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Commonwealth Environmental Water Office Water Management Plan 2021–22

Chapter 7 Namoi Valley Water Plan

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Acknowledgement of the Traditional Owners of the Murray–Darling Basin

The Commonwealth Environmental Water Office respectfully acknowledges the Traditional Owners, their Elders past and present, their Nations of the Murray–Darling Basin, and their cultural, social, environmental, spiritual and economic connection to their lands and waters.

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7.1 Region overview

7.1.1 River system

The Namoi River Valley is located in northern New South Wales (NSW), extending from the Great Dividing Range near Tamworth west to the low-lying alluvial floodplains that connect to the Barwon–Darling River near Walgett (**Error! Reference source not found.**). River flows are heavily influenced by rainfall in the upper catchment, which can be highly variable between years.

The Namoi River is the primary riverine asset in the Valley and a major tributary of the Barwon River. Major tributaries of the Namoi River include Cox's Creek and the Mooki, Manilla, McDonald and the Peel Rivers, which join the Namoi River upstream of Boggabri. Baradine and Bohena Creeks join downstream of Boggabri. Flows are confined in-channel until the floodplain begins to broaden at Gunnedah. Major distributary channels on the alluvial plains include Narrabri, Pian and Gunidgera Creeks. Two major storages, Keepit Dam (capacity 425 GL) on the Namoi River (WaterNSW 2021a), and Split Rock Dam (capacity 397 GL) on the Manilla River (WaterNSW 2021b), regulate streamflow in the Namoi River Valley. A number of smaller weirs downstream of Keepit Dam on the Namoi River also regulate catchment water supplies.

The Peel River is a major regulated tributary to the Namoi River, joining slightly downstream of Keepit Dam. Major tributaries of the Peel River are Goonoo Goonoo Creek, the Cockburn River and Dungowan Creek. Flows in the Peel River are regulated out of Chaffey Dam (capacity 100 GL) (WaterNSW 2021c).

7.1.2 Traditional Owners

The rivers of the Namoi River Valley hold significant spiritual and cultural importance for Aboriginal people. The Namoi and Peel rivers are within the traditional lands of the Gomeroi/Kamilaroi people (MDBA 2021). The Commonwealth Environmental Water Office (CEWO) respectfully acknowledges these Nations, their Elders past and present, as the Traditional Custodians of the lands on which this chapter is focused.

7.1.3 Important sites and values

The Peel and Namoi rivers support numerous species listed as vulnerable, endangered or critically endangered under the *Environment Protection and Biodiversity Conservation Act 1999*, including Murray cod, silver perch, freshwater catfish, purple spotted gudgeon, olive perchlet, (NSW DPI 2021). Freshwater mussels are also present in the Namoi River Valley (Murphy & Shea 2013). Riverine vegetation in the Namoi River Valley includes river red gums, coolibah black box endangered ecological community, rough-barked apple, river oaks and emergent aquatic plants (NSW DPIE 2020a).

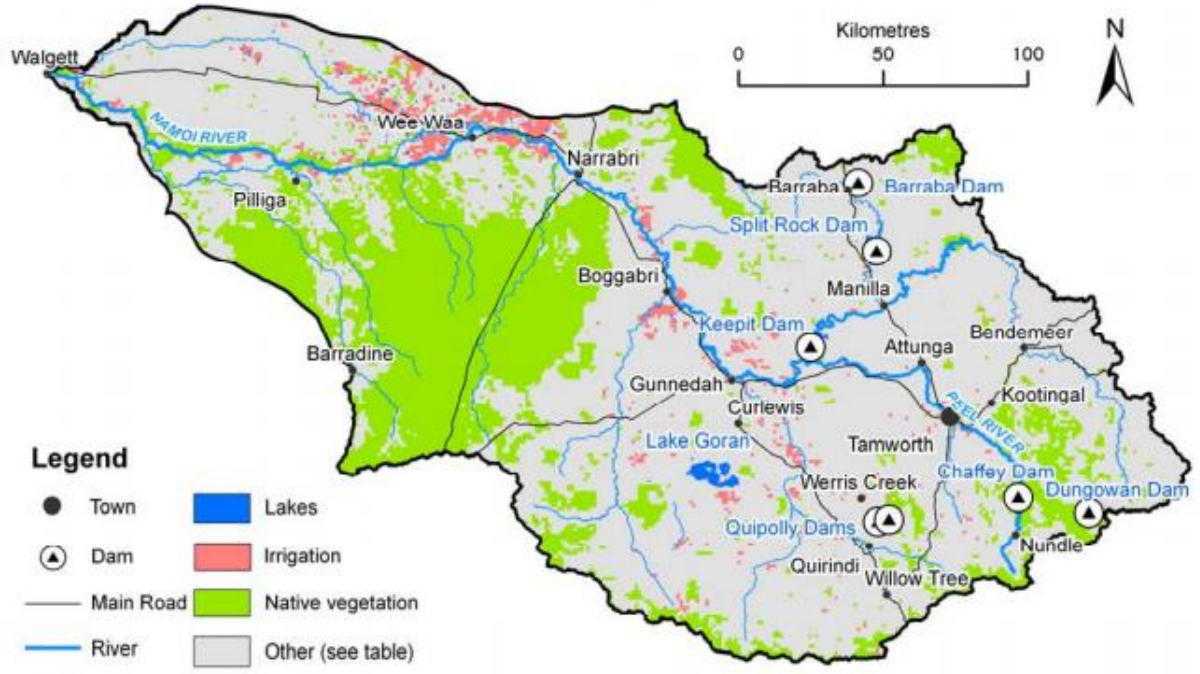
The Namoi, Peel and Manilla rivers form part of the *Lowland Darling River aquatic ecological community*, which is listed as an endangered community under the *NSW Fisheries Management Act 1994* (NSW DPI 2021). This community includes 21 native fish species and hundreds of native invertebrate species that are found within the Darling River and its associated streams, wetlands and anabranches within NSW (Green et al. 2011).

7.1.4 Stakeholder engagement

In the Namoi River Valley, the planning, management, and delivery of Commonwealth water for the environment is undertaken in conjunction with a range of partners and stakeholder groups. Key stakeholders in the Namoi River Valley include the NSW Department of Planning, Industry and Environment (DPIE), the Department of Primary Industries (DPI) – Fisheries, and WaterNSW.

Local Engagement Officers from the CEWO also work with different stakeholders as part a broader program of engagement around the management of the Commonwealth environmental water entitlements. As part of this work, Local Engagement Officers have been engaging directly with members of the local Aboriginal community.

Map NV1 Namoi Valley



Source: CSIRO (2007)

7.2 Environmental objectives

Based on long-term environmental objectives in the Basin Plan, state long-term watering plans, and best available knowledge, the following objectives are relevant for environmental watering in the Namoi Valley.

The objectives that are targeted in a particular year may vary, depending on available water, catchment conditions, operational feasibility, and demand for environmental water. These objectives will continue to be revised as part of the CEWO's commitment to adaptive management.

The objectives are:

- Vegetation – Maintain the condition, growth and survival of riparian, in channel, anabranch and wetland vegetation.
- Waterbirds – Provide drought refuge for waterbirds and support waterbird habitat.
- Native fish – Prevent loss of native fish species by supporting opportunities for movement, dispersal, reproduction, and recruitment, and providing in-channel refuge and aquatic habitat.
- Other vertebrates and invertebrates – Support opportunities for the reproduction and recruitment of other native aquatic species, including frogs and turtles.
- Connectivity – Support longitudinal connectivity, including with the Lower Namoi and the Barwon River, and lateral connectivity between the river and floodplains.
- Processes/water quality/resilience – Support key ecosystem functions and promote productivity and nutrient cycling; maintain water quality in channels and pools; and maintain drought refuge habitat.

7.3 First Nations environmental watering objectives

The CEWO is committed to working with First Nations groups to better understand their objectives. The CEWO will use environmental flows to contribute to these objectives where possible and where this is consistent with the Commonwealth Environmental Water Holder's statutory responsibility of protecting and restoring environmental assets in the Basin (see Chapter 2).

As the next steps, CEWO will develop and implement a work program to work with First Nations groups in the northern Basin. This work program will be developed in collaboration with First Nations groups and will be integral in continuing to build relationships and our capacity with First Nations groups. It will also ensure First Nations groups actively participate in the planning and management of environmental flows.

7.4 Recent conditions and seasonal outlook

7.4.1 Recent conditions and environmental water use

The Namoi Valley experienced extreme drought conditions between 2017–2020, with lowest on record rainfall and highest on record temperatures. Inflows to storage were extremely low during this time with no releases made from Keepit Dam between December 2018 and March 2020. No water for the environment was delivered in 2019–20 as drought conditions continued.

The extreme drought conditions and lack of available water for the environment affected the condition of the Namoi and Peel rivers. In the Namoi River, extended cease to flow conditions resulted in the drying of refuge pools, fish deaths (including Murray cod, golden perch, silver perch, and eel tailed catfish) and stressed vegetation. Very little flow occurred in the Peel River, with flows being restricted downstream of Dungowan to help secure town water supply.

Conditions began to improve later in 2019–20 with late summer and autumn rainfall providing much needed water to parts of the Lower Namoi and Peel rivers. However, the recovery of water storages was slow, with low run off from the dry catchment. Allocations against General Security entitlements were not received until September 2020 in the Namoi and January 2021 in the Peel.

Autumn rainfall also provided good inflows from tributaries to parts of both the lower Namoi and Peel rivers. However, flows remained low directly downstream of Keepit and Chaffey dams, with inflows being captured by the storages.

The summer and autumn rainfall and inflows increased storage levels and water availability. As of 8 June 2021, Keepit Dam was at 67.9% (WaterNSW 2021d) and Chaffey Dam was at 58.1% (WaterNSW 2021e). Allocations of General Security entitlements were increased to 90.5% in the Lower Namoi, and to 84% in the Peel River on 7 June and 9 June 2021, respectively (NSW DPIE – Water 2021a and 2021b).

While no Commonwealth water for the environment was delivered in the Namoi River in 2020– 21, a small volume (395 ML) was delivered in the Peel River in autumn, 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.

Learn more about previous Commonwealth environmental water use in the Namoi Valley.

7.4.2 Seasonal outlook

The La Niña climate pattern that was bringing more rainfall has now ended. However, other climate drivers may provide conditions over coming months that are conducive to above average rainfall. According to the Bureau of Meteorology outlook, the forecast is for above average rainfall between June and August, and between July and September across the Namoi Valley (BoM 2021a). While this forecast indicates that the recent increase in rainfall may continue over winter, conditions can change quickly in the northern Basin.

Maximum temperatures are forecast to be average between June and August, and between July and September (BoM 2021b).

7.4.3 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 gigalitres of general security entitlements in the Lower Namoi. With the current allocations, the volume of Commonwealth water for the environment carried over into 2021–22 in the Lower Namoi is approximately 12.9 gigalitres.

The Commonwealth holds 1.26 gigalitres of entitlements in the Peel River. NSW manages 5 gigalitres 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 2021–22 will be dependent on the announcement of new allocations from 1 July 2021.

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 2021–22. Forecast allocation of regulated (surface water) Commonwealth environmental water in 2021–22 under different water availability scenarios is provided in table 4 of Chapter 2.

7.4.4 Environmental demands

The environmental water demands for assets in the Namoi Valley Catchment in 2021–22 are shown in Table NV1. The capacity to contribute to these environmental demands is contingent on water availability and conditions in the catchment throughout the year.

Table NV1 Environmental demands and watering priorities, 2021–22, and outlook for coming year, Namoi Valley

Environmental assets	Target values	Indicative demand (for all sources of water in the system)		Watering history (from all sources of water)	2021–22		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 2022–23 if watering occurred as planned in 2021–22
Lower Namoi River channel: d/s Keepit Dam to Boggabri, Boggabri to Mollee, Mollee to Bugilbone, Bugilbone to Walgett Native fish habitat, dispersal and spawning Instream aquatic ecosystems Riparian vegetation Threatened species, e.g. silver perch, eel tailed catfish.	Drought refuge habitat Water quality Fish maintenance and survival (all groups)	**Very low flows** **d/s Keepit Dam:** 5 to 200 ML/day for minimum 365 days **Gunnedah:** 1 to 200 ML/day for minimum 365 days **Boggabri:** 1 to 150 ML/day for minimum 356 days **Mollee:** 1 to 200 ML/day for minimum 343 days **Bugilbone:** 1 to 150 ML/day for minimum 336 days **Goangra:** 1 to 25 ML/day for minimum 323 days	Ideally: Annually Can occur at any time of year	Very low flows were last met in 2017–18 in the Namoi River between Keepit Dam and Mollee, and in 2016– 17 between Mollee and Walgett. With extended periods of cease to flow conditions, very low flows were not achieved downstream of Keepit Dam to Gunnedah, or between Bugilbone and Walgett, and only partially met between Gunnedah and Mollee in 2020–21. Very low flows are required annually and for most of the year. Therefore, the demand for water in 2021–22 in the lower Namoi River between Keepit and Walgett has been assessed as critical.	**Critical**	High priority for CEW under very low to low scenarios, subject to water availability. Would be met by other water in moderate to very high scenarios. The reaches downstream of Keepit Dam to Gunnedah, and downstream Bugilbone to the Barwon River may be a particularly important target for CEW.	High
	Water quality Habitat maintenance Connectivity Fish maintenance and survival (all groups) Fish recruitment (generalists + in-channel specialists)	**Baseflows** **d/s Keepit Dam:** 200 to 500 ML/day for minimum 209 days for survival; 119 days for recruitment **Gunnedah:** 200 to 600 ML/day for minimum 240 days for survival; 140 days for recruitment **Boggabri:** 150 to 350 ML/day for minimum 274 days for survival; 154 days for recruitment **Mollee:** 200 to 600 ML/day for minimum 267 days for survival; 154 days for recruitment **Bugilbone:** 150 to 350 ML/day for minimum 277 days for survival; 158 days for recruitment **Goangra** 25 to 65 ML/day for minimum 335 days for survival; 195 days for recruitment	Ideally: 1 in 1 to 2 years (Max interval: 2 years for fish recruitment) Can occur at any time for native fish maintenance and survival, or Sept to Mar for native fish recruitment.	Baseflows have generally only been partially or not met in the Lower Namoi River over at least the past six years, except at Goangra, which was met in 2016–17. In 2020–21, intermittent periods of cease to flow conditions meant that baseflows were not achieved for the required duration in the lower Namoi River. The maximum time between baseflow events has been exceeded, and the required frequency to support native fish has not been achieved. Considering baseflows are required once every one to two years, and they have not been adequately met for a number of years, the demand for these flows in 2021–22 has been assessed as critical.	**Critical**	High priority for CEW under very low to moderate scenarios, subject to water availability. May be met by other water in high to very high scenarios.	High
	Longitudinal connectivity Low level bank and bar wetting Pool maintenance Fish movement, productivity and condition Fish spawning (generalists + in-channel specialists)	**Small freshes** **d/s Keepit Dam:** 500 to 1,400 ML/day **Gunnedah:** 600 to 5,400 ML/day **Boggabri:** 350 to 3,600 ML/day **Mollee:** 500 to 6,000 ML/day **Bugilbone:** 350 to 3,200 ML/day **Goangra:** 65 to 1,000 ML/day	Ideally: Annually for fish dispersal and productivity/condition (Max interval: 1 year) 1 in 1 to 2 years for fish spawning (Max interval 2 years) Fish dispersal and condition/ productivity: ideally occurs Oct to Apr (but can occur any time) for minimum of 10 days Fish spawning: Sept to Apr for a minimum of 14 days.	Small freshes have been met each year in the Namoi River between Keepit Dam and Mollee between 2015–16 and 2020–21, except in 2019–20, when they were not met below Keepit Dam and only partially met at Gunnedah. Small freshes are ideally met each year, particularly for native fish dispersal and condition. The maximum interval for these flows will be exceeded if small freshes are not consistently provided across years. Therefore the demand for small freshes has been assessed as high for 2021–22.	High	High priority for CEW under low to moderate water resource scenarios, subject to water availability and being delivered in conjunction with other water. May be met by other water under a high or very high scenario.	High
	Longitudinal connectivity Increase ecosystem function Bench and bank wetting Access to habitat Nutrient cycling	**Large freshes** **d/s Keepit Dam:** 1,400 to 3,500 ML/day **Gunnedah:** 5,400 to 32,700 ML/day **Boggabri:** 3,600 to 17,750 ML/day **Mollee:** 6,000 to 18,750 ML/day	Ideally: 1 in 1 to 2 years for fish dispersal and productivity/condition (Max interval 2 years);	Large freshes were achieved in the lower Namoi River between Gunnedah and Walgett in 2020–21, following rainfall and tributary inflows. These flows were previously met between Mollee and Walgett in 2019– 20, but large freshes between Gunnedah and Boggabri had not been adequately met since 2013–14	**Critical** (d/s Keepit)	Possible use of CEW only if there is an increase in available water under high to very high water resource availability scenarios. Would need to be delivered in conjunction with other flows.	High to Critical

Environmental assets	Target values	Indicative demand (for all sources of water in the system)		Watering history (from all sources of water)	2021–22		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 2022–23 if watering occurred as planned in 2021–22**
	Fish dispersal and productivity/condition (all groups) Fish spawning (flow specialists)	**Bugilbone:** 3,200 to 9,900 ML/day **Goangra:** 1,000 to 5,800 ML/day	1 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.	or longer. Downstream of Keepit Dam large freshes have not been achieved since 2017–18. Large freshes are required in 2021–22 downstream of Keepit Dam, particularly for native fish dispersal and condition, which is required once every one to two years. The demand at this location has been assessed as critical. From Gunnedah to Boggabri large freshes were met in 2020–21, however, had not been met for multiple years before that, so require water again in 2021–22. Therefore the demand at these locations has been assessed as high to critical. From Mollee to Goangra, large freshes were met in both of the last two years. Therefore the demand at these locations has been assessed as moderate to high for 2021–22.	High to Critical (Gunnedah to Boggabri) Moderate to High (Mollee to Goangra)	Downstream of Keepit to Boggabri would be a particular priority.	
	Lateral and longitudinal connectivity Riparian vegetation in low commence to flow anabranch channels Increase ecosystem function Nutrient cycling Access to habitat Fish spawning (floodplain specialists) Fish dispersal and productivity/condition (all groups)	**Bankfull and overbank flows** **d/s 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:** 18,7500 to 21,750+ ML/day **Bugilbone:** 9,900 to 13,400+ ML/day **Goangra:** 5,800 to 8,200+ 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). 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.	Bankfull and overbank flows have not been met in the Lower Namoi River between Keepit Dam and Walgett in the last three years, and during the past seven years, these flows have only been met at Goangra and Walgett in 2016–17. The maximum interval for these flows has been exceeded between Keepit Dam and Bugilbone for both spawning and dispersal/conditioning flows for native fish, and for fish spawning between Goangra and Walgett. Therefore, the demand for 2021–22 has been assessed as critical overall, particularly between Keepit and Bugilbone.	**Critical**	Commonwealth environmental water unlikely to contribute to this demand because of insufficient water and system constraints.	**Critical**
Peel River channel (d/s Chaffey Dam to Piallamore, Piallamore to Carrol Gap) Native fish habitat and spawning Instream aquatic ecosystems Riparian vegetation	Drought refuge habitat Water quality Fish maintenance and survival (all groups)	**Very low flows** **d/s Chaffey Dam:** 1 to 100 ML/day **Piallamore:** 1 to 100 ML/day **Carrol Gap:** 1to 100 ML/day	Ideally: Annually Very low flows may occur at any time.	Very low flows were met in the Peel River downstream of Chaffey Dam to Carrol Gap in every year between 2012–13 and 2018–19. However, these flows were only partially met at Piallamore and Carrol Gap in 2019–20, with flows being <1 ML/day for part of the year. In 2020–21, very low flows were met at Piallamore and Carrol Gap, following rainfall and tributary inflows, but only partially met downstream of Chaffey Dam. Very low flows are required annually, so the demand for water in 2021–22 has been assessed as high between Piallamore and Carrol Gap. However, the demand has been assessed as high to critical downstream of Chaffey Dam, where these flows were not sufficiently achieved in 2020–21.	High to Critical (d/s Chaffey) High (Piallamore to Carrol Gap)	High priority for 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
	Water quality Habitat maintenance Connectivity Fish maintenance and survival (all groups) Fish recruitment (generalists + in-channel specialists)	**Baseflows** **d/s Chaffey Dam:** 100 to 250 ML/day **Piallamore:** 100 to 250 ML/day **Carrol Gap:** 100 to 300 ML/day	Ideally: 1 in 1 to years for fish recruitment (Max interval 2 years) Native fish maintenance and survival: anytime Native fish recruitment: Sept to Mar.	Baseflows were last met downstream of Chaffey and at Piallamore in 2018–19, but have not been sufficiently met for at least the past eight years at Carrol Gap (partially met in 2012–13 and 2016–17). In 2020–21, baseflows were not met in the Peel River downstream of Chaffey Dam, and were only partially met at Piallamore and Carrol Gap. These flows are required once in every 1–2 years, with a maximum interval of 2 years for native fish recruitment. Therefore, the demand for water in 2021–22 has been assessed as critical.	**Critical**	High priority for CEW under very low to moderate water resource scenarios, subject to water availability. May be met by other water under high to very high scenarios.	High

Environmental assets	Target values	Indicative demand (for all sources of water in the system)		Watering history (from all sources of water)	2021–22		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 2022–23 if watering occurred as planned in 2021–22
	Longitudinal connectivity Low level bank and bar wetting Pool maintenance Fish movement, productivity and condition Fish spawning (generalists + in-channel specialists)	**Small freshes** **d/s Chaffey Dam:** 250 to 900 ML/day **Piallamore:** 250 to 1,350 ML/day **Carrol Gap:** 300 to 3,900 ML/day	Ideally: Annually for fish dispersal and productivity/ condition (Max interval 1 year); 1 in 1 to 2 years for fish spawning (Max interval 2 years). Fish dispersal and condition/ productivity: ideally Oct to Apr (but can occur any time) for a minimum of 10 days Fish spawning: Sept to Apr for a minimum of 14 days.	Small freshes were not met downstream of Chaffey Dam in 2020–21. However, these flows were achieved at Piallamore and Carrol Gap following rainfall and tributary inflows. Before this, small freshes were last met downstream of Chaffey and at Piallamore in 2016–17 and at Carrol Gap in 2019–20. These flows are required annually for native fish dispersal and condition, and the maximum interval has been exceeded downstream of Chaffey Dam. Therefore, this demand for water in 2020–21 has been assessed as critical downstream of Chaffey Dam and high at Piallamore and Carrol Gap.	Critical (d/s Chaffey) High (Piallamore to Carrol Gap)	High priority for CEW in conjunction with other water under low to high scenarios, particularly downstream of Chaffey Dam. Would likely be met by other water in very high scenarios.	High
	Longitudinal connectivity Increase ecosystem function Bench and bank wetting Access to habitat Nutrient cycling Fish dispersal and productivity/condition (all groups) Fish spawning (flow specialists)	**Large freshes** **d/s Chaffey Dam:** 900 to 2,900 ML/day **Piallamore:** 1,350 to 5,150 ML/day **Carrol Gap:** 3,900 to 13,500 ML/day	Ideally: 1 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). Fish dispersal and condition/ productivity: ideally Jul to Sept (but can occur any time) for a minimum of 5 days.	Large freshes have not been achieved in the Peel River between Chaffey Dam and Carrol Gap in the period assessed since 2012–13. During that time, large freshes have only been partially met (for a dispersal flow) in 2016–17 at Piallamore and Carrol Gap, and have otherwise not been met. Large freshes are ideally required every 1–2 years for native fish dispersal and once in every 2–3 years for spawning. The maximum intervals for both flows have been exceeded in this reach. Therefore, the demand for water in 2021–22 has been assessed as critical.	**Critical**	Commonwealth environmental water unlikely to contribute to this demand because of insufficient water and system constraints.	**Critical**
	Lateral and longitudinal connectivity Riparian vegetation in low commence to flow anabranch channels Increase ecosystem function Nutrient cycling Access to habitat Fish spawning (floodplain specialists) Fish dispersal and productivity/condition (all groups)	**Bankfull and overbank flows** **d/s 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 2021–22.	**Critical**	Commonwealth environmental water unlikely to contribute to this demand because of insufficient water and system constraints.	**Critical**

Note: Contributions to meet Barwon–Darling environmental requirements may be considered subject to water availability, antecedent conditions and environmental demands (see chapter 9 of the CEWO Water Management Plan 2021–22).
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 DPIE – EES and NSW DPI – Fisheries.
All watering history sourced from NSW DPIE – EES and NSW DPI – Fisheries, and data from the following gauges (WaterNSW 2021f) – 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 2021–22

- 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)

7.5 Water delivery in 2021–22

Based on the demand for water for the environment, water availability (supply), and catchment conditions, the overall purpose for managing Commonwealth water for the environment in the Namoi River Valley in 2021–22 is to protect, maintain and where possible improve, the health and resilience of aquatic ecosystems in the Lower Namoi River and the Peel River, subject to water availability.

Consistent with the demands and purpose identified, the Commonwealth Environmental Water Office is considering supplying water for the environment to the following actions in 2021–22.

There is a critical demand to provide very low flows and baseflows in the lower Namoi River, where prolonged drought conditions have meant these flows have not been for an adequate duration for several years. Targeting these flows in reaches below Keepit Dam may be a particularly high priority, where rainfall and tributary inflows have not recently provided sufficient water. These flows would help provide refuge habitat, improve water quality, increase connectivity, support native fish, and help to build resilience.

Should conditions continue to improve, the priority would be to deliver a small fresh, or continue providing baseflows through spring in the lower Namoi River. Targeting these flows further downstream in the system (e.g. downstream of Gunidgera) would help increase connectivity and movement opportunities for native fish, and help achieve greater connectivity with the Barwon River. These flows may also help to improve productivity and support spawning of more generalist fish species.

In the Peel River, the highest priority would be to deliver a small fresh or contribute to a baseflow during spring particularly in the reach downstream of Chaffey Dam, which has a critical demand for water. Delivering a small fresh or supporting a baseflow would provide increased connectivity and maintain pools, help to build resilience, support native fish movement and condition, and possibly the spawning of some generalist and in-channel native fish species. With no carryover provisions, being able to provide water for the environment in the Peel River will be dependent on new allocations being announced in 2021–22.

While there are also critical demands for water to achieve large freshes and bankfull flows in the Namoi and Peel rivers, the capacity to use Commonwealth environmental water to contribute to these demands is limited. In the Namoi River, an increase in water availability and other water in the system would be required to deliver large freshes. It is unlikely that Commonwealth 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 water for the environment in the Namoi River Valley will be adaptively managed throughout 2021–22, in response to changing water resource availability and environmental conditions and demands.

7.6 Monitoring and lessons learned

7.6.1 Monitoring

In the Namoi River Valley, monitoring is primarily undertaken by NSW agencies including NSW DPIE (inundation and photo point monitoring), NSW DPI – Fisheries (native fish), and WaterNSW (hydrology and flow delivery data).

7.6.2 Lessons learned

Outcomes from monitoring and lessons learned in previous years are a critical component for the effective and efficient use of Commonwealth water for the environment. These learnings are incorporated into the way environmental water is managed.

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	• 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. • The number of small freshes has been substantially reduced by river regulation downstream of Chaffey Dam. Therefore, providing environmental water may be 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 2017–20 drought. This information will help to support the management of drought refugia and native fish in the future.
Connectivity	• A pulse of 750 ML/day is more effective than 500 ML/day in wetting low-level benches in the Peel River. • Flows of 750 ML/day can also result in some fine sediment movement/scouring, however, flows over 1 000 ML/day may be required to effectively mobilise sediment and algae that has accumulated downstream of Chaffey Dam.
Other aquatic animals[a]	• Persistence of health populations of freshwater mussels (particularly *Alathyria jacksoni*, 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 2017–20 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.

a Sheldon et al. (2020)

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