

# Managing groundwater extraction to limits - Presentation 3d

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## Exploring options in the Great Artesian Basin Eastern Recharge groundwater source



# We seek your input

The department must manage groundwater extraction to extraction limits defined in water sharing plans.

There are two methods available to reduce access if extraction by all water users exceeds the limit. These methods can be used separately or in combination.

We seek your comment on the method or combination of methods that best suits your area.



# Presentation content

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Presentation 1 : Understanding extraction limits

Presentation 2d: Extraction patterns in the GAB Eastern Recharge groundwater source

**Presentation 3d: Exploring options in the GAB Eastern Recharge groundwater source**

- **Current approach**
- **Future approach**
- **Options**
- **Where to from here.....**



# Our current approach

## Aim

- If extraction limits are exceeded then return average annual groundwater extraction to the limits

## How

- Reduce **volume going into accounts** by announcing an available water determination less than 1ML/share

## How quickly

- Year 1 – return extraction back to compliance trigger
- Year 2 - return extraction back to extraction limit
- Year 3 – only if year 1 required available water determination less than 0.5 ML/unit share, only reduce to 0.5 ML/unit share in year 1 and extend time to return extractions back to limits to 3 years.

**Note:** For the GAB Eastern Recharge: Extraction limit volume = 16,200 ML/yr and Compliance trigger volume = 16,200 + 10% = 17,820 ML/yr



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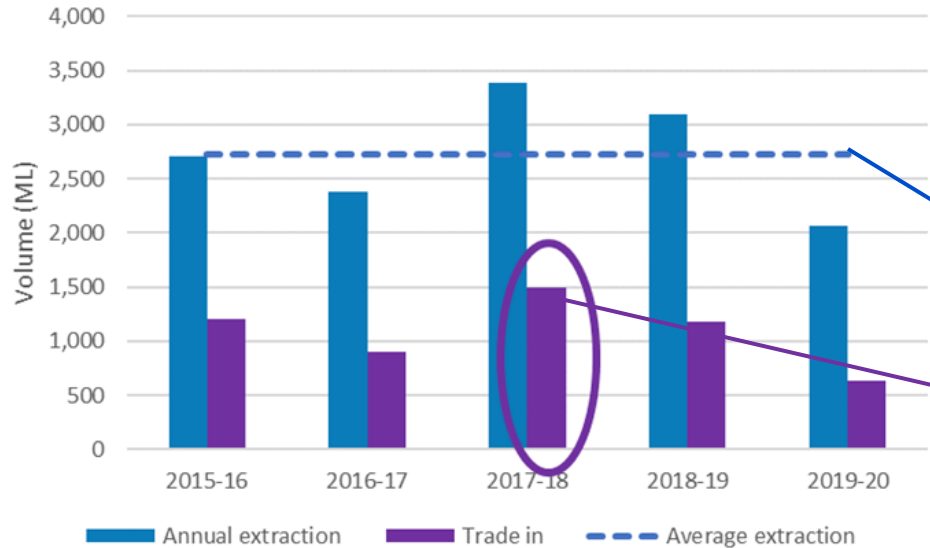
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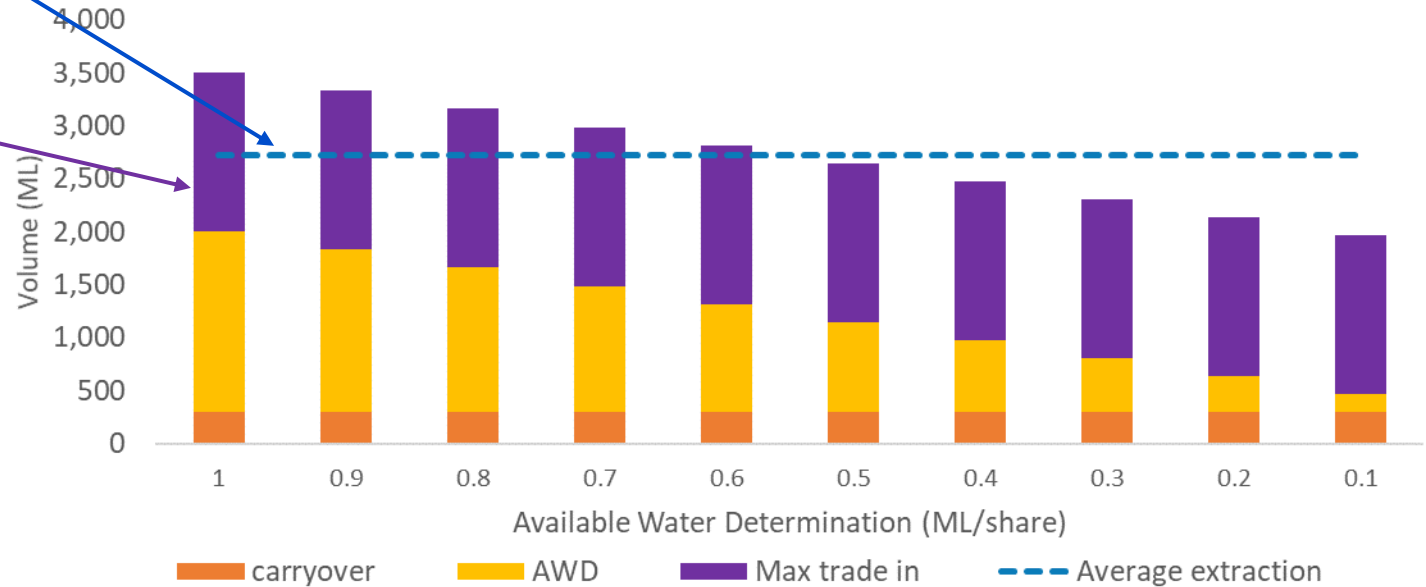


# Current approach - predicting extraction behaviour



For each licence we assume:

- Likely extraction = average extraction over previous 5 years
- Likely maximum temporary trade in = maximum temporary trade in over previous 5 years



## Example:

Access licence with 1,702 shares

Average usage = 2,750 ML/yr

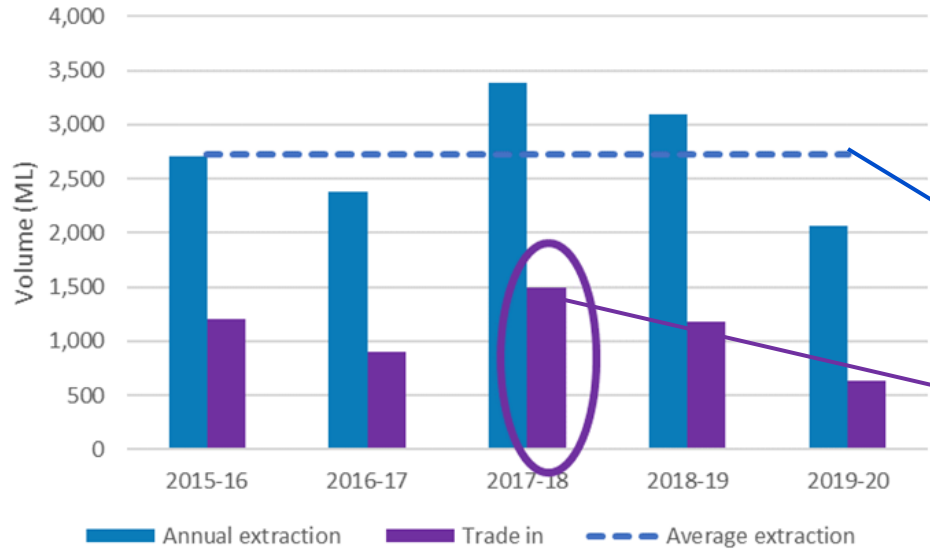
Maximum trade in = 1,500 ML

We use the result for each licence to then run scenarios to determine what available water determination will control extractions to the limit.



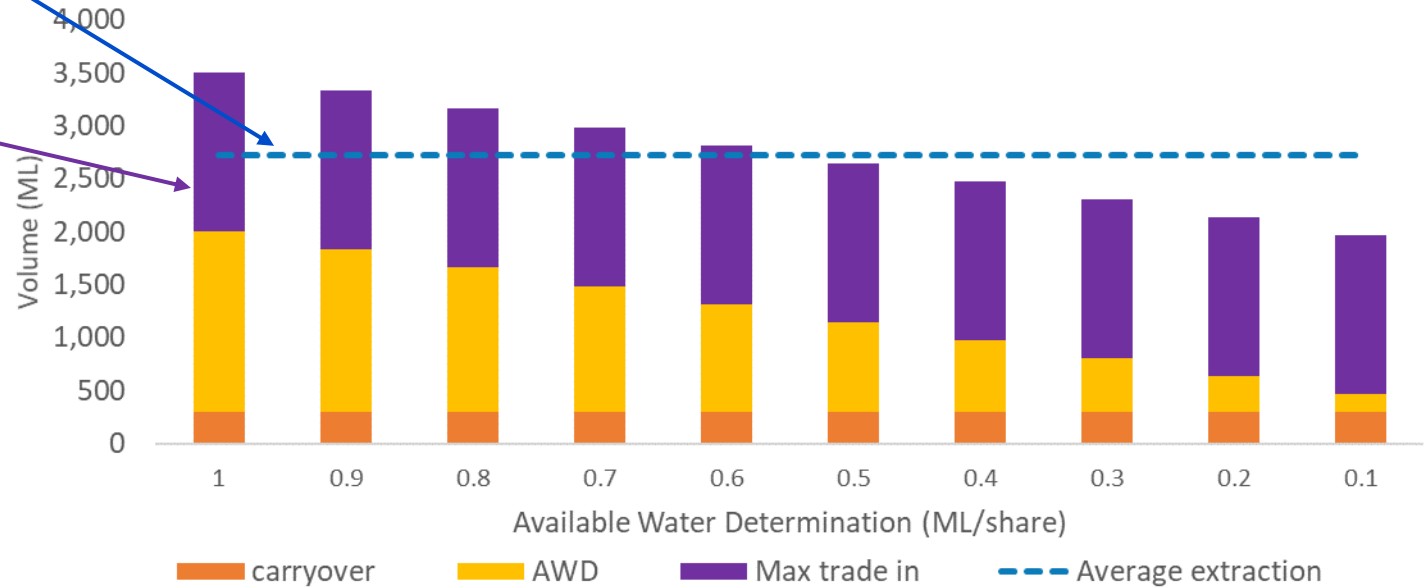


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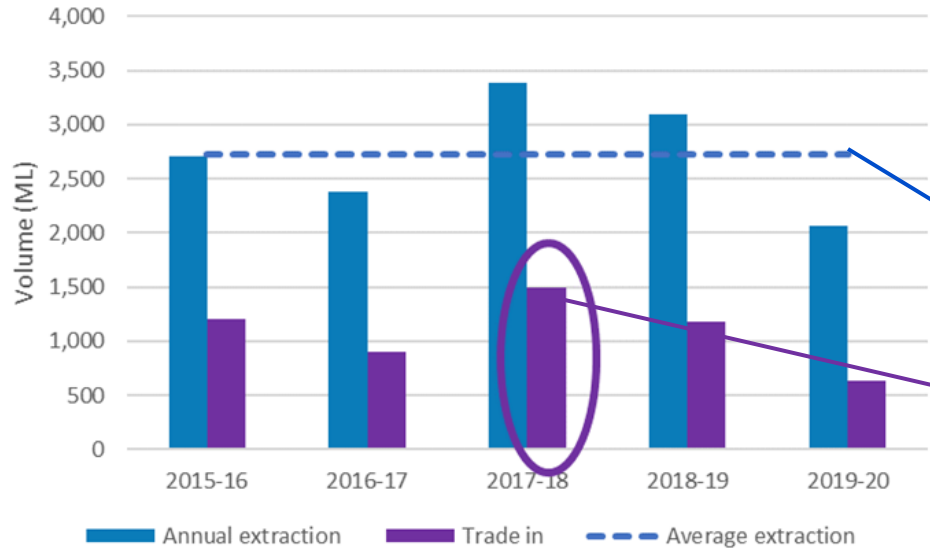
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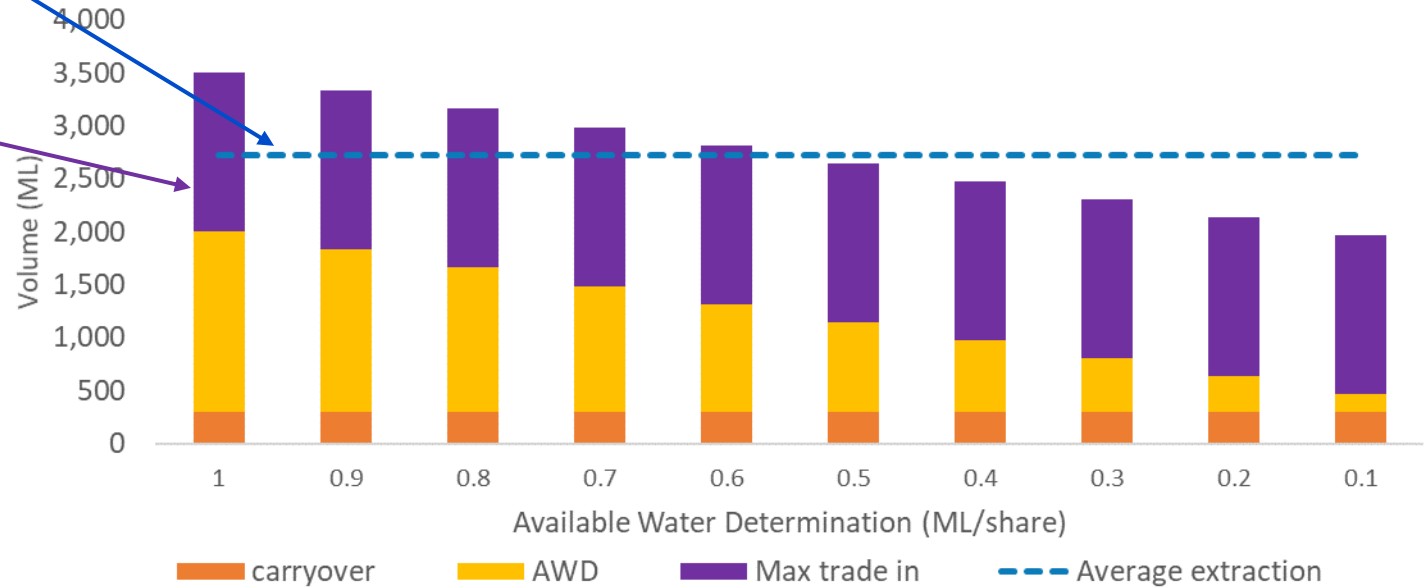


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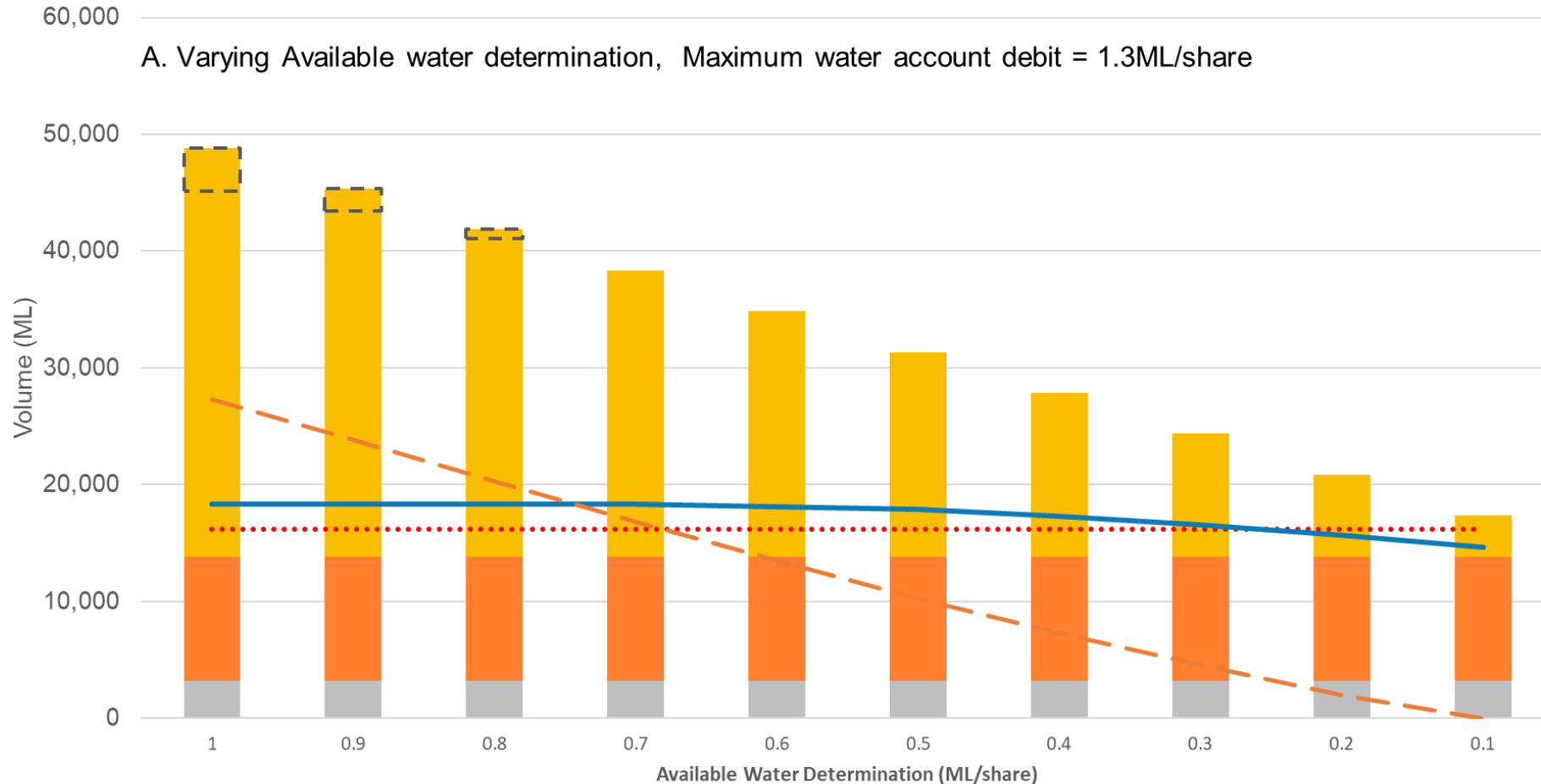
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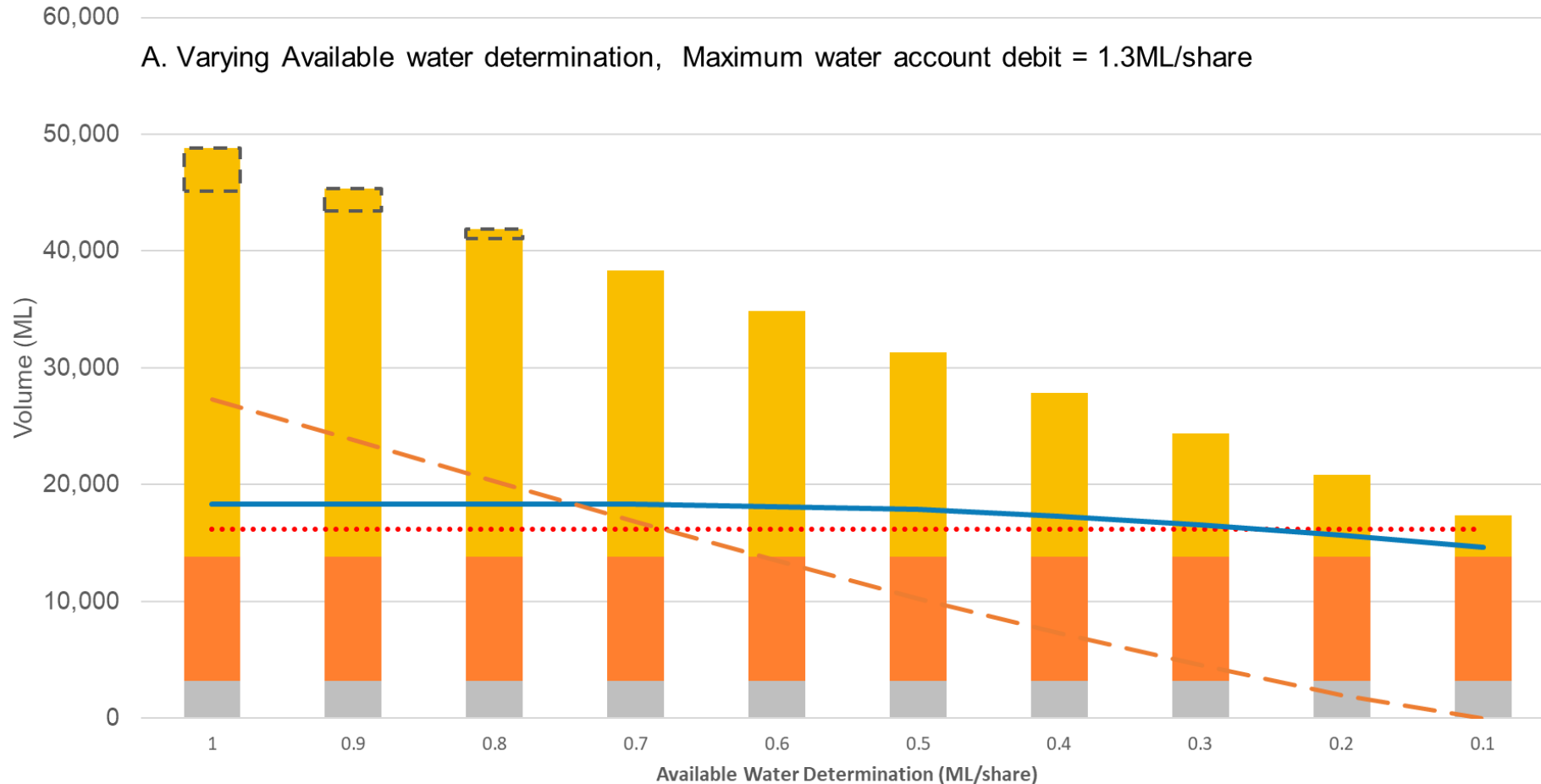
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- Basic Landholder Rights
- Opening account balance (carryover in)
- Allocation
- Account water not available
- Extraction limit
- Scenario extraction
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# Current approach

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## 2018/2019 year:

- Due to large volumes of carryover, an available water determination of zero was modelled and found not to be enough to have a marked reduction in extraction.
- As a first step reduction, an available water determination of 0.5 ML/share was announced.

## 2019/20 year:

- Considerable amounts of carryover remain in accounts.
- As a second step, the available water determination was set at the share of the extraction limit at that time, and an available water determination of 0.33 ML/share was announced.

## 2020/21 year:

- As a third step, an available water determination of 0.25 ML/share was announced, which is the level that is modelled to result in the desired reduction in extraction to bring it back within limits.



# Future approach

## Aim

- If extraction limits are exceeded then return average annual groundwater extraction to the limits

## How

- Reduce **volume going into accounts** by announcing an available water determination of less than 1 ML/unit share

AND/OR

- Reduce **volume debited from accounts** by reducing the maximum water account debit

## How quickly

- Full return in Year 1
- OR
- Over maximum 3 years

e.g. In Year 1 – reduce to compliance trigger and then in Year 2 reduce to the extraction limit OR have criteria for maximum step in Year 1 with full return no later than year 3.



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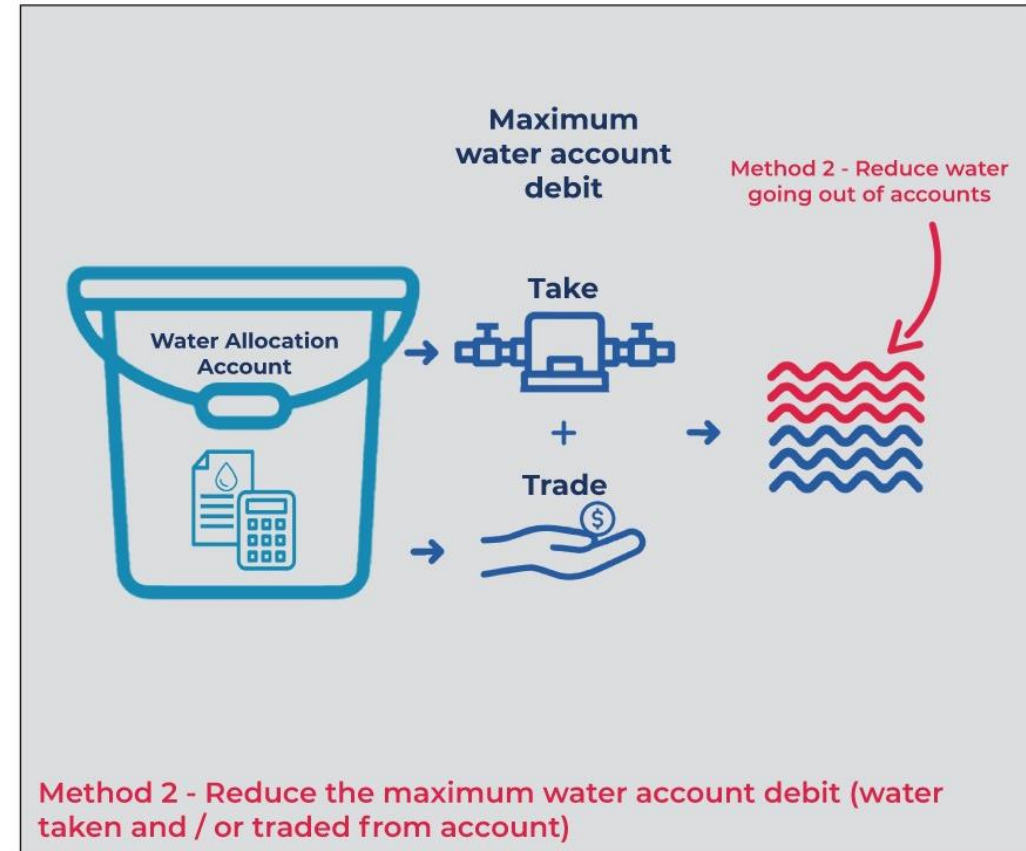
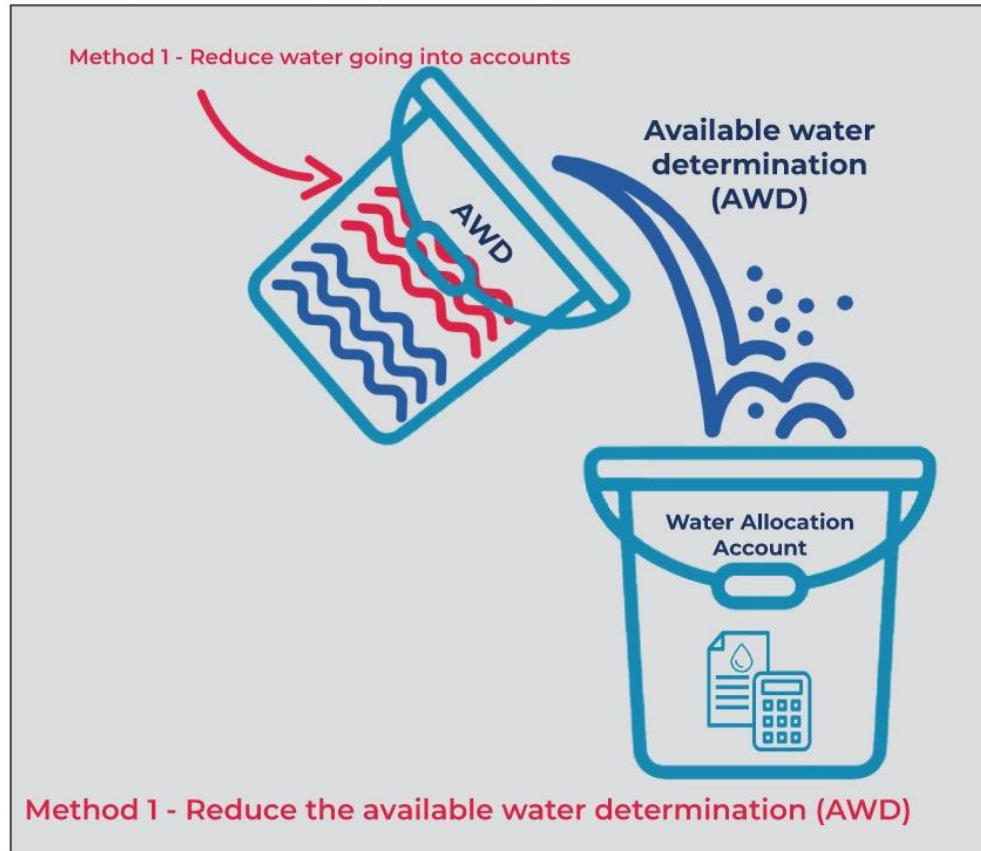
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# Future approach – the methods



The **maximum water account debit** in the GAB Eastern Recharge groundwater source is 1.3ML/share plus any water allocations assigned (71T) to the account or recredited to the account in that water year.

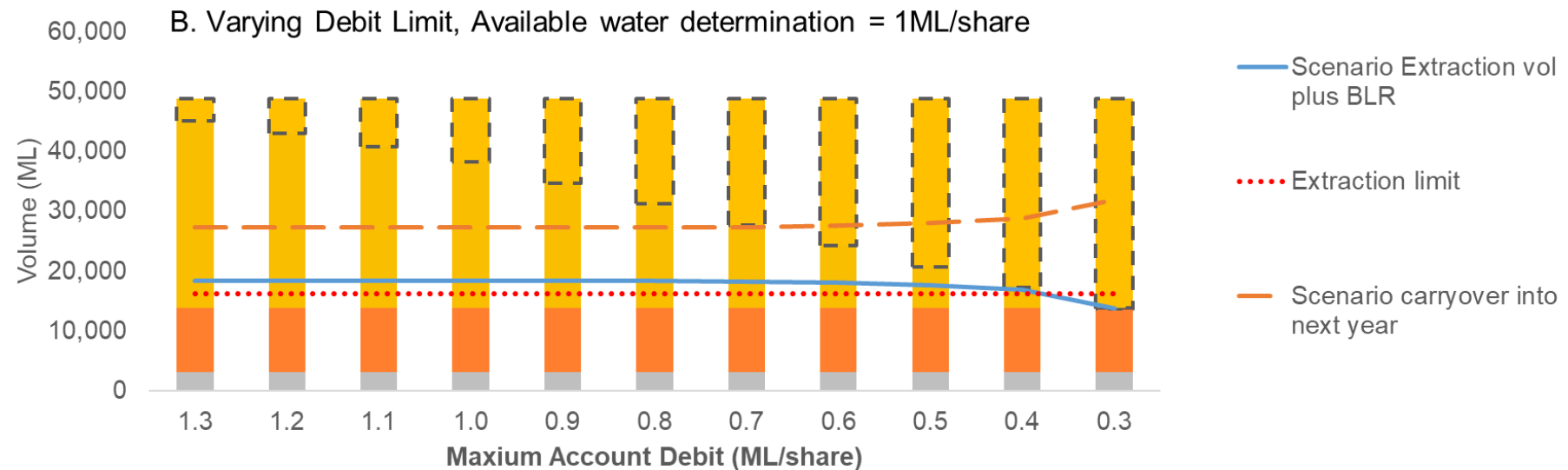
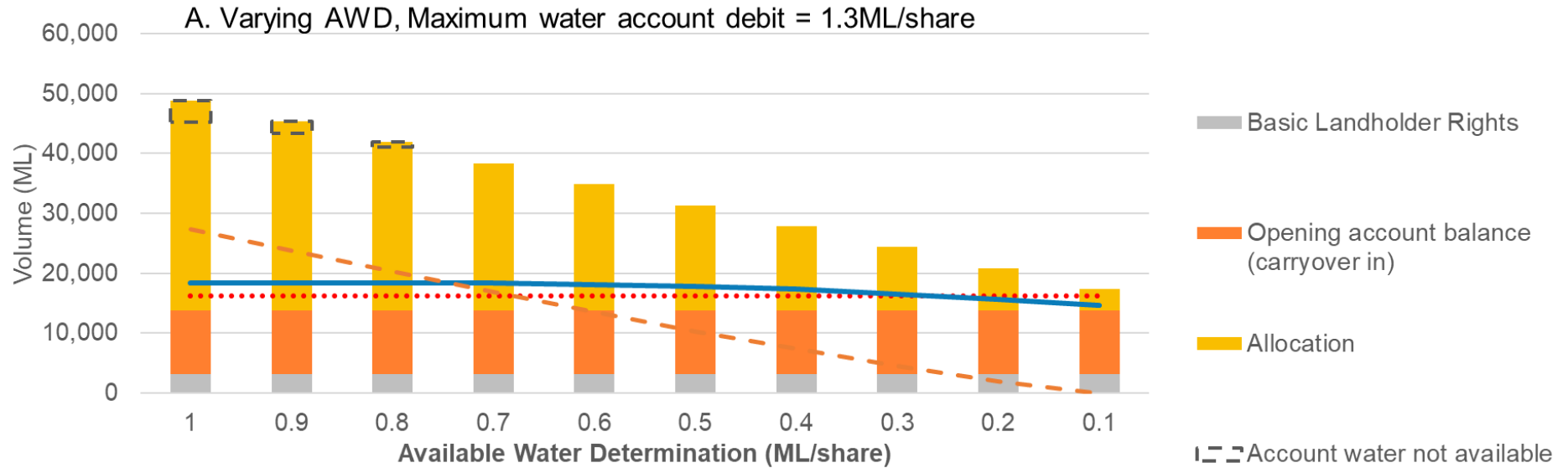


# Future approach - Options

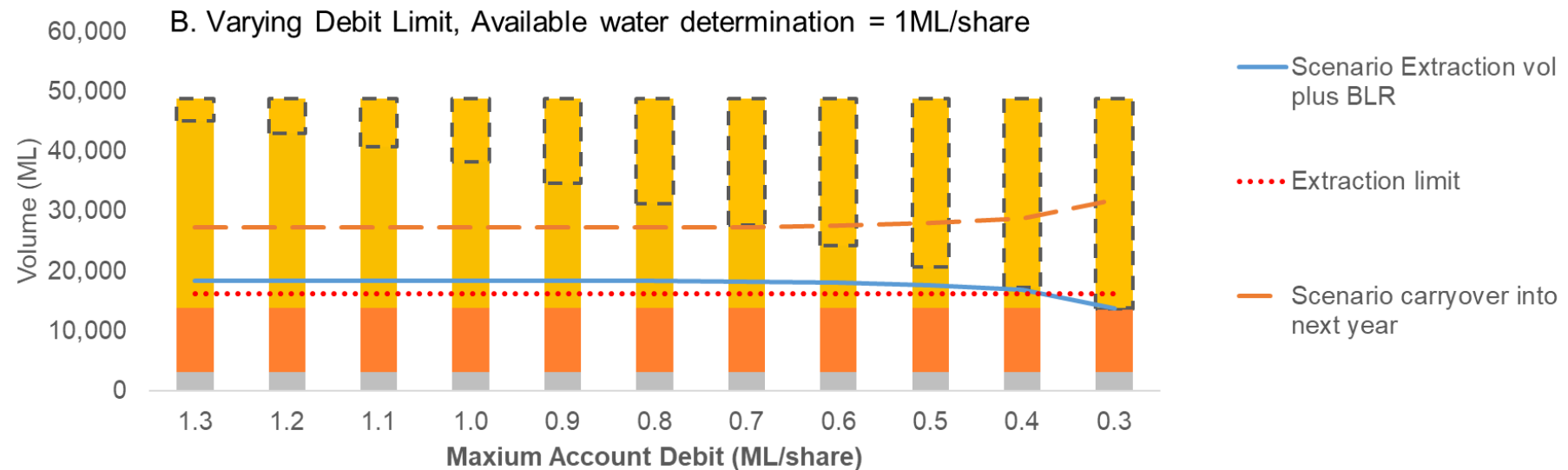
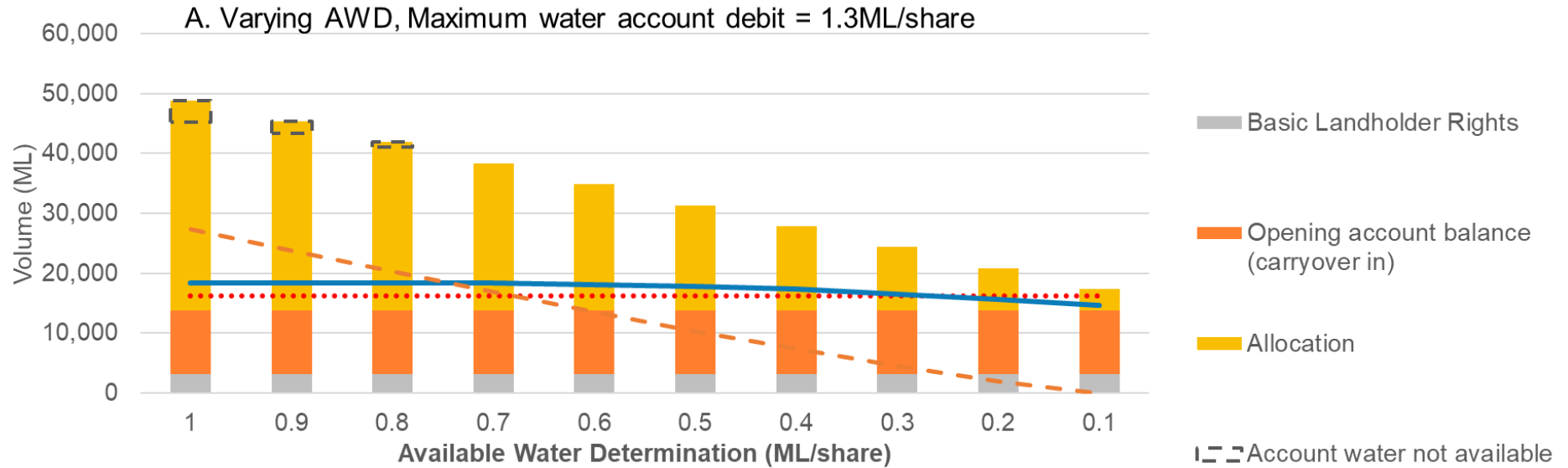
	<b>Option A</b>	<b>Option B</b>	<b>Option C</b>	<b>Option D</b>
	<b>Reduce water into accounts only</b>	<b>Reduce water out of accounts only</b>	<b>Combination of A and B</b>	<b>Set total water to be taken at extraction limit</b>
<b>Available Water Determination</b>	Reduce	Do not reduce	Reduce – based on set of principles or formulas	Reduce - based on allocating the difference between the limit and carryover
<b>Maximum water account debit</b>	No change	Reduce	Reduce – based on set of principles or formulas	No change - unless carryover exceeds limit then need to also reduce
<b>Assumptions</b>	Individual licence holders extraction = past 5 year average Individual licence holders trade in = maximum in past 5 years			No assumptions on individual extraction or trade



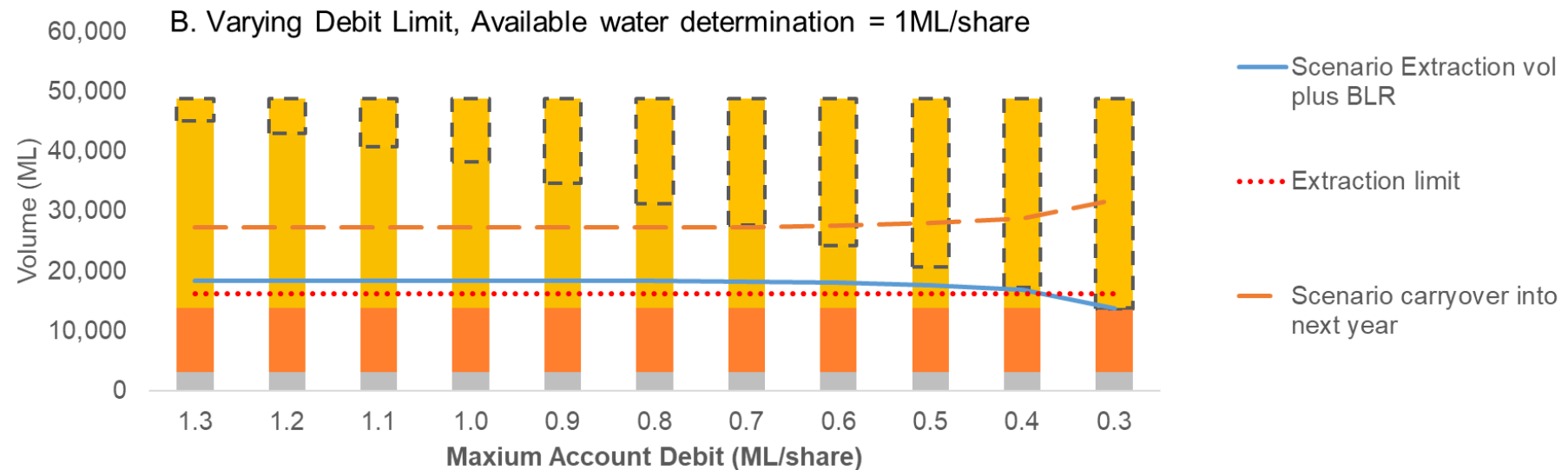
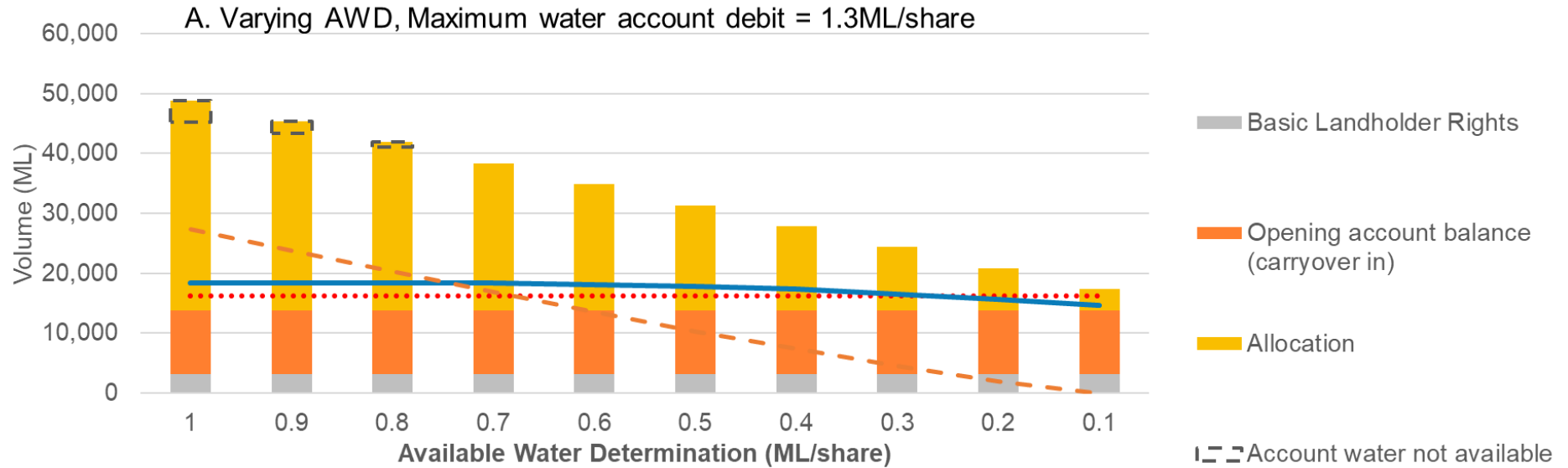
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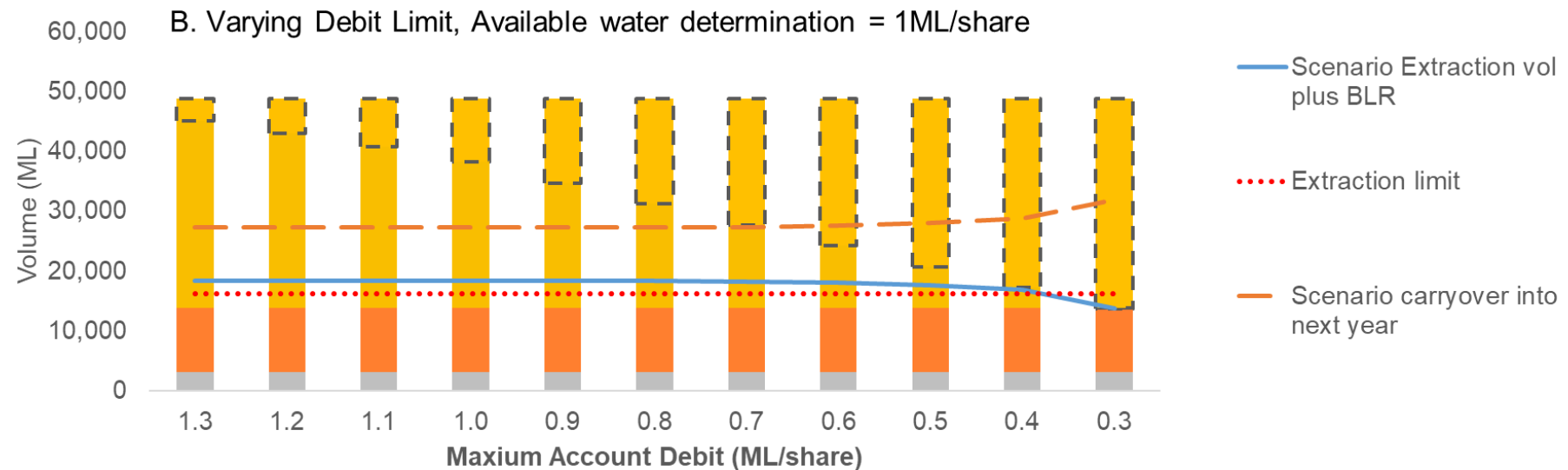
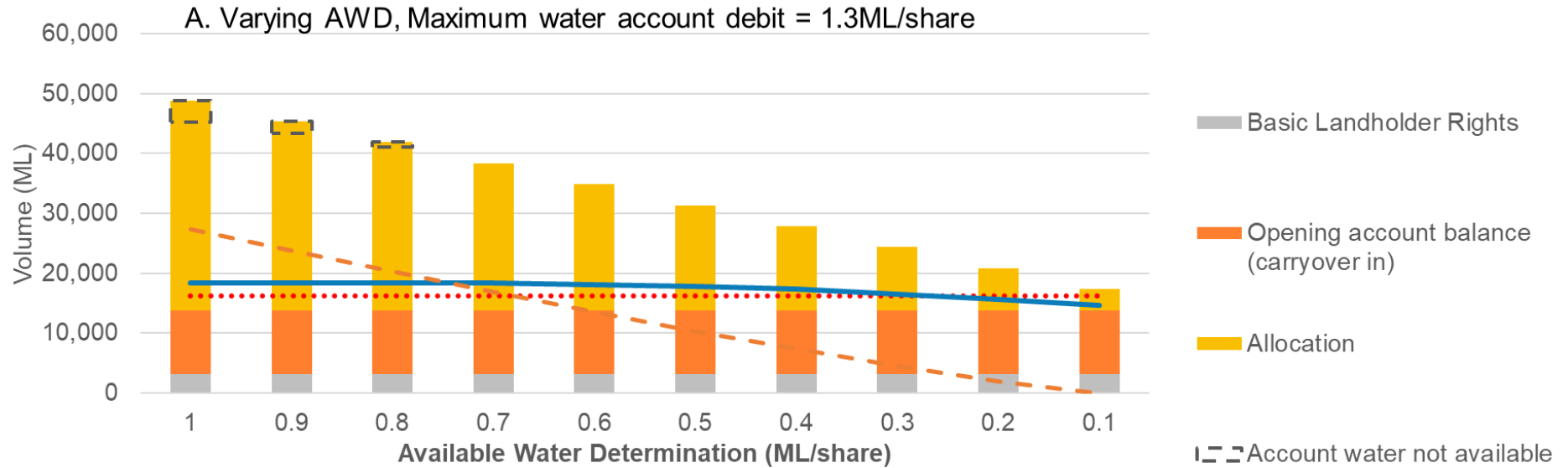
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# Option C

## Estimated extraction as % of plan extraction limit

Maximum water account debit	Available Water Determination								
	1	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2
1.3	113%	113%	113%	113%	112%	110%	107%	102%	97%
1.2	113%	113%	113%	113%	112%	110%	107%	102%	97%
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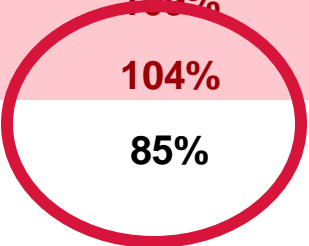
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# Option C – principles

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<p>Reduce AWD to share of extraction limit (i.e. LTAAEL/entitlements) and then, if necessary reduce maximum water account debit</p> <p>For GAB Eastern Recharge this would be an AWD of 0.37 ML/share and a maximum water account debit of 0.37 ML/share.</p>	<p>Reduce maximum water account debit to share of extraction limit (i.e. LTAAEL/entitlements) and then, if necessary, reduce available water determination</p> <p>For GAB Eastern Recharge this would be a maximum water account debit of 0.37 ML/share and an AWD of 1ML/share.</p>	<p>Set a specific criteria</p> <p><b>EXAMPLE:</b> Reduce AWD to no less than 0.5 ML/unit share (or other value) in Year 1, and/or</p> <p>Reduce Maximum water account debit to no less than 0.5 ML/unit share (or other value) in Year 1</p>
<p>Principle: Each licence receives a minimum allocation equal to: extraction limit/entitlements</p>	<p>Principle: Each licence can extract or trade out at least: extraction limit/entitlements.</p>	<p>Principle: Dependent on criteria set</p>



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# Option D

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- Makes no assumptions about likely use or trade by individuals and instead sets total water that can be taken from accounts at the extraction limit
- First, reduces available water determinations so total volume in accounts does not exceed extraction limit (carryover + allocation + BLR = limit).
- Then, only reduces the maximum water account debit if volume of exceeds the extraction limit (carryover > limit).
- No potential to exceed limit in following year





# Comparing options - overview

	<b>Option A</b> Reduce water into accounts by reducing the available water determination	<b>Option B</b> Reduce water out of accounts by reducing the maximum water account debit	<b>Option C</b> Reduce available water determination and the maximum water account debit	<b>Option D</b> Set total water that can be taken from accounts at extraction limit
<b>Assumptions</b>	Need to make assumptions (currently individual licence holders extraction = average past 5 years and individual licence holders trade in = maximum past 5 years) but could use different assumptions.			Makes no assumptions on extraction or trade by individuals
<b>To note</b>	Expected reduction in total extraction can be achieved as the AWD is reduced.	Expected reduction in total extraction is not achieved until a large reduction in MWAD. It then increases quickly with small increments of further reduction.	Expected reduction depends on the relative mix of approach.	Expected reduction in total extraction is rapidly achieved back to limits in one step.
<b>Effects at groundwater source scale</b>	<b>Reduces volume into accounts:</b> <ul style="list-style-type: none"> <li>➤ Less carryover to next water year compared to Options B and C</li> <li>➤ Less likelihood/degree of exceeding limits in following years.</li> </ul>	<b>Reduces volume out of accounts</b> <ul style="list-style-type: none"> <li>➤ More carryover to next water year than other options</li> <li>➤ More likelihood/degree of exceeding limits in following years.</li> </ul>	<b>Reduces volume into and out of accounts:</b> <ul style="list-style-type: none"> <li>➤ Effects depend on relative mix of approach.</li> </ul>	<b>Reduces volume in accounts</b> <ul style="list-style-type: none"> <li>➤ Less carryover at end of year compared to other options</li> <li>➤ Less likelihood of exceeding limits in the following years.</li> </ul>
<b>Effects at individual scale</b>	<b>Licence holders will need to trade in if:</b> <ul style="list-style-type: none"> <li>• they have insufficient water in their account to meet their needs</li> <li>• they need more water than the maximum water account debit allows, even if there is water in their account</li> </ul>			
<b>Actual impact will depend on individual's extraction patterns; level of carryover and success in the market</b>	<ul style="list-style-type: none"> <li>• Carryover influences size of impact on individual users (more carryover, less impact).</li> <li>• More active accounts likely to be impacted first (have less water available than their average use).</li> </ul>	<ul style="list-style-type: none"> <li>• No impact on accounts that are less than the announced maximum water account debit (except for potential loss in trade out).</li> <li>• Most impact on more active accounts using more than the announced maximum water account debit.</li> </ul>	<ul style="list-style-type: none"> <li>• Effect depends on relative mix of approaches.</li> </ul>	<ul style="list-style-type: none"> <li>• Carryover influences size of impact on individual users (more carryover, less impact).</li> <li>• More active accounts likely to be impacted first (have less water available than their average use).</li> <li>• More accounts impacted compared to other options.</li> </ul>

Note: These are modelled, not actual results. They are provided for comparative purpose only.



# Comparing options - overview

	<b>Option A</b> Reduce water into accounts by reducing the available water determination	<b>Option B</b> Reduce water out of accounts by reducing the maximum water account debit	<b>Option C</b> Reduce available water determination and the maximum water account debit	<b>Option D</b> Set total water that can be taken from accounts at extraction limit
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<b>Effects at groundwater source scale</b>	<b>Reduces volume into accounts:</b> <ul style="list-style-type: none"> <li>➤ Less carryover to next water year compared to Options B and C</li> <li>➤ Less likelihood/degree of exceeding limits in following years.</li> </ul>	<b>Reduces volume out of accounts</b> <ul style="list-style-type: none"> <li>➤ More carryover to next water year than other options</li> <li>➤ More likelihood/degree of exceeding limits in following years.</li> </ul>	<b>Reduces volume into and out of accounts:</b> <ul style="list-style-type: none"> <li>➤ Effects depend on relative mix of approach.</li> </ul>	<b>Reduces volume in accounts</b> <ul style="list-style-type: none"> <li>➤ Less carryover at end of year compared to other options</li> <li>➤ Less likelihood of exceeding limits in the following years.</li> </ul>
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<b>Actual impact will depend on individual's extraction patterns; level of carryover and success in the market</b>	<ul style="list-style-type: none"> <li>• Carryover influences size of impact on individual users (more carryover, less impact).</li> <li>• More active accounts likely to be impacted first (have less water available than their average use).</li> </ul>	<ul style="list-style-type: none"> <li>• No impact on accounts that are less than the announced maximum water account debit (except for potential loss in trade out).</li> <li>• Most impact on more active accounts using more than the announced maximum water account debit.</li> </ul>	<ul style="list-style-type: none"> <li>• Effect depends on relative mix of approaches.</li> </ul>	<ul style="list-style-type: none"> <li>• Carryover influences size of impact on individual users (more carryover, less impact).</li> <li>• More active accounts likely to be impacted first (have less water available than their average use).</li> <li>• More accounts impacted compared to other options.</li> </ul>

Note: These are modelled, not actual results. They are provided for comparative purpose only.



# Comparing options - overview

	<b>Option A</b> Reduce water into accounts by reducing the available water determination	<b>Option B</b> Reduce water out of accounts by reducing the maximum water account debit	<b>Option C</b> Reduce available water determination and the maximum water account debit	<b>Option D</b> Set total water that can be taken from accounts at extraction limit
<b>Assumptions</b>	Need to make assumptions (currently individual licence holders extraction = average past 5 years and individual licence holders trade in = maximum past 5 years) but could use different assumptions.			Makes no assumptions on extraction or trade by individuals
<b>To note</b>	Expected reduction in total extraction can be achieved as the AWD is reduced.	Expected reduction in total extraction is not achieved until a large reduction in MWAD. It then increases quickly with small increments of further reduction.	Expected reduction depends on the relative mix of approach.	Expected reduction in total extraction is rapidly achieved back to limits in one step.
<b>Effects at groundwater source scale</b>	<b>Reduces volume into accounts:</b> <ul style="list-style-type: none"> <li>➤ Less carryover to next water year compared to Options B and C</li> <li>➤ Less likelihood/degree of exceeding limits in following years.</li> </ul>	<b>Reduces volume out of accounts</b> <ul style="list-style-type: none"> <li>➤ More carryover to next water year than other options</li> <li>➤ More likelihood/degree of exceeding limits in following years.</li> </ul>	<b>Reduces volume into and out of accounts:</b> <ul style="list-style-type: none"> <li>➤ Effects depend on relative mix of approach.</li> </ul>	<b>Reduces volume in accounts</b> <ul style="list-style-type: none"> <li>➤ Less carryover at end of year compared to other options</li> <li>➤ Less likelihood of exceeding limits in the following years.</li> </ul>
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# Comparing options - example

	<b>Option A</b> Reduce water into accounts by reducing the available water determination	<b>Option B</b> Reduce water out of accounts by reducing the maximum water account debit	<b>Option C</b> Reduce available water determination and the maximum water account debit	<b>Option D</b> Reduce water into accounts by setting total water account
<b>Comparison example</b>	If we were to return extractions: <ul style="list-style-type: none"> <li>to the extraction limit (16,200 ML)</li> <li>within one water year</li> <li>assuming carryover volumes as at 1 July 2020, and</li> <li>based on assumptions that individual licence holders would: Extract a volume = average past 5 years; Trade in a volume = maximum past 5 years; and all water available for purchase would be offered to the market; then.....</li> </ul>			
<b>Action required</b>	<b>Available water determination</b> - 0.25ML/share.	<b>Maximum water account debit</b> - 0.37ML/share.	<b>Available water determination</b> - 0.37ML/share. <b>Maximum water account debit</b> - 0.37 ML/share.	<b>Available water determination</b> - 0.07ML/share.
<b>Effects on accounts</b>	<ul style="list-style-type: none"> <li>18 accounts would have limited access compared to their average use and previous trade behaviour.</li> <li>Those impacted are likely to be most active users as well as those who trade most of their account.</li> <li>Carryover influences size of impact on individual users (more carryover, less impact).</li> </ul>	<ul style="list-style-type: none"> <li>21 accounts, would have limited access compared to their average use.</li> <li>18 accounts would have <b>potential</b> to be impacted because there is insufficient water available to meet the anticipated demand for trade. <b>Actual</b> impact would depend on success in a tight water market.</li> </ul>	<ul style="list-style-type: none"> <li>21 accounts, would have limited access compared to their average use.</li> <li>18 accounts would have <b>potential</b> to be impact because there is insufficient water available to meet the anticipated demand for trade. <b>Actual</b> impact would depend on success in a tight water market.</li> </ul>	<ul style="list-style-type: none"> <li>21 accounts would have limited access compared to their average use and previous trade behaviour.</li> <li>Those impacted are likely to be most active users as well as those who trade most of their account.</li> <li>Carryover influences size of impact on individual users (more carryover, less impact).</li> </ul> Scenario usage estimated at 14,295ML (including BLR)
<b>Modelled Results for water market</b>	Water available for purchase =8,750ML Trade demand = 2,029ML More supply than demand in water market	Water available for purchase = 4,013ML Trade demand = 4,383ML More demand than supply in water market	Water available for purchase = 4,013ML Trade demand =4,383ML More demand than supply in water market	Water available for purchase = 5,350ML Trade demand = 3,331ML More supply than demand in water market

Note 2ML/unit share changed to 1.3/unit share to correct error on original presentation PDF.

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# Comparing options - example

	<b>Option A</b> Reduce water into accounts by reducing the available water determination	<b>Option B</b> Reduce water out of accounts by reducing the maximum water account debit	<b>Option C</b> Reduce available water determination and the maximum water account debit	<b>Option D</b> Reduce water into accounts by setting total water that can be taken from accounts at extraction limit
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# What is your preference?

Method	Assumptions / Principles	Timing
<p>A. Available water determination only?</p> <p>B. Maximum water account debit only?</p> <p>C. Combination available water determination and maximum water account debit?</p> <p>D. Set total water to be taken at extraction limit?</p> 	<p>Continue with assumptions to predict future extraction?</p> <p>Use different or additional assumptions around user and market behaviour to predict future extraction?</p> <p>Make no assumptions about future use or trade as provided for in option D?</p> <p>Licence holders allocated their 'share' of the extraction limit into their account?</p> <p>Licence holders able to extract their 'share' of the extraction limit"?</p> <p>Available water determinations should not drop below X before adjusting maximum water account debit?</p> <p>Maximum water account debit should not drop below 1ML/share or other value before adjusting available water determinations?</p>	<p>Full return in Year 1 OR over maximum 3 years</p> <ul style="list-style-type: none"><li>• Return to the extraction limit in Year 1.</li><li>• Allow for adjustment -maximum 3 years to return to extraction limit, e.g.<ul style="list-style-type: none"><li>○ Take action in year 1 to return to compliance trigger and action in year 2 to return to extraction limit</li><li>○ Take action over 3 years if available water determination in year 1 would be less than 0.5 ML/unit share</li></ul></li></ul> 

# Default method and transition period

## Default method

- If procedures not prepared and able to be implemented by 1 July 2021 and water sources exceed the extraction limits - current method of only reducing available water determination will apply.

## Transition Period

- Is a transition period required to provide enough time for water users to prepare for the 2021-22 water year?
- E.g. continue current approach of only reducing available water determinations for 2021-22 if limits are exceeded, commence new procedures from 1 July 2022.



# Where to from here

## Consultation

Dec 2020 - Feb 2021

- Mail out to access licence holders
- Webpage
- Face to face sessions with recorded presentations and live Q & A

All feedback due  
5 March 2021

Department develop  
implementation  
procedures

## Implementation

July 2021

- Announcements





# Have your say

Your input can be provided by:

- Complete the feedback form on our webpage at [www.dpie.nsw.gov.au/managing-access-to-groundwater](http://www.dpie.nsw.gov.au/managing-access-to-groundwater)
- Download the feedback form from our webpage and email it to us at [water.relations@dpie.nsw.gov.au](mailto:water.relations@dpie.nsw.gov.au)
- Post your feedback to Groundwater Consult, [Suite 5/620 Macauley St, Albury NSW 2640](#).
- Provide feedback during a [face-to-face information session](#) in your local area.

Your feedback will need to be submitted by 5 March 2021.



**Information sessions**  
**Thursday 11 February 2021**  
**10.30am – 1.00pm**  
**North Star Sporting Club**  
**North Star Road,**  
**North Star NSW**



# Presentation content

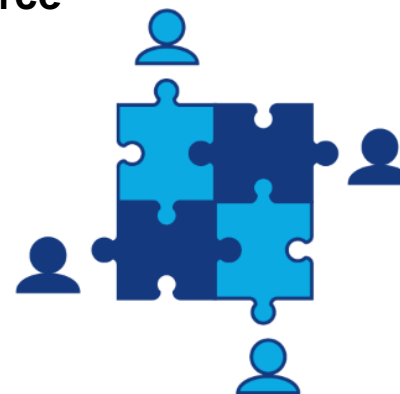
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Presentation 1 : Understanding extraction limits

Presentation 2d: Extraction patterns in the GAB Eastern Recharge groundwater source

**Presentation 3d: Exploring options in the GAB Eastern Recharge groundwater source**

- **Current approach**
- **Future approach**
- **Options**
- **Where to from here.....**



**The End**

**For more information go to**

**<https://www/dpie.nsw.gov.au/managing-access-to-groundwater>**

