Water market outlook

July 2020

Tim Westwood, Charlie Qin and Linden Whittle

Research by the Australian Bureau of Agricultural and Resource Economics and Sciences

Water Market Outlook 20.2
July 2020
Contents

Summary ............................................................................................................................................................. 4
Current water market conditions .............................................................................................................. 6
2020–21 water market scenarios .............................................................................................................. 9
Appendix A: ABARES outlook scenarios ............................................................................................... 14
References ....................................................................................................................................................... 17

Tables
Table 1: ABARES water allocation price scenarios for 2020–21 ................................................................. 11
Table 2: ABARES selected commodities production scenarios for 2020–21 ........................................... 13
Table 3: ABARES GVIAP scenarios for 2020–21 .................................................................................... 13
Table A1 ABARES outlook scenarios matched against state outlook scenarios .................................. 14
Table A2 Rainfall ............................................................................................................................................... 15
Table A3 Allocation forecasts for 2020–21, as at 15 July 2020 ................................................................. 15
Table A4 Carryover volumes ......................................................................................................................... 16

Figures
Figure 1 Water allocations in 2019–20 ........................................................................................................... 6
Figure 2 Allocation prices and storage volumes in the Murray-Darling Basin ........................................ 7
Figure 3 Chance of above median rainfall - August to October 2020 ..................................................... 8
Figure 4 Water allocation scenarios for 2020–21 (closing - 30 June 2021) ............................................. 10
Figure 5 Total available water allocation supply in the sMDB ............................................................ 11
Figure 6 Allocation price scenarios, in the Vic. Murray below Barmah choke – 2017–18 to 2020–21 ............................................................................................................................................... 12
Summary

This report provides a summary of water market conditions in 2019–20 and ABARES outlook for water allocation prices in the southern Murray-Darling Basin (sMDB) for 2020–21, under four representative scenarios: extreme dry, dry, average and wet. These scenarios are indicative and should not be treated as projections. ABARES scenario forecasts are provided in each Water Market Outlook, to provide consistent information on the consequences of different seasonal conditions and related on farm decisions (such as carryover). Each scenario is modelled using the ABARES Water Trade Model and includes the latest data from state water agencies and updated seasonal conditions from the Bureau of Meteorology (BOM). Seasonal conditions assumed for the remainder of 2020–21 vary across the four scenarios, as described in 2020–21 water market scenarios and Appendix A: ABARES outlook scenarios. The analysis finds that water prices are sensitive to differences in rainfall and allocations. At the time of publication, the current BOM seasonal outlook for 2020–21 appears most closely aligned to the assumptions that underpin the average scenario. The summary of market conditions in 2019–20 is based on recently completed end of water years accounting by state water agencies.

Prices were high in the first half of 2019–20, but have since fallen

Water prices at the start of 2019–20 were high compared to the historical average. This was driven by low opening allocation volumes, exceptionally dry and warm conditions across the sMDB and poor seasonal outlooks for 2020–21. However, prices fell sharply in the latter half of 2019–20, from an average of $719 per ML across the sMDB in January 2020, to $204 per ML by June 2020. This decline in prices was driven by increased levels of rainfall and additional allocations late in the water year, along with improvements in the BOM seasonal outlook for 2020–21. Overall, the annual average price across the sMDB for 2019–20 was $543 per ML, which is the highest it has been since the height of the Millennium drought (2007–08) when prices averaged $715 per ML. Despite similar allocation levels in 2019–20 compared to 2007–08, significantly more carryover water was available in 2019–20, which improved the overall volume of water available in 2019–20.

In the March outlook, allocation forecasts for 2020–21 were relatively low, signalling the possibility of limited water supply in 2020–21. Demand for carryover water was therefore high as irrigators sought to secure water for 2020–21. Overall 1,760GL of water was carried over into 2020–21 in the southern basin, 17% higher than carryover into 2019–20.

Prices likely to be lower in 2020–21

Water prices are forecast to fall under all scenarios in response to considerable improvements in the volume of water supply available in 2020–21. Water allocation forecasts have been revised upwards by all state water agencies and the volume of water carried forward into 2020–21 is greater than previously estimated. The seasonal outlook for the next three months (August to October) from the BOM is indicating slightly above average conditions are likely. The average annual weighted sMDB allocation price is expected to decrease in 2020–21 relative to 2019–20 under all scenarios except the extreme dry scenario. Under the wet and average scenarios prices are expected to fall significantly, to $207 per ML and $287 per ML respectively. A more moderate decrease is forecast for the dry scenario with prices averaging $450 per ML. Under the extreme dry scenario, prices are expected to be similar at $544 per ML.
As a result of lower water prices, production of irrigated crops and the gross value of irrigated agricultural production (GVIAP) are forecast to increase in 2020–21. Industries which are particularly sensitive to water prices, such as rice, are expected to dramatically increase production under the wet and average scenarios. While under the dry and extreme dry scenarios, production is forecast to remain at similar levels to 2019–20.

**Binding trade limits likely to cause regional price differences**

Water supply is expected to be greater in catchments upstream of the Barmah Choke, while demand for water from horticultural commodities in catchments below the Barmah choke will remain strong. As a result, all major inter-valley trade (IVT) limits are likely to be binding in 2020–21, which will restrict the volume of trade and cause price gaps to open up between catchments.
Current water market conditions

Water markets in 2019–20
Allocations against entitlements in 2019–20 were well below average in both NSW and Victoria (Figure 1). Allocation levels against general security entitlements in NSW remained very low for most of the year with late allocations in May taking the closing allocations to 3% in the NSW Murray and 11% in the NSW Murrumbidgee. In contrast, high security entitlements in Victoria reached 26% in the Vic. Murray and 32% in the Vic. Goulburn by August and closed at 66% and 80% respectively.

Figure 1 Water allocations in 2019–20

Source: NVRM, NSW DPIE, ABARES, SA DEW
Note: Historical average calculated from 2000–01 to 2019–20.

Prices in the sMDB were high during 2019–20, averaging $543 per ML across the year, reflecting low allocation levels and poor seasonal outlooks. Prices fell dramatically between January and June in response to increased rainfall, additional allocations and improvements in the seasonal outlook for 2020–21. However, this is still the highest average annual price seen since the Millennium Drought (2007–08), where annual prices averaged $715 per ML. One of the reasons that prices didn’t reach the same highs, despite similar allocation levels, was the volume of carry over water available in 2019–20 compared to 2007–08.

Interim measures to address environmental concerns relating to trade between the Goulburn and Vic. Murray regions were announced by the Victorian Minister for Water on 29 November 2019 (Neville 2019). Tagged trade (that is, water from the Goulburn, Broken, Campaspe or Loddon systems that is tagged for use in the Murray) will no longer be excluded from the Goulburn IVT rule, along with a monthly delivery limit of 50 GL of water from the IVT account between December 2019 and April 2020. It is likely these changes have reduced the volume of water that can be exported from the Goulburn to Murray. The Victorian Department of Environment, Land, Water and Planning is currently undertaking a review the Goulburn IVT rules.
The Goulburn-Murray IVT was binding for much of the period between August 2019 and June 2020 leading to relatively low prices in the Vic. Goulburn, compared to the Vic. Murray below the Barmah Choke (Figure 2). Prices in the Vic. Murray below Barmah averaged $626 per ML in 2019–20 compared to $492 per ML in the Vic. Goulburn.

**Figure 2 Allocation prices and storage volumes in the Murray-Darling Basin**

![Graph showing allocation prices and storage volumes in the Murray-Darling Basin.](image)

**Source:** BOM, waterflow

**Note:** Water prices in 2020 dollar terms.

**Seasonal climate outlook**

The BOM climate outlook for the first three months of 2020–21 has improved since March, and now suggests wetter than average conditions across eastern Australia (Figure 3) ([BOM, 2020b](#)). While the El Niño–Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD) currently remain neutral, the BOM has revised its outlook of these indicators ([BOM, 2020a](#)). The BOM has issued a La Niña WATCH outlook, suggesting a greater probability of a La Niña forming. Typically if a La Niña event is realised, it brings above average spring rainfall for eastern Australia. The BOM is also forecasting a negative IOD developing, which typically brings above average winter and spring rainfall to southern Australia.
Figure 3 Chance of above median rainfall - August to October 2020

Chance of exceeding the median rainfall for August to October 2020

Model: ACCESS-S1
Base period: 1990-2012

Model run: 13/07/2020
Issued: 16/07/2020
2020–21 water market scenarios

ABARES developed four scenarios for water availability in 2020–21 (Figure 4) that draw upon the latest allocation outlooks from state water agencies as at 15 July 2020. ABARES uses allocation forecasts and carryover (excluding water allocated to the environment) to determine the volume of water available for irrigation in the sMDB under each scenario for 2020–21 (Figure 5).

The scenarios provide an indication of possible water availability levels under representative ‘extreme dry’, ‘dry’, ‘average’ and ‘wet’ conditions. For each scenario, allocation levels are determined by state water agencies based on the likelihood of inflows to storages above historical levels, and estimates of rainfall (see Appendix A: ABARES outlook scenarios for more details). While methodologies vary across states, ABARES has broadly aligned the scenarios such that inflows to storages are greater in:

- 99 years out of 100 in the extreme dry scenario
- 90 years out of 100 in the dry scenario
- 50 years out of 100 in the average scenario
- 10 years out of 100 in the wet scenario

The scenarios are indicative only, and conditions could be better or worse than forecast, which would in turn affect prices.

While readers should make their own judgements about the probabilities and consequences of each scenario, ABARES considers the current BOM seasonal outlook to be most closely aligned to the assumptions that underpin the average scenario. Nevertheless, all four outlook scenarios are discussed in each edition of the Water Market Outlook, to provide consistent information on the consequences of different seasonal conditions, and related on-farm decisions such as carryover and irrigation water use.

Water supply in 2020–21

Allocations are generally expected to improve in 2020–21 compared to 2019–20 for most catchments. NSW Murrumbidgee opening allocations for 2020–21 have already exceeded their closing levels in 2019–20, and are forecast to receive additional allocations under all but the extreme dry scenario. Similarly NSW Murray regions are expected to see an improvement in allocation levels relative to 2019–20 under dry or better scenarios.
Figure 4 Water allocation scenarios for 2020–21 (closing - 30 June 2021)

Water supply for 2020–21 has increased since the June water update due to updated allocation forecasts from state water agencies. As a result of higher likely allocations and higher carryover volumes, the volume of water supply available for irrigation is expected to increase in 2020–21 under the dry, average and wet scenarios. Under the extreme dry scenario, the supply of water is expected to decrease slightly to 3,211GL, which is still above the levels seen in the Millennium drought (2007–08), where supply was 2,408GL.

Source: NVRM, NSW DPIE, ABARES
Note: Historical average calculated from 2000–01 to 2019–20
Figure 5 Total available water allocation supply in the sMDB

Source: ABARES estimate using data from SA DEW, NSW DPIE, NVRM and CEWH
Note: a 'Water available for irrigation use' is calculated as the sum of allocations, water carried over from the previous year and any water classified as uncontrolled flows, minus water allocated for the environment and water forfeited during the year. fABARES forecast.

**Water demand in 2020–21**

The volume of water consumed is expected to increase across the sMDB during 2020–21, under all scenarios. As discussed in the March outlook, the majority of almond and fruit plantings are in regions below the Barmah choke, with demand for water from these industries expected to remain strong. These regions are modelled to import water to meet demand under all scenarios.

**Water allocation prices in 2020–21**

Average annual allocation prices and annual trade flows are simulated for each region under extreme dry, dry, average and wet scenarios for 2020–21 using the ABARES Water Trade Model (Gupta, et al. 2018). Price forecasts for 2020–21 are presented in Table 1.

<table>
<thead>
<tr>
<th>Region</th>
<th>2019–20 Average ($)/ML</th>
<th>Extreme Dry ($)/ML</th>
<th>Dry ($)/ML</th>
<th>Average ($)/ML</th>
<th>Wet ($)/ML</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW Murrumbidgee</td>
<td>552</td>
<td>436</td>
<td>386</td>
<td>251</td>
<td>167</td>
</tr>
<tr>
<td>VIC Goulburn-Broken</td>
<td>492</td>
<td>522</td>
<td>403</td>
<td>244</td>
<td>196</td>
</tr>
<tr>
<td>NSW Murray Above</td>
<td>496</td>
<td>484</td>
<td>422</td>
<td>271</td>
<td>156</td>
</tr>
</tbody>
</table>
It is important to note that these are estimates of the average annual price. In practice, prices are likely to fluctuate throughout the year around the modelled annual average price (Figure 6). ABARES has produced a dashboard visualisation to accompany this report, which allows for exploration of price forecasts for each region in 2020–21.

**Figure 6 Allocation price scenarios, in the Vic. Murray below Barmah choke – 2017–18 to 2020–21**

Under the wet and average scenarios, price are likely to fall sharply in 2020–21, from $543 per ML in 2019–20, to $207 per ML in the wet scenario and to $287 per ML in the average scenario. Under the dry scenario, prices are forecast to fall moderately to $450 per ML, reflecting a smaller improvement in water availability compared to the wet and average scenarios.

Under the extreme dry scenario, water availability for the sMDB is forecast to decline relative to 2019–20. However, average prices across the sMDB are expected to be similar in 2020–21 at $544 per ML. This is driven by large volumes of water carried into 2020-21 in the Murrumbidgee which is expected to contribute to lower prices in that region.

Binding export trade limits across all major IVT's means the market is not expected to reach a common price across the southern basin under any scenario. Prices in regions that import water will be higher compared to prices in regions exporting water. For example, in the average
scenario, prices in regions below the Barmah choke are $379 per ML compared to $251 per ML in the Murrumbidgee.

**Production and GVIAP in 2020–21**

Production of irrigated crops in the sMDB is modelled to increase relative to 2019–20 under the *wet, average* and *dry* scenarios, in response to the lower water prices (Table 2). As a result, GVIAP is also modelled to increase in 2020–21 (Table 3).

**Table 2: ABARES selected commodities production scenarios for 2020–21**

<table>
<thead>
<tr>
<th>Industry</th>
<th>2019–20 modelled ('000) tonnes</th>
<th>Extreme Dry ('000) tonnes</th>
<th>Dry ('000) tonnes</th>
<th>Average ('000) tonnes</th>
<th>Wet ('000) tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almonds</td>
<td>87.6</td>
<td>84.4</td>
<td>86.0</td>
<td>90.0</td>
<td>98.7</td>
</tr>
<tr>
<td>Cotton</td>
<td>53.7</td>
<td>88.3</td>
<td>94.0</td>
<td>109.6</td>
<td>117.3</td>
</tr>
<tr>
<td>Grapevines</td>
<td>927.9</td>
<td>911.0</td>
<td>1008.1</td>
<td>1199.8</td>
<td>1283.2</td>
</tr>
<tr>
<td>Rice</td>
<td>54.7</td>
<td>71.5</td>
<td>130.2</td>
<td>324.6</td>
<td>529.7</td>
</tr>
</tbody>
</table>

*Source: ABARES*

The value of production for horticultural commodities, such as almonds and fruits, is forecast to remain relatively stable under all scenarios. Dairy production is forecast to increase in the *wet* and *average* scenarios due to lower water prices, particularly in Northern Victoria. Rice and cotton sectors, which are typically more sensitive to water prices, are forecast to significantly increase production under the *wet* and *average* scenarios, particularly in the Murrumbidgee.

**Table 3: ABARES GVIAP scenarios for 2020–21**

<table>
<thead>
<tr>
<th>Industry</th>
<th>2019–20 modelled</th>
<th>Extreme Dry</th>
<th>Dry</th>
<th>Average</th>
<th>Wet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$m</td>
<td>$m</td>
<td>$m</td>
<td>$m</td>
<td>$m</td>
</tr>
<tr>
<td>Almonds</td>
<td>545</td>
<td>514</td>
<td>523</td>
<td>548</td>
<td>601</td>
</tr>
<tr>
<td>Cotton</td>
<td>119</td>
<td>202</td>
<td>215</td>
<td>250</td>
<td>268</td>
</tr>
<tr>
<td>Dairy and grazing</td>
<td>95.6</td>
<td>635</td>
<td>793</td>
<td>981</td>
<td>971</td>
</tr>
<tr>
<td>Horticulture</td>
<td>2193</td>
<td>2288</td>
<td>2357</td>
<td>2485</td>
<td>2503</td>
</tr>
<tr>
<td>Rice</td>
<td>59</td>
<td>30</td>
<td>55</td>
<td>138</td>
<td>226</td>
</tr>
<tr>
<td>Other cereals, broadacre and hay</td>
<td>157</td>
<td>123</td>
<td>165</td>
<td>258</td>
<td>289</td>
</tr>
<tr>
<td>Total</td>
<td>4029</td>
<td>3791</td>
<td>4109</td>
<td>4661</td>
<td>4857</td>
</tr>
</tbody>
</table>

*Source: ABARES*
Appendix A: ABARES outlook scenarios

ABARES outlook scenarios
ABARES designed four outlook scenarios for 2020–21 (Table A1). It is important to note that outlook scenarios released by the states remain indicative only. Actual water allocations will depend on realised seasonal conditions. Outlook scenarios are also subject to updates throughout the year.

As shown in Table A1, the definition of outlook scenarios and the level of information provided can vary by state water agency. The ABARES outlook scenarios are largely based on those used by the Northern Victoria Resource Manager (NVRM). Outlook scenarios from other states are matched against the ABARES scenario definitions.

Table A1 ABARES outlook scenarios matched against state outlook scenarios

<table>
<thead>
<tr>
<th>ABARES scenario</th>
<th>NVRM scenario</th>
<th>SA DEW scenario</th>
<th>NSW DPIE scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme dry</td>
<td>Extreme dry</td>
<td>Exceptionally dry</td>
<td>Extreme</td>
</tr>
<tr>
<td>In 99 years out of 100, inflows to storages exceed those experienced in this scenario. Rainfall is in the 1st percentile of historical levels.</td>
<td>Inflow volumes to storages that are greater in 99 years out of 100.</td>
<td>99% likelihood that actual allocations will exceed allocation forecast</td>
<td>99 chances in 100 of exceeding the allocation forecast</td>
</tr>
<tr>
<td>Dry</td>
<td>Dry</td>
<td>Very Dry</td>
<td>Very Dry</td>
</tr>
<tr>
<td>In 90 years out of 100, inflows to storages exceed those experienced in this scenario. Rainfall is in the 10th percentile of historical levels.</td>
<td>Inflow volumes to storages that are greater in 90 years out of 100.</td>
<td>90% likelihood that actual allocations will exceed allocation forecast</td>
<td>9 chances in 10 of exceeding the allocation forecast</td>
</tr>
<tr>
<td>Average</td>
<td>Average</td>
<td>Average</td>
<td>Average</td>
</tr>
<tr>
<td>In 50 years out of 100, inflows to storages exceed those experienced in this scenario. Rainfall is in the 50th percentile of historical levels.</td>
<td>Inflow volumes to storages that are greater in 50 years out of 100.</td>
<td>50% likelihood that actual allocations will exceed allocation forecast</td>
<td>1 chance in 2 of exceeding the allocation forecast</td>
</tr>
<tr>
<td>Wet</td>
<td>Wet</td>
<td>Wet</td>
<td>Wet</td>
</tr>
<tr>
<td>In 10 years out of 100, inflows to storages exceed those experienced in this scenario. Rainfall is in the 90th percentile of historical levels.</td>
<td>Inflow volumes to storages that are greater in 10 years out of 100.</td>
<td>25% likelihood that actual allocations will exceed allocation forecast</td>
<td>NSW has not released a forecast for this scenario. ABARES assumption.</td>
</tr>
</tbody>
</table>

Source: ABARES, NVRM, SA DEW, NSW DPIE

Note: Allocation forecasts made by NVRM are created using a model of historical inflow volumes, and the chance that actual inflows will be higher than those presented. The wet scenario defined by SA DEW uses a higher likelihood measure, meaning this is a drier scenario than the wet scenario used by ABARES and defined by NVRM.

For each of these scenarios, ABARES has estimated allocations made against each entitlement type, annual rainfall by catchment and the volume of water carried over into 2021–22.

The scenarios describe four potential outcomes for the volume of water available for irrigation use in the southern basin in 2020–21. In each scenario, the aggregate demand for irrigation water is assumed to be the same (i.e. at 2019–20 levels). Therefore, prices in each scenario are primarily influenced by seasonal conditions, the volume of water available (which is affected by
allocation and carryover forecasts), rainfall (which affects crop water requirements) and trade limits that restrict the flow of water between catchments.

**Rainfall**

Table A2 shows the assumed annual rainfall in 2020–21 by catchment for each outlook scenario. This is calculated as a percentile of historical annual rainfall between 2000–01 and 2019–20.

**Table A2 Rainfall**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
</tr>
<tr>
<td>NSW Lower Darling</td>
<td>150.2</td>
<td>152.1</td>
<td>167.4</td>
<td>225.4</td>
<td>316.2</td>
</tr>
<tr>
<td>NSW Murray Above</td>
<td>356.3</td>
<td>251.2</td>
<td>272.7</td>
<td>367.3</td>
<td>485.1</td>
</tr>
<tr>
<td>NSW Murray Below</td>
<td>302.7</td>
<td>212.2</td>
<td>222.9</td>
<td>303.3</td>
<td>429.5</td>
</tr>
<tr>
<td>NSW Murrumbidgee</td>
<td>356.7</td>
<td>245.1</td>
<td>280.7</td>
<td>370.3</td>
<td>486.6</td>
</tr>
<tr>
<td>SA Murray</td>
<td>245.9</td>
<td>197.6</td>
<td>224.3</td>
<td>251.2</td>
<td>364.8</td>
</tr>
<tr>
<td>VIC Goulburn-Broken</td>
<td>482.0</td>
<td>321.3</td>
<td>337.4</td>
<td>445.3</td>
<td>595.7</td>
</tr>
<tr>
<td>VIC Loddon-Campaspe</td>
<td>460.7</td>
<td>337.0</td>
<td>341.3</td>
<td>418.3</td>
<td>595.4</td>
</tr>
<tr>
<td>VIC Murray Above</td>
<td>559.7</td>
<td>343.2</td>
<td>448.4</td>
<td>564.1</td>
<td>701.2</td>
</tr>
<tr>
<td>VIC Murray Below</td>
<td>247.9</td>
<td>189.1</td>
<td>209.9</td>
<td>264.2</td>
<td>389.0</td>
</tr>
</tbody>
</table>

**Source:** BOM  
**Note:** 2020–21 scenario values are ABARES forecasts

**Allocations**

Table A3 shows the allocation forecasts by entitlement type for 2020–21. While these predominantly reflect the outlook scenarios released by the state water agencies, ABARES has also made some additional assumptions.

- In Victoria, ABARES has assumed no allocations are made against low reliability entitlements in 2020–21.
- South Australian Class 3a entitlements are assumed to be comparable to high reliability entitlements in Victoria and NSW.
- For New South Wales catchments, a wet scenario forecast was not provided, and as such, ABARES assumes that under a wet scenario allocations forecasts will increase by 25% relative to the average scenario.
- Allocations for Vic. Murray above and below (the Barmah choke) are assumed to receive the same allocation percentage as each other. The same assumption is made for NSW Murray above and below regions.

**Table A3 Allocation forecasts for 2020–21, as at 15 July 2020**

<table>
<thead>
<tr>
<th>Region</th>
<th>Security</th>
<th>Extreme Dry (%)</th>
<th>Dry (%)</th>
<th>Average (%)</th>
<th>Wet (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW Murray</td>
<td>General</td>
<td>2</td>
<td>7</td>
<td>30</td>
<td>55</td>
</tr>
<tr>
<td>NSW Murray</td>
<td>High</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>NSW Lower Darling</td>
<td>General</td>
<td>30</td>
<td>40</td>
<td>65</td>
<td>90</td>
</tr>
<tr>
<td>NSW Lower Darling</td>
<td>High</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Table A4 shows the volume of water carried over into 2020–21 and ABARES forecast for carryover into 2021–22. Carryover is modelled taking into account forecasts for rainfall, entitlements on issue and allocations, along with state-based carryover rules. Overall the results suggest lower levels of carryover into 2021–22 compared to 2020–21, in the extreme dry and dry scenarios.

Table A4 Carryover volumes

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW Murrumbidgee</td>
<td>347,430</td>
<td>152,875</td>
<td>197,202</td>
<td>335,459</td>
<td>436,787</td>
</tr>
<tr>
<td>NSW Murray</td>
<td>348,193</td>
<td>151,594</td>
<td>186,977</td>
<td>364,237</td>
<td>610,777</td>
</tr>
<tr>
<td>VIC Murray</td>
<td>530,690</td>
<td>185,056</td>
<td>306,147</td>
<td>584,275</td>
<td>775,288</td>
</tr>
<tr>
<td>VIC Goulburn-Broken</td>
<td>478,840</td>
<td>208,807</td>
<td>283,353</td>
<td>490,378</td>
<td>666,761</td>
</tr>
<tr>
<td>VIC Loddon-Campaspe</td>
<td>20,202</td>
<td>15,175</td>
<td>17,971</td>
<td>27,085</td>
<td>30,635</td>
</tr>
<tr>
<td>Total</td>
<td>1,725,355</td>
<td>713,507</td>
<td>991,650</td>
<td>1,801,434</td>
<td>2,520,247</td>
</tr>
</tbody>
</table>

Note: Scenario values are ABARES forecast.
References


BOM 2020b, Climate outlooks – weeks, months and seasons, Bureau of Meteorology, Victoria, accessed 17 July 2020.


Gupta, M & Hughes, N 2018, Future scenarios for the southern Murray-Darling Basin water market, ABARES research report, Canberra, August. CC BY 4.0.

MDBA 2020, Murray-Darling Basin Ministerial Council, 19 June 2020, Murray Darling Basin Authority, ACT.


NSW DPIE 2020b, Murrumbidgee valley, water allocation statement (pdf 454kb), New South Wales Department of Primary Industries, NSW.

NSW DPIE 2020c, NSW Murray and Lower Darling, water allocation statement (pdf 590kb), New South Wales Department of Primary Industries, NSW.


Sanders, O, Hughes, N, and Gupta, M 2019, Measuring water market prices, ABARES research report, report to client prepared for the Department of Agriculture and Water Resources, Canberra, March. CC BY 4.0


Victoria Water Register 2020c, Trade opportunities, Victoria Water Register, Victoria, accessed 17 July 2020.


Westwood, T, Whittle, L, & Gupta, M 2020, ABARES water market outlook: March 2020, Canberra, March. CC BY 4.0.