Lachlan water sharing plan rules regarding airspace and account reset – April 2023

The purpose of this paper is to clarify for the Lachlan Airspace Panel, provisions in the Water Sharing Plan for the Lachlan Regulated River Water Source 2016 around Wyangala airspace management and account resets.

Figure 1: Wyangala Dam

Summary

In providing advice to WaterNSW, the Lachlan airspace panel should note:

- An airspace target less than the maximum (assumed 80%ile inflows) can be recommended.
- Pre-release is the loss of regulated supply, assumed will be soon replaced.
- The greater the airspace, the greater the flood mitigation potential, but the greater the risk to resource availability and allocations (if the storage does not fill).

PUB23/368

- Account reset is triggered by a specific circumstance, namely 'wet' pre-release (or physical spill). It is when storages are (deemed) full, or will imminently fill, based on real-time storage and inflow data (not probabilistic information).
- Account reset allocations are based on actual water availability at the time. (Note: reset allocation is likely to be slightly less under current circumstances given that lower Lachlan storages are unable to hold their usual full supply volumes due safety upgrades and repairs).
- The current seasonal rainfall outlook is for likely drier than median conditions (Attachment 1).

Storage operation objectives

Large irrigation storages in Australia are generally required to be operated in a manner that achieves the following objectives, in priority order:

1. Safety of the infrastructure and its operators.
2. Conservation of water.
3. Flood mitigation, environmental outcomes, other.

The water sharing plan (Clause 63) provides for flood (and spill) operations consistent with these objectives:

Clause 63 - Dam operation during floods and spills

1. The operation of Wyangala Dam during times of flood and spilling of water from the dam is to be undertaken in a manner that maintains the safety of dam infrastructure.
2. Providing it is consistent with subclause (1), the operation must aim to;
   a. leave Wyangala Dam water storage as full as possible after a flood or spilling of water, subject to the airspace operation rules at clause 64, and
   b. minimise downstream flood damage where possible.

Seasonality of inflows

Historically the Lachlan valley has experienced dominant winter rainfall and inflows, with typically less inflow during the summer months (Attachment 2). Nevertheless, past flow patterns are not guaranteed to repeat and weather systems can bring storms and floods at any time.

Significant irrigation demand typically commences around September and continues over summer but may be earlier or later depending on existing seasonal conditions.

Therefore, consistent with priority 2 above, operators aim to safely manage winter inflows and airspace while ensuring the maximum resource is captured by the time significant irrigation demand commences in spring.

Risks

Airspace operations are about using the best available information and balancing risk; the more airspace, the better flood mitigation capability, but the less resource available for allocation if the storage is not (re)filled.

The pre-release of water is synonymous with controlled spill, that is, water is released from storage by operators before time, because it is determined the storage will likely (inevitably) spill. Pre-release provides better safety and mitigates potential flooding by ensuring peak outflows are less than peak inflows. However, it requires skilful operation and the balancing of risks because too much pre-release amounts to a loss of resource, which may prove costly if dry conditions unfold.

Therefore, operators are only to pre-release water to create airspace to the extent they are very confident that the storage will be refilled (full) when significant irrigation demand commences. Or put another way, if operators pre-release, it means they are near certain the storage will be filled on the back of the inflow recession.

On this basis therefore, if pre-release occurs, the resource assessment will assume a full storage for allocation purposes, even though the storage may not yet be full.

If the storage is not refilled after pre-release, assuming the release was not useful in reducing liability (by debiting accounts), then over-allocation is likely to have occurred and the deficit, if not soon remedied naturally with subsequent inflows, may need to addressed by restricting access to water in general security accounts (temporary water restriction) in order to protect higher priority entitlements.

As noted below, the water sharing plan (Cl 64(b)) identifies the maximum allowable airspace risk (80%ile inflow), but a lower inflow assumption (less risk) can be used if warranted, requiring less (or zero) pre-release depending on the best seasonal information and outlooks available.

Water sharing plan rules

Airspace operation

Clause 64 allows WaterNSW to release water for flood mitigation purposes on a pre-cautionary basis, that is, without a storm or significant inflow being forecast or imminent. However this 'dry' pre-release risks loss of regulated supply and a potential deficit in the resource assessment.

Clause 64 - Airspace operation rules

The operator must manage Wyangala Dam in accordance with the following:

a. airspace is to be maintained in Wyangala Dam for the purpose of reducing downstream flood damage,

b. the target airspace volume to be maintained at any time must be set so that the probability of the water storage volume being full by the time significant irrigation demand commences is at least 80%,

c. releases undertaken to create airspace should not result in the flow at Cotton's Weir, Forbes or Jemalong Weir exceeding the minor flood level at these sites,

d. if practical, releases to create airspace are to be made through the Wyangala power station when Wyangala Dam is within 1% of the airspace target.

This clause therefore provides for a limited variable airspace target for flood mitigation (only). Operators can choose a target airspace, with advice from the panel, suitably balancing the risk to resource and the risk of flood damage. The maximum airspace (risk) allows use of the 80%ile future inflow, but a lower airspace target (less risk) may be appropriate in some seasons. Given that the priority is water conservation, and the requirement that the storage be refilled (full) by the time significant irrigation demand commences, care must be taken to not pre-release to excess.

If the storage is near full, and resources have been shared accordingly, and if a pre-release then occurs, it means the available resource is reduced and there is insufficient water to underpin announced allocations until inflows restore the deficit. A worst case scenario if inflows continue to be insufficient is that access to water in general security accounts is temporarily restricted until the deficit is overcome, to protect higher priority commitments.

If there is no pre-release, the storage may or may not subsequently fill, depending on inflows, but the resource assessment and allocations will be based on the captured water in storage, plus the usual assumed minimum inflows. If there is no pre-release there should be no subsequent deficit.

Airspace operations are more obvious during wet conditions, with observed or imminent high inflows upstream of the dam. Water is released before time to absorb the peak inflow rates and mitigate potential downstream flooding. Pre-release is progressively reduced through the inflow recession allowing the storage level to recover to full to thereby maximise water conservation.

The airspace panel should consider all available information, noting that the current dry outlook (Attachment 2) may not warrant the same airspace target as a wet outlook. Rather, noting that storms can occur at any time, close monitoring of weather models and systems and the 7 day forecasts, might be sufficient to guide active pre-release decisions where warranted.

Account reset

The effect of clauses 37(4), 38 and 45(3) is to empty all regulated river (general security) access licence accounts and regulated river (conveyance) access licence accounts and make new available water determinations. In addition, water remaining in the spillable subaccounts of regulated river (high security) access licences must be withdrawn. This occurs **when Wyangala Dam, Lake Brewster and Lake Cargelligo are full, deemed full, or will fill**.

Simply put, this is the removal of account balances from subject accounts and equal re-distribution of all available water to relevant accounts. It is known as an account reset and occurs when the regulated system is full. A reset can occur no more frequently than once in six months (Cl 45(3)).

The rationale for reset is that, with the system constrained and unable to capture new inflows, those contributing to the constraint by holding higher account balances, should not be allowed to penalise those with lower account balances from receiving further allocation since inflows cannot be captured. Hence, under a reset, accounts are emptied and an equal allocation announced that shares all the available water, meaning that the highest account balances will forego water to the lower account balances.

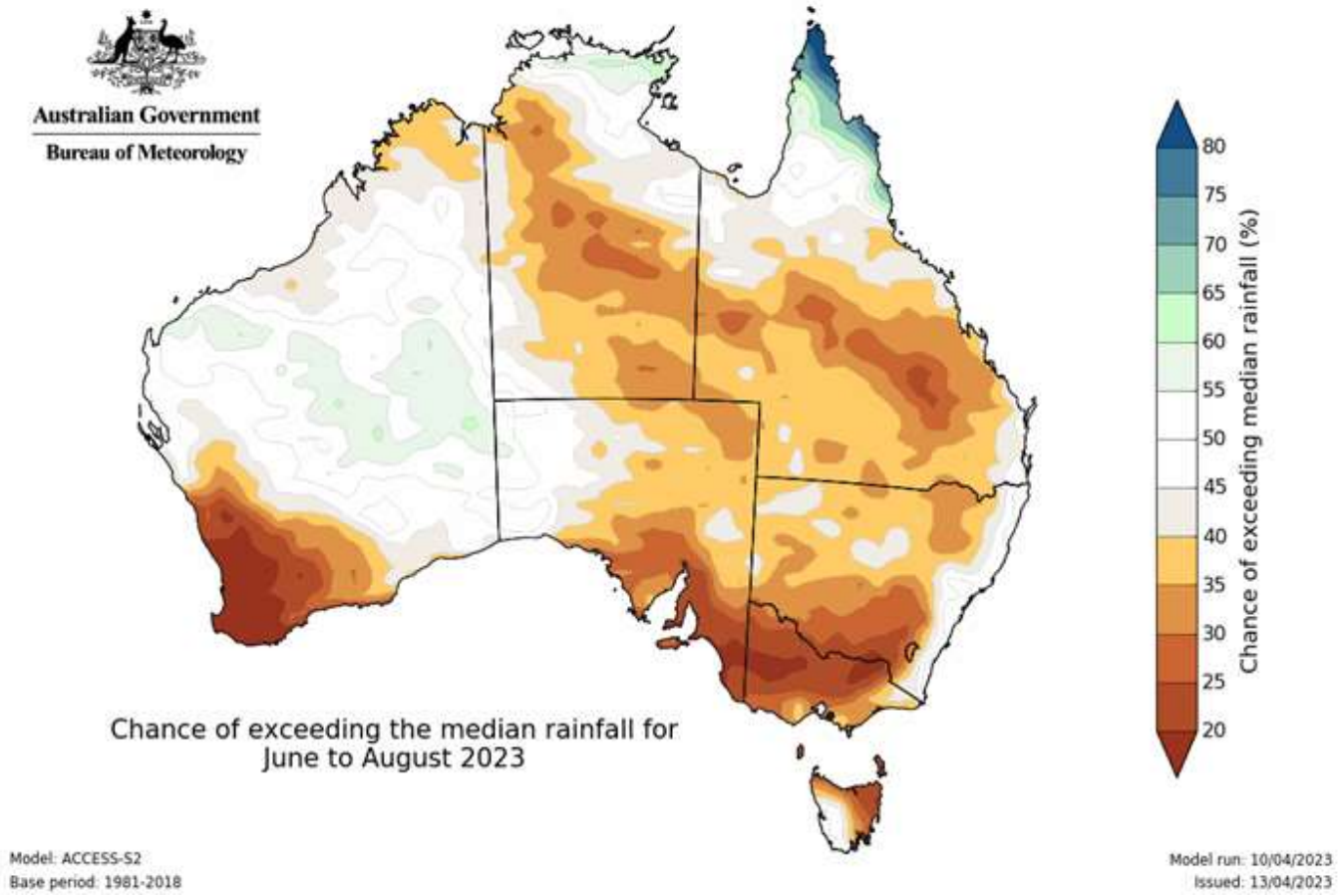
At present (April 2023) there are two further details to note:

- Firstly, Lake Cargelligo is being lowered for maintenance and repairs. It is therefore currently deemed full during drawdown and will be deemed full at 50% of its full supply level (FSL) once the current lowering is complete. Similarly flood damage at Lake Brewster means it can currently only safely hold up to 116 GL and is therefore deemed full at 79.5% of its FSL. The WaterNSW 'Lachlan Operations Update' notices will be used to advise water users of changes to holding capacities.
- Secondly, it is important to distinguish between a 'dry' pre-release and 'wet' pre-release. Unlike the resource assessment and allocation process that assumes a full Wyangala Dam if a 'dry' pre-release is made, actual (real-time) conditions will be used for the purposes a 'wet' pre-release and the triggering of an account reset. That is, if inflows can be seen that will more than fill Wyangala Dam (currently 100% FSL) then, assuming downstream storages are also (deemed) full or will be filled, a 'wet' pre-release is likely and an account reset will be administered. The department will be advised by WaterNSW whether a pre-release is 'wet' to avoid or manage an imminent spill (reset trigger), or 'dry' for seasonal airspace purposes (not a reset trigger). It is important to note that allocations associated with an account reset are based on actual storage volumes (water availability) at the time (including future minimum inflows).

Attachments

Attachment 1

Chance of exceeding median rainfall June to August 2023



Attachment 2

Monthly inflow probability