give irrigators the information and tools to plan ahead through the provision of probability scenarios for water allocations.
- provide consistency with the approach to the provision of irrigation allocation information in New South Wales (NSW) and Victoria, where appropriate.

To inform the development of effective actions to achieve these outcomes, in late 2018, DEW collaborated with the South Australian irrigation community about what allocation statement information they need and when they need it. Based on the feedback, DEW updated its approach to allocation statements for the 2019-20 and 2020-21 water years. The updated approach has been generally well received by the irrigation community.

Now that the new approach and products have been used for the past two water years, DEW commissioned this review to see if further improvements can be made to the products that it produces for water users. Also, some stakeholders have raised concerns about the 2020-21 allocation announcements because of the large difference between the original projected minimum opening allocation of 2 per cent (announced in mid-April 2020), and the actual opening allocation of 54 per cent (announced on 1 July 2020).

Ensuring that water users are receiving the best available information is vital to continuously improve the water literacy of the irrigation community.

1.3. What is the scope of the review?

This review is focused on the information DEW provides in the water allocation statements and the effectiveness of the communication techniques used. The key documents were the allocation statements available in PDF format that are distributed to subscribers via email, and the media releases on the DEW website.

The review also included:

- A comparison of the information provided in the NSW River Murray and the Victorian River Murray allocation statements. This comparison was done to help identify potential improvements that

DEW could consider. The content in this report that relates to the NSW and Victorian River Murray allocation announcements should not be considered a full assessment of the NSW and Victorian information and processes.

- A review of DEW's new Water Calculator for forecasting potential water allocations. At the time of the review (8 February 2021), this tool is yet to be publicly released.

Review and analysis of the accuracy of the underlying inputs that inform the projected minimum opening allocations and the information provided in the water allocation statements, such as modelling and water availability assessments provided to DEW, was beyond the scope of this review.

1.4. How is this report structured?

This report is structured as follows:

- **Section 2** briefly describes the current SA River Murray water allocation announcement process.
- **Section 3** presents the approach used to complete the assessment of the SA River Murray allocation announcement process.
- **Section 4** presents the results of the assessment, structured around the five key questions used to frame the assessment.
- **Section 5** presents the review of the new SA Water Calculator recently developed by DEW.
- **Section 6** presents and describes the recommended actions DEW can consider to further improve the water allocation announcement information and process.

2. Background: River Murray water allocation announcement process

2.1. Overview

This section briefly describes the current SA River Murray water allocation announcement process. It also highlights the key changes that were implemented in the 2019-20 and 2020-21 water years, and why the new process was critical to supporting irrigators' business planning.

2.2. How has the SA River Murray allocation announcement process changed?

In 2019-20 and 2020-21, DEW implemented a new allocation announcement process. Implementation of the new process was particularly timely because a robust allocation announcement process is most critical during dry conditions. Generally, SA River Murray High Security entitlements are highly reliable. Since the Millennium drought ended, allocations to Class 3 and Class 8 entitlements have opened at less than 100 per cent in only three years; two of which were 2019-20 and 2020-21.

The changes DEW introduced were based on feedback from extensive stakeholder consultation undertaken in 2018-19. DEW gathered water users' views on the types of water allocation information they need and when it is needed. Two clear messages emerged from the consultation:

1. Irrigators wanted water allocation information as early as possible.
2. Irrigators did not want allocations to go backwards as happened in 2006-07.

2.2.1. Providing information as early as possible

In the past, pre-season allocation announcements were generally ad hoc, with announcements being made in any of the pre-season months between March and June. In 2019-20 and 2020-21, DEW released pre-season announcements every month starting in mid-April, and then fortnightly during the water year until allocations reached 100 per cent.

2.2.2. Ensuring allocations do not go backwards

In 2006-07, allocations to SA River Murray Class 3 and Class 8 entitlements were reduced during the water year. An 80 per cent allocation was announced and then reduced to 60 per cent due to actual inflows being less than initial assumptions. Although this has only happened once before (in recent history), irrigators were clear that they did not want this to happen again.

Now, DEW announces a conservative projected minimum opening allocation which is based on the worst case forecast of water availability for the next water year provided by the MDBA. This effectively manages the risk of allocations 'going backwards'.

2.2.3. Other improvements

DEW has also introduced official allocation statements that provide irrigators with a range of useful water market information, including:

- rainfall outlooks from the Bureau of Meteorology.
- a brief explanation about SA's water sharing arrangements, including the projected minimum amount of water that will be delivered to SA as part its entitlement for the following water year.
- a brief explanation about the modelling approaches used to provide allocation outlooks.
- information on how much water is held in storage for private carryover.

2.3. Current timeline of the announcement process and information provided

The current allocation announcement process can be broken down into three key phases (Figure 2):

- Pre-season announcements – mid-April to mid-June. The allocation statements provided in this phase include:
  - A projected minimum opening allocation announcement is made on 15 April (or the next business day), based on the 'worst case' forecast of water availability for the next water year provided by the MDBA.[3]
  - If the 15 April announcement indicates that the projected minimum opening allocation is below 100 per cent, water users receive a range of water allocation outlook information, including:
    - the projected minimum opening allocation.
    - the projected minimum amount of water that will be delivered to SA as part of its entitlement for the following water year.
    - information on how much water is held in storage for private carryover.
    - updated rainfall outlook information across the Murray-Darling Basin from the Bureau of Meteorology.
    - information on potential allocations for a range of probability scenarios at specified points in time.
- Actual opening allocation announcement – mid-June.
  - Actual opening allocations are announced on 15 June (or the next business day). This is based on the actual volume of water available to SA, which may have increased since minimum opening allocations were announced.
- Opening allocation announcements – 1 July.
  - The allocation statement provided on the first business day of the water year provides the actual opening allocation (which may have increased between the mid-June announcement and 1 July).

[3] In accordance with the Water Allocation Plan for the River Murray Prescribed Watercourse, if the mid-April announcement indicates that the projected minimum opening allocation is equal to or less than 50 percent, private carryover is made available to eligible water users for the upcoming water year. Rollover arrangements that are set out in the carryover policy apply should allocations reach and/or exceed 80 per cent in the water year for when carryover is available.

- Within-season announcements – 15 July onwards. The allocation statements provided in this phase provide updates on all the information provided in the earlier allocation statements.
  - If actual opening allocations are less than 100 per cent, DEW provides updated allocations and water outlook information on a fortnightly basis.
  - Once allocations reach 100 per cent, no further announcements are made.

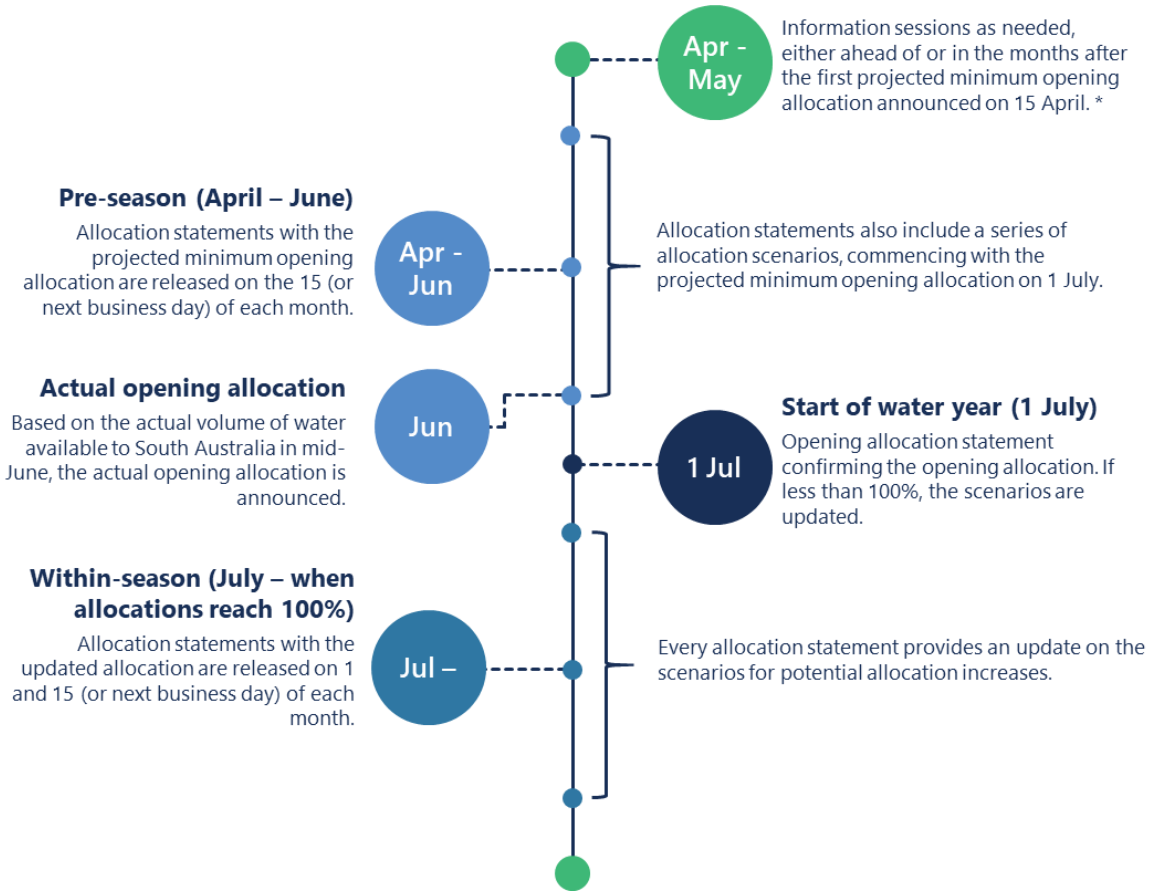


Figure 2: General timeline of the SA River Murray water allocation announcement process as implemented in 2019-20 and 2020-21.

* In May 2019, DEW provided two drop-in sessions in Murray Bridge and Loxton to help irrigators prepare for the 2019-20 water year.[4] This was following six information sessions for irrigators, which had been delivered in partnership with industry bodies prior to the first allocation announcement. In April 2020, ahead of the first announcement on 15 April, an information session was delivered to help irrigators prepare for 2020-21.[5]

[4] Government of South Australia: Department for Environment and Water (15 May 2019). *Improved minimum opening allocation for 2019-20.* Retrieved 27 November 2020 from https://kapara.rdbk.com.au/landers/cd8df8.html

[5] Government of South Australia: Department for Environment and Water (7 April 2020). *Webinar to provide irrigators with water information.* Retrieved 27 November 2020 from https://www.environment.sa.gov.au/news-hub/news/articles/2020/04/water-allocation-webinar

3. Approach used to complete the allocation announcement process review

3.1. Overview

This section presents the approach used to complete the assessment of the SA River Murray allocation announcement process. The approach included five key steps as summarised in Figure 3.

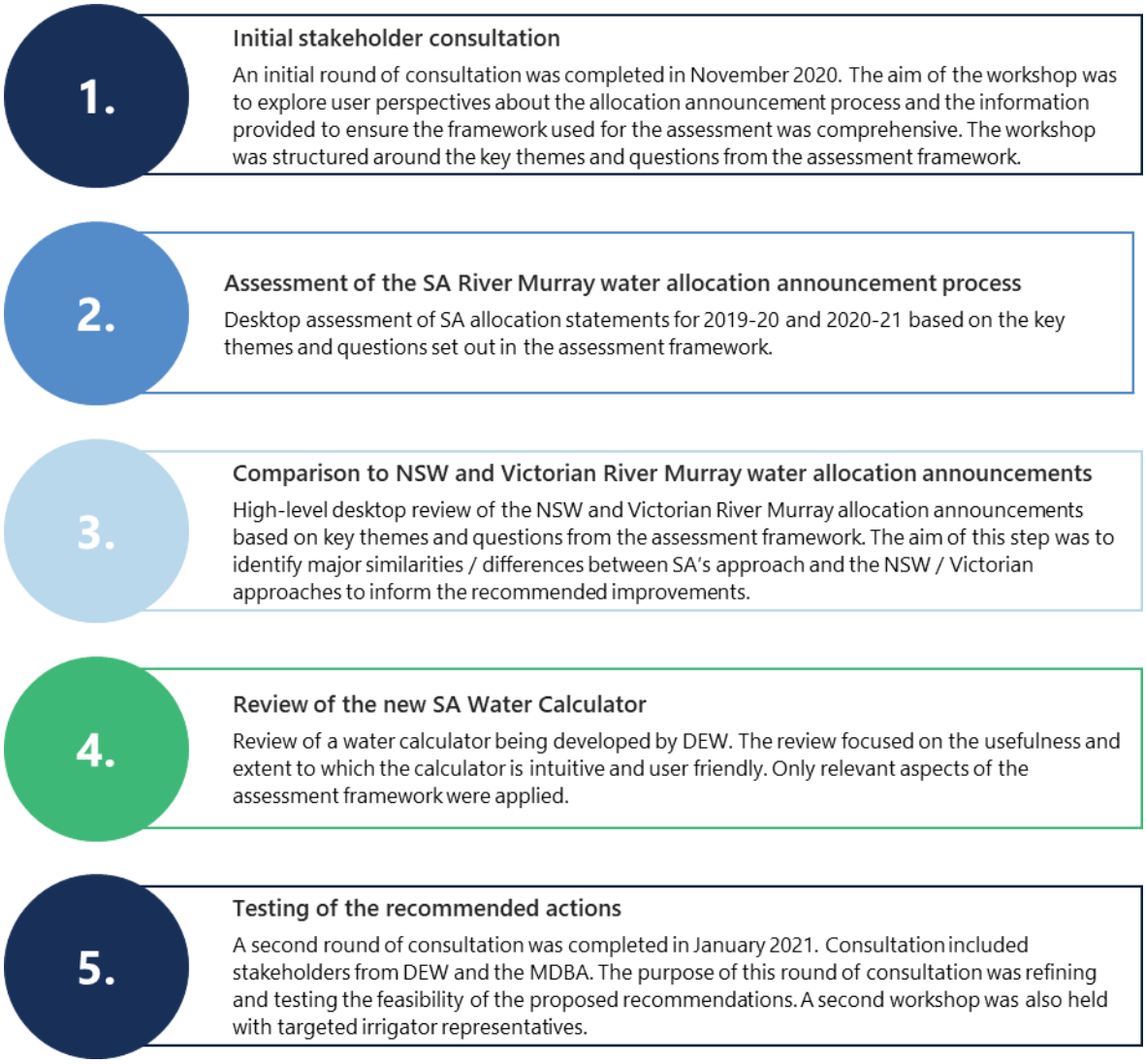


Figure 3: Overview of the method used to complete the assessment.

3.2. The assessment framework

A common framework ensures a fit-for-purpose assessment of the SA allocation announcement process, and enables efficient comparison to the NSW and Victorian announcement processes. The assessment framework formed the basis of how the desktop review was conducted, as well as stakeholder engagement. This framework comprised five key themes (see also Table 1).

- **Transparency**
  - How transparent is the process used to determine allocation announcements?
- **Timeliness and predictability**
  - How timely and predictable is the announcement process?
- **Accuracy**
  - How accurate are forecasts and allocation outlooks? (i.e., how closely the relevant scenarios presented in the allocation statements matched what actually eventuated).
  - How is uncertainty communicated?
- **Clarity and communication techniques**
  - To what extent are the allocation statements clear, unambiguous and well communicated?
- **Accessibility**
  - To what extent are the allocation announcements and statements accessible?

The scope of the review was limited to the information provided in the allocation statements and the effectiveness of the communication techniques used. Review and analysis of the accuracy of the underlying inputs that inform the water allocation statements, such as modelling and water availability assessments provided to DEW, was beyond the scope of this review.

3.3. Stakeholder consultation

- **Round 1 consultation:** The purpose of the first round of consultation was to explore user perspectives about the allocation announcement process and information provided, and to ensure that the assessment framework was comprehensive. In November 2020, a workshop with a targeted group of irrigator representatives was held. The workshop was structured around the five key themes from the assessment framework.
- **Round 2 consultation:** The purpose of the second round of consultation was to refine and test the feasibility of the proposed recommendations. The primary stakeholders consulted were DEW and the MDBA. A second workshop was held with the irrigator representatives from round 1 to test initial responses to the proposed recommendations. DEW acknowledges that for some of the recommendations further consultation will likely be required with water users.

Table 1: Overview of the assessment framework.

Theme	Key question	Sub-questions	Examples of evidence sought (where applicable)
Transparency	How transparent is the process used to determine allocation announcements?	Do allocation statements explain the projected (or actual) water available to SA at the time of announcement?	• Is SA's state share clearly specified as a volume?
		Is there a clear relationship between the SA water available and how the water is allocated to different entitlement types?	• Are allocations to different entitlement types expressed as volumes? • Are there charts translating water availability into allocations?
		How does SA convert water available to allocation announcements? Is the modelling approach and assumptions used for generating outlooks explained?	• Do the statements include references to relevant water allocation plans and policies? Based on the information presented, is it possible to gain a high level understanding of how water is allocated to different entitlement types? • Is information provided regarding the modelling approach and scenarios considered?
Timeliness and predictability	How timely and predictable is the announcement process?	Are allocation announcements made at regular intervals?	• What dates / time steps are allocation statements released?
		When does DEW get information from the MDBA and how quickly are updates released to the public?	• What documents / data are provided to DEW from the MDBA as inputs to complete its allocation announcements? • Number of days between DEW receiving information from the MDBA and when allocation announcements are released.
Accuracy	How accurate are forecasts and allocation outlooks?	Was the 1 July opening allocation a potential scenario communicated in the 15 April, 15 May, and 15 June statements?	• N/A
		In each statement, what was the forecast timing of allocations reaching 100 per cent?	• Specified months, or window of months when 100 per cent was expected.
		Was the actual timing of achieving 100 per cent allocation consistent with the scenarios presented in the pre-season statements?	• N/A

Theme	Key question	Sub-questions	Examples of evidence sought (where applicable)
	How is uncertainty communicated?	Allocation outlooks are probabilistic. Is the probabilistic nature of the outlook scenarios explained?	• What are the allocation scenarios considered and have these been clearly explained? • Has DEW articulated what scenario(s) are considered in its allocation announcements and why?
		To what extent is the communication of uncertainty suitable for a range of users? Is it appropriate communication of the uncertainty?	• Commentary about how users can interpret the scenarios and integrate multiple pieces of information about potential future outcomes.
		Can the future scenarios help users estimate future allocations, or the range of potential allocation outcomes, themselves?	• N/A
Clarity and communication techniques	To what extent are the allocation statements clear, unambiguous, and well communicated?	How is the allocation and outlook information communicated? i.e., is the content text heavy or are visualisations used to communicate key concepts?	• What kind of visuals are used to convey key messages? • How is textual content presented and does this complement the visuals? • Are key messages clearly identified?
		Are the technical details of how scenarios are determined clearly explained? How are these details communicated? In-text only or with visualisations?	• N/A
		How is the allocation statement and outlook information organised? Does it flow logically? Are connections between the different pieces of information clear and easy to follow?	• What headings are used, and do they appear logically? • How is additional information like storages and climate outlooks presented? Are these appropriately interpreted so as to provide a synthesised commentary in relation to the allocations announced? • Are there hyperlinks to other supplementary information sources?
Accessibility	To what extent are the allocation announcements and statements accessible?	Are allocation statements intuitive to find and accessible for the intended audience?	• Are allocation statements retained online? • Is there aggregated data combining statements? • Can irrigators subscribe to updates, so they receive announcements as soon as they are released?

4. Results: Assessment of the SA allocation announcement process

4.1. Overview

This section presents the results of the assessment structured around the five key questions. The results for the SA allocation announcement process are presented first, then the similarities / differences compared to the NSW and Victorian River Murray allocation announcements are summarised.

4.2. Transparency: How transparent is the process used to determine allocation announcements?

Key findings summary

- The SA allocation statements clearly identify the projected amount of water available to SA (and the actual volume from the mid-June announcement) based on the most recent water availability assessment from the MDBA. However, the current focus on irrigation allocations (Class 3 (High Security)) could be broadened to cover additional SA River Murray entitlement types.
- SA's allocation statements provide a high-level overview of the allocation policies and scenarios. However, the rationale for adopting a conservative approach to allocation announcements is not regularly explained in the allocation statements.
- Compared to NSW, SA provides a similar level of information about the processes used to determine allocations, although DEW does not provide updated water balance diagrams that visually link water availability to different entitlement types (because SA's current focus is on Class 3 (High Security)).
- Compared to Victoria, SA's allocation statements tend to include more information about projected / actual state share of resources and the underlying allocation policies. (Victoria provides this information, but it is typically spread across multiple web pages.)

4.2.1. Do allocation statements explain the projected (or actual) water available to SA at the time of announcement?

Allocation statements during a water year clearly state the volume of water available to SA. This information is typically presented near the beginning of each allocation statement and forms one of the key messages for readers. Before the water year (between April and June), the statements include this information as a projected minimum volume of water that will be delivered to SA. However, neither the pre-season nor within water-season allocation statements specify the specific date at which the water availability assessment is current. That said, the statements do include references (in the chart and table) that specify the date at which the overall water availability assessment was made.

This leaves it to the reader to determine if there have been significant rainfall events between DEW receiving the water availability assessment and when the SA River Murray allocation statements are released.

4.2.2. Is there a clear relationship between the water available to SA and how the water is allocated to different entitlement types?

In the pre-season allocation statements, the projected minimum allocation percentages are clearly stated. In 2020-21, in all pre-season allocation statements, a single projected minimum opening allocation was provided (worst case scenario). In the first allocation statement of 2019-20 (mid-April 2019), a range of projected opening allocations was initially provided (extreme dry, dry, and average), but subsequent statements only specified a projected minimum opening allocation.

In the within-season allocation statements, actual allocations against each water entitlement type are presented in a table. In the pre-season and within-season allocation statements, projected minimum (pre-season) or minimum (within-season) allocations are not expressed as volumes and do not clearly link how the volume available to SA is allocated to different entitlement types.

In every water allocation statement, DEW includes a standard diagram that shows how the water available to SA is shared across different entitlement types (Figure 4). However, this figure is not updated to show how the projected minimum or actual water available to SA translates into projected or actual volumes available to different water entitlement classes. Updating this diagram for each allocation statement would likely support the development of irrigators' water literacy.

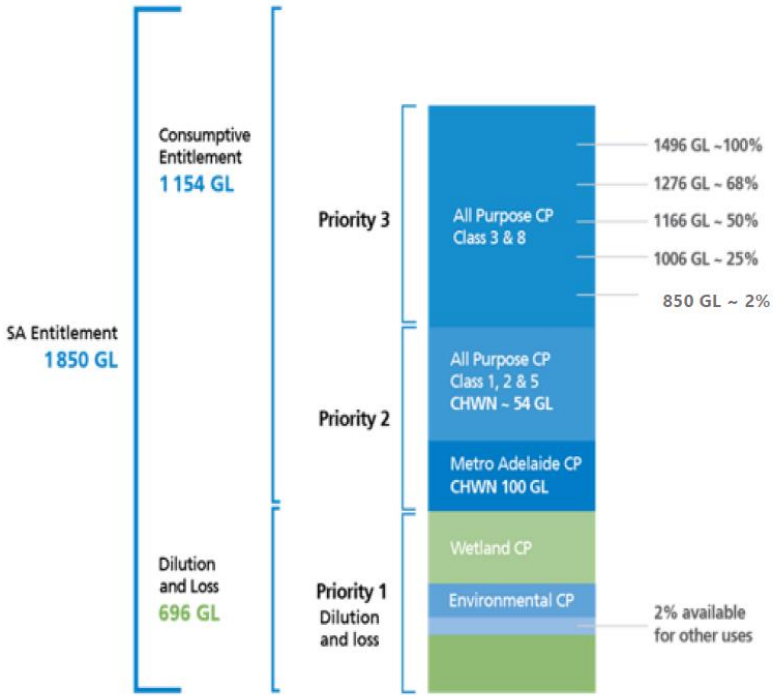


Figure 4: Standard diagram used in allocation statements showing how SA's water entitlement is split among different priorities and water entitlement types based on the 'Water Allocation Plan for the South Australian River Murray Prescribed Watercourse'.

4.2.3. How does SA convert water available to allocation announcements?

DEW provides some information in the allocation statements about how it converts the water available to SA into allocations to different entitlements types. However, this information is quite high-level and requires readers to refer to the Water Allocation Plan for the South Australian River Murray Prescribed Watercourse (WAP) to understand how water is prioritised and allocated. This approach requires readers to have a firm grasp of water allocation policies and planning instruments. As noted in several high-level water markets inquiries, many irrigators do not have this knowledge. The rationale for adopting a conservative approach to allocation announcements is not regularly explained in the allocation statements.

4.2.4. Is the modelling approach and assumptions used for generating outlooks explained?

Allocation statements include a high-level overview of the modelling and assumptions used to generate the allocation outlook scenarios. The definitions of each scenario are presented in Table 2.

In the pre-season statements, the scenarios assume that current conditions (worst case) will continue until 1 July, and then historical inflow and climate conditions over the last 30 years are used to generate six scenarios, ranging from exceptionally dry (worst case) to wet.

The pre-season statements clearly identify that the exceptionally dry (worst case) scenario is used to calculate the projected minimum opening allocation. Consistent with DEW's approach to provide allocations based on a worst-case scenario, the key messages focus on the outcome of the exceptionally dry scenario.

Table 2: Water allocation scenarios used to model future water availability projections.

Allocation scenarios	Description
Exceptionally dry	99% likelihood of the allocation in this scenario being exceeded
Extreme dry	95% likelihood of the allocation in this scenario being exceeded
Very dry	90% likelihood of the allocation in this scenario being exceeded
Dry	75% likelihood of the allocation in this scenario being exceeded
Average	50% likelihood of the allocation in this scenario being exceeded
Wet	25% likelihood of the allocation in this scenario being exceeded

4.2.5. Comparison to NSW and Victorian information and process

The transparency of SA's allocation statement process is broadly aligned to NSW's River Murray allocation statements. The Victorian River Murray allocation statements tend to be much briefer than SA and NSW, with information spread across several different web pages.

From a transparency perspective:

- The main similarity is that all states provided a similar level of detail about the modelling approaches used to generate scenarios, data inputs and scenario definitions.
- The major differences include:

- SA's allocation statements have a primary focus on irrigation entitlements. So, compared to NSW, SA does not provide updated charts visually showing how the water available to SA is allocated across different entitlement types. The NSW allocation statements include a pie chart showing the updated resource distribution.
- Compared to Victoria, SA provides more detail about the water available to the state, and how this is shared. Victoria provides this information on separate webpages, although there are no links from the main outlook webpages.

Table 3: Comparison of SA allocation announcement information and process to NSW and Victoria: Transparency

Question	NSW	Victoria	Summary of similarities / differences
Do allocation statements explain the water available to [the state] at time of announcement?	Yes – state sharing of the Murray resource, including volumes available to NSW are presented on p. 2 of the allocation statements.	Partially – Victoria does not specify the volume available to Victoria on the outlook / seasonal determination web pages. This information is available elsewhere, but no links are included on the main allocation announcement webpages.	SA's allocation statements most closely resembles NSW.
Is there a clear relationship between the [state] water available and how the water is allocated to different entitlement types?	Yes – allocation statements include information that translates allocation percentages into actual volumes allocated to different users. This information is presented in a table and a pie chart. This is updated in every statement. Reference and some details of the relevant NSW water sharing plan are provided.	No – information on how allocation percentages translate to actual allocated volumes is not provided on the allocation announcement web pages. This information is available elsewhere (e.g., water balance diagrams). No information or links to the relevant water sharing plans are provided.	SA's allocation statements most closely resemble NSW's statements, albeit without updated charts showing a visual split.
Is the modelling approach and assumptions used for generating outlooks explained?	The underpinning inputs, modelling approach, assumptions, and scenario definitions are explained at a high level.	The underpinning inputs, modelling approach, assumptions, and scenario definitions are explained at a high level.	SA's approach resembles the NSW and Victorian approaches. All states provide high level descriptions of the data inputs used, modelling approach and scenario definitions.

4.3. Timeliness and predictability: How timely and predictable is the announcement process?

Key findings summary

- Allocation announcements are made monthly prior to the start of each water year. If 1 July opening allocations are less than 100 per cent, announcements are made fortnightly until allocations reach 100 per cent.
- DEW's final inputs to prepare the allocation statements are generally received between 4 and 5 days prior to the announcement dates. DEW does not publicly disclose when these inputs are received (the water availability assessment and multihistory data). How much time has passed between the water availability assessment and the announcement date is disclosed, although further specificity and commentary could be provided.
- NSW and SA use the same release schedule for pre-season statements, although NSW outlooks may release them earlier (e.g., in mid-March for 2020-21).
- Compared to Victoria, in the pre-season months, SA releases allocation announcements every month, while Victoria typically releases announcements in February then May. Victoria releases its first pre-season announcement in mid-February.
- All states use the same fortnightly announcement schedule to update allocations within water years.

4.3.1. Are allocation announcements released at regular intervals?

Allocation announcements are released at regular intervals depending on the time of year:

- Before the start of the water year (April – June): statements are released on the 15th (or next business day) of each month.
- Start of the water year (1 July): the opening allocation announcement is made on 1 July (or next business day) at the start of the water year.
- During the water year (July onwards): announcements are made on the 1st and 15th of each month (or next business day) until allocations reach 100 per cent.

4.3.2. When does DEW get information from the MDBA and how quickly are updates released to the public?

When DEW receives inputs from the MDBA is not publicly disclosed in allocation statements. Aither received additional information from DEW about which information it receives and when the information is received. This information includes:

- A water availability assessment showing the water available for the state under a range of scenarios.
- Multi-history data combining current water availability with historical allocations. DEW uses these data to generate the allocation scenarios.

Generally, the water availability assessment is received prior to the multi-history data. In 2020-21, the time between when DEW received the last inputs from the MDBA and the statement release date was generally between 4 and 5 days.

While basin states need to be prudent with what information is released, the date at which the water availability assessment is current is critical information for water users when interpreting water allocation statements. For example, a significant rainfall event may have occurred in the days immediately prior to an announcement, but any resulting inflows will not have been factored into the announcement due to the processing times required. SA includes a note below the outlook chart and table that discloses the approximate date of the water availability assessment. This is an area that would benefit from increased clarity.

4.3.3. Comparison to NSW and Victorian information and process

The timeliness and predictability of SA's allocation announcement process is broadly the same as the schedules used by NSW and Victoria. From a timeliness and predictability perspective:

- The main similarities are:
  - Pre-season outlooks are typically released monthly.
  - All states release within-season allocation statements on a fortnightly basis.
  - None of the states explain the allocation announcement process as it relates to the data received and the timing at which these data are received from the MDBA.
- The major differences are:
  - NSW and Victoria release their first pre-season outlooks on 15th of February (or next business day), which is earlier than SA. Generally, the reliability of outlook information improves as the forecast period reduces.
    - In the case of Victoria, this includes outlooks under a range of scenarios.
    - In the case of NSW, this includes indicative opening allocations for the next water year. Allocation scenarios are then released in subsequent mid-month announcements (e.g., starting in mid-April 2019 for the 2019-20 water year, and mid-March for the 2020-21 water year).
  - SA updates outlook information fortnightly in every within-season allocation statement, whereas NSW and Victoria continue to update outlook information monthly.

Table 4: Comparison of SA allocation announcement information and process to NSW and Victoria: Timeliness and predictability

Question	NSW	Victoria	Summary of similarities / differences
Are allocation announcements released at regular intervals?	Yes – allocation statements are released monthly prior to the water year and fortnightly during the water year, with outlooks updated monthly (mid-month). The first pre-season outlook is released on 15 February (or next business day).	Yes – within season allocation announcements are released fortnightly, with outlooks updated monthly (mid-month). The first pre-season outlook is released on 15 of February (or next business day), and then updated as required in the pre-season months.	SA's within-season announcement schedule aligns with NSW and Victoria. SA provides updated outlook scenarios in every within-season statement released. SA's pre-season announcement schedule broadly aligns with NSW and Victoria.
When does [the state] get information from the MDBA and how quickly are updates released to the public?	NSW does not publicly release information about when it receives inputs from the MDBA. NSW generally includes the approximate date at which the water availability assessment applies (e.g., 'the end of October accounts…").	Victoria does not publicly release information about when it receives inputs from the MDBA.	SA resembles its counterparts with limited disclosure about when it receives inputs from the MDBA.

4.4. Accuracy: How accurate are forecasts and allocation outlooks?[6] How is uncertainty communicated?

Key findings summary

- SA's projected minimum allocations in the pre-season announcements cannot be expected to align with actual opening allocations. This is largely driven by a conservative approach that assumes very dry (only 10 in 100 years will be drier) to exceptionally dry conditions (only 1 in 100 years will be drier) will continue, and because a range of potential opening allocation outcomes are not always provided.
- SA's allocation statements include brief explanations of the probabilistic nature of scenarios, but more can likely be done to help readers understand the uncertain nature of allocation outlooks.
- Compared to Victoria, SA uses a similar range of scenarios, ranging from extreme dry conditions to wet conditions.
- Compared to NSW, SA uses a wider range of scenarios. For NSW Murray General Security outlooks, NSW only includes scenarios that range from mean conditions to extreme dry conditions.
- The three basin states use different scenario definitions and nomenclature.

4.4.1. Was the 1 July opening allocation a potential scenario communicated in the 15 April, 15 May, and 15 June statements?

DEW's pre-season statements clearly state a projected minimum opening allocation. However, in the last two water years, the actual opening allocations on 1 July have been higher than the projected minimum opening allocations provided in the lead-up to the water year. Although, as expected, the difference between the projected minimum opening allocation and the actual opening allocation reduces as the time between each announcement and 1 July reduces.

- In the first announcement for 2019-20 (mid-April 2019), DEW provided a range of opening allocations (extreme dry, dry, and average), but this approach was discontinued in subsequent announcements. The actual 1 July opening allocations were (Table 5):
  - Between 10 per cent and 17 per cent higher than the mid-April announcement.
  - 9 per cent higher than the mid-May announcement.
  - 5 per cent higher than the mid-June announcement.
- In 2020-21, DEW provided only a projected minimum opening allocation based on a worst-case scenario in all pre-season announcements. The actual 1 July opening allocations were (Table 5):
  - 52 per cent higher than the mid-April announcement.
  - 46 per cent higher than the mid-May announcement.

[6] For the purposes of this review, accuracy refers to how closely the relevant scenarios presented in the allocation statements matched what actually eventuated.

- 14 per cent higher than the mid-June announcement.

This mismatch between pre-season projections and the actual 1 July opening allocation is primarily driven by a combination of the conservative approach DEW uses and the absence of a range of potential opening allocations. (i.e., projected opening allocations that span from an exceptionally dry scenario to a wet scenario).

Table 5: Actual 1 July opening allocations compared to pre-season projected minimum opening allocations for 2019-20 and 2020-21.

Year	15 April projected minimum	15 May projected minimum	15 June projected minimum	1 July opening allocation
2019-20	14 - 21%*	22%	26%	31%
2020-21	2%	8%	40%	54%

* DEW provided a range of projected opening allocations in the 15 April 2019 allocation statement for the 2019-20 water year. This projected 14 per cent in an extreme dry scenario, 16 per cent in a dry scenario, and 21 per cent in an average scenario. This approach was then discontinued for subsequent announcements.

4.4.2. In each statement, what was the forecast timing of allocations reaching 100 per cent?

In 2019-20 and 2020-21, opening allocations were less than 100 per cent. The pre-season and within-season statements clearly provide indications of when allocations might reach 100 per cent under 6 different scenarios (ranging from exceptionally dry to wet).

Pre-season outlooks of when 100 per cent might be reached are generally less accurate than outlooks released near the beginning or within a water year. Providing accurate forecasts of when allocations will reach 100 per cent is important for irrigators, so they can ensure they have sufficient water to meet their crop needs. This is particularly the case between July and September before irrigators' quarterly balancing obligations on 30 September.

Table 6 shows the projected timing of allocations reaching 100 per cent before and during the water year. The first month noted is under the wet scenario, and the second month is under an exceptionally dry scenario.

Table 6: Forecast timing of allocations reaching 100 per cent in pre-season and within-season allocation statements (all scenarios).

Year	Projected 100% allocation before water year (April – June)	Projected 100% allocation at the start of the water year (1 July)	Projected 100% allocation in 1 August announcement
2019-20	November - December	October - January	October - March
2020-21	October - November	November	September - November

4.4.3. Was the actual timing of achieving 100 per cent allocation consistent with the scenarios presented in the pre-season statements?

DEW's forecasts for when allocations would reach 100 per cent appear to be more accurate in 2019-20 than they were in 2020-21. Table 7 shows the period in which the pre-season and within-season

announcements forecast allocations to reach 100 per cent alongside when allocations actually reached 100 per cent.

- In 2019-20, allocations reached 100 per cent in the second announcement of November. This timing aligns with the scenarios presented in pre-season and within-season announcements.
- In 2020-21, allocations reached 100 per cent in the second announcement of August. This was earlier than the scenarios indicated that were presented in the pre-season and within-season announcements, including the allocation statement released two weeks prior to reaching 100 per cent.

The timing of allocations actually reaching 100 per cent earlier than forecasts is likely to be partially driven by DEW's provision of scenarios that assume the projected minimum opening allocation will be the actual 1 July opening allocation. Figure 5 shows an example from the 15 May 2020 announcement. All scenarios assume an 8 per cent minimum opening allocation. As described above, actual opening allocations in 2020-21 were 54 per cent.

It also reflects that when only a small number of scenarios are presented, not all eventualities can be shown. In 2020-21, the fact that allocations reached 100 per cent earlier than represented in the scenarios included in the allocation statements was driven by a combination of wet conditions and the interaction with water accounts. The wettest scenario presented was 25 per cent. If a wetter scenario had been presented, the conditions that eventuated may have been picked up in one of the scenarios.

This highlights the importance of ensuring that the scenarios presented in the allocation statements are selected to ensure that irrigators have access to the best available information that supports accurate water budgeting. It may also be worthwhile to explore options for improving the data on which the scenarios are based (e.g., is there a way to integrate climate projections rather than relying exclusively on historical data?).

Table 7: Actual timing of allocations reaching 100 per cent allocation compared to pre-season announcements and 1 August announcement (all scenarios).

Year	Projected 100% allocation before water year (April – June)	Projected 100% allocation in 1 August announcement	Actual 100% allocation timing
2019-20	November - December	October - March	November
2020-21	October - November	September - November	August

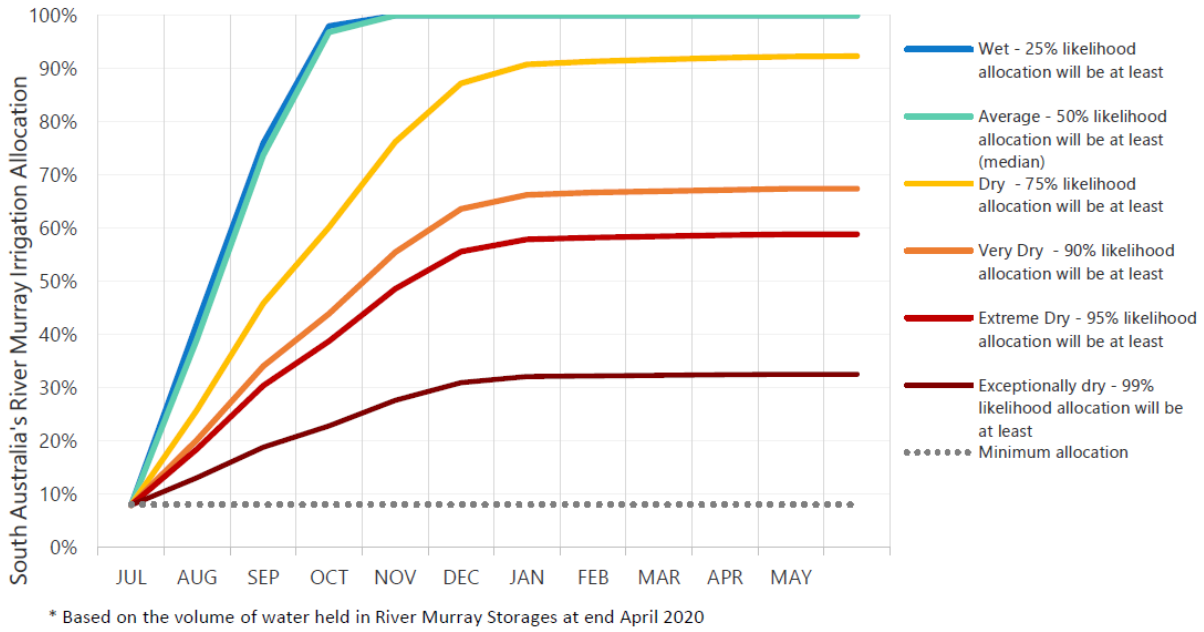


Figure 5: Water allocation scenarios in the 15 May 2020 pre-season allocation statement showing DEW's approach to only generate outlook scenarios that assume an opening allocation that is equal to the projected minimum opening allocation at the time of the announcement.

4.4.4. Allocation outlooks are probabilistic. Is the probabilistic nature of the outlook scenarios explained?

SA's allocation statements include information about the probabilistic nature of the scenarios used to forecast potential allocations. As shown in Table 2 (section 4.2.4), DEW provides 6 water allocation scenarios from exceptionally dry conditions to wet conditions. DEW also reinterprets the scenario definitions into the form of: 'There is a XX per cent likelihood your allocation will meet or exceed the allocation in this scenario'. In addition, throughout the allocation statements, explanations such as the following are included:

> Even under an extreme dry scenario, in which inflow conditions would be worse in only 5 per cent of years, allocations are projected to reach around 60 per cent by the end of the 2020-21 water year (South Australia's River Murray Water Allocation Statement, 15 May 2020).

4.4.5. To what extent is the communication of uncertainty suitable for a range of users? Is it appropriate communication of the uncertainty?

Broadly, the way in which uncertainty is communicated is appropriate for allocation announcements and outlook scenarios. However, the extent to which a range of users can easily understand this information, interpret it and use it to inform decision-making is unclear. For example, in SA's allocation announcements there is limited commentary that explains how the scenarios can be interpreted alongside other information included in the water allocation statements (e.g., Bureau of Meteorology 3-month rainfall outlooks). This disconnection may make it difficult for many irrigators to interpret the scenarios in the context of current conditions.

This challenge relates to irrigators' water (and science) literacy, and is not unique to water allocation announcements. Striking a balance between providing useful information while clearly communicating the inherent uncertainty with any forecasting applies to many areas of science. In turn, professional

communicators with formal training likely have an important role in supporting governments to improve the information they release publicly while managing the risk of not appearing to be guaranteeing outcomes.

4.4.6. Can the future scenarios help users estimate future allocations, or the range of potential allocation outcomes themselves?

The projected minimum opening allocations and the allocation scenarios DEW provides could be used by irrigators to estimate future allocations. However, there are two shortcomings of DEW's existing approach that make it difficult for irrigators to estimate future allocations themselves.

- In 2020-21, DEW only provided a projected minimum opening allocation in the pre-season announcements. This meant it was impossible for irrigators to estimate a range of water availability outcomes. While DEW provided additional information such as the 3-month rainfall outlooks from the Bureau of Meteorology that showed conditions were likely to be wetter than average, there is limited information for irrigators to make informed decisions about what they might mean in terms of allocation improvements.
- In 2019-20 and 2020-21, DEW's approach to present scenarios that assume the projected minimum opening allocation will be the actual opening allocation on 1 July mean it is difficult for irrigators to assess for themselves the potential timing of allocation increases.

The above features of DEW's existing approach are likely contributing to perceptions among water users that the approach is too conservative. However, DEW has developed a new tool – the SA Water Calculator – that will likely be useful for irrigators to visualise what the different scenarios mean for the water available to them subject to some functionality changes. See Section 5 for further information.

4.4.7. Comparison to NSW and Victorian information and process

From an accuracy perspective:

- The major similarities are that all states provide a range of outlook scenarios and a similar level of detail explaining the probabilistic nature of allocation forecasts and the scenario definitions.
- The major differences include:
  - Compared to NSW and Victoria, SA's actual opening allocations do not align with projections in the pre-season announcements.
  - The three basin states use different scenario definitions and nomenclature.
  - Compared to NSW, SA considers all scenarios ranging from exceptionally dry to wet. For NSW Murray General Security outlooks, NSW only includes scenarios that range from mean conditions to extreme dry conditions.

Table 8: Comparison of SA allocation announcement information and process to NSW and Victoria: Accuracy

Question	NSW	Victoria	Summary of similarities / differences
Was the 1 July opening allocation a potential scenario communicated in the 15 April, 15 May, and 15 June statements?	Yes – opening allocations for both states aligned with outlooks provided in prior months. This is largely a reflection of the spectrum of outlooks provided. In NSW, for River Murray General Security allocations, 2019-20 and 2020-21 saw a 1 July opening allocation of 0 per cent aligning with 0 per cent forecasts in pre-season announcements. In Victoria, for River Murray high reliability water shares (Figure 6), 2019-20 saw a 1 July opening allocation of 2 per cent aligning with forecasts of 0-40 per cent in February, and 0-28 per cent in May. In 2020-21, a 1 July opening allocation of 8 per cent aligning with the forecast of 0-31 per cent in February and 3-13 per cent in May.		Figure 7 shows that actual opening allocations on 1 July have not matched the outlooks provided in pre-season announcements for the last two water years, because SA has focused on providing a worst case scenario only.
In each statement, what was the forecast timing of allocations reaching 100 per cent?	2019-20 was a very dry year, and all outlook scenarios were 0 per cent for most of the year. NSW Murray General Security only reached 3 per cent in May 2020. This was not forecast in earlier statements.	In 2019-20 and 2020-21, outlooks generally forecast 100 per cent by October-December (wet scenario), and February (average scenario).	NSW and Victoria use a standard set of outlooks specified by dates, whereas SA uses a graphical approach to represent estimates of when allocations will reach 100 per cent.
Was the actual timing of achieving 100 per cent allocation consistent with the scenarios presented in the pre-season statements?	At the time of writing (8 February 2021), 2020-21 saw allocations for NSW Murray General Security reach 46 per cent, which is higher than the early season outlooks, but broadly aligns with scenarios presented in the 15 December 2020 allocation statement.	The latest outlook Victoria provides is 15 February each year. In 2019-20, mid-February allocations were 57 per cent. This outcome generally aligned with the dry scenario presented in previous outlooks (pre-season and within-season). At the time of writing (8 February 2021), 2020-21 saw allocations for high reliability water shares reach 97 per cent (96 per cent in mid-January), which is between the dry and average scenarios presented in earlier outlooks (Figure 8).	Generally, NSW and Victorian outlooks align well with what actually eventuates. In 2019-20, SA outlooks aligned with what eventuated, but in 2020-21, allocations reached 100 per cent earlier than all prior outlooks.

Question	NSW	Victoria	Summary of similarities / differences
Allocation outlooks are probabilistic. Is the probabilistic nature of the outlook scenarios explained?	Yes – scenarios only range from mean to extreme dry conditions. These are presented in a table at intervals of every second month, although the specified months change between statements.	Yes – scenarios range from wet to extreme dry conditions. These are presented in a table at intervals of every second month. These months are standardised.	All states include a similar level of detail about the probabilistic nature of outlook scenarios. However, the scenario definitions and nomenclature differ.
To what extent is the communication of uncertainty suitable for a range of users? Is it appropriate communication of the uncertainty?	Broadly, the way in which uncertainty is communicated is appropriate for allocation announcements and outlook scenarios.	Broadly, the way in which uncertainty is communicated is appropriate for allocation announcements and outlook scenarios.	All state governments communicate uncertainty in similar ways.
Can the future scenarios help users estimate future allocations, or the range of potential allocation outcomes themselves?	Yes – the outlook information could be used by irrigators to estimate the range of potential allocation outcomes.	Yes – the outlook information could be used by irrigators to estimate the range of potential allocation outcomes.	The absence of a range of potential opening allocations means it is more difficult for irrigators to estimate allocation outcomes to SA Murray High Security for themselves than with the NSW and Victorian outlooks.

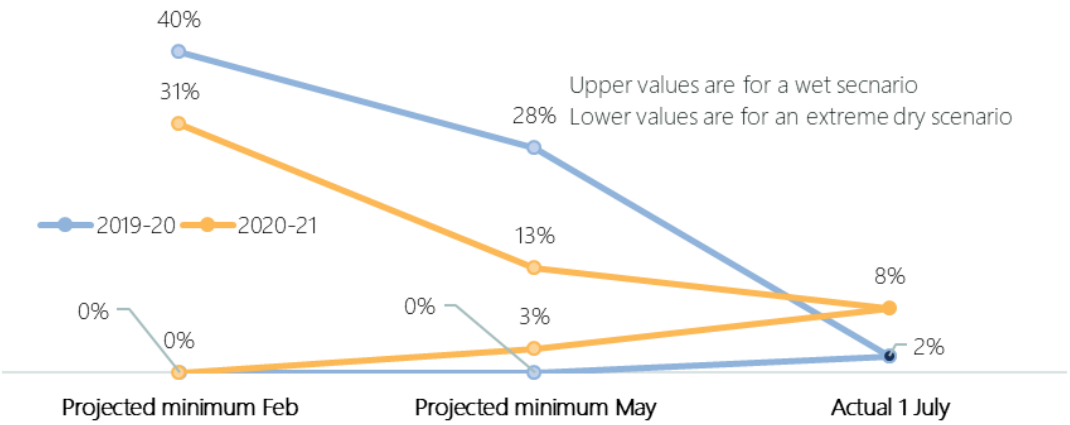


Figure 6: Victorian Murray high reliability water shares – Actual opening allocation on 1 July compared with forecast opening allocations in pre-season announcements.

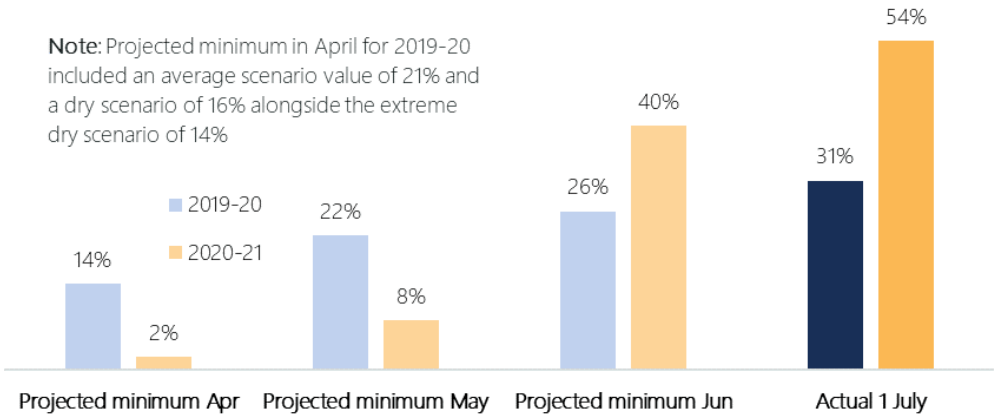


Figure 7: SA River Murray High Security Class 3 – Actual opening allocation on 1 July compared with forecast minimum opening allocations in April, May, and June in pre-season announcements.

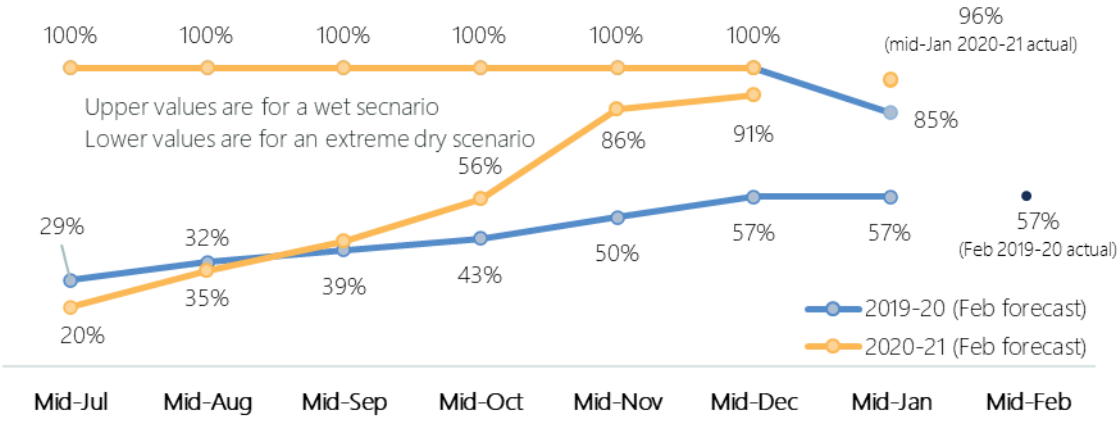


Figure 8: Victorian Murray high reliability water shares – Actual allocation in mid-January for 2020-21 and February in 2019-20 compared with forecast allocations in February in within-season announcements.

4.5. Clarity and communication techniques: To what extent are the allocation statements clear, unambiguous, and well communicated?

Key findings summary

- SA allocation statements are presented using a mix of text, visuals, and tables to present allocation information. A particular strength of the SA allocation statements is the graphical presentation of the scenarios.
- SA allocation statements provide a range of information relevant to water users. However, there could be better synthesised commentary to help water users interpret and integrate the different pieces of information.
- Compared to NSW and Victoria, SA's allocation statements have a more balanced use of visuals, tables, and text in communicating allocation information. SA's allocation statements also include a clear summary of the key messages presented as succinct bullet points at the top of each statement.

4.5.1. How is the allocation and outlook information communicated? Is the content text heavy, or are visualisations used to communicate key concepts?

SA allocation statements present allocation information using a range of text, tabulated information, graphical visualisations, and maps. Notably, the allocation scenarios are presented graphically.

Temperature and rainfall charts are also provided from the Bureau of Meteorology, with tables presenting information about the volume of water held in storage.

4.5.2. Are technical details of how scenarios are determined clearly explained? How are these details communicated? In-text only or with visualisations?

SA allocation statements present the definitions of the scenarios used to determine allocation outlooks in a table. SA could provide additional information that explains why these scenarios were selected.

There is also limited commentary that explains the scenarios modelled in the context of other information presented in the allocation statement, particularly the climate outlooks from the Bureau of Meteorology. For example, the April statement for the 2020-21 highlights that the projected minimum opening allocation is 2 per cent. This is despite the weather outlook predicting a 60-80 per cent chance of wetter than average conditions over the next three months. In other words, the climate outlook information suggested that inflow conditions could improve, but the current approach to scenarios (assumes that the opening allocations will be 2 per cent) does nothing to incorporate this.

4.5.3. How is the allocation statement and outlook information organised? Does it flow logically? Are connections between the different pieces of information clear and easy to follow?

SA allocation statements generally have a consistent approach to their statements within a water year, although the structure and presentation changed between 2019-20 and 2020-21. A particular strength

of the 2020-21 allocation statements, starting from the second announcement in mid-May, was the use of key messages at the top of the allocation statements. The technical detail is then provided in a series of sub-sections, generally with topic or descriptive headings (rather than message headings) that limit the scan ability of the allocation statements.

Each of the sub-sections is generally discrete, that is, there is limited synthesised commentary that links the key messages throughout the statements. For example, it is unclear how 'Water held in storage' is relevant to allocation statements for readers unfamiliar with water markets and river operations. For example, details about the extent to which storages need to improve for there to be material improvements in SA River Murray allocations would help in this regard.

4.5.4. Comparison to NSW and Victorian information and process

The communication techniques used in SA allocation statements generally differ to those used in the NSW and Victorian River Murray allocation statements. From a clarity and communication perspective:

- The main similarity is that all statements provide similar technical details on how the scenarios are defined and the modelling approaches used. The NSW allocation statements also have a similar approach to organising content (i.e., topic or descriptive headings).
- The major differences include:
  - Compared to NSW and Victoria, SA uses more visual elements in the allocation statements. Notably, SA is the only state to present its outlook scenarios graphically.
  - Compared to NSW and Victoria, SA's allocation statements identify the key messages at the top of each allocation statement.

Table 9: Comparison of SA allocation announcement information and process to NSW and Victoria: Clarity and communication techniques

Question	NSW	Victoria	Summary of similarities / differences
How is the allocation and outlook information communicated? Is the content text heavy, or are visualisations used to communicate key concepts?	Allocation and outlook information is generally text heavy. NSW provides a pie chart of the resource distribution which is updated for each statement in which this appears. Allocation outlooks are only presented in a table.	Allocation and outlook information is concise, and presented in tables. Supporting text is largely based on commentary and quotes from water resource managers. No graphics are used on the main seasonal determination and outlook web pages.	SA statements are different from their counterparts with a more balanced used of visuals, tables, and text.
Are technical details of how scenarios are determined clearly explained? How are these details communicated? In-text only or with visualisations?	Partially – allocation statements include the definitions for each outlook scenario. No justification for why these scenarios were selected is provided. Only text and tables provided.	Partially – some explanation of scenarios considered with a list of definitions provided. No justification for why these scenarios were selected is provided. Only text and tables provided.	SA statements closely align with the Victorian and NSW allocation statements with respect to the technical details provided about the outlook scenarios. SA includes a graphical presentation of its scenarios.

Question	NSW	Victoria	Summary of similarities / differences
How is the allocation statement and outlook information organised? Does it flow logically? Are connections between the different pieces of information clear and easy to follow?	Outlook and allocation information are provided in the same statement. Topic or descriptive headings are used to structure the content. No key messages section. Limited synthesis of the information.	Outlook and allocation information is provided on separate webpages. Limited synthesis of the information. Heavy use of data tables. No headings used for structuring content.	SA allocation statements are most like the NSW allocation statements. Both governments use topic or descriptive headings to structure the content. SA highlights the key messages in a series of bullet points at the start of the statements.

4.6. Accessibility: To what extent are the allocation announcements and statements accessible?

Key findings summary

- SA makes its water allocation announcements via media releases that are retained on the DEW website. Full allocation statements are available to water users if they subscribe to email notifications. In the past two years, DEW has also delivered information sessions just before the first announcement in mid-April (2020-21), or in May (2019-20).
- DEW also provides historical, aggregated allocation data. Although this is only available as a PDF download from the DEW website. This format is relatively inflexible and makes data extraction difficult if users wish to complete their own analyses.
- Compared to NSW and Victoria, SA does not generally retain a central, online repository of its full water allocation statements. This means that users must know that they need to subscribe to receive the full allocation statements.

4.6.1. Are allocation statements intuitive to find and accessible for the intended audience?

The DEW website has dedicated webpages for:

- The most recent water allocation announcement: Water allocations and announcements.[7] This webpage is straightforward to find via a simple Google search.[8]
- Water allocations media releases: Historical water allocations.[9] This webpage is also relatively straightforward to find via a simple Google search.

However, both webpages only include the online media release for each allocation announcement. Users can subscribe to receive full allocation statements via email immediately upon release. The full SA allocation statements are generally not retained on the DEW website.[10] This limits the accessibility of the allocation statement information, preventing users from easily accessing this information if they are not subscribers to DEW's email notifications or they wish to refer back to the allocation statements at a later point in time.

An aggregated data set of monthly allocations since 2002 is also available on the DEW website via a PDF download. However, this format makes it difficult for users to extract data for their own analytical purposes.

[7] Government of South Australia: Department for Environment and Water, Water allocations and announcements, https://www.environment.sa.gov.au/topics/river-murray/latest-news-announcements/water-allocations-and-announcements

[8] For example: water allocations + south australia

[9] Government of South Australia: Department for Environment and Water, Historical water allocations, https://www.environment.sa.gov.au/topics/river-murray-new/information-for-industry/water-allocations-and-announcements-redirect/historical-water-allocations

[10] The allocation statements for 2020-21 are now available on the DEW website alongside the media releases. But the 2019-20 allocation statements are not available online.

In the last two water years, DEW has also provided information sessions for irrigators, however the timing of these sessions has been variable. In May 2019, DEW provided two drop-in sessions in Murray Bridge and Loxton to help irrigators prepare for the 2019-20 water year (in addition to six irrigation information sessions prior to the first announcement). In April 2020, ahead of the first announcement on 15 April, an information session was delivered to help irrigators prepare for 2020-21. There is likely merit in DEW providing an information session on the day of the first announcement in mid-April (or the week following), as well as information sessions in the pre-season months. This combination would support the development of irrigator water literacy.

4.6.2. Comparison to NSW and Victorian information and process

SA's allocation statements are slightly less accessible than the NSW and Victorian River Murray allocation statements. This is because compared to NSW and Victoria, SA does not generally retain a central, online repository of its official allocation statements. Only the media releases are available online on the DEW website. The media releases contain only the key messages from the official allocation statement, without the supporting analysis including the visualisations of the scenarios.

The main similarity across the three states is that all states provide public access to allocation statements as either a media release or detailed allocation statement. SA provides both. All states also allow users to subscribe to email notifications, so they can receive new announcements in a timely manner.

Table 10: Comparison of SA allocation announcement information and process to NSW and Victoria: Accessibility

Question	NSW	Victoria	Summary of similarities / differences
Are allocation statements intuitive to find and accessible for the intended audience?	Yes – detailed allocation statements are available as PDFs. Users can subscribe to receive email notifications for when new announcements are released. PDFs are retained online, in a central repository on the NSW Department of Planning, Industry and Environment website.[11]	Yes – allocation announcements are available online in a web format. Users can subscribe to receive email notifications for when new announcements are released. A full history of the allocation outlooks and announcements are available on the Northern Victoria Resource Manager website.[12]	SA issues a media release alongside the official allocation statements. The media releases are retained online in the DEW website, but the official allocation statements are generally only accessible if water users subscribe to email notifications.

[11] NSW Government: Department of Planning Industry and Environment, Water allocation statements, https://www.industry.nsw.gov.au/water/allocations-availability/allocations/statements

[12] Northern Victoria Resource Manager, Seasonal determinations, https://nvrm.net.au/seasonal-determinations

5. The new SA Water Calculator

5.1. Overview

This section presents the review of the new SA Water Calculator recently developed by DEW. The water calculator was reviewed against key questions that align with the relevant parts of the assessment framework used for the water allocation announcement process presented in sections 3 and 4.

5.2. Background

DEW is currently developing a water calculator with the intent of making it publicly available to support irrigator water literacy. The intent of the tool is for it to help irrigators better understand:

1. How much water will be available to them under different water availability scenarios – the Personal Water Calculator.
2. How water available to SA is shared – the State Water Calculator.

5.3. Assessment results

Four questions were used to assess how well the water calculator would help irrigators understand how water is shared in SA and how much water is available to them under different scenarios (Table 11).

Table 11: Assessment results of the new SA Water Calculator

Key question	Assessment
Accuracy: Does the calculator help water users understand how much water will be available to them under different water availability scenarios?	Broadly yes. The Personal Water Calculator allows users to test how much water they might have available that accounts for owned entitlement, water traded, and water used. However, the scenario functionality is likely difficult to understand and the calculator does not currently enable users to factor in carryover volumes (see below).
Transparency: Does the calculator help irrigators understand how water available to SA is shared?	Yes – the State Water Calculator provides a simple, intuitive tool that enables users to test different SA River Murray entitlement volumes and see how this influences the way water is shared.
Clarity and communication: Is the calculator intuitive and user friendly?	Broadly yes. There are two key areas where the calculator could be made more intuitive and user friendly. 1. The Personal Water Calculator scenario functionality requires users to understand state water sharing arrangements and make an informed decision about how much water might be available to SA. For many water users, this is likely challenging and requires improved water literacy about state water sharing arrangements and the implications for SA's share during dry conditions. 2. The chart legends used on the State Water Calculator do not clearly relate to each other.

Key question	Assessment
Clarity and communication: Are there any parts of the calculator that are confusing or misleading?	Yes – the Personal Water Calculator does not currently enable users to factor in carryover volumes. This is an important consideration particularly in very dry years. The Personal Water Calculator is also in KL rather than ML. Irrigators and most water market transactions are typically completed in ML.

5.4. Recommendations to improve the information in the new SA Water Calculator

Based on the above assessment, there are two key recommendations that will make the SA Water Calculator more intuitive and user friendly. Both recommendations have been incorporated into the full list of recommendations presented in Section 6.

5.4.1. Personal Water Calculator: Make three updates to the functionality of the Personal Water Calculator

The Personal Water Calculator will likely help irrigators assess and visualise the water they may have available under the scenarios and, therefore, is likely to be most useful in the lead-up to a water year. This is especially the case in years when SA does not receive its full entitlement in the end-of-March water availability assessment from the MDBA. To ensure the Personal Water Calculator is as useful and user friendly as possible, the following functionality updates are recommended.

Update units to ML (not KL)

Water market transactions are typically undertaken in ML not KL. If there is a practical reason for including KL in the Personal Water Calculator, include functionality that allows users to select their preferred unit.

Introduce functionality to include carryover water

The Personal Water Calculator should include functionality allowing users to factor in carryover under different scenarios. If introducing this functionality will take some time, Version 1 of the Personal Water Calculator could be released with only the other two updates, then the carryover functionality could be released in Version 2.

Update scenario functionality

To support irrigators in the pre-season months, and to clearly link use of the Personal Water Calculator to allocation announcements, update the scenario functionality to reflect the scenarios presented in the water allocation statements. This could be achieved by replacing the existing scenario functionality that requires irrigators to understand SA's River Murray entitlement with a drop-down menu of the different scenarios. The drop-down menu should be updated with every allocation announcement, and a link to the Personal Water Calculator included in each statement (Figure 9).

Figure 9: Screen shot of the SA Personal Water Calculator showing how the scenario functionality could be made more user friendly (version provided to Aither for this review).

5.4.2. State Water Calculator: Update the legend of the bar chart to clearly link to the legend of the pie chart.

The State Water Calculator as provided to Aither for the purposes of this review can contribute to increasing water literacy around state water sharing arrangements, and how they influence water sharing within SA. There is likely merit in working with the MDBA and basin states to develop a tri-state River Murray Water Calculator to provide a single source of information for irrigators across NSW, Victoria and SA.

One minor update to SA's State Water Calculator is recommended. The legend of the bar chart should clearly link to the legend of the pie chart (Figure 10).

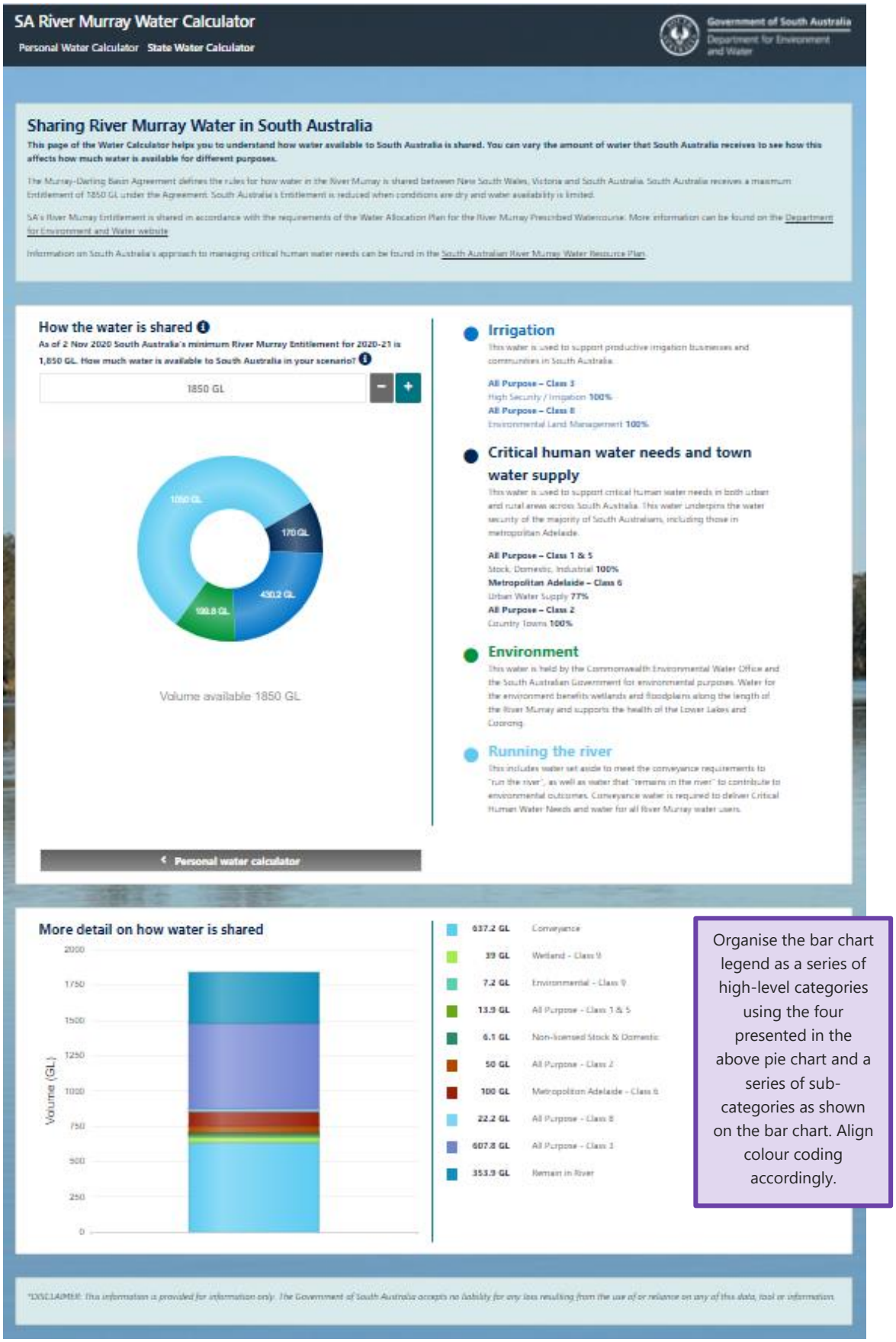


Figure 10: Screen shot of the SA State Water Calculator showing how the legends could be edited to make them easier to understand (version provided to Aither for this review).

6. Recommendations

6.1. Overview

This section presents and describes the recommended actions DEW can consider to further improve the water allocation announcement information and process. While there are 16 recommendations in total, the number of recommendations should not be considered an indication of the need for fundamental improvements. As noted throughout this report, the processes DEW used in 2019-20 and 2020-21 have generally been well received by irrigators. Rather, the recommendations should be viewed as ways in which DEW can continuously improve the water literacy of its stakeholders. The recommendations have also been structured to represent reasonably discrete actions to provide DEW with as much flexibility as possible about which recommendations to implement and when based on available resources.

The 16 recommendations are grouped according to three time horizons:

- **Must do**: Actions that should be prioritised and completed if budget and time are limited before the first 2021-22 water allocation announcement in mid-April 2021. These actions will enable DEW to address the main issue a range of stakeholders have raised about providing a spectrum of opening allocation outlooks every year and in all pre-season announcements.
- **Short term:** Actions that can be implemented relatively easily, likely before the first 2021-22 water allocation announcement in mid-April 2021, subject to available resources. Typically, these actions are reliant only on DEW.
- **Medium term:** Strategic actions that will improve the water allocation information and process over the medium term, and typically require collaboration with other organisations and basin state governments (*circa* 12 months and beyond the 2021-22 water year).

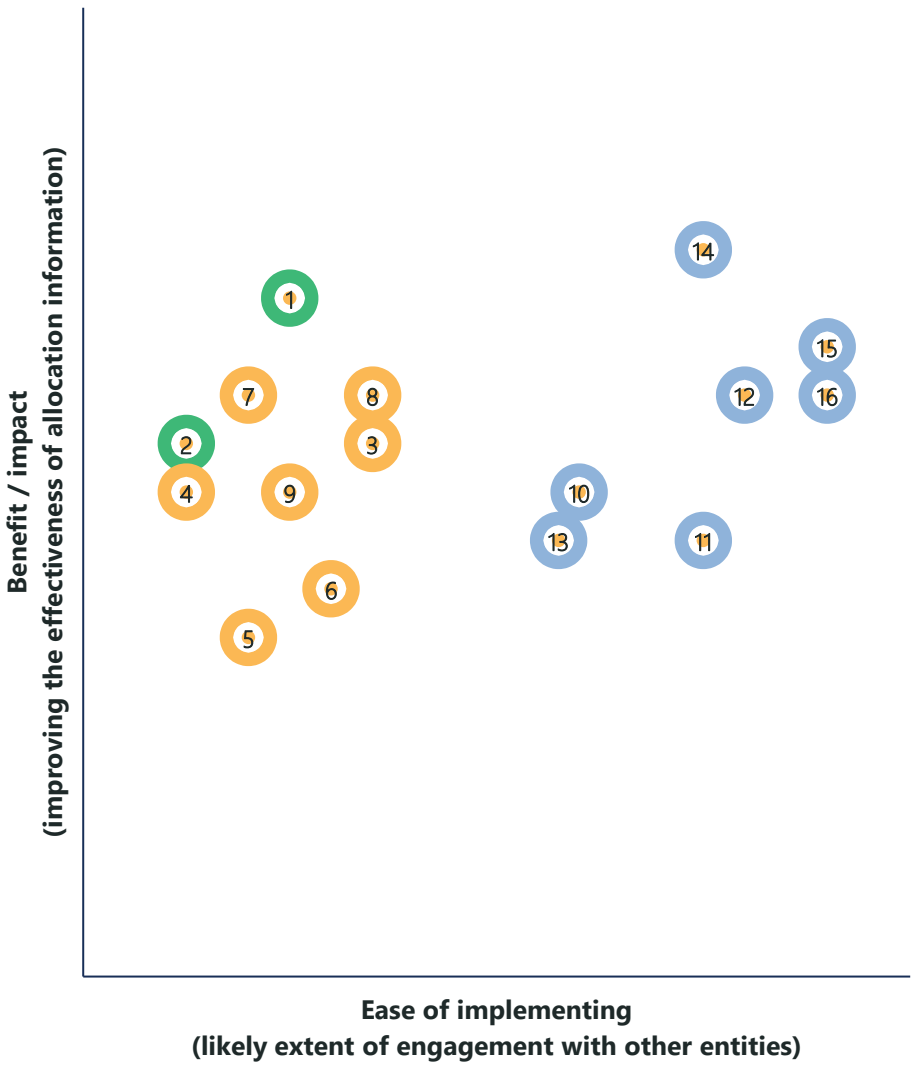
6.2. Recommendations summary and next steps

The next step for DEW is to review the recommended actions and decide which ones warrant implementation, and in which order. To inform DEW's decision-making, Figure 11 plots the recommendations on a 2 by 2 matrix:

- The x axis captures the relative benefit or impact that each recommendation could provide in terms of improving the allocation information DEW makes available to irrigators and other users.
- The y axis shows the relative ease of implementation. In this preliminary assessment of the ease of implementation, the main consideration was the extent to which DEW will need to collaborate with other organisations and basin states to implement the recommendation.

This visualisation should be considered a preliminary assessment and is intended as a starting point to aid conversations about the merits of each recommendation. When considered alongside available resources it should also support DEW to develop an implementation plan.

Each recommendation is explained in further detail in sections 6.3, 6.4, and 6.5.



Must do
1 – Consistently provide a spectrum of opening allocation outlooks every year and in all pre-season announcements.
2 – Amend graphical presentation of scenarios.
Short term
3 – Clarify the allocation announcement process and improve explanation of the relevance of the water allocation plan.
4 – Improve visualisations of water available.
5 – Retain allocation announcement statements in a central online repository.
6 – Develop a standard template for allocation statements.
7 – Release Version 1 of the State Water Calculator as soon as possible.
8 – Finalise and release Version 1 of the Personal Water Calculator by April 2021.
9 – Review the approach used to develop and select allocation outlook scenarios.
Medium term
10 – Work with the MDBA and basin states to make the water availability assessments publicly available.
11 – Review outlook scenario definitions and nomenclature.
12 – Engage an independent communication specialist.
13 – Provide synthesised discussion of the scenarios and supporting data / information included in allocation statements.
14 – Work with industry to deliver an annual program of water literacy workshops.
15 – Integrate climate projections into water availability assessments.
16 – Work with MDBA and basin states to develop tri-state water calculator.

Figure 11: Prioritisation matrix for recommended actions DEW can implement to further improve the water allocation statement information and process.

6.3. Must do recommendations

Table 12 presents the must do recommendations as well as the rationale / benefit that each will provide if successfully implemented.

Table 12: Summary of recommendations – must do

Recommendation	Rationale / Benefit
Recommendation 1: Consistently provide a spectrum of opening allocation outlooks every year and in all pre-season announcements. In pre-season announcements, opening allocation outlooks should include a spectrum of outcomes associated with improved inflow scenarios from the worst case. The spectrum should span from worst case to a wet scenario.	To help irrigators make informed decisions and better understand uncertainty, pre-season announcements should include a spectrum of opening allocation outlooks. This approach means that irrigators will have access to a range of possible outcomes, and the actual opening allocation is likely to fall within that range. Providing a spectrum of opening allocation outlooks enables SA to retain its existing approach of announcing a projected minimum opening allocation, thereby minimising the risk of 'going backwards'. Two complementary recommendations could be implemented at the same time if resources allow: • Recommendation 9 – Review the approach used to develop and select allocation outlook scenarios. • Recommendation 11 – Review outlook scenario definitions and nomenclature.
Recommendation 2: Amend graphical presentation of scenarios. At a minimum, the existing graphical presentation of the scenarios needs to be updated to reflect recommendation 1. But DEW could develop and test alternative graphical approaches in collaboration with water users.	The graphical presentation of the scenarios in DEW's allocation statements is a key strength. In line with recommendation 1, the current graphical presentation should be amended to reflect the range of potential opening allocation outlooks. This could be achieved by beginning the scenarios on the date of the announcement, rather than beginning at the projected minimum opening allocation on the 1 July.

6.4. Short term recommendations

Table 13 presents the short term recommendations as well as the rationale / benefit that each will provide if successfully implemented.

Table 13: Summary of recommendations – short term

Recommendation	Rationale / Benefit
Recommendation 3: Clarify the allocation announcement process and improve explanation of the relevance of the water allocation plan. This recommendation includes providing further details about the relevance of the water allocation plan, and how DEW uses the inputs provided by the MDBA.	Responds to a key finding from recent water market reviews that there is opportunity to improve knowledge and understanding of water allocation policies among water users. This recommendation comprises two parts: 1. Improve the explanation of SA's water allocation policy that is included in the allocation statements. This is not intended to supersede or replace the water allocation plan, rather it is intended to help users understand how the water allocation plan relates to the allocation announcement process. 2. Clarify the allocation announcement process, the inputs used, and when DEW receives these inputs from the MDBA. Consistent with recommendations 2 (*Amend graphical presentation of scenarios*) and 4 (*Improve visualisations of water available*), visual approaches, such as a timeline, are likely to be more effective for communicating how the process works (rather than relying solely on text-based explanations).
Recommendation 4: Improve visualisations of water available. Update the existing standard visualisation so it shows water available to different water entitlement types and update for each announcement.	Clearly linking the allocation announcements to the actual volumes of water available to different entitlement types will contribute to increasing water users' understanding of water allocation policies. In the pre-season allocation statements, a series of visualisations could be provided to show how the actual volumes of water change under the different scenarios presented (i.e., not a standard set of scenarios). In the within season allocation statements, the image should be updated to reflect the actual allocation.
Recommendation 5: Retain allocation announcement statements in a central, online repository. Consistently post the full PDF allocation statements when they are released on the DEW website to be downloaded from the media release webpages.	An online repository of all allocation statements supports efforts to improve availability of water market information. Implementation of this recommendation will bring SA's announcement archiving processes in line with NSW and Victoria. The current process of email notifications should be retained so users are notified as soon as announcements are made. * the allocation statements for 2020-21 are now available on the DEW website alongside the media releases.
Recommendation 6: Develop a standard template for allocation statements. A standardised template should include sections and sub-sections that clearly specifies which information is presented where. The template could also be developed to include message headings (rather than topic or descriptive headings).	Using a template to prepare allocation statements ensures consistent presentation across multiple announcements and improves 'scan ability', enabling readers to identify relevant information faster. A template approach can also allow announcements to effectively deliver key messages via the use of message headings so readers can easily grasp the key takeaways. Including message headings in the allocation statements also provides DEW with an opportunity to clearly communicate more nuanced messages than is currently possible in the media release component of the allocation announcements. Different templates and approaches could be tested with irrigator representatives.

Recommendation	Rationale / Benefit
Recommendation 7: Release Version 1 of the State Water Calculator as soon as possible. Version 1 of the State Water Calculator should include a minor update to the legend of the bar chart to clearly link to the legend of the pie chart.	The State Water Calculator as provided to Aither for the purposes of this review appears sufficiently advanced to warrant public release as soon as possible. The State Water Calculator can contribute to increasing water literacy around state water sharing arrangements, and how they influence water sharing within South Australia. Releasing the SA State Water Calculator can support implementation of: Recommendation 16 – Work with MDBA and basin states to develop tri-state water calculator.
Recommendation 8: Finalise and release Version 1 of the Personal Water Calculator by April 2021. Release Version 1 of the Personal Water Calculator to help irrigators assess and visualise the water they may have available under the scenarios included in the pre-season announcements.	The Personal Water Calculator as provided to Aither for the purposes of this review is likely a useful tool for irrigators in the lead-up to each water year. This is especially the case in years when SA does not receive its full entitlement in the end-of-March water availability assessment from the MDBA. Releasing the Personal Water Calculator in time for the first allocation announcement in mid-April 2021 should be prioritised, subject to the following updates. **Update units to ML (not KL):** Irrigators typically work in ML not KL. If there is a practical reason for including KL in the Personal Water Calculator, include functionality that allows users to select their preferred unit. **Update scenario functionality:** To support irrigators in the pre-season months, and to clearly link use of the Personal Water Calculator to allocation announcements, update the scenario functionality to reflect the scenarios presented in the water allocation statements. This could be achieved by replacing the existing scenario functionality that requires irrigators to understand SA's River Murray entitlement with a drop-down menu of the different scenarios. The drop-down menu should be updated with every allocation announcement, and a link to the Personal Water Calculator included in each statement. **Consider additional functionality, such as incorporating carryover:** Given irrigator sentiments about the new SA carryover policy, the Personal Water Calculator could include additional functionality allowing users to factor in carryover under different scenarios. If introducing such functionality will take some time, the Personal Water Calculator could be released by April 2021 with only the above two updates, then the carryover functionality could be released in Version 2.
Recommendation 9: Review the approach used to develop and select allocation outlook scenarios.	Outlooks that provide useful estimates for when allocations will reach 100 per cent will help irrigators plan ahead to match the timing of their water usage with the water they have available. In 2020-21, allocations reached 100 per cent earlier than forecast in any of the scenarios released in earlier allocation statements. Review whether the approach used to generate the scenarios can be further refined to help ensure that the best possible spectrum of forecasts are provided to help irrigators understand when allocations may reach 100 per cent. DEW could also consider engaging with irrigator groups to seek feedback on the number of scenarios that are presented.

6.5. Medium term recommendations

Table 14 presents the medium term recommendations as well as the rationale / benefit that each will provide if successfully implemented.

Table 14: Summary of recommendations – medium term

Recommendation	Rationale / Benefit
Recommendation 10: Work with the MDBA and basin states to make the water availability assessments publicly available. The MDBA's water availability assessments are a key input into state-based water allocation announcements. These assessments are currently not publicly available. To make them publicly available will require agreement from the MDBA, as well as the NSW and Victorian governments.	Public perceptions of the information DEW makes available in its water allocation announcements can be improved by the public release of some of the underlying information. The MDBA's water availability assessments are a key input to DEW's allocation announcements. Making these assessments publicly available will start to open the 'black box' of the water sharing arrangements under the Murray-Darling Basin Agreement and how the states allocate their share of the resource. The timing of the release of the MDBA water availability assessments should be aligned with the timing of the state-based water allocation announcements.
Recommendation 11: Review outlook scenario definitions and nomenclature. Work with the NSW and Victorian governments to decide a common set of outlook scenarios and nomenclature.	A key challenge for irrigators when interpreting water market information is the variation across the information released by SA, Victoria, and NSW. The definition and terminology used for outlooks scenarios is a key area where this can be improved. This recommendation could be approached in one of two ways: 1. DEW could align the scenarios it uses with Victoria's approach. Victoria's approach is preferred because the outlook scenarios span extremely dry conditions to wet conditions. 2. DEW could start discussions with the NSW and Victorian governments and the MDBA to agree a common set of scenarios and nomenclature. Agreement on a common set of 4 scenarios would be sufficient. Individual states could still opt to provide additional scenarios. This recommendation represents an opportunity for the SA Government to lead the way with harmonising fundamental water market information across the basin states.
Recommendation 12: Engage an independent communication specialist. A key challenge for basin state governments is communicating uncertainty while providing information that is easy to understand and use.	Communicating water allocation information and the inherent uncertainty in outlooks is challenging. By working with a communications specialist, DEW could develop an approach and style that can appropriately manage risks associated with appearing to 'guarantee certain future outcomes'. A communications specialist can also support DEW with developing the structure, content and messaging, so it aligns with the knowledge and expectations of water users. This recommendation should be considered alongside: • Recommendation 13 – Provide synthesised discussion of the scenarios and supporting data / information included in allocation statements. • Recommendation 14 – Work with industry to deliver an annual program of water literacy workshops.

Recommendation	Rationale / Benefit
Recommendation 13: Provide synthesised discussion of the scenarios and supporting data / information included in allocation statements. Frame the scenarios presented in each allocation statement in the context of the other data and information that is included (e.g., climate outlooks and storage volumes).	Improved synthesis of the allocation outlooks alongside other information provided in the statements, such as the 3-month outlooks from the Bureau of Meteorology, will support water literacy and better equip readers to make water and business planning decisions. For example, explanations such as the following or similar would be helpful: *The Bureau of Meteorology is currently forecasting the next three months to be wetter than average. This broadly aligns with the average and wet scenarios presented.* This recommendation should be considered alongside: • Recommendation 12 – *Engage an independent communication specialist.* A communication specialist can likely assist with the key challenge of communicating uncertainty and the fact that the allocations outlooks are not a guarantee. SA's existing approach of a announcing a projected minimum opening allocation positions DEW well to achieve this while managing public perception risks.
Recommendation 14: Work with industry to deliver an annual program of water literacy workshops. Work with industry to develop a series of annual water literacy information sessions in partnership with industry groups. A key component of the information's sessions would be supporting irrigators to understand and better use water availability and allocation information.	A consistent theme from high-profile water markets inquiries is the challenges water users face with accessing and interpreting water market information. The effectiveness of any improvements to information delivered in written formats can be improved by regularly providing interactive forums (e.g., online, and face-to-face workshops) that enable irrigators to ask questions. Developing irrigators' water literacy is a long-term initiative, so these forums should be provided on an annual basis. In recent years, there have seen several examples of 'roadshows' in the South Australian Riverland that have been well received by irrigators. To support DEW's water allocation announcement process, the information sessions should occur after the 15 April announcement. For example, an online webinar could be held on the day of the announcement, or in the week followed, and then follow-up sessions held face-to-face could be held in the remaining pre-season months.
Recommendation 15: Integrate climate projections into water availability assessments. Continue discussions with the MDBA about incorporating forward looking climate projections into water availability assessments.	The current process for providing allocation outlooks is based on multihistory data from the MDBA. Allocation outlook information can be considerably improved by integrating climate outlook information (e.g., 3-month outlooks using synthetic sequences). This recommendation likely requires extensive collaboration with the MDBA and the Bureau of Meteorology about the feasibility of this from both data and timing perspectives.

Recommendation	Rationale / Benefit
Recommendation 16: Work with MDBA and basin states to develop tri-state water calculator. Start discussions with the MDBA and basin states about developing a River Murray tri-state water calculator to provide a single source of information about how water is shared.	There is a need to improve irrigators' water literacy around state water sharing arrangements. One way of achieving this is via a publicly available tri-state water calculator with similar functionality to DEW's State Water Calculator. This would involve collaboration with the MDBA and the NSW and Victorian governments.

Document History

Revision:

Revision no.	4
Author/s	Rajiv Venkatraman, Erin Smith
Checked	Erin Smith
Approved	Chris Olszak

Distribution:

Issue date	12 April 2021
Issued to	South Australian Department for Environment and Water

AITHER