Environment Victoria Submission on the Goulburn to Murray Trade Rule Review

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Environment Victoria welcomes the opportunity to comment on the proposed changes to operating rules and trade rules to enable sustainable delivery of water for Kaiela, the lower Goulburn River. This is a welcome step forward in halting further damage to the river.

In recent years, interim operating rules aimed at limiting summer inter-valley transfers to 50 GL and 40 GL per month have played a critical role in avoiding the worst outcomes, like severe erosion. But while some vegetation on lower banks has had a chance to begin recovery, erosion has still been high and regular pulses have prevented further vegetation growth.[1]

With an aim to avoid further environmental damage by sustained high flows during summer and autumn, when the lower Goulburn River would naturally be lowest, the Regulatory Impact Statement provides the Victorian Government's preferred option: setting operating rules that prescribe a variable baseflow, delivering an average monthly flow of 1,100 ML per day over summer and autumn. The proposed option would also enable three additional pulses of water between 3,000 – 6,000 ML per day. In our view, this option may perpetuate unacceptable impacts to the environment.

Option 1, which would provide for flows around 940 ML per day over summer and autumn, is the most acceptable option assessed in the Regulatory Impact Statement. Still, it is a compromise intended to continue downstream deliveries during the peak demand period at the expense of waterway health.

We support this option with several comments and qualifications.

[1] Goulburn Broken Catchment Management Authority (2021). *Goulburn River Seasonal Watering Proposal 2021/2022*. 33

I. Average summer baseflows should vary between 500 – 1,000 ML per day.

The RIS provides the Government's preferred option for variable baseflows with a maximum monthly average of 1,100 ML per day from November to April. This would be achieved by varying flows between 960 – 1,360 ML per day.

This range exceeds recommendations from both the Goulburn Broken Catchment Management Authority and the newest environmental flows study for the lower Goulburn River. Recognising that the most important flow component to deliver is variable baseflows year-round, both the Seasonal Watering Proposal and environmental flows study recommend flows between 500 – 1,000 ML per day during summer and autumn. Using the recommended ratio of the standard deviation to the mean, baseflows would have a maximum monthly average of 750 ML per day.[2]

The Seasonal Watering Proposal also recommends that flows should not exceed 1,000 ML per day for more than 20 consecutive days during the IVT period, predominantly between December and April.[3] At the very least, it suggests flows greater than 1,000 ML per day should be limited to 55 days if bank vegetation established in spring is to survive over the summer period – and that these levels should not be reached until 5-6 weeks after a spring fresh.[4]

These levels are essential to providing the slow, shallow habitat required for the survival of juvenile fish, deep-water habitat for larger fish and submerged snags for water bugs. The overall effect for aquatic vegetation would encourage planktonic production for food and maintain water quality.

It is also important to recognise the river's value for fishing, camping and boating. High summer flows may impact tourism and the local economy. Fishing would be impacted by excessive flows that diminish the slack water habitat essential for fish. A wider range of uses would suffer from high flows that limit access by inundating sandbars and reducing bank stability. These impacts are seen when flows rise above 1,000 ML per day.[5]

II. Pulses should be delivered at levels of magnitude, duration, frequency and timing supported by the best available science.

The Government's preferred option includes three pulses of up to 3,000 ML per day over summer and autumn, over 14 days each. As a longer-term measure, the Regulatory Impact Statement references the potential for implementing 6,000 ML per day pulses by moving privately-owned in-channel pumps onto the riverbank. Even Option 1 includes a proposed pulse reaching 5,000 ML per day.

[2] Ibid., 38
[3] Ibid., xxv
[4] Ibid., 34
[5] Ibid., 38

We are concerned that these pulses are an entirely new component of the flow regime, having never been delivered at the magnitude, duration, frequency and timing proposed in the operating rules.

In terms of magnitude, the most recent environmental flows study for the lower Goulburn advises that flows larger than 2,000 ML per day are likely to remove vegetation from the lower bank.[6] Without vegetation present to stabilise the bank, it is likely that slumping will continue to occur. Pulses reaching 6,000 ML per day would likely introduce high risks for vegetation. Moreover, this magnitude does not appear to have been fully assessed by the scientific panel.

In terms of duration, the flows study identifies that baseflows exceeding 1,000 ML per day at a constant rate longer than 7 days are likely to lead to bank notching and slumping.[7] Even at this level, flows lasting longer than 10 days will lead to a loss of streamside vegetation.[8]

In terms of frequency, it does not appear that the scientific panel considered the implications of three pulses at the volumes proposed in the Government's preferred option. There is a reasonable likelihood that three pulses would cause substantial ecological damage, impacting aquatic vegetation and seeds on banks that have will not yet have established. A series of high-volume pulses may also contribute to increased erosion, with implications for fish as well as macroinvertebrates. The potential impacts of this flow regime are unknown and warrant proper scientific study and monitoring.

In terms of timing, any pulses should account for ecological requirements as well as antecedent conditions to ensure that any damage is limited. In December, this might include potential damage to young plants recruiting after spring flows, disturbance of fish nesting or the need to allow for bank drying at popular access times. Flows in this period that are higher than those delivered in late winter may also impact platypus by flooding nesting burrows.[9] In January, high flows might adversely impact turtle nesting habitat by inundating and killing eggs.[10]

Pulses should also align with recommended rates of rise (to reduce displacement of macroinvertebrates and small fish) and fall (to reduce bank erosion and stranding of macroinvertebrates and small fish). Slow drawdown rates have the added benefit of promoting deposition and encouraging the establishment of vegetation. It may also be worth recognising that in recent years, environmental water has been used to slow the recession of near bankfull events. At times, erosion has been significant despite the slowed recession because of preceding impacts from IVT flows. With the potential for damage even outside of IVT months, it is critical that pulses avoid erosion impacts as much as possible.

[6] Horne, Avril et al. (2020). *Kaiela (Lower Goulburn River) Environmental Flows Study.* 45
[7] Ibid.
[8] Ibid., 63
[9] Ibid.
[10] Ibid., 155

III. Operating rules should not impact the ability to deliver environmental outcomes.

It is essential that operating rules should be reviewed in partnership with the Goulburn Broken Catchment Management Authority to allow for the beneficial delivery of environmental water and preserve the ability to respond to ecological incidents in the November-April period. As proposed, the operating rules may severely restrict the delivery of environmental water for 6 months of the year.

The Catchment Management Authority should retain the ability to deliver the spring and autumn fresh to initiate spawning, promote migration, reinvigorate drying vegetation and maintain in-channel habitat.

Environmental water can also be used responsively for slowing the recession of near bankfull events to prevent erosion, reducing blackwater risk or diluting blackwater. Blackwater events can have dire consequences for the river system. A major blackwater event in early 2017 caused fish deaths in such large numbers that surveys in 2020 found that Murray cod numbers still had not recovered.[11] Left unaddressed, these events will impact the potential positive effects of environmental flows.

Water for the environment may also be adversely impacted by the two-part trade rule. The potential increase of inter-valley transfers in the May-October period would reduce the opportunity to deliver environmental water. This may constrain the delivery of water for the environment at appropriate times or potentially leave entitlements stranded. In the likelihood of this event, it is essential that inter-valley transfers are aligned to achieve ecological outcomes. This also draws attention to the necessity of constraints management.

IV. Constraints management should not be used to increase unseasonal high flows through the lower Goulburn. The removal of constraints should be prioritised to increase the ability to deliver water over the winter-spring period.

Competition for channel capacity between irrigators, the Commonwealth Environmental Water Holder and the Murray-Darling Basin Authority in meeting delivery obligations may become more intense with seasonal restrictions. In this context, it is important to recognise that environmental water cannot currently be delivered to the Goulburn floodplain because of constraints. There may be possible benefits to both downstream users and the environment from managing constraints to increase channel capacity.

The necessity of overbank flood events has been a focus of recent environmental flow recommendations, highlighting the potential to meet ecological, cultural and social objectives. Ideally, this would include an event greater than 10,500 ML per day each year to inundate low-lying floodrunners and anabranches; an event larger than 20,000 ML per day seven in ten years to inundate the floodplain near Loch Garry; and an event greater than

[11] Goulburn Broken Catchment Management Authority (2021). *Goulburn River Seasonal Watering Proposal 2021/2022*. xxiv

30,000 ML per day at a natural frequency to inundate more substantial areas of vegetation.[12] Based on long-term averages, smaller 25,000 ML per day events should occur six in ten years and larger 40,000 ML per day events three in ten years.[13]

Under current flow conditions, flows between 25,000 – 55,000 have occurred 20-30% less often, are 50-70% shorter and the time between events is 2.5-3.5 times longer than unregulated conditions. This is far less than what is needed to maintain the health of the floodplain and the river channel.[14]

Releases from Lake Eildon are currently limited to 9,500 ML per day and releases from Goulburn Weir are limited to 10,000 ML per day to avoid inundation of private land downstream. Recent spring freshes have only reached half-way up the riverbank, peaking around 8,000 ML per day.[15]

Existing constraints on delivering environmental flows to deliberately inundate the floodplain limit the benefits that can be achieved with available water. Floodplain events engage off-channel habitats that contribute carbon to the system, improving productivity at each level of the food chain. Connectivity to off-channel habitats provides food resources for fish, provides cues for movement throughout the system, maintains plant condition, provides nesting habitat for turtles, feeding habitat for platypus and maintains plant condition and habitat complexity.

Progress to address constraints has already fallen five years behind schedule. Until agreements are reached with private landholders, the full potential of water recovery will not be realised and the ecological outcomes required under the Basin Plan may not be met. Relaxed constraints will also help to buffer the impact of high summer flows while easing likely pressures on channel capacity outside of the high-demand period.

It is critical to recognise that even smaller flows deliver substantial benefits. Increasing flows up to 13,000 ML per day could inundate ten additional wetlands, connecting them to the river channel.[16] Flows of 25,000 ML per day lasting over four days would inundate 75% of wetlands and key river red gum areas.[17]

Considering the presence of existing modelling, the relative feasibility of constraints management on the Goulburn and the potential to buffer impacts flowing on from new operating and trade rules, constraints management pilot projects should be a priority in the near future.

[12] Horne, Avril et al. (2020). *Kaiela (Lower Goulburn River) Environmental Flows Study.* 63
[13] Ibid., 29
[14] Department of Environment, Land, Water and Planning (2016). *Goulburn Constraints Measure Business Case – Phase 2 Investigations.*
[15] Horne, Avril et al. (2020). *Kaiela (Lower Goulburn River) Environmental Flows Study*. 17
[16] Goulburn Broken Catchment Management Authority (2021). *Goulburn River Seasonal Watering Proposal 2021/2022*. 36
[17] Horne, Avril et al. (2020). *Kaiela (Lower Goulburn River) Environmental Flows Study*. 30

V. Ongoing monitoring, scientific assessment and risk management is critical to safeguard against further environmental damage.

There does not currently appear to be any provision for ongoing monitoring, scientific assessment and risk management. Funding for these activities is critical to safeguard against further river damage.

First, there is a need to evaluate the impacts of existing conditions that are likely to grow more severe. As climate change continues to impact water supply, the lower Goulburn will become increasingly vulnerable. Lower inflows will reduce the ability of water managers to deliver high-magnitude flows, which rely on piggy-backing upon natural events.

While inflows may not be impacted to extent of other rivers in the region, its position as a source of high reliability water will continue to influence the Goulburn's role in the system.[18] The challenges we are presented with today, with the Goulburn subject to high demand for consumptive water, will likely grow more severe.

The role of the Goulburn in a Basin with changing water demands and availability is likely to become more precarious as expanded horticulture and almond growing downstream moves toward maturity and as supply is constrained from Menindee Lakes. While the Lakes are likely to fill above 640 GL, passing to Commonwealth control and taking pressure momentarily off the Murray, the New South Wales Government is currently in the process of regulating floodplain harvesting, which entails the use of infrastructure like channels and pumps to divert rainfall runoff and water flowing overbank onto the floodplain into massive on-farm storages. For more than 25 years, this type of extraction has been recognised as a major threat to the river system, but it has never been licensed, measured or monitored.

Floodplain harvesting also hasn't been accounted for under the Cap, which sets the current limit on extraction at 1994 levels of development. A recent study seeking to understand how much use irrigators may have made from unregulated flows evaluated the capacity of on-farm storages. Between 1994-2020, the capacity of these storages increased by 142% (or 2.4 times). As a total number, this is an increase from 400 storages in 1988 to 1,833 in 2020.[19]

Without independent verification of modelling, end of system flow targets and a clear timeline for the removal of works that are not approved, it is likely that the Menindee Lakes will drop below 480 GL, reverting to New South Wales control in the foreseeable future.

Second, there is a need to evaluate how ecological conditions respond to changes in the delivery of inter-valley transfers. For example, Murray River rainbowfish decreased in abundance in recent years, likely because of high summer flow conditions. The environmental flows study recommended that a monitoring program be designed and implemented specifically for this purpose.[20]

[18] Horne, Avril et al. (2020). *Kaiela (Lower Goulburn River) Environmental Flows Study*. 25
[19] Slattery & Johnson (2021). *Floodplain water harvesting in the Northern New South Wales Murray-Darling Basin.*
[20] Horne, Avril et al. (2020). *Kaiela (Lower Goulburn River) Environmental Flows Study*. 17

Other studies have worked to link recruitment of other fish species to attributes of the flow regime. For example, research by the Arthur Rylah Institute suggests that increasing summer flows to 1,800 ML per day is likely to decrease Murray cod survival by more than a third.[21] It will be critical to understand the impacts of any increase above the 889 ML per day baseline used in the study.

Finally, it is essential that Yorta Yorta people are provided the opportunity to be part of an ongoing monitoring program that will report on changes to the ecological and cultural values on Country. This should include the resources to aid in remediation of any Cultural heritage sites that have been impacted as a result of high flows created by inter-valley transfers.

The Goulburn (Kaiela) and Murray (Dhungala) rivers have held significant cultural and spiritual values to the Yorta Yorta community since time immemorial. Attempts to deliver water to support downstream development cannot come at a loss to Yorta Yorta culture, identity and connection to Country.

High unseasonal flows have already created irreversible damage to important cultural heritage sites, such as burials, middens, hearths, scar trees and artefacts. There is a risk that these sites will be lost forever due to cutting and collapsing banks.

At the same time, there is significant potential to see the greatest benefits of water management through agreement with the Yorta Yorta Nation, particularly where links are made to cultural flows, integrating knowledge and understanding of Country.

The Whole of Country Plan includes several actions that relate directly to flows. This includes the need to maintain the 'health and status of the turtle populations. Turtles are important to the Yorta Yorta as both a totemic protector and as a food source'.[22]

The Plan also identifies the need to address 'the drying of most floodplain habitats and the death of many of the River Red Gum Trees that grow on the floodplain. Flooding and water flows have changed in timing and now peak during the summer irrigation season. This has had major consequences for the health of reptiles including turtles, and has required both Yorta Yorta and other natural resource managers to adapt [their] management practices and priorities, including in relation to uses and quality of water resources'.[23]

There is also a need to account for timing of cultural burns in coordination with Yorta Yorta representatives. Floodplain inundation at appropriate times may help by supporting native plants like cumbungi, common reed, old man weed and basket weaving grasses.[24]

Considering the potential for ongoing damage from inter-valley transfers, the irreversible damage to significant sites that has happened already and the risk of unintended

[21] Tonkin, Zeb et al. (2021). *Linking flow attributes to recruitment to inform water management for an Australian freshwater fish with an equilibrium life-history strategy*. 10
[22] Yorta Yorta National Aboriginal Corporation (2012). *Yorta Yorta Nation Caring for Country and Culture: Whole of Country Plan 2012-2017.* 30
[23] Ibid., 31
[24] Horne, Avril et al. (2020). *Kaiela (Lower Goulburn River) Environmental Flows Study*. 64

consequences of these trade rules, it is essential that Yorta Yorta people have the opportunity to monitor and report on impacts of new operating and trade rules.

The most important flow components for the lower Goulburn River are variable baseflows at recommended levels during the summer and autumn months alongside winter flow events that inundate the floodplain. Option 1 is a compromised option but is the most appropriate of those assessed in terms of its ability to meet these objectives.

High unseasonal flows have already created notching and damage to vegetation while placing banks at risk for further erosion outside of the highest-risk period for inter-valley transfers. They have eroded recent improvements in river health and damaged the recruitment of iconic fish like the Murray cod.

Without considered limits on average monthly flows and pulses – and consideration of potential impacts to environmental water entitlements – elevated flows are likely to continue damaging littoral vegetation, shallow slow-flowing habitats and the species that rely on them. As described above, impacts from high summer flows pose issues for fishing, camping, boating, tourism and the local economy.

In addition to a strong rule, it will be important to consider the future risks of climate change and the ongoing ecological impacts of unseasonal flows. This may be accomplished by establishing a scientific and community advisory group to capture local knowledge. It is also essential that Yorta Yorta people have the opportunity to monitor and report on the impacts of new operating and trade rules.

The implementation of sensible summer flow limits to protect the Goulburn River is essential to the preservation of the river ecosystem and communities that depend on it. This review is a critical step in addressing the incisions and carving of the Goulburn's banks, which put us at risk of compromising the integrity of the river forever. But it is also critical that we undertake a holistic approach to the compounding issues faced by the Goulburn River.

For further information

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