**Integrated planning for the use, carryover and trade of Commonwealth environmental water**

**Namoi River Valley**

**2015–16**

Front cover image credit: Namoi River

© Neal Foster, New South Wales Office of Environment and Heritage

Back cover image credit: Namoi River demonstration reach - regrowth at Iron Bridge

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# Commonwealth environmental water portfolio management planning

## Purpose of the document

This document consists of two parts. Part I sets out the Commonwealth Environmental Water Office’s (the Office) portfolio management planning for 2015–16 and for the following two years. Part II of this document establishes the context for how the Office integrates its management of the Commonwealth environmental water portfolio in the Namoi River Valley and across the Murray-Darling Basin more broadly. It sets out the environmental demands that Commonwealth environmental water may contribute to in the Namoi River Valley, as well as the long-term supply profile for Commonwealth environmental water. Part II also explains how these two factors are considered together to inform an overall purpose for portfolio management, as well as the most appropriate mix of portfolio management options to maximise the benefits that can be achieved with the water portfolio across multiple years.

## Purpose of portfolio management planning

Efficient and effective management of the Commonwealth environmental water holdings requires the utilisation of all portfolio management options (use, carryover and trade). To support improved outcomes from water use over time, carryover provides the opportunity to optimise water use across water years and to improve water availability early in a water year, while trade provides further capacity to optimise use over the long-term as well as across catchments.

Through multi-year integrated planning, portfolio management tools such as use, carryover and trade can be strategically managed for maximising environmental outcomes. Integrated portfolio management planning will also support the Office in:

* meeting Basin Plan obligations and contributing to the long-term objectives of the environmental watering plan, the expected outcomes in the Basin-wide environmental watering strategy and Basin annual environmental watering priorities
* managing the Commonwealth environmental water portfolio in response to the demands identified by Basin States in long-term environmental watering plans, once available
* applying adaptive management (including the setting of objectives, evaluating outcomes and informing future decision-making)
* providing increased transparency in relation to the Commonwealth Environmental Water Holder’s portfolio management (use, trade and carryover) behaviour
* coordinating water use with delivery partners, including developing long-term delivery arrangements.

## Scope of integrated portfolio management planning

The following portfolio management options have been determined to be in scope for integrated planning by the Office:

* use
* carryover
* trade of allocations including:
  + transfer of allocations between connected catchments
  + sale of allocations
  + purchase of allocations.

The Office’s portfolio management planning seeks to consider long-term demands (i.e. flow regimes) and supply, covering at least the preceding three years and out to three years.

# Part I: Portfolio management planning in the Namoi River Valley

# Purpose and portfolio management for 2015–16

## Overall purpose

Demand for environmental water

Generally hot and dry conditions have prevailed in the Namoi catchment since 2012–13, with below average to lowest on record rainfall since March 2012, and above average to very much above average maximum temperatures across the region. Dry conditions have led to decreasing storage levels, and a lack of appropriate triggers to deliver environmental water in either 2013–14 or 2014–15. As conditions continue to dry, water dependent species will require support to ensure their survival, and the river system will need watering to maintain resilience over the coming years.

Environmental water demands for environmental assets in the Namoi River Valley in 2015–16 are represented in Table 2 and summarised below:

*Lower Namoi River channel:* High demand. As a result of dry conditions in the catchment, target flows have not all been fully met over the past three years. Demands identified in the lower Namoi River are required between 1 in 1–2 years and 1 in 3 years. Consequently there is a high demand for water in 2015–16 to provide habitat, support native fish, and maintain connectivity within the river channel.

*Wetlands/anabranches:* Moderate demand. As a result of dry conditions in the catchment, target flows have not been fully met in the wetlands and anabranches of the lower Namoi system. Water is required to meet the demands identified 1 in 4–5 years, and may be required in the next 1–2 years to provide off channel habitat, and to support native fish and riparian vegetation in low commence to flow anabranches.

*Peel River channel:* High demand. Demands for baseflows and freshes in the Peel River have not been fully met in the past three years, resulting in a high demand for water. In particular, pulsed baseflows are required annually and are required in 2016–17. Water is required to provide habitat and opportunities for native fish, and to maintain water quality and connectivity.

Supply

Water resource availability (supply) in the context of meeting environmental demands is made up of allocations against entitlements held for the environment by the Commonwealth Environmental Water Holder, as well as natural and unregulated flows, and planned environmental water provisions. Further detail is provided in Part II, Section 4.

Considering carryover of Commonwealth environmental allocations from 2014–15 to 2015–16 and the range of potential opening allocations for 2015–16, along with the full range of potential stream flows, all resource availability scenarios from very low to high are in scope for 2015–16 (with moderate to high resource availability only possible if conditions become wet).

This resource availability scenario takes into account the significant storage deficit in the Lower Namoi that is required be made up to meet essential needs prior to any new allocation announcements being made. As at 18 June 2015 this storage deficit was 73 gigalitres. Split Rock and Keepit dams were at 6 per cent and 5 per cent of capacity respectively. The last General Security water allocation announcement in the lower Namoi River was made in August 2013.

Purpose

Figure 1 shows how these two factors (demand and supply) are considered together. The overall ‘purpose’ for managing the Commonwealth’s water portfolio in the Namoi River Valley for 2015–16 is to **avoid damage** and **protect** assets in the lower Namoi River channel, wetlands and anabranches, and the Peel River to ensure ecological capacity for recovery. If water availability becomes high to very high, there may be scope to **improve** the health and resilience of aquatic ecosystems in the Namoi River Valley.

A figure depicting the range of potential water resource availability and environmental demands in the Namoi catchment for 2015-16.
Resource availability is expected to be very low to low in 2015-16, or moderate to high if wet conditions eventuate. Considered together with environmental demands, which range from moderate to high, the overall purpose of environmental watering will be to protect or avoid further decline to the Lower Namoi River channel, while improving ecological health and resilience if conditions become wet.


Figure 1: Determining a broad purpose for portfolio management in the Namoi River Valley for 2015–16.

Note: grey lines represent potential range in demand and resource availability

## Water Use

Consistent with the demands and purpose described above, the Office is considering supplying environmental water to the following watering actions for 2015–16. Table 1 summarises which of these actions are relevant to which resource availability scenarios in 2015–16, with further detail and rationale established in Table 2, including implications for future years based on assumed use behavior for 2015–16. Table 1 also identifies the 2015–16 Basin annual environmental watering priorities (published by the Murray-Darling Basin Authority) that the various watering actions may contribute to meeting.

**Table 1:** Potential Commonwealth watering actions and applicable resource availability scenarios for the Namoi River Valley in 2015–16

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Watering action** | * **2015–16 Basin annual environmental watering priority(s) [[1]](#footnote-1)** | **Resource availability scenarios action is likely to be pursued under** | | |
| **Low – very low** | **Moderate** | **High – very high** |
| Lower Namoi River (baseflows and freshes) | * Basin-wide flow variability and longitudinal connectivity * Northern Basin fish refuges * Silver perch | Yes | Yes | Yes |
| Wetlands / Anabranches | * Basin-wide in-stream and riparian vegetation * Northern Basin fish refuges | No | No | Yes |
| Peel River channel (baseflows and freshes) | * Basin-wide flow variability and longitudinal connectivity | Possible | Possible | Possible |

**Lower Namoi River (baseflows and freshes)**

Summary: Contributing to minimum and high/low season baseflows, and small to medium sized freshes in the lower Namoi River. Watering will provide refuge habitat, refresh and maintain pools, manage water quality, inundate low level structures, and provide hydrological connectivity and access for native fish. This may involve supplementing natural river flows or other water releases.

Timing: Year round

Operational considerations and feasibility:

* The substantial shortfall in storage levels in Keepit Dam may limit the availability of water and capacity to deliver environmental water in the lower Namoi River in 2015–16
* Providing baseflows in late winter to summer and contributing to spring/summer freshes may be most feasible/beneficial
* Consideration may be given to releasing environmental water from storage in response to periods of significant inflow into Keepit reservoir that are captured by the storage. This would be of greatest environmental value if releases were made to coincide with, or follow on from, periods of high end of system flows from the Peel River or other downstream tributaries
* When contributing to freshes, consideration may be given to increasing peak flows in the river, providing a more natural recession rate, and/or contributing to end of system connectivity
* Where environmental water is used to supplement other flows, the preference is for those flows to be natural/unregulated, rather than regulated releases
* No variations from the standard operational considerations (see actions 1–4 in Part II, Section 3.6).

**Wetlands / anabranches**

Summary: Contributing flows to supplement natural unregulated freshes to connect the lower Namoi River with low commence to flow anabranches, provide off channel habitat, and support riparian vegetation.

Timing: Late spring/summer, and winter

Operational considerations and feasibility:

* The substantial shortfall in storage levels in Keepit Dam may limit the availability of water and capacity to deliver environmental water in anabranches and wetlands in the lower Namoi in 2015–16
* Environmental watering to target wetlands and anabranches would most likely only occur under a high or very high water resource availability scenario, which is only expected in 2015–16 if significant rainfall occurs
* No variations from the standard operational considerations (see action 5 in Part II, Section 3.6).

**Peel River channel (baseflows and freshes)**

Summary: Contributing to variable baseflows and freshes to the Peel River below Chaffey Dam, to inundate low level benches and point bars to enhance carbon and nutrient exchange, provide refuge habitat, maintain resilience, provide hydrological connectivity, and maintain riparian vegetation and water quality.

Timing: Year round

Operational considerations and feasibility:

* Delivery of environmental water in the Peel River system in 2015–16 would be dependent on receiving General Security allocations.
* Baseflows would most likely be delivered during or after a protracted period of low flows
* Freshes would be delivered in conjunction with other sources of water (natural and regulated)
* No variations from the standard operational considerations (see action 6–7 in Part II, Section 3.6).

**Stakeholder feedback:** Stakeholder feedback has recommended that if dry conditions continue protecting drought refuge habitat and deep holes will be important in 2015–16. Feedback will be sought on an ongoing basis as planning transitions to implementation phase (see Section 1.5).

## Carryover

Commonwealth environmental water was not delivered in 2014–15, so all available allocations were carried over into 2015–16. A low proportion of the Commonwealth’s available allocations for 2015–16 may be carried over to 2016–17 in the Namoi catchment, given the high environmental demands identified for 2015–16. However, if conditions preclude the release of Commonwealth environmental water from Keepit Dam (such as a blue-green algae outbreak in the reservoir or outlet capacity constraints), a high proportion of the available allocations may be carried over to 2016–17. The level of available allocations to be carried over to 2017–18 will depend upon resource availability and demand at the time.

## Trade

At this time there is no plan to buy or sell allocations in the Namoi catchment in 2015–16. While supplementing supplies (through the purchase of regulated or supplementary allocation) may assist in meeting environmental demands, there is currently limited market opportunity for allocation purchase to be pursued. Additionally, if conditions remain dry, releases of general security water may not be made (as announced by Water NSW in April 2015), which would mean that the purchase of additional allocations is not a practical approach to meeting environmental demand. The moderate to high demands for environmental water that may extend to 2016–17 mean that the trade of allocations will be considered based on ongoing assessments of environmental demands within the Namoi catchment and across the Basin over the next two years (Table 2). The types of scenarios where the need to adjust the availability of Commonwealth allocations is most likely to arise in coming years include:

* If environmental demands have been met and it is determined that there is sufficient forecast allocation to meet future demands in the Namoi catchment, the market will be assessed to determine if there are opportunities to sell surplus water and  secure proceeds to improve the Commonwealth Environmental Water Holder’s capacity to meet current or future environmental demands across the Murray Darling Basin
* If a Basin-scale analysis identifies urgent environmental demands within a particular catchment and allocation purchase provides an opportunity to meet those demands using proceeds from the sale of water in a catchment with less urgent demands
* If conditions were to become wet while environmental demands remain high, market conditions might provide a favourable opportunity to purchase allocations to assist in meeting demands and augmenting natural flows

Refer to the [Commonwealth environmental water Trading Framework](http://www.environment.gov.au/water/cewo/publications/water-trading-framework), which includes operating rules, procedures, and [protocols](http://www.environment.gov.au/water/cewo/trade/trading-framework#protocols), for further information.

## Your input

The management of Commonwealth environmental water relies on considerable advice and assistance from local organisations, state governments and others. Individuals and groups within the Murray-Darling Basin community are encouraged to submit suggestions for the management of Commonwealth environmental water. Please contact the Office via: [ewater@environment.gov.au](mailto:ewater@environment.gov.au).

**Table 2a**: Environmental demands, potential watering in 2015–16 and outlook for coming years in the Namoi River Valley – **VERY LOW** **/** **LOW WATER RESOURCE AVAILABILITY IN 2015–16**

| **Environmental assets** | ***Physical and process assets*** | **Indicative demand (for all sources of water in the system)** | **Required frequency (maximum dry interval)** | **Watering history**  **(from all sources of water) 4** | | | **2015–16** | | | **Implications for future demands** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Predominant urgency of environmental demand for water** | **Purpose under very low / low resource availability** | **Potential Commonwealth environmental water contribution?** | **Likely urgency of demand in 2016–17 if watering occurred as planned in 2015–16** | **2017–18**  **Range of likely demand** | Met in 2016–17 |
| **2012–13** | **2013–14** | **2014–15** |
| (drying) | (dry) | (dry) | Not met in 2016–17 |
| **Lower Namoi River channel 1** | Drought refuge habitat  Habitat maintenance  Fish dispersal and resilience | Small flows (minimum flows and baseflows):   * 8 ML/day at Boggabri and 13 ML/day at Wee Waa * 72 ML/day at Boggabri and 105 ML/day at Wee Waa (Dec–June) * 215 ML/day at Boggabri and 260 ML/day at Wee Waa (July–Nov) | 1 in 1–2 years | Minimum flows met  Baseflows below targets much of March–June 2013  Met at Boggabri but less than target at Wee Waa for parts of July, Sept & Nov | Min. Flows below target for much of May–June 2014  Baseflows below targets much of March–June 2014, and July–Aug at Boggabri and July–Oct at Wee Waa | Min. Flows below targets for much of July–Aug & Oct–Nov  Baseflows below targets Feb–March 2015 and July–Nov | HIGH / VERY HIGH  Baseflow demands have not been fully met in last three years. | **Avoid damage / Protect** | A high potential for watering in 2015–16 | Moderate to High | Moderate to High | |
| High | |
| Longitudinal connectivity  Low level bank and bar wetting:  Pool maintenance  Fish movement and access to habitat  Fish spawning and recruitment | Medium flows:   * 500 ML/day at Bugilbone for 75 days (min. 25 consecutive days) preferably in late spring/summer and late winter | 1 in 2–3 years | Minimum 25 consecutive days not met | Not met | Not met | HIGH  Demands have generally not been fully met in the last three years. | **Protect** | Environmental water could contribute to meeting this demand for the minimum of 25 days if delivered in conjunction with other water | Moderate to High | Low | |
| High | |
| Fish spawning, recruitment, dispersal and condition (linked to nutrient cycling  Increase ecosystem function  Bench and bank wetting:  Access to habitat  Nutrient cycling | Large flows:   * 1 800 ML/day at Bugilbone for 60 days (min. 6 consecutive days) preferably in late spring/summer and late winter * 1 400–2 870 ML/day at Boggabri and 1 500–3 150 ML/day at Wee Waa in Sept–Dec for min. 7 days | 1 in 3–5 years | 1 800 ML/day flow met for min.6 consecutive days  Min. target met in Nov-Dec at Boggabri but target not met at Wee Waa | 1 800 ML/day flow not met  Target met in October at Boggabri, but target not met at Wee Waa | Not met | HIGH  Demands have generally not been fully met in the last three years. | **Protect** | Insufficient water under a low water availability scenario to contribute to this demand. | High | Low | |
| High | |
| **Wetlands / Anabranches 2** | Riparian vegetation in low commence to flow anabranch channels  Fish movement and off channel habitat  Fish breeding and recruitment | Commence to fill wetlands preferably in late spring/summer and winter over 45 days (min. 7 consecutive days):   * 4 000–4 500 ML/day at Bugilbone * Greater than 4 600 ML/day at Boggabri (for Barbers Lagoon) * Greater than 3 300 ML/day at Duncan’s gauge | 1 in 2–5 years  (varies between native fish species) | Target at Bugilbone only met for min. 7 consecutive days (in winter)  Other targets not met | Not met | Not met | MODERATE  Demands have not been fully met in the past three years. | **Protect** | Insufficient water under a low water availability scenario to contribute to this demand. | HIGH | Low | |
| High | |
| **Peel River channel 3** | Habitat  Water quality  Fish resilience, movement, spawning and recruitment  Connectivity  Wet low level-benches and point bars | Baseflows:   * Minimum variable low baseflow greater than 3 ML/day) from Chaffey Dam * Pulsed baseflow (~500 ML/day) from Chaffey Dam | Annually | Min, baseflows met  Pulsed baseflow met for only 4 days in July 2012 | Min, baseflows met  Pulsed baseflow not met | Min, baseflows met  Pulsed baseflow not met | HIGH  Higher pulsed baseflow requirements have not been fully met over past three years. | **Protect** | Environmental water could contribute to providing variability in baseflows releases if allocations become available in 2015–16 | Moderate to High | Moderate-High | |
| High | |
| Connectivity  Water quality  Fish spawning, recruitment, movement and condition | Fresh flow (1 000–4 000 ML/day) to provide connectivity and wet medium-level benches, point bars and riparian zone | 2–3 years Average return interval | Flows greater than 1 000 ML/day over 3 days in July 2012 | Not met | Not met | HIGH  Demand has not been fully met in recent years. | **Protect / Maintain** | Insufficient water under a very low water availability scenario to contribute to this demand. | High | Low | |
| Critical | |
| 1. Sourced from information provided by NSW DPI Fisheries (2011), MDBA (2012), and previous environmental watering, with advice from NSW DPI Fisheries (Tony Townsend, pers. comm.)  2. Sourced from information provided by NSW DPI Fisheries (2011), MDBA (2012) and Foster (1999), with advice from NSW DPI Fisheries (Tony Townsend, pers. comm.)  3. Sourced from Barma Water Resources et al. (2012), with advice from NSW DPI Fisheries (Tony Townsend, pers. comm.)  4. All watering history sourced from data from the following gauges (Water NSW 2015):   * 419021: Namoi River at Bugilbone * 419012: Namoi River at Boggabri * 419059: Namoi River d/s Gunidgera Weir * 419094: Namoi River d/s Duncan’s Junction * 419045: Peel River d/s Chaffey Dam | | | | | | | | **Carryover potential** | Low proportion of lower Namoi allocations carried into 2016–17.  *NOTE: No carryover provisions in the Peel Valley.* | Low to high proportion of allocations may be carried over to 2017–18, but will depend upon resource availability and demands. | Level of carryover will depend on environmental demands and resource availability. | |
|  |  |  |  |  |  |  |  | **Trade potential** | High need to augment supply, given recent dry conditions. Therefore should market conditions improve there is likely to be a desire to purchase allocation (general or supplementary) to assist in meeting high demands. Sale of allocations unlikely if demands remain high and low availability of water to meet them. | Moderate to high expected need to augment supply, therefore should market conditions improve there is likely to be a desire to purchase allocation or supplementary flow access to assist in meeting high demands. Sale of allocations unlikely considering a number of moderate and high demands expected. | Potential to trade will depend on environmental demands and resource availability. | |

**Table 2b**: Environmental demands, potential watering in 2015–16 and outlook for coming years in the Namoi River Valley - **MODERATE WATER RESOURCE AVAILABILITY IN 2015–16**

| **Environmental assets** | ***Physical and process assets*** | **Indicative demand (for all sources of water in the system)** | **Required frequency (maximum dry interval)** | **Watering history**  **(from all sources of water) 4** | | | **2015–16** | | | **Implications for future demands** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Predominant urgency of environmental demand for water** | **Purpose under moderate resource availability** | **Potential Commonwealth environmental water contribution?** | **Likely urgency of demand in 2016–17 if watering occurred as planned in 2015–16** | **2017–18**  **Range of likely demand** | Met in 2016–17 |
| **2012–13** | **2013–14** | **2014–15** |
| (drying) | (dry) | (dry) | Not met in 2016–17 |
| **Lower Namoi River channel 1** | Drought refuge habitat  Habitat maintenance  Fish dispersal and resilience | Small flows (minimum flows and baseflows):   * 8 ML/day at Boggabri and 13 ML/day at Wee Waa * 72 ML/day at Boggabri and 105 ML/day at Wee Waa (Dec–June) * 215 ML/day at Boggabri and 260 ML/day at Wee Waa (July–Nov) | 1 in 1–2 years | Minimum flows met  Baseflows below targets much of March–June 2013  Met at Boggabri but less than target at Wee Waa for parts of July, Sept & Nov | Min. Flows below target for much of May–June 2014  Baseflows below targets much of March–June 2014, and July–Aug at Boggabri and July–Oct at Wee Waa | Min. Flows below targets for much of July–Aug & Oct–Nov  Baseflows below targets Feb–March 2015 and July–Nov | HIGH / VERY HIGH  Baseflow demands have not been fully met in last three years. | **Protect** | Contributing to medium sized flows would meet this demand | Moderate to High | Moderate to High | |
| High | |
| Longitudinal connectivity  Low level bank and bar wetting:  Pool maintenance  Fish movement and access to habitat  Fish spawning and recruitment | Medium flows:   * 500 ML/day at Bugilbone for 75 days (min. 25 consecutive days) preferably in late spring/summer and late winter | 1 in 2–3 years | Minimum 25 consecutive days not met | Not met | Not met | HIGH  Demands have generally not been fully met in the last three years. | **Protect** | A high potential for watering in 2015–16, depending on available water | Moderate | Low | |
| High | |
| Fish spawning, recruitment, dispersal and condition (linked to nutrient cycling  Increase ecosystem function  Bench and bank wetting:  Access to habitat  Nutrient cycling | Large flows:   * 1 800 ML/day at Bugilbone for 60 days (min. 6 consecutive days) preferably in late spring/summer and late winter * 1 400–2 870 ML/day at Boggabri and 1 500–3 150 ML/day at Wee Waa in Sept–Dec for min. 7 days | 1 in 3–5 years | 1 800 ML/day flow met for min.6 consecutive days  Min. target met in Nov-Dec at Boggabri but target not met at Wee Waa | 1 800 ML/day flow not met  Target met in October at Boggabri, but target not met at Wee Waa | Not met | HIGH  Demands have generally not been fully met in the last three years. | **Protect** | Environmental water may be able to contribute to meeting this demand, at least for the minimum number of days, depending on available water | Moderate to High | Low | |
| High | |
| **Wetlands / Anabranches 2** | Riparian vegetation in low commence to flow anabranch channels  Fish movement and off channel habitat  Fish breeding and recruitment | Commence to fill wetlands preferably in late spring/summer and winter over 45 days (min. 7 consecutive days):   * 4 000–4 500 ML/day at Bugilbone * Greater than 4 600 ML/day at Boggabri (for Barbers Lagoon) * Greater than 3 300 ML/day at Duncan’s gauge | 1 in 2–5 years  (varies between native fish species) | Target at Bugilbone only met for min. 7 consecutive days (in winter)  Other targets not met | Not met | Not met | MODERATE  Demands have not been fully met in the past three years. | **Maintain** | Insufficient water under a low water availability scenario to contribute to this demand. | HIGH | Low | |
| High | |
| **Peel River channel 3** | Habitat  Water quality  Fish resilience, movement, spawning and recruitment  Connectivity  Wet low level-benches and point bars | Baseflows:   * Minimum variable low baseflow greater than 3 ML/day) from Chaffey Dam * Pulsed baseflow (~500 ML/day) from Chaffey Dam | Annually | Min, baseflows met  Pulsed baseflow met for only 4 days in July 2012 | Min, baseflows met  Pulsed baseflow not met | Min, baseflows met  Pulsed baseflow not met | HIGH  Higher pulsed baseflow requirements have not been fully met over past three years. | **Protect** | Environmental water could contribute to providing variability in baseflows releases if allocations become available in 2015–16 | Moderate to High | Moderate-High | |
| High | |
|  | Connectivity  Water quality  Fish spawning, recruitment, movement and condition | Fresh flow (1 000–4 000 ML/day) to provide connectivity and wet medium-level benches, point bars and riparian zone | 2–3 years Average return interval | Flows greater than 1 000 ML/day over 3 days in July 2012 | Not met | Not met | HIGH  Demand has not been fully met in recent years. | **Maintain / Improve** | Insufficient water under a very low water availability scenario to contribute to this demand. | High | Low | |
| Critical | |
| See references at Table 2a | | |  |  |  |  |  | **Carryover potential** | Low to moderate proportion of allocations carried into 2016–17.  *NOTE: No carryover provisions in the Peel Valley.* | Low to moderate proportion of allocations may be carried over to 2017–18, but will depend upon resource availability and demands. | Level of carryover will depend on environmental demands and resource availability. | |
|  |  |  |  |  |  |  |  | **Trade potential** | Moderate to high need to augment available allocations given recent dry conditions. Therefore should market conditions improve there is likely to be a desire to purchase allocation or supplementary flow access to assist in meeting high demands. Sale of allocations unlikely considering moderate and high demands. | Moderate to high need to augment available allocations given recent dry conditions. Therefore should market conditions improve there is likely to be a desire to purchase allocation or supplementary flow access to assist in meeting high demands. Sale of allocations unlikely considering moderate and high demands. | Potential to trade will depend on environmental demands and resource availability. | |

**Table 2c**: Environmental demands, potential watering in 2015–16 and outlook for coming years in the Namoi River Valley –**HIGH WATER RESOURCE AVAILABILITY IN 2015–16**

| **Environmental assets** | ***Physical and process assets*** | **Indicative demand (for all sources of water in the system)** | **Required frequency (maximum dry interval)** | **Watering history**  **(from all sources of water) 4** | | | **2015–16** | | | **Implications for future demands** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Predominant urgency of environmental demand for water** | **Purpose under high / very high resource availability** | **Potential Commonwealth environmental water contribution?** | **Likely urgency of demand in 2016–17 if watering occurred as planned in 2015-16** | **2017–18**  **Range of likely demand** | Met in 2016–17 |
| **2012–13** | **2013–14** | **2014–15** |
| (drying) | (dry) | (dry) | Not met in 2016–17 |
| **Lower Namoi River channel 1** | Drought refuge habitat  Habitat maintenance  Fish dispersal and resilience | Small flows (minimum flows and baseflows):   * 8 ML/day at Boggabri and 13 ML/day at Wee Waa * 72 ML/day at Boggabri and 105 ML/day at Wee Waa (Dec–June) * 215 ML/day at Boggabri and 260 ML/day at Wee Waa (July–Nov) | 1 in 1–2 years | Minimum flows met  Baseflows below targets much of March–June 2013  Met at Boggabri but less than target at Wee Waa for parts of July, Sept & Nov | Min. Flows below target for much of May–June 2014  Baseflows below targets much of March–June 2014, and July–Aug at Boggabri and July–Oct at Wee Waa | Min. Flows below targets for much of July–Aug & Oct–Nov  Baseflows below targets Feb–March 2015 and July–Nov | HIGH  Baseflow demands have not been fully met in last three years. | **Improve** | Contributing to large flows would meet this demand | Moderate to High | Moderate to High | |
| High | |
| Longitudinal connectivity  Low level bank and bar wetting:  Pool maintenance  Fish movement and access to habitat  Fish spawning and recruitment | Medium flows:   * 500 ML/day at Bugilbone for 75 days (min. 25 consecutive days) preferably in late spring/summer and late winter | 1 in 2–3 years | Minimum 25 consecutive days not met | Not met | Not met | HIGH  Demands have generally not been fully met in the last three years. | **Improve** | Contributing to large flows would meet this demand | Moderate | Low | |
| High | |
| Fish spawning, recruitment, dispersal and condition (linked to nutrient cycling  Increase ecosystem function  Bench and bank wetting:  Access to habitat  Nutrient cycling | Large flows:   * 1 800 ML/day at Bugilbone for 60 days (min. 6 consecutive days) preferably in late spring/summer and late winter * 1 400–2 870 ML/day at Boggabri and 1 500–3 150 ML/day at Wee Waa in Sept–Dec for min. 7 days | 1 in 3–5 years | 1 800 ML/day flow met for min.6 consecutive days  Min. target met in Nov-Dec at Boggabri but target not met at Wee Waa | 1 800 ML/day flow not met  Target met in October at Boggabri, but target not met at Wee Waa | Not met | HIGH  Demands have generally not been fully met in the last three years. | **Improve** | A high potential for watering in 2015–16, depending on available water | Low | Low | |
| High | |
| **Wetlands / Anabranches 2** | Riparian vegetation in low commence to flow anabranch channels  Fish movement and off channel habitat  Fish breeding and recruitment | Commence to fill wetlands preferably in late spring/summer and winter over 45 days (min. 7 consecutive days):   * 4 000–4 500 ML/day at Bugilbone * Greater than 4 600 ML/day at Boggabri (for Barbers Lagoon) * Greater than 3 300 ML/day at Duncan’s gauge | 1 in 2–5 years  (varies between native fish species) | Target at Bugilbone only met for min. 7 consecutive days (in winter)  Other targets not met | Not met | Not met | MODERATE  Demands have not been fully met in the past three years. | **Improve** | Environmental water may be able to contribute to meeting this demand, at least for the minimum number of days, depending on available water | Moderate to High | Low | |
| High | |
| **Peel River channel 3** | Habitat  Water quality  Fish resilience, movement, spawning and recruitment  Connectivity  Wet low level-benches and point bars | Baseflows:   * Minimum variable low baseflow greater than 3 ML/day) from Chaffey Dam * Pulsed baseflow (~500 ML/day) from Chaffey Dam | Annually | Min, baseflows met  Pulsed baseflow met for only 4 days in July 2012 | Min, baseflows met  Pulsed baseflow not met | Min, baseflows met  Pulsed baseflow not met | HIGH  Higher pulsed baseflow requirements have not been fully met over past three years. | **Improve** | Environmental water could contribute to providing variability in baseflows releases if allocations become available in 2015–16 | Moderate to High | Moderate-High | |
| High | |
|  | Connectivity  Water quality  Fish spawning, recruitment, movement and condition | Fresh flow (1 000–4 000 ML/day) to provide connectivity and wet medium-level benches, point bars and riparian zone | 2–3 years Average return interval | Flows greater than 1 000 ML/day over 3 days in July 2012 | Not met | Not met | HIGH  Demand has not been fully met in recent years. | **Improve** | Environmental water could contribute to providing a fresh flow if allocations become available and there are other adequate flows in the system. | Moderate to high | Low | |
| High | |
| See references at Table 2a | | |  |  |  |  |  | **Carryover potential** | Due to small holdings, low to moderate proportion of allocations carried into 2016–17.  *NOTE: No carryover provisions in the Peel Valley.* | Low to moderate proportion of allocations may be carried over to 2017–18, but will depend upon resource availability and demands. | Level of carryover will depend on environmental demands and resource availability. | |
|  |  |  |  |  |  |  |  | **Trade potential** | Moderate to high need to augment supply, given recent dry conditions. Therefore should market conditions improve there is likely to be the desire to purchase allocation or supplementary flow access to assist in meeting high demands. Sale of allocations unlikely considering moderate and high demands. | Moderate need to augment available allocations. Sale of allocations may be considered, although there is expected to still be some moderate to high demands requiring water. | Potential to trade will depend on environmental demands and resource availability. | |

# Part II: Commonwealth environmental water portfolio management planning

# Background

## Commonwealth environmental water

The Commonwealth Environmental Water Holder is an independent statutory position established by the *Water Act 2007* (the Water Act) to manage the Commonwealth environmental water holdings. The Commonwealth Environmental Water Holder leads and is supported by the Commonwealth Environmental Water Office (the Office), a division of the Australian Government Department of the Environment.

Under the Water Act, Commonwealth environmental water must be managed to protect or restore environmental assets, so as to give effect to relevant international agreements. The Water Act also requires that the Commonwealth Environmental Water Holder perform its functions and exercise its powers consistently with and in a manner that gives effect to the Basin Plan and that Commonwealth environmental water is managed in accordance with the Basin Plan’s environmental watering plan.

## The Namoi River Valley

The Namoi River Valley is located in north eastern New South Wales (NSW), extending westwards of Nundle to Walgett. Rainfall in the upper catchment drives valley flows, with water for regulated delivery throughout the valley being stored in Split Rock and Keepit dams. 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 downstream of Boggabri.

Environmental watering in the Namoi River is most likely to be delivered as baseflows or freshes, undertaken in conjunction with other flows in the system (e.g. a naturally occurring fresh flow, or consumptive water), or during prolonged low flow conditions.

In order to achieve lower Namoi in-channel fresh requirements regulated releases from Keepit Dam can be timed to coincide with unregulated inflows from the Mooki River and Cox’s Creek. Benefits may also extend downstream to the Barwon-Darling. Consideration may also be given to augmenting modified river management practices that may be implemented by river operators in response to low inflows, such as block releases of consumptive water orders. Where possible, environmental water will be managed for the benefit multiple sites to maximise the efficiency and effectiveness of water delivery.

The Peel River contributes an average annual volume of approximately 280 000 megalitres (ML) into the Namoi system (Green et al. 2011) and as such constitutes the other key asset within the Namoi River Valley. Flows 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.

Held environmental water in the Peel River can be made available from Chaffey Dam in combination with downstream unregulated tributary inflows, or as a form of translucency release in response to storage inflows. Use of Commonwealth environmental water is not contingent on unregulated flows in the Peel River and can be delivered in conjunction with a stimulus flow managed by the NSW Office of Water under the planned environmental water provisions of Water Sharing Plan.

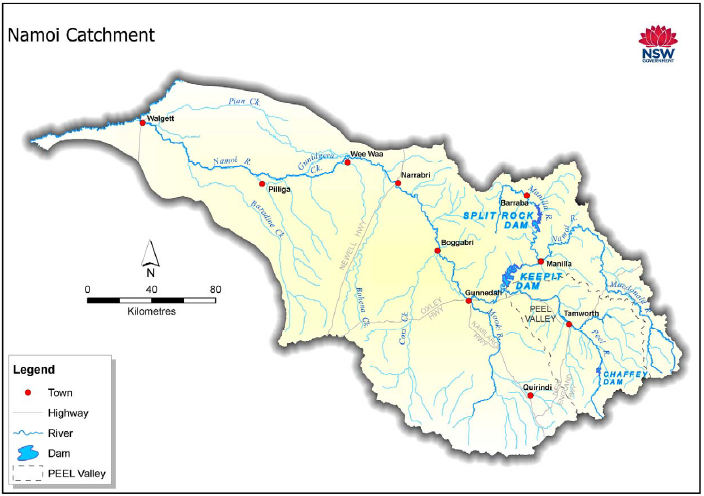
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Figure 2: Map of the Namoi River Valley (Green et al. 2011).

# Long-term environmental water demands in the Namoi River Valley

## Basin-wide environmental watering strategy

The Murray-Darling Basin Authority has published the first Basin-wide environmental watering strategy (the Strategy, MDBA 2014). Building on Basin Plan’s environmental objectives, the Strategy sets out the Authority’s best assessment of the expected environmental outcomes over the next decade as a result of implementing the Basin Plan and associated water reforms. The Strategy focuses on four components: river flows and connectivity; vegetation; waterbirds; and native fish. The expected outcomes for each component are summarised below, with more specific quantified outcomes provided in Attachment A.

**River flows and connectivity:** Improve connections along rivers and between rivers and their floodplains

**Vegetation:** Maintain extent and improve the condition

**Waterbirds:** Maintain current species diversity, improve breeding success and numbers

**Native Fish:** Maintain current species diversity, extend distributions, improve breeding success and numbers

## Long-term watering plans

State governments are developing long-term watering plans for each catchment in the Basin. These plans will identify:

* the priority environmental assets and ecosystem functions in the catchment
* the objectives and targets for these assets and functions
* their watering requirements.

In developing these plans, state governments will be consulting with environmental water holders and local communities.

Once developed, these plans will provide the key information on the long-term environmental water demands in the catchment and the Office’s planning for the Namoi River Valley will be reviewed so that this information can be incorporated.

Prior to the development of long-term watering plans, the Office will continue draw on existing documentation on environmental water demands developed by state governments, local natural resource management agencies and the Murray-Darling Basin Authority.

Key documentation includes:

* Assessment of environmental water requirements for the proposed Basin Plan: Lower Namoi River (in-channel flows) (MDBA 2012)
* Environmental water delivery: Namoi River (Barma Water Resources et al. 2012)
* A range of scientific literature and on-ground knowledge (e.g. from NSW Department of Primary Industries – Fisheries, and NSW Office of Environment and Heritage officers).

The below section represents the Office’s summary of the long-term environmental water demands, based on these documents. The objectives and expected outcomes for water-dependent ecosystems will continue to be revised and refined in response to best available knowledge, including drawing on the results of environmental watering monitoring programmes.

## Expected outcomes in the Namoi River Valley

The expected outcomes from environmental watering in the Namoi River Valley are described below in Table 3 and how these contribute to Basin-wide outcomes. These outcomes will be refined and/or revised once the long-term watering plan for the catchment has been developed.

Table 3: Summary of long-term expected outcomes from environmental watering in the Namoi River Valley

|  |  |  |  |
| --- | --- | --- | --- |
| * **BASIN-WIDE OUTCOMES**   **(Outcomes in red link to the Basin-wide Environmental Watering Strategy)** | **EXPECTED OUTCOMES FOR LOWER NAMOI ASSETS** | | |
| * **ECOSYSTEMS** | **IN-CHANNEL ASSETS** | | **OFF-CHANNEL ASSETS** |
| **Lower Namoi River channel** | **Peel River channel** | **Lower Namoi anabranch & floodplain wetland system** |
| **VEGETATION** | Maintain riparian and in-channel vegetation condition, growth and survival (extent) | | Maintain the condition, growth and survival (extent) of native vegetation of the anabranch communities and wetland vegetation |
| **WATERBIRDS** | Provide drought refuge for waterbirds and opportunities for waterbird breeding | | |
| **FISH** | Support reproduction and recruitment opportunities for native fish  Support connectivity and movement, and maintain in-channel refuge and aquatic habitat for native fish | | |
| **MACROINVERTEBRATES** | Support recruitment and maintain macroinvertebrate diversity | | |
| **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 Barwon-Darling system | Support longitudinal connectivity along the river channel | Support connectivity, particularly lateral between the river and floodplain |
| **PROCESSES** | Support key ecosystem functions within channel and on the floodplain, including the cycling of nutrients and wetting banks and benches | | |
| **WATER QUALITY** | Maintain water quality within channels and pools | | |
| **RESILIENCE** | Provide drought refuge habitat (particularly for fish) | | |

Information sourced from:

* Murray-Darling Basin Authority (2012)
* Murray-Darling Basin Authority (2014)
* Barma Water Resources et al. (2012)
* Commonwealth Environmental Water Office (2014)
* Commonwealth Environmental Water Office (2011)

## Flows in scope for Commonwealth environmental watering

Not all environmental demands can and will be met through the use of held environmental water. Some demands are met by regulated water deliveries for consumptive purposes, while others are met by large unregulated/natural flows events or are beyond what can be delivered within operational constraints. Figure 3 shows the broad environmental demands that are in scope for the Office to focus on contributing to in the Namoi River Valley. Importantly, these are broad, indicative demands and individual watering events may contribute to particular opportunities, such as using infrastructure to deliver water to individual wetlands that would otherwise not be possible due to constraints. Also, there may be opportunities for Basin State governments to remove or modify constraints, which will improve the efficiency and/or effectiveness of environmental watering.

A hydrograph figure showing the scope of demands that Commonwealth environmental water may contribute to in the Namoi catchment.
Low flows are often met by other sources of water, such as consumptive water deliveries. Conversely, very high flows are the result of unregulated or natural flows. Commonwealth environmental water cannot contribute to these high flows, due to the amount of water required and because doing so would create unacceptable third party impacts. The focus for Commonwealth environmental watering is therefore on small to moderate channel flows in the Namoi and Peel Rivers, including through to the Barwon River.


Figure 3: Scope of demands that environmental water may contribute to in the Namoi River Valley

The delivery of environmental water in the Namoi River Valley is currently constrained by the release capacities from storages, channel capacities, and system constraints.

Watering actions will be developed in consideration of the following constraints:

* Keepit Dam storage capacity of 425 510 ML and outlet capacity of 4 000 ML/day (Water NSW 2015)
* Chaffey Dam storage capacity of 65 830 ML and outlet capacity of 1 100 ML/day (Water NSW 2015)
* Minor flood level of 39 900 ML/day at Narrabri
* Minor flood level of 13 400 ML/day at Bugilbone (downstream of Duncan’s Junction)

In the Namoi River, Commonwealth environmental water will be carefully coordinated with unregulated flow events to deliver freshes and appropriate flow recessions. In the instance of a low inflow scenario, Commonwealth environmental water may be used in conjunction with minimum releases to provide low flow variability and maintain water quality and drought refuge.

Commonwealth environmental water delivery may be coordinated with a NSW stimulus flow in the Peel River to deliver a fresh flow. Alternatively, unregulated tributary flows could be used to piggy-back releases from Chaffey Dam. Under a low flow scenario, Commonwealth environmental water could provide low flow variability for baseflows delivered from Chaffey Dam as per the Peel valley Water Sharing Plan.

The lower Namoi entitlement has a maximum use in a single year of 125 per cent of entitlement (subject to the account balance) and 300 per cent of entitlement over three consecutive years. The Peel allocation cannot be carried over and unused water is forfeited.

Operational considerations such as delivery methods, opportunities, constraints and risks will differ depending on the inflow scenario and are summarised in Table 4. These considerations will be assessed throughout the year as decisions to make water available for use are made and implemented. This includes refining the ecological objectives, assessing operational feasibility and potential risks and the ongoing monitoring of the seasonal outlook and river conditions.

**Table 4:** Current constraints on environmental watering for the Namoi River Valley

| **Inflow scenario** | **Very low** | | **Low** | **Moderate** | **High** | **Very high** |
| --- | --- | --- | --- | --- | --- | --- |
| **Constraints** | | | | | | |
| Delivery options are limited due to high unregulated flows resulting in reduced channel capacity, limiting the operation of river infrastructure and inhibiting additional releases from storages. |  |  | |  |  |  |
| Maximum annual usage on entitlements is up to 125 per cent of entitlement. |  | | | | | |
| Flow thresholds for existing river infrastructure may constrain the delivery of environmental water. |  | | | | | |

Constraints as they relate to specific watering actions are described in the standard operating considerations listed in section 3.5 below.

Based on the above outcomes sought and delivery constraints, Table 5 identifies flows that are in scope for Commonwealth environmental watering. Some specific watering requirements (flow magnitude, duration, timing and frequency) have also been listed, drawn from existing resources. The watering requirements for the Namoi River Valley will be developed in full by the state government as part of their long-term watering plan and will be reflected in future planning documents by the Commonwealth Environmental Water Office.

**Table 5:** Long-term indicative elements of a flow regime in scope for Commonwealth environmental watering in the Namoi River Valley

|  |  |  |
| --- | --- | --- |
| **Asset/Function** | **Indicative demands / events** | **Frequency (Maximum dry interval)** |
| Lower Namoi River channel  (habitat access and maintenance, connectivity, and opportunities for native fish) | Small flows (minimum flows and baseflows):   * 8 ML/day at Boggabri and 13 ML/day at Wee Waa * 72 ML/day at Boggabri and 105 ML/day at Wee Waa (Dec–June) * 215 ML/day at Boggabri and 260 ML/day at Wee Waa (July–Nov) | 1 in 1–2 years |
| Medium flows:   * 500 ML/day at Bugilbone for 75 days (min. 25 consecutive days) in late spring/summer and winter | 1 in 2–3 years |
| Large flows:   * 1 800 ML/day at Bugilbone for 60 days (min. 6 consecutive days) in late spring/summer and winter * 1 400–2 870 ML/day at Boggabri and 1 500–3 150 ML/day at Wee Waa in Sept–Dec for min. 7 days | 1 in 3 years |
| Wetlands / Anabranches  (riparian vegetation, off channel fish habitat, fish breeding and recruitment) | Commence to fill wetlands in late spring/summer and winter over 45 days (min. 7 consecutive days):   * 4 000–4 500 ML/day at Bugilbone * Greater than 4 600 ML/day at Boggabri (for Barbers Lagoon) * Greater than3 300 ML/day at Duncan’s gauge | 1 in 4–5 years |
| Peel River channel  (habitat, water quality, connectivity, opportunities for native fish) | Baseflows:   * Minimum variable low baseflow (greater than 3 ML/day) from Chaffey Dam * Pulsed baseflow (~500 ML/day) from Chaffey Dam | Annually |
| Fresh flow (1 000–4 000 ML/day) to provide connectivity and wet medium-level benches, point bars and riparian zone | 2–3 years Average return interval |

Information sourced from NSW DPI Fisheries (2011), MDBA (2012), Foster (1999), Barma Water Resources et al. (2012), add personal communications.

## Potential watering actions under different levels of water resource availability

Under certain levels of water resource availability, watering actions may not be pursued for a variety of reasons, including that environmental demand may be met by unregulated flows and that constraints and/or risks may limit the availability to deliver environmental water. Table 6 identifies the range of potential watering actions in the Namoi River Valley and the levels of water resource availability that relate to these actions.

Table 6: Summary of potential watering actions for the Namoi River Valley

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Broad Asset** | **Indicative demand** | **Applicable level(s) of resource availability** | | | | | |
| **Very Low** | **Low** | **Moderate** | | **High** | **Very High** |
| **Lower Namoi River channel** | Small flows (minimum flows and baseflows):   * 8 ML/day at Boggabri and 13 ML/day at Wee Waa * 72 ML/day at Boggabri and 105 ML/day at Wee Waa (Dec–June) * 215 ML/day at Boggabri and 260 ML/day at Wee Waa (July–Nov) | *1. Minimum baseflows:* contribute to minimum flows during dry periods to provide refuge habitat and maintain resilience. |  | | | | |
| *2. High and low season baseflows:* contribute to baseflows to refresh and maintain pools as refuge, manage water quality, and provide hydrological connectivity, allowing fish movement and building population resilience. | | | |  | |
| Medium flows:   * 500 ML/day at Bugilbone for 75 days (min. 25 consecutive days) preferably in late spring/summer and late winter |  | *3. Providing hydrological connectivity:* contribute flows (freshes) to supplement river flows to inundate low level structures and provide longitudinal connectivity and access to habitat for native fish, which would also achieve movement, spawning and possible recruitment in some species. | | | |  |
| Large flows:   * 1 800 ML/day at Bugilbone for 60 days (min. 6 consecutive days) preferably in late spring/summer and late winter * 1 400–2870 ML/day at Boggabri and 1 500–3 150 ML/day at Wee Waa in Sept–Dec for min. 7 days |  | *4. Managed flow recessions:* contribute flows (freshes) to extend the duration and recession of unregulated flows to provide instream habitat, support native fish (movement, spawning, recruitment and condition), and maintain ecosystem function and longitudinal connectivity. | | | | |
| **Wetlands / Anabranches** | Commence to fill wetlands preferably in late spring/summer and late winter over 45 days (min. 7 consecutive days):   * 4 000–4 500 ML/day at Bugilbone * Greater than4 600 ML/day at Boggabri (for Barbers Lagoon) * Greater than 3 300 ML/day at Duncan’s gauge |  | | *5. Connectivity with anabranches:* contribute flows to supplement natural unregulated freshes to connect the river with low commence to flow anabranches, provide off channel habitat, support riparian vegetation, and support fish movement, spawning, recruitment and condition. | | | |
| **Peel River channel** | Baseflows:   * Minimum variable low baseflow (greater than 3 ML/day) from Chaffey Dam * Pulsed baseflow (~500 ML/day) from Chaffey Dam | *6. Variable baseflows:* Contribute to a variable baseflow, likely during or after a period of low flows, to provide refuge habitat, maintain resilience, provide hydrological connectivity, and maintain water quality, as well as fish movement and population resilience. | | |  | | |
| Fresh flow (1 000–4 000 ML/day) |  | | *7. In-channel freshes:* Contribute to freshes in conjunction with other flows to provide habitat, support ecological processes, maintain riparian vegetation, and support fish movement, spawning, recruitment and condition | | |  |

Note: Under certain resource availabilities, options may not be pursued for a variety of reasons including that environmental demand may be met by unregulated flows and that constraints and/or risks may limit the ability the deliver environmental water.

## Potential watering actions – standard operational considerations

Table 6 above identifies the range of potential watering actions in the Namoi River Valley that give effect to the long-term demands and flow regime identified as being in scope for the Office to contribute environmental water to in any given year. The standard considerations associated with these actions are set out below.

**1. Lower Namoi River minimum baseflows**

*Watering action:* Contribute to minimum flows (including low flow variability) in the lower Namoi River during dry periods, to provide refuge habitat and maintain resilience. This action would contribute to maintaining flows and preventing a no flow situation.

*Standard operational considerations:*

* Environmental water would be delivered from Keepit Dam as in-channel flows, and will be managed within standard water delivery arrangements
* The flow limit for this action is generally 4 500 ML/day at Narrabri Creek (noting that the minor flood level at Bugilbone is 13 400 ML/day)
* The delivery rate will depend on antecedent conditions and available water, and may be delivered by supplementing other water sources.
* Water orders will be developed in conjunction with Water NSW to ensure operational feasiblity and the achievement of environmental objectives.

*Typical extent:* This action could contribute flows to the lower Namoi River downstream of Keepit Dam to Bugilbone. The actual extent achieved will depend on antecedent conditions and availabile water. Consideration could also be given to delivering low baseflows in the Manilla River downstream of Split Rock Dam to maintain critical refuge during extreme dry conditions (using General Secutiry entitlements held in the upper Namoi River).

*Approvals:* Consult with NSW agencies (Water NSW, OEH and Fisheries) before implementing this action.

**2. Lower Namoi River high/low season baseflows**

*Watering action:* Contribute to baseflows in the lower Namoi River to refresh and maintain pools as refuge, manage water quality, and provide hydrological connectivity, allowing fish movement and building population resilience.

*Standard operational considerations:*

* Environmental water would be delivered from Keepit Dam as in-channel flows, and will be managed within standard water delivery arrangements
* The flow limit for this action is generally 4 500 ML/day at Narrabri Creek (noting that the minor flood level at Bugilbone is 13 400 ML/day)
* The delivery rate will depend on season and antecedent conditions, and could be delivered by supplementing other water sources.
* Water orders will be developed in conjunction with Water NSW to ensure operational feasiblity and the achievement of environmental objectives.

*Typical extent:* This action could contribute flows to the lower Namoi River downstream of Keepit Dam to Bugilbone. The actual extent achieved will depend on antecedent conditions and water availability.

*Approvals:* Consult with NSW agencies (Water NSW, OEH and Fisheries) before implementing this action.

**3. Providing hydrological connectivity**

*Watering action:* Contribute flows (freshes) to supplement river flows to inundate low level structures and provide longitudinal connectivity and access to habitat for native fish, which would also achieve movement, spawning and possible recruitment in some species.

The timing and duration of this action is important for achieving outcomes for target native fish species.

*Standard operational considerations:*

* Environmental water would be delivered from Keepit Dam as in-channel flows, and will be managed within standard water delivery arrangements
* The flow limit for this action is generally 4 500 ML/day at Narrabri Creek (noting that the minor flood level at Bugilbone is 13 400 ML/day)
* This action could be delivered by supplementing other river flows, with preference given to supplementing natural flows rather than regulated releases
* Water orders will be developed in conjunction with Water NSW to ensure operational feasiblity and the achievement of environmental objectives.

*Typical extent:* This action could contribute flows to the lower Namoi River downstream of Keepit Dam, with the potential to coordinate releases to augment end of system flows to the Barwon-Darling system.

*Approvals:* Consult with NSW agencies (Water NSW, OEH and Fisheries) before implementing this action.

**4. Managed flow recessions in the lower Namoi River**

*Watering action:* Contribute flows (freshes) to extend the duration and recession of unregulated flows to provide instream habitat, support native fish support native fish (movement, spawning, recruitment and condition), and maintain ecosystem function and longitudinal connectivity.

The timing and duration of this action is important for achieving outcomes for target native fish species.

*Standard operational considerations:*

* Environmental water would be delivered from Keepit Dam as in-channel flows, and will be managed within standard water delivery arrangements
* The flow limit for this action is generally 4 500 ML/day at Narrabri Creek (noting that the minor flood level at Bugilbone is 13 400 ML/day)
* This action would be delivered by supplementing other river flows, with preference given to supplementing natural flows rather than regulated releases. Consideration may be given to augmenting regulated releases to increase peak flows, or to provide a secondary flow peak, and to provide a more natural recession.
* Water orders will be developed in conjunction with Water NSW to ensure operational feasiblity and the achievement of environmental objectives.

*Typical extent:* This action could contribute flows to the lower Namoi River downstream of Keepit Dam, with the potential to coordinate releases to meet end of system flow requirements in the Barwon-Darling system.

*Approvals:* Consult with NSW agencies (Water NSW, OEH and Fisheries) before implementing this action.

**5. Connectivity with wetlands/anabranches in the lower Namoi**

*Watering action:* Contribute flows to supplement natural unregulated freshes to connect the Namoi River with low commence to flow anabranches, provide off channel habitat, support riparian vegetation, and support fish movement, spawning, recruitment and condition.

*Standard operational considerations:*

* Environmental water would be delivered from Keepit Dam as in-channel flows, and will be managed within standard water delivery arrangements
* This action would be delivered in conjunction with a natural unregulated flow event (likely in the order of 2 000–4 000 ML/day
* Environmental water may be used to slow and extend the flow recession following an unregulated flow event of an appropriate size to maintain inundation in anabranch habitats
* Environmental water may delivery may also be considered to add to an unregulated event to deliver a secondary flow peak that allows reconnection of anabranch habitat for native fish outcomes
* Water orders will be developed in conjunction with Water NSW to ensure operational feasiblity and the achievement of environmental objectives.

*Typical extent:* This watering action would contribute flows to low commence to flow anabranch channels in the lower Namoi River system. Providing a reconnection flow is important for native fish outcomes.

*Approvals:* Consult with NSW agencies (Water NSW, OEH and Fisheries) Local Land Services, peak irrigation bodies and landholders before implementing this action.

**6. Variable baseflows in the Peel River**

*Watering action:* Contribute to a variable baseflow in the Peel River, likely during or after a period of low flows. This will provide refuge habitat, maintain resilience, provide hydrological connectivity, and maintain water quality, as well as fish movement and population resilience.

*Standard operational considerations:*

* Water will be delivered to the Peel River from Chaffey Dam as in-channel flows, and will be managed within standard water delivery arrangements
* Water orders will be developed in conjunction with Water NSW to ensure operational feasiblity and the achievement of environmental objectives
* The actual flow rate will be determined based on antecedent conditions and flows through the season.

*Typical extent:* This action will contribute flows to the Peel River between Chaffey Dam and the Namoi River.

*Approvals:* Consult with NSW agencies (Water NSW, OEH, NSW Office of Water and NSW Fisheries) before implementing this action.

**7. In-channel freshes in the Peel River**

*Watering action:* Contribute to freshes to the Peel River, in conjunction with other flows to provide habitat, support ecological proceses, maintain riparian vegetation, and support fish movement, spawning, recruitment and condition.

*Standard operational considerations:*

* Water will be delivered in conjunction with other in-stream freshes or water sources, such as tributary flows or a Water Sharing Plan stimulus flow. Stimulus flows only occur from Chaffey Dam when certain storage conditions are met. In the absence of a stimulus flow, releases of environmental water will be timed to take advantage of tributary inflows or other water deilvery/transfers.
* Water will be delivered to the Peel River from Chaffey Dam as in-channel flows, and will be managed within standard water delivery arrangements
* Water orders will be developed in conjunction with Water NSW to ensure operational feasiblity and the achievement of environmental objectives
* The actual flow rate will be determined based on antecedent conditions and flows through the season.

*Typical extent:* This action will contribute flows to the Peel River between Chaffey Dam and the Namoi River.

*Approvals:* Consult with NSW agencies (Water NSW, OEH and Fisheries) Local Land Services, peak irrigation bodies and landholders before implementing this action.

# Long-term water availability

## Commonwealth environmental water holdings

The Commonwealth holds the following entitlements in the Namoi River Valley:

* General Security – Upper Namoi
* General Security – Lower Namoi
* General Security – Peel

The full list of Commonwealth environmental water holdings can be found at [www.environment.gov.au/topics/water/commonwealth-environmental-water-office/about-commonwealth-environmental-water/how-much](http://www.environment.gov.au/topics/water/commonwealth-environmental-water-office/about-commonwealth-environmental-water/how-much) and is updated monthly.

## Other sources of environmental water

There are currently no other sources of held environmental water in the Namoi River Valley.

## Planned environmental water

In addition to water entitlements held by environmental water holders, environmental demands may also be met via natural or unregulated flows and water provided for the environment under rules in state water plans (referred to as ‘planned environmental water’).

The Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated Water Sources (2004) provides for planned environmental water and stock and domestic (replenishment flows) releases. Water deliveries to meet irrigation orders may provide baseflows in some sections of the Namoi River. Supplementing releases with Commonwealth environmental water may increase the potential for environmental objectives to be achieved and assist with delivery efficiency.

The Peel Water Sharing plan has provision for a stimulus flow of 1 600 ML to be released under certain conditions. Once the capacity of Chaffey Dam has been increased the stimulus flow will be replaced by a 5 000 ML Environmental Contingency Allowance.

The Bureau of Meteorology provides a seasonal streamflow forecasting service, which estimates the potential for low, median or high flows for the coming three months ahead.

# Next steps

## From planning to decision making

It is important to distinguish between planning and operational decision making. As shown in Figure 7, planning allows the Office to manage the environmental water portfolio in a holistic manner and is an exercise in developing a broad approach or intention, based on the key drivers (demand and supply).

Decision making throughout each year builds on the intention by considering in more detail the specific prevailing factors and additional factors such as costs, risks, constraints to water delivery and market conditions.

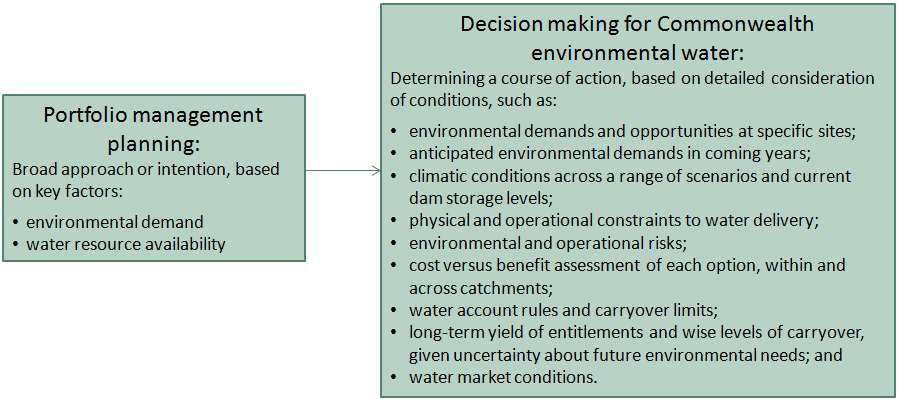


Figure 4: Planning and decision-making for Commonwealth environmental water use

## Further information

For further information on how the Office plans for water use, carryover and trade, please visit our web site [www.environment.gov.au/topics/water/commonwealth-environmental-water-office](http://www.environment.gov.au/topics/water/commonwealth-environmental-water-office)

* Water use: [www.environment.gov.au/topics/water/commonwealth-environmental-water-office/assessment-framework](http://www.environment.gov.au/topics/water/commonwealth-environmental-water-office/assessment-framework)
* Carryover: <http://www.environment.gov.au/topics/water/commonwealth-environmental-water-office/portfolio-management/carryover>
* Trade: *Discussion Paper – Trade of Commonwealth Environmental Water* and *Commonwealth Environmental Water Trading Framework:* <http://www.environment.gov.au/water/cewo/trade/trading-framework>

# Attachment A – Expected outcomes from the Basin-wide environmental watering strategy

**Expected outcomes from the Basin-wide Environmental Watering Strategy (MDBA 2014) that are relevant to the Namoi are described below.**

**RIVER FLOWS AND CONNECTIVITY**

Baseflows are at least 60 per cent of the natural level.

Contributing to a 10 per cent overall increase in flows in the Barwon-Darling.

A 10–20 per cent increase in the frequency of freshes and bankfull.

**VEGETATION**

Maintain the current extent of forest and woodland vegetation and non woody vegetation.

No decline in the condition of black box, river red gum and coolibah.

Improved recruitment of trees within black box and river red gum communities

**Vegetation extent**

| Area of river red gum (ha) | Area of black box (ha) | Area of coolibah (ha) | Shrublands | Non–woody water dependent vegetation |
| --- | --- | --- | --- | --- |
| 6 100 | 800 | 4 200 |  | Closely fringing or occurring within the Namoi River |

**WATERBIRDS**

Maintain current species diversity

Increase Basin-wide abundance of waterbirds by 20–25 per cent by 2024

A 30–40 per cent increase in nests and broods (Basin-wide) for other waterbirds

Up to 50 per cent more breeding events (Basin-wide) for colonial nesting waterbird species

**FISH**

No loss of native species

Improved population structure of key species through regular recruitment, including:

* Short-lived species with distribution and abundance at pre-2007 levels and breeding success every 1–2 years
* Moderate to long-lived with a spread of age classes and annual recruitment in at least 80% of years

Increased movements of key species

Expanded distribution of key species and populations

**Key species for the Namoi include:**

| Species | Specific outcomes | In-scope for Commonwealth environment water in the Namoi? |
| --- | --- | --- |
| Freshwater catfish (*Tandanus tandanus*) | Expand the core range of at least 3-5 existing populations (Candidate sites include Namoi River) | Yes |
| Golden Perch (*Macquaria ambigua*) | A 10–15 per cent increase of mature fish (of legal take size) in key populations | Yes |
| Murray cod (*Maccullochella peelii peelii*) | A 10–15 per cent increase of mature fish (of legal take size) in key populations | Yes |
| Olive perchlet (*Ambassis agassizii*) | Establish or improve the core range of 2-5 additional populations (Candidate sites include Namoi River) | Possibly (Once widespread. Current extent unknown in Namoi) |
| River blackfish (*Gadopsis marmoratus*) | Establish or improve the core range of 2–4 additional populations (candidate sites include Namoi Rivers) | Yes |
| Silver Perch (*Bidyanus bidyanus)* | Expand the core range of at least 2 existing populations (Candidate sites include Namoi River) | Possible (Current extent unknown in Namoi) |
| Southern purple-spotted gudgeon (*Mogurnda adspersa*) | Establish or improve the core range of 2–5 additional populations – (priority catchments include Namoi) | Possibly (Once widespread. Current extent in Namoi unknown. Some stocking has occurred) |

Important Basin environmental assets for native fish in the Namoi

| Environmental asset | Key movement corridors | High Biodiversity | Site of other Significance | Key site of hydrodynamic diversity | Threatened species | Dry period / drought refuge | In-scope for C’th water |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Namoi (Gunnedah to Walgett) | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Peel River downstream of Chaffey Dam |  | Yes |  | Yes | Yes | Yes | Yes |
| Namoi River upstream of Keepit Dam |  | Yes |  | Yes | Yes |  | No |

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1. For full details on the Basin annual environmental watering priorities refer to the MDBA website at http://www.mdba.gov.au/what-we-do/environmental-water/environmental-watering-priorities [↑](#footnote-ref-1)