



Australian Government

Commonwealth Environmental Water Office

Commonwealth Environmental Water Office

Water Management Plan

Chapters 1 and 2

2020–21



This document represents Chapter 1 and Chapter 2 of 'Commonwealth Environmental Water Office Water Management Plan 2020-21, Commonwealth of Australia, 2020'.

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

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

1800 803 772

ewater@awe.gov.au

www.environment.gov.au/water/cewo

@theCEWH

GPO Box 858, Canberra ACT 2601

Foreword

It is a pleasure to present the *Commonwealth Environmental Water Management Plan for 2020-21*. Using a new, more accessible format, the Plan scopes options for where and when Commonwealth water for the environment may best be used across the Basin this year.

Our planning for 2020–21 is against the backdrop of three very dry years that have seen the environment and communities suffer. While the Bureau of Meteorology’s outlook for winter and early spring rainfall is cause for optimism, we plan for all scenarios – from dry to wet - so we are prepared and can adapt to deliver the best we can for the environment.

For the first time, the Plan includes formal input from the Murray Lower Darling River Indigenous Nations and the Northern Basin Aboriginal Nations on First Nations’ environmental objectives and outcomes across the Basin. This is a significant step in our on-going efforts to better integrate cultural objectives into the management of water for the environment and complements the work we do locally with First Nations people.

We have worked closely with local communities, including water managers, scientists, delivery partners, river operators, landholders, and First Nations peoples to plan our water use. Local knowledge is key to getting the best possible results for our environment – helping to prioritise and carefully plan what needs to be watered this year, river by river, wetland by wetland.

Central to our planning is matching supply with demand – comparing how much water we are likely to have with what the environment needs. What we aim to achieve is scaled to the seasonal conditions and depends on how much water is allocated to us. Every year is different.

In dry years, water is delivered to sites that provide drought refuge, helping native plants and animals survive so they can bounce back when the drought breaks. Sites in critical condition or supporting threatened plants and animals are prioritised over sites that can do without water for another year or two. In wetter years, we can build on higher river flows to give wetlands a drink and reconnect billabongs and lagoons to the river so native fish can move and breed.

We begin 2020-21 with access to water carried over from the previous year. Through careful planning we set this water aside so we can deliver flows in winter and early spring when the environment most needs it. This year we have carried over 267 gigalitres in the Southern-connected Basin and 51 gigalitres in the Lachlan and northern valleys. This is the lowest volume of carryover of Commonwealth environmental water in a decade.

With storages across the Basin remaining low, early season allocations are expected to be low. In the southern Basin, our winter water use will likely be limited to maintaining river flow patterns to help native fish. We will scale our water use as the season unfolds. We hope prudent early-season use, with increased water availability will allow us to deliver larger late spring flows across northern Victorian tributaries, the River Murray, the Baaka/Lower Darling and the creeks and rivers in the Edward/ Kolety-Wakool.

In the northern Basin, unregulated flows helped to connect some rivers during late summer and autumn, however inflows to storages have been modest. Without further major rainfall, our water use will be limited to topping up refuges for native fish and possibly some small flows to internationally important wetlands such as the Macquarie Marshes, Gwydir Wetlands and Narran Lakes.

Our water use will continue to use the best science to build on successes and lessons learnt as we attempt to reverse the decline in the environmental health of the Basin over the past decades. The science is showing us water for the environment is achieving positive environmental outcomes, but recovery will take time.

In the last year, water for the environment contributed to the first major flows into the internationally important Narran Lakes in seven years; helped native fish survive in the Gwydir and Mehi rivers and Carole Creek; improved vegetation in Barmah-Millewa, Gunbower and Koondrook-Pericoota Forests, saw congolli abundant again in the Lower Lakes and reduced salt levels in the Coorong.

At the same time, and not unexpected during severe drought, we have seen no improvement in waterbird numbers; little recruitment in golden perch in the Edward/Kolety-Wakool and Lower River Murray, a decline in floodplain vegetation health and devastating fish deaths in the Baaka/Darling River.

Throughout 2020-21 we will continue working with communities across the Basin to understand local priorities and support community involvement in the planning and use of water for the environment. Individuals and groups are encouraged to get in touch with their nearest Local Engagement Officer to provide suggestions for how we can best use Commonwealth environmental water.

We will also consider all available options as we manage our water to maximise environmental outcomes, including the use of carryover and trade. The opportunity to trade water will continue to be evaluated throughout the year, however water can only be traded if our objectives have been met and there is no risk of harm to the ecosystems if environmental water is not provided in the near term.

Together we can work to deliver water for the environment to keep our rivers flowing and healthy, so they continue to sustain healthy communities.

A handwritten signature in blue ink that reads "Jody Swirepik". The signature is written in a cursive style with a large, stylized initial "J".

JODY SWIREPIK

Commonwealth Environmental Water Holder

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1 How we plan and make decisions

1.1 Introduction

1.1.1 Water for the Environment

The rivers of the Murray-Darling Basin have experienced significant changes over the past 100 years. As agriculture, industries and communities have grown over time, water use has increased dramatically. While benefiting our food and fibre production, this has seen as much as 50 per cent of natural flows removed from the river in some locations. The changes in river flows have seen the health of our environment decline over many decades, which has had negative impacts on native fish, waterbirds, forests, woodlands and wetlands.

‘Water for the environment’ is water that is managed with the aim of restoring the health of the Basin’s rivers for the benefit of all users. Water is allocated to federal and state environmental water holders across the Basin, who make decisions about when, where and how much water is released for the environment and deliver flows to where nature needs it.

1.1.2 Commonwealth Environmental Water Holder

The Commonwealth Environmental Water Holder (CEWH) is a statutory position established by the *Water Act 2007* (the Water Act) to manage the Commonwealth environmental water holdings. This water must be managed to protect or restore the rivers, wetlands and floodplains (and the native animals and plants they support) of the Murray-Darling Basin, to give effect to relevant international agreements.

Ms Jody Swirepik is the current CEWH. Ms Swirepik is supported by staff of the Commonwealth Environmental Water Office (CEWO) within the Department of Agriculture, Water and the Environment. The CEWO employs six full-time local engagement officers who live and work in regional centres across the Murray-Darling Basin.

The CEWH is governed by the Water Act and the *Basin Plan 2012* (Basin Plan) and must comply with the specific requirements and standards of Commonwealth and state legal, policy and environmental legislation and frameworks.

The water managed by the CEWH are a mix of entitlement types held across 24 catchments. The rules governing the entitlements vary across states and across valleys, but they are subject to the same fees, allocations, carryover and other rules as equivalent entitlements held by other water users.

1.1.3 What are the options for managing water for the environment?

The CEWH is a diligent, responsive and prudent operator. Commonwealth water for the environment is managed efficiently and effectively, focused on maximising beneficial outcomes. The options for managing this water include:



- delivering water to a river or floodplain to meet an identified environmental demand (**use**)



- leaving water in storage and carrying it over for use in the next water year (**carryover**)



- trading water (**trade**), which includes:
 - transferring water between connected catchments
 - buying and selling water allocations
 - using the proceeds from selling water to invest in activities that improve the outcomes from the use of water for the environment.

Each year the CEWO considers and plans for how it will manage Commonwealth water for the environment. This document explains the process by which we plan and manage this water and captures the key

information that will inform the CEWH's decisions in 2020–21. The plan reflects the collective effort of a multitude of government agencies, scientists, First Nations, and community organisations that have provided valuable input.

1.1.4 Providing feedback

The CEWO welcomes information from the community on how environmental water can best be managed. If you have any comments or suggestions, please call 1800 218 478 or send an email to: ewater@awe.gov.au.

Visit www.environment.gov.au/water/cewo for more information on Commonwealth water for the environment.

1.2 Planning Commonwealth environmental water use

Each year the CEWO considers and plans for how it will manage Commonwealth environmental water. The objective of the planning is to support the CEWH's decisions on making best use of the available water across years and across catchments. It also supports coordination of water deliveries with other environmental water holders and river operators.

Planning is undertaken at both basin scale and catchment scale and involves:



- having clear objectives and identified environmental water needs (demand)



- considering how much water is available under different scenarios (supply)



- robust planning and decision-making approaches that identify the different actions (including water use, carryover and trade) that may be undertaken under different scenarios (that is, matching supply to demand)



- collaboration and cooperation with delivery partners, river operators, site managers, First Nations, scientists, landholders and local community advisory groups



- learning from past actions and the latest information (which is underpinned by having robust monitoring, evaluation and reporting processes).

Further information on these elements are discussed below.

1.2.1 What we are trying to achieve for the environment

Under the **Water Act**¹, the CEWH functions are to be performed for the purpose of protecting or restoring the environmental assets of the Murray-Darling Basin. These give effect to relevant international agreements such as Ramsar and Bonn conventions, and migratory bird agreements with Japan, China and Republic of Korea. The Water Act² also states that the CEWH must manage holdings in accordance with the Basin Plan's environmental watering plan.

The Basin Plan's **environmental watering plan**³ establishes the objectives, processes and principles that guide the management of water for the environment by the Murray-Darling Basin Authority (MDBA), Basin States and the CEWH. The environmental watering plan also sets broad targets⁴ to measure progress towards meeting the objectives (Figure 1).

The **Basin-wide environmental watering strategy** provides the next level of detail on the environmental objectives and targets. It describes the environmental outcomes expected over the next decade as a result of implementing the Basin Plan and associated water reforms. These outcomes focus on four components: river

¹ Water Act 2007 s105(3a)

² Water Act 2007 s105(4a)

³ Chapter 8 of the *Murray-Darling Basin Plan 2012*

⁴ *Murray-Darling Basin Plan 2012* s8.08 and Schedule 7

flows and connectivity; native vegetation; waterbirds; and native fish (Figure 1). The CEWH must act consistent with this strategy.

Refer to Chapter 8 of the [Murray-Darling Basin Plan \(2012\)](#) and MDBA's [Basin-wide environmental watering strategy \(2019\)](#) for more detail.

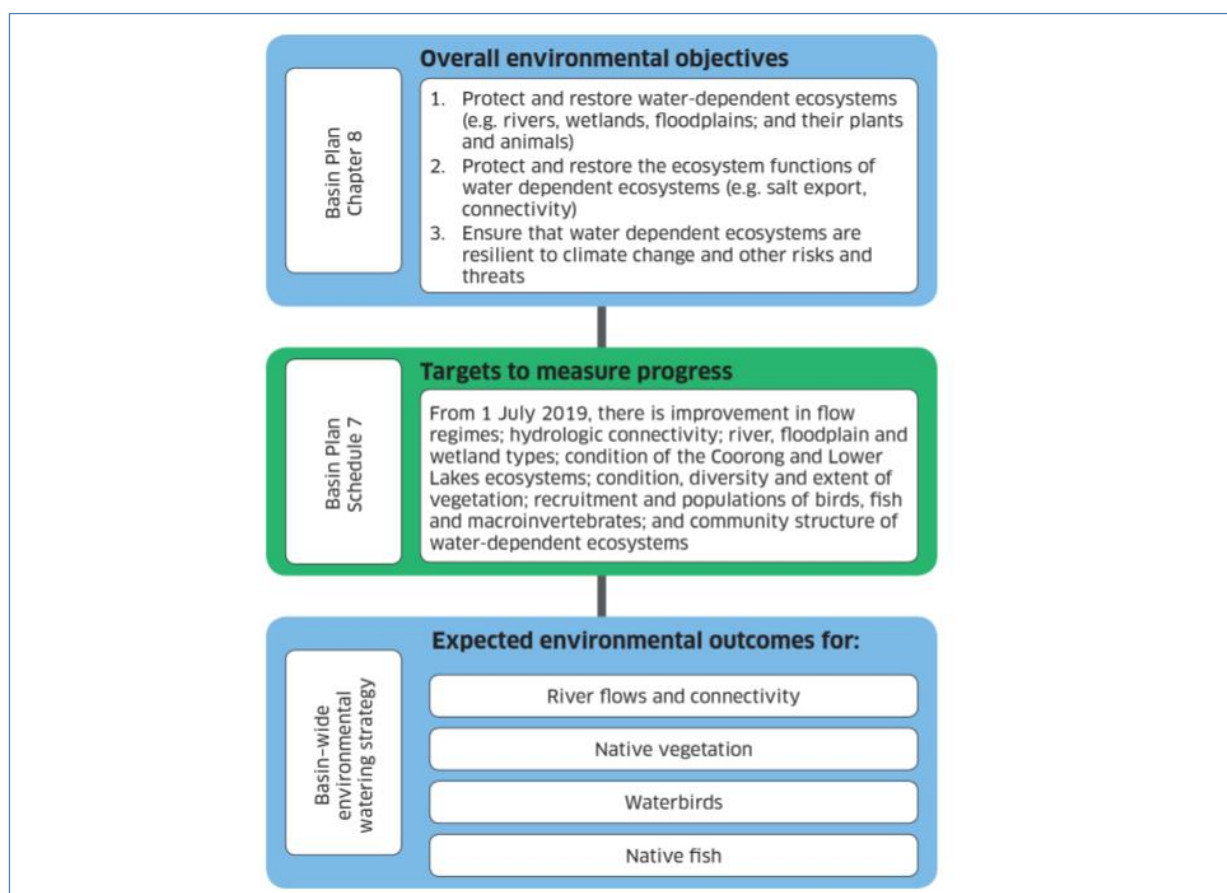


Figure 1: Hierarchy of environmental objectives, targets and expected outcomes for the Murray-Darling Basin⁵.

At a valley scale, **long-term watering plans** are prepared by Basin state governments. These plans identify the key rivers and floodplains in each valley, and the objectives, targets and environmental watering requirements for each river or floodplain. They provide the key information on the long-term environmental water requirements within the valley.

These plans are being progressively developed over the coming years. Plans are currently available for catchments in South Australia, Victoria and western river valleys of Queensland, while plans are still being prepared for catchments in New South Wales and the Australian Capital Territory. Environmental water managers will continue to draw on information from the many existing documents that describe environmental watering requirements for specific wetlands and catchments, as well as local knowledge and monitoring results.

Links to long-term watering plans can be found here:

- [Victorian long-term watering plans](#)
- [South Australian long-term watering plans](#)
- [Queensland long-term watering plans](#)
- [New South Wales Draft long-term watering plans](#)

⁵ Basin-wide environmental watering strategy (MDBA, 2019)

Prior to the start of each water year, **annual environmental watering priorities** are prepared by Basin state governments (for each valley) and by the MDBA (for the Basin as a whole). These articulate the environmental water needs (or demands) for the coming year.

The Basin annual environmental watering priorities establish both the context and key environmental water needs at a basin scale through describing the priority environmental values and the desired trend from a whole of basin perspective. The Basin priorities for 2020-21 are described in Chapter 2, Section 0 of this Plan.

The valley priorities provide local information on the key environmental demands in the coming year, under different climatic scenarios. They can provide details on the past and current environmental health of the valley, the objectives for the coming year, and the volumes and timing of desired environmental flows. Valley priorities are developed in close consultation with catchment management agencies, site managers, First Nations representatives, local landholders and community advisory groups.

First Nations environmental and cultural outcomes

Under the Basin Plan, environmental water holders must have regard to Indigenous values when undertaking environmental watering. One way this is occurring is through incorporating First Nations environmental objectives into planning processes. This occurs at the local level, with First Nations representatives typically involved in the development of watering proposals at particular sites or valleys. For the first time this year, this is also being complemented by First Nations environmental objectives at the system-scale, which have been developed by the Murray Lower Darling River Indigenous Nations (MLDRIN) and the Northern Basin Aboriginal Nations (NBAN) (see Chapter 2, Section 2.4).

There is variation between the level of First Nations input and consistency of engagement at a valley scale. This is a reflection of CEWO's journey to enhance how we work with First Nations people in the management of environmental water. We still have work to do and are continuously looking for opportunities to improve.

1.2.2 Providing water to meet environmental demands

Commonwealth environmental water planning is primarily driven by supply (how much water is available) and how this can be used to meet identified demands (what are the environment's needs).

The scope of watering actions and the environmental outcomes that can be achieved will be limited by availability of water (or 'supply') to achieve these outcomes. The Commonwealth considers current water availability and estimates its likely future supply of environmental water based on factors such as rainfall, flow conditions and forecasts of water allocations. Other important considerations include the availability of other sources of water and other likely demands in the system that can either assist or hinder the ability to deliver water to meet environmental demands.

The Commonwealth Environmental Water Portfolio Management Framework has been developed to support decisions on the best mix of water delivery, carryover and trade under different levels of supply and demand. By considering both supply and demand, the framework identifies four different purposes for managing the portfolio (Figure 2) and the outcomes that are in scope under each purpose.

In planning for the new water year, we need to be prepared for all scenarios—from very dry through to very wet, providing flexibility and ability to adapt quickly to changing conditions.

Further information on how we plan can be found within the Framework for determining Commonwealth Environmental Water Use available at:

<http://www.environment.gov.au/water/cewo/publications/framework-determining-cew-use>

Overall environmental water resource availability	Demand for environmental water				
	Very High – water predominantly needed urgently	High – water predominantly needed this year	Moderate – water predominantly needed this year and/or next	Low – water predominantly not needed this year	Very low – water predominantly not needed this year and next
Very low					
Low					
Moderate					
High					
Very high					

Figure 2: Environmental demand and water available influence the purpose of Commonwealth environmental water management

Our water management planning occurs at both the valley and Basin-scale. Valley annual water management plans (refer Chapter 3), include a summary of the objectives and long-term flow regime required to meet environmental demands. A multi-year approach is then taken to identifying water management intentions, considering the:

- past watering history and its impact on environmental demands and asset condition
- likely effects of planned actions on environmental demands in future years.

Once initial valley planning has been undertaken, this is then fed into a Basin-wide planning process. This process considers:

- key demands across the Basin
- opportunities to use allocation trade (purchase, sale or transfer) to rebalance the portfolio to better match differing demands across catchments
- opportunities to align environmental outcomes from watering, such as multi-site watering events in hydrologically connected catchments.

1.3 From planning to decision making

Once planning is completed, decisions on the use of Commonwealth environmental water need to be made. Many local factors influence these decisions on water delivery, carry over and trade (Figure 3).

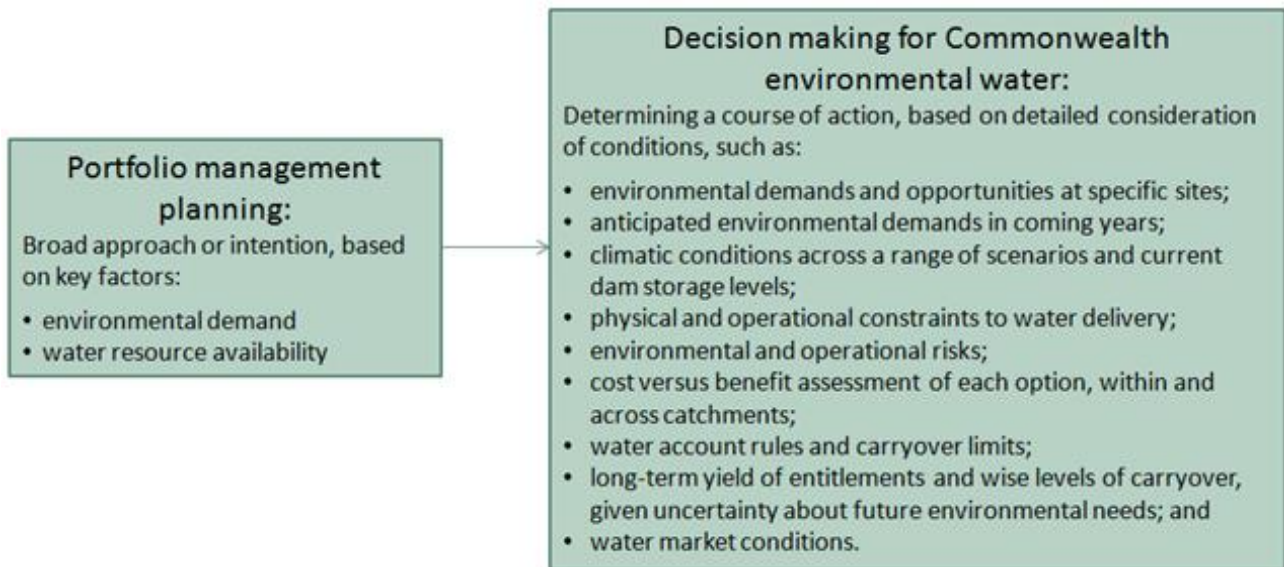


Figure 3: Factors informing planning and decision-making for Commonwealth environmental water.

1.3.1 Making Commonwealth environmental watering decisions

Towards the beginning of the new water year, the focus shifts from planning to implementation. Greater consideration is given to current and forecast catchment conditions and water availability to determine whether the watering intentions identified during the planning process can feasibly be implemented. Local on-ground knowledge is important for detailing a specific watering action including the flow magnitude, timing, triggers for commencement, rates of rise and fall and the area to be inundated.

Once an action has been scoped in more detail, an assessment is undertaken against the following criteria:

- ecological value of the river, floodplain or wetland
- expected outcomes from watering
- potential risks of watering
- long-term sustainability and management of the site
- cost effectiveness and feasibility of watering.

When a decision is made by the CEWH to proceed with a watering action, arrangements for implementation are made with delivery partners. This includes river operators, who manage the delivery of the water and operational monitoring. Local involvement is crucial at this stage of implementation and during water delivery as conditions can change rapidly and may result in the need to adjust, suspend or even cancel the watering action.

For further information see the *Framework for Determining Commonwealth environmental water use* and the *Criteria for assessing options for Commonwealth environmental water use* (available at: www.environment.gov.au/water/cewo/publications/framework-determining-cew-use).

1.3.2 Carryover

Carryover rules are set by state governments and vary markedly for different entitlements and in different water plan areas across the Basin. The carryover limits, account limits and use limits apply to all entitlement holders including the Commonwealth.

When making carryover decisions, under the rules set by Basin states, considerations include:

- having sufficient water in accounts for environmental watering actions that occur early in a water year
- considering the risk of carryover of water in accounts that may be subject to trade or use restrictions through the following water year
- considering the cost-effectiveness with regard to the cost of water delivery and transfer fees against the potential market cost of water being reallocated under State rules
- minimising the risk of water being reallocated under State rules by carrying over water in accounts with better carryover provisions
- during droughts, the minimum amount of water that can be used to sustain environmental assets whilst maintaining some carryover for future years.

1.3.3 Trade

The primary purpose behind any selling or purchase of Commonwealth environmental water is to improve environmental outcomes. The trade of Commonwealth environmental water can only occur on the open water market when the volume held in an account is excess to environmental requirements and there is no risk of harm to the ecosystems if environmental water is not provided in the near term. Under the law, water set aside for the environment cannot be given away or borrowed.

Decisions to sell water allocations are made by the CEWH consistent with the obligations under s.106 of the Water Act. Broadly, Commonwealth environmental water can be sold if one of two conditions are met:

1. If allocations are not required during the water year and either:
 - a) cannot be carried over, or
 - b) retaining the water is likely to result in forgoing future allocations due to account limits⁶.
2. If the proceeds will be used to purchase water and/or invest in environmental activities, where the CEWH reasonably believes this will provide greater capacity to achieve environmental objectives⁷.

The decision to trade water is made after considering: the current and forecast volume of water available in Commonwealth accounts; the balance of available environmental water (supply) to meet identified environmental demands; and (where appropriate) the prudent level of carryover. Decisions to trade also include undertaking a market assessment, which informs the mechanisms available to trade water, the volume of water to be pursued or made available from the holdings, the price at which the CEWH is willing to enter the market and (in the case of purchases) the available budget.

Information on current trading actions and trade intentions is available at:

<http://www.environment.gov.au/water/cewo/trade>.

Further information on the process and framework for conducting a trade can be found here:

<http://www.environment.gov.au/water/cewo/trade/trading-framework>.

⁶ Water Act 2007 s106(2)

⁷ Water Act 2007 s106(3)

1.4 How we consult and engage

Commonwealth environmental water cannot be delivered without the coordinated effort of many stakeholders. The planning, delivery and monitoring of Commonwealth environmental water is undertaken in partnership with a range of organisations and communities across the Basin.

To this effect, the CEWH regularly meets with individuals and representatives of First Nations, local government, business, landholders and peak bodies, to discuss the planning, management, and monitoring of Commonwealth environmental water. These meetings occur at locations throughout the Basin and in Canberra.

This outreach activity is complemented by the work of the CEWO, including the six local engagement officers who live and work in Basin communities. These officers are in Moree, Walgett, Griffith, Albury, Mildura and Berri. These six officers, alongside other officers of local land and water management agencies, work closely with all levels of government as well as local communities and businesses to assist members of the community to participate in environmental water planning and decision making. For further information please refer to: <http://www.environment.gov.au/water/cewo/local-engagement>.

1.4.1 Delivery partners

Planning for Commonwealth environmental water use involves conversations with state government departments and agencies, river operators, catchment management and land service agencies, local environmental watering advisory groups, wetland managers, holders of environmental water, the MDBA, landholders and communities, as well as the organisations responsible for the monitoring the outcomes from environmental water. These conversations identify environmental demands, relevant lessons learnt and outcomes from previous watering, barriers to delivery (e.g. infrastructure maintenance), potential risks, other complementary sources of water and any relevant operational plans.

The CEWH has entered into formal partnership agreements with the Victorian Environmental Water Holder, the New South Wales Department of Planning, Industry and Environment, the South Australia Murraylands and Riverland Landscape Board, and the Renmark Irrigation Trust. A formal partnership agreement with South Australian Department for Environment and Water is currently in the final stages of development. These agreements outline the way in which the CEWH and staff of the CEWO will work with partners to coordinate the management of environmental water. The CEWH also continues to work collaboratively with other partners where formal agreements are not in place.

1.4.2 Working with First Nations

The CEWO is committed to working with First Nations across the Basin in how we plan, deliver and monitor water for the environment.

In some cases, this is achieved through direct partnerships, where Nations can propose, plan, deliver and monitor watering events. In other cases, collaboration relies on State and local delivery partners who have working relationships with local communities and established processes for First Nations participation in management of important environmental sites, including use of environmental water.

This may include involvement in community reference groups, environmental water advisory committees or engagement with local and regional engagement officers. Many First Nations have articulated their desired environmental outcomes through these mechanisms, water resource plan consultation and/or Aboriginal Waterway Assessments.

In addition, the CEWO works with the MLDRIN and NBAN representative bodies.

1.4.3 Community engagement

Local information and experience are critical to being able to effectively manage and deliver Commonwealth environmental water. We are very grateful for the expertise, advice, feedback and support provided by our [delivery partners](#), environmental water holders and members of regional advisory groups who invite us to participate in their processes, and the many landowners who work with us to plan, manage and monitor the use of environmental water in the Basin.

The CEWO is involved in state government-led local engagement processes such as environmental water advisory groups. These local forums enable the CEWH to keep abreast of local information whilst accessing a range of people who are experienced in local water and land management issues. This includes community representatives (landholders, Aboriginal community representatives and others) with intimate knowledge of how their rivers, floodplains and wetlands work.

1.5 Monitoring, Evaluation, Reporting and Improvement

Monitoring, evaluation and reporting are essential to improving the planning and use of Commonwealth environmental water. Each year the evaluation of monitoring results and past delivery events expands our knowledge of managing water for the environment. This knowledge is then used to inform next year's planning (Chapter 2 and 3 of this plan) enabling adaptation and trialling of new ways to achieve improved outcomes.

To guide CEWO monitoring, evaluation and reporting activities and to ensure we fulfil our legislative and Basin Plan obligations, the CEWO has developed the Commonwealth Environmental Water Monitoring, Evaluation, Reporting and Improvement (MERI) Framework. The activities done as part of this framework assist in developing new knowledge to enhance the management of Commonwealth environmental water management. This provides the critical evidence we need to understand how water for the environment is helping protect and restore the ecosystems and native species across the Murray-Darling Basin.

Further information on the CEWO Monitoring, Evaluation, Reporting and Improvement Framework can be found here: <http://www.environment.gov.au/water/cewo/monitoring>.

The CEWO Monitoring, Evaluation and Research Program (Flow-MER) is a core activity within this framework. It integrates and continues monitoring and research activities under the former Long-Term Intervention Monitoring (LTIM) and Environmental Water Knowledge and Research (EWKR) projects.

The Flow-MER program has the following components:

- Basin scale – Basin evaluation, research and engagement
- Seven selected areas – On-ground monitoring, evaluation, research and engagement in the following areas:
 - Junction of the Warrego and Darling rivers
 - Gwydir river system
 - Lachlan river system
 - Murrumbidgee river system
 - Edward-Wakool river system
 - Goulburn River
 - Lower Murray River

Further information on the Flow-MER program can be found here: <http://www.environment.gov.au/water/cewo/monitoring/mer-program> and <https://flow-mer.org.au/>.

Further information on the Long-term Intervention Monitoring (LTIM) program can be found here: <http://www.environment.gov.au/water/cewo/monitoring/ltim-project>.

Further information on the Environmental Water Knowledge and Research (EWKR) projects can be found here: <http://www.environment.gov.au/water/cewo/monitoring/ewkr>.

2 Managing Commonwealth water for the environment in 2020-21

2.1 Adaptive Management – ‘Learning by Doing’

Outcomes from monitoring, evaluation and research play a key role in informing adaptive management of Commonwealth water for the environment. Collectively, we draw on the best available science, and the knowledge, insights and experiences of those people living and working in the Basin.

Environmental water delivery is still a relatively new practice, which means trialling and learning by doing from various events and outcomes. These learnings continue to be incorporated into the way water for the environment is managed to support adaptive management and help build knowledge.

Lessons Learned

The following tables (Table 1 and Table 2) provide a summary of key learnings and considerations at a Basin-scale that are contributing to inform water planning for 2020–21. The findings are drawn from the results of the past five years of LTIM and EWKR projects. For site scale lessons, please refer to the Valley Water Plans in Chapter 3.

Table 1: Basin scale key learnings from LTIM and EWKR projects

Theme	Learnings
Hydrology	<ul style="list-style-type: none"> • Delivery of water for the environment has contributed to restoring flow regimes through the provision of base flows. • Water for the environment has contributed to maintaining connectivity.
Productivity	<ul style="list-style-type: none"> • In-channel flows using water for the environment can result in increased productivity. • Source of water doesn't matter (although some exceptions apply).
Fish	<ul style="list-style-type: none"> • Fish responses are linked to provision of fresh and baseflows. • Impact of fish kills will be significant, and recovery will take time. • Low flow conditions and river regulation has limited spring/summer flow pulses which is linked to limited spawning and recruitment of Golden perch.
Vegetation	<ul style="list-style-type: none"> • Water for the environment contributes to plant species diversity and vegetation community diversity both locally and at Basin scales. • Basin vegetation communities are very diverse and support a diversity of communities – over watering can compromise native vegetation outcomes and if other areas are underwatered this may result in reduced diversity of vegetation communities at the landscape scale. • Wetting and drying regimes are important for promoting diversity and seedling growth.
Ecosystem and Biodiversity	<ul style="list-style-type: none"> • Water for the environment is supporting a diverse array of aquatic ecosystems that are representative of the Basin.
Waterbirds	<ul style="list-style-type: none"> • There is a common movement route between the north and the south of the Basin. • Waterbird chicks require a large quantity (8 tonnes of small fish/36 big macs) of food to support survival.

Table 2: Key considerations for water planning

Theme	Learnings
Hydrology	<ul style="list-style-type: none"> Promoting lateral and longitudinal river connectivity to support Basin Watering Strategy outcomes is beneficial for the health of the Basin.
Productivity	<ul style="list-style-type: none"> Small amounts of extra water are valuable in boosting food for fish and waterbirds. Timing for delivery is important and should be considered in terms of the intended outcome e.g. linking timing with needs for fish populations at different life-stages or waterbird breeding. Likely to get more benefit (higher quality food resources) if water can be reconnected from floodplain and backwaters following the initial inundation. Timing is critical to avoid blackwater events.
Fish	<ul style="list-style-type: none"> For fish outcomes, water for the environment should provide a range of hydraulic diversity (flow rate and depth) and hydrological connectivity. During drought conditions, the primary objective is to support native fish persistence, including base flows. Fresh flows are important to maintain refuges, water quality and food availability. After fish kills, it is critical to provide base flows and freshes to maintain refugia habitats, water quality and promote connectivity. For Golden perch, where possible spring and summer freshes or pulse events should be used to trigger spawning, recruitment and dispersal of young. Water for the environment should also aim to consider the large spatial scale in which this species operates, the need for hydrological and physical connectivity for all life stages.
Vegetation	<ul style="list-style-type: none"> All watering is likely to enhance plant species and vegetation community diversity at the Basin scale in some way. Watering lignum once in every 1-3 years assists in greatest clump size which supports waterbird recruitment.
Ecosystem and Biodiversity	<ul style="list-style-type: none"> Repeated annual watering of some ecosystems can have negative impacts on vegetation diversity and the diversity of flora and fauna it supports. Multi-year watering approaches are encouraged to help maintain ecological character of Ramsar sites – consider both wetting and drying cycles and protecting biodiversity hotspots.
Waterbirds	<ul style="list-style-type: none"> Basin scale thinking and coordination in planning water for the environment is required for waterbird recruitment outcomes. For maximum impact, water for the environment could be managed to support foraging habitat and stopover within the north and south route. This could occur both between and during breeding events. Improvements in productivity (see above) will help ensure food sources are available to support waterbird breeding events and survival of juveniles.

Reports for LTIM and EWKR: <https://www.environment.gov.au/water/cewo/publications>

2.2 Current conditions and seasonal outlook

The Murray-Darling Basin has just experienced the hottest and driest three-year period on record. This has significantly impacted water resources throughout the Basin, including groundwater, soil moisture and water held in storages. At the end of 2019, dam levels were at record lows. The northern Basin held just over 5 per cent capacity on average, which was 7 per cent less than the lowest levels during the Millennium Drought. The southern Basin also experienced below average winter rainfall, however total storage volumes were higher relative to the north and didn't fall lower than Millennium Drought levels, despite some low water allocations.

The ongoing dry conditions had a significant impact on rivers and most northern rivers ceased to flow by December 2019. While streamflows in the south were also below average, they didn't reach the same critical levels experienced in the north.

Above average rainfall, particularly in the north, between January and April 2020 replenished surface soil moisture levels and flows resumed temporarily in some rivers. However, there was only limited recovery in critically low major water storage levels in the north of the basin. This was reflected in the generally minor easing of northern NSW allocation restrictions. Many months of above average rainfall is needed to substantially improve water availability across the Basin.

The harsh conditions over the past three years have had devastating impacts on the Basin's ecology, with large-scale fish deaths, permanent waterholes drying up, limited waterbird breeding and declines in the health of some floodplain woodlands. Bushfires have also affected the upper reaches of some valleys, with significant amounts of ash being washed into waterways.

The recent rainfall and inflows have provided some relief. Flows reached Narran Lakes in early 2020 (which included Commonwealth water), providing the first significant watering of this Ramsar-listed wetland since 2013. Unregulated flow events also delivered water to the Macquarie Marshes and Gwydir Wetlands. Some inflows to Menindee Lakes were released into the lower Darling, connecting to the River Murray in April. This was the first time in over two years there has been full connectivity of the Barwon-Darling River from Mungindi to Wentworth. Commonwealth water that flowed from the Culgoa and Warrego rivers contributed to this important first flush and connectivity event.

Water for the environment in regulated river systems has played an important role in maintaining key parts of the Basin's environment over this period, including:

- connecting and replenishing waterholes for native fish in the Gwydir
- maintaining the health of vegetation in the core wetland habitats (and providing waterbird refuge habitat) in the lower Lachlan, the mid and lower Murrumbidgee floodplains, Barmah-Millewa Forest and Gunbower Forest
- providing elevated baseflows and freshes to support riverbank vegetation, native fish and other animals that live in northern Victorian rivers, the creeks and rivers of Mid-Murray (Barmah-Millewa, Gunbower and the Edward-Wakool system), and down the entire length of the River Murray
- maintaining the Lower Lakes at levels that avoid the exposure of acid sulphate soils
- maintaining a continuous flow into the Coorong to export salt, support fish migration and freshen the estuarine habitat.

2.3 Basin Annual Environmental Watering Priorities

Prior to the start of each new water year, the MDBA must publish Basin annual environmental watering priorities (Table 3). They are developed having regard to the annual environmental watering priorities developed by Basin States for each catchment. All environmental watering, including by the CEWH, must be undertaken having regard to these priorities.

Commonwealth environmental watering actions will seek to contribute to the Basin annual environmental watering priorities, subject to conditions as they unfold throughout the year.

Table 3: Basin annual environmental watering priorities 2020-21

	Rolling, multi-year priorities	2020–21 annual guidance
River flows and connectivity	<ul style="list-style-type: none"> • Support lateral and longitudinal connectivity along the river systems • Support freshwater connectivity through the Lower Lakes, Coorong and Murray Mouth 	<ul style="list-style-type: none"> • Protect drought refuges • Build ecosystem resilience by providing or enhancing connectivity
Native vegetation	<ul style="list-style-type: none"> • Allow opportunities for growth of non-woody wetland vegetation • Allow opportunities for growth of non-woody riparian vegetation • Maintain the extent, improve the condition and promote recruitment of forests and woodlands • Maintain the extent and improve the condition of lignum shrublands • Expand the extent and improve the condition of Moira grass in Barmah-Millewa Forest • Expand the extent and improve resilience of ruppia in the southern Coorong 	<ul style="list-style-type: none"> • Maintain core wetland vegetation and refuges • Avoid critical loss and (where possible) improve vegetation condition in areas where drought conditions persist • Support and build on watering events that have happened in previous years • Provide follow-up watering to consolidate improvement in lignum communities at Narran Lakes • Support growth of ruppia in the southern Coorong
Waterbirds	<ul style="list-style-type: none"> • Maintain the diversity and improve the abundance of the Basin’s waterbird population • Maintain the abundance of key shorebird species in the Lower Lakes and Coorong 	<ul style="list-style-type: none"> • Provide follow-up watering to build resilience in the Narran Lakes system or to support waterbird breeding and recruitment • Provide water to the Macquarie Marshes to support waterbird habitat • Support productive shorebird habitat and foraging resource availability in the Coorong, Lower Lakes and Murray-Mouth
Native fish	<ul style="list-style-type: none"> • 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 • Improve flow regimes and connectivity in northern Basin rivers to support native fish populations across local, regional and system scales • Support viable populations of threatened native fish, maximise opportunities for range expansion and establish new populations 	<ul style="list-style-type: none"> • Protect or provide flows that protect existing populations, support connectivity and sustain short-lived species recruitment • Support recruitment from breeding events and subsequent dispersal of new recruits in the northern Basin • Maintain existing populations and ensure hydrological integrity of flows in the southern Basin rivers

2.4 First Nations environmental water objectives and outcomes

First Nations environmental watering outcomes describe tangible benefits experienced by First Nations' people from the delivery of water for the environment on Country. These benefits can include:

- healthy rivers and wetlands that sustain Country in a way that allows for populations of culturally significant species to thrive,
- the improved health of culturally important places through seasonally appropriate flows.

Achieving First Nation environmental watering outcomes is therefore essential, to ensure First Nation peoples' health, wellbeing and cultural resilience.

The below advice on environmental water objectives for the northern and southern Basin have been provided directly by NBAN and MLDRIN through the First Nations Environmental Watering Guidance project. This information has been collected through the collaborative efforts of representatives from 16 Nations across the southern Basin and 16 Nations from the Northern Basin.

MLDRIN and NBAN developed their own guidance, using different approaches to reflect the differences in climate, water management and cultural diversity in the northern and southern Basin. In recognition that First Nations cannot prioritise one species over another, NBAN identified indicator species that reflect the health of Country. MLDRIN identified shared priorities for waterways and places in need of environmental water, improved flows and connectivity, vegetation, waterbirds and fish and threats to the cultural health of Country for environmental water planning in 2020–21. Environmental flows will aim to contribute to these objectives where possible.

These objectives represent a great wealth of information. However, they are not fully representative of all the Nations in the Basin and do not capture the detail, depth and complexity of Nations' localised water-related objectives. The CEWH is committed to continuing to strengthen engagement with all First Nations to support those Nations to articulate objectives for water management and shape water planning in a way that supports self-determination.

2.4.1 Northern Basin Priority Sites and Indicator Species

Table 4 lists priority sites and indicator species provided by representatives from NBAN for the northern Basin. These species are listed as they are species which are endemic to river stretches and if they were seen to be flourishing reflect the health of Country (NBAN Ltd, 2020).

Table 4: NBAN priority sites and indicator species for the northern Basin (NBAN Ltd, 2020).

River flows and Connectivity
<ul style="list-style-type: none"> • Paroo River must connect to Darling River (when possible) for cultural obligations to other Nations. • Macquarie River must flow at all times. • Culgoa and Warrego Rivers need to connect to Gerrera and Tego Springs. • Sufficient flows to maintain abundant animal life in Narran Lakes. • Moonie River connection event to support fish recruitment (Catfish, Yellowbelly). • Nebine River to have water at all times for ephemeral lakes and creeks, gilguuys, waterholes and connection to billabongs. • Lachlan River must flow at all times, and flow into Booberoi Creek and Willandra Creek. <p><i>Other flows and connectivity:</i></p> <ul style="list-style-type: none"> • Reduction of river velocity to reduce erosion. • Adequate quantity to support flows. Release soft flows (more permanent) • Ephemeral creeks to flow for lateral connectivity. • Water quality to ensure downstream river health.

Native Vegetation
<p><i>Indicator species:</i> Murray Lily, Lignum, Red Gum, Bullrush, Box Tree, Native Grasses, Mitchell Grass, Kangaroo Grass, Nardoo, Sedges, Native Spinach, Duckweed, Will Bill, Lomandra, Snotty Gobble (Mistletoe), Coolabah Belah.</p> <p><i>Other priority species:</i> Iron Bark, Black Box, Sandalwood, Stringy Bark, Karrajon Tree, Ruby Saltbush, Quandong, Quinine, Water Ribbons, Blue Gum, Tea Tree, Yellow Box, Bimble Box, Naipan, Emu Bush, Gumby Gumby, Bush Onion, Yam, Eurah (<i>Eremophila sp.</i>).</p>
Native Birds
<p><i>Indicator species:</i> Brolga, Kingfisher, Waterhen, Black Duck, Pelican, Bush Turkey, Eagle, Black Cockatoo (glossy and red tail), Australian Painted Sniper, Wood Duck, Black Koel, (Storm Bird), Red-Winged Parrot, Black Swan, Teal, Willy Wagtail, Major Mitchell Cockatoo, Whistling Kite (Red), Finch, Tawny Frogmouth, Emu.</p>
Native Animals
<p><i>Indicator species:</i> Water Spider, Macquarie Perch, Yellowbelly, Catfish, Cod, River Blackfish, Spiny Cray, Platypus, Crucifix Frog.</p> <p><i>Other priority species:</i> Water Dragon, Golden Perch, Yabbies/Bogglies, Shrimp, Mussels, Purple-Spotted Gudgeon, Jewfish, (Silver Perch), Long-Tailed Eel, Bony Breem, Kangaroo, Wallaby, Water Rat, Echidna, Bat (all varieties), Possum, Red Belly Black Dingo, Ants (all varieties), Goanna (Sand and Black), Tiny Brown Frog, Tree Frog, Bogan Moth, Longnecked Turtles.</p>
Connecting with Country
<p>A healthy environment is required for: communal living, research, fishing, trade, camping, weaving, gathering, transfer of knowledge, storytelling, teaching, healing, ceremony, initiation, identity and belonging, spiritual connection, wellbeing.</p>

2.4.2 Southern Basin First Nations Environmental Watering Priorities Statement 2020-21

Representatives of 16 First Nations across the southern Murray-Darling Basin have contributed information about their priorities for the use of environmental water in 2020-21 as part of the First Nations Environmental Water Guidance project.

First Nations share common concern for all major rivers across the region. In particular, multiple Nations submitted priorities relating to the Murrumbidgee, Baaka (Darling River), Lachlan, Campaspe, Murray and Edward-Wakool systems. First Nations understand that declining river health and low flows in one part of the Basin can affect communities and cultural outcomes across the region.

Nations want to see improvements in water quality and the volume and timing of flows in all major rivers, and particularly in degraded river systems. Improved seasonality of flows, informed by First Nations' science and traditional knowledge, is a key to sustaining the cultural health of major waterways. Addressing barriers and constraints, such as barriers to fish movement, is essential to sustain the interconnectivity which underpins First Nation stories and cultural values. Improving the health of tributary waterways and ensuring adequate flows, is also a key to revitalising major rivers.

Participating Nations' contributions stressed the significance of wetlands, billabongs and floodplains. Nations want to see life return to these culturally significant places through watering activities that create connectivity between rivers and floodplains and restore the hydrological cycles of degraded wetlands, thereby supporting cultural values and resources.

Participating Nations identified key plant and animal species that are most in need of watering in the 2020-21 watering year. Key culturally significant fish such as Murray Cod, Golden Perch (Yellowbelly) and catfish were identified as priorities by most Nations. More than half of all contributing Nations highlighted black swans, pelicans and duck species as culturally significant waterbirds that would benefit from environmental watering. Improved health and abundance of old man weed and other medicinal plants were

noted as priorities for vegetation, alongside improved outcomes for river redgums, blackbox, cumbungi and lignum.

Critically, Nations stressed the importance of considering outcomes beyond fish, waterbirds and vegetation. Nations also want to see improved outcomes for aquatic fauna such as turtles, yabbies, frogs, platypus and rakali (water rat). The contributions also stressed the importance of environmental watering in sustaining healthy populations of important terrestrial fauna such as kangaroo and emu.

Participating Nations have identified a range of key threats to the cultural health of waterways as well as preferences for improved participation in environmental water planning for 2020-21. Water holders should consider these preferences alongside the detailed, locally specific watering objectives produced by Nations. It is essential that water holders continue, and strengthen, direct engagement with First Nations to empower participation in environmental water planning and delivery.

2.5 Water availability

Water words

Entitlement: Also known as a licence or holding. An entitlement is a legal right to a share of the water available at a location, subject to rules and conditions. Water entitlements can be used for a range of purposes, including household use, industry, irrigated farming or the environment. A bucket is a good metaphor for a water entitlement – the bigger the water entitlement, the bigger the bucket.

Allocation: the amount of water made available in proportion to the entitlement (how full the bucket is). Available water varies from year to year, depending on how much water is in storage and how much it has rained. Dry/drought years will have low water allocation/low availability, while average/wet years have a higher water allocation/high availability. Whether or not an allocation is made may depend on the type and/or security of the entitlement. Generally, each entitlement (bucket) gets filled with water (allocation) as more water becomes available in storage. Some entitlements are not linked to water storage (unregulated entitlements) and allow diversion of in-river flows above a certain height/rate or flows in excess of what is needed to supply consumptive users.

Carryover: the amount of water allocated and not used in a water year that can be used in subsequent years, depending on the rules and conditions of the entitlement. Carryover is sometimes used by water holders as a strategy to get through dry times.

Security/reliability: the higher the security/reliability level of the entitlement, the more certainty of a water allocation each year.

Commonwealth water entitlements are subject to the same state government regulations, fees, allocations and other rules as apply to equivalent entitlements held by other water users. In valleys where carryover is available, Commonwealth entitlements are governed by the same rules as other water users. Environmental water managers need to make careful decisions about how much water to use, trade or carryover, just like other water users.

In times of drought, allocations are reduced the same way for all water users – including environmental water holders. The Basin Plan prioritises water for critical human needs (drinking and household water) before being allocated for any other use.

In unregulated river systems, water cannot be ordered from public storages at a particular time – environmental water can only be sourced as a share of an unregulated flow event. Thus, carryover and management of account balances cannot generally be used to influence the timing and volumes of environmental water in these river systems.

Table 5 summarises the carryover and allocation forecasts for regulated Commonwealth environmental water. Allocation forecasts through until 30 June 2021 are sourced from the relevant state agencies where the information is available and long-term averages where state agencies do not provide these forecasts.

Information on allocations to Commonwealth environmental water holdings and volumes transferred for delivery can be found at <http://www.environment.gov.au/water/cewo/portfolio-mgt/holdings-catchment>. This information is updated monthly.

Table 5: Carryover and forecast allocation of regulated (surface water) Commonwealth environmental water in 2020-21

Catchment	Carryover from 2019-20 (GL)	Forecasts of regulated allocations (including carryover) in 2020-21 (GL)					
		Very dry ← → Very wet					
		95 percentile	90 percentile	75 percentile	50 percentile	25 percentile	10 percentile
Border Rivers	2.2	4.9	5.2	6.5	9.4	11.4	12.9
Gwydir	12.0	16.5	16.5	16.5	32.8	56.5	90.4
Namoi	0.6	0.7	0.7	1.6	4.6	9.2	15.0
Macquarie	22.7 ^	22.7	23.7	31.5	92.1	148.9	148.9
Lower Darling	10.8	15.0	16.5	17.6	25.8	25.8	25.8
Lachlan	16.0 ^^	16.7	16.9	16.9	67.4	103.9	121.2
Murrumbidgee	62.0	107.5	146.2	223.8	301.5	350.9	350.9
Ovens	0	0.1	0.1	0.1	0.1	0.1	0.1
Upper Broken Creek and Broken River	0.1	0.1	0.3	0.5	0.5	0.5	0.5
Goulburn	55.2	198.1	233.1	369.6	372.8	372.8	372.8
Campaspe	0.4	0.7	1.7	5.1	7.0	7.0	7.0
Loddon	0	1.1	1.9	3.3	3.4	3.4	3.4
Wimmera	0	0	0	0	0	0	0
Murray – NSW	20.0	47.5	47.8	97.6	185.7	353.3	425.4
Murray - Vic	118.4	288.7	310.4	451.7	480.7	480.7	480.7
Murray - SA	0	162.1	162.1	162.1	162.1	162.1	162.1
Southern-connected Basin Total⁸	267	821	920	1 332	1 539	1 756	1 829
Regulated Total	320	882	983	1 405	1 746	2 086	2 217

^ until conditions improve, only 40% of carryover is available for environmental use with remaining quarantined for drought reserve accounts

^^until conditions improve, 100% carryover is quarantined in drought reserve accounts and is unavailable for environmental use

2.6 Water delivery in 2020–21

Approximately 333 gigalitres of CEWH water was carried over into the new water year, with about 267 gigalitres carried over in the southern-connected Basin, 31 gigalitres of groundwater, and the remaining 53 gigalitres in the Lachlan and northern valleys. At the start of the water year, 31 gigalitres of the 53 gigalitres in the Lachlan and northern valleys was quarantined in drought reserves and is unable to be called for delivery until inflow conditions improve. This is the lowest volume of carryover of Commonwealth environmental water in a decade, reflecting the dry conditions experienced in 2019-20. In addition, storages across the Basin remain low and as such, early season allocations are low.

⁸ The Southern-connected Basin is the network of rivers that feed into the Murray River between the Hume Dam and the sea. This includes the Lower Darling, Murrumbidgee, Murray, Ovens, Goulburn-Broken, Campaspe and Loddon valleys.

Consequently, environmental water use in winter in the Southern-connected Basin is likely to be limited to helping maintain minimum baseflows, with more significant water use delayed until spring. This could include providing spring freshes across several catchments (such as the northern Victorian tributaries, the River Murray, the Lower Darling and the creeks and rivers in the Edward-Wakool system). The size of these flows will be dependent on the prevailing conditions, with the volumes scaled up under wetter conditions. Similarly, the opportunity to provide flows to important off-channel wetlands will increase as conditions get wetter.

In the northern Basin, unregulated flows have provided some connectivity during late summer and autumn. However, inflows into northern storages have been modest and without further significant inflows, water use may be limited to contributing to refuges for native fish and possibly some small flows to internationally significant wetlands, in addition to contributing to unregulated flow events.

2.7 Trading water in 2020–21

The CEWH protocols governing the trade of Commonwealth environmental water are detailed in the Commonwealth environmental water Trading Framework, available at:

<https://www.environment.gov.au/water/cewo/publications/water-trading-framework-nov2016>

Should the CEWH decide to enter the retail water market at any time during 2020-21, information will be publicly disclosed to inform participants in the retail water market ahead of any trade of Commonwealth environmental water at <http://www.environment.gov.au/water/cewo/trade>

2.7.1 Commercial trade

The CEWH has no plans to either buy or sell entitlements in the July to September 2020 period and is unlikely to enter the entitlement market until water recovery to meet the volumetric water recovery targets established in the Basin Plan 2012 have been reached.

Large parts of the Basin are currently experiencing pressures from water scarcity, with declining storage levels, low allocations and rainfall deficiencies evident in most catchments. The extended dry conditions have seen parts of the environment experience stress and declining health, particularly in the Darling River and its tributaries. There is low likelihood of the CEWH selling water allocations under these conditions.

Trade opportunities are reviewed in all valleys throughout the water year and as conditions change.

2.7.2 Administrative Transfers

In 2020-21, administrative transfers may be required between environmental water accounts in the Southern-connected Basin trade zones 6, 6B, 7, 10A, 10B, 11 and 12 to enable environmental water delivery. Based upon water resource availability at the time of the watering event and scale of the event, this may include:

- small transfers for environmental watering activities
- moderate transfers (~ 50 gigalitres) through the Barmah choke from trade zone 7, if required and allowable given the Barmah Choke trade limit
- large transfers (>100 gigalitres)
 - within trade zones, due to the large size of environmental watering activities.
 - From New South Wales Murray and Victorian Murray to South Australia, most likely during Summer-Autumn for environmental outcomes in the Coorong and Lower Lakes.

2.8 Carrying over water for use in 2021–22

The volume of water carried over for use in 2021-22 will depend upon how the 2020–21 water year unfolds, overall water availability and both current and future environmental demands.

If very dry conditions eventuate in 2020-21, there may be very little water to carryover for use in the following year, as it is expected that most of the available environmental water will be required to meet key environmental needs. However, under dry to wet scenarios in the southern Basin, a volume of water will be reserved to help meet early season needs in 2021-22.

In the north, given the low volumes of water in storage at the start of the water year, the opportunity to carryover water for 2021-22 in the regulated northern valleys will be limited by inflow conditions into storages as the water year unfolds. Under a very dry scenario, water carried over into 2021-22 would be set aside to maintain key environmental needs. Under moderate to wet scenarios, carryover volumes may be used to assist in the recovery of core wetland and native fish communities over multiple water years.

3 Valley Water Plans

This chapter describes the specific environmental objectives, recent conditions, supply, demand, priorities and monitoring outcomes/lessons learned for each of the following valleys:

3.1	Border Rivers	22
3.2	Condamine-Balonne	36
3.3	Warrego and Moonie rivers	49
3.4	Gwydir Valley	64
3.5	Namoi Valley	79
3.6	Macquarie River Valley	91
3.7	Barwon-Darling River	107
3.8	Lower Darling River	118
3.9	Lachlan River	128
3.10	Murrumbidgee River Valley	144
3.11	Victorian Rivers	164
3.12	River Murray Valley	183

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