



Australian Government

Commonwealth Environmental Water Office

Commonwealth Environmental Water Office

Water Management Plan

Chapter 3.5 – Namoi Valley

2020–21



This document represents a sub-chapter of 'Commonwealth Environmental Water Office Water Management Plan 2020-21, Commonwealth of Australia, 2020'.

Please visit: <https://www.environment.gov.au/water/cewo/publications/water-management-plan-2020-21> for links to the main document.

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

1800 803 772

ewater@awe.gov.au

www.environment.gov.au/water/cewo

@theCEWH

GPO Box 858, Canberra ACT 2601

3.5 Namoi Valley

3.5.1 Region overview

(a) River valley

The Namoi River valley is located in north-eastern New South Wales, extending westwards of Nundle to Walgett. Rainfall in the upper catchment drives river flows and can be highly variable between years. Water for regulated delivery throughout the valley is stored in Split Rock and Keepit dams (Figure 1). There are also a number of smaller regulating weirs downstream of Keepit Dam.

The Namoi River is the primary riverine asset and is a major tributary of the Barwon River. Major tributaries of the Namoi include Cox's Creek and the Mooki, Manilla and the Peel rivers, which join the Namoi River upstream of Boggabri. Flows are confined in-channel until the floodplain begins to broaden at Gunnedah. The Pian (an anabranch of the Namoi River), Narrabri, Baradine and Bohena creeks contribute flows to the Namoi River downstream of Boggabri. The Namoi River connects with the Barwon–Darling near Walgett.

Flows in the Peel River are regulated out of Chaffey Dam and flow into the Namoi River slightly downstream of Keepit Dam. Major tributaries into the Peel River are Goonoo Goonoo Creek, the Cockburn River and Dungowan Creek.

(b) 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 Gomerioi/Kamilaroi people.

(c) Important sites and value

The Peel and Namoi rivers support a number of threatened fish species including Murray cod, silver perch, freshwater catfish, olive perchlet, purple spotted gudgeon and the river snail. Riverine vegetation in the Namoi River Valley includes emergent aquatic plants and river oaks, rough-barked apple and river red gum.

The aquatic community of the Namoi River forms part of the *Lowland Darling River aquatic ecological community*, which is listed as endangered under the *NSW Fisheries Management Act 1994*. 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.

(d) 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.

CEWO is looking to build engagement around the planning, management and delivery of Commonwealth water with the local Aboriginal community, by developing relationships with local individuals and organisations. It is important to work with those who have a direct kinship right to the Namoi system, as well as the broader Aboriginal and community groups in the Namoi-Peel.

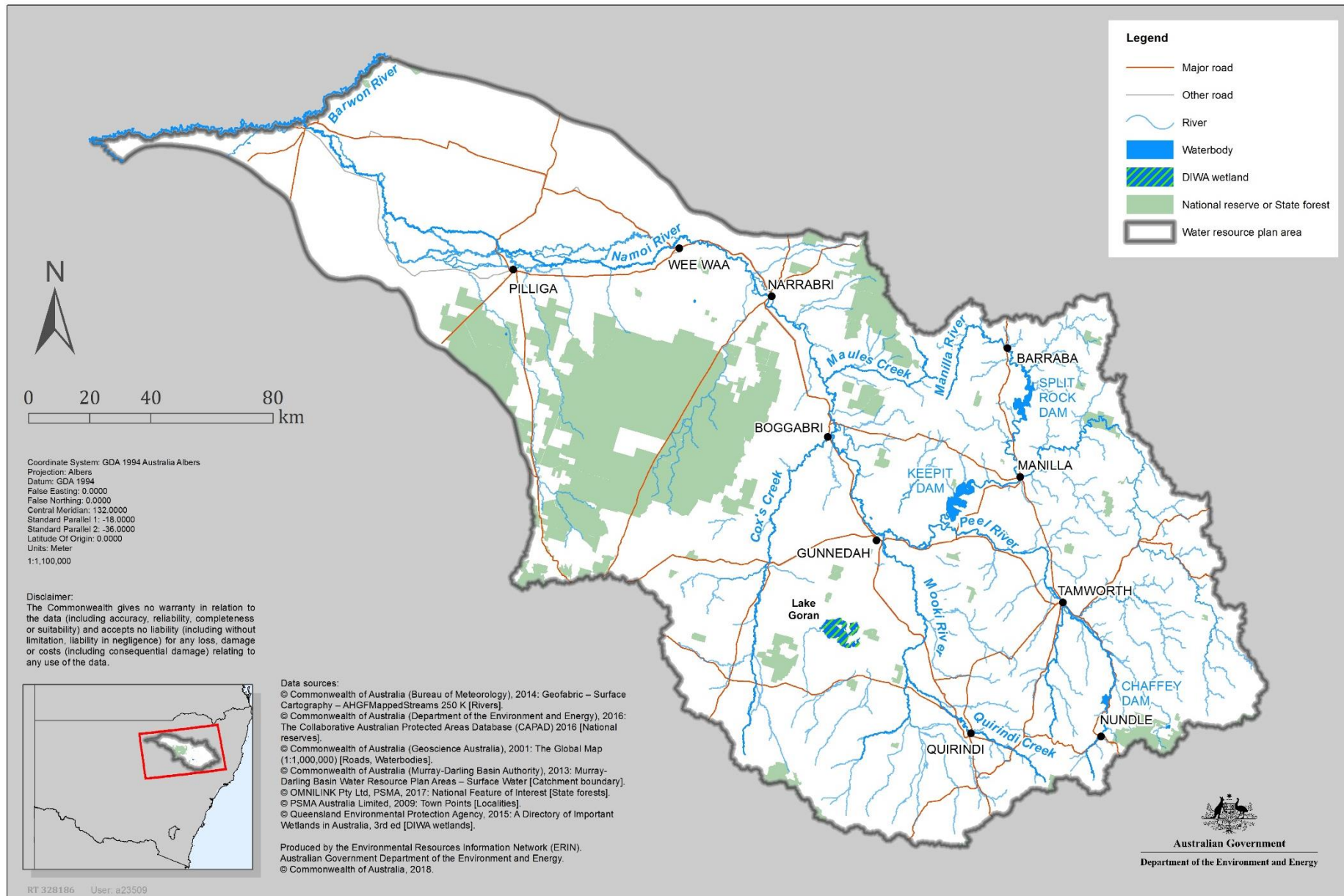


Figure 1: Map of the Namoi River Valley (produced by the Department of Environment and Energy, June 2018).

3.5.2 Environmental objectives

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

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 Commonwealth Environmental Water Office’s (CEWO) commitment to adaptive management.

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: 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 floodplain and the Barwon River, and lateral connectivity between the river and floodplain.

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.

3.5.3 First Nations environmental objectives

Representatives of the First Nations peoples of the Namoi River valley have identified environmental objectives for their country for 2020–21 (Table 1). These objectives were developed through the First Nations Environmental Guidance project undertaken by the Northern Basin Aboriginal Nations organisation. Some of these objectives sit outside the scope of water for the environment to influence, while for others, the link between water for the environment and the site or species is not well understood.

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.

Table 1: First Nations environmental objectives for the Namoi River system for 2020–21 (NBAN Ltd. 2020)

River flows and Connectivity
<i>Priority sites:</i> Narrabri is an important site for recreational activities; Namoi to flow at a certain level at all times.
Native Vegetation
<i>Indicator species:</i> Gidgee Gum ⁱ , blue gum ⁱ , bulrush, water lily, sedges, tea trees ⁱ , sandalwood ⁱ , iron bark (poplar box) ⁱ .
Native Birds
<i>Indicator species:</i> Teal, crimson wing, storks, white long-legged heron.
Native Animals
<i>Indicator species:</i> Dhufish (eel tailed catfish), yellowbelly, codfish, black bream (silver perch).
Connecting with Country
To tell and share our stories, to be able to hunt and fish along the rivers, to gather at the river as a Nation to camp.

ⁱ Water for the environment targeting other environmental outcomes may influence this species or objective

3.5.4 Recent conditions and seasonal outlook

(a) *Recent conditions and environmental water use*

The Namoi catchment has experienced very hot and dry conditions since 2017–18, with lowest on record rainfall, and highest on record temperatures. Inflows to storage have been extremely low during this time, and no releases have been made from Keepit Dam since December 2018, with the exception of a 200 megalitres stock and domestic flow in March 2020.

With extreme drought conditions in the Namoi River Valley, general security allocations were zero during 2019–20 in both the Lower Namoi and Peel. Access to general security carryover water was also restricted in the Lower Namoi until this restriction was lifted on 25 February 2020. Carryover is not available in the Peel, and environmental accounts remain unavailable for use. No Commonwealth water for the environment was delivered in 2019–20 in either the Namoi or Peel rivers.

Ongoing very hot and dry conditions have affected the condition of the Namoi and Peel rivers. Extended cease to flow conditions in the Namoi River resulted in the drying of refuge pools and stressed riparian and floodplain vegetation. Flows below Dungowan on the Peel River were restricted from 30 November 2019, to help secure town water supply, resulting in very little flow downstream. A number of fish kills occurred over the summer in the Namoi and Peel rivers, which included native fish such as Murray cod, golden and silver perch, and freshwater catfish.

Increased rainfall began in February 2020, which provided much needed flows to parts of the Lower Namoi and Peel rivers. Inflows also resulted in some increase in storage levels in Keepit Dam, which was at 14.8 per cent capacity as of 30 June 2020 (up from less than 1 per cent at the end of January). As of 30 June, Chaffey Dam was at 15.1 per cent capacity. However, in the absence of further significant rainfall, there may be insufficient water available to meet system requirements in 2020–21. Around 34 gegalitres of inflows into Keepit Dam are required before any new allocations would be available in the Lower Namoi.

Details of previous Commonwealth environmental use in the Namoi River Valley are available at: <http://www.environment.gov.au/water/cewo/catchment/namoi/history>.

(b) *Seasonal outlook*

According to the Bureau of Meteorology outlook in July, above median rainfall is forecast across the Namoi River Valley from late winter into spring. While this forecast suggests that the recent severe dry conditions may ease somewhat, several months of above average rainfall are needed to see a recovery from the current severe drought. Stream flows may be less than expected during the recovery. However, wetter conditions can return suddenly in the northern Basin. Maximum temperatures are also forecast to remain above average over the coming months.

(c) *Water availability*

The volume of Commonwealth environmental water carried over in the Namoi River Valley for use in 2020–21 is 0.6 gegalitres. Further improvements in resource availability are required before any new allocations are expected in either the Namoi or Peel rivers.

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 very low to low in 2020–21.

(d) *Environmental demands*

Considering the prolonged drought and need to support recovery and avoid further damage to key assets, there are a number of environmental demands that require water urgently in 2020–21.

The environmental water demands for assets in the Namoi River Valley in 2020–21 are represented in **Error! Reference source not found.** Note that the capacity to contribute to these environmental demands is contingent on a substantial improvement in water availability in the catchment.

Table 2: Environmental demands, priority for watering in 2020–21 and outlook for coming year in the Namoi River Valley

Environmental asset	Target values	Indicative demand (for all sources of water in the system)		Watering history (from all sources of water)	2020–21		Implications for future demands Likely environmental demand in 2021–22 if watering occurred as planned in 2020–21
		Flow/Volume	Required frequency (maximum dry interval)		Environmental demands for water	Potential Commonwealth environmental water contribution?	
<p>Lower Namoi River channel:</p> <ul style="list-style-type: none"> • D/s Keepit Dam to Boggabri • Boggabri to Mollee • Mollee to Bugilbone • Bugilbone to Walgett <p>Native fish habitat, dispersal and spawning</p> <p>Instream aquatic ecosystems</p> <p>Riparian vegetation</p> <p>Threatened species e.g. silver perch, eel tailed catfish</p>	<p>Drought refuge habitat</p> <p>Water quality</p> <p>Fish maintenance and survival (all groups)</p>	<p><u>Very low flows:</u></p> <ul style="list-style-type: none"> • 5–200 ML/day d/s Keepit Dam (min. 365 days) • 1–200 ML/day at Gunnedah (min. 365 days) • 1–150 ML/day at Boggabri (min. 356 days) • 1–200 ML/day at Mollee (min. 343 days) • 1–150 ML/day at Bugilbone (min. 336 days) • 1–25 ML/day at Goangra (min. 323 days) 	<p>Annually</p> <p>(can occur at any time of year)</p>	<p>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 prolonged periods of cease to flow conditions, very low flows were not achieved in the Lower Namoi River in any reach in 2019–20.</p> <p>Very low flows are required annually. Therefore, the demand for water in 2020–21 in the Lower Namoi River between Keepit and Walgett has been assessed as critical.</p>	Critical	<p>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.</p> <p>The reaches between Mollee and Walgett may be a particularly important target for CEW.</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 + in-channel specialists)</p>	<p><u>Baseflows:</u></p> <ul style="list-style-type: none"> • 200–500 ML/day d/s Keepit (min. 209 days for survival; 119 days for recruitment) • 200–600 ML/day at Gunnedah (min. 240 days for survival; 140 days for recruitment) • 150–300 ML/day at Boggabri (for a min. 274 days for survival; 154 days for recruitment) • 200–500 ML/day at Mollee (min. 267 days survival; 154 days recruitment) • 150–300 ML/day at Bugilbone (min. 277 days for survival; 158 days for recruitment) • 25–65 ML/day at Goangra (min. 335 days for survival; 195 days for recruitment) • 30–200 ML/day u/s of Walgett 	<p>1 in 1–2 years</p> <p>(Max interval 2 years for fish recruitment)</p> <p>(can occur at any time for native fish maintenance and survival, or Sept-Mar for native fish recruitment)</p>	<p>Baseflows have generally only been partially or not met in the Lower Namoi River over at least the past five years, except at Goangra, which was met in 2016–17.</p> <p>In 2019–20, prolonged periods of cease to flow conditions meant that baseflows were not achieved in the Lower Namoi River. River flows commencing in February were substantially shorter in duration than the minimum required, even in very dry years. Also, the maximum time between baseflow events and required frequency to support native fish have been exceeded.</p> <p>Considering baseflows are required once every 1–2 years, and they have not been adequately met for a number of years, the demand for these flows in 2020–21 has been assessed as critical.</p>	Critical	<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/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 + in-channel specialists)</p>	<p><u>Small freshes:</u></p> <ul style="list-style-type: none"> • 500–1 400 ML/day d/s Keepit • 600–5 400 ML/day at Gunnedah • 350–3 600 ML/day at Boggabri • 500–6 000 ML/day at Mollee • 350–3 200 ML/day at Bugilbone • 65–1 000 ML/day at Goangra • 200–2 250 ML/day u/s of Walgett 	<p>Annually for fish dispersal and productivity/ condition (max interval 1 year);</p> <p>1 in 1–2 years for fish spawning (max interval 2 years)</p> <p>(Ideally Oct–Apr for fish dispersal and condition/ productivity (but can occur any time) for a minimum of 10 days.</p> <p>Sept–Apr for fish spawning for a minimum of 14 days)</p>	<p>Small freshes have been met each year in the Namoi River between Keepit Dam and Mollee since at least 2015–16, except in 2019–20, when they were not met below Keepit Dam and only partially met at Gunnedah. Downstream of Mollee, small freshes have been less frequent, particularly at Bugilbone and upstream of Walgett.</p> <p>However, rainfall between February and April provided sufficient flows to achieve this demand from Boggabri down to Walgett.</p> <p>Small freshes are ideally met each year, particularly for native fish dispersal and condition. The maximum interval for these flows will be exceeded if water is not provided in 2020–21 downstream of Keepit Dam and at Gunnedah, and small freshes have not been consistently provided across years further downstream. Therefore, the demand for small freshes has been assessed as high (Boggabri to Walgett) to critical (downstream Keepit to Gunnedah).</p>	High to Critical	<p>High priority for CEW, particularly between Mollee and Walgett under low to high 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 very high scenario.</p>	High

Environmental asset	Target values	Indicative demand (for all sources of water in the system)		Watering history (from all sources of water)	2020–21		Implications for future demands Likely environmental demand in 2021–22 if watering occurred as planned in 2020–21
		Flow/Volume	Required frequency (maximum dry interval)		Environmental demands for water	Potential Commonwealth environmental water contribution?	
Lower Namoi River channel (ctd)	<p>Longitudinal connectivity</p> <p>Increase 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><u>Large freshes:</u></p> <ul style="list-style-type: none"> 1 400–3 500 ML/day d/s Keepit 5 400–32 700 ML/day at Gunnedah 3 600–17 750 ML/day at Boggabri 6 000–18 750 ML/day at Mollee 3 200–9 900 ML/day at Bugilbone 1 000–5 800 ML/day at Goangra 2 250–8 500 ML/day u/s Walgett 	<p>1 in 1–2 years for fish dispersal and productivity/condition (max interval 2 years);</p> <p>1 in 2–3 years for fish spawning (max interval 4 years)</p> <p>(Ideally July–Sept for fish dispersal and productivity/condition (but can occur any time) for a minimum of 5 days.</p> <p>Oct–Apr for flow specialists spawning for a minimum of 5 days.)</p>	<p>The achievement of large freshes in the Lower Namoi River has been variable. Downstream of Keepit Dam, large freshes were last achieved in 2017–18. Between Gunnedah and Boggabri, large freshes have not been adequately met since 2013–14, or longer.</p> <p>However, rainfall resulted in sufficient river flows to achieve large freshes in February 2020 at Mollee, Bugilbone, Goangra and Walgett. Before that, large freshes had not been met since 2012–13 (Mollee and Bugilbone) and 2016–17 (Goangra and Walgett).</p> <p>Large freshes are required in 2020–21 downstream of Keepit Dam to Boggabri, particularly for native fish dispersal and condition, which is required once every 1–2 years. The demand at these locations has been assessed as critical.</p> <p>From Mollee to Walgett small freshes were met in 2019–20, however, had not been met for multiple years before that, so may require water again in 2020–21. Therefore, the demand at these locations has been assessed as moderate to high.</p>	<p>Critical (d/s Keepit to Boggabri)</p>	<p>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.</p>	<p>High to Critical</p>
	<p>Lateral and longitudinal connectivity</p> <p>Riparian vegetation in low commence to flow anabranch channels</p> <p>Increase ecosystem function</p> <p>Nutrient cycling</p> <p>Access to habitat</p> <p>Fish spawning (floodplain specialists)</p> <p>Fish dispersal and productivity/condition (all groups)</p>	<p><u>Bankfull and overbank flows:</u></p> <ul style="list-style-type: none"> 3 500–6 150+ ML/day d/s Keepit 32 700–40 000+ ML/day at Gunnedah 17 750–22 000+ ML/day at Boggabri 18 750–21 750+ ML/day at Mollee 9 900–13 400+ ML/day at Bugilbone 5 800–8 200+ ML/day at Goangra 8 500–10 600+ ML/day u/s Walgett 	<p>1 in 2 years for fish spawning (max interval 4 years);</p> <p>1 in 3–5 years for fish dispersal and productivity/condition (max interval 5 years)</p> <p>(Oct–Apr for fish spawning (floodplain specialists) for a minimum of 10 days.</p> <p>Ideally Sept–Feb for fish dispersal and productivity/ condition (but can occur any time) for a minimum of 5 days.)</p>	<p>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 six years, have only been met at Goangra and Walgett in 2016–17.</p> <p>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 2020–21 has been assessed as critical overall, particularly between Keepit and Bugilbone.</p>	<p>Critical</p>		

Environmental asset	Target values	Indicative demand (for all sources of water in the system)		Watering history (from all sources of water)	2020–21		Implications for future demands Likely environmental demand in 2021–22 if watering occurred as planned in 2020–21
		Flow/Volume	Required frequency (maximum dry interval)		Environmental demands for water	Potential Commonwealth environmental water contribution?	
Peel River channel ³ • 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)	<u>Very low flows:</u> • 1–100 ML/day d/s Chaffey Dam, and at Piallamore and Carrol Gap, for a minimum 365 days Very low flows may occur at any time.	Annually	Very low flows have been 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. Because very low flows are required annually and were not fully met at all sites for all of 2019–20, the demand for water in 2020–21 has been assessed as high to critical.	High to Critical	High priority for CEW under very low and 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)	<u>Baseflows:</u> • 100–250 ML/day d/s Chaffey Dam (min. 60 days for survival; 29 days for recruitment) • 100–250 ML/day at Piallamore (min. 130 days for survival; 78 days for recruitment) • 100–300 ML/day at Carrol Gap (min. 241 days for survival; 152 days for recruitment)	1 in 1–2 years (Max interval 2 years for fish recruitment) (May occur at any time for native fish maintenance and survival, or Sept–Mar for native fish recruitment.)	Baseflows were not met in the Peel River in 2019–20. These flows 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). 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 2020–21 has been assessed as critical.	Critical	High priority for CEW (particularly to Piallamore and Carrol Gap) 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
	Longitudinal connectivity Low level bank and bar wetting Pool maintenance Fish movement, productivity and condition Fish spawning (generalists + in-channel specialists)	<u>Small freshes:</u> • 250–900 ML/day d/s Chaffey Dam • 250–1 350 ML/day at Piallamore • 300–3 900 ML/day at Carrol Gap	Annually for fish dispersal and productivity/ condition (max interval 1 year); 1 in 1–2 years for fish spawning (max interval 2 years) (Ideally Oct–Apr for fish dispersal and condition/productivity (but can occur any time) for a minimum of 10 days. Sept–Apr for fish spawning for a minimum of 14 days)	Small freshes were not met downstream of Chaffey and at Piallamore in 2019–20, however, a small fresh was achieved at Carrol Gap in February 2020. Before this, small freshes were last met at all three sites in 2016–17. These flows are required annually for native fish dispersal and condition, and the maximum interval has been exceeded downstream of Chaffey and Piallamore. Therefore, this demand for water in 2019–20 has been assessed as high to critical (high at Carrol Gap, and critical downstream of Chaffey and at Piallamore).	High to Critical	High priority for CEW in conjunction with other water under low to high scenarios. Would be met by other water in very high scenario.	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)	<u>Large freshes:</u> • 900–2 900 ML/day d/s Chaffey Dam • 1 350–5 150 ML/day at Piallamore • 3 900–13 500 ML/day at Carrol Gap	1 in 1–2 years for fish dispersal and productivity/condition (max interval 2 years); 1 in 2–3 years for fish spawning (max interval 4 years) (Ideally July–Sept for fish dispersal and productivity/ condition (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 2020–21 has been assessed as critical.	Critical	Commonwealth environmental water unlikely to contribute to this demand because of insufficient water and system constraints.	Critical

Environmental asset	Target values	Indicative demand (for all sources of water in the system)		Watering history (from all sources of water)	2020–21		Implications for future demands Likely environmental demand in 2021–22 if watering occurred as planned in 2020–21
		Flow/Volume	Required frequency (maximum dry interval)		Environmental demands for water	Potential Commonwealth environmental water contribution?	
Peel River channel ³ (ctd)	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)	<u>Bankfull and overbank flows:</u> <ul style="list-style-type: none"> 2 900–6 400+ ML/day d/s Chaffey Dam 5 150–13 400+ ML/day at Piallamore 13 500–40 000+ ML/day at Carrol Gap 	1 in 2 years for fish spawning (max interval 4 years); 1 in 3–5 years for fish dispersal and productivity/ condition (max interval 5 years) (Oct–Apr for fish spawning (floodplain specialists) for a minimum of 10 days. Ideally Sept–Feb for fish dispersal and productivity/ condition (but 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 2020–21.	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. Refer to CEWO Water Management Plan 2020-21: Chapter 3.7 Barwon–Darling.

References

- Sourced from information provided by Green et al. (2011), MDBA (2012), and previous environmental watering, with advice from NSW DPI – Fisheries (Anthony Townsend, pers. comm.)
- Sourced from information provided by Green et al. (2011), MDBA (2012), NSW OEH (2019a and b), and Foster (1999), with advice from NSW DPI – Fisheries (Anthony Townsend, pers. comm.)
- Sourced from Barma Water Resources et al. (2012), with advice from NSW DPI – Fisheries (Anthony Townsend, pers. comm.)
- All watering history sourced from data from the following gauges (WaterNSW 2020):
 - 419021: Namoi River at Bugilbone
 - 419094: Namoi River d/s Duncan’s Junction
 - 422001: Dangar Bridge
 - 419012: Namoi River at Boggabri
 - 419091: Upstream Walgett
 - 419045: Peel River d/s Chaffey Dam
 - 419059: Namoi River d/s Gunidgera Weir (Wee Waa)

Key - potential watering in 2020-21

- High priority for Commonwealth environmental watering (likely to receive water even under low water resource 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)
- Unable to provide Commonwealth water because of constraints or insufficient water

Key - environmental demands

- Critical demand i.e. urgent need for water in that particular year to manage risk of irretrievable loss or damage
 - High demand for water i.e. needed in that particular year
 - Moderate demand for water i.e. water needed that particular year and/or next
 - Low demand for water i.e. water generally not needed that particular year
 - Very low demand for water i.e. water generally not needed that particular year or the following year
- Note that demand is considered at a generalised scale; there may be specific requirements that are more or less urgent within the flow regime

3.5.5 Water delivery in 2020–21

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 2020–21 is to avoid damage and protect the health and resilience of aquatic ecosystems in the Lower Namoi and Peel rivers.

Subject to water availability, and consistent with the demands and purpose identified, the CEWO is considering supplying water for the environment to the following actions in 2020–21.

There is a critical demand to provide very low flows and baseflows in both the Lower Namoi and Peel rivers, where prolonged drought conditions have meant requirements for these flow components have not been adequately met. In particular, requirements for baseflows have generally not been adequately met for a number of years in the Lower Namoi River. Maintaining a very low flow (at minimum) and preferably a baseflow along as great a length of river as possible will be a high priority for 2020–21. These flows would help provide refuge habitat, improve water quality, increase connectivity, support native fish, and help to build resilience.

Should conditions improve, and more water becomes available, the priority would be to reassess demand and potentially deliver critical components, which may include extending the duration of baseflows, or providing small freshes, which currently have a high to critical demand for water. Providing small freshes in either the Lower Namoi River or Peel River would be dependent on delivering water for the environment in conjunction with other water. The highest priority reaches for delivering small freshes may be Keepit Dam to Gunnedah (especially downstream of Keepit to the Peel River junction) in the Lower Namoi River, and Chaffey Dam to Piallamore in the Peel River, where these flows were not met in 2019–20. Delivering small freshes would provide connectivity, maintain pools and water quality, support native fish movement and condition, and possibly provide opportunity for spawning of some species (flow generalists and in-channel specialists).

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, a significant increase in water availability would be required, and environmental water is unlikely to contribute to these flows in the Peel River because of the relatively small volumes available to meet demand, and system constraints.

As in previous years, the use of Commonwealth water for the environment in the Namoi River Valley will be adaptively managed throughout 2020–21, in response to changing water resource availability and environmental conditions and demands.

3.5.6 Monitoring and Lessons learned

(a) 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).

(b) 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 lessons and findings the 2017–18 and 2018–19 watering years and state agency monitoring results in the Namoi River Valley are summarised in Table 3.

Table 3: Key lessons learned in the Namoi River Valley

Theme	Lesson learned
Native fish	<ul style="list-style-type: none"> • Providing a small flow to the lower Namoi River during dry conditions can be beneficial for improving 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.
Connectivity/ processes	<ul style="list-style-type: none"> • A pulse of 750 ML/day is more effective than 500 ML/day in wetting more low-level benches in the Peel River and providing greater depths for fish movement. • 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.

3.5.7 Bibliography

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