

Draft Macquarie- Castlereagh Regional Water Strategy



What we heard

Public consultation: October - November 2022

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Acknowledgement of Country

The NSW Government acknowledges First Nations people as its first Australian people and the traditional owners and custodians of the country's lands and water. First Nations people have lived in NSW for over 60,000 years and have formed significant spiritual, cultural and economic connections with its lands and waters.

Today, they practice the oldest living culture on earth.

The NSW Government acknowledges the First Nations people/ Traditional Owners from the Macquarie-Castlereagh region as having an intrinsic connection with the lands and waters of the Macquarie-Castlereagh Regional Water Strategy area. The landscape and its waters provide First Nations people with essential links to their history and help them to maintain and practice their traditional culture and lifestyle.

We recognise that Traditional Owners were the first managers of Country and incorporating their culture and knowledge into the management of water in the region is a significant step toward closing the gap.

Under this regional water strategy, we seek to establish meaningful and collaborative relationships with First Nations people. We will seek to shift our focus to a Country-centred approach, respecting, recognising and empowering cultural and traditional Aboriginal knowledge in water management processes at a strategic level.

We show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places where First Nations people are included socially, culturally and economically.

As we refine and implement this regional water strategy, we commit to helping to support the health and wellbeing of waterways and Country by valuing, respecting and being guided by First Nations people/Traditional Owners, who know that if we care for Country, it will care for us.

We acknowledge that further work is required under this regional water strategy to inform how we care for Country and ensure First Nations people/Traditional Owners hold a strong voice in shaping the future for Indigenous/Aboriginal and non-Aboriginal communities.

Artwork: Image courtesy of Nikita Ridgeway



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Introduction

The NSW Government has developed regional water strategies as part of a broader suite of long-term strategies aimed at improving the security, reliability, quality and resilience of the state's water resources for current and future generations.

The regional water strategies adopt a long-term approach to strengthening and building the reliability and quality of the state's water resources.

They combine climate evidence and economic and ecological analysis with local and regional insights from water service providers, local councils, communities, Aboriginal people, and other stakeholders.

The Macquarie-Castlereagh Regional Water Strategy (strategy) examines future water-related risks and challenges in the region, and the actions that need to be taken to manage water availability and security risks.

The NSW Department of Planning and Environment (the department) has taken a staged approach to develop the strategy, with early steps designed to identify a long list of options which, after consultation and analyses, were narrowed down to a shortlist of priority areas and proposed shortlisted actions.

Figure 1 NSW regional water strategies



Consultation

The strategy was developed over several years in consultation with water users, Aboriginal groups, environmental and local government representatives and government agencies.

The purpose of consulting with the community was to share information, gather feedback and seek views on what should be included in the final strategy.

Public consultation on the draft strategy occurred from late 2020 to late 2022.

Public consultation phase 1 (2020)

The draft strategy was first placed on public exhibition from September to December 2020. It included detailed analysis of the challenges and opportunities in the Macquarie-Castlereagh region as well as a long list of options with the potential to address the challenges and opportunities.

Feedback from this public consultation phase and the department's response is published in the Macquarie-Castlereagh Region – Draft Regional Water Strategy What We Heard (2021) report.

Following the first round of consultation and further technical analysis, the long list of options was distilled into 29 proposed shortlisted actions designed to address water security priorities and challenges specific to the Macquarie-Castlereagh region.

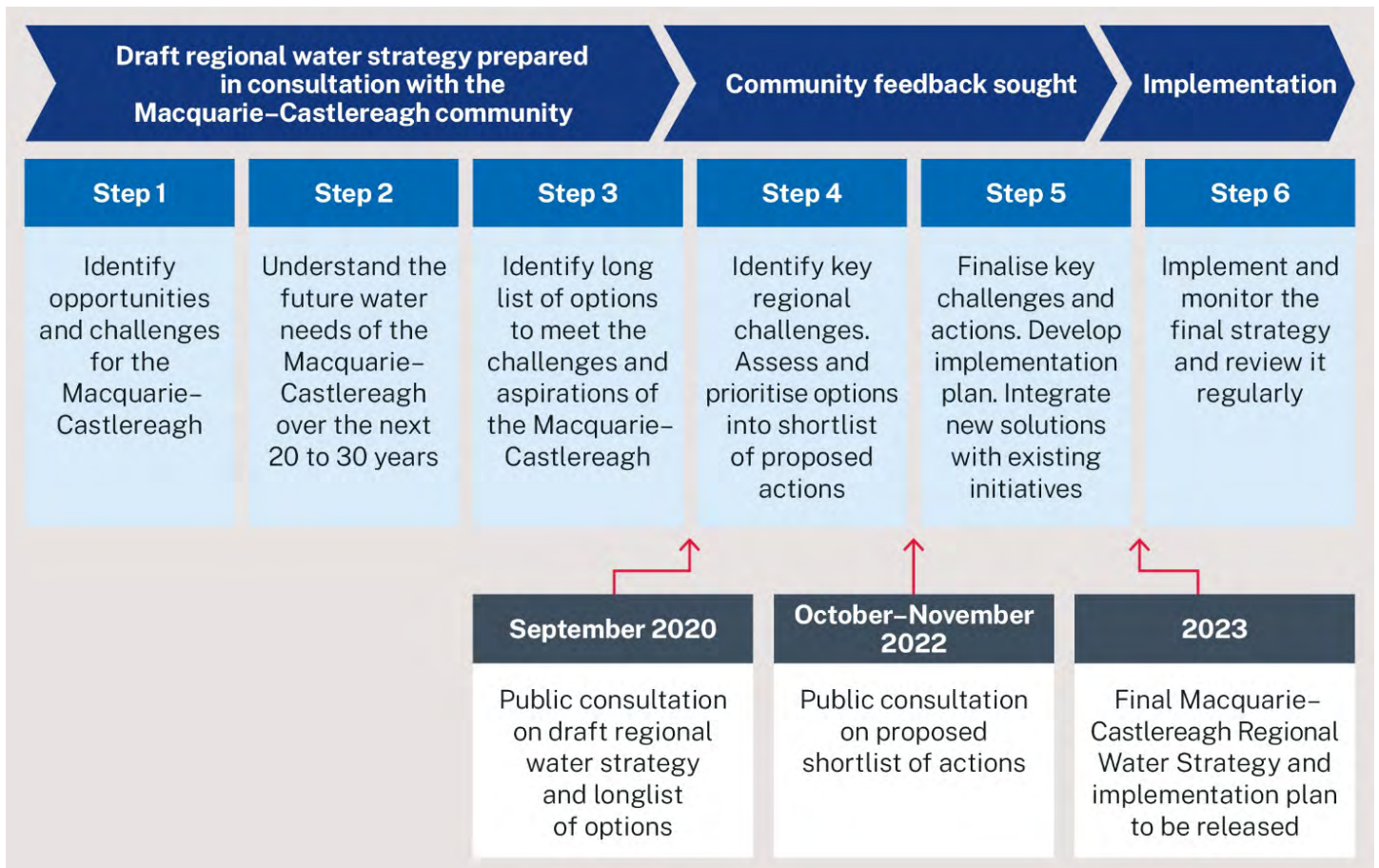
Public consultation phase 2 (2022)

A second draft of the strategy – comprising an Executive Summary and Consultation Paper – was placed on public exhibition from 5 October to 18 November 2022. During public consultation, the department engaged with:

- Aboriginal communities
- Local councils
- Landholders
- Business and industry groups
- Peak organisations
- Community members and organisations.

See Figures 3, 4, and 5 for a summary of engagement activities and participation.

Figure 2 Regional water strategy implementation process



Feedback

The department received 64 formal submissions and over 100 people participated in engagement sessions about the strategy (see Figures 3 and 4) during public consultation phase 2.

This report summarises ‘what we heard’ during the public consultation phase 2 process. It includes input and analysis from fillable forms and submissions as well as feedback and insights from the public and targeted information sessions.

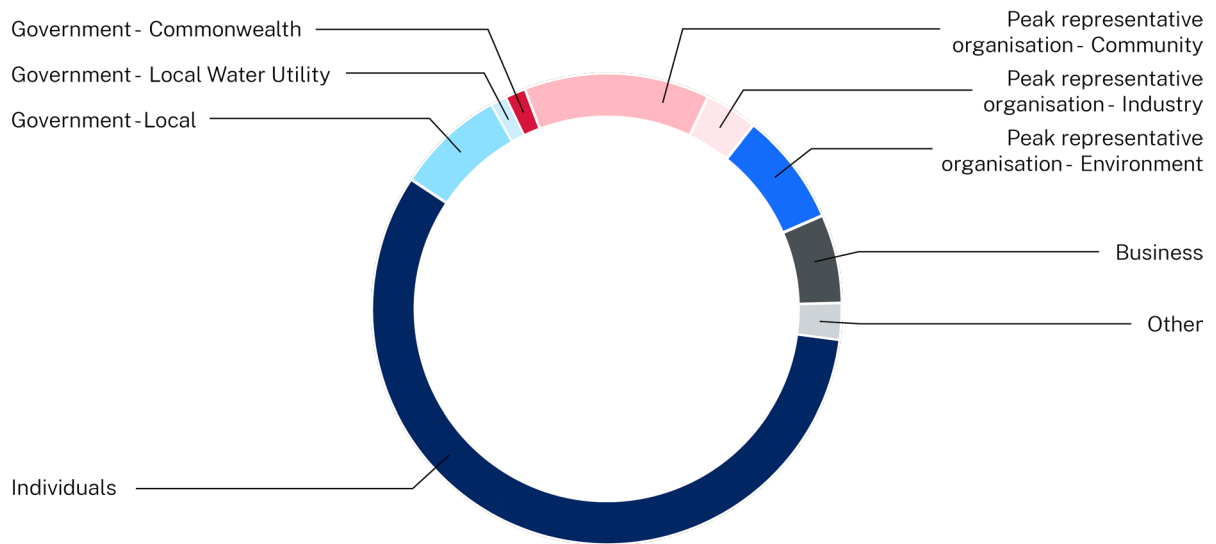
Figure 3 Macquarie-Castlereagh public consultation phase 2 timeline of activities



Figure 4 Macquarie-Castlereagh public consultation phase 2 engagement at a glance



Figure 5 Overview of submissions by stakeholder type



What we heard: key insights from phase 2 consultation

- We heard support for developing a long-term water strategy for the region and many requests from the community and stakeholders for continued collaboration when implementing its actions.
- Community feedback was supportive of long-terms actions to improve ecological resilience, industry sustainability and Aboriginal water rights.
- While there was a recognition that water security for Orange and Bathurst needs focused attention, there were mixed views on the best long-term option to secure water for these cities.
 - **Critical human needs definition:** there were concerns raised around the operation of council-owned dams during the last drought and why businesses within towns are considered “critical human needs” and a higher priority than businesses outside of towns.
 - **Making better use of existing water:** there was strong support for water conservation and efficiency measures. We heard support for innovative water supply options, including purified recycled water and stormwater harvesting, as long as the programs do not impact on the environment or downstream water users.
 - There were mixed views on **infrastructure options**. While some suggested that new infrastructure in the region could secure water for the upper Macquarie, others urged government to adequately consider downstream impacts on the environment and on landholders.
- In the west of the catchment, we heard:
 - support for **additional off-river storages**.
 - mixed views about **raising the full supply level of Burrendong Dam**. Some stakeholders suggested it needed to be prioritised for implementation, while others were concerned that storing more water in the flood mitigation zone could erode planned environmental water provisions.
 - concern about the environmental impacts of **Gin Gin weir** and whether it should be removed, updated, or replaced.
 - concern from landholders on the **regulated effluent creeks** that changing their operation would reduce water availability and impact riverine health.
 - general support for using **groundwater more sustainably** and improving knowledge about groundwater systems. Community members suggested that the strategy needed a greater focus on groundwater, given its importance in parts of the region.
 - concern about implementing the **NSW Floodplain Harvesting Program** in its current form.
 - Concern that the **drought of record** needs updating and that water allocations should consider the updated information.

What we will do

We will use this feedback to shape the final Macquarie-Castlereagh Regional Water Strategy and develop its supporting implementation plan. We will undertake targeted engagement with stakeholders before the final strategy is released.

In the interim period we have published two additional technical papers to help inform future discussions on the strategy. They cover:

- Analysis of the option to investigate changing the operation of regulated effluent creeks during dry periods
- Analysis of the option to use some of the flood mitigation storage in Burrendong Dam for water supply¹

¹ Fact sheets are available at <https://www.dpie.nsw.gov.au/water/plans-and-programs/regional-water-strategies/public-exhibition/macquarie-castlereagh-regional-water-strategy>

Feedback on strategy priorities and proposed actions



*Image courtesy of John Spencer,
Department of Planning and Environment. Macquarie Marshes, NSW.*

This section provides an overview of the issues and themes that were most commonly raised by those who made submissions and attended engagement sessions during phase 2 of consultation about the strategy.

Priority 1: Secure water supplies for growing regional cities and towns

General comments

- We heard strong support for towns having multiple sources of water supply and a desire for government to act quickly to progress actions under this priority to ensure we are prepared before the next drought.
- Cooperation across various levels of government and different stakeholders will be required to meet the urban water challenges of the future. Stakeholders suggested that governance arrangements should provide an integrated, catchment-based approach to managing water, and early and meaningful community input should inform urban water supply planning.
- There were calls for better support for local government with water sensitive urban design, including rainfall-independent water supplies and subsidies for water tanks, and implementing water savings and management strategies.
- Some stakeholders suggested that data from recent droughts and floods needs to be considered in urban water supply planning.
- We heard the volume of water being captured by on-farm dams needs to be assessed for compliance with the harvestable rights allowance in the upper Macquarie.
- Proposed actions that received widespread support for priority implementation included:
 - Confirm the level of water security needed to support regional cities (Proposed action 1.1)
 - Develop guidelines for managing extreme events in the upper Macquarie (Proposed action 1.3)
 - Adopt a stronger focus on urban water conservation and efficiency (Proposed action 1.4)
 - Invest in innovative water supply options (Proposed action 1.5)
 - Reduce uncertainty in groundwater security for the region's towns (Proposed action 1.7).

Moving towards an 'enduring level of supply' approach for long-term town water supply planning

Proposed action 1.1 in the consultation paper canvassed an option around moving towards an 'enduring level of supply' for urban water security planning, rather than planning urban water around an 'acceptable risk' of running out of water. Existing NSW Government guidelines suggest town water supplies should meet a minimum service level. This roughly correlates to town water supplies being able to withstand a drought that has the probability of occurring once in 1,000 years. The enduring supply concept proposes to move away from the above concept and involves determining the amount of water needed to meet the minimum needs of the community during periods of prolonged and extreme drought, irrespective of how long the drought lasts.

Determining this level of supply is informed by:

- the minimum amount of water needed for the cities or large towns to keep running
- how long residents and businesses are willing to endure severe water restrictions
- the willingness of communities to pay for increased water security.

The importance of this action was widely recognised, with suggestions for it to be expanded to all towns.

Some stakeholders suggested that defining an enduring level of supply needs to be informed by community consultation, consider climate change and understand environmental, social and cultural impacts of supply options.

Water for critical human and environmental needs in drought

Proposed action 1.3 suggested developing guidelines that provide a clear framework for how and when water releases from town dams in the upper Macquarie could change during extreme droughts, and the communication protocols associated with the changes.

- Some stakeholders raised strong concerns about the operation of Bathurst's town water supply dams in the 2017–2020 drought, particularly the ceasing of daily releases from Winburndale Dam and the reducing of water allocations for irrigators below Chifley Dam in the middle of the growing season. Stakeholders around Bathurst specifically requested that the guidelines in proposed action 1.3 do not consider suspending environmental or daily water releases from council-owned dams under any circumstance.
- We heard concerns about water supply to town-based businesses being considered a 'critical human need' and having a higher priority in extreme drought than businesses and livestock industries downstream of town dams. In particular, there were equity concerns about Bathurst Regional Council watering parks and gardens when flows from Winburndale Dam for stock and domestic needs had ceased.
- Councils want stronger and earlier triggers to be able to conserve remaining water in dams during extreme dry periods for critical human needs.
- All stakeholders wanted clearer rules around when irrigation access below council-owned dams would be restricted or reduced.
- There was support for ensuring environmental releases are protected from extraction and that water sharing plans have clearer rules around when these flows may need to change. Currently, Bathurst and Orange councils are required to make environmental water releases from council-owned dams, measured at a gauge further downstream of the dam. Water users take water between the dam and gauging point. During droughts, significantly more water is required to be released from the dams to meet the required flows at the gauge, which can impact on water security for councils during droughts.
- Across the board there were requests for:
 - a clear definition of what constitutes critical human and environmental needs are in the upper Macquarie.
 - clear and transparent rules for how town water supply dams will be operated to meet critical human, environmental and cultural needs in drought, including when water allocations will be reduced.
 - clarity and transparency about how decisions will be made and communicated during extreme events to help meet critical needs.
 - recognition of previously negotiated environmental flow rules from Suma Park Dam.

Urban water conservation and innovative supply options

- Urban water conservation measures such as household rainwater tanks, greywater systems and water restrictions were considered cost-effective, sustainable options.
- There was support for purified recycled water, managed aquifer recharge and stormwater harvesting, including calls for the early adoption of recycled water technologies to meet water demand in the short to medium term, not the long-term. Stakeholders suggested that demonstration plants are needed to communicate and showcase purified recycled water.
- Support for these options was conditioned on them not impacting on the environment or downstream water users. We heard that downstream water users are concerned about their water security if Orange Councils' Stormwater Harvesting stage 2 scheme is approved.
- There were some views that re-use and recycling actions could improve the quality of run-off to the local rivers and streams. There was also support for councils receiving credit for the return of treated water back to the catchment, as this would assist baseflows in local streams.

Long-term water security solutions for the upper Macquarie

Proposed action 1.6 shortlisted a number of infrastructure and non-infrastructure options that could support medium to long-term water security for towns in the upper Macquarie.

There were mixed views on the short-listed options and strong sentiment that the economic and environmental costs and benefits of any additional infrastructure, including its impacts on water availability for downstream users and communities, should be evaluated carefully (Feedback on Proposed Action 1.6: Plan for the best long-term augmentation solution for the upper Macquarie). We received requests to implement proposed action 1.1 (confirm the level of water security needed to support regional cities) prior to implementing this action.

Table 1 Feedback on Proposed Action 1.6: Plan for the best long-term augmentation solution for the upper Macquarie

Proposed option	Feedback
<p>Supply water to the Upper Macquarie from the Fish River or Cox's River catchments</p>	<ul style="list-style-type: none"> • This option was generally supported and there were suggestions that it should be the highest priority. However, the timing of when water may become available from the Fish River and Cox's River catchments is uncertain and depends upon transitioning coal dependent industries near the Lithgow region. • We heard that progressing this option for the benefit of towns in the upper Macquarie should not come at the cost of reducing water security for Oberon or towns in the Upper Blue Mountains. • There were suggestions to consider creation of a pipeline network between Burrendong Dam, Oberon Dam and Lake Rowlands.
<p>Supply of water from the Lachlan Valley to the upper Macquarie</p>	<ul style="list-style-type: none"> • This option received mixed views. There were some views that Wyangala Dam should function as a regional water source and that inter-regional pipeline connections should be progressed as a priority. Other stakeholders suggested that water transfer between catchments should be avoided or only used in emergency situations.
<p>Additional water from the Wambuil / Macquarie River for Orange</p>	<ul style="list-style-type: none"> • While the analysis to date suggests that an additional 300-400 ML/year of water taken by Orange City Council is unlikely to significantly impact downstream needs, there were many concerns about this option, mostly from stakeholders downstream of Orange. • There were suggestions that any increase in water taken by Orange City Council should only come from purchasing shares on the market.
<p>New infrastructure in the upper Macquarie, such as an Ulmarrah Dam at Dixons Long Point</p>	<ul style="list-style-type: none"> • There were both strong objections and strong support for a new dam in the upper Macquarie catchment. • Support for a new dam in the catchment revolved around the potential for it to help secure water for the towns and communities in the upper Macquarie. • Concerns related to potential impacts on the reliability of water for downstream users, and the cultural and environmental impacts of a new dam. Some stakeholders also questioned the likelihood of this option being realised. • We heard that if the option to increase the full supply level of Burrendong Dam (proposed action 2.3) is progressed, then it should consider how some of the additional water stored in Burrendong Dam could be used to support upper Macquarie towns through a pipeline.

Reliable and secure groundwater supplies for towns

- Groundwater is the primary or supporting water source for many towns in the catchment and as a result there was strong support for proposed action 1.7 (Reduce uncertainty in groundwater security for the region's towns).
- Councils are seeking more streamlined groundwater approval processes and there was some concern that the NSW Groundwater Strategy may not be specific enough to address local-level groundwater regulatory challenges. There was concern that local water utilities do not have the resources and skills to investigate and identify suitable groundwater sources.
- The consultation paper suggested that temporary licences to access groundwater could be issued during drought to help secure water for towns during extreme droughts. This received mixed feedback with some stakeholders requesting that further work is undertaken to ensure this does not lead to further declines in groundwater levels, impacts on groundwater dependent ecosystems, and other water users.
- We heard that actions resulting in an increased reliance on groundwater would need to ensure the ongoing sustainability of the resource is not compromised and that surface and groundwater dependent ecosystems are protected.
- It was suggested that the proposed groundwater actions should be informed by work to improve groundwater modelling (proposed action 3.1) and increasing knowledge of groundwater resources to inform future decisions on sustainable groundwater extraction limits (proposed action 3.4).

Priority 2: Reduce water security risks in the region's west

General comments

- This priority shortlisted actions that could efficiently deliver water to high priority needs in the region's west, reduce town water security risks and build drought resilience in the region without significantly reducing flows into the Macquarie Marshes or to the end of the system. It was suggested that this priority acknowledge that business as usual may not be an option under climate change as risks may be reduced but not eliminated.
- We heard that all options need to consider potential reductions to water availability for existing users in the Macquarie Valley.
- There was concern that the strategy focused too heavily on urban water security and the upper Macquarie catchment. Some respondents requested that more consideration be given to downstream communities, landholders and the environment, as well the Castlereagh catchment.
- We heard that water quality is a significant issue along the river system, including within the Macquarie Marshes, when flows cease. We heard suggestions to provide additional real-time water quality monitoring in both normal and drought operations and for river re-start protocols.
- There were also suggestions to conduct a state-wide investigation of PFAS contamination in aquifers, and to pipe water from the Great Artesian Basin in extreme droughts.
- Proposed actions that received widespread support for priority implementation included:
 - Raise Burrendong Dam's full supply level (Proposed action 2.3)
 - Investigate ways to improve connectivity with the Barwon–Darling on a multi-valley scale (Proposed action 2.4).

Investigate an additional off-river storage at Nyngan

- Proposed action 2.1 suggested an additional off-river storage at Nyngan. This option and the water delivery efficiencies it could provide were well supported. Some stakeholders suggested that alternative locations should be considered and cautioned that, if constructed at Nyngan, planning must avoid the leakage issues of the existing storage.
- The dependence of Cobar on water from the Wambuul / Macquarie River was considered a good reason for improving the efficiency of the water delivery system, with additional suggestions to replace the Albert Priest channel with a pipeline. It was suggested that the off-river storage should be sized to store two years of water supply for Nyngan, Cobar and

surrounding mines. We also heard that the proposal to upgrade the Nyngan to Cobar pipeline should feature as a specific action in the strategy.

- Concerns were raised about potential impacts on the threatened species population of olive perchlet in the Nyngan weir pool.

Changing the operation of regulated effluent creeks in dry periods

Gunningbar Creek, Crooked Creek and Duck Creek form part of a network of channels that branches off the main trunk of the Wambuul / Macquarie River near Warren. They are often termed the effluent creeks. During dry periods it can take a significant amount of water to be released from Burrendong Dam to provide flows for the basic landholder rights on the creeks. Proposed action 2.2 proposed to return the Gunningbar, Duck and the upper part of Crooked Creek to a more natural regime with occasional periods of no flow. This would be supported by investments in alternative ways to supply water to the essential stock and domestic needs in dry periods through bores or pipelines rather than the inefficient delivery of water down the creeks.

- There were requests for the department to undertake environmental studies before progressing with this option, with some stakeholders suggesting that the effluent creeks should be considered an extension of the Macquarie Marshes.
- Stakeholders requested the department publish clear information on when the pipeline would operate, how much water would be saved by changing the operation of the creeks and how any water savings that could result from the option would be managed.
- We also heard that there could be opportunities to trial this option in some creeks initially rather than implementing the option on all creeks.
- There were concerns that water security in the lower Bogan would be impacted, including the training facilities at Gongolgon for Aboriginal people. The effluent creeks are important recreational areas for landholders and the communities from nearby towns of Warren, Nyngan and Brewarrina.
- There were requests to consult the Nyngan Local Aboriginal Land Council about the cultural significance of the effluent creeks.
- There were questions about the possible route of the pipeline and what effect it would have on overland flows in the time of flood, as well as question about whether the pipeline would be affected by floodwaters.
- Some stakeholders supported more efficient ways of managing the catchment during dry periods and suggested that water savings be used to improve the water security of towns that rely on Burrendong Dam.

However, many stakeholders recognised that broad community support was needed to progress this action.

- Some respondents suggested that reducing the permanency of flows and introducing variability in Gunningbar Creek could be beneficial to the system, noting that there would need to be provisions to ensure the environmental water needs of the creek are met. However, some stakeholders sought assurance that these provisions would not rely on water currently held by environmental water managers to meet those needs.

Regional water security solutions for the region's west

Using some of the flood mitigation storage in Burrendong Dam for water supply

- Some stakeholders viewed this option as a priority, and the most cost effective and easiest to implement compared to major infrastructure proposals. There were requests for this option to be implemented as a priority.
- Other stakeholders were concerned about the potential impacts on the environment such as decreased dam spills resulting in failures of breeding events, erosion of planned environmental water, impacts on downstream river flows and connectivity with the Barwon River, impacts on and properties upstream of Burrendong Dam, increase in flooding risks downstream of the Burrendong Dam and if climate change (e.g., increasing intensity of rainfall events) would exacerbate these risks.
- Some stakeholders recommended that the full supply level be increased to 120% rather than the 113% proposed in the strategy.
- There were suggestions that the benefits of the water should be shared equally between irrigation, environment, town and Aboriginal needs.
- Councils in the Upper Macquarie requested that this option investigate a pipeline connection to upper Macquarie towns to help support the water needs of Orange, Bathurst and surrounding communities.
- Some stakeholders raised concerns that the strategy had not specifically shortlisted or progressed an action to update the drought of record in the region, citing that updating the drought of record would negate the need to progress raising the full supply level in Burrendong Dam or many of the other options in the strategy.

Gin Gin re-regulating project

Replacing the aged Gin Gin weir is an existing government commitment that is being assessed through a final business case.

- Respondents raised strong concerns about this option. Concerns revolved around its potential impacts on the downstream environment, cultural sites, businesses and landholders, and the impact of reduced flows on graziers in the Macquarie Marshes and the downstream irrigation industry.
- There were requests for more information about the ecological assessment of Gin Gin weir and concerns that the results did not show the impact of the ecological issues raised previously in the strategy and in the Macquarie Marshes. Some stakeholders suggested that the modelling used was insufficient to show impacts on seasonal and wet cycles, the impacts of the proposed weir may be far greater in the below average years, and it could result in increased losses of Wambuul / Macquarie River water to upstream aquifers.
- There were suggestions that the structure be removed or replaced by a new similar-sized structure to allow fish passage and to improve operational efficiencies.

Pipeline from Dubbo to Nyngan

- A number of submissions did not support this option. Concerns raised included the impacts on surface and groundwater systems, flora and fauna, and the ecological processes in the originating and receiving water sources.
- There were calls for the drought of record to be updated before this action is advanced and some preference for addressing the way water is allocated from Burrendong dam as a first step.
- Support for this proposed action revolved around the potential for the action to more efficiently deliver water during droughts. However, many stakeholders indicated they would not support this if the pipeline was operated instead of water flowing along rivers during non-drought periods.
- Some respondents gave conditional support for the pipeline if the Albert Priest Channel was going to be filled in.

Investigate ways to improve connectivity with the Barwon–Darling on a multi-valley scale

- Improving connectivity from the Wambuul / Macquarie River system to the Barwon-Darling was considered important for supporting riverine ecosystems and processes, productivity and water quality. It was also seen as providing important social and cultural benefits.
- There was acknowledgement that active management has helped to improve connectivity through the Wambuul / Macquarie River and into the Barwon River. However, there was support for additional ways to improve connectivity.
- There was support for in-valley and end-of-system flow targets to be included in the Unregulated Macquarie Water Sharing Plan. There was also support for better floodplain connectivity, connectivity targets at the Wambuul / Macquarie's junction with the Barwon-Darling and overall system health targets.
- Connectivity was noted by some respondents as an increasing priority in a drying climate.
- Those who did not support this action requested that no flows should bypass the Macquarie Marshes except during floods.



Image courtesy of Destination NSW, Lake Burrendong, Mumbil.

Priority 3: Support industry and community climate adaptation

General comments

- There was widespread support for investing in better information, mapping, water modelling and data to support decision-making and understanding of river and groundwater systems and extractions. There were suggestions for NSW water models and water use data to be made available to the Murray Darling Basin Authority for annual validation, valley scale audits and adjustments for real world performance.
- Better information was also viewed as essential for future planning under projected climate change scenarios.
- There was support for assisting community and businesses to adapt to climate change, including improving the water efficiency of current industries. However, some respondents suggested that the strategy does not go far enough to consider climate change and the risk of extreme droughts in the future.
- Proposed actions that encourage Aboriginal people's access to water and inclusion in water management decisions were strongly supported and were seen to advance the objectives of the Closing the Gap agreement.
- It was suggested that, as the catchment is fully allocated and water will become increasingly scarcer in the future, new industries need to be realistic about what water security can be achieved without significantly altering the water sharing system.
- Proposed actions that received widespread support for priority implementation included:
 - Invest in continuous improvement to surface and groundwater modelling (Proposed action 3.1)
 - Undertake research to inform reviews of groundwater extraction and condition limits (Proposed action 3.4)
 - Develop ongoing arrangements for participation of local Aboriginal people in water management (Proposed action 3.5)
 - Support place-based initiatives to deliver cultural outcomes for Aboriginal people (Proposed action 3.6)
 - Support the development of new water related Aboriginal business opportunities in the Macquarie–Castlereagh region (Proposed action 3.7).

Greater focus on groundwater in the Macquarie-Castlereagh catchment

- There was general support for actions that improved understanding of groundwater sources and knowledge and protection of groundwater dependent ecosystems. Stakeholders requested greater investment to better understand groundwater availability and sustainability.
- A number of stakeholders suggested that there needed to be a greater focus on groundwater in the Macquarie-Castlereagh catchment. This included how and when it is used during dry periods and how climate change could impact supplies into the future.
- There were suggestions to assess the potential for supplementing Bathurst, Wellington and Dubbo with groundwater.

Supporting better outcomes for Aboriginal people

- There was support for actions around Aboriginal peoples' access to and management of water. This included integrating Aboriginal knowledge and cultural interests with the water security/critical human needs aspects of the strategy. These actions were seen as advancing the objectives of the Closing the Gap agreement.
- Some respondents requested further information on how place-based initiatives and development of new water-related Aboriginal business opportunities would be delivered before offering their support.
- There was a suggestion to identify a pathway for the allocation of water for cultural flows for Aboriginal people, and to establish suitable volumes of entitlements needed for cultural flows, as well as the creation of licences specifically designed to support economic purposes.

Conversion of water access licences from general security to high security

- There were strong concerns about increasing the availability of high security licences. There were calls for a thorough assessment and consultation around this option, as well as a suggestion that available licences be sold to the Commonwealth.
- There was some conditional support if the licences were designated for town water or environmental water.
- There were also concerns that farmers could not compete with the mining industry in purchasing these licences.

Improve public access to the Macquarie Marshes

- There was general support for this proposed action, with good support for expanding Aboriginal management of Macquarie Marshes reserves.
- This action was viewed as being able to support cultural access, educational, recreational and tourism opportunities. It was noted by some respondents that, as much of the Macquarie Marshes is private or managed by state government as nature reserves, there would need to be extensive consultation to minimise impacts on the environment and landholders.
- It was suggested that this action would help support proposed actions 3.5: Develop ongoing arrangements for participation of local Aboriginal people in water management and 3.6: Support place-based initiatives to deliver cultural outcomes for Aboriginal people.



Image courtesy of CSIRO. Waterbirds, Macquarie Marshes.

Priority 4: Best use of existing water for the environment

General comments

- Actions that mitigate water regulation and infrastructure impacts on ecosystems, restore habitat and provide scope for greater protection of important environmental assets were widely supported.
- There was concern that the strategy focused too strongly on the Wambuul / Macquarie River and Macquarie Marshes and more consideration of other tributaries and effluent systems was needed.
- Suggestions were made to install more stream gauges and metering for environmental flows, assess land clearance and its impact on water in the landscape and investigate ways to support regenerative land use practices, to review and address willow rafts in the Wambuul / Macquarie River, and to reassess the sustainable diversion limit in the Macquarie catchment.
- Proposed actions that received widespread support for priority implementation included:
 - Modify or remove barriers to delivering water for the environment (Proposed action 4.1)
 - Mitigate impacts to fish communities (Proposed action 4.3)
 - Provide clarity and certainty for environmental needs during drought operations (Proposed action 4.5)
 - Assess gaps in the flow regime and identify cooperative actions to improve ecological outcomes (Proposed action 4.6)
 - Identify regionally significant riparian, wetland and floodplain areas to protect or rehabilitate (Proposed action 4.8).

Remove barriers for fish movement and mitigate impacts of infrastructure on ecosystems

- There was general support for removing and modifying barriers, implementing fish screens and removing constraints to delivering water for the environment. This was viewed as enabling environmental water managers to increase flow rates to improve connectivity and floodplain inundation. Some respondents asked for more information about potential impacts on other water users.
- Cold water pollution measures were supported, but there were also concerns about the long time taken to complete previous fish passage and cold water pollution commitments and how this timeframe might play out for similar measures in the Wambuul / Macquarie River.
- There were concerns about the thermal curtain and algal blooms at Burrendong Dam which limit the effectiveness or use of multi-level offtake structures in mitigating cold water pollution. These issues were considered important when determining an effective solution at the dam. It is also important that solutions are effective and easy to implement and maintain and that operational protocols and technologies are developed with input from relevant agencies and are publicly accessible.
- There were calls to retain the native fish passage in the Wambuul / Macquarie River during dry periods by enforcing the 108 ML flow trigger for Orange.

Restoration and protection of important sites

- There was general support for undertaking rehabilitation and restoration strategies at priority areas in the Macquarie Marshes. Some respondents asked for a review of previous work done in the southern Marshes.
- There was widespread support for identifying regionally significant riparian, wetland and floodplains for protection and restoration, although there were some views that this work has already been done.
- Comprehensive vegetation mapping was supported for the riparian zone of all inland rivers and wetland complexes, with particular support given for additional water studies and rehabilitation programs for the effluent creeks.
- There was also support for identifying and protecting significant sites in urban settings and funding for off-stream wetlands and wetland investment programs to improve water quality.

Assess gaps in the flow regime and identify cooperative actions to improve ecological outcomes

- While there was general support for assessing gaps in the flow regime that would improve environmental outcomes, there was some feedback that environmental flows are already being effectively managed.
- There were requests for more water to be provided for the environment to address the decline of the Macquarie Marshes, fish populations and flows to the Barwon Darling.
- There were also requests for the way environmental water is used to be more transparent.

Fully implement the NSW Floodplain Harvesting Program

- There were concerns raised about implementing the NSW Floodplain Harvesting Program in its current form, with suggestions to improve the policy so that it would have better environmental outcomes.
- Respondents were generally concerned that there would be no reduction in floodplain harvesting diversions upstream of the Macquarie Marshes because of the implementation of the floodplain harvesting program. There were also concerns that this policy would enable valley extraction limits, the sustainable diversion limit and Murray-Darling Basin Plan limits to be exceeded.
- Some stakeholders suggested that no floodplain harvesting entitlements should be issued in the Macquarie catchment until the cumulative environmental, social and cultural impact of floodplain harvesting has been assessed and all unapproved floodplain works have been remediated.
- There was concern that floodplain harvesting is being implemented with a 5-year carry-over. It was suggested that modelling without this data and assessment would give an incomplete picture of the water in the river system. There was also concern regarding incomplete data in models and the need to include rainfall runoff in licences.
- There were requests to implement cease-to-divert flow targets that are scientifically based on environmental sustainability. There were also concerns that other targets, such as in-valley and end-of-system targets in the water sharing plan currently do not protect the environmental or cultural values downstream.
- Some respondents also considered it critical that floodplain harvesting is rigorously measured and monitored for compliance, and that it is integrated with other rules to protect downstream outcomes.

General feedback



Image courtesy of Destination NSW.
Coonamble Water Tower, Coonamble.

We heard a range of general comments that were not related to specific shortlisted actions in the consultation paper:

Water allocation, policy and accounting

- There were concerns raised that the action to review the allocation of water using the drought of record has not been shortlisted and should be a priority action to implement in the region.
- It was suggested that water allocation from Burrendong Dam should change from a 'credit' model to a 'debit' model that allocates water that is physically in the dam at the time.
- There were requests to review water allocations and accounting processes, sustainable diversion limits, and aquifer interference policy rules, considering projected climate change scenarios. There were also suggestions to introduce cease-to-divert, in-valley and end-of-system flow targets and to reclassify environmental water as high security.

Community consultation

- We heard that many stakeholders and community members wanted continued collaboration in the development and implementation of the actions. There were suggestions to establish a regional water committee to provide integrated strategic planning for sustainable water management.
- There were requests to advertise the consultation more evenly across the region so that more communities could have the opportunity to provide input.
- We heard concerns that the community found it difficult to make submissions due to flooding.

Options assessment

- Several respondents called for more comprehensive baseline analyses, including the condition of aquifers and information on take from harvestable rights dams, for the whole valley. This was suggested to help better understand the benefits, costs and options proposed for the future. Some people suggested that no changes to water sharing rules should occur until these analyses are progressed.
- There were suggestions to re-evaluate the use of 'average' flows to allow for more comprehensive and better analysis of data under more climate extremes, particularly in relation to ecological impacts.
- We heard that the economic figures, under the assessment of options, needed references to the sources of data and more information about what was or wasn't included. There were requests to include economic valuations of grazing in future studies.
- There were suggestions that using a 'most likely' climate change scenario may have been better for informing decision-making than using a 'worst case' scenario which risks panicking stakeholders and makes it hard to chart a clear path for the strategy.

Next steps

The development of the Macquarie-Castlereagh Regional Water Strategy has been a multi-year, multi-step process. Consultation with a range of stakeholders has been essential for us to build our understanding of the key water-related challenges facing the region. It has also helped us identify the actions we can undertake that are best suited to addressing these challenges.

Feedback received during the public exhibition will now help us to finalise the strategy.

In the interim, the department has published two supporting technical papers to provide additional information on actions where we received significant comment and additional questions. They cover:

- investigating changing the operation of regulated effluent creeks during dry periods
- using some of the flood mitigation storage in Burrendong Dam for water supply.²

The additional evidence presented in these papers will help inform further discussions of the options. Further targeted consultation will also be undertaken to develop an implementation plan for the Macquarie-Castlereagh Regional Water Strategy. It will outline the timing, responsibilities and funding sources to enable the actions to be carried out.

The final Macquarie-Castlereagh Regional Water Strategy and associated implementation plan will be released in 2023.

² Fact sheets are available at www.water.dpie.nsw.gov.au/plans-and-programs/regional-water-strategies/what-we-heard/macquarie-castlereagh-regional-water-strategy



Image courtesy of Peter Robey,
Department of Planning and Environment, Farmland Cattle, Dubbo



More information:

water.dpie.nsw.gov.au/plans-and-programs/regional-water-strategies