Northern Basin temporary water restrictions: targets and principles

This information sheet provides an overview of the targets and principles for managing the temporary water restrictions that were applied to river and overland flows from January to the end of March 2020 in the Northern NSW Basin.

Where and why were the temporary restrictions applied?

In January 2020, the Bureau of Meteorology was forecasting rainfall to occur over widespread areas of the Northern NSW Basin. This region had been experiencing severe drought. In some river valleys, inflows were substantially lower than the previous drought of record. As a result many towns had, or were close to, exhausting their river water supplies and many rivers had reverted to a series of disconnected pools.

It was necessary to protect these first flows after a prolonged dry period to meet critical human and environmental needs.

The temporary restriction order on river pumping started on 17 January 2020 and applied to most commercial water extraction. The temporary water restriction applied to regulated and unregulated rivers of the Border Rivers, Gwydir, Namoi, Peel, Macquarie-Bogan and Castlereagh catchments - and also in the Barwon-Darling River and Intersecting Streams. On 7 February 2020, floodplain harvesting, from the associated floodplains, was also restricted through a further temporary water restriction.

The temporary water restriction orders were in place until 28 February. On 29 February a new order was made that applied only to the Barwon-Darling River and floodplain to ensure flows from the upstream catchments could move along the Barwon-Darling and reach Menindee Lakes.

During the period of the temporary water restrictions, some limited pumping was permitted based on a set of flow triggers and principles. Information on where and when some access was permitted during the period of the temporary water restrictions orders up until 28 February 2020 can be found here.

What were the objectives of the restrictions?

The key objectives of the restrictions were to:

- meet critical human needs – provide flow locally and downstream, particularly to replenish town water supply weir pools and provide water supply for domestic and stock purposes
- meet critical environmental needs – provide flow along the length of the river systems to ensure re-connection of rivers and drought refuge pools.

What flow targets guided our management of restrictions?

Prior to the rainfall events, DPIE Water had been working with DPIE Biodiversity and Conservation and DPI Fisheries to determine the critical environmental needs that should be targeted in the northern valleys under various first flush scenarios.

The flow targets proposed were based on the minimum environmental water requirements developed as part of the draft *Long Term Water Plan* for each valley and other literature where available. The *Long Term Water Plans* can be found here. The targets were selected to provide for the survival of the biota (e.g. fish) by aiming to:

- maintain refugia pool water quality
- provide some connectivity and fish passage between drying pools
- provide low-level lake fill for fish and other aquatic biota support and maintaining lake processes
- inundate inner-core wetland areas for critical flow-dependent vegetation maintenance and wetland processes, where known thresholds were at risk.

The targets consisted of flows or volumes at key gauge locations relevant to important refuge areas, and some core wetland and lake habitats.

To assist with the operational application of the temporary water restrictions, the adopted flow targets were converted to a volume at each site. For example, the initial baseflow requirement at Collarenebri gauge determined to meet critical environmental needs was 280 megalitres (ML) per day for 10 days. This was converted to a single volume of 2,800 ML. It is recognised that one total flow target may not provide as much ecological benefit as the flow occurring over consecutive days, however; the adopted approach was easier to forecast and manage. The move to a single target volume, rather than a duration, was agreed by an interagency panel for its operational ease for this particular event.

Any decision to allow access was also dependent on meeting critical human needs. As the critical environmental need volumes provided a base flow, this was anticipated to be enough to also supply critical human needs. In practice the volume required to re-start flows in a river is generally adequate to meet town, domestic and stock supplies and basic landholder rights.

The original criteria and subsequent targets adopted for the event are set out below. These targets are regarded as interim and will be reviewed prior to being utilised in any future events.

Interim triggers to consider licenced extraction of first flush flows – Summer 2019-2020

Target location	Original criteria for environmental needs	Adopted volumetric targets for considering lifting restrictions – where the event is predicted to provide the following total flow volume
Barwon-Darling		
Barwon River at Collarenebri 422003	>280 ML/d (10 days)	2,800 ML
Barwon River at Dangar Bridge 422001	>320 ML/d (10 days)	3,200 ML
Barwon River at Brewarrina 422002	>500 ML/d (10 days)	5,000 ML

Darling River at Bourke 425003	>500 ML/d (10 days)	5,000 ML
Darling River at Wilcannia 425008	>350 ML/d (10 days)	3,500 ML
Border Rivers		
Severn River at Ashford 416006	>40 ML/d (10 days)	400 ML
Macintyre River at Ridgelands 416031	>210 ML/d (10 days)	2,100 ML
Macintyre at Boggabilla 416002	>230 ML/d (10 days)	2,300 ML
Macintyre at Goondiwindi 416201A	>120 ML/d (10 days)	1,200 ML
Macintyre u/s Boomi 416043	>60 ML/d (10 days)	600 ML
Boomi River at Boomi Weir Offtake 416037	>5 ML/d (10 days)	50 ML
Barwon River at Mungindi 416001	>300 ML/d (10 days)	3,000 ML
Gwydir		
Gwydir River including Gwydir Wetlands		
Gwydir @ Gravesend 418013	>440 ML/d (10 days)	4,400 ML
Gwydir @ Yarraman 418004	>240 ML/d (10 days)	2,400 ML
Lower Gwydir Gwydir DS Tyreel 418063	>100 ML/d (10 days)	1,000 ML
Central Lower Gwydir	>6,000 ML event with a ***maximum period between flows*** (ie maximum interflow) of 1 yr (418066 Millewa) >36GL maximum interflow 2 yr (418078 Allambie)	>6,000 ML event maximum interflow 1 yr >36GL maximum interflow 2 yr (418078 Allambie)
Gingham watercourse		
Gingham @ Teralba 418074	>100 ML/d (10 days)	1,000 ML
Central Gingham Gingham @ Tillaloo 418076	>15 GL event maximum interflow 1 yr >30 GL event maximum interflow 2 yr	>15 GL event maximum interflow 1 yr >30 GL event maximum interflow 2 yr

Lower Gingham Gingham @ Gingham Brd 418079	>3GL event maximum interflow 1 yr >15GL event maximum interflow 2 yr	>3GL event maximum interflow 1 yr >15GL event maximum interflow 2 yr
Mehi River inc. Mallowa and Moomin		
Mehi @ Moree 418002	>130 ML/d (10 days)	1,300 ML
Mehi near Collarenebri 418055	>40 ML/d (10 days)	400 ML
Moomin Creek at Combadello 418048	>30 ML/d (10 days)	300 ML
Mehi and Mallowa wetlands	>3GL event maximum interflow 18 mth >8GL event maximum interflow 2 yr	>3GL event maximum interflow 18 mth >8GL event maximum interflow 2 yr
Mallowa creek at regulator 418049	>10 ML/d (10 days)	100 ML
Carole/Gil		
Carole near Garah 418052	>70 ML/d (10 days)	700 ML
Namoi		
Namoi River at Manilla 419022	>70 ML/d (10 days)	700 ML
Namoi River at Gunnedah 419001	>200 ML/d (10 days)	2,000 ML
Namoi River at Mollee 419039	>200 ML/d (10 days)	2,000 ML
Namoi River upstream of Walgett 419091	>30 ML/d (10 days)	300 ML
Pian Creek at Waminda 419049	>50 ML/d (10 days)	500 ML
Peel River at Piallamore 419015	> 100 ML/d (10 days)	1,000 ML

Peel River at Carroll 419006	>100 ML/d (10 days)	1,000 ML
Macquarie		
Macquarie at Baroona 421001	>200ML (10 days)	2,000 ML
Macquarie at Warren (@ Warren Weir) 421004	>200ML (10 days)	2,000 ML
Macquarie River Marebone Weir inflows (@combined Marebone Break & Macquarie River below Marebone gauges) 421088 + 421090	>100 ML/d (10 days)	1,000 ML
Streams between Marebone Weir and the Macquarie Marshes (@combined Macquarie River & Marebone Break below Marebone gauges) 421088 + 421090 * excluding take	>65 ML/d (10 days)	650 ML
Inner core of Macquarie Marshes wetland system Northern, Southern & Eastern Marshes (@combined Macquarie River & Marebone Break below Marebone gauges) 421088 + 421090	For core wetlands: 60,000 ML event maximum interflow period 18 months - 2 years over 3-4 months	# For core wetlands: 60,000 ML total volume over 3 to 4 months

Following the period of the restrictions in the upstream northern valleys (end of February 2020), on the advice of the DPIE Biodiversity and Conservation Division, supplementary access was delayed in early April in the Macquarie to ensure that a total of 30 GL could reach the Northern Marshes reedbed. This was considered a minimum critical target at that time to inundate this area of the Marshes which had been damaged by wildfires in October 2019. For further information see Macquarie Marshes fact sheet.

In addition to the interim targets in the northern valleys, an initial target for the filling of Menindee Lakes of 60-70 GL was also adopted. This was based on a flow sufficient to re-fill the drought block banks and to provide domestic and stock supplies along the Lower Darling (approximately 20-30 GL), and to retain a volume of around 40 GL in Lake Wetherell as a drought refuge. As further flows were contributed from the Queensland tributaries, this target was increased to 200 GL. This higher target would provide for 12 months' supply for high priority requirements, allow for the removal of the block banks, and flush the Lower Darling River using a large pulse flow event to manage water quality and protect native fish populations.

Similarly, as flows continued to occur in the northern valleys, the department looked to securing 12 months' essential supply in the major northern storages before considering allowing access to general security water held in accounts.

What principles were applied when we considered lifting restrictions?

Once a target was reached, or forecast to be reached, then DPIE Water, in consultation with DPI Fisheries and WaterNSW considered the following principles prior to making any decision:

- Consider providing access to upstream water users under normal rules if the nearest downstream targets are met or forecast to be met ***and*** there is an assessment that this event will not meaningfully contribute to meeting any downstream targets.
- However, where an event is predicted to meaningfully contribute to meeting the next downstream target, the temporary water restriction should **not** be lifted (e.g. meet Menindee Lakes requirements).
- When an event has met local targets and is no longer expected to contribute to meeting downstream targets, or is in excess of that required to meet downstream targets, some local extraction relief could be allowed.
- Temporary water restrictions should to apply to a consistent upstream network of both unregulated and regulated rivers systems in a valley, to provide sufficient volumes of water to meet critical needs, avoid interceptions by extractors, and avoid inequitable sharing between users.
- Early relaxation of upstream access restrictions prior to downstream targets being met should only occur if there is high confidence in downstream flow predictions meeting targets.
- When flow predictions are used for early relaxation of restrictions on upstream access, river system loss assumptions should reflect the antecedent extended dry conditions.

What was achieved?

Key outcomes of the flows over January to March 2020, were:

1) The northern NSW Basin rivers experienced flows along their lengths allowing:
    a. Town water supply weirs to be refilled and many towns that had been dependent on groundwater as a backup supply to return to using river water.
    b. Flow connection between drought refuge pools in rivers to allow water quality improvement and the ongoing survival of many species, including fish.
2) Inundation of critical areas within important wetland systems, including parts of the northern Macquarie Marshes reedbed, and the Gwydir Wetlands.
3) Over 200 GL reached Menindee Lakes by the end of March enabling the commencement of the pulse release to the Lower Darling from 26 March 2020.

Next steps

The volumetric targets were interim and were adopted as a guide to decision-making as the Northern Basin rainfall events unfolded. The extent to which the targets were met, the appropriateness of the targets, and the outcomes of the restrictions are being further evaluated.