

Nogoa Mackenzie Water Supply Scheme

Technical Paper: High Priority Announced Allocations when Fairbairn Dam is at very low levels

26 May 2020

Background

Sunwater is seeking feedback from High Priority customers on whether it should apply to the Department of Natural Resources, Mines and Energy (DNRME) to amend the High Priority Announced Allocation rules.

Current water sharing rules may require most or all the stored water to provide for carryover and future evaporation losses when Fairbairn Dam drops to very low levels (e.g. 189.9 m AHD or 4.4% of the dam's full capacity). This may result in zero Announced Allocations for High Priority customers.

While not currently impacting the scheme, should there be lower than normal inflows to Fairbairn Dam in the coming months or years, the rules may have this impact.

Options to address the risk

Sunwater has developed several options for the consideration of High Priority water allocation customers to facilitate access to remaining water supplies when Fairbairn Dam is at very low levels (e.g. 189.9 m AHD or 4.4% of the dam's full capacity).

For the purposes of illustrating how each water sharing alternative may work, worked examples are used to assist in comparing options. Please note that none of these options impact Medium Priority allocations, which would likely be at zero and with no remaining carryover when Fairbairn Dam is at very low levels.

The assumptions used in the worked examples include:

- Fairbairn Dam levels starting at 189.9 m AHD on 1 July, then continuously dropping through the water year due to High Priority water use, along with losses and minimal inflows (188.9 m AHD on 1 October, 186.9 m AHD on 1 January and 183.2 m AHD on 1 April).
- High Priority water consumption is no more than 50% of nominal volume with usage spread evenly throughout the water year.
- The carryover volumes from the previous water year available at 1 July total:
 - 22,000 ML for High Priority allocations (reflecting the volume of High Priority water not used in the previous water year)
 - 0 ML for Medium Priority allocations (reflecting that the Medium Priority Announced Allocation for the previous year in such circumstances is likely to have been zero).
- The levels in the weirs are steady throughout the water year with Bedford Weir at 122.45 m AHD, Bingegang Weir at 100.12 m AHD and Tartrus Weir at 80.86 m AHD.

Option A – Current High Priority Announced Allocation rules

Option A assumes there is no change to the existing Announced Allocation rules. The current rules assess the volume of water that may be made available to High Priority customers after setting aside water for carryover from the previous water year, and provision for storage and transmission losses up to the end of the water year.

Table 1 sets out the results of applying the current rules using the assumptions outlined.

Table 1 – Option A: Current rules with Announced Allocation for up to 12 months (i.e. Announced Allocation to the end of the water year) and with carryover from the previous water year

Date of announcement	Assumed Fairbairn Dam level (m AHD)	Assumed Fairbairn Dam % of full supply (%)	Assumed remaining carryover available to HP (ML)	HP Announced Allocation (%)	HP Announced Allocation (ML)	Total volume available to HP customers (ML)
1-Jul	189.88	4.4%	22000	0%	0	22000
1-Oct	188.90	3.0%	13834	11%	4861	12929
1-Jan	186.92	1.4%	3774**	45%**	20629**	12872**
1-Apr	183.21*	0.2%	0	45%**	0**	0

* Less than Fairbairn Dam's dead storage of 185.86 m AHD

** Note that Announced Allocations or any remaining carryover would not be able to be supplied from Fairbairn Dam when the dam approaches, or is below, its dead storage level

Applying the current rules would result in a High Priority Announced Allocation of 0% at the start of the water year. Carryover water from the previous water year would be available to High Priority allocation customers who have not used all their allocation in the previous water year.

This option may over-estimate the volume of water available for High Priority users in the second and third quarters of the water year due to not making any provision for potential difficulties in releasing and accessing water supplies when the dam is at very low levels.

Option B – Current High Priority Announced Allocation rules but with allowance for reduced access to stored water when Fairbairn Dam is very low

In Option B, an extra allowance is made to account for potential difficulties in releasing and accessing water supplies when the dam is at very low levels. This option therefore includes a provision to reduce the accessible volume when calculating Announced Allocations. Existing carryover arrangements are also retained in this option.

Table 2 sets out the results of applying Option B using the assumptions outlined for the worked examples.

Table 2 - Option B: Current rules with Announced Allocation for up to 12 months (i.e. Announced Allocation to the end of the water year), with carry over and including allowance for reduced access to stored water when Fairbairn Dam is very low

Date of announcement	Assumed Fairbairn Dam level (m AHD)	Assumed Fairbairn Dam % of full supply (%)	Assumed remaining carryover available to HP (ML)	HP Announced Allocation (%)	HP Announced Allocation (ML)	Total volume available to HP customers (ML)
1-Jul	189.88	4.4%	22000	0%	0	22000
1-Oct	188.90	3.0%	13834	0%	0	8068
1-Jan	186.92	1.4%	3774**	30%**	13684**	5927**
1-Apr	183.21*	0.2%	0	30%**	0**	0

* Less than Fairbairn Dam's dead storage of 185.86 m AHD

** Note that Announced Allocations or any remaining carryover would not be able to be supplied from the Fairbairn Dam when the dam approaches, or is below, its dead storage level

This option would again result in a 0% High Priority Announced Allocation at the start of the water year and carryover water being available to High Priority allocation customers who have not used all their allocation in the previous water year.

This option reduces the volume of water available for High Priority customers in the second and third quarters of the water year as it makes the provision for potential difficulties in releasing and accessing water supplies when the dam is at very low levels.

Option C – Three-month High Priority Announced Allocation rules including allowance for reduced access to stored water when Fairbairn Dam is very low

Option C is based on the High Priority Announced Allocations being calculated and made available for a three-month period only instead of the current rules that apply up to 12 months to the end of the water year. The High Priority Announced Allocation would be capped at 25% in any quarter. Existing carryover of unused water from the previous water year is retained in this option.

This option also includes an extra allowance for potential difficulties in releasing and accessing water supplies when the dam is at very low levels.

Option C would apply in water years when the level at Fairbairn Dam on 1 July is less than 191.67 m AHD (which is the level where the current rules would result in 25% High Priority Announced Allocation on 1 July using the assumptions previously outlined). The alternative rules would continue to be applied through the water year until the level in Fairbairn Dam returned above 191.67 m AHD.

Table 3 sets out the results of applying this option using the assumptions for the worked examples outlined above.

Table 3 – Option C: Three-month High Priority Announced Allocation rules including allowance for reduced access to stored water when Fairbairn Dam is very low

Date of announcement	Assumed Fairbairn Dam level (m AHD)	Assumed Fairbairn Dam % of full supply (%)	Assumed remaining carryover available to HP (ML)	HP Announced Allocation for 3 months only (%)	Total volume available to HP customers (ML)
1-Jul	189.88	4.4%	22000	25%	33532
1-Oct	188.90	3.0%	16234	1%**	16861
1-Jan	186.92	1.4%	8068**	0%	8068**
1-Apr	183.21*	0.2%	0	0%	0

* Less than Fairbairn Dam's dead storage of 185.86 m AHD

** Note that Announced Allocations or any remaining carryover would not be able to be supplied from Fairbairn Dam when dam approaches, or is below, its dead storage level

This option would result in a High Priority Announced Allocation of 25% at the start of the first quarter, plus the volume of carryover water being available to High Priority water allocation customers who have not used all of their allocation in the previous water year. Comparison with Option B illustrates how the total volume of water available in each quarter increases due to not locking up water for up to 12 months future losses.

Option D – Three-month High Priority Announced Allocation rules including allowance for reduced access to stored water when Fairbairn Dam is very low but with no carryover

Option D is similar to Option C except no carryover is allowed from the previous water year. This option includes the extra allowance for potential difficulties in releasing and accessing water supplies when the dam is at very low levels.

Table 4 sets out the results of applying this option using the assumptions for the worked examples.

Table 4 – Option D: Three-month High Priority Announced Allocation rules including allowance for reduced access to stored water when Fairbairn Dam is very low but with no carryover from the previous water year

Date of announcement	Assumed Fairbairn Dam level (m AHD)	Assumed Fairbairn Dam % of full supply (%)	Assumed remaining carryover available to HP (ML)	HP Announced Allocation for 3 months only (%)	Total volume available to HP customers (ML)
1-Jul	189.88	4.4%	0	25%	11532
1-Oct	188.90	3.0%	0	25%	11532
1-Jan	186.92	1.4%	0	11%**	5133**
1-Apr	183.21*	0.2%	0	0%	0

* Less than Fairbairn Dam's dead storage of 185.86 m AHD

** Note that Announced Allocations or any remaining carryover would not be able to be supplied from the Fairbairn Dam when dam approaches, or is below, its dead storage level

This option would result in a High Priority Announced Allocation of 25% at the start of the first two quarters and 11% for the third quarter. Although this option would distribute available water supplies between water allocations equally (i.e. without distributing any carryover) in each quarter, the total volume of water available across the three quarters would be less than Option C.

Side-by-side comparison of options

Table 5 presents a side-by-side comparison of the options discussed above.

Table 5 – Comparison of options

Date of announcement	Assumed Fairbairn Dam level (m AHD)	Assumed Fairbairn Dam % of full supply (%)	HP Announced Allocation at start of Quarter (%)				Total volume available to HP customers from Announced Allocations plus carryover (ML)			
			Option A	Option B	Option C	Option D	Option A	Option B	Option C	Option D
1-Jul	189.88	4.4%	0%	0%	25%	25%	22,000	22,000	33,532	11,532
1-Oct	188.90	3.0%	11%	0%	1%	25%	12,929	8068	16,861	11,532
1-Jan	186.92	1.4%	45%	30%	0%	11%	12,872	5927	8068	5133
1-Apr	183.21*	0.2%	*Fairbairn Dam is less than dead storage level – see notes for Tables 1 - 4				*Fairbairn Dam is less than dead storage level – see notes for Tables 1 - 4			

Other Considerations

It should be noted that under Queensland's *Water Act 2000*, the Minister for Natural Resources, Mines and Energy has the power to declare a water supply emergency. The Minister may take such action if satisfied that there is a water supply emergency or that one is developing. A water supply emergency might be declared if extended drought conditions are presenting a demonstrably serious risk that essential water supply needs such as for domestic purposes or essential services including the generation or distribution of electricity, would not be met.

This means that whether or not Sunwater implements (or prepares to implement) any of the options outlined, the Minister may consider declaring a water supply emergency if Fairbairn Dam is at very low levels.

Have your say

Sunwater is actively seeking the views of High Priority allocation customers on whether the High Priority Announced Allocation rules should be retained or changed to reflect one of the outlined options when Fairbairn Dam is at very low levels.

If High Priority customers indicate a clear preference, Sunwater will submit an amended Operations Manual with the changed rules to DNRME for consideration. **Pending any approval, current rules apply.** The timing of any change would also be based feedback.

To provide your feedback, please complete a Feedback Form and email to customersupport@sunwater.com.au prior to close of business on 17 June 2020. If you have any questions, please contact Jason Smith, Operations Manager Nogoia Mackenzie, by email at Jason.Smith@sunwater.com.au.