



Australia's Finest Trout 

Submission to the Parliamentary Inquiry on the flood event in Victoria in 2022.

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Executive Summary

- Goulburn River Trout has existed as one of Victoria’s premier aquaculture operations since the mid-1970s. The business employs about 25 people, produces approximately 1000 tonnes of rainbow trout per annum – that’s 1.5 million fish per year or 30 000 fish per week.
- **As we draw to the close of the 2022/23 financial year, the cost of the floods to our business will be at least \$2 million.**
- It is our contention that GMW is NOT giving significant weight to its responsibilities regarding flood mitigation. Given the forecasts available last year (*the ENSO (or El Nino Southern Oscillation), the IOD (or Indian Ocean Dipole), and SAM (Southern Annular Mode) were all indicating a wet spring*) the fact that they ran the Lake up so high in winter and spring of 2022 was a mistake at best or negligent at worst.
- **We hope that the Parliamentary Inquiry will recommend that GMW pays more attention to the legislation requiring it to implement strategies to mitigate flooding – holding the Lake at 100% of capacity in late winter/spring does NOT meet this obligation.**
- The use of “carryover” water (an arrangement that allows water holders (whether irrigators, water corporations or the environmental water holder) to keep unused, allocated water in Eildon at the end of one season to use in the next) has exacerbated the flood risk from Eildon.
- In 2007, the carryover mechanism was introduced to de-risk the system with respect to drought. However, the unintended consequence of that change has led to greater risk of flooding for us in the mid-Goulburn. If you like, we have seen a transfer of risk from a group of water holders to another group of landholders on the river and in the towns along the Goulburn.
- At the close of the 2021/2022 irrigation season, 840 000 megalitres of carryover water was being held in spillable accounts. This equates to about 25% of the volume of Lake Eildon.
- **In light of the 2022 floods, we hope that the Parliamentary Inquiry will look at the carryover mechanism and its impact on Lake volumes. A recommendation to reduce the amount of carryover from 100% to 50% or 30% might be appropriate.**
- The mechanism used by Goulburn Murray Water (GMW) to manage flood risk at Lake Eildon is known as the “in-fill curve”. The in-fill curve sets the parameters/allowable targets around the Lake volume at any given time in the year.
- **We hope that the Parliamentary Inquiry recommends GMW adopt a more conservative infill curve to avoid the coincidence of a full Lake in late winter and spring with heavy spring rains. The significant floods caused by Eildon spilling have occurred in November 1974, September and October 1993, and October 2022 – always in spring with a full Lake.**
- There are two inquiries unfolding con-currently, this Parliamentary Inquiry and the Inquiry set up by DEECA (Assessment of the operating arrangements for Lake Eildon for Flood Mitigation purposes). However, the timelines around both inquiries leave us on the Goulburn very exposed in 2023.
- At present (late March 2023) Lake Eildon is at approximately 95% of capacity, which is unprecedentedly high for this time of year.
- **We hope that the Parliamentary Inquiry recommends to the Minister that an Order be made directing GMW to hold Lake Eildon at a level below 95% for the remainder of 2023 or until the reviews are completed.**

Background and Flood Impact

Goulburn River Trout has existed as one of Victoria's premier aquaculture operations since the mid-1970s. The business employs about 25 people, produces approximately 1000 tonnes of rainbow trout per annum – that's 1.5 million fish per year or 30 000 fish per week. We have our own hatchery, two farm sites, a wet processing plant and a smoke house. Our product is distributed all around Australia, ending up in the big supermarkets under our brand Goulburn River Trout.

The species we farm is *Onchorynchus mykiss* or rainbow trout. It is a native of the cold, northern latitudes of the Pacific Ocean. They like to operate in water temps between 8 and 15 degrees Celsius. Farming them demands access to cold water and lots of it. Hence, Goulburn River Trout was established in the valley 20km downstream of Lake Eildon, where the water discharges from great depth (up to 60 metres depending on Lake volume) and at temperatures around 10 degrees. We are a non-consumptive water user – we “borrow” the water as it flows down the Goulburn and pass it through our farm, before returning it to the River. This is called a flow through aquaculture system. We need the water to flow through the farm to deliver oxygen to our trout. If the water stops, the trout die.

From a flooding perspective, given our proximity to Lake Eildon, the volume of the Lake and the water being released is the major determinant of riverine flooding for us. Eildon is the second biggest impoundment in the State (after Dartmouth). It is central to the operation of our business – no dam, no trout farming business. The dam was built in the 1950s by the State Electricity Commission (or SEC) and by irrigators. The SEC got a financial return via electricity generation, while irrigators get access to water to increase production and hopefully profitability. This point (regarding the builders of the dam wall) is important to the understanding of how the floods impacted us. Goulburn Murray Water (or GMW), which manages Eildon, makes no qualms about its chief obligation being the harvest and preservation of water for its customers. Flood mitigation is provided where possible but not specifically. And, of course, this is a legal dance whereby they do NOT want to acknowledge responsibility for flood mitigation and thereby expose themselves to liability.

2022 was a wet year. The ENSO (or El Nino Southern Oscillation), the IOD (or Indian Ocean Dipole), and SAM (Southern Annular Mode) were all indicating a wet spring. The forecasters got it right and the rains came and came again. By early September 2022, GMW started doing very limited flood pre-release. This occurs when the water volumes in the Lake exceeds the designated “infill curve” (which is a curve that is derived from anticipated inflows, while trying to hit 100% of capacity on 1 October in a given year).

Throughout September, inflows increased. By September 20th, inflows were 27 500 Megalitres per day. By the 22nd of September, releases from Eildon had increased to 12 000 megalitres (just below the minor flood level – which is a level based NOT on science but politics – NOT good to be seen to be releasing too much water and causing flooding – even if its minor). For the next 3 weeks, releases were held at this level of just below Minor flood. All the time, the Lake was creeping up slowly. On the trout farms, we made preparations. We anticipated what might be coming our way. We checked and tested the big gate valves on the farms, made sure levees were good and we moved pumps – big pumps (24”axail flow) in readiness for flooding.

For us, our day of reckoning was 13 October. The catchment was sodden. The tributaries above and below Eildon were running full channel and some were spilling, and the Lake was at 98%. In the 48 hours of 13 and 14 October, we got 99mm of rain on the farm- there would have been much more in the mountains to our east which is the catchment for Eildon. GMW on the Thursday reduced the

release from Eildon “to allow the tributaries below Eildon to get away, before they anticipated having to increase the release from the Lake” – they wanted to reduce the flood pulse. Although well intentioned, this act of reducing the release shows they did NOT have a handle on what the rivers were doing and it also sent up a false flag to people like us, who gained some confidence that the inflows must have been in hand. However, this confidence was misplaced. By late on the afternoon of 13 October, GMW had sort of lost control. The release went up through minor, then moderate to major – 38 000 megalitres. The rate of increased release was savage and caught many people unaware, especially as the increased releases took place at night. The tributaries below the Lake were also pumping in, causing grief to farmers and towns downstream of us.

That night at Goulburn River Trout it was all hands on deck implementing our flood plans. It was rather dramatic (and traumatic) given the speed at which flood waters rose. However, by early morning on the 14 October we had everything settled at both farms. Water was passing through the farms as we required to keep fish oxygenated and all our flood infrastructure was sound. At our second farming site, known as Walnut Island we were operating behind a levee, controlling the water coming into the farm through big submerged pipes (1.8m) and pumping water away over the levee bank via large axial flow pumps. We were operating this site with an internal water level about 1.5 metres below the external, flooding river level. Everything held for 72 hours, until a control structure failed on the Sunday night, October 16. At this point, the water surged through the big intake pipes and drowned the farm. A farm that had 23 ponds 12m x 32m neatly in a row fed from an inlet channel, each pond holding about 6 tonnes of trout (on average) - all of certain weight and sex class. As the water rose in the farm to a level about 4 feet above the top of pond banks, the fish rose up out of their ponds and swam away. Suddenly we were operating a great big lake, with 140 tonnes of trout swimming around freely.

Our inlet and outlet structures had some screening on them – more for the screening of river debris than confining fish. Consequently, there was a great escape.

Eventually the river came back down and some fish dropped back into the ponds, most were in our inlet channel and of course many were in the Goulburn. 6 months on, and we’re still doing the clean-up. Fish from the inlet channel have been captured and returned to ponds, weight classes have been graded but sex classes haven’t been possible to sort out. Damage to riverbanks, infrastructure such as roads, control structures, pumps is all being slowly patched up.

We estimate that we lost about 30 tonnes of trout into the river – about 60 000 fish. At a market value of \$10 per kg, that was a direct loss of \$300 000. Sales have been disrupted (down about \$1million to \$1.5 million on anticipated) as a result of the fish being mixed or boxed by sex class. We have also seen an outbreak of a previously unseen bacterial infection in much of our stock. We and the vets we’ve been working with are not sure if this is a coincidence or whether it’s associated with the 4 or 5 weeks of poor water quality we experienced during the flooding. All sorts of contaminants get flushed off farmland and/or urban centres when big floods occur. These contaminants can act to erode fish resilience and base-line health, leaving them exposed to infection. **As we draw to the close of the 2022/23 financial year, the cost of the floods to our business will be at least \$2 million.**

Beyond the financial loss, the trauma and stress that the floods have placed upon all working at Goulburn River Trout has been significant. Looking to our east and seeing a still near-full Lake does nothing to ease our anxiety.

Management of Eildon

Goulburn Murray Water (GMW) manages Lake Eildon. According to the 1989 Water Act, storage managers have certain obligations. Section 122ZL lists the functions of storage managers. Clause 2 (d) states that the storage manager “must have regard to developing implementing strategies to mitigate flooding, where possible.”

WATER ACT 1989 - SECT 122ZL Functions of storage managers

WATER ACT 1989 - SECT 122ZL

Functions of storage managers

- (1) The functions of a [storage manager](#) appointed under this Part in respect of the land to which the appointment relates are—
- (a) to control and manage any [water](#) storage on the land specified in the instrument of appointment and any [water](#) or [works](#) on the land so specified, in a manner that is consistent with this Act and that will maintain the [water](#) quality of any [water](#) storage on the land;
 - (b) to carry out any other functions that are conferred on the [storage manager](#) by or under this Act or any instrument made under this Act.
- (2) An [Authority](#), in performing its functions under subsection (1) must have regard to—
- (a) protecting the ecological values of the [water](#) systems relating to the land specified in the instrument of appointment; and
 - (b) protecting the reliability and quality of [water](#) supply; and
 - (c) subject to [water](#) supply needs, minimizing the impact on the environment of the carrying out of any such function and maximizing the benefit to the environment of the carrying out of any such function; and
 - (d) developing and implementing strategies to mitigate flooding, where possible.

On their website, GMW says of flooding:

What role do GMW dams have in flood mitigation?

The primary role of a water storage is to harvest and store customers' water entitlements, GMW operates the dams to provide flood mitigation benefits where possible. Generally large water storages are not designed or operated specifically for flood mitigation

The amount of flood mitigation a water storage can provide depends on a number of factors - including the operating rules of the storage, the size of the flood event, the level of water in the dam at the beginning of the event and the release capacity of the spillway.

Water storages may provide significant mitigation for small floods and may significantly reduce downstream flooding. The amount of mitigation generally reduces as the size of the flood increases, so there may be little mitigation benefit for large floods.

It is our contention that GMW is NOT giving significant weight to its responsibilities regarding flood mitigation. Given the forecasts available last year (*the ENSO (or El Nino Southern Oscillation), the IOD (or Indian Ocean Dipole), and SAM (Southern Annular Mode) were all indicating a wet spring*) the fact that they ran the Lake up so high in winter and spring of 2022 was a mistake at best or negligent at worst.

The negligence does not reside with the GMW staff implementing the operating rules; but with those who codified the operating rules, which give no flexibility in the face of an unfolding disaster.

We hope that the Parliamentary Inquiry will recommend that GMW pays more attention to the legislation requiring it to implement strategies to mitigate flooding – holding the Lake at 100% of capacity in late winter/spring does NOT meet this obligation.

1. Carryover water and spillable accounts

The dry conditions across SE Australia from 1996 to 2010, known as the Millennium Drought, brought about changes to the way water is managed in the Goulburn Irrigation System. 12 years later, these changes played a significant role in the flooding that occurred in October 2022.

The change of note is referred to as “carryover” and it’s an arrangement that allows water holders (whether irrigators, water corporations or the environmental water holder) to keep unused, allocated water in Eildon at the end of one season to use in the next. In the old days, it was a case of use the water within season or lose it.

Carryover was initially introduced in 2007 as an “emergency” drought measure. By 2010 it had evolved into a permanent and sophisticated arrangement allowing water holders to carry over 100% of their water entitlement from one season to the next. The carryover mechanism effectively “de-risked” the business model of many irrigators, water corporations and the environmental water holder by delivering certainty to water access the following year. Carryover water is held in a “spillable account”, so water holders do risk losing their carryover water if Eildon spills; but they know that in a spill year, the allocation for the following season will be 100%.

At the close of the 2021/2022 irrigation season, 840 000 megalitres of carryover water was being held in spillable accounts. This equates to about 25% of the volume of Lake Eildon. Consequently, rather than commencing the water harvest phase of the year (when releases are cut back and the Lake filled) with a Lake volume of about 55% to 60%, we started with a Lake volume of about 80%.

In an average year, inflows to the Lake are about 30% of Lake volume. But 2022 was not an average year, it was a very wet year. Given the relatively full Lake, as a consequence of carryover, the large inflows inevitably led to a major flood release of 38 000 megalitres on 14 October 2022. This release coupled with the flooding tributaries below the Lake caused significant damage down the Goulburn Valley.

In 2007, the carryover mechanism was introduced to de-risk the system with respect to drought. However, the unintended consequence of that change has led to greater risk of flooding for us in the mid-Goulburn. If you like, we have seen a transfer of risk from a group of water holders to another group of landholders on the river and in the towns along the Goulburn.

Maybe we don’t need to scrap carryover all together, but the trade-off for those of us exposed to the increased likelihood of flooding would be a change to operational procedures around flood mitigation via the adoption of a more conservative in-fill curve. This would see more water being flood pre-released and avoid having the Lake level at near 100% of capacity in Spring.

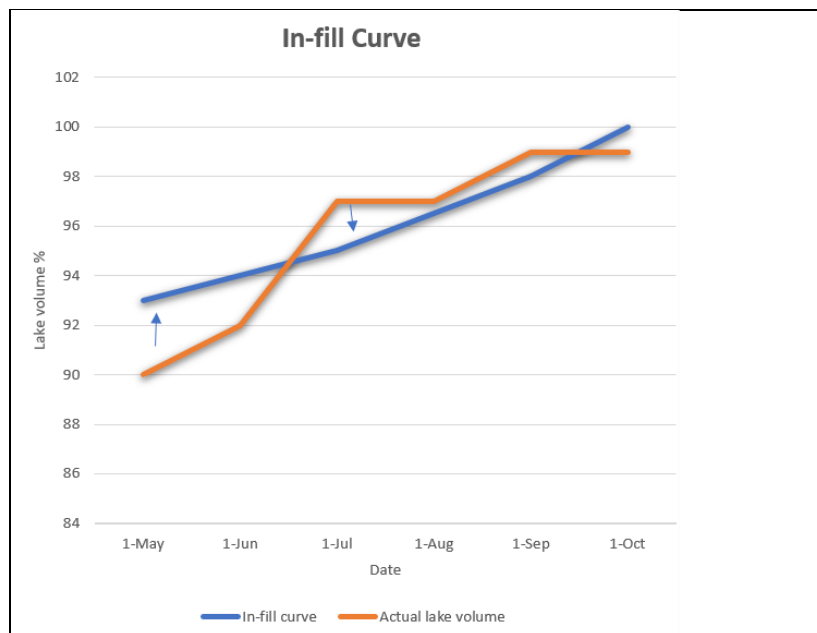
The amount of carryover water this year is likely to exceed last season. Meanwhile, Lake Eildon (at time of writing – late March 2023) is still sitting at 95% of total capacity. The probability of another spill in 2023 is increasing day by day.

In light of the 2022 floods, we hope that the Parliamentary Inquiry will look at the carryover mechanism and its impact on Lake volumes. A recommendation to reduce the amount of carryover from 100% to 50% or 30% might be appropriate.

2. Adoption of a more conservative “Infill curve”

The mechanism used by Goulburn Murray Water (GMW) to manage flood risk at Lake Eildon is known as the “in-fill curve”. The in-fill curve sets the parameters/allowable targets around the Lake volume at any given time in the year.

The in-fill curve is determined at the start of May (in any given year), as we enter the water harvest phase of the year. This year (2023), the curve will look something like the graph below (BLUE LINE)



The starting point will be about 93% (May/June). The curve will then follow a, more-or-less, linear incline towards 100% by 1 October (the target date for a full Lake). The orange line on the graph shows a theoretical “actual” Lake volume. If the actual volume is below the in-fill curve, GMW will limit Eildon release to say 400ML/day and be in full water harvest mode. If at any point during the harvest season, the actual volume goes above the in-fill curve, then GMW will “flood pre-release” at a rate that tries to return the Lake volume to the stipulated in-fill curve level.

The shape of the in-fill curve is determined by anticipated future in-flows based on tributary flows and forecasts. Note, that last year (2022) the 100% target date was side-shifted from 1 October to 1 November, as a result of the high inflows and wet forecast. Limited flood pre-releases were undertaken in August and were stepped up to 8 000, 10 000, 12 500 through September and early October. The release went to 38 000 ML on the night of 13 October into the morning of 14 October. Obviously, the defined in-fill curve of 2022 did NOT meet the needs of farmers or town communities (such as Seymour) as we were all subjected to major-level flooding. A more conservative in-fill curve would have provided us with greater protection.

We hope that the Parliamentary Inquiry recommends GMW adopt a more conservative infill curve to avoid the coincidence of a full Lake in late winter and spring with heavy spring rains. The significant floods caused by Eildon spilling have occurred in November 1974, September and October 1993, and October 2022 – always in spring with a full Lake.

Call for Ministerial Direction in the current (2023) season

There are two inquiries unfolding con-currently, this Parliamentary Inquiry and the Inquiry set up by DEECA (Assessment of the operating arrangements for Lake Eildon for Flood Mitigation purposes). However, the timelines around both inquiries leave us on the Goulburn very exposed in 2023.

At present (late March 2023) Lake Eildon is at approximately 95% of capacity, which is unprecedentedly high for this time of year. GMW's best guidance on where the Lake volume will be at mid-May (the close of the irrigation season and start of the water harvest season) is about 92%. This leaves us very vulnerable to another major flood event in winter or spring of 2023 (remembering that in a normal year, inflows to the Lake equate to about 30% of total volume).

Under the 1989 Water Act (Section 159E), the Minister can make an Order and direct a water corporation. The relevant section is shown below.

WATER ACT 1989 - SECT 159E Emergency

WATER ACT 1989 - SECT 159E

Emergency

(1) The Governor in [Council](#), on the recommendation of the Minister by Order published in the Government Gazette, may direct a [water corporation](#) to take the action specified in the Order in relation to any area specified in the Order during any period specified in the Order or in any circumstances specified in the Order.

(2) The Minister must not recommend to the Governor in [Council](#) the making of an Order under subsection (1) unless he or she is of the opinion that an emergency exists in the area to which the Order is to apply and that the making of the Order is necessary to deal with that emergency.

(3) An Order under subsection (1) must specify the period of time for which it is to remain in force.

(4) An Order under subsection (1) has effect despite anything to the contrary in an [emergency management plan](#), for so long as the order is in force.

We hope that the Parliamentary Inquiry recommends to the Minister that an Order be made directing GMW to hold Lake Eildon at a level below 95% for the remainder of 2023 or until the reviews are completed.