

Reconnecting River Country Program

Proposed environmental water releases in the Murrumbidgee



This technical note provides information about the environmental water releases expected as an outcome of the Reconnecting River Country Program's Murrumbidgee Project. The document may assist landholders and valuers in understanding the proposed environmental water release and potential impacts of the project. It should be read in conjunction with the easement terms and Declaration Order¹.

This technical note is specific to the Phase 1 area of the project (as described in Schedule 2 of the Declaration Order¹) and may be expanded in the future to include areas associated with additional phases.

Scenic country views of the Murrumbidgee River in Balranald. Credit: Destination NSW

Project purpose

The project involves the relaxation of constraints to the delivery of environmental water releases. The project goal is to increase the frequency and extent of flows connecting to wetlands and floodplains along the Murrumbidgee River system, to improve the health of the system and make the best use of water recovered for the environment.

The frequency of flows connecting to wetlands and floodplains has reduced over time due to river regulation and consumptive use of water, and the

health of important habitats has declined. This has had significant negative impacts on native plants and animals including native fish populations.

The project will enable higher environmental water releases, to overtop riverbanks and inundate low-level wetland and floodplain habitats along the length of the river.

¹ Water Management (General) Regulation Landholder Negotiation Scheme (Murrumbidgee) Order (No. 1) 2025

New upper limit on environmental water releases

The current operational limit on environmental water releases in the Murrumbidgee River is a flow rate of 22,000 ML/day at the Wagga Wagga gauge². The project will enable environmental water releases targeting a flow rate up to 40,000 ML/day at Wagga Wagga (i.e. the highest target flow rate). This upper limit will apply to the total flow rate at the Wagga Wagga gauge during an environmental water release, recognising flows in the river during an environmental water release will be a combination of environmental water, tributary inflows downstream of Burrinjuck and Blowering dams and dam releases for other purposes.

While the Declaration Order provides that a proposed environmental water release (as described in Item 5 of the Declaration Order) may include releases contributing to a flow rate up to 45,000 ML/day, the highest target flow rate is 40,000 ML/day. Both the

Declaration Order and easement terms have allowed for a flow rate of up to 45,000 ML/day as a safeguard for landholders in the rare event the highest target flow rate of 40,000 ML/day is exceeded due to exceptional circumstances or inherent uncertainties in weather and flow forecasting, and unexpected tributary inflows.

In the easement terms, the flow rate of 45,000 ML/day comprises the Upper Flow Limit of 40,000 ML/day, plus the buffer of 5,000 ML/day at the Wagga Wagga gauge.

Note: The Wagga Wagga gauge is used as the primary reference location when describing flow rate limits on environmental water releases in the Murrumbidgee Valley. The Wagga Wagga gauge is used because all major tributaries of the Murrumbidgee River are upstream of Wagga Wagga, and therefore the flow rate at the Wagga Wagga gauge is representative of flows along the length of the river.



Aerial overlooking the town of Balranald in the Riverina district. Credit: Destination NSW

² The flow rate limit referenced in the Murrumbidgee Regulated Rivers Water Sharing Plan is 32,000 ML/day at Gundagai. The lower operational limit of 22,000 ML/day at the Wagga Wagga gauge has been adopted by WaterNSW in response to landholder concerns regarding impacts.

Flows and heights at other gauges

While the easement terms and Declaration Order use the Wagga Wagga gauge as the point of measurement, flow rates will change along the river system due to natural flow attenuation. The tables below show the flow rates and gauge heights for gauges within the Phase 1 area corresponding to the flow rate limits at the Wagga Wagga gauge. These

flow rates and heights are upper end estimates and most environmental water releases will achieve lower flow rates and heights. The corresponding heights are based on height-flow rating tables at the respective gauge sites. Rating tables (and therefore the corresponding heights) are subject to minor change over time due to changes in river channel profiles.

Table 1 — Corresponding flow rates

Gauge	Estimated corresponding flow rate (ML/day)			
	22,000 ML/d at Wagga Wagga	32,000 ML/d at Wagga Wagga	40,000 ML/d at Wagga Wagga	45,000 ML/d at Wagga Wagga
Murrumbidgee at Darlington Point	18,000	25,000	30,000	34,000
Murrumbidgee at Carrathool Bridge	15,000	23,000	28,000	32,000
Murrumbidgee downstream of Hay Weir	14,000	22,000	27,000	31,000
Murrumbidgee downstream of Maude Weir	12,600	18,900	19,700	20,000
Murrumbidgee downstream of Balranald Weir	8,800	10,400	11,900	12,400

Table 2 — Corresponding gauge heights

Gauge	Estimated corresponding gauge height (m)			
	22,000 ML/d at Wagga Wagga	32,000 ML/d at Wagga Wagga	40,000 ML/d at Wagga Wagga	45,000 ML/d at Wagga Wagga
Murrumbidgee at Darlington Point	4.57	5.41	5.91	6.18
Murrumbidgee at Carrathool Bridge	4.80	6.21	6.73	7.02
Murrumbidgee downstream of Hay Weir	5.84	7.62	8.46	8.92
Murrumbidgee downstream of Maude Weir	5.77	6.81	6.89	6.91
Murrumbidgee downstream of Balranald Weir	5.51	5.87	6.06	6.12

Frequency, timing and duration of environmental water releases

Schedule 1 of the Declaration Order establishes limits on the frequency, timing and duration of environmental water releases to which it applies. This technical note explains how environmental water releases may occur within those limits.

Flows rates above the current operational limit of 22,000 ML/day already occur in response to runoff from tributary catchments and dam spills following rainfall events, without environmental water releases. In this document these flows are referred to as 'unregulated flows.' The frequency and durations described in this document do not include unregulated flows, including those preceding or following the environmental water releases.

Frequency of environmental water releases

The frequency of the proposed environmental water releases will vary over time according to climate conditions, water availability, ecological priorities, river operations requirements and assessment of risks.

Over the long-term, it is expected environmental water releases contributing to flow rates above 32,000 ML/day and up to 40,000 ML/day at the Wagga Wagga gauge will occur on average about 3 to 5 water years out of every 10 water years. Smaller releases contributing to flow rates up to 32,000 ML/day at Wagga Wagga may be more frequent.

In sequences of wet years, when unregulated flows occur frequently, there may be a lower number of environmental water releases. During extreme wet conditions, when there is elevated flood risk, environmental water releases will not occur.

In sequences of dry years, when water allocations are low, there may also be a lower number of environmental water releases.

In sequences of years with moderate rainfall and water allocations, the frequency of environmental water releases may exceed the average and there may be environmental water releases contributing to flow rates above 22,000 ML/day at the Wagga Wagga gauge, over consecutive years.

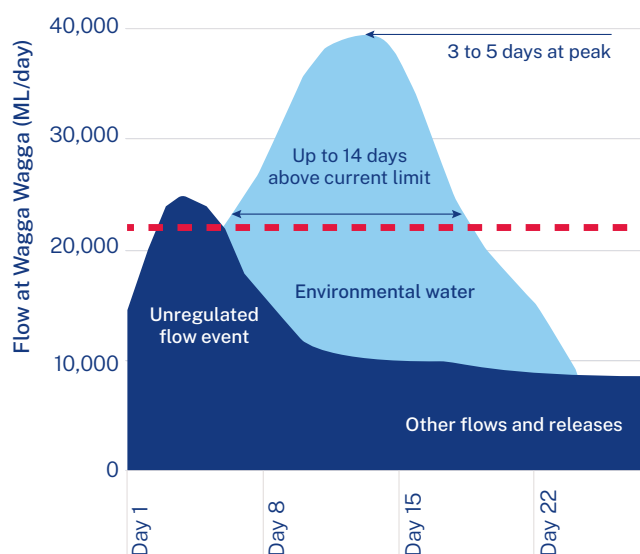
Duration of environmental water releases

The duration of each environmental water release will also vary over time but will generally involve a flow peak of 3 to 5 days duration at the Wagga Wagga gauge, followed by a gradual reduction in flows to background levels.

The duration of each flow event above 22,000 ML/day at the Wagga Wagga gauge may be up to 14 days at Wagga Wagga.

Slightly longer durations are expected in lower reaches of the river system due to natural flow attenuation processes.

Figure 1 — Indicative hydrograph showing durations



Timing of environmental water releases

Most environmental water releases will occur from August to October. Occasionally releases may occur earlier in May to July or may extend into November. Environmental water releases during summer months will be infrequent and will mostly be required to mitigate hypoxic blackwater risk. Timing will be slightly later in downstream reaches due to flow travel times.

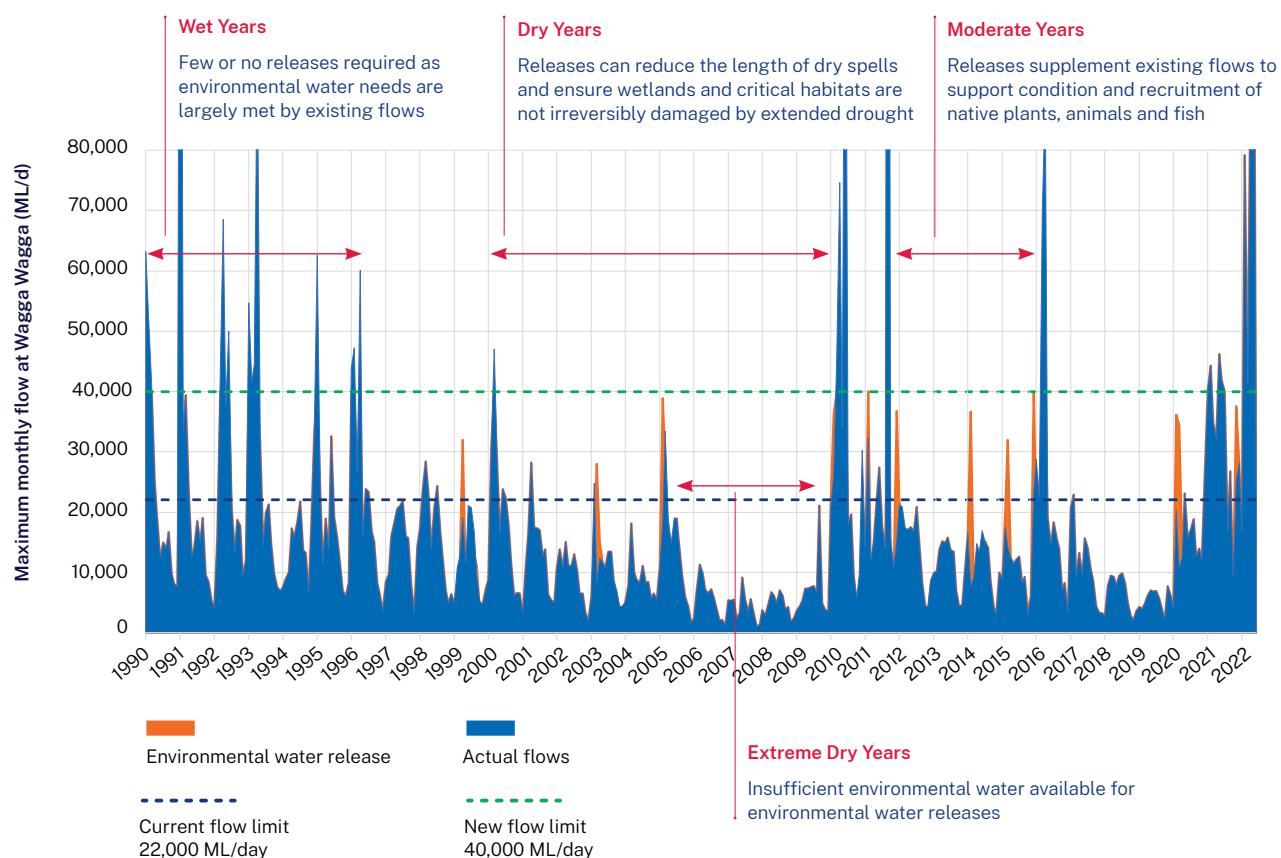
Sequence of environmental water releases over time

Figure 2 is provided as an illustrative example to demonstrate the potential sequence of environmental water releases over an extended period, within the limits set out in the Declaration Order. The figure shows a sequence of environmental water releases at the Wagga Wagga gauge, over the period 1990 to 2022. The sequence assumes the volume of environmental water entitlements available in 2022 was available over the full period, and the limit on environmental water releases was 40,000 ML/day at the Wagga Wagga gauge.

The figure shows some key points:

- Environmental water releases will occur in response to climate and water availability conditions, resulting in an irregular pattern of releases.
- Over the 33-year period, 11 environmental water releases are shown (in orange) representing an average of 3 environmental water releases per decade.
- There will be variation in the flow size across the environmental water releases.
- Environmental water releases are much lower than the flood events of 2010, 2012, 2016 and 2022 (as examples). The duration of those flood events is also considerably longer than the duration of the environmental water releases.

Figure 2 – Illustrative sequence of environmental water releases over period 1990 to 2022



Practical limitations for delivering environmental water releases

The frequency at which environmental water releases targeting a flow rate above the current operational limit of 22,000 ML/day can occur is limited by both the release capacity from dams in the Murrumbidgee Valley and the limited volume of environmental water available.

To meet a target flow rate above 22,000 ML/day, proposed environmental water releases will involve large rates of releases from Burrinjuck Dam, which are only possible in years when the dam is relatively full.

Environmental water releases targeting flows above 30,000 to 35,000 ML/d at Wagga Wagga will also rely on concurrent inflows from tributaries such as Adelong, Tarcutta, Hillas and Jugiong creeks. Flow events with sufficient tributary inflows do not occur

every year and typically only occur for durations of a few days, providing a practical limit to both the frequency and duration of environmental water releases above 30,000 to 35,000 ML/day.

The other factor impacting on the frequency and duration of environmental water releases is environmental water availability. Environmental water is subject to accounting and Available Water Determination rules in the Murrumbidgee Regulated Rivers Water Sharing Plan. Environmental water releases targeting flows above the current operational limit will require large volumes of environmental water. These volumes will only be available in years with high water allocations.

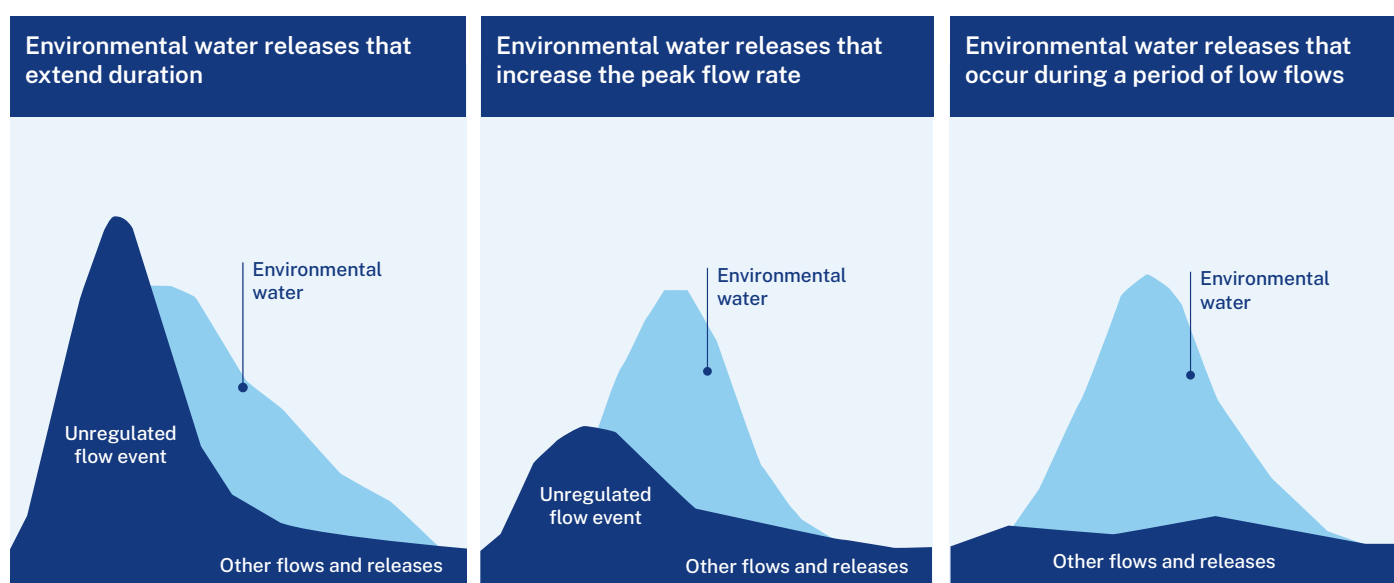
Types of environmental water releases

The proposed environmental water releases will involve a combination of water for the environment, tributary inflows downstream of Burrinjuck and Blowering dams and dam releases for other purposes. Some proposed environmental water releases may be made to enhance unregulated flow events to increase

environmental outcomes by increasing either the duration or the peak of the flow event, or both.

Figure 3 shows some examples of how a proposed environmental water releases may occur in combination with unregulated and other flows.

Figure 3 — Types of environmental water releases



Notification of environmental water releases

Under section 247I of the Regulation, WaterNSW is required to take reasonable steps to notify affected landholders of the release. These notifications will enable landholders to move livestock or other assets

to higher grounds out of the inundation zone. The program is currently working with WaterNSW on the development of an improved flow notification system.

The land in the project area is naturally prone to inundation

The land in the project area currently experiences inundation due to flow rate at the Wagga Wagga gauge exceeding 22,000 ML/day and also 40,000 ML/day (highest target flow rate) due to unregulated flows in many years.

An understanding of the frequency at which these unregulated flows have occurred can assist in understanding the baseline level of inundation experienced within the project area.

Tables 3 and 4, and Figure 4 show the frequency and duration at which unregulated flows exceeding 22,000 ML/day and 40,000 ML/day at the Wagga Wagga gauge (and corresponding flows at other gauges) occurred over time from 1990 to 2024 (prior

to the commencement of this project). While the frequency of unregulated flows will vary over time in the future, unregulated flows of this size will continue to occur.

The data shows between 1990 and 2024 unregulated flows of this magnitude occurred in many years. At the Wagga Wagga gauge, flows with a flow rate of 22,000 ML/day and above occurred in 49% of years, and flows with a flow rate of 40,000 ML/day and above occurred in 31% of years. On average, at the Wagga Wagga gauge, flows with a flow rate of 22,000 ML/day and above occurred for approximately 23 days per year, and flows with a flow rate of 40,000 ML/day and above occurred for approximately 7 days per year.



Table 3 – Frequency of unregulated flows between 1990 and 2024

Gauge location		Number of years that flow rate is exceeded within time period				
	Flow rate (ML/day)	1990-1999	2000-2009	2010-2019	2020-2024	Average per 10 years
Current limit –22,000 ML/day at the Wagga Wagga gauge – or corresponding flow						
Murrumbidgee at Wagga Wagga	22,000	7	3	5	2	4.9
Murrumbidgee at Darlington Point	18,000	6	1	5	2	4.0
Murrumbidgee at Carrathool Bridge*	15,000	Incomplete data	1	4	3	3.2
Murrumbidgee downstream of Hay Weir	14,000	6	1	4	3	4.0
Murrumbidgee downstream of Maude Weir	12,600	6	1	4	3	4.0
Murrumbidgee downstream of Balranald Weir	8,800	6	0	4	3	3.7
Highest target flow rate –40,000 ML/day at the Wagga Wagga gauge – or corresponding flow						
Murrumbidgee at Wagga Wagga	40,000	6	0	3	2	3.1
Murrumbidgee at Darlington Point	30,000	6	0	3	1	2.9
Murrumbidgee at Carrathool Bridge*	28,000	Incomplete data	0	3	1	1.6
Murrumbidgee downstream of Hay Weir	27,000	6	0	3	1	2.9
Murrumbidgee downstream of Maude Weir	19,700	6	0	3	1	2.9
Murrumbidgee downstream of Balranald Weir	11,900	4	0	3	1	2.3

* **Note** the Carrathool Bridge gauge commenced operation in 1995.



Scenic views of the Murrumbidgee River Bridge in Narrandera. Credit: Destination NSW



Morning sun rising over the town of Narrandera. Credit: Destination NSW

Figure 4 — Flows at Wagga Wagga from 2010 to 2024 showing unregulated flows above 22,000 and 40,000 ML/day

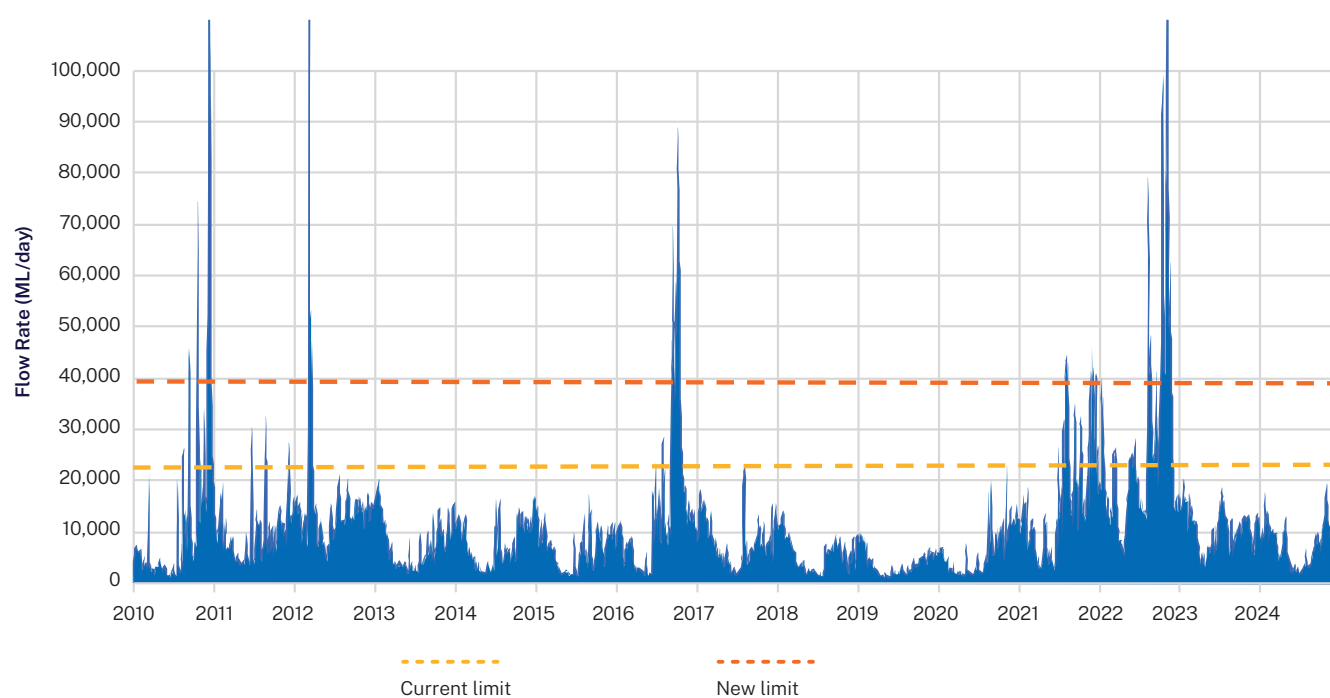


Table 4 – Duration of unregulated flows between 1990 and 2024

Gauge location		Average number of days per year that flow rate is exceeded				
	Flow rate (ML/day)	1990–1999	2000–2009	2010–2019	2020–2024	Average per 10 years
Current limit – 22,000 ML/day at the Wagga Wagga gauge – or corresponding flow						
Murrumbidgee at Wagga Wagga	22,000	37.0	2.5	14.8	50.8	22.8
Murrumbidgee at Darlington Point	18,000	35.4	1.0	15.3	50.4	22.0
Murrumbidgee at Carrathool Bridge*	15,000	Incomplete data	1.6	16.9	60.8	18.0
Murrumbidgee downstream of Hay Weir	14,000	38.8	0.7	19.4	63.2	25.9
Murrumbidgee downstream of Maude Weir	12,600	38.6	0.4	19.7	58.8	25.2
Murrumbidgee downstream of Balranald Weir	8,800	45.5	0.0	27.2	85.2	32.9
Highest target flow rate – 40,000 ML/day at the Wagga Wagga gauge – or corresponding flow						
Murrumbidgee at Wagga Wagga	40,000	6.7	0.2	7.9	16.6	6.6
Murrumbidgee at Darlington Point	30,000	9.7	0	8.2	13.6	7.1
Murrumbidgee at Carrathool Bridge*	28,000	Incomplete data	0	7.3	13.8	5.0
Murrumbidgee downstream of Hay Weir	27,000	9.9	0	7.6	17	7.4
Murrumbidgee downstream of Maude Weir	19,700	18.6	0	8.3	13.6	9.6
Murrumbidgee downstream of Balranald Weir	11,900	22.5	0	10.5	35.6	14.5

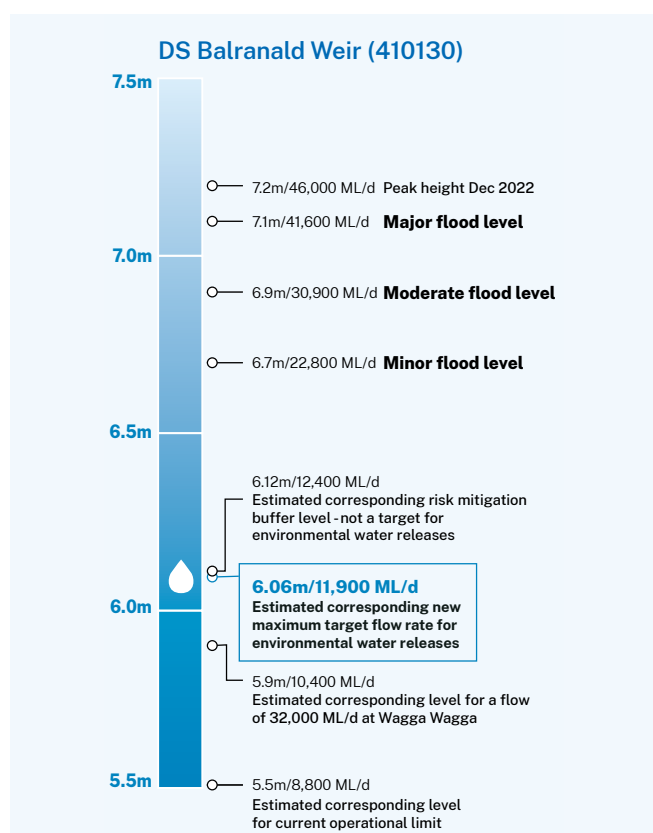
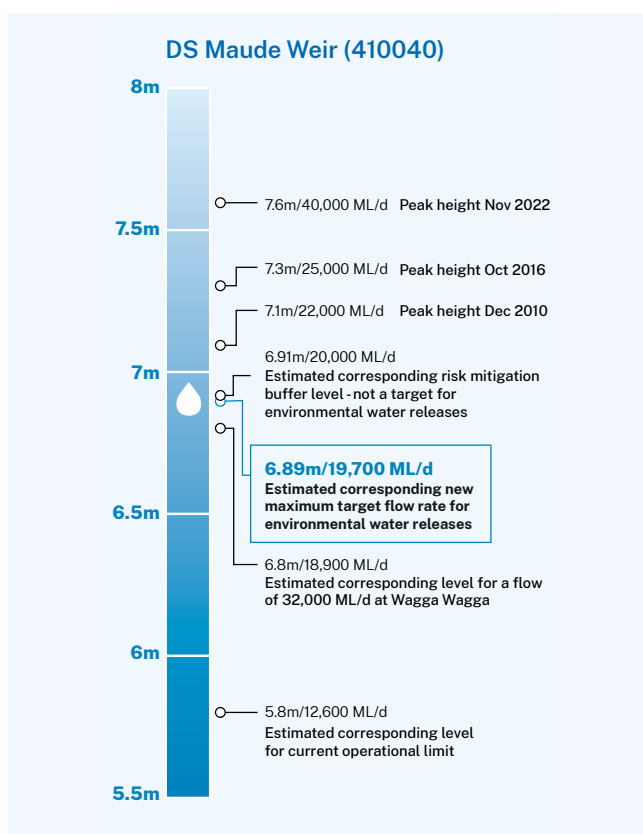
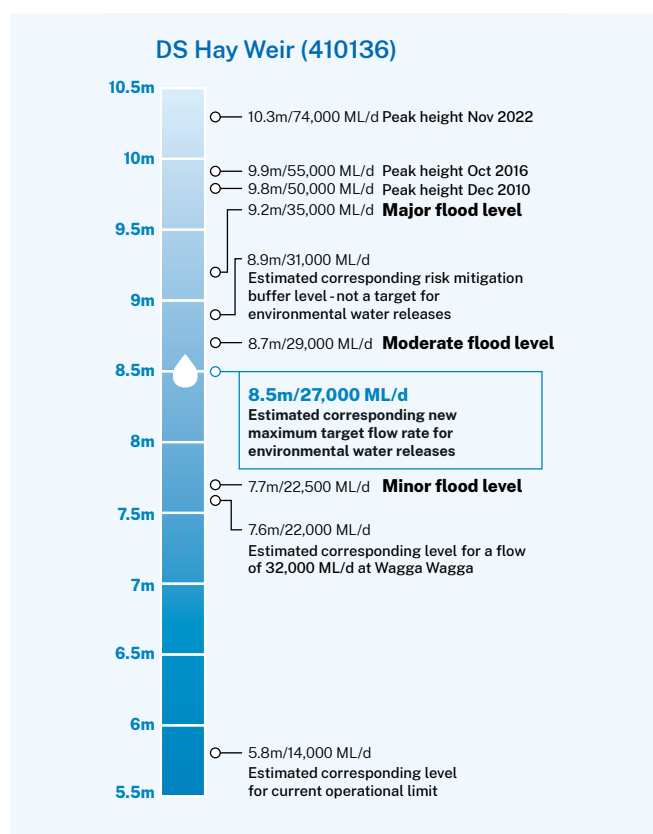
* **Note** the Carrathool Bridge gauge commenced operation in 1995.

Gauge board diagrams showing flow limits and flood levels

Figure 5 – Gauge board diagrams showing flow limits and flood levels



Figure 5 — Gauge board diagrams showing flow limits and flood levels (Continued)



Note: flood warning levels as of August 2025.