

# Lake Eildon Technical Assessment

## Factsheet



After major flooding in the Goulburn River caused significant damage in October 2022, we have been working with Hydrology and Risk Consulting (HARC) to complete the Lake Eildon technical assessment. The assessment investigates how changing the way the lake is operated could improve protection for downstream communities from future flooding. The assessment also considers the associated financial and non-financial implications of each option.

The assessment looks at six options for their potential to improve protection for downstream communities from future flooding. All options explored were found to be ineffective or unreliable as flood mitigation strategies, or created costs and impacts that outweigh the benefits of a change to how the storage is managed.

The assessment report (published in March 2024) highlights that tributaries that flow into the Goulburn River downstream of Lake Eildon have a more significant impact on flooding in communities downstream, including Molesworth and Seymour, than releases from the lake.

The [Victorian Floodplain Management Strategy](#) provides policy and guidance for investment in flood mitigation infrastructure and maintenance. The investment principles include cost effectiveness, so that the flood mitigation benefits are greater than the total cost (including both capital and ongoing costs).

A working group involving DEECA, local councils, water corporations, Goulburn Broken CMA (GBCMA) and the Victorian Environmental Water Holder were involved in scoping and supporting the assessment.

This factsheet briefly summaries the scope and the outcome of the assessment. For more detailed information, read the full technical report or summary technical report on DEECA's website [Lake Eildon operating arrangements assessment \(water.vic.gov.au\)](https://water.vic.gov.au/lake-eildon-operating-arrangements-assessment).

## What options have been looked at?

The technical assessment investigated six options as selected and agreed by the working group.

Option	Description
1	<b>Change target filling curves</b> so that Lake Eildon is full later in the year (e.g., December/January instead of October/November) and under less conservative inflow statistics (e.g., reaching full supply in 85 years out of a hundred instead of 95 years)
2	<b>Reduce target storage levels</b> by holding the lake, where possible, at a maximum volume of 78%, 85%, 90%, 95% of Full Supply Level all year round
3	<b>Reduce target storage based on climate signals</b> by holding the lake, where possible at a lower Full Supply Level based on industry-standard climate indicators indicating a wet year
4	<b>Pre-release based on forecast rainfall</b> by releasing water to create airspace within the lake, 2 to 3 days prior to forecast rainfall and resulting inflows
5	<b>Change maximum surcharge</b> by increase the amount of water that is held in the lake above the Full Supply Level during a flood
6	<b>Restrict maximum outflows</b> by restricting the outflows to match the minor, moderate or major flood class levels downstream of Lake Eildon, and allowing the reservoir to surcharge more often

Table 1 – Six options selected for exploration through technical assessment

### The scope of the assessment

The technical assessment provides important information on how changing the operating arrangements could improve protection for downstream communities from future flooding.

The assessment of the options was split over two stages:

- **Stage 1:** assessments of the water resource implications, flood frequency changes at Lake Eildon, and anticipated changes to 1993 and 2022 peak outflows from Lake Eildon (if events were repeated)
- **Stage 2:** detailed technical assessment of initial capital costs, upstream water level implications, flow regime changes, and potential reductions of tangible flood damages (only option 1 and 2 progressed to stage 2)

The assessment **does not** consider the ongoing economic and social consequences of reducing the volume of entitlement in the Goulburn system, the costs of modifying community assets around Lake Eildon (e.g., boat ramps) or the reduced income to GMW from (or cost to offset) fees associated with storing water if entitlements are retired from the Goulburn system.

The assessment considers the approximate reduction in tangible flood damages downstream; however, it does not consider the ongoing social impact and/or benefit of these changes to those communities.

The water resource implications and the initial cost to offset supply reliability changes were assessed as any options that changes the filling curve or reduces the volume of water stored in Lake Eildon would impact the reliability of water supplies for entitlement holders. To avoid or offset this impact, water sharing arrangements would need to be adjusted through some form of water recovery program that reduces the amount of entitlement held. Under the *Victorian Water Act 1989*, when making changes to water sharing arrangements the Minister must have regard to (among other things) the impact the change would have on third parties (including holders of entitlements and water shares) and the environment.

The cost-benefit ratio outcome from this consideration alone, against avoided tangible flood damages downstream, was enough to rule out the options and any more detailed assessments.

The impact of the options to Traditional Owner values has also not yet been assessed.

## What the technical assessment tells us

The assessment was informed by applying existing water resource and flood hydrology models and using historical datasets. Results from the technical analyses completed are suitable for high-level comparisons between current conditions (base case) and what is anticipated if the options were implemented.

During the stage 1 assessment, options 3 to 6 were not deemed to be robust flood mitigation options and therefore not progressed to stage 2. This is because:

- **Option 3** – Reduce target storage based on climate signals: Climate signals tested for this were generally poor predictors of monthly inflows and storage volumes at Lake Eildon. This meant that – when combined with the influence of downstream flow constraints during wet periods – the option to reduce target storage based on climate signals was unlikely to increase the flood mitigation provided by Lake Eildon.
- **Option 4** – Pre-release based on forecast rainfall: The uncertainty in the predicted location of where rainfall will be heaviest will constrain the degree to which storage operators can confidently make pre-releases without either reducing the water available to entitlement holders or making downstream flooding worse. Furthermore, the event-based analysis of the October 1993 and October 2022 floods showed that increasing pre-releases to the moderate flood class level flow threshold downstream of Lake Eildon exacerbated the peak flows estimated at Seymour.
- **Option 5** – Change maximum surcharge: This option would increase the duration of Lake Eildon outflows above the minor, moderate and major flood classifications at Eildon as well as materially increase the likelihood of the dam overtopping during back-to-back floods.
- **Option 6** – Restrict maximum outflows: This option would increase the duration of Lake Eildon outflows above the minor, moderate and major flood classifications at Eildon.

The two options which were progressed to the detailed technical assessment were changing the target filling curve (option 1) and reducing the target storage (option 2). These options could increase the flood mitigation provided by Lake Eildon; however, the cost of offsetting supply reliability impacts outweighs the avoided flood damages.

The main reason for the low benefit to cost ratio is that the flood mitigation benefits provided by the changes to target filling curve (**option 1**) and reduced target storage (**option 2**) diminish the further downstream the flood frequencies are assessed i.e. the degree of difference between the frequency estimates reduce by Molesworth and the difference is minor at Seymour.

This is because the tributary flows downstream of Eildon from the Rubicon River, Acheron River, Yea River, King Parrot Creek, Sugarloaf Creek and Sunday Creek influences the peak flows at towns such as Seymour. This means that changes to operations at Eildon have less influence on reducing the overall avoided damages downstream. In contrast, the approximate initial capital cost of purchasing water shares to implement these options ranges from \$7.5 million to \$266 million.

When looking at the 1993 and 2022 floods, the only option that would have made a difference to what was observed during these floods, would have been holding the storage to a reduce level of 78% FSL. However, this option still had a low benefit to cost ratio. If option 1 or any other target storage within option 2 was implemented, there would have been no material difference to the flows observed downstream of Lake Eildon, Molesworth and Seymour.

The assessment also looked at other impacts from changing the filling curve (option 1) and reducing the volume of water stored in Lake Eildon (option 2). Both options would change the downstream flow regime in the Goulburn River, by reducing flows in generally wetter months and increasing them in drier months. This may have negative environmental impacts. However, further investigations would be required to confirm this.

For option 2, there would also be some recreational impacts because the water body would be smaller and the distance between community and recreational facilities (e.g. holiday accommodation) and the water's edge would increase.

## What's next?

The technical assessment does not identify any option at Lake Eildon which warrants further consideration. Whilst the assessment did not identify any viable options for flood mitigation at Lake Eildon, the information gathered and outputs from this assessment are available to local councils and CMAs when delivering flood studies and reviewing flood mitigation options in their local area.

Flood studies are designed to help communities understand and manage their risk and the outputs often include preferred elements for Total Flood Warning Systems (e.g. improved flood warning service), preferred options for flood mitigation measures, draft planning scheme amendments and draft components of the Municipal Flood Emergency Plan.

The Victorian Government is committed to supporting local councils by investing in traditional funding streams such as the Risk and Resilience Grants Program and the Disaster Ready Fund, as well as providing an additional \$10 million over the next 5 years to deliver flood studies in regional Victoria.

The [Victorian Floodplain Management Strategy](#) provides policy and guidance for investment in flood mitigation infrastructure and maintenance.

Post the completion of a flood study, if there is a preferred flood mitigation option, this can be put forward for funding consideration. The Victorian Government is guided by a set of principles when deciding whether to invest in the flood mitigation measure. The principles include due process, due diligence, supporting analysis, community benefit and cost effectiveness, being that the flood mitigation benefits are greater than the total cost (including both capital and ongoing costs).

The ongoing maintenance costs of flood mitigation infrastructure is the responsibility of the beneficiaries, who may be represented by Local Government Authorities (LGAs).

In addition to investing in flood studies in regional Victoria, DEECA have been analysing potential benefits and impacts of higher river flows on the Goulburn River as part of the [Victorian Constraints Measures Program](#) (CMP). The CMP, if implemented, would help those along the Goulburn River manage flooding up to the minor flood level.

The CMP is exploring how enhanced natural river flows could be delivered while managing risks and impacts to public and private land, infrastructure, stock, crops and people. The CMP is part of a wider initiative that makes the best use of available water for the environment and delivers it to where it is needed.

A feasibility study is considering how higher river flows (up to the minor flood level) might affect landholders along the river to better understand the programs benefits and impacts to the community if the program was to proceed. An important aspect to this work is looking at how landholders can be compensated for any impact they may have from these higher flows. The feasibility study's findings will be used to inform an upcoming Murray-Darling Basin Authority-led roadmap for implementation that seeks to resolve cross-border issues.

## Further information

For more detailed information, read the full technical report or summary technical report on DEECA's website [Lake Eildon operating arrangements assessment \(water.vic.gov.au\)](https://www.water.vic.gov.au).

We acknowledge Victorian Traditional Owners and their Elders past and present as the original custodians of Victoria's land and waters and commit to genuinely partnering with them and Victoria's Aboriginal community to progress their aspirations.



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