



Barwon Darling Resumption of Flow Event

January 2021



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Summary

In recent years there has been significant regulatory and operational changes to the management of flows in the Barwon-Darling river system.

This includes changes to the Barwon Darling Water Sharing Plan, which commenced on 1 July 2020. Among these changes was the introduction of active management, individual daily extraction components and, resumption of flows rule.

Active management is a new way of operating that ensures water released for the environment remains in the river for its intended environmental purpose and enables the river system to be operated dynamically. Active management is supported by the WaterInsights Portal (waterinsights.waternsw.com.au), which provides data on flows in the Barwon Darling and daily updates for access arrangements.

The resumption of flows rule prohibits access to water flowing through the Barwon-Darling system after an extended dry period so that the first flows can provide for critical environmental and social needs.

On the 12th of January 2021, WaterNSW forecast that flows at Wilcannia would have been in the low flow range (<200ML/d) for 90 days, triggering the resumption of flows rule in the watering sharing plan. The restrictions were relaxed on the 29th of January after WaterNSW forecast that rule relaxation triggers would be met at both Bourke (at least 972 ML/day for 10 consecutive days) and Wilcannia (at least 400 ML/day for 10 consecutive days). In total, 8,000 ML was protected using the resumption of flows rule.

Introduction

The northern tributaries in the Murray Darling Basin have experienced drought conditions during the second half of 2020. Many of the northern tributaries had ceased to flow after a short respite of improved rainfall during February to April 2020 that brought some much-needed relief to communities in this area.

The return to dry conditions in the Barwon-Darling resulted in more than 90 days of low flow at Wilcannia. This triggered, for the first time, the resumption of flow rule on 12 January 2021.

The resumption of flows rule was designed to ensure that flows that happened after a prolonged low or no flow period are able to pass through the system to achieve connectivity from the Queensland border to Menindee Lakes. It does not provide for flows to the Lower Darling. The rule restricts pumping from these first flows. The resumption of flow rule was not designed to enhance allocation reliability below Menindee Lakes, or to deliver replenishment type flow events during prolonged droughts.

This January 2021 trigger of the rule resulted in restrictions to pumping and the protection of flows until enough water was forecast to flow through the system to obtain connectivity in the system from the Queensland border to Menindee Lakes and met the flow conditions to relax the rule. At the time the Lakes were holding over 300,000 ML of water and releases from the Lakes were providing connectivity through to the Murray River.

Background Flow Conditions

The graphs below show the flows along the Barwon Darling during 2020 at the gauging points relevant to the resumption of flows rule. There were good flows along the system from February to May, which resulted in over 672,000 ML flowing past Wilcannia and into the Menindee Lakes. This was the first good flow in the system since 2016. The graphs also show that while the initial flows in February were generated from the tributaries above Walgett including the Border, Gwydir and Namoi, the flows continued in March, April and May from flow entering the system between Walgett and Bourke (Macquarie and Condamine-Balonne (Culgoa) systems).

After this initial event, a smaller flow event occurred in June and August with inflows from the Macquarie River resulting in a small flow through to Wilcannia of approximately 47,000 ML during August to October. The flows from this last event dropped below 200 ML/d on the 15 October 2020 and the system had stayed dry until the flow resumed at Wilcannia in late January 2021.

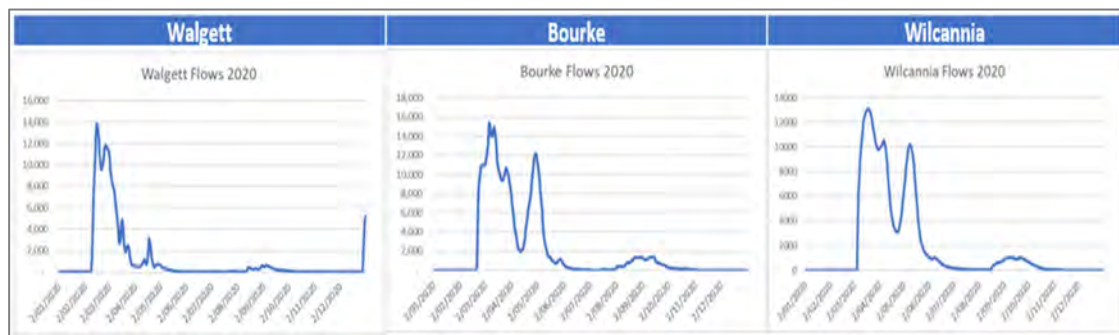


Figure 1. Flows along the Barwon Darling at key gauges during 2020.

Early January Water Management

Flows recommenced in the Barwon Darling in the final days of 2020. Initial flows entered the Barwon upstream of Tara from the Thalaba Creek and reached Walgett on 29 December. Further inflows arrived at Walgett from the Namoi on 1 January 2021 with a short peak in the event. About 25 GL entered the system over the period from the 29 December to the 5 January. Further rainfall across the catchments after this event resulted in an additional 31 GL flowing past Walgett from the 5 January through to 5 February.

The table 1. shows the access licence holders received in the Barwon-Darling during the early parts of the event - up to when the Resumption of Flow rule was activated on 12 January. Initially the flows met commence to pump flow thresholds for water users at Walgett and as the water flowed down the system, access was [announced](#) to downstream sections of the river.

As the 90 days trigger for low flows at Wilcannia was triggered on the 12 January, access was suspended for A, B and C Class licence holders until flows were forecast to reach the requirements of the water sharing plan.

River Management Zone	29 Dec	30 Dec	31 Dec	1 Jan	2 Jan	3 Jan	4 Jan	5 Jan	6 Jan	7 Jan	8 Jan	9 Jan	10 Jan	11 Jan
Mungindi to Boomi (zone 1)									B	B	B	B	B	
Boomi to Mogil (zone 2)											B	B	A	
Mogil Mogil weir pool (zone 3)											A	A	A	
Mogil to Collarenebri (zone 4)												A	A	B
Collarenebri to Walgett (zone 5)												A	B	B
Walgett weir pool (zone 6)	B	B	B	B	B	B	B	B	A	A	A	B	B	B
Walgett to Boorooma (zone 7)				B	B	B	B	B	A	A	A	B	A	A
Boorooma to Brewarrina (zone 8)						B	B	B	B	B	B	B	B	B
Brewarrina to Culgoa (zone 9)									B	B	B	B	B	B
Culgoa to Bourke (zone 10)										B	B	B	B	B
Bourke to Louth (zone 11)														A
Louth to Tilpa (zone 12)														
Tilpa to Wilcannia (zone 13)														
Wilcannia to upstream of Lake Wetherell (zone 14)														

Table 1. Barwon Darling Access during early January 2021

As can be seen from the table, in the lead up to the activation of the resumption of flows rule, different sections of the river had variable access to water. Licence holders in the Walgett Weir Pool Management Zone had a total of 14 days of access (3 days of A class and 11 days of B Class), whereas customers in the Culgoa to Bourke Management Zone only had 5 days of B class.

Access during this event prior to resumption of flows rule trigger provided 17,446 ML of water for extractive users.

Resumption of Flows Rule Flow Conditions

Triggering the Resumption of Flows Rule and Prohibition of Access

The resumption of flows rule was triggered on the 12 January when low flows were forecast at Wilcannia to be below 200 ML/d for 90 days in a row. The flow graph below shows the flows at the Wilcannia gauge during 2020. There was a large flow recorded at Wilcannia from March to June and then a smaller event from August to October with the flow dropping below 200 ML/d on the 15 October 2020. Access was then suspended for A, B and C Class licence holders 90 days after this date.

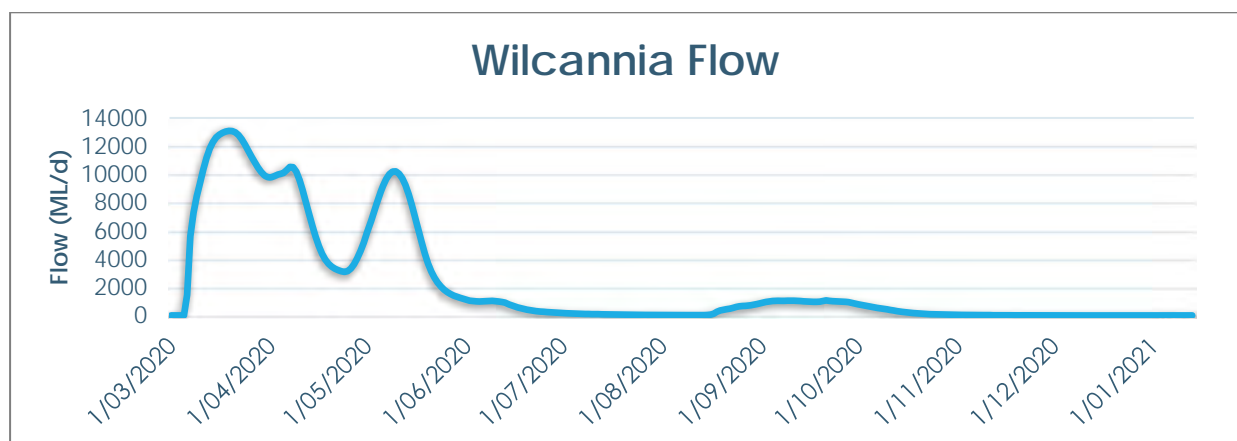


Figure 2. Flows at Wilcannia in 2020.

Reinstating Access

The Water Sharing Plan has clear triggers for reinstating access arrangements.

Clause 50 of the Water Sharing Plan allows for access to water to resume either wholly or partially provided that the flow requirements are still met.

This rule enabled access to be provided to only A-Class licences from 24 to 29 January.

*It is important to note that Resumption to Flow restrictions cease to apply if, in the Minister's opinion, an announcement of **a flow class** other than a No Flow Class under clause 49A will not prevent one of the following flows from occurring:*

(a) each of: (i) a flow greater than 972 ML/day for more than 10 consecutive days in the Darling River at Bourke Town (425 003);

(ii) a flow greater than 400 ML/day for more than 10 consecutive days in the Darling River at Wilcannia (425 008);

(b) a total flow of 30,000 ML in the Darling River at Bourke Town (425 003) since the commencement of the period when the flow in the Darling River at Wilcannia (425 008) has been less than 200 ML/day for more than 90 consecutive days.

Forecasting Flows to Reinstate Access

WaterNSW undertook daily modelling of flow in the system to forecast flows along the river using our modelling system, CARM.

Flows commenced in the Barwon Darling at Walgett in late December with these flows reaching Bourke on the 6th January 2021. While flows prior to the 12 January did not form part of the 30,000 ML target to relax the resumption to flow rule (the rule clearly states that 30,000 ML must flow past Bourke *after* the rule has been triggered), it did assist in providing a connecting flow downstream by wetting up the riverbed and filling waterholes along the way. A total of 8,186 ML flowed past Bourke between the 6th and the 12th January before the resumption of flows rule was triggered. The flow increased the likelihood of forecasting more than 10 days of flow above 400 ML/d at Wilcannia.

WaterNSW was undertaking flow forecasting for the Barwon Darling from late December, but up until the 23 January indicated there was insufficient water in the river to reach the Bourke target of 10 consecutive days of flows above 972 ML. By the 23 January, the flow forecast had improved with the model now forecasting 12 days of flow above the target. WaterNSW then allow a small volume of access to A Class licences (234 ML/d) without preventing the trigger being met (Figure 1).

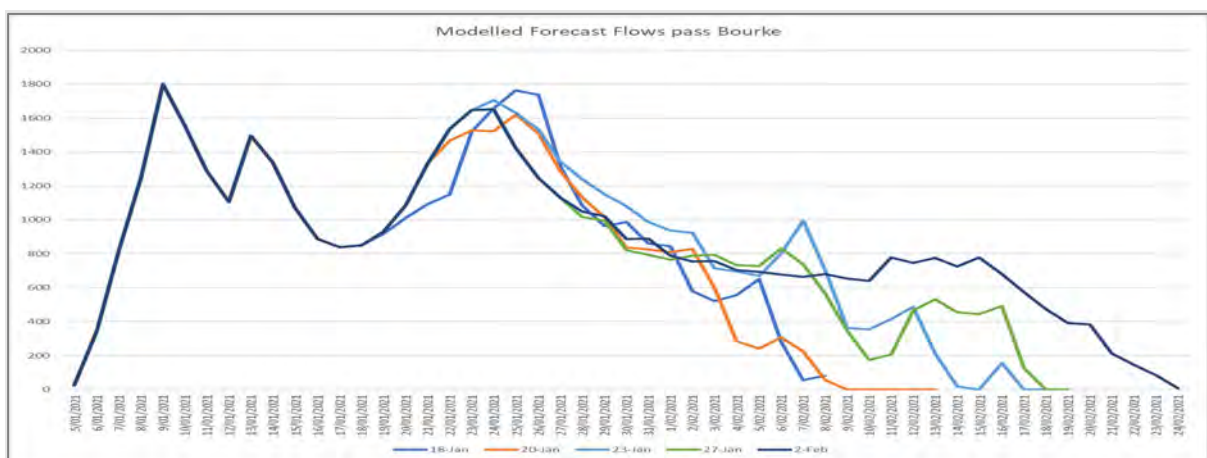


Figure 3. Flow forecast for Bourke

Similar to the flow forecast for Bourke, the flow forecast for Wilcannia indicated that flow would be above the target of 400ML/d for a period of 10 days. The forecast was difficult to predict in this section of the Barwon Darling because a comparison of forecast flows to modelled flows was not able to be undertaken until flows reached Tilpa on the 17 January. The actual flows at Tilpa were slightly higher than the modelled (forecast) flows which provided improved confidence that the forecast flows for Wilcannia would be achieved.

Flows reached Wilcannia on 30 January providing more than 10 consecutive days of flow above the resumption to flows rule target. Water is expected to continue to flow past Wilcannia at least until early March with an estimated volume in the order of 22-26,000 ML (Figure 4.).

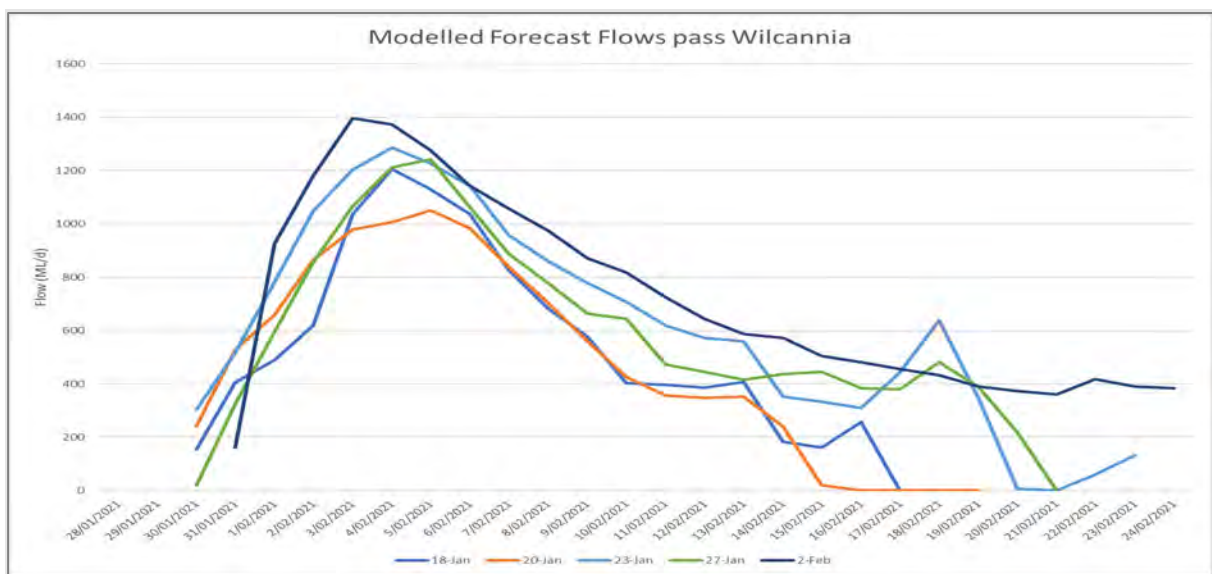


Figure 4. Flow forecast for Wilcannia

Normal access arrangement as stipulated in the Water Sharing Plan were reinstated on the 29 January. Since then, further rainfall across the catchment has resulted in further inflows to the system with increased flow forecast to pass Bourke. As of the 16 February over 49,000 ML is forecast to flow pass Bourke, with between 22-26,000 ML to reach Wilcannia and 16,000 ML to flow into Menindee Lakes.

Contribution to Flows

The resumption to flows rule was incorporated into the Barwon-Darling Water Sharing Plan (WSP) to protect initial flows in the system after a dry period and to provide river connectivity from Mungindi to Menindee Lakes.

The Plan does not specify what source of water is can contribute to flow conditions for the relaxation of the rule.

In the Barwon Darling there are three types of water in the system.

Planned Environmental Water – which is water that is protected from extraction based on the threshold levels and access rules. For example, at Bourke all flows below 605ML need to be protected to meet environmental, stock and domestic and town water supply needs downstream.

Held Environmental Water - this is water owned by environmental water customers (Commonwealth Environmental Water Holder (CEWH) or NSW Department of Energy, Environment and Science (EES). Environmental customers own water licences in the Barwon-Darling in which they can choose to have their water protected from extraction in the system. Environmental customers also have licenced water in the NSW northern tributaries including the Border, Gwydir, Namoi and Macquarie which can also be protected from extraction when it flows through the Barwon-Darling. This held environmental Water is protected from extraction by increasing flow thresholds for extraction.

Extractable Water – this is the water that can be made available for extraction depending upon access rules to licence holders in the system.

In the period between the 6 and 12 January there was a mix of water in the system flowing past Bourke. The volume of Planned Environmental Water was 4,002 ML, Held Environmental Water was 81 ML and water above access thresholds was 4,102 ML.

Not all of the water above the access thresholds was available for extraction. Individual Daily Extraction Components (IDECs) and actual pump capacity limits the volume of water that can be taken on any single day.

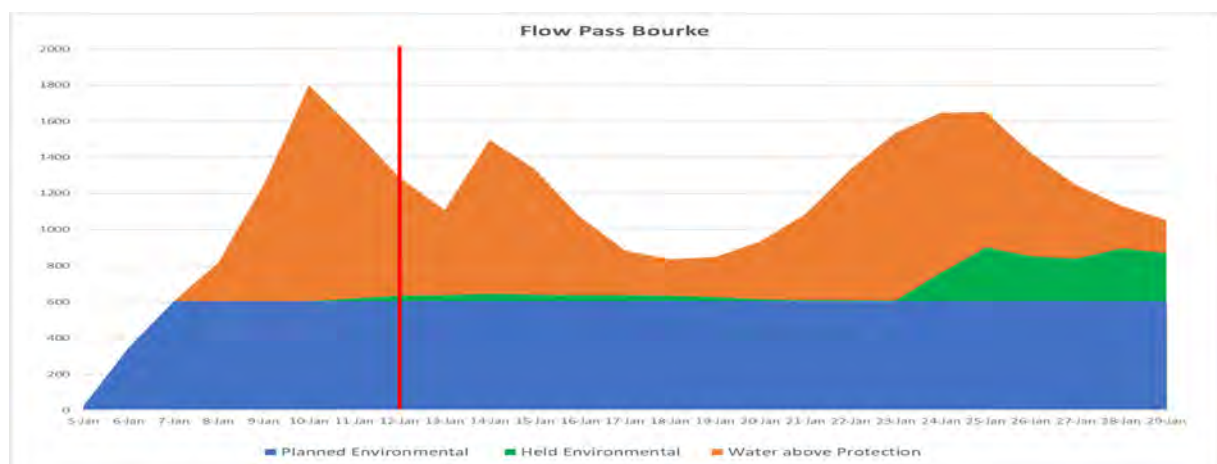


Figure 3 – Flow types passing Bourke during January 2021

While the resumption of flows rule was restricting access after 12 January, a mix of water also made up the flow passing Bourke to achieve downstream connectivity (Figure 3). During this period the volume of planned environmental water that passed Bourke was 10,285 ML; held environmental water was 1,919 ML and above the access thresholds was 8,340 ML.

While there was 8,340 ML of flow over the period from the 12 January to the 29 January available above the normal access triggers for licence holders, not all of this water would have been able to be extracted. Based on the volume of expression of interests and available IDECs that approximately 6,000 ML could have been extracted if the Resumption to Flow rule had not been prohibiting access.

Protection of Environmental Water

Environmental water from the Border, Gwydir, and Macquarie has been flowing through the Barwon-Darling since early January out of the Border, Gwydir, and Macquarie rivers and more recently from licences in the Barwon Darling. This water has been recognised in river flow forecasts and protected from extraction using active management to adjust commence to pump flow targets.

WaterNSW tracks the environmental water as it flows down the system protecting the water by raising the commence to pump flow thresholds. Flow Class Announcements for the Barwon-Darling are then issued each day. The Flow Class Announcements are publicly available on WaterNSW's Water Insights webpage.

The environmental water being protected in the system can be identified in the announcements by looking at the adjusted CTPs / flow thresholds in the announcements. The table below is a copy of the announcements which shows the CTP as per the WSP in brackets and the adjusted CTP shown above it.

Management zone	Reference stations		A class Adjusted CTP (WSP CTP) ML/Day		B class Adjusted CTP (WSP CTP) ML/Day		C class Adjusted CTP (WSP CTP) ML/Day		Flow class	Flow share announcement
	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S		
Mungindi to Boomi River Confluence (16221)	Barwon River at Mungindi (416001)	Barwon River upstream of Presbury Weir (416050)	198 (198)	176 (176)	230 (230)	270 (270)	230 (230)	1500 (1500)	Low flow class	Yes. See announced flow share for eligible volume.
Culgoa River Junction to Bourke (16230)	Darling River at Warraweena (425039)	Darling River at Bourke town (425003)	678 (645)	655 (605)	1363 (1330)	1300 (1250)	1363 (1330)	11050 (11000)	A class	Yes. See announced flow share for eligible volume.

As can be seen in the table the values in the brackets and above the brackets for the Mungindi to Boomi River Confluence are the same showing that there is no held environmental water being protected in the river. However, the values above the brackets in the Culgoa Junction to Bourke shows a higher number. This reflects the protection of volume of environmental water, i.e. 33 ML/day at the Warraweena gauge and 50 ML/d at the Bourke gauge.

The majority of the HEW (1,700 ML) was released from the Border and Gwydir systems in early December to provide for environmental flow in the upper reaches of the Barwon (prior to the rainfall occurring across the system). This water was protected from extraction and reached Bourke on the 23 January to assist in reaching the connectivity targets.

During this event a total of 5,610 ML of environmental water has flowed into the Barwon-Darling from the tributaries and a further 3,764 ML of water has been allocated to the Environmental water holders in the Barwon Darling and protected.