

# SUMMARY: PROPOSED NEW OPERATING RULES FOR THE LOWER GOULBURN RIVER

OVERVIEW

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OFFICIAL

## 1 Introduction

The Goulburn River operating rules need to be updated to limit further environmental damage caused by transfers of large volumes of water over summer and autumn to the Murray River.

The total amount of water delivered from the Goulburn River to the Murray River has increased because of sustained irrigation demand in the Murray system and increased environmental flows across the South Australian border<sup>1</sup>. In recent years this has been exacerbated by low water availability in NSW tributaries and the sale of allocations by Goulburn entitlement holders.

Deliveries of traded water from the Goulburn system jumped from an average of 60 GL per year before 2014, to 320 GL and then 433 GL in 2017-18 and 2018-19 respectively. Similarly, the tagged use component of this trade water jumped from an average of 25 GL per year between 2007-08 and 2016-17 to about 120 GL in 2017-18 and 75 GL in 2018-19. These 2017-18 and 2018-19 water years saw record volumes of water delivered down the Goulburn River in an unseasonal pattern with constant high flows over summer, which caused damage to riverbanks, loss of important vegetation, and a reduction in native fish habitat. Ongoing monitoring, as well as advice from a scientific panel has confirmed this environmental damage<sup>2</sup>.

Current operating rules in the lower Goulburn River have not been designed to prevent this environmental damage over summer and autumn months, when natural flows in the waterway would have been lower.

The objective of the new rules is to set limits on the amount of water that can be transferred through the lower Goulburn River to the Murray River over the peak irrigation period, striking a balance between enabling trade and avoiding further environmental damage caused by high summer and autumn flows.

The rules will support delivery of legacy commitments to the Murray, and allocations traded on the southern connected Murray Darling Basin water market.

## 2 Summary of proposed new operating rules

### Base flows and pulses

The operating rules apply to regulated flows managed from Goulburn Weir and measured at McCoy's Bridge gauging station. They include the following base flow and pulse components:

#### *Base flow*

- Regulated base flows will be varied over the year, noting that the base flows specified below are the maximum that can be delivered outside pulses
- 1 July to 31 October: average monthly flow of 1,300 ML/day<sup>3</sup>

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<sup>1</sup> *Managing Delivery Risks in the River Murray System*, MDBA 2021 -

<https://waterregister.vic.gov.au/images/documents/Managing-delivery-risks-in-the-River-Murray-system.pdf>

<sup>2</sup> *Environmental risk and opportunities assessment of flow scenarios in the lower Goulburn* available at <https://waterregister.vic.gov.au/>

<sup>3</sup> A higher base flow than the 1,300 ML/day winter and spring limit was not adopted because of the risks of notching the lower bank associated with higher base flows.

- 1 November to 30 June: maximum average monthly flow of 1,100 ML/day<sup>4</sup>
- the river operators would be expected to vary flows by at least plus or minus 0.1 m over one to two days, with larger variations to be provided where possible, i.e. weekly and fortnightly to avoid notching of the river bank.

See **Appendix 1 – Estimated volumes of monthly flows** for more information.

*Timing of pulses during summer and autumn*

- the first pulse following the environmental spring fresh may not occur until average flows are equal to or less than 1,100 ML/day for 6-8 weeks. This means that the timing of the pulse will depend on the natural and environmental freshes that occur during winter and spring (see section below on assumptions regarding timing of environmental freshes)
- a second pulse may commence when average flows have been equal to or less than 1,100 ML/day for at least 28 days
- a third pulse (and any subsequent pulses) may commence when average flows have been equal to or less than 1,100 ML/day for at least 35 days

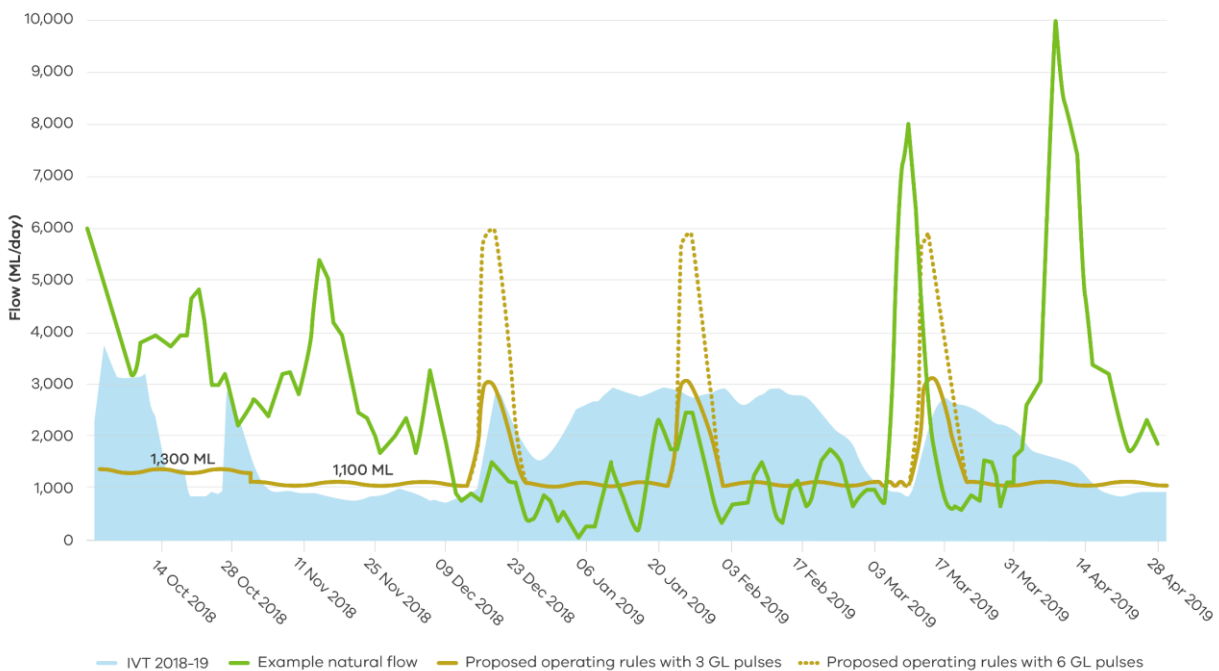


Figure 1: Example of natural variable flows compared to proposed base flow and pulses from October to April

*Shape of pulses*

- pulses of up to 6,000 ML/day<sup>5</sup> may be delivered in accordance with defined rates of rise and fall between 1 November and 30 April

<sup>4</sup> Flows would be varied between 960 – 1,360 ML/day to achieve 1,100 ML/day average

<sup>5</sup> Pulses during the peak irrigation season will initially need to be limited to a maximum of 3,000 ML/day to protect private pump infrastructure.

- the proposed target rate of rise is less than or equal to 0.8 m/day.
- The proposed target rates of fall are:
  - 0.4 m/day when flows are greater than 3,000 ML/day
  - 0.25 m/day when flows are less than 3,000 ML/day

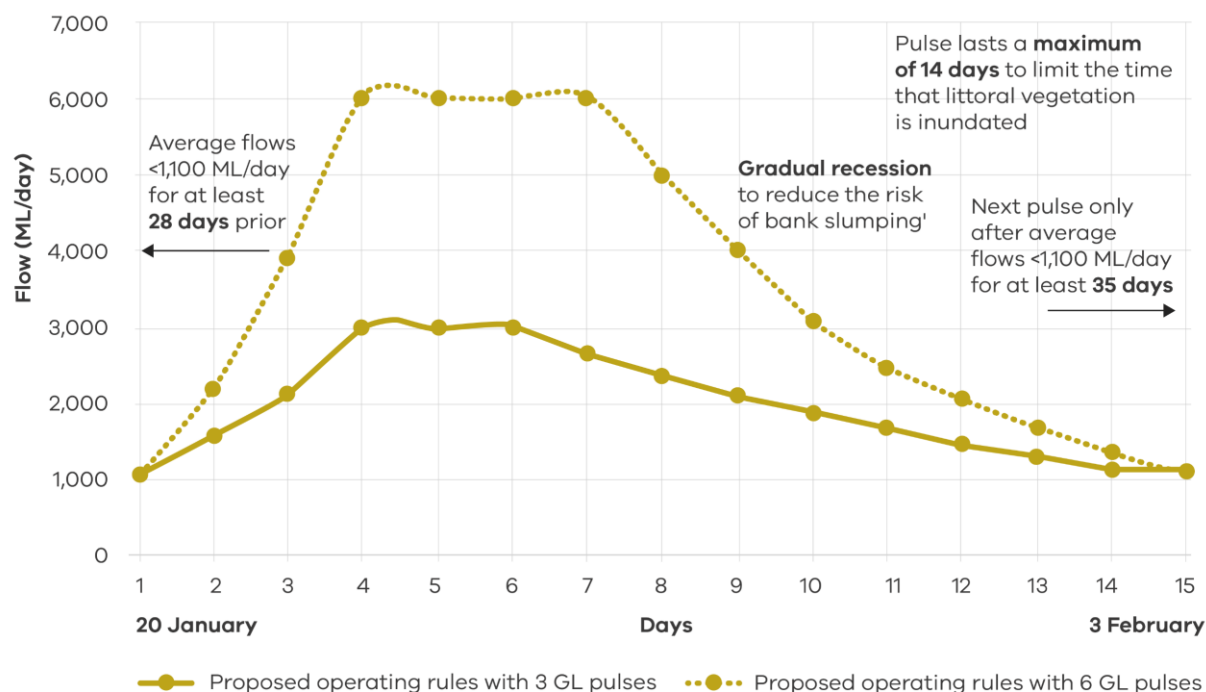


Figure 2: Example pulse

See **Appendix 2 – Pulse flow rates, water levels and rates of rise and fall** for more information.

### Key assumptions behind the rules

The following assumptions were used in proposing the operating rules.

1. Environmental water deliveries:
  - throughout the year IVT can be used to achieve shared benefits – between 1 May and 31 October environmental managers may provide environmental freshes or additional water on top of prescribed limits
  - from 1 November to 30 April, prescribed limits apply and flows will be used for IVT deliveries as priority – pulses will be timed according to the prescribed rules
  - while IVT deliveries have priority, environmental managers may request an earlier November pulse of IVT to capture shared benefits of a late spring fresh – this request would be considered by river operators in light of risks to Murray entitlements at the time
  - environmental freshes will be designed to maximise environmental outcomes for the lower Goulburn River

- Where emergency water conditions emerge<sup>6</sup>, regulated releases of the Goulburn water quality reserve can be made in excess of the limits in these rules.
- 2. The proposed operating rules do not apply to natural unregulated flows in the lower Goulburn River.
- 3. Priority for operating the lower Goulburn River between 1 November and 30 April will be to supply demands in the Murray generated by Goulburn IVT within the limits of the proposed rules.

### Reviewing the rules

Because environmental condition depends on many factors, it is difficult to be certain how the river will respond. An adaptive management approach is proposed with an option to review the rules in three years (i.e. by June 2024). Such a review should be informed by monitoring of environmental condition and scientific evaluation of that monitoring.

An earlier review by DELWP should be triggered if the extent of mass failure of the banks at designated reaches at McCoys Bridge caused by regulated flows increase by more than 10% or if other significant issues arise.

Base flows for the period 1 May to 31 October may be reviewed sooner to incorporate up to date flows studies and outcomes from scientific analysis and monitoring.

### Relocating pump infrastructure

Existing operating practices limit pulses in the lower Goulburn River between December and April to a maximum of 3,000 ML/day to protect in-channel private pump infrastructure in use over that period. Implementation of the proposed pulses of up to 6,000 ML/day would require a program of works to relocate pumps up on top of riverbanks, in consultation with affected landholders, to enable higher flows to be delivered while mitigating impacts on diverters' ability to access water and/or damage to in-channel infrastructure.

### Expected benefits of new operating rules

Drawing on the analysis and advice from the scientific panel, it can be expected that the proposed rules would avoid the kind of damage to the river caused in 2017/18 and 2018/19, protect Aboriginal Victorian cultural values from unseasonal high flows and maintain or improve outcomes for recreational values.

It is expected that by implementing the proposed operating rules it would:

- Likely enable the river to slowly rehabilitate, with continuation of environmental flow management through winter and spring
- Substantially reduce the risks of erosion compared to recent years
- Avoid erosional 'notching' of riverbanks by varying flows, preventing steepened banks that are more prone to mass failure/ erosion

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<sup>6</sup> defined in Schedule 3 of *Bulk Entitlement (Eildon – Goulburn Weir) Conversion Order 1995*

- Result in more prevalent flood-tolerant vegetation along the edges of the riverbank (though likely limited to a narrow band), and maintained or increased vegetation along the lower elevations of the banks

The panel's ecological risk assessment and associated discussions noted that the following have also been accounted for as part of developing the proposed operating rules:

- provide sufficient time for small bodied fish to breed over summer months by providing a period of lower flow in the warmer months of at least four weeks
- avoid large bodied fish abandoning their nests during breeding season (mid-October to early December) by limiting the rate of fall to about 0.15 m/day
- enable vegetation along riverbank edges to establish after spring high flows recede
- avoid prolonged inundation of vegetation along riverbank edges over the summer months by limiting inundation to about two weeks (for a single event)
- provide about four weeks of lower flows for vegetation along riverbank edges to recover after a summer pulse
- consider coordinating higher flows with tributary inflows to raise sediment and seeds onto banks to assist with vegetation regeneration.

The current habitat and flow-regulated conditions for small-bodied and large-bodied fish species for low-flow (summer/autumn) months would be maintained.

The proposed operating rules have also been designed so that:

- legacy water delivery commitments could be comfortably met, without using all available capacity so that there is scope for further transfer of traded water
- the volume of 205 GL of IVT delivered in 2019/20 could be accommodated, including 125 GL between 1 December and 28 February assuming pulses of 3,000 ML/day are possible
- if works were done to enable 6,000 ML/day pulses, the volume that could be delivered between 1 December and 28 February would increase to 170 GL
- there is scope for river operators to better align IVT delivery with lower Murray irrigation demand patterns
- additional transfers would be possible in the shoulder months of October and November and March and April.

### 3 How the rules were developed

The proposed operating rules are informed by the findings of a scientific panel established by DELWP. This panel assessed the risks and opportunities of six different flow scenarios in the lower Goulburn River to understand the likely environmental outcomes of possible future management frameworks. The scenarios were designed to identify the most important aspects of the summer and autumn flow regime for environmental outcomes and where opportunities to supply water to downstream areas can be maximised.

The ecological risk assessment was a key input but given that the Goulburn River is a ‘sustainable working river’, it must be managed to provide a broad range of social, economic, environmental, and cultural benefits. The new operating practices and rules have been developed with consideration of all these benefits.

The scientific panel was given an opportunity to comment on the environmental consequences to the lower Goulburn of the proposed operating rules, as these are different to the six flow scenarios assessed by the panel. Noting there is scientific uncertainty in predicting such outcomes, the panel advised that the proposed rules would avoid the kind of environmental damage to the river caused in 2017/18 and 2018/19.

## 4 Conclusions and next steps

These proposed operating rules will support improved outcomes for the lower Goulburn River into the future compared to current arrangements and underpin the development of improved rules for Goulburn to Murray trade and IVT delivery.

The proposed operating rules should be implemented alongside any changes to trade rules to ensure that water that is traded from the Goulburn to the Murray can be delivered in accordance with the operating rules and without adverse impacts to Victorian Murray entitlements or increasing delivery shortfall risks.

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## Appendix 1 – Estimated volumes of monthly flows

*Table 1 – Monthly flow associated with the proposed operating rules using a design pulse with a peak flow of 6,000 ML/day (note: this is the total flow, including the minimum flows in the lower Goulburn River at McCoys Bridge gauging station, excluding environmental release events outside of the November to April period.*

Month	No. Days	Pulse	Baseflow (average ML/day)	Baseflow Volume (total ML)	Pulse Volume (total ML)	Total Volume (ML)
July	31	No	1,300	40,300	0	40,300
August	31	No	1,300	40,300	0	40,300
September	30	No	1,300	39,000	0	39,000
October	31	No	1,300	40,300	0	40,300
November	30	No	1,100	33,000	0	33,000
December	31	Yes	1,100	34,100	35,361	69,461
January	31	No	1,100	34,100	11,787	45,887
February	28	Yes	1,100	30,800	23,574	54,374
March	31	No	1,100	34,100	35,361	69,461
April	30	No	1,100	33,000	0	33,000
May	31	No	1,100	34,100	0	34,100
June	30	No	1,100	33,000	0	33,000
<b>TOTAL</b>				<b>426,100</b>	<b>106,083</b>	<b>532,183</b>

*Table 1 – Monthly flow associated with the proposed operating rules using a design pulse with a peak flow of 3,000 ML/day McCoys Bridge gauging station, excluding environmental release events outside the November to April period.*

Month	No. Days	Pulse	Baseflow (average ML/day)	Baseflow Volume (total ML)	Pulse Volume (total ML)	Total Volume (ML)
July	31	No	1,300	40,300	0	40,300
August	31	No	1,300	40,300	0	40,300
September	30	No	1,300	39,000	0	39,000
October	31	No	1,300	40,300	0	40,300
November	30	No	1,100	33,000	0	33,000
December	31	Yes	1,100	34,100	12,878	46,978
January	31	No	1,100	34,100	4,293	38,393
February	28	Yes	1,100	30,800	8,585	39,385
March	31	No	1,100	34,100	12,878	46,978
April	30	No	1,100	33,000	0	33,000
May	31	No	1,100	34,100	0	34,100
June	30	No	1,100	33,000	0	33,000
<b>TOTAL</b>				<b>426,100</b>	<b>38,634</b>	<b>464,734</b>



## Appendix 2 – Pulse flow rates, water levels and rates of rise and fall

Table 2 – Approximate shape of 3,000 ML/day design pulse

Day	Flow (ML/day)	Approximate water level (m)	Approximate change in water level (m) <sup>1</sup>
1	1,100	0.92	n/a
2	1,561	1.3	0.38
3	2,111	1.68	0.38
4	3,000	2.13	0.45
5	3,000	2.13	0
6	3,000	2.13	0
7	2,642	1.98	-0.15
8	2,357	1.83	-0.15
9	2,111	1.68	-0.15
10	1,883	1.53	-0.15
11	1,669	1.38	-0.15
12	1,467	1.23	-0.15
13	1,277	1.08	-0.15
14	1,100	0.92	-0.16
15	1,100	0.92	0

1. Based on Murchison gauge; 2. The river operator would be asked to vary the pulse at the peak

Table 2 – Approximate shape of 6,000 ML/day design pulse

Day	Flow (ML/day)	Approximate water level (m)	Approximate Change in water level (m) <sup>1</sup>
1	1,100	0.92	n/a
2	2,175	1.72	0.8
3	3,933	2.52	0.8
4	6,000 <sup>2</sup>	3.32	0.8
5	6,000	3.32	0
6	6,000	3.32	0
7	6,000	3.32	0
8	4,979	2.94	-0.38
9	4,010	2.56	-0.38
10	3,072	2.18	-0.38
11	2,451	1.88	-0.3
12	2,032	1.63	-0.25
13	1,669	1.38	-0.25
14	1,340	1.13	-0.25
15	1,100	0.92	-0.21

1. Based on Murchison gauge; 2. The river operator would be asked to vary the pulse at the peak