

Floodplain harvesting flow targets

Work that informed DPE Water's flow targets

DPE Water has developed access rules in the form of in-catchment flow targets to temporarily protect flows from floodplain harvesting following a dry period (Table 1). The flow targets are based on the Needs of the Environment During an Extreme Event (NEDEE) project. The NEDEE project was established in 2019 following an extended extreme dry period to determine the critical environmental needs that should be targeted in the northern catchments under various 'first flush' scenarios, particularly in circumstances where water sharing plan rules were suspended.

Flow targets are loosely based on the minimum environmental water requirements (EWR) stated in the Long Term Water Plan (LTWP) for each catchment (baseflows) in the hopes of achieving the following ecological outcomes:

- Maintain refugial 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.

However, DPE Water converted flows from a flow rate (ML/day) with a specific duration, frequency and timing, to a total volume (ML) for ease of delivery for WaterNSW. This modification incorrectly describes the required flows to support the environment and may not achieve the desired ecological outcomes.

Furthermore, the NEDEE project was established to prevent critical environmental loss in times when the environment is so dry that the WSP needs to be suspended. This is not a state that would support the maintenance or improvement of ecological values and assets over the long term. The proposed flow targets from Water are also substantially lower than some of the Barwon-Darling resumption of flow targets for the northern tributaries. As such, these flows are inadequate as an access rule to allow floodplain harvesting to commence if they are to protect the environment and provide any meaningful connectivity to downstream communities.

EHG's proposed alternative flow targets

In order for a WSP to provide for the environment, a range of essential flows need to be protected during moderate and wet years, in addition to extreme dry conditions.

EHG has proposed alternative flow targets (Table 2) based on the EWRs in the published LTWPs, which were developed using the best available evidence and were widely tested through peer review. These flow targets improve on DPE Water's as they more adequately capture the range of flows required to protect the environment, will ensure that some anabranches and low-lying floodplain systems and processes are less likely to be impacted by floodplain harvesting take, will provide improved connectivity within and between catchments, and are described at the most appropriate and reliable gauges to assess the influence of floodplain harvesting on downstream flows. At this stage, DPE Water has not modelled the impact that these proposed targets would have on long term water access.

Table 1 DPE Water floodplain harvesting in-catchment flow targets and relevant concerns from EHG

Gauge	Water published flow target	LTWP flow component	Description and EHG concerns
Border Rivers			
Barwon River @ Mungindi	A continuous uncontrolled flow event volume of 3,000 ML	Smaller volume of water than what is described as a very low flow	<ul style="list-style-type: none"> Flows of this volume may not be able to maintain adequate water quality in refuge pools along the Barwon-Darling Increased risk of blue-green algal blooms if flows of at least 350 ML/day don't occur at least 290 days per year (in typical years) and 120 days per year (in very dry years)
Gwydir¹			
Carole Creek @ near Garah	A continuous uncontrolled flow event volume of 700 ML	Smaller volume of water than what is described as a very low flow	<ul style="list-style-type: none"> Flows of this volume may not be able to maintain adequate water quality in refuge pools and increase the risk of blue-green algal blooms
Gingham Channel @ Teralba	A continuous uncontrolled flow event volume of 1,000 ML	Similar to a very low flow in very dry years	<ul style="list-style-type: none"> May support limited connectivity between refuge pools but would be insufficient to reduce the risk of blue-green algal blooms
Gwydir River @ d/s Tyreel Offtake Regulator	A continuous uncontrolled flow event volume of 1,000 ML	Similar to a very low flow in very dry years	<ul style="list-style-type: none"> May support limited connectivity between refuge pools but would be insufficient to reduce the risk of blue-green algal blooms
Mehi River @ near Collarenebri	A continuous uncontrolled flow event volume of 400 ML	Smaller volume of water than what is described as a baseflow	<ul style="list-style-type: none"> Very low flows are not described in this section of the Mehi River Flows above this volume should occur in more than 95% of years here, making this target irrelevant
Macquarie and Cudgegong			
Macquarie @ Warren	A continuous uncontrolled flow event volume of 5,000 ML	Smaller volume of water than what is described as a baseflow	<ul style="list-style-type: none"> Perhaps related to supplementary water access licences that may begin to extract water when flows in the river exceed 5,000 ML/day at Warren – however this is a flow rate not a total volume and is therefore more restrictive than the floodplain harvesting flow target
Barwon-Darling Unregulated			
Darling River @ Wilcannia	A continuous uncontrolled flow event volume of 4,000 ML	Smaller volume of water than what is described as a very low flow in very dry years	<ul style="list-style-type: none"> Flows of this volume may not be able to maintain adequate water quality in refuge pools along the Barwon-Darling Increased risk of blue-green algal blooms if flows of at least 350 ML/day don't occur at least 290 days per year (in typical years) and 120 days per year (in very dry years)

¹ None of these gauges will adequately be able to manage floodplain harvesting in the Thalaba water management zone

Table 2 EHG proposed alternative flow targets for the Border Rivers, Gwydir, Macquarie and Barwon-Darling catchments

Gauge	EHG proposed flow target	Flow component	Environmental outcomes	Rationale
Border Rivers				
Macintyre River @ Goondiwindi	>8,000 ML/d, 5 consecutive days in the last 365 days	Large fresh	<ul style="list-style-type: none"> Protect flows that will start to fill half of the anabranches in the reach Improve native fish spawning 	<ul style="list-style-type: none"> Goondiwindi is a reliable gauge as it is in a large deep channel, is well positioned in the catchment, and is a good indicator of all inflows into the Macintyre River
	>20,000 ML/d, 5 consecutive days in the last 2 years (730 days)	Small overbank	<ul style="list-style-type: none"> Protect flows that will inundate additional creeks and anabranches and start to provide some connectivity with the low-lying floodplain Support water-dependent vegetation, native fish spawning and nutrient cycling 	
Boomi River @ Boomi Weir offtake	>1000 ML/d, 4 consecutive days in the last 2 years (730 days)	Bankfull	<ul style="list-style-type: none"> Protect flows that start providing some connectivity with the floodplain Support fish spawning and connectivity 	<ul style="list-style-type: none"> Larger flows are recorded at this gauge but are not accurate and therefore can't be reliably described
Gwydir				
Gil Gil Creek @ Galloway	>10,000 ML/d, 2 consecutive days in the previous 3 years	Small overbank	<ul style="list-style-type: none"> Provide connectivity with the Barwon-Darling Protect flows that will inundate anabranches and low-lying floodplain and provide some connectivity between catchments Support native fish spawning, water-dependent vegetation and ecosystem functions such as nutrient cycling 	<ul style="list-style-type: none"> This gauge was used as opposed to Weemalah as referenced in the LTWP because it is better positioned to assess floodplain harvesting take in the water management zone Flows described are in line with a small fresh at Weemalah as described in the LTWP
Mehi River @ Moree	>20,000 ML/day, 2 consecutive days in the previous 10 years	Large overbank	<ul style="list-style-type: none"> Promote large scale productivity Provides connectivity with floodplains and wetlands and the Barwon-Darling Support waterbird breeding, large scale native fish migration, and water-dependent vegetation communities 	<ul style="list-style-type: none"> These flows cannot be met with licenced environmental water and are dependent on the remaining natural flows being protected

Gauge	EHG proposed flow target	Flow component	Environmental outcomes	Rationale
Gwydir @ Yarraman	>11,000 ML/d, 2 consecutive days in the previous 3 years	Large fresh	<ul style="list-style-type: none"> • Provide connectivity with the Barwon-Darling • Provides lateral connectivity with floodplains and wetlands • Support fish migration between catchments 	<ul style="list-style-type: none"> • Required to protect this flow as water from the 3T rule is not sufficient to support key environmental assets and HEW volumes are insufficient
Thalaba creek gauge (418091)	>1,000 ML/d, 2 consecutive days in the past 365 days	Small overbank	<ul style="list-style-type: none"> • Protect flows that start to inundate anabranches and low-lying floodplain • Support waterbird species, water-dependent vegetation communities, and native fish, including golden perch 	<ul style="list-style-type: none"> • This gauge does not currently have an EWR described in the LTWP as it is in an unregulated water source • It is the most appropriate and reliable gauge to assess floodplain harvesting take in the water management zone • Connectivity with other water sources and catchments (such as the Barwon-Darling) is only achieved via overbank flows
Macquarie and Cudgegong				
Lower Macquarie @ Bells Bridge	140 ML/day, 28 days in last 2 years	Small fresh	<ul style="list-style-type: none"> • Low-level connection flows to the Barwon River • Support movement of fish recruits from the Barwon River 	<ul style="list-style-type: none"> • This is the lowest flows required to support connectivity and outcomes may still be affected by unregulated irrigation take
Macquarie Marshes	60,000 ML volume, over 90 days measured at combined River and Marebone Break gauges downstream of Marebone Weir within the last 365 days.	Overbank / wetland flow small	<ul style="list-style-type: none"> • Support inundation inner semi-permanent wetland areas in the Marshes before floodplain harvesting is permitted 	<ul style="list-style-type: none"> • This flow is not specifically described in this way in the LTWP, however is based on a small overbank event and recent experience from the first flush in early 2020 • In this location, the flow rate is relatively unimportant to achieving the desired outcomes

Gauge	EHG proposed flow target	Flow component	Environmental outcomes	Rationale
Barwon-Darling				
Barwon River @ Mungindi	>3,000 ML/day, 15 consecutive days in the last 2 years	Large fresh	<ul style="list-style-type: none"> Support native fish spawning Inundate instream habitat for fish Provide connectivity within and between catchments 	<ul style="list-style-type: none"> Connectivity with the Border Rivers Larger flows from the Broder Rivers are required to drown out the Boomi weir and provide connectivity
Barwon River @ Mungindi	>10,000 ML/day, 5 consecutive days in the last 3 years	Small overbank	<ul style="list-style-type: none"> Support water-dependent vegetation communities Provide connectivity within and between catchments Provide fish passage by drowning out Barwon River weirs from Mungindi to Collarenebri 	
Barwon River @ Brewarrina	>100 ML/day, in typical years, at least 345 days per year, within the last 365 days. >100 ML/day, in very dry years, at least 185 days per year, within the last 365 days.	Very low flow	<ul style="list-style-type: none"> Provide replenishment flows to refuge pools along the Barwon-Darling Provide fish passage through the Brewarrina Weir Fishway and flows through the Ngemba (Brewarrina) Fish Traps 	<ul style="list-style-type: none"> Protect minimum connectivity between the Macquarie catchment and the Barwon-Darling
	>9,000 ML/d, 15 consecutive days in the last 485 days	Large fresh	<ul style="list-style-type: none"> Inundate instream habitat for fish Support native fish spawning Provides flows to the majority of anabranches and billabong wetlands 	<ul style="list-style-type: none"> Ensures town water supply at Brewarrina is met before floodplain harvesting is permitted Connectivity with the Gwydir and the Border Rivers
Darling River @ Wilcannia	>14,000 ML/d, 15 consecutive days in the last 485 days	Large fresh	<ul style="list-style-type: none"> Inundate instream habitat for fish Support native fish spawning Provides flows to approximately a quarter of the wetlands, lakes and anabranches Provides fish passage by drowning out all Darling River weirs to Menindee 	<ul style="list-style-type: none"> Ensures town water supply at Wilcannia is met before floodplain harvesting is permitted Included as a flow target in the Gwydir