

# **SUBMISSION BY THE COMMONWEALTH ENVIRONMENTAL WATER OFFICE ON THE DRAFT NAMOI REGIONAL WATER STRATEGY**

## **About the Commonwealth Environmental Water Holder**

The Commonwealth Environmental Water Holder (CEWH) is a statutory position established under the *Water Act 2007* (Cth). The Water Act gives effect to relevant international agreements on the environment, including the Ramsar Convention on Wetlands of International Importance, and conventions that protect endangered and migratory species. The CEWH is responsible for managing the Commonwealth holdings of environmental water to protect and restore the environmental assets of Murray-Darling Basin including rivers, lakes, wetlands, and floodplains, in the national interest. The CEWH's function is a part of the sustainable management of the Basin's water resources over the long-term for environmental, social, cultural, and economic outcomes. The CEWH is supported by the Commonwealth Environmental Water Office (CEWO).

## **1. General comments**

The CEWO appreciates the opportunity to provide feedback on the draft regional water strategies being prepared by NSW. The CEWO recognises the significance of these regional water strategies in planning for, and balancing, the demands on river systems across NSW for future decades. Some of the options may have environmental benefits and impacts, or both, depending on different flow sequences. Given the CEWO's interest and expertise across the Murray-Darling Basin and the statutory responsibilities of the CEWH, we request the opportunity to be involved in future discussions to help test and refine the regional water strategies and any projects or programs that may arise from them.

This submission focuses on the draft Namoi regional water strategy. The Namoi catchment supports a variety of instream aquatic habitats, lagoons, floodplain watercourses, wetlands, riparian vegetation, and woodlands. These ecosystems support many water-dependent species, including migratory or threatened waterbirds such as the Australasian bittern and threatened and iconic native fish species such as silver perch and Murray cod. Parts of the Namoi catchment form part of the Lowland Darling River Aquatic Ecological Community. The rivers, creeks and wetlands of the Namoi River Valley hold significant spiritual and cultural importance for Aboriginal people, including the Kamilaroi/Gamilaraay/Gomeroi and other Nations for whom this river system is significant. Environmental water managers hold a relatively small proportion of licences in this catchment, so Water Sharing Plan rules and complementary measures are particularly important to protect and restore these valuable ecosystems.

In the Namoi River Valley, the CEWH manages general security entitlements in the Upper and Lower Namoi water sources and the Peel water source. The CEWO therefore has an interest in the water sharing rules for both of these regulated water sources. The arrangements for groundwater systems and interception activities such as floodplain harvesting also affect river health. The CEWO recognises how severe the recent drought has been for communities across the Basin, including in the Namoi valley, and acknowledges that the volume of water in storages reached

critically low levels at times. The CEWO also recognises the primacy of securing water supplies for critical human water needs, specifically for Tamworth, and the challenges in achieving a balance in the sharing and use of water under these circumstances that meets the objectives of the *NSW Water Management Act 2000*. In the first instance, consideration ought to be given to maximising the benefits of already existing infrastructure. The enlarged Chaffey Dam and connecting pipeline to Dungowan will have significantly improved water security. Policy options should be explored to improve the intended utility of these investments and assessment made of the need for further infrastructure investment.

Under normal operating conditions, the *NSW Water Management Act 2000*<sup>1</sup> prioritises water for the riverine environment and basic landholder rights, as noted in Table 3 of the draft Namoi regional water strategy. During a severe water shortage, critical human needs are prioritised, followed by the needs of the environment. In the prioritisation process to develop a package of options, the priorities under the *Water Management Act 2000* would be an important consideration – e.g. options that provide for lower priority needs at the expense of higher priority needs would need consideration of appropriate offsets. How the various options are prioritised and packaged will affect the outcomes, including environmental outcomes, along the Peel, Namoi and Barwon Rivers.

The *Water Management Act 2000* gives a high priority to environmental values. The vision for the regional water strategies includes the need for the delivery of ‘*healthy, reliable and resilient water resources for a liveable and prosperous region*’. Sustaining healthy rivers, wetlands and floodplains is necessary to have a ‘*liveable and prosperous region*’. For example, a healthy native fish community in rivers is important for social and cultural outcomes, and ecosystem function is important for maintaining good water quality. The CEWO has an important role in contributing to this vision by protecting and restoring environmental assets to the extent possible with the Commonwealth holdings. The CEWO suggests adding a definition of a ‘healthy and resilient environment’ to the box of definitions in the Namoi regional water strategy. This would give more of a balanced emphasis on the environment and be more consistent with the *Water Management Act 2000*.

The sequence in which the options are implemented will be an important determinant of the outcomes through time. We suggest that options are implemented in a sequence that is consistent with the *Water Management Act 2000*, with those options contributing to securing critical human water needs and critical environmental needs being implemented first. Provision for critical environmental needs should consider matters of national environmental significance and state listed threatened species and ecological communities. For example, supporting the needs of endangered species, like silver perch and Murray cod and Bell’s turtle, for which the populations in the Namoi and Peel are particularly important. Consideration of critical refuge and the needs of more sedentary species such as mussels that may be more vulnerable to increases in the frequency of drought and cease-to-flow events will be important. For transparency and to increase community confidence, independent bodies such as the Natural Resources Commission could be asked to publish advice on whether the packages and sequence of implementation under the Namoi regional water strategy are consistent with the *Water Management Act 2000*.

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<sup>1</sup> *NSW Water Management Act 2000* - <https://legislation.nsw.gov.au/view/html/inforce/current/act-2000-092>

The CEWO also acknowledges the potential significant connections between the regional water strategies and the Basin Plan, particularly with regard to the protection of planned environmental water and accreditation following any changes in water infrastructure. For transparency and clarity, the community may appreciate a clear explanation of the relationship between the NSW regional water strategies and the Commonwealth Basin Plan, which both set a forward agenda for how water is to be managed at a broad scale for multiple outcomes.

### ***1.1. Managing the impacts of a highly variable climate***

The draft Namoi regional water strategy provides new information from NSW on likely climate and water availability changes in the region. This is a significant contribution and important when managing the Commonwealth holdings in a highly variable and changing climate.

#### *Carryover*

Environmental demands and water availability vary between years. The CEWO uses carryover to help meet a range of environmental demands across multiple years. For example, environmental water has been carried over and managed to meet environmental demands in the Namoi catchment during some drier periods. The ability to access carryover is critical to meeting environmental demands in a variable climate, particularly in dry years where environmental damage can occur. During the recent drought, remaining general security water in carryover accounts was put in drought reserves in the Namoi to meet critical human needs and was unavailable for general security users. If there are risks associated with the delivery of carryover within a particular year, these need to be clearly articulated months in advance to help all water users make informed decisions when planning for the use of their allocated water.

The ability to carryover water in the Peel would improve the ability to meet environmental demands when needed most needed as well as improve water use efficiency with potential to coordinate Peel and Namoi flows to meet environmental outcomes.

### ***1.2. Current and future challenges***

#### *Reduced water availability and ability to maintain environmental assets*

The CEWO recognises that NSW is being forward-looking by analysing future climate scenarios in a ground-breaking way. To increase community confidence in water planning, it is important that new climate data and updated modelling are shared with the community and with relevant agencies, including the MDBA and relevant NSW agencies. Consideration should be given to offering public interpretation and explanation of the modelling results by an expert and/or facilitated discussions on the implications of water resources in the valley from these climate scenarios. There should be an agreed and consistent basis for the planning and management of water resources.

Higher temperatures, increased evaporation, changes to rainfall patterns and associated flows, and changes to the intensity and duration of dry and wet periods are all emerging risks to the environment. These risks have the potential to significantly impact water dependent ecosystems and the achievement of environmental water requirements as specified in the Namoi Long-Term Water Plan, the Basin Environmental Watering Strategy and the Basin Plan.

Some of the options in the Namoi regional water strategy increase the regulation of water, including the proposed new Dungowan Dam, additional weirs and re-regulating structures in the Namoi and Peel rivers. These proposals may exacerbate these impacts and if approved may need to be packaged with offsets that would have counterbalancing environmental benefits.

The potential for reduced water availability from climate change is concerning for many users of water, including environmental water managers. Any such reductions in water availability would have implications for the ability to maintain some environmental assets. This includes the endangered aquatic ecological community in the natural drainage system of the lowland Darling River Aquatic Endangered Ecological Community, which includes the Namoi and Peel rivers, and is listed under the *NSW Fisheries Management Act 1994*. Strategies for mitigating risks to the environment are required, with the baseline to at least maintain the current level of health and resilience or, ideally, to improve health and resilience.

Within this context, it would be helpful for the Namoi regional water strategy to set out a complete water balance for the catchment under a drying climate that includes further information on the risks to the environment, to basic landholder rights, and to other water users. It is important to include estimates of the extraction from unlicensed works and interception activities, such as farm dams and floodplain harvesting for completeness. Even if there is uncertainty around those figures, it is important to understand the likely scale of impact on the water balance of all uses of water in the region. Such uses are expected to become more significant under a drying climate. The work being done to implement the NSW Floodplain Harvesting Policy may support this.

#### *Drought operations*

During extreme dry conditions, river operators in northern valleys may use a range of practices such as ceasing deliveries beyond a certain point in the river, block releases and dam wall debiting to preserve the longevity of supply from the dams. These practices reduce connectivity and groundwater recharge, impacting upon aquatic animals and river and wetland health. They can also have profound social and cultural implications: sometimes negative, sometimes positive. These practices should only be used occasionally and during extreme circumstances and not become more standard operational practice in the pursuit of system efficiencies, particularly if they are implemented so that any savings are provided for lower priority uses under the *Water Management Act 2000*. Options for supporting critical environmental needs during a range of conditions need to be developed.

The process of re-starting rivers after dry times or cease-to-flow conditions needs to be carefully managed regardless of the water source. Protocols that guide the best way to re-start flows in the river to minimize risks (e.g. water quality, fish death) and conditions (stratification, leaf litter) should be developed with advice from relevant agencies and experts (including DPIE-EES, DPI Fisheries, environmental water managers).

If the climate changes consistently with predictions, storage management such as the period and volume for essential supplies and allocation processes may need to be reviewed and modified to reduce the risk of drought operation practices such as block releases and quarantining of carryover becoming implemented more often. Striking the balance between providing water allocations now and the risk of more frequent occurrence of stage 3 and stage 4 under the NSW

Extreme Events Policy in the future is important and all water users including the CEWO should be involved in this discussion.

### *Connectivity*

Improving river connectivity between the Peel and the Namoi, and between the Namoi River and the Barwon-Darling, is important for achieving environmental outcomes. Water resource development and changing rainfall and inflow patterns have already impacted connectivity between the Namoi and Barwon rivers. However, under the climate predictions, reduced water availability and inflows may exacerbate reductions in connectivity. We would be concerned if any of the options to address inefficiency and improve water supply reliability resulted in increased barriers and a reduction in flows along the length of the Peel and Namoi to the Barwon. This may reduce planned environmental water and be inconsistent with the Basin Plan. Investigating strategies such as option 22 (connectivity with downstream systems) will be important in maintaining and improving connectivity with the Barwon River.

Consistent with this principle of connectivity being applied across the northern basin, held environmental water from the Peel River should be protected from re-regulation and extraction once it enters the Namoi River. This water was acquired from licences associated with properties along the regulated Peel River system. Prior to its acquisition, this water would have been extracted out of the Peel River and would not have flowed into the Lower Namoi water source to be available for extraction or re-regulation by downstream users. Therefore, held environmental water from the Peel River should be protected when it joins the Namoi River. This would provide connectivity benefits, supporting ecosystems downstream and enabling deliveries of held environmental water from the Peel and Namoi to be coordinated for a range of other environmental benefits, contributing to Long-Term Water Plan and Basin-wide environmental watering strategy outcomes.

The Namoi regional water strategy should aspire to package up options that provide an adequate level of river connectivity for resilience and health while achieving other benefits. Water from Namoi and Peel can provide significant flow contributions into the Barwon River.

Connectivity should be considered across multiple regional water strategies in the northern Basin. For the Barwon-Darling to be healthy and resilient, the contribution of each tributary to the Barwon-Darling should have some proportionality to the natural distribution, and there should be enough flow in the Barwon-Darling with an appropriate temporal distribution.

### *Operation and maintenance of existing and new infrastructure*

To maximise the effectiveness of all water sources to meet environmental water requirements in the Long-Term Water Plan and the outcomes in the Basin Plan, existing infrastructure such as fishways, regulators and cold water pollution mitigation measures (e.g. multi-level offtakes, fishways/fish locks) must be operated appropriately, regularly maintained and fixed in a timely manner. The delayed implementation of fish passage in the Namoi catchment following under NSW legislation as part of dam safety upgrades highlights the challenges associated with these types of infrastructure projects. The fish lock on Mollee Weir has been in disrepair for most of the time since it was constructed. While, the second fishway committed to by NSW as part of the offset package, on Gunidgera weir, has not been constructed in the last decade.

Operational protocols for infrastructure should be developed with input from relevant agencies such as DPIE-EES, DPI Fisheries, DPIE-Water, environmental water managers, and relevant experts. These protocols should be made publicly available to increase transparency. The effectiveness of the infrastructure and operation should be reviewed to ensure they are meeting their objectives (i.e. fish passage, mitigation of cold-water pollution) and identify whether improvements can be made.

The Namoi regional water strategy does not indicate who would be responsible for the operation and maintenance costs associated with the proposed water security measures, particularly Dungowan Dam and other new weirs and regulators. We request further information on the likely operating and maintenance costs associated with these options and the implications for water users in the catchment. Without this information it is difficult to weigh up the potential benefits and costs associated with the water security measures.

### *Accountability and transparency*

Improved accountability and transparency would be supported by making the following information and documents publicly available:

- Explanation of resource availability scenarios and allocation processes and associated risks for different licence types, particularly under future climate scenarios.
- Any WaterNSW environmental water management plan(s) or procedures for river operations in each valley (e.g. management of rise and falls of releases; water quality risks; river restart procedures etc).
- Operational protocols and procedures for infrastructure such as various fishways, locks, weirs and re-regulating structures; and cold water pollution mitigation measures (e.g. multi-level offtakes, destratification technology).
- Reasonable use guidelines for the take of stock and domestic water and basic landholder rights.

## **2. Comments on options**

### *Consistency with the National Water Initiative*

Jurisdictions agreed under the National Water Initiative that investment in new or refurbished water infrastructure would only proceed where assessed as economically viable and ecologically sustainable prior to the investment occurring (recognising that some small community services may not be economically viable but were required for social and public health obligations)<sup>2</sup>. This high level principle was reaffirmed in the recommendations by the Productivity Commission's draft report on National Water Reform<sup>3</sup>. Assessment of the various options under the Namoi regional water strategy should be consistent with these commitments and principles.

### *Consistency with the Basin Plan*

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<sup>2</sup> National Water Initiative, CI 69

<https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/water/Intergovernmental-Agreement-on-a-national-water-initiative.pdf>

<sup>3</sup> Productivity Commission, National Water Reform 2020, Draft Report.

<https://www.pc.gov.au/inquiries/current/water-reform-2020/draft/water-reform-2020-draft.pdf>

Management of water resources across the Murray-Darling Basin must be consistent with the Basin Plan. We expect that any new option implemented under the Namoi regional water strategy would also be subject to the requirements of the Basin Plan. Options that involve changes to water resource plans, including significant changes to water management infrastructure, are likely to require accreditation by the Murray-Darling Basin Authority. New infrastructure or rules will need to ensure extraction is kept within Sustainable Diversion Limits<sup>4</sup> and protect the effectiveness of planned environmental water. Improvements in reliability of supply may need to be offset to be compliant with the Sustainable Diversion Limits. Packaging of options will likely be required to achieve the outcomes envisioned by the Namoi regional water strategy without compromising the overarching Basin Plan objectives.

### *Environmental benefits and impacts*

Some options may result in environmental benefits, and some could result in impacts. In general, options that lead to changes or reductions in river flows may compromise the achievement of environmental water requirements in the Long-Term Watering Plan and outcomes in the Basin Environmental Watering Strategy. Potential impacts of the proposed options on matters of national environmental significance, such as threatened and migratory species, would need to be assessed in accordance with the *Environment Protection and Biodiversity Conservation Act 1999* in addition to any requirements under relevant NSW environmental legislation such as the *Biodiversity Conservation Act 2016*.

As identified in the strategy, many areas of the Namoi region are heavily reliant on groundwater for towns, industry and the environment. The strategy also notes that in some areas, increased groundwater demand is causing a decline in groundwater levels. Options that result in increased reliance on and use of groundwater may further impact groundwater levels, recharge rates and ongoing sustainability of groundwater resources. These impacts may be further exacerbated under climate change with predictions of less rainfall, runoff, and greater persistence of dry conditions. Increased use of groundwater may impact on groundwater dependent ecosystems, river flows and wetlands. This may increase environmental demands in river and wetland systems and the volume of water required to meet those demands. Further consideration of groundwater options should be informed by additional work on the sustainability of groundwater systems, such as options 26, 27, 29, 35, and 43.

### *Feedback on specific options*

The CEWO supports the following options as a high priority for further investigation:

- 15. NSW Fish Passage Strategy
- 17. Cold water pollution mitigation measures
- 18. Riparian habitat restoration and re-establishing threatened species
- 19. Diversion screens to prevent fish extraction at pump offtakes

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<sup>4</sup> MDBA submission on infrastructure.

<https://www.parliament.nsw.gov.au/lcdocs/submissions/69285/0125%20Murray%20Darling%20Basin%20Authority.pdf>

- 20. Modification and/or removal of existing priority flood work structures causing adverse impacts
- 22. Improve connectivity for downstream systems
- 23. Revise water sharing plan provisions for planned environmental water
- 46.to 56. Under the heading of *Improving the recognition of Aboriginal people’s water rights, interests and access to water*

The CEWO is particularly interested in, and possibly concerned about, the potential environmental impacts of the following options:

- 1. New Dungowan Dam
- 2. Inter-regional pipelines, including inland diversion of water from the Macleay or Barnard rivers to the Namoi region
- 3. Intra-regional pipelines
- 4. Suspension of water sharing plan provisions for planned environmental water for critical needs in the Peel River
- Any options involving infrastructure that may change river flows, such as those included in options 31 and 41

While the CEWO does not reject these options outright, they could reduce the volume of water that reaches the valuable environmental assets in the Namoi, Peel or the Barwon rivers and, depending on how they are operated, may not achieve the same or better environmental outcomes.

The CEWO recognises the primacy of securing water supplies for critical human water needs, and specifically for Tamworth. However, any additional options should be considered in light of the already increased water security provided by the recently constructed Chaffey Dam to Dungowan pipeline and the enlarged Chaffey Dam. First consideration ought to be given to much cheaper and less impacting policy options that allow the existing structures to be better targeted for this purpose. This could include introducing drought reserves, rebalancing shares considering the original purpose of the Chaffey Dam enlargement or amending water account rules.

More detailed comments on specific options are provided in Attachment 1. While the comments in Attachment 1 are provided on individual options, when implemented together as a package the final suite of selected options may in combination provide a range of positive cultural, economic, social and environmental outcomes. The CEWO requests to be part of ongoing discussions regarding the options that are selected for implementation under the Namoi regional water strategy.

**Attachment 1. Comments on the Long list of options and government commitments in the draft Namoi regional watering strategy**

Option	Comments
<p><b>1. New Dungowan Dam</b></p>	<p>The economic and environmental costs and benefits of a new dam need to be assessed. Dungowan Creek contributes flows and variability to the Peel River as well as supporting a range of aquatic biota and ecological processes. A new larger dam on Dungowan Creek and operation of the associated pipeline may impact the hydrological regime, riparian vegetation, water dependent biota including fish populations and threatened species, water quality and temperature in Dungowan Creek and the Peel River. The impacts of a new Dungowan Dam on the environment including matters of national environmental significance require careful assessment. Measures to minimise and mitigate potential environmental impacts through rules and dam operation should be considered if the option proceeds.</p> <p>Reductions and changes in river flows may also compromise the achievement of environmental objectives in the Peel Water Sharing Plan and achievement of environmental water requirements in the Namoi Long-Term Water Plan for Dungowan Creek, the Peel River and possibly the Namoi. This could potentially increase environmental demands in the Peel and Namoi rivers that need to be met by other water.</p> <p>Any implications for the Basin Plan, the Sustainable Diversion Limit, the Peel and Namoi Water Sharing Plans, planned environmental water, water security and licence holders need to be clearly identified and assessed. Responsibility for the operational and maintenance costs should also be clarified.</p>
<p><b>2. Inter-regional pipelines, including inland diversion of water from the Macleay or Barnard rivers to the Namoi region</b></p>	<p>The economic and environmental costs and benefits of inter-regional pipelines need careful evaluation. The impact on surface and groundwater systems, their associated biota, and ecological processes in both the originating and receiving water sources needs thorough assessment. Potential environmental impacts depend on the location and the scale of the water transferred via pipelines. Moving water between regions can also be energy intensive.</p> <p>From an environmental perspective, assessment of the options individually or as part of a package should consider the impacts on:</p> <ul style="list-style-type: none"> <li>• the hydrological regime in rivers and creeks affected by the various pipelines</li> <li>• the environment</li> <li>• groundwater recharge</li> <li>• planned environmental water</li> <li>• hydrological connectivity and potential increases in periods of cease-to-flow</li> <li>• refuges</li> </ul>

Option	Comments
	<ul style="list-style-type: none"> <li>• end of system flows and contributions to downstream catchments</li> <li>• the volumes of water required to deliver water orders and run the river</li> <li>• water security</li> <li>• cultural and basic landholders rights.</li> </ul> <p>Any implications for the Basin Plan, the Sustainable Diversion Limit, new diversions not covered by the Sustainable Diversion Limit, respective Water Sharing Plans, planned environmental water and licence holders also need to be clearly identified and assessed.</p> <p>Any facilitated impacts of this option also need to be carefully considered. Facilitated impacts are those actions and impacts which are made possible by the action (e.g. increase in growth, development, land use changes etc).</p>
<b>3. Intra-regional pipelines</b>	<p>Piping water can improve delivery efficiency, substantially reducing the volume of water required for transmission from the source to the demand point. However, if the original flow path is a river, it is important to recognise that this water meets a range of environmental needs in the river and can have a role in recharging groundwater – it is not just a ‘loss’. Assessment of the environmental impacts of the various pipelines is required as particular options are developed further.</p> <p>Clarity about how the potential savings will be managed is important. There may be co-benefits realized if some of these water savings are used to meet environmental water requirements or support drought reserves. An integrated understanding of the implications and opportunities for these proposals should be explored early in the design phase so that risks can be mitigated and multiple benefits can be realised.</p>
<b>4. Suspension of water sharing plan provisions for planned environmental water for critical needs in the Peel River</b>	<p>Suspension of the daily release rule may impact on the aquatic and riparian ecosystems of the Peel River, groundwater recharge, basic landholder rights, planned environmental water and environmental water requirements in the Long-Term Water Plan. Cease-to-flow conditions can lead to stratification and poor water quality in refuge pools and result in death of fish and other aquatic biota.</p> <p>During suspension of daily release rules provisions to support critical environmental needs (e.g. refuge pools and other emergency requirements) are required. For example, enabling suspended releases to be accumulated and released if needed.</p> <p>Critical environmental needs are the second priority under the extreme events policy and appropriate measures should also be in place to provide for these needs.</p> <p>See response to Option 23 for comments on making permanent changes to the daily release rule.</p>

Option	Comments
<b>5. Investigate the use of advanced water treatment technologies for towns</b>	<p>Options that increase water supply and result in reduced reliance on supply from water storage may be beneficial where there are no significant impacts on the quantity or quality of surface and groundwater systems. Options that result in an increased reliance on groundwater need careful evaluation to ensure the ongoing sustainability of the groundwater resource is not compromised.</p> <p>Any facilitated impacts of this option such as an increase in development and land use change would need careful consideration.</p>
<b>6. Reuse, recycling and stormwater projects</b>	<p>Options that increase water supply and result in water savings and reduced reliance on supply from the regulated storage system may be beneficial. Assessment of impacts on the quantity or quality of surface and groundwater systems would be required. Stormwater projects could also improve the quality of run-off to the Peel and Namoi rivers.</p>
<b>7. Connect the Peel Regulated River System to Quipolly Dam</b>	<p>As with the other pipeline options the economic and environmental costs and benefits of intra-regional pipelines need careful evaluation. The impacts on surface and groundwater systems, their associated biota, and ecological processes in both the originating and receiving water sources should be assessed thoroughly. Impacts on the water security and reliability on water users, Water Sharing Plan and planned environmental water would need to be determined.</p>
<b>8. Managed aquifer recharge investigations and policy</b>	<p>Further investigation of this option would need to assess the potential environmental risks and impacts on both aquifers and surface water systems. Any changes to planned environmental water and surface and groundwater water sharing plans would need to be assessed.</p>
<b>9. Reliable access to groundwater by towns</b>	<p>Undertaking a strategic review of current and forecast groundwater use would be beneficial. The review should consider potential environmental impacts on surface and groundwater sources, planned environmental water, implications for the Sustainable Diversion Limit and relevant Water Sharing Plan. Option 26 <i>Improved understanding of groundwater processes</i> and 43 <i>Sustainable access to groundwater by all users</i> would be important inputs to this option, particularly where options will increase reliance on groundwater resources.</p>
<b>11. Investigate the development of a water access licence for critical human needs</b>	<p>It is unclear about the need for a new licence category. The NSW water management framework already has a range of licences that are prioritised under the <i>Water Management Act 2000</i>. These include local water utility and domestic and stock licences, which are already given highest priority. High security regulated river licences are also prioritised over some other licence categories. The identification of critical human water needs within a valley and downstream is very important, however adding an additional access</p>

Option	Comments
	<p>licence isn't necessarily required to do this and could add confusion to or undermine the existing licensing framework.</p> <p>Further, the major limitation to meeting highest priority needs in the 2017 to 2020 was not the identification process or the licencing, but the physical volumes of water in storage to deliver those needs in the furthest reaches of the river system.</p> <p>Therefore, instead of creating a new access licence, consideration ought to be given to creating a drought reserve in storage. This would achieve a similar intent towards meeting critical human needs but would be more effective in reserving physical water supplies for extended dry periods when they are really needed. While a drought reserve may result in a small reduction to general security allocations, including for the CEWH, it would improve the reliability of delivery of those allocations. It could be designed to partially offset the benefits already realised for general security licence holders of an enlarged Chaffey Dam. A drought reserve could enable releases to the Peel river to be made for longer, benefitting critical human needs as well as a wide range of landholders, licence holders, First Nations peoples and the environment.</p> <p>The CEWO requests further opportunities to be involved in option discussions, particularly regarding any provisions to support critical environmental needs, which may also be required.</p>
<p><b>15. NSW Fish Passage Strategy</b></p>	<p>We are supportive of further development and implementation of this option and consider it a high priority.</p> <p>Providing effective fish passage for all life stages is critically important to improve native fish populations in the Basin. Addressing barriers to fish passage through the Namoi-Peel catchment would improve the ability to achieve outcomes for native fish for environmental water deliveries and other flows. Fishways need to be operated appropriately and maintained to ensure they are effective in providing fish passage.</p> <p>We note that there has been little progress on fishways in the northern Basin, including the Namoi, despite there being some outstanding obligations for NSW to construct fishways as part of several dam safety upgrades including in the Namoi. Many of these obligations have existed for over 10 years. Mollee fish lock has needed repair for longer than it has been operational; and the fishway on Gunidgera Weir is long overdue.</p>
<p><b>16. Providing incentives to landholders to conserve and rehabilitate riparian,</b></p>	<p>Actions that rehabilitate riparian, wetland and floodplain vegetation and reduce erosion may improve water quality, habitat and river health in the Namoi and Peel rivers. This may complement delivery of water for the environment and improve achievement of environmental outcomes.</p>

Option	Comments
<b>wetland and floodplain vegetation</b>	
<b>17. Cold water pollution mitigation measures</b>	<p>Implementation of effective options to ameliorate cold water pollution in the Namoi-Peel catchment are a high priority. This would improve riverine productivity, spawning and recruitment of native fish and other aquatic species. It would improve outcomes for native fish and other biota from all water deliveries including water from for the environment. There are also social benefits of addressing cold water pollution for riverine recreation activities.</p> <p>There have been significant delays in implementing the Cold Water Pollution Strategy adopted by NSW in 2004. We understand there are outstanding requirements to construct a multi-level offtake as part of the Keepit Dam Upgrade. Chaffey Dam has a multi-level offtake; however, we understand that the presence of algal blooms limits the use and effectiveness of the structure in ameliorating cold water pollution. Improved operational protocols or alternative approaches may be required to effectively mitigate cold water pollution from Chaffey Dam.</p> <p>Technologies that address a range of water quality risks, including cold water pollution, should be considered holistically for their multiple benefits. Mitigation measures and technologies need to be effective, reliable, and reasonably easy to implement, adjust and maintain. Operational protocols need to be developed with input from relevant agencies (e.g. DPI Fisheries and DPIE-EES) and implemented.</p>
<b>18. Riparian habitat restoration and re-establishing threatened species</b>	<p>We are supportive of this option and consider it a high priority. Rehabilitating and protecting riparian vegetation, fencing, re-snagging, habitat mapping and other activities would help reduce erosion, improve water quality and improve aquatic and riparian habitat in the Namoi and Peel rivers. These actions would complement delivery of water for the environment.</p> <p>The Namoi Long-Term Water Plan also describes potential management actions which may also be relevant to this option.</p>
<b>19. Diversion screens to prevent fish extraction at pump offtakes</b>	<p>We are supportive of further development of this option and consider it a high priority.</p> <p>Diversion screens would reduce the loss of native fish from waterways and improve the ability to achieve environmental outcomes for native fish from environmental water deliveries and other flows.</p>

Option	Comments
<p><b>20. Modification and/or removal of floodwork structures causing adverse impacts</b></p>	<p>We are supportive of further development of this option and consider it a high priority.</p> <p>Options to modify or remove identified priority floodplain structures and barriers that impede delivery of water to priority wetland and floodplain areas should be a priority.</p>
<p><b>21. Implementation of surface water quality mitigation measures</b></p>	<p>We are supportive of further development of this option. Real-time water quality monitoring of key parameters such as dissolved oxygen and temperature would be beneficial during both normal and drought operations and help inform river re-start protocols.</p> <p>Options for improving water quality both within storages (e.g. mixing, bubblers or other options) and releases from storages should be considered in these options and may link with cold water pollution mitigation.</p>
<p><b>22. Improve connectivity with downstream systems</b></p>	<p>We are supportive of further development of this option as a high priority.</p> <p>Restoring longitudinal connectivity throughout the catchment and into the Barwon is critical for supporting many of the ecosystem functions in these systems including improving riverine productivity, water quality, native fish populations and other aquatic animals. Improved connectivity also has significant cultural, social and recreational benefits.</p> <p>Protecting and restoring connectivity within and between water dependent ecosystems is an objective of the Basin Plan and an expected outcome of the Basin Wide Environmental Watering Strategy. Protection of environmental water along the length of the Peel and Namoi rivers would help improve connectivity along these systems.</p> <p>Options that maintain ecosystems during dry times to help protect refuges and native fish populations should also be considered.</p> <p>The CEWO requests further opportunities to be involved in option discussions.</p>

Option	Comments
<p><b>23. Revise water sharing plan provisions for planned environmental water</b></p>	<p>We are supportive of further development of this option as a high priority.</p> <p>Reviewing the planned environmental water provisions in the Water Sharing Plans to better meet environmental water requirements in the Long-Term Water Plan would be beneficial. Rules to protect environmental water from extraction and re-regulation should also be considered as part of the review.</p> <p>One of the options mentioned is the replacement of the daily release in the Peel River with a volume that can be actively managed to meet environmental needs. This would require detailed consideration of the environmental impacts of permanently changing this option, including on matters of national environmental significance. The rules around when that volume would be available would need careful consideration as the existing environmental contingency allowance is only available when general security allocations have been made. This could potentially leave long periods of time when there is no water in Peel River, particularly in the reaches downstream of the dam.</p> <p>Any implications for the Basin Plan, planned environmental water and ability to meet environmental water requirements in the Long-Term Water Plan would need to be determined.</p>
<p><b>24. Improve understanding of water use in unregulated water sources</b></p>	<p>A better understanding of water availability and extraction in unregulated sources would better support system management, implementation and compliance with water sharing plan rules and water licenses. This improved understanding should include floodplain harvesting in these areas. Information may help understand environmental impacts, potential changes in levels of access.</p>
<p><b>25. Ability to redirect supplementary flows that are in excess of needs</b></p>	<p>We support this option, including that the NSW environmental water manager has a central role in decisions about the direction of excess supplementary flows. Where feasible this may allow supplementary flows to support flows required for native fish populations and other aquatic biota, end of the system requirements and connectivity with the Barwon-Darling. Some of this water may be under the 90:10 rule. Consultation mechanisms would need to be provided in real time, and possibly include input from any future Namoi Environmental Water Advisory Group.</p>
<p><b>26. Improved understanding of groundwater processes</b> <b>27. Implementation of a groundwater quality monitoring program</b></p>	<p>We are supportive of further development of this suite of groundwater options.</p> <p>Improved understanding of groundwater processes and sustainable access to groundwater is essential to implement existing water sharing plans and any options in the strategy that increase reliance on groundwater resources. This is even more important under the climate change projections.</p> <p>Improving understanding of groundwater quality would help inform appropriate use and identify risks and impacts on the environment and</p>

Option	Comments
	groundwater dependent ecosystems.
<b>29. Protecting ecosystems that depend on groundwater resources</b>	We are supportive of options to improve knowledge and protection of groundwater dependent ecosystems. This would help improve understanding of the potential impacts to these systems from water resource development, climate change, groundwater extraction and other factors.
<b>30. Improving information about impacts from State Significant Development and State Significant Infrastructure projects on water</b>	Improving transparency around the impacts from State Significant Developments and State Significant Infrastructure projects on water and other aspects of the environment is important. Community engagement is important.
<b>32. Improve water supply reliability</b>	<p>The environmental impacts (including impacts to matters of national environmental significance) of any of the proposed infrastructures projects under this option would need to be assessed.</p> <p>Additional weirs and increasing the height of existing infrastructure can have significant impacts on the hydrological regime and associated ecology of the affected rivers. Reductions and changes in river flows may further compromise the achievement of environmental watering requirements in the Long-Term Water Plan for the Namoi and Peel rivers. Additional infrastructure often leads to additional barriers to movement of aquatic fauna and can change flowing habitats to more still habitats.</p> <p>Tributary flows play an important role in riverine productivity, carbon and nutrient cycling and fish spawning, movement, and recruitment requirements. Capturing and reducing these flows can have significant impact on riverine ecology including native fish and lateral and longitudinal connectivity.</p> <p>Any impacts on planned environmental water, reliability and potential growth in use and the Basin Plan should be assessed. The distribution of any efficiency savings will be critical to this.</p> <p>The CEWO requests further opportunities to be involved on discussions on the proposed infrastructure options.</p>
<b>35. Implementing the Great Artesian Basin Strategic Management Plan</b>	Implementation of the Great Artesian Basin Strategic Management Plan is important. Engagement with Aboriginal Nations will be important.

Option	Comments
<p><b>36. New drought operational rules (Namoi and Peel rivers)</b></p>	<p>During extended dry sequences adequate, transparent, and timely management and sharing of water is critical in the Namoi-Peel valley. We would be concerned if drought operations became more standard practice, for example:</p> <ul style="list-style-type: none"> <li>• ceasing deliveries beyond certain points of the river;</li> <li>• dam wall debiting;</li> <li>• increased use of block releases with rivers being stopped more often with associated environmental risks of re-starting rivers (e.g. fish death events).</li> </ul> <p>Options such as storage management and allocation processes may need to be reviewed and modified to reduce the risk of drought operation practises becoming more common under climate predictions.</p> <p>Any new drought operational rules and procedures need to:</p> <ul style="list-style-type: none"> <li>• clearly identify both critical human and environmental needs within the Namoi and Peel systems;</li> <li>• identify how these needs will be addressed during extended dry sequences;</li> <li>• be clear and transparent;</li> <li>• assess the potential impacts to the environment;</li> <li>• address how tributary flows, supplementary and first flush events will be managed to support requirements in the Peel, Namoi and Barwon-Darling systems;</li> <li>• address processes and strategies for restarting rivers;</li> <li>• ensure these practises are only used during extreme circumstances; and</li> <li>• identify the impacts of any new drought operation rules on the basin plan Sustainable Diversion Limits, water sharing plans, planned environmental water and licence holders.</li> </ul> <p>The recent extended dry sequence resulted in shutting off the Lower Namoi and parts of the Peel River which resulted in, declining refuge pool water quality, fish rescues and fish deaths. The package of options implemented under the regional watering strategy should specifically identify measures to mitigate risks to the health and resilience of the environment during dry times.</p>

Option	Comments
<b>37. Review of water accounting and allocation process</b>	<p>We are supportive of further development of this option.</p> <p>With a changing climate, water allocation processes may need to be reviewed and adjusted. The review should consider:</p> <ul style="list-style-type: none"> <li>• historic inflow sequences, trends and climate change/variability while balancing the risk to allocation reliability. Further consideration should be given to whether the worst sequence of record is used, or whether there are points at which the allocation process is adjusted if the climate is becoming progressively drier, or other options;</li> <li>• the volume required to cover essential supplies and conveyance and how long these supplies should be kept in storage;</li> <li>• ensuring adequate water has been set aside for conveyance prior to announcing allocations against licences;</li> <li>• ensuring carryover volumes are secure and if not, be clear about any associated risks for carryover;</li> <li>• priorities in the <i>Water Management Act 2000</i>;</li> <li>• how to meet critical environmental and human needs;</li> <li>• the implications of any changes for the Water Sharing Plans, Basin Plan, Sustainable Diversion Limit, planned environmental water and all licence holders.</li> </ul>
<b>38. Investigation of licence conversions</b>	<p>Further consideration of this option would need to:</p> <ul style="list-style-type: none"> <li>• Ensure there is adequate and appropriate consultation on the option and conversion factor;</li> <li>• Assess impacts on the suite of different entitlement types and implications for storage management and allocation processes;</li> <li>• Consider how to make it equitable while balancing the risks and implications for providing high security water to remote locations;</li> <li>• Consider any implications for volumes in storage for conveyance; and</li> <li>• Consider whether there are any impacts or implications of license conversion for the Basin Plan, Sustainable Diversion Limit and Planned environmental water.</li> </ul> <p>Implementation of options need to be consistent with the Basin Plan. Options that reduce planned environmental water, change the Sustainable Diversion Limit, or increase reliability may need to be offset to continue to be compliant. Changes in the Water Resource Plans may require accreditation.</p>
<b>39. Improved data collection</b>	<p>Improved groundwater and surface water data collection (e.g. water flows, water levels and quality parameters) would be beneficial for river operation and environmental water management and implementation of surface and groundwater water sharing plans.</p>

Option	Comments
<p><b>41. Maintain amenity for regional towns during drought</b></p>	<p>The environmental impacts, including any impacts to matters of national environmental significance, of any of the proposed infrastructure options need to be assessed thoroughly.</p> <p>Additional weirs on the Peel River and Narrabri Creek could have significant impacts on the hydrological regime and associated ecology of these systems. Reductions and changes in river flows may further compromise the achievement of the environmental watering requirements in the Long-Term Water Plan for the Namoi and Peel rivers. Additional infrastructure often leads to additional barriers to movement of aquatic fauna and can change flowing habitats to more still habitats.</p> <p>Maintaining minimum water levels in dams for recreational purposes would need to consider impacts on water security and allocations for other users and the ability to support critical human and environmental needs.</p>
<p><b>43. Sustainable access to groundwater by all users</b></p> <p><b>44. Improved transparency in managing groundwater resources sustainably</b></p>	<p>We are supportive of further development of this suite of groundwater options.</p> <p>Improved understanding of groundwater processes and ensuring sustainable access to groundwater is essential to implement existing water sharing plans and options in the strategy that increase reliance on groundwater resources. This is even more important under the climate change predictions. Increasing the transparency and certainty around groundwater management would also be beneficial.</p>
<p><b>45. Land use change and population growth impacts on water resources</b></p>	<p>We are supportive of further development of this option.</p> <p>Land use change, increase in development and population growth can have a significant impact on water resources, demands, and water availability. Some land use changes can intercept significant volumes of surface and/or groundwater. A strategic approach to land use planning and changes would be beneficial and ensure that appropriate planning, management, and regulatory measures are implemented where necessary to protect the integrity of the entitlements system and achieve environmental objectives.</p> <p>Any impacts of land use change on the Basin Plan, sustainable diversion limits and water resource plans need to be identified and carefully assessed.</p>
<p><b>46. Integrating Aboriginal knowledge into groundwater decision making</b></p> <p><b>47. Culturally appropriate water knowledge program</b></p> <p><b>48. Water dependent cultural practices and</b></p>	<p>The rivers, creeks and wetlands of the Namoi River Valley hold significant spiritual and cultural importance for Aboriginal people, including the Kamilaroi/Gamilaraay/Gomeroi and other Nations for whom this river system is significant.</p> <p>The CEWO acknowledges the Traditional Owners and their Nations have deep cultural, social, environmental, spiritual and economic connection to their lands and waters. Healthy rivers and full waterholes also contribute significantly to the health and wellbeing of Aboriginal communities along the rivers. The CEWO supports improving recognition of Aboriginal people's</p>

Option	Comments
<p><b>site identification project</b></p> <p><b>49. Secure flows for water dependent cultural sites</b></p> <p><b>50. Shared benefit project (environment and cultural outcomes)</b></p> <p><b>51. Regional Cultural Water Officer employment program</b></p> <p><b>52. Establish a regional Aboriginal Water Advisory Committee</b></p> <p><b>53. Water allocations for Aboriginal communities</b></p> <p><b>54. Co-management investigation of Travelling Stock Reserves</b></p> <p><b>55. Aboriginal cultural water access licence review</b></p> <p><b>56. River Ranger Program</b></p>	<p>water rights, interests and access to water and looks forward to the journey ahead. The suite of proposed options would build capacity, support inclusion and real participation of Aboriginal people in water planning and management.</p> <p>Integrating Aboriginal knowledge into decision-making related to groundwater and surface water systems would improve the ability to provide for important cultural values or support or protect culturally significant sites.</p> <p>Building capacity of, and providing opportunities for, Aboriginal communities to participate in discussions around water management is very important. This could be further supported by the proposed Cultural Water Officer program. Participation on any future Namoi/Peel Environmental Water Advisory Group will also be important.</p> <p>Improved understanding of cultural values and traditional ecological knowledge would improve the ability of environmental water managers, river operators and water policy makers to support cultural values and sites with a range of water deliveries and water sharing plan rules.</p> <p>Options that provide access to cultural licenses would enable Aboriginal communities to directly manage water to support their values and sites.</p> <p>The Commonwealth holdings are to protect and restore environmental assets, particularly those subject to international agreements, but can have regard for Aboriginal cultural values. The CEWO would be willing to work with an Aboriginal Water Advisory Committee, should it be formed. This would enhance the ability of the CEWO to have regard for Aboriginal cultural values and achieve complementary cultural outcomes.</p> <p>Co-management of travelling stock reserves or other places may improve Aboriginal access and connection to Country and enhance the ability to more influence river management and improvements in river health.</p> <p>An Aboriginal River Ranger Program could provide numerous environmental and community benefits. For example, it could improve the health of rivers, lagoons and riparian areas, wetlands and floodplains and recovery of Country. An aboriginal River Ranger Program is also likely to complement other river repair activities in the catchment and outcomes from the use of water for the environment. Ensuring the Program is sustainable with a source of funding will be important to the continued implementation and success of the program.</p>

## Additional options

<p><b>Identify critical environmental needs and how to support them</b></p>	<p>Under normal operating conditions, the <i>NSW Water Management Act 2000</i> prioritises water for the riverine environment and basic landholder rights. During a severe water shortage, critical human needs are prioritised, followed by the needs of the environment. There are numerous options to address critical human needs in the strategy but limited specific options to address critical environmental needs. Some of the proposed options may also impact on achievement of critical environmental needs.</p> <p>Critical environmental needs within the Namoi region should be identified. This should consider matters of national environmental significance and state listed threatened species and ecological communities. For example, supporting the needs of endangered species, like silver perch and Murray cod, Bell’s turtle, for which the populations in the Namoi and Peel which are particularly important. Consideration of important refuges and the needs of more sedentary species such as mussels that may be more vulnerable to increases in the frequency of drought and cease-to-flow events may be important.</p> <p>Options for how these needs will be addressed during normal operations and extended dry sequences should be identified. This could inform and link to other options such as 4, 23, 22, 25, 29, 36 and 37.</p>
<p><b>Review the ability to include General Security carryover provisions in the Peel system</b></p>	<p>Currently, there are no carryover provisions for General Security licences in the Peel Regulated River Water Sharing Plan. Lack of carryover encourages users to use water within the year and does not allow management of water and risks over multiple years.</p> <p>Environmental demands vary between years. Having the ability to accrue and manage environmental water over multiple years would enhance the ability to target environmental demands when water is most urgently needed. For example, in wetter years, access to carryover would allow water to be held in storage to be used to meet environmental demands in subsequent years when the demands may be higher. Carryover rules in other valleys has enabled the CEWH to successfully manage water over multiple years to meet a range of environmental demands and has associated social and community benefits. Through carryover, water could be accrued across years to a scale that is helpful. Other General Security users may also benefit from multi-year planning of water use and risk, rather than to ‘use or lose it’.</p> <p>The CEWO acknowledges that the storage behaviour, spill and reset and allocations may change from current practice if carryover were to be introduced in the Peel. However, carryover is used in many other valleys, which could inform implementation of carryover rules in the Peel.</p>

<b>Prevent re-regulation of Held Environmental Water from the Peel to the Namoi</b>	<p>Consistent with this principle of connectivity being applied across the northern basin, held environmental water from the Peel River should be protected from re-regulation and extraction once it enters the Namoi River. This water was acquired from licences associated with properties along the regulated Peel system. Prior to its acquisition, this water would have been extracted out of the Peel River and would not have flowed into the Lower Namoi water source to be available for extraction or re-regulation by downstream users. Therefore, held environmental water from the Peel River should be protected when it joins the Namoi River. This would provide connectivity benefits, supporting ecosystems downstream and enabling deliveries of held environmental water from the Peel and Namoi to be coordinated for a range of environmental benefits, contributing to LTWP and Basin-wide environmental watering strategy outcomes.</p>
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