



Australian Government

Commonwealth Environmental Water Holder



Water Management Plan 2023-24

Chapter 5 – Namoi Valley Water Plan



© Commonwealth of Australia 2023

Ownership of intellectual property rights

Unless otherwise noted, copyright (and any other intellectual property rights) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

Creative Commons licence

All material in this publication is licensed under a [Creative Commons Attribution 4.0 International Licence](#) except content supplied by third parties, logos and the Commonwealth Coat of Arms.

Inquiries about the licence and any use of this document should be emailed to copyright@dcceew.gov.au.



Cataloguing data

This publication (and any material sourced from it) should be attributed as: Commonwealth of Australia 2023, *Commonwealth Environmental Water Holder Water Management Plan 2023–24: Namoi Valley Water Plan*, Canberra. CC BY 4.0.

ISBN 978-1-76003-434-4

This publication is available at dcceew.gov.au/water/cewo/publications/water-management-plan-2023-24.

For more information about Commonwealth environmental water, contact us at:

Commonwealth Environmental Water Holder

Department of Climate Change, Energy, the Environment and Water

GPO Box 3090 Canberra ACT 2601

Telephone 1800 218 478

Email ewater@environment.gov.au

Web dcceew.gov.au/water/cewo

Cover photo credit: juvenile Murray cod, Brendan Ebner, NSW DPI – Fisheries.

Disclaimer

The Australian Government acting through the Department of Climate Change, Energy, the Environment and Water has exercised due care and skill in preparing and compiling the information and data in this publication.

Notwithstanding, the Department of Climate Change, Energy, the Environment and Water, its employees and advisers disclaim all liability, including liability for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying on any of the information or data in this publication to the maximum extent permitted by law.

Acknowledgement of Country

Our department recognises the First Peoples of this nation and their ongoing connection to culture and country. We acknowledge Aboriginal and Torres Strait Islander People as the Traditional Owners, Custodians and Lore Keepers of the world's oldest living culture and pay respects to their Elders past, and present.

Acknowledgement of First Nations people

The Commonwealth Environmental Water Holder (CEWH) and their staff acknowledge the First Nations communities of the Murray–Darling Basin and pay respect to their Elders past and present.

We acknowledge First Nations people as the Traditional Owners and custodians of the land, water and sky country across the Basin. We recognise the intrinsic connection of First Nations people to Country, and we value their enduring cultural, social, environmental, spiritual, and economic connection to the rivers, wetlands, and floodplains of the Basin.

Over millennia, First Nations people have shaped, managed, and cared for the land and waterways that sustain them. The CEWH values the relationships we currently have with First Nations people and is continuously building relationships to understand how we can empower and support First Nations people to care for Country. The CEWH will continue to work with First Nations people to identify ways to support cultural values alongside environmental outcomes with Commonwealth environmental water.

We value the ongoing contribution that First Nations people make to the planning and delivery of environmental water. We acknowledge this contribution is made largely through frameworks and processes that have not been determined, or endorsed, by First Nations people. More can be done to increase First Nations people’s involvement and enable progress towards self-determination within and beyond the environmental watering program. We will continue to support and enable this where we can.

There are more than 40 First Nations in the Basin with many distinct cultures and practices.

The rivers of the Namoi Valley hold significant spiritual and cultural importance for First Nations people. The Namoi and Peel rivers are within the traditional lands of the Gomeri/Kamilaroi people (MDBA 2022). The CEWH respectfully acknowledges these Nations, their Elders past and present, as the Traditional Custodians of the lands on which this chapter is focused.

We embrace the spirit of reconciliation, working towards equity and equality for First Nations people.

Contents

Acknowledgement of Traditional Owners	iii
1 Namoi Valley Water Plan	5
1.1 Recent conditions and seasonal outlook.....	5
1.2 Water delivery in 2023–24	11
1.3 Monitoring and lessons learned	12
References	14

Tables

Table NV1 Environmental demands, watering priorities and outlook for coming year, Namoi Valley, 2023–24	7
Table NV2 Key lessons learned in the Namoi Valley.....	12

1 Namoi Valley Water Plan

An overview of the Namoi Valley including the Traditional Owners, key environmental values and sites, environmental objectives and environmental water delivery partners is provided on the [CEWH website](#).

1.1 Recent conditions and seasonal outlook

1.1.1 Recent conditions and environmental water use

The Namoi Valley experienced extreme drought conditions between 2017 and 2020, with lowest on record rainfall and highest on record temperatures. Conditions began to improve in early 2020, with rainfall and tributary flows providing much needed water to parts of the lower Namoi and Peel rivers. However, storages were slow to recover.

A small volume (395 ML) of Commonwealth environmental water was delivered in the Peel River in autumn 2021, in combination with 1,170 ML of the NSW Environmental Contingency Allowance. This water contributed to a small baseflow downstream of Chaffey Dam to improve water quality, food and habitat availability, to support native fish and platypus.

Increased rainfall continued during 2021–2022, with Keepit and Chaffey storages remaining full, or close to, for much of the year (WaterNSW 2023b and c). With rainfall, tributary flows and dam releases providing water to the lower Namoi and Peel rivers, no Commonwealth environmental water was delivered in 2021–22.

Rainfall and flows from tributaries and storages continued for the first half of 2022–23, with conditions being particularly wet between late October and mid-November 2022. Keepit Dam ranged from 90 to 105% of capacity between July and December, after which storage levels began to decline. As at 1 July, Keepit Dam was at 95.8% of capacity (WaterNSW 2023c). Chaffey Dam remained at or just above 100% of capacity from July until mid-January, when it fell just below that. As at 1 July, Chaffey was at 100% of capacity (WaterNSW 2023b).

Allocations of General Security entitlements increased in the Lower Namoi during 2022–23, and reached 86% in January 2023 (NSW DPE – Water 2023). General Security entitlements in the Peel River received a full allocation (100%) on 1 July 2022 (NSW DPE – Water 2022).

Conditions in the Namoi Valley began to dry rapidly at the end of summer. Combined with warm weather, the receding flows resulted in poor water quality, algal blooms and fish death events in both the Namoi and Barwon–Darling (Baawan–Baaka) rivers. As a result of the forecast of drier and warmer than average conditions going into winter, environmental water was delivered in both the Namoi and Gwydir rivers as part of a '[Northern Refresh Flow](#)' between late April and mid-May. This flow was designed to improve water quality, keep streams and rivers connected, support native fish survival and to help native fish move along waterways.

Learn more about previous [Commonwealth environmental water use in the Namoi Valley](#).

1.1.2 Seasonal outlook

The La Niña climate pattern that has been bringing wet weather ended in the Pacific Ocean in mid-March 2023, with climate indicators returning to neutral levels. Climate models in June suggest that there is a 70% chance that an El Niño event will form later in 2023 (BoM 2023a).

According to the Bureau of Meteorology outlook, the forecast across the Namoi Valley is for well below average rainfall between June and September (BoM 2023b, c). Maximum temperatures across the Namoi Valley are forecast to be well above average between June and September (BoM 2023d, e). This forecast indicates that dry conditions are again returning to the Namoi Valley.

1.1.3 Water availability

Commonwealth environmental water in the Namoi Valley is managed in conjunction with other planned environmental water in the Peel managed by NSW. Other flows such as tributary flows, consumptive water, planned environmental water and other water orders may also support environmental demands in the Namoi Valley.

The Commonwealth holds 13.5 GL of general security entitlements in the Lower Namoi. With the current allocations, the volume of Commonwealth environmental water carried over into 2023–24 in the lower Namoi is approximately 27 GL.

The Commonwealth holds 1.26 GL of entitlements in the Peel River. NSW manages 5 GL of Environmental Contingency Allowance in the Peel River. However, carryover is not available in the Peel River, so the availability of water for the environment in 2023–24 will be dependent on the announcement of new allocations from 1 July 2023.

Based on the expected available volume of water held by the Commonwealth and other water holders, as well as recent and forecast catchment conditions, it is expected that the overall resource availability will be moderate to high in 2023–24. Forecast allocation of regulated (surface water) Commonwealth environmental water in 2023–24 is provided in Table 2 of chapter 1 in the [Commonwealth Environmental Water Holder Water Management Plan 2023–24](#).

1.1.4 First Nations environmental watering objectives

The CEWH is committed to learning from First Nations people to understand how First Nations people's voices, values and knowledge can be considered in environmental water planning decisions (see chapter 1 in the [Commonwealth Environmental Water Holder Water Management Plan 2023–24](#)). Over the next year the CEWH and their staff will work with First Nations people to understand what a work program could look like to ensure that First Nations people and representative groups actively participate in the planning and management of environmental flows in ways that they determine.

1.1.5 Environmental demands

The environmental water demands for assets in the Namoi Valley in 2023–24 are shown in Table NV1. The capacity to contribute to these environmental demands is contingent on water availability and weather conditions in the catchment throughout the year.

Table NV1 Environmental demands, watering priorities and outlook for coming year, Namoi Valley, 2023–24

Environmental assets	Target values	Indicative demand (for all sources of water in the system)			Watering history (from all sources of water)	2023–24		Implications for future demands
		Flow/volume	Required frequency (maximum dry interval)	Environmental demands for water (all sources)		Potential Commonwealth environmental water contribution	Likely urgency of demand in 2024–25 if watering occurred as planned in 2023–24	
<p>Lower Namoi River channel: downstream of Keepit Dam to Boggabri, Boggabri to Mollee, Mollee to Bugilbone, Bugilbone to Walgett</p> <ul style="list-style-type: none"> Native fish habitat, dispersal and spawning Instream aquatic ecosystems Riparian vegetation Threatened species, e.g. silver perch, freshwater catfish. 	<p>Drought refuge habitat.</p> <p>Water quality.</p> <p>Fish maintenance and survival (all groups).</p>	<p>Very low flows</p> <p>Downstream of Keepit Dam: 5 to 200 ML/day for minimum 365 days.</p> <p>Gunnedah: 1 to 200 ML/day for minimum 365 days.</p> <p>Boggabri: 1 to 150 ML/day for minimum 356 days.</p> <p>Mollee: 1 to 200 ML/day for minimum 343 days.</p> <p>Bugilbone: 1 to 150 ML/day for minimum 336 days.</p> <p>Goangra: 1 to 25 ML/day for minimum 323 days.</p>	<p>Ideally: Annually. Can occur at any time of year.</p>	<p>Very low flows were met in 2021–22 and 2022–23 in the lower Namoi River, except in the section downstream of Keepit Dam which was only partially met in 2021–22. Before this, very low flows were last met in 2017–18, with the river experiencing prolonged cease to flow conditions.</p> <p>Very low flows are required annually. Therefore, the demand for water in 2023–24 in the lower Namoi River has been assessed as high.</p>	High	<p>High priority for Commonwealth environmental water (CEW) under very low to low scenarios, subject to water availability. Would be met by other water in moderate to very high scenarios.</p>	High	
	<p>Water quality.</p> <p>Habitat maintenance.</p> <p>Connectivity.</p> <p>Fish maintenance and survival (all groups).</p> <p>Fish recruitment (generalists and in-channel specialists).</p>	<p>Baseflows</p> <p>Downstream of Keepit Dam: 200 to 500 ML/day for minimum 209 days for survival; 119 days for recruitment.</p> <p>Gunnedah: 200 to 600 ML/day for minimum 240 days for survival; 140 days for recruitment.</p> <p>Boggabri: 150 to 350 ML/day for minimum 274 days for survival; 154 days for recruitment.</p> <p>Mollee: 200 to 600 ML/day for minimum 267 days for survival; 154 days for recruitment.</p> <p>Bugilbone: 150 to 350 ML/day for minimum 277 days for survival; 158 days for recruitment.</p> <p>Goangra: 25 to 65 ML/day for minimum 335 days for survival; 195 days for recruitment.</p>	<p>Ideally: Once in 1 to 2 years (max. interval: 2 years for fish recruitment).</p> <p>Can occur at any time for native fish maintenance and survival, or Sept to Mar for native fish recruitment.</p>	<p>Baseflows were met in the lower Namoi River in 2022–23 at all locations except Bugilbone where these flows were partially achieved. Baseflows were met at all locations in 2021–22. However, baseflows were not fully met in the lower Namoi in at least the 6 years before 2021–22, except at Goangra in 2016–17.</p> <p>Baseflows are required 1 in 1 to 2 years and the maximum interval between these flows has been substantially exceeded. Therefore, the demand for water to achieve baseflows in 2023–24 has been assessed as high in the lower Namoi River.</p>	High	<p>High priority for CEW under very low to moderate scenarios, subject to water availability.</p> <p>May be met by other water in high to very high scenarios.</p>	High	
	<p>Longitudinal connectivity.</p> <p>Low level bank and bar wetting.</p> <p>Pool maintenance.</p> <p>Fish movement, productivity and condition.</p> <p>Fish spawning (generalists and in-channel specialists).</p>	<p>Small freshes</p> <p>Downstream of Keepit Dam: 500 to 1,400 ML/day.</p> <p>Gunnedah: 600 to 5,400 ML/day.</p> <p>Boggabri: 350 to 3,600 ML/day.</p> <p>Mollee: 500 to 6,000 ML/day.</p> <p>Bugilbone: 350 to 3,200 ML/day.</p> <p>Goangra: 65 to 1,000 ML/day.</p>	<p>Ideally: Annually for fish dispersal and productivity/condition (max. interval: 1 year).</p> <p>1 in 1 to 2 years for fish spawning (max. interval 2 years).</p> <p>Fish dispersal and condition/productivity: ideally occurs Oct to Apr (but can occur any time) for minimum of 10 days.</p> <p>Fish spawning: Sept to Apr for a minimum of 14 days.</p>	<p>Small freshes have been met each year in the lower Namoi River over the last three years, excluding downstream of Keepit Dam, which was not met in 2019–20, and at Gunnedah, which was partially met in 2019–20.</p> <p>Small freshes are ideally met each year, particularly for native fish dispersal and condition. Native fish populations are also in a state of recovery following the drought. Therefore, the demand for water in 2023–24 has been assessed as moderate to high.</p>	Moderate to High	<p>High priority for CEW under low to moderate water resource scenarios, subject to water availability and being delivered in conjunction with other water.</p> <p>May be met by other water under a high or very high scenario.</p>	Moderate	
	<p>Longitudinal connectivity.</p> <p>Increased ecosystem function.</p>	<p>Large freshes</p> <p>Downstream of Keepit Dam: 1,400 to 3,500 ML/day.</p>	<p>Ideally: Once in 1 to 2 years for fish dispersal and</p>	<p>Large freshes were met along the lower Namoi River in both 2022–23 and 2021–22. However, the</p>	Moderate to High (downstream of Keepit)	<p>Possible use of CEW only under high to very high water resource availability scenarios. Would need</p>	Moderate	

Environmental assets	Target values	Indicative demand (for all sources of water in the system)			2023–24	Implications for future demands	
		Flow/volume	Required frequency (maximum dry interval)	Watering history (from all sources of water)			Environmental demands for water (all sources)
	Bench and bank wetting. Access to habitat. Nutrient cycling. Fish dispersal and productivity/condition (all groups). Fish spawning (flow specialists).	Gunnedah: 5,400 to 32,700 ML/day. Boggabri: 3,600 to 17,750 ML/day. Mollee: 6,000 to 18,750 ML/day. Bugilbone: 3,200 to 9,900 ML/day. Goangra: 1,000 to 5,800 ML/day.	productivity/condition (max. interval 2 years). Once in 2 to 3 years for fish spawning (max. interval 4 years). Fish dispersal and condition/productivity: ideally occurs July to Sept (but can occur any time) for minimum of 5 days. Flow specialist spawning: Oct to Apr for a minimum of 5 days.	achievement of large freshes has been variable over time. Downstream of Keepit Dam, large freshes had not been achieved since 2017–18, and the maximum interval between these flows to support native fish dispersal, productivity and condition had been exceeded. Therefore, water may be required again in the next 1 or 2 years to support the recovery of native fish and the demand has been assessed as moderate to high. Between Gunnedah and Boggabri large freshes had not been met for six or more years before 2021–22. This extended period of no large freshes meant that the maximum time between these flows had been exceeded for both native fish dispersal/condition and spawning. The demand for water in 2022–23 has been assessed as moderate, needing water in the next 1 or 2 years. Large freshes had been met in the river between Mollee and Goangra in each of the last four years. Before that, large freshes had not been achieved for between 2 and 6 years. Large freshes may be required again in the next 2 or 3 years, so the demand has been assessed as low.	Moderate (Gunnedah to Boggabri) Low (Mollee to Goangra)	to be delivered in conjunction with other flows. Downstream of Keepit to Gunnedah would be a particular priority.	
	Lateral and longitudinal connectivity. Riparian vegetation in low commence to flow anabranch channels. Increased ecosystem function. Nutrient cycling. Access to habitat. Fish spawning (floodplain specialists). Fish dispersal and productivity/condition (all groups).	Bankfull and overbank flows Downstream of Keepit Dam: 3,500 to 6,150 ML/day. Gunnedah: 32,700 to 40,000+ ML/day. Boggabri: 17,750 to 22,000+ ML/day. Mollee: 18,750 to 21,750+ ML/day. Bugilbone: 9,900 to 13,400+ ML/day. Goangra: 5,800 to 8,200+ ML/day.	Ideally: Once in 2 years for fish spawning (max. interval 4 years). Once in 3 to 5 years for fish dispersal and productivity/condition (max. interval 5 years). Fish dispersal and condition/productivity: ideally Sept to Feb (but can occur at any time) for a minimum of 5 days. Floodplain specialist spawning: Oct to Apr for a minimum of 10 days.	Improved rainfall and flows in 2022–23 provided bankfull and overbank flows in the lower Namoi River between Boggabri and Goangra. Between Keepit Dam and Gunnedah these flows were only partially met, because temperatures were not suitable for spawning at the time of the flows. However, these flows have been achieved very infrequently in the lower Namoi across the last 10 years. In particular, bankfull and overbank flows have not been adequately met at Gunnedah in the 10 years assessed since 2013–14. Bankfull and overbank flows are required every 1 in 2 years for native fish spawning and every 1 in 3 to 5 years for fish dispersal and condition. Because the maximum interval for bankfull and overbank flows had been exceeded in the lower Namoi River, water is required in 2023–24 downstream of Keepit Dam and at Gunnedah to help support recovery. Therefore, the demand for water has been assessed as high and critical respectively. Further downstream, water will be required in the next 1 to 2 years between Boggabri and Goangra, so the demand there has been assessed as moderate to high.	High (downstream of Keepit) Critical (Gunnedah) Moderate to High (Boggabri to Goangra)	CEW unlikely to contribute to this demand because of insufficient water and system constraints	Moderate to Critical
Peel River channel (downstream of Chaffey Dam to Piallamore, Piallamore to Carrol Gap)	Drought refuge habitat. Water quality. Fish maintenance and survival (all groups).	Very low flows Downstream of Chaffey Dam: 1 to 100 ML/day. Piallamore: 1 to 100 ML/day. Carrol Gap: 1 to 100 ML/day.	Ideally: Annually. Very low flows may occur at any time.	Very low flows have been achieved in the Peel River in most years since 2012–13, including in 2022–23. However, these flows were only partially met at Piallamore and Carrol Gap in 2019–20, and downstream of Chaffey Dam in 2020–21, when flows were below 1 ML/day for part of the time.	High	Possible use of CEW under very low to low water resource scenarios, subject to water availability. Expected to be met by other water under moderate to very high scenarios.	High

Environmental assets	Target values	Indicative demand (for all sources of water in the system)			Environmental demands for water (all sources)	2023–24 Potential Commonwealth environmental water contribution	Implications for future demands Likely urgency of demand in 2024–25 if watering occurred as planned in 2023–24
		Flow/volume	Required frequency (maximum dry interval)	Watering history (from all sources of water)			
<ul style="list-style-type: none"> Native fish habitat and spawning Instream aquatic ecosystems Riparian vegetation 	<p>Water quality.</p> <p>Habitat maintenance.</p> <p>Connectivity.</p> <p>Fish maintenance and survival (all groups).</p> <p>Fish recruitment (generalists and in-channel specialists).</p>	<p>Baseflows</p> <p>Downstream of Chaffey Dam: 100 to 250 ML/day.</p> <p>Piallamore: 100 to 250 ML/day.</p> <p>Carrol Gap: 100 to 300 ML/day.</p>	<p>Ideally: Annually for fish recruitment (max. interval 2 years).</p> <p>Native fish maintenance and survival: anytime.</p> <p>Native fish recruitment: Sept to Mar.</p>	<p>Because very low flows are required annually, the demand for water in 2023–24 has been assessed as high.</p> <p>Baseflows were met in the Peel River in 2022–23 and in 2021–22. However, before this baseflows had not been adequately met downstream of Chaffey and at Piallamore since 2018–19, or at Carrol Gap for more than eight years.</p> <p>These flows are required once in every 1 to 2 years, with a maximum interval of 2 years for native fish recruitment. Therefore, while baseflows were met in the last two years, the maximum interval had been exceeded before this, so the demand for water in 2023–24 has been assessed as high.</p>	High	<p>High priority for CEW under very low to moderate water resource scenarios, subject to water availability.</p> <p>May be met by other water under high to very high scenarios.</p>	High
	<p>Longitudinal connectivity.</p> <p>Low level bank and bar wetting.</p> <p>Pool maintenance.</p> <p>Fish movement, productivity and condition.</p> <p>Fish spawning (generalists and in-channel specialists).</p>	<p>Small freshes</p> <p>Downstream of Chaffey Dam: 250 to 900 ML/day.</p> <p>Piallamore: 250 to 1,350 ML/day.</p> <p>Carrol Gap: 300 to 3,900 ML/day.</p>	<p>Ideally: Annually for fish dispersal and productivity/condition (max. interval 1 year)</p> <p>Once in 1 to 2 years for fish spawning (max. interval 2 years).</p> <p>Fish dispersal and condition/productivity: ideally Oct to Apr (but can occur any time) for a minimum of 10 days.</p> <p>Fish spawning: Sept to Apr for a minimum of 14 days.</p>	<p>Small freshes were met in the Peel River in 2022–23 at Piallamore and Carrol Gap and at all locations assessed in 2021–22. Small freshes were partially met downstream of Chaffey Dam in 2022–23, with water temperatures not aligning well with the required flow rates to support native fish spawning. Before 2021–22, small freshes had also not been adequately met since 2016–17. This meant the maximum interval for these flows (1 year for fish dispersal/condition and 2 years for spawning) had been greatly exceeded.</p> <p>This assessment is based on the ideal minimum duration of 10 days for fish dispersal and condition/productivity, and 14 days for fish spawning, noting there is a need to further recovery of native fish populations in the Peel River.</p> <p>Given that these flows are required annually for native fish dispersal and condition, and the maximum interval had been exceeded downstream of Chaffey, the demand for water in 2022–23 has been assessed as high. Downstream of Chaffey Dam may be a particular priority, where small freshes have been achieved less frequently.</p>	High	<p>High priority for CEW in conjunction with other water under low to high scenarios, particularly downstream of Chaffey Dam.</p> <p>Would likely be met by other water in very high scenarios.</p>	High
	<p>Longitudinal connectivity.</p> <p>Increased ecosystem function.</p> <p>Bench and bank wetting.</p> <p>Access to habitat.</p> <p>Nutrient cycling.</p> <p>Fish dispersal and productivity/condition (all groups).</p> <p>Fish spawning (flow specialists).</p>	<p>Large freshes</p> <p>Downstream of Chaffey Dam: 900 to 2,900 ML/day.</p> <p>Piallamore: 1,350 to 5,150 ML/day.</p> <p>Carrol Gap: 3,900 to 13,500 ML/day.</p>	<p>Ideally: Once in 1 to 2 years for fish dispersal and productivity/condition. (max. interval 2 years); 1 in 2 to 3 years for fish spawning (max. interval 4 years).</p> <p>Fish dispersal and condition/productivity: ideally Jul to Sept (but can occur any time) for a minimum of 5 days.</p>	<p>Large freshes were met for the first time in 2021–22 in the 10 year period assessed since 2012–13. They were also met again at Piallamore and Carrol Gap in 2022–23. However, water temperatures suitable for native fish spawning did not align well with the occurrence of the required flow rates for larges freshes downstream of Chaffey Dam in 2022–23.</p> <p>Large freshes are ideally required every 1 to 2 years for native fish dispersal and once in every 2 to 3 years for spawning. Although these flows were achieved at Piallamore and Carrol Gap in 2021–22 and 2022–23, the maximum intervals for large freshes had been significantly exceeded before this. Therefore, the demand for water in 2023–24 has been assessed as high to critical to help support connectivity and native fish recovery in the system. Downstream of Chaffey Dam may be a particular priority, where large freshes have been achieved less frequently.</p>	High to critical	<p>CEW unlikely to contribute to this demand because of insufficient water and system constraints.</p>	Critical

Environmental assets	Target values	Indicative demand (for all sources of water in the system)			Watering history (from all sources of water)	Environmental demands for water (all sources)	2023–24 Potential Commonwealth environmental water contribution	Implications for future demands Likely urgency of demand in 2024–25 if watering occurred as planned in 2023–24
		Flow/volume	Required frequency (maximum dry interval)					
	Lateral and longitudinal connectivity. Riparian vegetation in low commence to flow anabranch channels. Increased ecosystem function Nutrient cycling. Access to habitat. Fish spawning (floodplain specialists). Fish dispersal and productivity/condition (all groups).	Bankfull and overbank flows Downstream of Chaffey Dam: 2,900 to 6,400+ ML/day. Piallamore: 5,150 to 13,400+ ML/day. Carrol Gap: 13,500 to 40,000+ ML/day.	Ideally: 1 in 2 years for fish spawning (max. interval 4 years); 1 in 3 to 5 years for fish dispersal and productivity/condition (max. interval 5 years). Floodplain specialist spawning: Oct to Apr for a minimum of 10 days. Fish dispersal and condition/productivity: can occur any time for a minimum of 5 days.	Bankfull and overbank flows have not been met in the Peel River between Chaffey Dam and Carrol Gap during the period assessed since 2012–13. These flows are ideally required 1 in 2 years for native fish flow spawning, and the maximum intervals for both spawning and dispersal flows have been exceeded. Therefore, this demand has been assessed as critical, with water being required in 2023–24.	Critical	CEW unlikely to contribute to this demand because of insufficient water and system constraints.	Critical	

Note: Contributions to meet Barwon–Darling environmental requirements will be considered subject to water availability, antecedent conditions and environmental demands (see chapter 7 of the [CEWH Water Management Plan 2023–24](#)).




Flow releases in the lower Namoi and Peel rivers are constrained by the outlet capacity of Keepit Dam (4,000 ML/day) and Chaffey Dam (1,100 ML/day) respectively.

Information on environmental demands has been sourced from the Namoi Long-Term Water Plan (NSW DPIE 2020a and b), Green et al. (2011), MDBA (2012), Barma Water Resources et al. (2012), Foster (1999), in conjunction with advice from NSW DPE – EHG and NSW DPI – Fisheries.




All watering history sourced from NSW DPE – EHG and NSW DPI – Fisheries, and data from the following gauges (WaterNSW 2023a) – 419007 Namoi River d/s Keepit, 419001 Namoi River at Gunnedah, 419012 Namoi River at Boggabri, 419039 Namoi River at Mollee, 419021 Namoi River at Bugilbone, 419026 Namoi River at Goangra, 419045 Peel River d/s Chaffey Dam, 419015 Peel River at Piallamore, 419006 Peel River at Carrol Gap.

Key

Potential watering in 2023–24

-  High priority for Commonwealth environmental watering (likely to receive water even under low water availability)
-  Secondary priority for Commonwealth environmental watering (watering to occur only if natural trigger is met, or under moderate – high water resource availability); or water demand likely to be met via other means
-  Low priority for Commonwealth environmental watering (under high – very high water resource availability); or unable to provide water because of constraints or insufficient water

Environmental demands (demand is considered at a generalised scale; there may be specific requirements that are more or less urgent within the flow regime)

-  High to critical demand for water (needed in that particular year or urgent in that particular year to manage risk of irretrievable loss or damage)
-  Moderate demand for water (water needed in that particular year, the next year, or both)
-  Low demand for water (water generally not needed in that particular year)

1.2 Water delivery in 2023–24

The overall purpose for managing Commonwealth environmental water in the Namoi Valley in 2023–24 is to protect, maintain and where possible improve, the health and resilience of aquatic ecosystems in the lower Namoi, Peel and Barwon–Darling rivers, subject to water availability.

There is a high environmental demand to meet very low flows and baseflows thresholds in much of the lower Namoi River, with a critical environmental demand to meet very low flow thresholds downstream of the Keepit Dam. These flows were not met for an adequate duration for several years before 2021–22, yet are required annually. There is also a moderate to high demand for small freshes in the lower Namoi River. These flows would help provide refuge habitat, improve water quality, increase connectivity, support native fish, and help to build resilience. Subject to conditions, some demands such as very low flows may be met by other water sources. However, if conditions continue to turn dry, environmental water may be required to contribute to some of these demands.

Consistent with the demands and purpose identified and advice from the Northern Basin Environmental Watering Group, the Commonwealth Environmental Water Holder is considering supplying environmental water to the following actions in 2023–24.

The priority for the lower Namoi River in 2023–24 will be to deliver a small fresh, most likely in spring and/or autumn. Providing a small fresh will build on the benefits of rainfall and flows that occurred during 2022–23. Depending on the timing of delivery, environmental water would:

- Support river productivity to improve food availability for aquatic animals and help build native fish condition (ideally spring or autumn)
- Support breeding for in-channel specialist native fish species (e.g. Murray cod, bony bream) and flow generalists (e.g. galaxids, gudgeons) (ideally spring)
- Assist recruitment, movement and dispersal of native fish, including movement of flow specialists (golden perch, silver perch) (ideally autumn)
- Support connectivity with the Barwon River.

Should conditions become very dry, the priority would be to support habitat and water quality for the survival of native fish, by providing very low flows and baseflows. Some environmental water would also be carried over in the Namoi River, to help meet demands in future years, particularly in dry conditions.

In the Peel River there is a high demand for very low flows, baseflows and small freshes. These flows are not being met for the required duration and/or frequency at all locations along the Peel.

The priority for the Peel River in 2023–24 is to deliver a small fresh in spring and/or autumn. Like the Namoi River, delivering a small fresh would build on the benefits of rainfall and good flows in the Peel system, and help support further recovery. Depending on the timing of delivery, environmental water would:

- Support breeding, where possible, of flow generalist and in-channel specialist native fish species (e.g. Murray cod, freshwater catfish, river blackfish) (ideally in spring)

- Support river productivity to improve food availability for aquatic animals, help build native fish condition and assist recruitment (ideally in spring or autumn)
- Increase habitat, movement and dispersal opportunities for native fish, platypus and other aquatic biota.

Should conditions become very dry, the priority in the Peel River is to support native fish survival by delivering very low flows and baseflows to maintain habitat and water quality. With no carryover provisions, availability of environmental water in the Peel River will depend on new allocations being announced in 2023–24.

While there are also high to critical demands for water to achieve bankfull flows in parts of the lower Namoi River, and both large freshes and bankfull flows in the Peel River, the capacity to use Commonwealth environmental water to contribute to these demands is limited. It is unlikely that Commonwealth environmental water would be used to contribute to bankfull flows in the Namoi because of insufficient water and system constraints. Similarly, in the Peel River, environmental water is unlikely to contribute to large freshes and bankfull flows because of system constraints and the relatively small volume of water available to meet demands.

As in previous years, the use of Commonwealth environmental water in the Namoi River Valley will be adaptively managed throughout 2023–24, in response to changing water resource availability and environmental conditions and demands.

1.3 Monitoring and lessons learned

1.3.1 Monitoring

In the Namoi River Valley, monitoring is primarily undertaken by NSW agencies including:

- NSW DPE – EHG (inundation and photo point monitoring) and DPE – Water (water quality)
- NSW DPI – Fisheries (native fish)
- WaterNSW (hydrology and flow delivery data).

1.3.2 Lessons learned

Outcomes from monitoring and lessons learned in previous years are a critical component for the effective and efficient use of Commonwealth environmental water. These learnings are incorporated into the way environmental water is planned and delivered (through decision making processes including advisory groups, water use plans and water use minutes). This includes influencing the targeted areas and species for environmental water; and the timing, magnitude and duration of environmental flows.

Key findings from fish, aquatic habitat and flow monitoring in the Namoi River Valley are summarised in Table NV2.

Table NV2 Key lessons learned in the Namoi Valley

Theme	Lessons learned
Native fish and aquatic invertebrates	<ul style="list-style-type: none"> • Providing a small flow to the lower Namoi River during dry conditions can be beneficial for water quality and native fish survival, by increasing water depth and dissolved oxygen levels in refuge pools.

Theme	Lessons learned
Connectivity	<ul style="list-style-type: none"> • The number of small freshes has been substantially reduced by river regulation downstream of Chaffey Dam. Therefore, providing environmental water is important for supporting native fish that depend on these flows to maintain healthy condition, and to support dispersal and recruitment, which is needed to maintain native fish populations. • The location, persistence and number of refugia in the lower Namoi and Peel rivers were identified during the height of the 2017 to 2020 drought. This information will help target specific refugia used by native fish in the future.
Other aquatic animals a, b	<ul style="list-style-type: none"> • Persistence of healthy populations of freshwater mussels (particularly <i>Alathyria jacksoni</i>, which is endemic to the Murray–Darling Basin) is dependent on permanent river reaches and waterholes. The provision and protection of minimum baseflows is vital to their persistence, and for populations to recover from the significant losses experienced during the 2017 to 2020 drought. • Recolonisation of freshwater mussels is dependent on the recovery and movement of native fish populations through the northern basin. Therefore, the minimum flow requirements of native fish also need to be provided to support recovery of both fish and mussel populations. • Freshwater mussel are extremely vulnerable when rivers dry out during intense drought or periods of low flow. Floodplain Mussels could survive for months under drying conditions in certain circumstances when temperatures were cooler. River Mussels could only survive for weeks under the same conditions. Survival times decreased to just days for both species as temperatures increase.

a Sheldon et al. (2020). **b** Wright et al. (2022)

References

Barma Water Resources, Thurtell, L & Wettin, P 2012, [Environmental water delivery: Namoi River \(PDF 2.56 MB\)](#), prepared for Commonwealth Environmental Water, Department of Sustainability, Environment, Water, Population and Communities, Canberra.

BoM 2023a, [Climate driver update – Climate drivers in the Pacific, Indian and Southern oceans and the Tropics – Issued 6 June 2023](#), Bureau of Meteorology, Canberra, accessed 7 June 2023.

—2023b, [Rainfall – The chance of above median for June to August](#), Bureau of Meteorology, Canberra, accessed 7 June 2023.

—2023c, [Rainfall – The chance of above median for July to September](#), Bureau of Meteorology, Canberra, accessed 7 June 2023.

—2023d, [Temperature – The chance of above median maximum temperature for June to August](#), Bureau of Meteorology, Canberra, accessed 7 June 2023.

—2023e, [Temperature – The chance of above median maximum temperature for July to September](#), Bureau of Meteorology, Canberra, accessed 7 June 2023.

Foster, N 1999, *An Assessment of the Commence-to-flow levels of Wetlands of the Lower Namoi Valley*, Department of Land and Water Conservation, Barwon Region.

Green, D, Petrovic, J, Moss, P & Burrell, M 2011, *Water resources and management overview: Namoi catchment*, NSW Office of Water, Sydney.

MDBA 2023, [Namoi](#), Murray–Darling Basin Authority, Canberra, accessed 22 February 2023.

—2012, [Assessment of environmental water requirements for the proposed Basin Plan: Lower Namoi River \(in-channel flows\) \(PDF 2.45 MB\)](#), Murray–Darling Basin Authority, Canberra, accessed 19 May 2021.

NSW DPIE 2020a, [Namoi Long Term Water Plan – Part A: Namoi Catchment \(PDF 4.52 MB\)](#), NSW Department of Planning, Industry and Environment, Sydney, accessed 12 May 2023.

—2020b, [Namoi Long Term Water Plan – Part B: Namoi Catchment \(PDF 8.20 MB\)](#), NSW Department of Planning, Industry and Environment, Sydney, accessed 12 May 2023.

NSW DPE – Water 2022, [Opening Water Allocations 2022/23 – NSW Regulated River Water Sources](#) (PDF 274.0 KB), NSW Department of Planning and Environment – Water, Sydney, August, PUB22/527, accessed 22 February 2023.

—2023, [Namoi Regulated River Water Sources: Water allocation update](#) (PDF 185.8 KB), NSW Department of Planning and Environment – Water, Sydney, May, PUB23/7, accessed 22 February 2023.

Sheldon, F, McCasker, N, Hobbs, M, Humphries, P, Jones, H, Klunzinger, M & Kennard, M 2020, [Habitat and flow requirements of freshwater mussels in the northern Murray–Darling Basin](#), report to the Commonwealth Environmental Water Office, Canberra, accessed 12 May 2023.

WaterNSW 2023a, [Real-time water data: 419 – Namoi River Basin](#), Sydney, accessed 12 May 2023.

—2023b, [Real-time water data – Major Dams: Chaffey Dam](#), Sydney, accessed 19 July 2023.

—2023c, [Real-time water data – Major Dams: Keepit Dam](#), Sydney, accessed 19 July 2023.

Wright, D, Thiem, J, Blackman, E, Beatty, S, Lymbery, A & Davis, S 2022, [Desiccation tolerance of river and floodplain mussels in the Murray–Darling Basin](#). NSW DPI Technical Report to the Commonwealth Environmental Water Office, Canberra, accessed 12 May 2023.