Wentworth Group's recommended floodplain harvesting flow targets in NSW

Priority of use principles

The *Water Management Act 2000* specifies that the sharing of water must "protect the water source and its dependent ecosystems" as well as basic landholder rights (sections 5(3) and 9(1)).

These so-called "priority of use principles" do not only apply to critical and low flows but also to larger flows which are required to sustain the environment. For example, many important ecosystems are on floodplains and require regular overbank flows to protect them.

Floodplain harvesting is an opportunistic take of water which should only occur when there is a surplus. It is amongst the lowest priority forms of take and should only be taken when downstream water needs, including those of communities and the environment, are satisfied.

Environmental Watering Requirements

The Basin Plan required the NSW government to identify the volumes of water needed to sustain water sources and their dependent ecosystems across all NSW Murray-Darling Basin rivers.

These environmental watering requirements cover all types of flows, from cease-to-flow to overbank flows (see Figure 1). They are defined as a flow rate (in ML/day) over a duration of time (days) with an achievement frequency i.e., must occur in x % of years to achieve environmental outcomes.

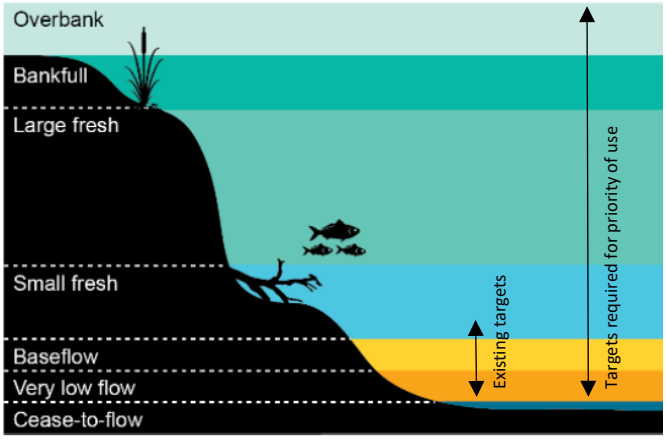

Figure 1: Types of flow regimes

Environmental watering requirements were developed by NSW government scientists based on "best available information from water managers, ecologists, scientific publications and analysis of gauged and modelled flows" to "be within the range of natural flow variability and seasonality" (Basin Plan 8.51(1)(d)).

Existing flow targets

Existing flow targets (i.e., resumption of flow rules, water sharing plan s324 orders, interim-unregulated flow management plan for the North-West, and the connectivity panel reference group) all relate to protecting only very low flow and baseflow and only after extended drought.

Recommendations for implementing floodplain harvesting flow targets

Environmental watering requirements should form the targets which determine if extraction will impact a water source and its dependent ecosystems. Where environmental water requirement achievement is below what is required, floodplain harvesting restrictions should be in place, as required by priority of use principles, to ensure environmental and community outcomes are protected.

All flow targets need to be embedded in each valley's water sharing plans as mandatory targets in the same manner as the resumption of flow rules.

Restrictions on take must be in place even if the flow will not "meaningfully contribute" to achieving the target. This protects wetting-up processes that create antecedent conditions which allow subsequent flows to achieve the environmental and community outcomes associated with the target.

Protections of any foregone water must be in place so that flow regimes are not extracted downstream.

Figure 2 shows the locations of recommended flow target sites and Table 1 lists environmental watering requirements for each site as well as the recommended flow targets for floodplain harvesting in NSW.

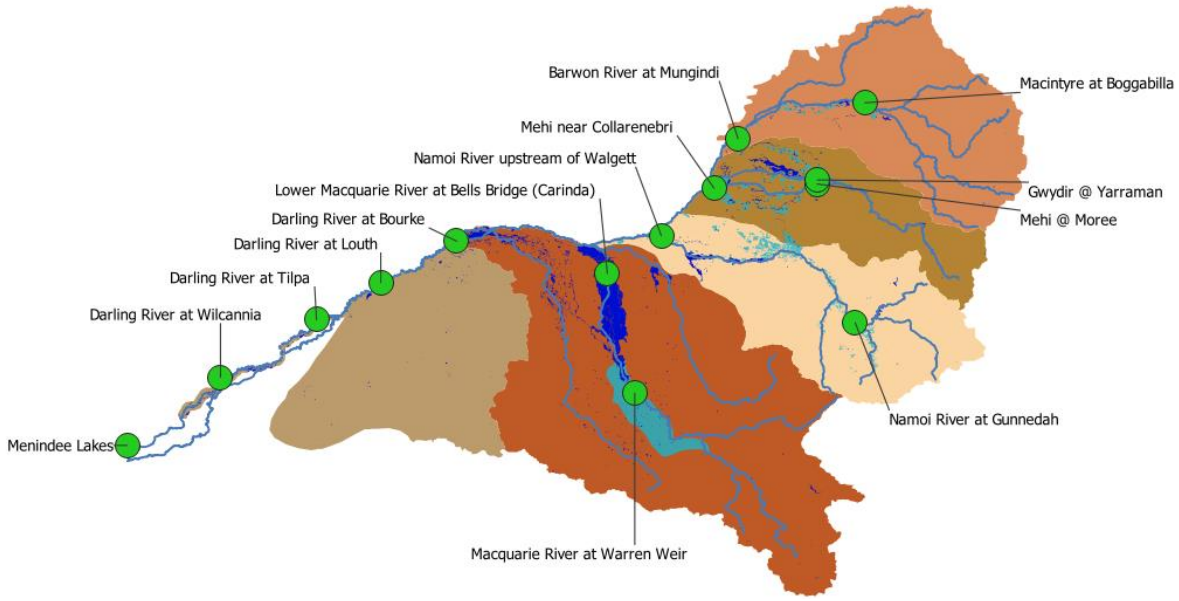

Figure 2: Map of the northern NSW floodplain valleys showing recommended floodplain harvesting target locations. Light blue areas represent major irrigation zones and dark blue areas represent NSW wetlands.

*Table 1: Environmental watering requirements developed by the NSW government representing key flows, recommended floodplain harvesting flow targets are **bolded**.*

	Location	Flow Type	Must occur in % of years	Environmental Watering Requirement
Barwon-Darling	Darling at Wilcannia	Very Low Flow	100%	30 ML/d for 340 days
		Baseflow	100%	350 ML/d for 290 days
		Small Fresh	**100%**	**1,400 ML/d for 10-14 days**
		Large Fresh	**75%**	**14,000 ML/d for 15 days**
		Bankfull	50%	25,000 ML/d for 15 days
		Overbank	**30%**	**30,000 ML/d for 15 days**
		Overbank	10%	43,000 ML/d for 15 days
	Barwon River at Mungindi	Very Low Flow	100%	45 ML/d for 310 days
		Baseflow	100%	160 ML/d for 220 days
		Small Fresh	100%	540 ML/d for 10 days
		Large Fresh	75%	3,000 ML/d for 15 days
		Bankfull	**50%**	**7,900 ML/d for 5 days**
		Overbank	30%	10,000 ML/d for 5 days
		Overbank	**20%**	**13,000 ML/d for 5 days**
		Overbank	10%	19,000 ML/d for 5 days
	Darling River at Bourke	Very Low Flow	100%	105 ML/d for 325 days
		Baseflow	100%	500 ML/d for 275 days
		Small Fresh	**100%**	**1,550 ML/d for 10 days**
		Large Fresh	**75%**	**15,000 ML/d for 15 days**
		Bankfull	50%	30,000 ML/d for 15 days
		Overbank	**30%**	**50,000 ML/d for 15 days**
		Overbank	20%	62,000 ML/d for 15 days
		Overbank	10%	129,000 ML/d for 15 days
	Darling River at Louth	Very Low Flow	100%	70 ML/d for 330 days
		Baseflow	100%	450 ML/d for 280 days
		Small Fresh	**100%**	**1,500 ML/d for 10 days**
		Large Fresh	**75%**	**15,000 ML/d for 15 days**
		Bankfull	50%	30,000 ML/d for 15 days
		Overbank	**30%**	**44,000 ML/d for 15 days**
		Overbank	20%	57,000 ML/d for 15 days
		Overbank	10%	125,000 ML/d for 15 days
	Darling River at Tilpa	Very Low Flow	100%	60 ML/d for 330 days
		Baseflow	100%	400 ML/d for 280 days
		Small Fresh	**100%**	**1,450 ML/d for 10 days**
		Large Fresh	**75%**	**14,500 ML/d for 15 days**
		Bankfull	50%	28,000 ML/d for 15 days
		Overbank	**30%**	**41,000 ML/d for 15 days**
		Overbank	20%	51,000 ML/d for 15 days
		Overbank	10%	120,000 ML/d for 15 days
	Menindee	**Water supply**	**100%**	**18 months' supply**
Border Rivers	Macintyre River at Boggabilla	Very Low Flow	100%	25 ML/d for 347 days
		Baseflow	100%	230 ML/d for 217 days
		Small Fresh	100%	840 ML/d for 10-14 days
		Large Fresh	**75%**	**3,100 ML/d for 5-10 days**

		Bankfull	100%	10,900 ML/d for 3 days
		Anabranch	**100%**	**10,900 ML/d for 13 days**
		Overbank	**30%**	**21,400 ML/d for 3 days**
		Overbank	12%	60,000 ML/d for 3 days
Gwydir	Mehi River at Moree	Very Low Flow	100%	20 ML/d for 330 days
		Baseflow	100%	130 ML/d for 200 days
		Small Fresh	100%	345 ML/d for 10 days
		Large Fresh	**75%**	**2,800 ML/d for 14 days**
		Large Fresh	**40%**	**10,000 ML/d for 5 days**
		Overbank	10%	20,000 ML/d for 2 days
		Overbank	**10%**	**30,000 ML/d for 2 days**
	Gwydir at Yarraman	Very Low Flow	100%	20 ML/d for 350 days
		Baseflow	100%	130 ML/d for 200 days
		Small Fresh	100%	540 ML/d for 10-14 days
		Large Fresh	**75%**	**4,860 ML/d for 14 days**
		Large Fresh	**40%**	**11,000 ML/d for 2 days**
		Large Fresh	25%	40,000 ML/d for 5 days
		Bankfull	**25%**	**60,000 ML/d for 2 days**
		Overbank	10%	60,000 ML/d for 1 day
	Mehi at Collarenebri	Baseflow	100%	40 ML/d for 130 days
		Small Fresh	100%	100 ML/d for 10 days
		Large Fresh	**100%**	**800 ML/d for 5 days**
Namoi	Namoi at Gunnedah	Very Low Flow	100%	1 ML/d for 365 days
		Baseflow	100%	200 ML/d for 240 days
		Small Fresh	100%	600 ML/d for 10-14 days
		Large Fresh	**75%**	**5,400 ML/d for 5 days**
		Bankfull	**30%**	**32,700 ML/d for 3 days**
		Overbank	**40%**	**40,000 ML/d for 2 days**
		Overbank	33%	45,000 ML/d for 2 days
	Namoi River upstream of Walgett	Very Low Flow	93%	1 ML/d for 365 days
		Baseflow	93%	30 ML/d for 347 days
		Small Fresh	100%	200 ML/d for 10 days
		Large Fresh	**75%**	**2,250 ML/d for 5 days**
		Bankfull	**40%**	**8,500 ML/d for 5 days**
		Overbank	**30%**	**10,600 ML/d for 10 days**
		Overbank	25%	20,000 ML/d for 2 days
Macquarie	Macquarie at Warren Weir	Very Low Flow	100%	1 ML/d for 365 days
		Baseflow	100%	200 ML/d for 271 days
		Small Fresh	100%	450 ML/d for 10 days
		Large Fresh	**75%**	**4,000 ML/d for 14 days**
		Overbank	50%	12,000 ML/d for 3 days
		Overbank	**50%**	**16,000 ML/d for 3 days**
		Overbank	25%	18,000 ML/d for 3 days
	Lower Macquarie at Bells Bridge	Very Low Flow	96%	10 ML/d for 267 days
		Baseflow	96%	100 ML/d for 208 days
		Small Fresh	100%	140 ML/d for 10 days
		Large Fresh	**75%**	**700 ML/d for 14 days**
		Overbank	75%	1,900 ML/d for 10 days