



**To:** Mr Phillip Glyde  
Chief Executive  
Murray–Darling Basin Authority

**From:** Ms Jody Swirepik  
Commonwealth Environmental Water Holder  
Australian Government

**Statement of Assurance for 2018–19  
Commonwealth Environmental Water Holder (CEWH)**

In order to maximise transparency and to provide assurance to other parties and the community that the obligations of the Basin Plan are being implemented appropriately and in line with agreed arrangements under the *Basin Plan 2012 Implementation Agreement*, I have, in my role as the Commonwealth Environmental Water Holder, completed a self-assessment of performance against my obligations under the *Basin Plan 2012* and section 34 of the *Water Act 2007* (Cth), including (where applicable) identifying progress towards full implementation of the Basin Plan Implementation Agreement and the identification of measures being, or to be, applied to rectify identified non or partial compliance.

I certify that to best of my knowledge, for the 2018–19 water accounting period, the information provided in the self-assessment attached to this statement accurately reflects the extent to which I, as the Commonwealth Environmental Water Holder, was compliant with my obligations under the *Basin Plan 2012*. No instance of non-compliance or partial compliance has been identified for the 2018–19 water accounting period. I have identified impediments that may impact future compliance with obligations or maximising the intended outcomes under the *Basin Plan 2012* and section 34 of the *Water Act 2007* (Cth).

Ms Jody Swirepik, Commonwealth Environmental Water Holder

JODY SWIREPIK  
Name

Swirepik  
Signature

9 October 2019  
Date



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## The Commonwealth Environment Water Holder (CEWH) 2018–19 annual report to satisfy annual reporting obligations for:

- Basin Plan Schedule 12 responses (except Matter 9 – use of environmental water which is reported separately)
- Basin Plan Implementation Agreement (BPIA) self-assessment of compliance with implementation tasks

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## Reporting context

This template addresses the CEWH's information reporting requirements for the 2018-19 reporting year. It meets the reporting obligations for Basin Plan Schedule 12 and for the Basin Plan Implementation Agreement (BPIA) reporting and compliance requirements (Statement of Assurance).

Note that: reporting for Schedule 12 Matter 9, regarding the identification and use of environmental water, is reported elsewhere (indicators 9.1 and 9.2, are reported through existing Water Act s71 and s32 reporting requirements and Matter 9, indicator 9.3 is reported through the *Matter 9.3 reporting template*).

In completing the template you are encouraged to refer to previously published material where appropriate, so as to maintain consistency and minimise any additional reporting burden.

## Matter 6: Local Knowledge & Solutions

Reporting Matter	Reporting Requirement (Supporting evidence to be provided by CEWH)	Response (response/milestone achievement/compliance status)
<p><b>M6 The extent to which local knowledge and solutions inform the implementation of the Basin Plan.</b> [Chapter 6, 8 &amp; 10]</p>	<p>Please describe the process and outcomes of local engagement contributing to key BP implementation activities in 2018–19 as follows:</p> <p><b>M6a) Environmental watering:</b></p> <ul style="list-style-type: none"> <li>• Describe the engagement process and how local knowledge, views and solutions influenced the planning and delivery of environmental water and the outcomes. This includes how the following were considered: <ul style="list-style-type: none"> <li>○ the views of local communities and persons materially affected by the management of environmental water (BP8.39)</li> <li>○ Indigenous values (BP8.35).</li> </ul> </li> </ul>	<p><b>Compliant <input checked="" type="checkbox"/>   Partially Compliant <input type="checkbox"/>   Non-compliant <input type="checkbox"/></b></p> <p>The Commonwealth Environmental Water Holder was compliant with s8.39 of the Basin Plan in 2018–19, in considering the views of local communities and persons materially affected by the management of environmental water. Further detail is provided below.</p> <p>The Commonwealth Environmental Water Holder maintains a number of processes to engage with local stakeholders and include their knowledge, views and solutions into the planning and delivery of Commonwealth environmental water. This includes providing opportunities for stakeholders to:</p> <ul style="list-style-type: none"> <li>• identify environmental water needs and the potential to achieve multiple benefits (such as social, cultural and economic benefits);</li> <li>• identify any potential risks, including third-party impacts;</li> <li>• partake in monitoring the environmental outcomes resulting from Commonwealth environmental water delivery;</li> <li>• support adaptive management through informing water managers of emerging opportunities during the watering year.</li> </ul> <p>Each year the Commonwealth Environmental Water Office develops portfolio management plans for catchments across the Murray–Darling Basin. During the development of these plans, staff liaise closely with external stakeholders to help identify appropriate objectives and outcomes to be targeted during the watering year. In particular, state agencies including catchment management authorities, the NSW Department of Planning, Industry and Environment (formerly the NSW Office of Environment and Heritage), the Victorian Environmental Water Holder and the South Australian Department for Environment and Water, play important roles in relaying local and state-based information to the Commonwealth Environmental Water Office on conditions and opportunities that Commonwealth environmental water could target.</p> <p>The Commonwealth Environmental Water Holder also receives input through site visits by staff, Environmental Watering Advisory Groups, Indigenous groups and other state government arrangements and processes. The Commonwealth Environmental Water Holder is supported in these engagement activities by the Commonwealth Environmental Water Office, which includes six local engagement officers who live and work in the Basin. These officers allow a direct link between community and delivery staff and spend much of their time discussing environmental watering activities with the community and feeding the information into Commonwealth Environmental Water Office operations.</p> <p>During the watering year, Commonwealth Environmental Water Office staff continue to engage with stakeholders across the Basin. Delivery officers within the Commonwealth Environmental Water Office have built strong relationships with key stakeholders throughout local communities. These relationships allow feedback to be provided to the Commonwealth Environmental Water Office in decision-making and for stakeholders to be made aware of the detailed implications of the delivery of environmental water. This can occur via ad hoc feedback by email and phone and through more formalised community forums such as reference groups. Representatives from the Commonwealth Environmental Water Office also attend broader community events such as the Murray Darling Association conference which allow face to face feedback to be provided by stakeholders from right across the Murray–Darling Basin.</p> <p><b>Case Studies</b></p> <p>In the Macquarie catchment in 2018–19, local knowledge, observations and collaboration supported the delivery of water for the environment and reduced the risk of fish deaths in the Lower Nyngan Weir pool on the Bogan River. The weir pool supports a known population of olive perchlet, which are listed as an endangered population under NSW legislation. They are also a key species targeted by the Basin-wide environmental watering strategy. The weir pool also supports other native fish, birds and wildlife. Following summer sampling, NSW Department of Primary Industries – Fisheries raised concerns about the risk of fish deaths, particularly olive perchlet, in the Lower Nyngan Weir Pool (if water levels continue to fall). The site was identified as a high priority for the use of water for the environment to avoid irretrievable loss of species and habitat and to support drought refuges in exceptionally dry conditions. Planning, design and delivery of water for the environment was undertaken in consultation with NSW Department of Planning, Industry and Environment, NSW Department of Primary Industries – Fisheries, WaterNSW, Bogan Shire Council, and the Macquarie-Cudgegong Environmental Flows Reference Group. The Macquarie-Cudgegong Environmental Flows Reference Group, which includes local community members, provided advice on the action. Bogan Shire Council delivered water from the upper weir pool on behalf of the Commonwealth Environmental Water Office and NSW Department of Planning, Industry and Environment and helped to monitor water levels in the weir pool. The Council also asked the local community to assist by minimising water extracted from the weir pool during this drought period. Local knowledge and collaboration supported the successful delivery of water for</p>

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		<p>the environment into the Lower Nyngan Weir Pool in autumn 2019, resulting in increased water levels, maintenance of water quality, and supporting fish populations over several months. The delivery received positive local media coverage.</p> <p>In South Australia, planning and delivery of 2018–19 Commonwealth environmental water in the Coorong, Lower Lakes and Murray Mouth was informed through consultation with the local community and scientists. Persistent dry conditions and water deliverability challenges in 2018–19 saw Lower Lakes water levels fall more rapidly than expected during spring and early summer. Considering the trade-offs between protecting the ecological assets of the Lower Lakes and maintaining flows to the Coorong, it was agreed at a joint meeting of the Coorong, Lower Lakes and Murray Mouth Community Advisory Panel and Scientific Advisory Group, that lowering lake level minimum thresholds by 5cm (to 0.5m) would deliver the best environmental outcomes. The additional water for the environment made available by lowering the threshold helped ensure that some barrages remained open to provide critical baseflows and connection to the Coorong through the hottest time of year, maintained localised refuge estuarine habitat and ensured the system did not cease-to-flow. This input of local knowledge helped inform an appropriate balancing of water use and adverse ecological impacts within the Coorong, Lower Lakes and Murray Mouth site in dry times.</p> <p><b>Compliant <input checked="" type="checkbox"/>   Partially Compliant <input type="checkbox"/>   Non-compliant <input type="checkbox"/></b></p> <p>The Commonwealth Environmental Water Holder was compliant with s8.35 (b)(iv) of the Basin Plan in 2018–19, in considering Indigenous values in the management of environmental water. Further detail is provided below.</p> <p><b>Indigenous values</b></p> <p>The Commonwealth Environmental Water Office works collaboratively with First Nations people across the Murray–Darling Basin to deliver environmental water for environmental and cultural outcomes. Through working relationships and direct partnerships with the Commonwealth Environmental Water Office, First Nations can provide input to and participate in, the management of Commonwealth environmental water.</p> <p>Ongoing existing relationships include:</p> <ul style="list-style-type: none"> <li>• Commonwealth environmental watering at Toogimbie Indigenous Protected Area and Nimmie-Caira in consultation with the Nari Tribal Council;</li> <li>• Formal partnership with Ngarrindjeri Regional Authority for watering in the lower River Murray, Coorong and Lower Lakes in South Australia;</li> <li>• Working with First Nations people at the Gwydir Wetlands, Macquarie Marshes, and in the Lachlan River through Environmental Water Advisory Groups.</li> </ul> <p>The Commonwealth Environmental Water Office’s six local engagement officers are critical for building and maintaining relationships with First Nations peoples, working alongside communities throughout the Basin. The Commonwealth Environmental Water Office also works closely with state government agencies, who have relationships with local communities and established processes for participation in management of important environmental sites, including use of environmental water.</p> <p>Some of the outcomes achieved so far through the incorporation of First Nations views in environmental watering include:</p> <ul style="list-style-type: none"> <li>• Enhancing sites as nesting and breeding areas for waterbirds of cultural significance.</li> <li>• Restoring and maintaining native vegetation for uses such as bush medicine, craft, ceremony artefacts and food.</li> <li>• Vegetation outcomes, which can be linked to re-establishing traditional harvest activity of the site, to enable sharing of cultural knowledge, stories and experiences as a community.</li> <li>• Establishing refuge for wildlife in a highly developed and modified landscape (farmland, irrigation, river regulation), including animals of historical and cultural importance.</li> <li>• Supporting cultural management, ongoing protection and preservation of significant sites, including artefact, burial sites and occupation sites, connected to the belief in the continuing spiritual presence of ancestors in the landscape.</li> </ul> <p>The Commonwealth Environmental Water Office and the Murray–Darling Basin Authority are funding the Murray-Lower Darling Rivers Indigenous Nations and Northern Basin Aboriginal Nations to implement the First Nations Environmental Watering Guidance project. This project, co-designed by the Northern Basin Aboriginal Nations and Murray-Lower Darling Rivers Indigenous Nations aims to incorporate First Nations environmental watering objectives into planning for environmental flows at a Basin-scale. These objectives will be fed into in the 2020–2021 Basin annual environmental watering</p>

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		<p>priorities and considered by the Commonwealth Environmental Water Office in water planning and on an ongoing basis.</p> <p>The Commonwealth Environmental Water Office is actively working to enhance its engagement with First Nations in the Basin by:</p> <ul style="list-style-type: none"> <li>• Discussing potential watering sites and opportunities with a range of First Nations as part of the Commonwealth Environmental Water Office Monitoring, Evaluation and Research Program (commenced 1 July 2019) which includes funding to support researchers to engage with First Nations communities;</li> <li>• Developing a First Nations participation strategy and evaluation framework for enhancing First Nations involvement in environmental watering.</li> </ul>

## Matter 10: Environmental Watering

Reporting Matter	Reporting Requirement (Supporting evidence to be provided by CEWH)	Response (response/milestone achievement/compliance status)
<p><b>M10 The implementation of the environmental management framework.</b></p> <p>[Chapter 8, Part 4]; Matter 10, Indicator 10.2</p>	<p><i>Watering strategies, plans and priorities are prepared consistently with Part 4 of Chapter 8, in relation to coordinating, consulting and cooperating with other reporters and the matters to which regard must be had.</i></p> <p><b>M10a)</b> Please describe progress in coordination, consultation or cooperation issues with other Basin jurisdictions in the management and delivery of environmental water and opportunities for further improvement.</p>	<p><b>Compliant</b> <input checked="" type="checkbox"/>   <b>Partially Compliant</b> <input type="checkbox"/>   <b>Non-compliant</b> <input type="checkbox"/></p> <p>In 2018–19, the Commonwealth Environmental Water Holder operated consistently with Part 4 of Chapter 8 of the Basin Plan. Further detail is provided below.</p> <p>The Commonwealth Environmental Water Office works in close partnership with state government agencies, water authorities, industry groups, scientists, non-government organisations and community groups. Relationships between Federal, state and local governments have continued to grow and there have been a number of watering events which demonstrate the upward trend in coordination and cooperation.</p> <p><b><u>Northern Basin Case Study</u></b></p> <p>Most of the northern Basin experienced below average to well below average rainfall and record high temperatures for much of 2018–19, resulting in very low to no flows in the north. Flows have been small and isolated in the Barwon River, with some waterholes at their lowest level in 50 years, with poor water quality that is putting native fish at risk.</p> <p>In April–May 2019, the Commonwealth Environmental Water Holder coordinated with New South Wales environmental water managers to release a combined total of 36 gigalitres (GL) (18 GL of Commonwealth environmental water) from Glenlyon Dam (Border Rivers system) and Copeton Dam (Gwydir River system) to support native fish by connecting the tributaries of the Barwon–Darling water course to replenish instream habitats. This release improved water quality in refuge habitat along 1,500 km of river, helping native fish survive the drought (<a href="http://www.environment.gov.au/water/cewo/catchment/northern-fish-flow-2019">http://www.environment.gov.au/water/cewo/catchment/northern-fish-flow-2019</a>).</p> <p>The Commonwealth Environmental Water Office worked closely with the New South Wales Department of Primary Industries – Fisheries to monitor native fish response to the river flows. The Commonwealth Environmental Water Office also worked with the New South Wales Department of Planning, Industry and Environment, the Natural Resources Access Regulator and the Murray–Darling Basin Authority to ensure the protection of the environmental water.</p> <p>During the flow event, over 70 community members attended information drop-in sessions across the northern Basin. Local engagement officers from CEWO listened to a range of opinions about how the flow was delivered and this feedback will assist in planning future events.</p> <p><b><u>Southern Basin Case Study</u></b></p> <p>In the Southern Basin, the Commonwealth Environmental Water Holder, the Victorian Environmental Water Holder, the New South Wales Department of Planning, Industry and Environment, South Australian Department for Environment and Water and the Murray–Darling Basin Authority work closely together to ensure that all environmental water is coordinated and delivered together to maximise environmental benefits and effectiveness of environmental watering. At the site and catchment scale, Operational Advisory Groups bring together site managers, river operators and environmental water holders to coordinate water use. At the larger system scale, Southern Connected Basin Environmental Water Committee coordinates water use across and between catchments. The Southern Connected Basin Environmental Water Committee also meets with Water Liaison Working Group to share annual plans, information and discuss opportunities to improve the coordination and delivery of environmental flows with river operations.</p>

		<p><b>Opportunities for improvement</b></p> <p>Although there is increasing maturity in the coordination of environmental flows by the Southern Connected Basin Environmental Water Committee, there are still physical and policy challenges in delivering environmental water in conjunction with operational flows. In 2018–19, the CEWO and other environmental water holders were unable to deliver a significant environmental flow along the length of the Murray system in spring 2018, due to potential impacts on operational flows. This had ramifications for the environmental outcomes that could be achieved in 2018–19, particularly for the Coorong.</p> <p>There are a number of learnings that have been taken from this experience. The first relates to the need for better integration between operations planning and environmental water planning. The Commonwealth Environmental Water Office notes that significant progress has already been made on this issue for 2019–20. Another area for improvement is communication between organisations and between committees. Clarity is also needed on when an order is or is not accepted and why. The Commonwealth Environmental Water Office also notes that capacity sharing arrangements between licence holders during a shortfall remain unresolved and are a key area to address.</p> <p>Inter-valley transfers in the Goulburn River have also affected the outcomes being able to be achieved with environmental water in that catchment, with sustained high flows in summer contributing to bank erosion and damage to bank vegetation. It is incumbent on relevant agencies to explore opportunities for the inter-valley trades to be delivered in a more environmentally sensitive manner.</p> <p>The Northern Basin Amendment to the Intergovernmental Agreement on Implementing Water Reform in the Murray–Darling Basin agreed by the Council of Australian Governments in August 2019 provides a framework for advancing a number of water initiatives in the Northern Basin. One of these initiatives is the establishment of a Northern Basin Environmental Watering Group, which held its first meeting in September 2019. The group will promote the planning and delivery of environmental water across the northern Murray–Darling Basin and the progress of relevant Northern Basin Toolkit Measures.</p>
<p>[Chapter 8, Part 4]; Matter 10, Indicator 10.3 [BPIA Task 33.3]</p>	<p>How environmental watering principles were applied consistent with Chapter 8, Part 4, Division 6.</p> <p><b>M10b)</b> Provide at least one case study that demonstrates how environmental watering principles were applied and identify the relevant principles.</p>	<p><b>Compliant <input checked="" type="checkbox"/>   Partially Compliant <input type="checkbox"/>   Non-compliant <input type="checkbox"/></b></p> <p>The Commonwealth Environmental Water Holder uses a number of frameworks and processes to ensure the use of Commonwealth environmental water is consistent with the <i>Principles to be applied in environmental watering</i> as set out in Chapter 8, Part 4, Division 6. One of the primary mechanisms is the <i>Criteria for Assessing Options for Commonwealth Environmental Water Use</i> ('the Criteria') which are used to support the planning process and which embodies the principles. This Criteria is an attachment to the <i>Framework for Determining Commonwealth Environmental Water Use</i> and is applied for all Commonwealth environmental watering decisions. A case study demonstrating how the Commonwealth Environmental Water Holder applied these principles, consistent with Chapter 8, Part 4, Division 6, is provided below.</p> <p><b><u>Case Study: Murray hardyhead translocation from South Australia to Wingillie Station, New South Wales</u></b></p> <p>Wingillie Station contains a range of vegetation communities and habitat types, including semi-permanent and intermittent wetlands, which support a number of flora and fauna species including the nationally endangered Southern bell frog. Environmental watering in 2018–19 supported native vegetation condition and aquatic habitat for the reintroduction of the endangered Murray hardyhead into Little Frenchman's Creek at Wingillie Station. In November 2018, around 800 endangered Murray hardyhead from the Riverland in South Australia were moved to Little Frenchman's Creek, representing the first successful reintroduction of a locally extinct fish to the Murray in New South Wales. The relocation aimed to reduce the risk of the fish species becoming extinct. A key component of the translocation was a detailed risk assessment and mitigation measures, including the establishment of a surrogate pond, (separate from the main wetland, to maintain a segregated nearby population if the initial translocation to the larger wetland was unsuccessful), water quality monitoring and fish condition monitoring (<i>Principle 4 – Risks</i>).</p> <p>Monitoring throughout 2018–19 has shown that the donor population is thriving in their new habitat, which is a positive sign for the recovery of the species across the southern Murray–Darling Basin (<i>Principle 1: Basin Annual Environmental Watering Priorities</i>, specifically "Supporting and improving threatened fish populations" and <i>Principle 2: Consistency with the objectives in Part 2</i>, specifically s8.05(3) "...ensuring that water-dependent ecosystems that support the life cycles of a listed threatened species... are protected and, if necessary, restored"). The monitoring has also informed future decisions about the need for further water, with the aim of maintaining the wetland within the ideal salinity levels for Murray hardyhead (<i>Principle 8: Adaptive management</i>).</p> <p>The successful relocation is a result of the joint efforts of the Commonwealth Environmental Water Holder, the New South Wales Department of Primary Industries Fisheries, Western Local Land Services, the South Australian Department for Environment and Water, Aquasave - Nature Glenelg Trust, the Murray Darling Wetlands Working Group, and the owners of Wingillie Station in western New South Wales. The project is a great example of how strong collaboration between local landholders, community groups and governments is ensuring water for the environment is supporting the health of rivers and</p>

		<p>native fish (<i>Principle 3: Maximising environmental benefits, specifically by (b)(i) co-ordinating environmental watering between all holders of held environmental water and managers of planned environmental water; (b)(iii) utilising local knowledge and experience; and Principle 7: Working effectively with communities</i>).</p>
<p>[BPIA Task 33.3]</p>	<p><i>Perform functions and exercise powers in a way that is consistent with the Basin Plan environmental watering plan.</i></p> <p><b>M10c) Responses should address the following requirement(s) as outlined in the Basin Plan Implementation Agreement:</b></p> <p>The CEWH will review its operations to ensure its functions and powers are exercised in a way that is consistent with the environmental watering plan.</p> <p>This includes acting consistently with the principles to be applied in environmental watering.</p> <p>The CEWH will publish an outcomes framework for environmental watering, which will be reviewed from time to time, that outlines how the expected outcomes from environmental water use will contribute to the achievement of, and be consistent with, the objectives of the environmental watering plan.</p> <p>The CEWH has published a framework and set of criteria that outlines how Commonwealth environmental water use decisions are made, including how this is undertaken consistent with the principles to be applied in environmental watering. The framework and criteria will be reviewed (and if necessary, revised) from time to time, with opportunities for the MDBA and Basin States, or stakeholders, to provide feedback at any time.</p> <p>The CEWH will maximise the environmental benefits and effectiveness of Commonwealth environmental watering through coordinating its use with other environmental water holders and managers of planned environmental water. The CEWH will work with the MDBA through the Southern Connected Basin Environmental Water Committee and Water Liaison Working Group, to support the coordination of environmental water delivery in the southern connected Basin. The CEWH will participate in Operational Advisory Group(s) (OAG) as necessary and to the extent that the OAG's functions relate to the CEWH's statutory functions. Coordinated use will also occur on an ongoing basis among relevant parties outside of the Forum, subject to bilateral or multilateral need.</p> <p>The CEWH will maintain mechanisms for local communities to put forward proposals for Commonwealth environmental water use. These mechanisms will include:</p> <ul style="list-style-type: none"> <li>• discussing proposals directly with staff of the Commonwealth Environmental Water Office, including regionally-based local engagement officers;</li> <li>• submitting a proposal via the CEWH's website; and</li> <li>• through relevant Basin State engagement mechanisms.</li> </ul> <p>Proposals received through these mechanisms will be assessed in accordance with the CEWH's published framework and criteria for determining Commonwealth environmental water use and considered in collaboration with relevant Basin State delivery partners.</p> <p>The CEWH will work with the MDBA, Basin States, Indigenous representative bodies, such as the Northern Basin Aboriginal Nations (NBAN) and the Murray Lower Darling Rivers Indigenous Nations (MLDRIN), and Indigenous communities to explore the need for additional mechanisms for engaging specifically with Indigenous communities, particularly in relation to potential opportunities for environmental water use to achieve mutual environmental and cultural outcomes.</p>	<p><b>Compliant <input checked="" type="checkbox"/>   Partially Compliant <input type="checkbox"/>   Non-compliant <input type="checkbox"/></b></p> <p>In 2018–19, the Commonwealth Environmental Water Holder performed its functions and exercised its power in a way that is consistent with the Basin Plan environmental watering plan.</p> <p>The Commonwealth Environmental Water Holder has a number of frameworks and processes to ensure the use of Commonwealth environmental water is undertaken consistent with the Basin Plan environmental watering plan. This includes the:</p> <ul style="list-style-type: none"> <li>• <i>Commonwealth Environmental Watering Outcomes Framework</i> (<a href="http://www.environment.gov.au/water/cewo/publications/environmental-water-outcomes-framework">http://www.environment.gov.au/water/cewo/publications/environmental-water-outcomes-framework</a>), which sets out how Commonwealth environmental water contributes to the objectives of the environmental watering plan;</li> <li>• Commonwealth environmental water portfolio managements plans, which identify the relevant long-term outcomes from the Basin-wide environmental watering strategy that Commonwealth environmental water contributes to by catchment;</li> <li>• <i>The Criteria for Assessing Options for Commonwealth Environmental Water Use</i>, which are a component of the <i>Framework for Determining Commonwealth Environmental Water Use</i>. All Commonwealth environmental watering decisions are assessed against the criteria, which are the primary mechanism through which the Commonwealth Environmental Water Holder acts in accordance with the <i>Principles to be applied in environmental watering</i>. <i>The Criteria for Assessing Options for Commonwealth Environmental Water Use</i> is available at <a href="http://www.environment.gov.au/water/cewo/publications/criteria-assessing-options-cew-use">http://www.environment.gov.au/water/cewo/publications/criteria-assessing-options-cew-use</a>.</li> </ul> <p>The Commonwealth Environmental Water Holder, the Victorian Environmental Water Holder, the NSW Department of Planning, Industry and Environment, South Australian Department for Environment and Water and the Murray–Darling Basin Authority work closely together to ensure that environmental water is coordinated and delivered together to maximise environmental benefits and effectiveness of environmental watering.</p> <p>Representatives from the Commonwealth Environmental Water Office provides advice to and attends numerous committees and workgroups regarding the management of environmental water and the implementation of the Murray–Darling Basin Plan including:</p> <ol style="list-style-type: none"> <li>a) Operational Advisory Groups</li> <li>b) Southern Connected Basin Environmental Water Committee (SCBEWC)</li> <li>c) Environmental Watering Working Group (EWWG)</li> <li>d) Water Liaison Working Group (WLWG)</li> <li>e) River Murray Operations Committee (RMOC)</li> <li>f) An informal environmental water leaders group</li> </ol> <p>The Commonwealth Environmental Water Holder maintains mechanisms for local communities to put forward proposals for Commonwealth environmental water use on the Commonwealth Environmental Water Office's website through both phone and email. The Commonwealth Environmental Water Office also participates in local engagement forums established by state governments, including Environmental Water Advisory Groups and other community forums and events. The Commonwealth Environmental Water Office's local engagement officers proactively engage with community members and attend relevant on the ground events. Proposals can also be submitted through local engagement officers. All local engagement officers contact details are available on the website: <a href="http://www.environment.gov.au/water/cewo/local-engagement">http://www.environment.gov.au/water/cewo/local-engagement</a>.</p> <p>Proposals are assessed in accordance with the Commonwealth Environmental Water Holder's published framework and criteria (included above) during planning and decision-making processes for the use of environmental water.</p> <p>The Commonwealth Environmental Water Office works closely with the Northern Basin Aboriginal Nations and the Murray-Lower Darling River Indigenous Nations. The Office is looking to broaden its engagement with Indigenous peoples outside of these groups and current partnerships to progressively incorporate increased cultural values into watering decisions. Identifying additional mechanisms and opportunities for the Office to work with Indigenous communities in achieving mutual environmental and cultural outcomes is a high priority.</p> <p>It is expected the recent launch of the findings of the National Cultural Flows Research Project and the additional funding being provided to Indigenous communities through Basin Plan processes will assist Indigenous peoples in identifying options for additional mechanisms and opportunities for</p>

		environmental water managers to work more closely in delivering on environmental and cultural benefits.
[BPIA Task 33.2]	<p><i>Perform its functions and exercise its powers in a way that is consistent with the Basin-wide environmental watering strategy.</i></p> <p><b>M10d) Responses should address the following requirement(s) as outlined in the Basin Plan Implementation Agreement:</b></p> <p>Following the finalisation of the Basin-wide environmental watering strategy, the CEWH will review its operations to ensure its functions and powers are exercised consistently with the Basin-wide environmental watering strategy.</p>	<p><b>Compliant <input checked="" type="checkbox"/>   Partially Compliant <input type="checkbox"/>   Non-compliant <input type="checkbox"/></b></p> <p>In 2018–19, the Commonwealth Environmental Water Holder performed its functions and exercised its power consistent with the Basin-wide environmental watering strategy ('the Strategy').</p> <p><b>Planning</b></p> <p>The Commonwealth Environmental Water Office undertakes portfolio management planning prior to the start of each water year that represents a review of CEWO operations on a valley-by-valley basis. The approach includes the identification of how short-term outcomes (&lt;1 and 1-5 years) from environmental water contribute to the long-term (10+ years) in the Strategy and Basin Plan. Portfolio management plans are produced for each catchment and identify the relevant long-term outcomes from the Strategy that Commonwealth environmental water will be contributing to in that catchment.</p> <p><b>Decision-Making</b></p> <p>The Criteria for Assessing Options for Commonwealth Environmental Water Use is applied to all Commonwealth environmental watering decisions. Assessment against the criteria includes a description of how a watering action contributes to the achievement of outcomes listed in the Strategy (and applies any of the relevant management strategies). See also description against <i>Principles to be applied to environmental watering</i> for further descriptions of the way in which the Commonwealth Environmental Water Holder applies the management strategies identified in the Strategy.</p>
[Chapter 8, Part 4]; Matter 10, Indicator 10.1 [BPIA Task 33.4]	<p><i>Give information relating to expected holdings of held environmental water.</i></p> <p><b>M10e) Responses should address the following requirement(s) as outlined in the Basin Plan Implementation Agreement:</b></p> <p>The CEWH will provide information to the MDBA about expected holdings of held Commonwealth environmental water, including quantities, reliability, security class, licence type, limitations, and other characteristics.</p> <p>The CEWH will report on the Commonwealth environmental holdings each month on its website.</p>	<p><b>Compliant <input checked="" type="checkbox"/>   Partially Compliant <input type="checkbox"/>   Non-compliant <input type="checkbox"/></b></p> <p>The Commonwealth Environmental Water Holder publishes monthly information on its holdings on the Commonwealth Environmental Water Office's website. This includes holdings against each entitlement type leading the way in public transparency.</p> <p>The monthly holdings update is available on the website at <a href="http://www.environment.gov.au/water/cewo/about/water-holdings">http://www.environment.gov.au/water/cewo/about/water-holdings</a>.</p> <p>Information on holdings is also provided to the Department of Agriculture and the Murray–Darling Basin Authority as well as to meet regular requests by the media.</p>
[BPIA Task 33.3 and 33.5]	<p><i>Have regard to the Basin annual environmental watering priorities when performing functions and exercising powers and report when they were not followed.</i></p> <p><b>M10f) Responses should address the following requirement(s) as outlined in the Basin Plan Implementation Agreement:</b></p> <p>The CEWH will have regard to the Basin annual environmental watering priorities. Please provide reasons for any environmental watering that was not in accordance with Basin annual watering priorities listed at Att A (partially/fully) in accordance with s8.44 of the Basin Plan and Principle 1.</p> <p>The MDBA may publish the statement of reasons on its website.</p>	<p><b>Compliant <input checked="" type="checkbox"/>   Partially Compliant <input type="checkbox"/>   Non-compliant <input type="checkbox"/></b></p> <p>The Commonwealth Environmental Water Holder had regard to the Basin annual watering priorities in all environmental watering that was undertaken during the 2018–19 watering year. Attachment A demonstrates how the Commonwealth Environmental Water Holder has had regard to the Basin annual watering priorities in 2018–19. The Commonwealth Environmental Water Office also demonstrates its regard to the Basin annual watering priorities by including relevant priorities in Portfolio Management Plans that are developed on an at least annual basis for each catchment. These are published on the website at <a href="http://www.environment.gov.au/water/cewo/publications">http://www.environment.gov.au/water/cewo/publications</a>.</p> <p><b>Impediments to maximising outcomes</b></p> <p>The achievement of some priorities was limited during the 2018–19 watering year due to deliverability issues and broader water resource availability. For example:</p> <ul style="list-style-type: none"> <li>• In the Murray and the Goulburn, high operational deliveries limited the opportunity to provide planned environmental flows. This resulted in insufficient flows reaching the Coorong, with the total volume delivered less than the minimum annual target of 650 GL to be achieved for 95% of years.</li> <li>• Very low water resource availability and very dry conditions meant in some valleys there was little or no environmental water available to provide to key wetlands and alleviate drought conditions, such as in the Lower Darling River.</li> </ul>

## Matter 14: Water Quality and Salinity

Reporting Matter	Reporting Requirement (Supporting evidence to be provided by CEWH)	Response (response/milestone achievement/compliance status)
<p><b>M14 Progress the implementation of water quality and salinity management plan, including the extent to which regard is had to the targets in Chapter 9 when making flow management decisions.</b></p> <p>[Chapter 9; Matter 14, Indicator 14.2]</p> <p>[BPIA Task 34.1]</p>	<p><i>Context: BP s9.14 recognises that flow management, in some circumstances, can assist with the management of water quality issues, such as salinity, hypoxic blackwater events and blue green algae outbreaks. The intent of s9.14 is that 'having regard' to these risks and opportunities becomes part of business as usual when making decisions about flow management or the use of environmental water. Other actions that can also address water quality issues include coordination and communication about blue green algae outbreaks (in line with BP s9.18) or hypoxic blackwater events.</i></p> <p><b>M14a)</b> In this context, please describe how these water quality issues were considered, when making decisions about flow management or the use of environmental water, and/or other actions; did this make a difference to these water quality issues, and are there any learnings to inform adaptive management.</p>	<p><b>Compliant <input checked="" type="checkbox"/>   Partially Compliant <input type="checkbox"/>   Non-compliant <input type="checkbox"/></b></p> <p>The Commonwealth Environmental Water Holder had regard to the water quality targets set out in s9.14(5) when making decisions about the use of all Commonwealth environmental water in 2018–19.</p> <p>The Commonwealth Environmental Water Office considers expert regional knowledge, in-field monitoring and salinity forecast modelling to support the planning and active management of the Commonwealth environmental water portfolio. For every Commonwealth watering action, a risk assessment is undertaken 'including with regard to the Basin Plan's water quality and salinity targets for managing water flows'. These risk assessments are guided by the <i>Risk Management Guidance for the Use of Commonwealth Environmental Water</i>, which specifically identifies the potential risks of Commonwealth environmental watering on water quality and salinity targets being exceeded, and provides guiding mitigation strategies.</p> <p>As part of these risk assessments, contingency plans and procedures for the monitoring and operational response to risks are developed and integrated within the delivery arrangements for Commonwealth environmental water use. Delivery arrangements are agreed with state delivery partners through Watering Schedules. These schedules outline the operational strategies and procedures for the management of Commonwealth environmental water, including the on-going assessment and management of water quality risks where required. In the majority of instances, the provision of environmental water results in significantly improved water quality. Commonwealth environmental water exports large amounts of salt through the River Murray system each year.</p> <p>In 2018–19, naturally dry conditions resulted in a number of river systems experiencing water quality issues. While Commonwealth environmental water can assist with some water quality issues such as reduced dissolved oxygen levels, the Commonwealth Environmental Water Holder is mindful of balancing risks such as blue green algal outbreaks being moved to downstream communities, so we manage carefully to avoid such situations. The Commonwealth Environmental Water Office continues to improve its learning and knowledge base for adaptive management of water quality, as shown by the second large-scale regulated watering of the Barwon River using Commonwealth environmental water.</p> <p><b>Case Studies</b></p> <p>Two examples that demonstrate how the Commonwealth Environmental Water Holder has had regard to water quality issues through active management of the Commonwealth environmental water portfolio are provided below.</p> <p><b>Lower Darling River</b></p> <p>In 2018–19, the ongoing drought led to lack of sufficient flows in the Lower Darling river, resulting in poor water quality in the form of blue-green algae outbreaks and low dissolved oxygen levels. While the Commonwealth Environmental Water Holder was aware of the water quality issues being experienced in the Lower Darling, there was not enough water available to provide an effective flush down the length of the river to alleviate the poor water quality conditions. The small volume of Commonwealth environmental water in Menindee was quarantined from use owing to drought management. Even if this volume (3608 ML) had been available, previous experience by water managers has shown that delivering small volumes of water during poor water quality periods can have negative impacts on downstream plants, animals and local communities. In fact, small flows can spread (rather than dilute) poor quality water and cause oxygen levels to drop further, that may result in fish kills. When water availability improves, following significant rainfall across the upper Darling catchments, water for the environment can be used to replenish the river, improve water quality and help restore fish populations, as has been achieved in previous years.</p> <p><b>Murrumbidgee</b></p> <p>In 2018–19 the Murrumbidgee catchment experienced average to very much below average rainfall resulting in limited natural inundation along the river system and low water allocations. Atmospheric temperatures ranged across the catchment from very much above average to highest on record. The climate conditions, along with low flows, led to adverse water quality conditions, including low dissolved oxygen below target levels in the lower Murrumbidgee River during summer 2019 and a small amount of fish deaths started to occur. In consultation with experts, Commonwealth, New South Wales and The Living Murray environmental water were delivered to the lower Murrumbidgee River, successfully improving water quality to address</p>

		<p>dissolved oxygen issues and no further fish deaths were observed.</p> <p><b>Opportunities for further improvement</b></p> <p>An example of one of many learnings from the management of water quality issues in the Murrumbidgee case study, monitoring of weir pool stratification (the establishment of a thermocline, with warmer, oxygenated water above and cooler, low dissolved oxygen below) and hypoxic water management in the Lower Murrumbidgee River in 2019 reinforced that high temperatures and low flow conditions have the potential to adversely affect water quality. Mixing of the hypoxic bottom water with oxygenated surface water can result in low dissolved oxygen concentrations through out the water column thereby potentially causing fish kills. Water quality can be improved and fish kills mitigated against by either steadily increasing in-channel flows and gradually releasing hypoxic water from weirs, and exporting hypoxic water from weirs onto the floodplain using existing regulators. This is an example of the outcomes from monitoring environmental water use that is used to inform environmental water use planning and adaptive management decision-making. The Commonwealth Environmental Water Office would welcome working with other agencies on the recommendations of the Vertessy Report (into fish deaths in the Lower Darling) related to better anticipating these conditions.</p>
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## Matter 16: Water Trading

Reporting Matter	Reporting Requirement (Supporting evidence to be provided by CEWH)	Response (response/milestone achievement/compliance status)
<p><b>M16 The implementation of water trading rules.</b></p> <p>[Chapter 12]</p> <p>[BPIA Task 35.1]</p>	<p><b>Responses should address the following requirement(s) as outlined in the Basin Plan Implementation Agreement:</b></p> <p><b>M16 a)</b> Has the CEWH sold water in the previous year? If so, did they notify the approval or registration authority of the price agreed for the trade?</p> <p>Note: This applies to both entitlement and allocation trades as per section 1.07 (3).</p>	<p><b>Compliant <input checked="" type="checkbox"/>   Partially Compliant <input type="checkbox"/>   Non-compliant <input type="checkbox"/></b></p> <p>In 2018–19, the Commonwealth Environmental Water Holder sold 20.8 GL of Commonwealth environmental water allocations for a return of \$6.044 million. The Commonwealth Environmental Water Holder notified the approval authority of the sale price for allocations traded through the relevant application to trade water forms which must be submitted for a trade to be processed.</p>
<p>[Chapter 12]</p> <p>[BPIA Task 35.2]</p>	<p><b>Responses should address the following requirement(s) as outlined in the Basin Plan Implementation Agreement:</b></p> <p><b>M16 b)</b> The CEWH will publish its water announcements in a way that makes them likely to be brought to the attention of interested members of the public.</p>	<p><b>Compliant <input checked="" type="checkbox"/>   Partially Compliant <input type="checkbox"/>   Non-compliant <input type="checkbox"/></b></p> <p>The Commonwealth Environmental Water Holder makes water announcements publically available on the Commonwealth Environmental Water Office's website at <a href="http://www.environment.gov.au/water/cewo/news">http://www.environment.gov.au/water/cewo/news</a>.</p> <p>Water announcements are also made available on the Commonwealth Environmental Water Holder's twitter account and through other media distribution channels used by the Commonwealth Environmental Water Office including sending out notification emails to subscribers to the Office's distribution lists.</p>
<p>Chapter 12]</p> <p>[BPIA Task 35.3]</p>	<p><b>Responses should address the following requirement(s) as outlined in the Basin Plan Implementation Agreement:</b></p> <p><b>M16c)</b> The CEWH will develop, publish and act consistent with a set of protocols regarding trading of water entitlements and allocations. These protocols will be designed to avoid trading if a situation arose where the CEWH were to become aware of a water announcement that was not generally available and could be reasonably expected to materially affect the price or value of any water access right that is the subject of the water announcement.</p> <p>The CEWH will, where it considers it would be appropriate, develop a trading strategy and will make any such trading strategy generally available.</p>	<p><b>Compliant <input checked="" type="checkbox"/>   Partially Compliant <input type="checkbox"/>   Non-compliant <input type="checkbox"/></b></p> <p>The Commonwealth Environmental Water Holder has not traded water in a situation where it has become aware of a water announcement that was not generally available.</p> <p>The Commonwealth Environmental Water Holder has published the <i>Commonwealth Environmental Water Trading Framework</i> which includes operating rules, procedures and protocols.</p> <p>These water trading protocols assist the Commonwealth Environmental Water Holder and staff of the Commonwealth Environmental Water Office to meet their requirements as per the Basin Plan water trading rules. The protocols include Chinese wall arrangements; avoiding exposure to inside information and conflicts of interest; disclosing and managing inside information and conflicts of interest if they arise; record keeping and information and management; being aware of water announcements and decisions to trade; and sanctions for breaches of the APS Code of Conduct.</p> <p><i>The Commonwealth Environmental Water Trading Framework</i> is available at <a href="http://www.environment.gov.au/water/cewo/trade/trading-framework">http://www.environment.gov.au/water/cewo/trade/trading-framework</a>.</p> <p>Consistent with the framework, the internal 'approach to market' minute and 'trade approval' minute for the trading of Commonwealth environmental water includes checklists to ensure the Basin Plan trade rules are considered as part of the decision making process. The Commonwealth</p>

		Environmental Water Office also has standard operating procedures for water transfers; a due diligence process for trade; and appropriate delegate approval processes for sign off on transfers and trade. The Department of the Environment and Energy and Commonwealth Environmental Water Office also have fraud controls plans in place, and staff are instructed in the use of these plans.
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## Other: Operation of Organisation – Overview of monitoring and evaluation approach

Reporting Matter	Reporting Requirement (Supporting evidence to be provided by CEWH)	Response (response/milestone achievement/compliance status)
<p>Perform its functions and exercise its powers in a way that is consistent with, and in manner that gives effect to, the principles to be applied in monitoring and evaluating the effectiveness of the Plan.</p> <p>[BPIA Task 36.1]</p>	<p>Responses should address the following requirement(s) as outlined in the Basin Plan Implementation Agreement:</p> <p>Oa) The CEWH will monitor the response to the delivery of Commonwealth environmental water at a number of locations across the Basin between 2014–15 and 2018–19. This long-term intervention monitoring and evaluation program will align with the CEWH's published outcomes framework for environmental watering.</p> <p>Consistent with principles 6 and 8 in Chapter 13 of the Plan, the CEWH will work collaboratively with Basin States and the MDBA and will undertake to both avoid duplication of effort and ensure monitoring is cost-effective and efficient. In particular, the CEWH will rely on monitoring undertaken by the MDBA in relation to the specific objectives in the environmental watering plan for the Lower Lakes and Coorong.</p>	<p><b>Compliant <input checked="" type="checkbox"/>   Partially Compliant <input type="checkbox"/>   Non-compliant <input type="checkbox"/></b></p> <p>In 2018–19, the Commonwealth Environmental Water Holder continues to be compliant in monitoring the response of delivery of Commonwealth environmental water to a number of locations across the Basin over the period 2014–15 to 2018–19. Consistent with Chapter 13 Principle 6 and Principle 8, the Commonwealth Environmental Water Holder has worked collaboratively with Basin States and the MDBA to avoid duplication of effort and ensure efficient and cost-effective monitoring is in place to monitor the response to the delivery of Commonwealth environmental water.</p> <p>Monitoring and evaluation supports the efficient and effective use of water, ensures accountability and transparency, supports adaptive management and helps to build knowledge. It is also critical to the management of Commonwealth environmental water so that outcomes can be reported and communicated. The Commonwealth Environmental Water Office developed the <i>Commonwealth Environmental Water Monitoring, Evaluation, Reporting and Improvement (MERI) Framework</i> to guide monitoring and evaluation activities and ensure we are aligning with and meeting legislative and Basin Plan obligations.</p> <p>Broadly, the Basin Plan establishes the following responsibilities:</p> <ul style="list-style-type: none"> <li>• The Commonwealth Environmental Water Holder is focussed on monitoring and reporting on the outcomes from Commonwealth environmental watering at the asset and Basin-scale.</li> <li>• Basin States are focussed on monitoring and reporting on the achievement of environment outcomes at the asset scale.</li> <li>• The Murray–Darling Basin Authority is focussed on monitoring and reporting on the achievement of environment outcomes at the Basin-scale.</li> </ul> <p>The Commonwealth Environmental Water Holder's Long-Term Intervention Monitoring program has been deliberately designed to complement the activities of other agencies while supporting the Commonwealth Environmental Water Holder's statutory obligations, and informing adaptive management. Commonwealth Environmental Water Office continues to work with colleagues from state government and the Murray–Darling Basin Authority to ensure the most efficient monitoring programs are in place.</p> <ul style="list-style-type: none"> <li>• Operational monitoring is undertaken for every Commonwealth environmental watering action, typically by state government delivery partners. It involves collecting on-ground data about the environmental water delivery action such as volumes, timing, duration, location, flow rates and river heights.</li> <li>• Intervention monitoring helps the Commonwealth Environmental Water Office to understand the environmental response to decisions on Commonwealth environmental water use.</li> </ul> <p>The Commonwealth Environmental Water Office has been monitoring the short term environmental response of environmental water since 2010. Short term monitoring projects have focussed on determining whether selected watering actions are meeting their intended ecological objectives and understanding the implications for environmental water delivery.</p> <p>The Long-Term Intervention Monitoring Project monitors and evaluates the contribution of Commonwealth environmental water delivery in the Basin over five-years from 2014 to June 2019 with the final evaluation report due in mid-2020. The teams implement the monitoring and evaluation plans in seven selected areas within the Basin – the Junction of the Warrego and Darling rivers; Gwydir river system; Lower Lachlan river system; Murrumbidgee river system; Edward-Wakool river system; Goulburn River; and Lower Murray River. These regions provide the maximum coverage possible over areas where Commonwealth environmental watering occurs and complements, rather than duplicates, monitoring activities undertaken by others.</p> <p>Our monitoring is proving to be fundamental to adaptively managing the sites where environmental water is delivered (both in real-time and learning from watering event to watering event). More than 30 of Australia's leading regional universities and scientific research institutions engaged to undertake monitoring and research regularly discuss what is happening at sites with ourselves and state colleagues, leading to the rapid adoption of knowledge.</p>

		<p>All monitoring, evaluation and research reports are published on the Commonwealth Environmental Water Office website annually. All monitoring data is publicly available on request for any purpose. The Commonwealth Environmental Water Office acknowledges that further effort is required to communicate outcomes in a format that is more readily accessible to the public.</p> <p>In the 2018–19 watering year, the Commonwealth Environmental Water Office undertook a tender to extend the Long-Term Intervention Monitoring and Environmental Water Knowledge and Research Projects, with some enhancements, under a single integrated monitoring, evaluation and research program for another three years (until June 2022).</p> <p>The Commonwealth Environmental Water Office's Monitoring, Evaluation and Research Program commenced on 1 July 2019. A continuation of on-ground monitoring, evaluation and research activities will enable the CEWH to continue to:</p> <ul style="list-style-type: none"> <li>a) Demonstrate outcomes from Commonwealth environmental water;</li> <li>b) Inform environmental water management;</li> <li>c) Fulfil legislative reporting obligations; and</li> <li>d) Build on our knowledge of the contribution of environmental water to the aquatic health of the Murray–Darling Basin.</li> </ul> <p>Further information on the Long Term Intervention Monitoring project is available at <a href="http://www.environment.gov.au/water/cewo/monitoring/tim-project">http://www.environment.gov.au/water/cewo/monitoring/tim-project</a>.</p>
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## Attachment A: Basin Environmental Watering Priorities (BAEWP) for reference

The table lists Basin annual environmental watering priorities for 2018–19, with demonstrative examples of how environmental watering actions were delivered against the priorities. The Commonwealth Environmental Water Holder had regard to the Basin annual watering priorities in all environmental watering that was undertaken during the 2018–19 watering year.

FLOW		
1	<b>Support lateral and longitudinal connectivity along river systems.</b>	<p>Under the Very Dry and Dry conditions in the northern and southern Basin respectively, environmental flows were targeted at supporting longitudinal connectivity.</p> <p>In 2018–19 the Commonwealth Environmental Water Holder delivered 853 GL of Commonwealth environmental water.</p> <p>In the southern Basin, approximately 420 GL of Commonwealth environmental water was delivered along the Murray River valley (comprised of 79 GL delivered from Hume Dam, 221 GL of return flows from the tributaries and 120 GL ordered at the South Australian border). This water supported environmental outcomes from Hume Dam to the Murray Mouth—a distance of over 2200 km. Some of the flows from Hume Dam also supported lateral connectivity through the Barmah-Millewa Forest.</p> <p>In the northern Basin, the Commonwealth Environmental Water Holder collaborated with New South Wales environmental water managers to deliver the ‘Northern Fish Flow’ (<a href="http://www.environment.gov.au/water/cewo/catchment/northern-fish-flow-2019">http://www.environment.gov.au/water/cewo/catchment/northern-fish-flow-2019</a>). A total of 36 GL (18 GL of Commonwealth environmental water) was released from Glenlyon Dam (Border Rivers) and Copeton Dam (Gwydir River) in April–May 2019 to support native fish by connecting the tributaries of the Barwon–Darling water course to replenish instream habitats.</p>
2	<b>Support freshwater connectivity through the Lower Lakes, Coorong and Murray Mouth.</b>	<p>Approximately 550 GL of Commonwealth environmental water was delivered into the Lower Murray and Lower Lakes in 2018–19. Approximately 377 GL of this water flowed through the barrages and into the Coorong and Murray Mouth. This water was critical in ensuring a continuous connection between the lakes and the Coorong, the barrage fishways remaining open all year and preventing lake levels from falling below 0.4m AHD. The remaining water is accounted for in the lakes for release through the barrages.</p>
VEGETATION		
3	<b>Maintain and improve the condition and promote recruitment of forests and woodlands.</b>	<p>In 2018–19, 46.5 GL of Commonwealth environmental water, in conjunction with over 90.3 GL of New South Wales environmental water, was delivered into the Redbank system (Yanga National Park and North Redbank) in the Lower Murrumbidgee. This water inundated large areas of river red gum forest and contributed to maintaining its ecological condition.</p> <p>Delivery of 2.3 GL of Commonwealth environmental water, in conjunction with approximately 2 GL of New South Wales environmental water, in the Gayini Nimmie–Caira area has inundated areas of lignum shrubland supporting its growth and maintaining its condition.</p> <p>Delivery of 30 GL of Commonwealth environmental water to the Gwydir Wetlands supported over 3000 ha of lignum shrublands throughout the wetland area.</p>
4	<b>Improve the condition and extent of lignum shrublands.</b>	<p>Over 51 GL of Commonwealth environmental water, along with over 75 GL of New South Wales environmental water, was delivered into the Macquarie Marshes. This water inundated approximately 7.5 percent of the Marshes, including areas of river red gum forest, helping to maintain the condition of river red gum and supporting recruitment.</p> <p>In South Australia, close to 9 GL of Commonwealth environmental water was delivered to 18 discrete wetlands to maintain lignum shrublands.</p> <p>In autumn 2019, Commonwealth environmental water, in conjunction with natural flows, inundated large areas of the Toorale Western Floodplain at the Warrego–Darling junction that includes lignum, river red gum, river cooba, black box, coolabah and the threatened tiny teeth. Prior to the flows, the vegetation communities on the Western Floodplain were in the poorest condition they have been in since mid-2016.</p>
5	<b>Improve the condition and extent of Moira grass in Barmah–Millewa Forest.</b>	<p>Approximately 39 GL of Commonwealth environmental water contributed to overbank flows through Barmah-Millewa Forest. This combined with significant volumes of operational flows and other sources of environmental water to provide an extended watering of Moira grass, particularly in Barmah Forest. This watering improved the condition and extent of Moira grass significantly, particularly within the feral horse and pig-proof exclusion fence constructed in April 2017. Moira grass was also recorded in areas where it had previously disappeared.</p>
6	<b>Expand the extent and improve resilience of <i>Ruppia tuberosa</i> in the southern Coorong.</b>	<p>Approximately 360 GL of Commonwealth environmental water provided consistent flows into the Coorong. This contributed to salinity levels in the South Lagoon remaining below maximum thresholds; however, recovery of <i>Ruppia tuberosa</i> (a keystone aquatic vegetation species at the site) has been limited since the Millennium Drought.</p>
WATERBIRDS		
7	<b>Improve the abundance and maintain the diversity of the Basin’s waterbird population.</b>	<p>In 2018–19, over 51 GL of Commonwealth environmental water was delivered, with over 75 GL of New South Wales environmental water, into the Macquarie Marshes, inundating approximately 7.5 percent of the northern, southern and eastern Marshes. A total of 42 species of waterbirds were recorded by New South Wales Office of Environment and Heritage in spring 2018, including the endangered Australasian bittern, sharp-tailed sandpiper and Latham’s snipe, which are listed on international migratory bird agreements. Other migratory bird species supported by the environmental watering included black-winged stilts, Glossy ibis and bralgas. Delivering environmental water to the Macquarie Marshes in winter–spring 2018 was particularly important given the prolonged dry conditions across eastern Australia.</p> <p>In April and May 2019, 7.7 GL of instream Commonwealth environmental water provided habitat for waterbird species in the Warrego catchment. A significant proportion of the flows reached the Cuttaburra Channels and nationally significant Yantabulla Swamp, which supports a high diversity of waterbirds.</p> <p>Between March and May 2019, over 110 GL of Commonwealth environmental water was delivered to South Australia to support releases of fresh water to the Coorong while lowering the water levels in the Lower Lakes. This lowering provided extensive foraging habitat for waterbirds, including migratory waders such as red-necked stilts, curlew sandpipers and the rare white-rumped sandpiper.</p> <p>Also, 40.5 GL of Commonwealth environmental water, in conjunction with approximately 69.3 GL of New South Wales water, was delivered into Yanga National Park in the Murrumbidgee catchment to support a diverse assemblage of waterbird species. Waterbird surveys observed the vulnerable-listed freckled duck and magpie goose; and migratory species Caspian tern, marsh sandpiper, red-necked stint and sharp-tailed sandpiper. In response to this watering a number of waterbirds, including the endangered Australasian bittern, Australian little bittern, darters, cormorants, white ibis and Eastern</p>

		<p>great egrets, were also observed nesting. This was the only wetland with nesting egrets detected in New South Wales during 2018–19.</p> <p>Watering of the North Redbank system (6 GL of Commonwealth environmental water and 21 GL of New South Wales environmental water) supported habitat for important species, including endangered Australasian bitterns and Australian little bitterns.</p> <p>Delivery of 2.3 GL of Commonwealth environmental water and approximately 2 GL of New South Wales environmental water in the Gayini Nimmie–Caira area supported habitat for a migratory species, including the sharp-tailed sandpiper.</p> <p>Delivery of 1.4 GL of Commonwealth environmental water to Ramsar-listed wetlands Fivebough and Tuckerbil Swamps supported habitat for important species, including the endangered Australasian bitterns and vulnerable broilgas.</p>
8	<b>Maintain the abundance of key migratory shorebird species in the Coorong and Lower Lakes.</b>	See flows described in Priority 2 and 6. These flows help contribute to providing food resources and habitat for waterbirds more generally.
<b>NATIVE FISH</b>		
9	<b>Support Basin-scale population recovery of native fish by reinstating flows that promote key ecological processes across local, regional and system scales in the southern connected Basin.</b>	See longitudinal flow in the Murray described in Priority 1 and 2.
10	<b>Improve flow regimes and connectivity to maximise the ecological function of the Barwon–Darling river system for native fish.</b>	<p>See <i>Northern Fish Flow</i> example in Priority 1.</p> <p>Commonwealth and New South Wales environmental water delivered to the Macquarie River and Marshes in the winter/spring period of 2018 resulted in approximately 2.7 GL of flow entering the Barwon River. This environmental flow continued to Brewarrina through until late December, breaking a three-month cease-to-flow. The environmental flow helped to reconnect and top up approximately 175 pools along the river between the Macquarie River junction and the Brewarrina Weir. This small flow was important for relieving cease-to-flow conditions, improving water quality in pools, and providing refuge for native fish.</p>
11	<b>Support viable populations of threatened native fish, maximise opportunities for range expansion and establish new populations.</b>	<p>In spring 2018 in the Namoi River, 5.5 GL of Commonwealth environmental water was delivered downstream of Wee Waa to refresh disconnected waterholes and support the survival of native fish, including critically endangered silver perch and threatened Murray cod. The flow event improved the persistence of pools and refuge habitat, helping to maintain fish populations and create opportunity for silver perch movement.</p> <p>In autumn 2019 in the Border Rivers catchment, 7.4 GL of Commonwealth environmental water was delivered from Glenlyon Dam to the Dumaresq and Macintyre Rivers as part of the Northern Fish Flow. The flows replenished disconnected waterholes and inundated significant habitat for the threatened native Murray cod and freshwater catfish. The Northern Fish Flow also provided benefits for aquatic vegetation in the Dumaresq/Macintyre, particularly important for small-bodied threatened native fish species like olive perchlet and purple-spotted gudgeon. The Northern Fish Flow resulted in large abundances of shrimps that provided a significant food source for native fish species.</p> <p>In the Edward/Kolety–Wakool River system, during 2018–19 a total of 14 GL of Commonwealth environmental water was delivered in the Colligen Creek–Neimur River system, over 16 GL in the Yallakool Creek–Wakool River system to support native fish outcomes. 2018–19 monitoring results have shown:</p> <ul style="list-style-type: none"> <li>• Trout cod, a threatened native fish, were detected for the first time in Yallakool Creek during the winter watering action. This indicates an improvement to the distribution of this native fish in the NSW mid-Murray region.</li> <li>• Silver perch, also a threatened native fish, spawned for the second year in a row in the Yallakool Creek–Wakool River system. This indicates the importance of the NSW mid-Murray region as a potential stronghold for Silver Perch in the southern connected Basin.</li> </ul> <p>During autumn 2019, a total of 670 ML of Commonwealth environmental water was delivered in combination with 430 ML of New South Wales environmental water in the Macquarie catchment to maintain two key refuge sites for native fish.</p> <p>In the Murrumbidgee catchment, 40.5 GL of Commonwealth environmental water, in conjunction with approximately 69.3 GL of New South Wales environmental water, was delivered into Yanga National Park to support the spawning and growth of five native fish species in the Yanga floodplain system, including golden perch, Murray cod, Australian smelt, flathead gudgeon and carp gudgeon.</p> <p>A total of 145 ML of Commonwealth environmental water was delivered across three sites in South Australia to support populations of threatened Murray hardyhead fish. In 2018–19, 800 Murray hardyhead from one of these sites were used as the source population for fish being relocated to New South Wales—the first time they have been in the state in over a decade. To complement the translocation, Commonwealth environmental water was supplied to the new site on Wingillie Station to create conditions beneficial to Murray hardyhead growth and reproduction.</p> <p>In response to very low dissolved oxygen concentrations in the lower Murrumbidgee River in January and February 2019, 3.3 GL of Commonwealth environmental water, in conjunction with 8.2 GL of New South Wales environmental water and 16.1 GL of The Living Murray water, was delivered to mitigate poor water quality conditions and prevent major native fish deaths.</p>