



Basin Plan annual report 2020–21

December 2021

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Acknowledgement of the Traditional Owners of the Murray–Darling Basin

The Murray–Darling Basin Authority pays respect to the Traditional Owners and their Nations of the Murray–Darling Basin. We acknowledge their deep cultural, social, environmental, spiritual and economic connection to their lands and waters.

The guidance and support received from the Murray Lower Darling Rivers Indigenous Nations, the Northern Basin Aboriginal Nations and our many Traditional Owner friends and colleagues is very much valued and appreciated.

Aboriginal people should be aware that this publication may contain images, names or quotations of deceased persons.

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About this report

Under section 52A of the *Water Act 2007* (Cth) the Murray–Darling Basin Authority (MDBA) is required to report on the effectiveness of the Basin Plan within 6 months of the end of each financial year. By providing an annual assessment of progress these reports help to focus priorities, acknowledge achievements and identify problems, as well as build trust and confidence in the community about the Basin Plan reforms.

The MDBA, the Basin states, the Australian Government Department of Agriculture and Water Resources, and the Commonwealth Environmental Water Holder (CEWH) also report against matters listed in Schedule 12 of the Basin Plan each year. These Schedule 12 reports are an important source of information for preparing the Basin Plan Annual Report.

Summary

Investing in new knowledge to understand risks



Basin governments, the MDBA and the Commonwealth Environmental Water Office are investing in new knowledge to better understand impacts on water resources from climate change.

30 SDL Adjustment Mechanism



supply measures on track or in operation

7 measures at high risk of not being completed by 2024

\$177.5m

approved for off-farm efficiency measure



97% compliance with permitted take

In 2019–20 there was compliance with levels of permitted take in 97% of sustainable diversion limit resource units.

Independent Inspector-General of Water Compliance established





3 of 5 salinity targets met

Targets met at Murray Bridge, Morgan, Lock 6 Target not met at Burtundy and Milang

2900GL of environmental water delivered

82% WAS DELIVERED THROUGH WATERING EVENTS COORDINATED ACROSS MULTIPLE ENVIRONMENTAL WATER HOLDERS



Water resource plans



In place for Queensland, Victoria, the ACT and South Australia

The remaining 20 New South Wales water resource plans have not yet been accredited

Murray-Darling Communities Investment Package

\$296.6m

To put communities and jobs at the heart of the Murray-Darling Basin Plan.



Bridging the Gap



Sufficient water was available to meet

critical human water needs



in the River Murray

EVALUATION AND 5-YEARLY REVIEWS COMPLETED



- 2020 Evaluation of the Basin Plan
- Review of environmental watering plan
- Review of water quality and salinity management plan targets

Water trading has brought benefits to many water users across the Basin



Continued reforms are needed to improve water market effectiveness



First dedicated Indigenous member of Murray-Darling Basin Authority Board appointed

Introduction

The Basin Plan 2012 was made under Part 2 of the *Water Act 2007* (Cth). Building on the National Water Initiative and the Murray–Darling Basin Agreement, it was created to guide the management and sharing of water in the Basin in a more sustainable way. It is a shared responsibility, involving the Basin governments – the Australian Government and the governments of New South Wales, Victoria, Queensland, South Australia and the Australian Capital Territory – and other stakeholders including First Nations, industries, environmental groups and Basin communities.

The intention of the Basin Plan is to provide an integrated system of managing the water resources of the Murray–Darling Basin where:

- water supports people and communities
- water supports a healthy and resilient environment
- water supports the economy.

Monitoring, evaluating and reporting on the effectiveness of the Basin Plan

The Basin Plan contains a program for monitoring, evaluating and reporting its effectiveness. It includes 5-yearly reviews, evaluations, and annual reporting. Evaluations assess the effectiveness of the Basin Plan against its objectives and outcomes.

Basin Plan evaluations are required to be undertaken within a conceptual framework of program logic, which describes the relationship between activities and outcomes. An overarching Basin Plan logic is presented in Figure 1. The program logic shows how the implementation activities relate to the intended outcomes described in the Basin Plan.

This report documents progress to 30 June 2021 with the Basin Plan implementation activities in Figure 1. To provide a clear link to the Basin Plan, this report is structured to correlate to chapters in the Basin Plan and associated implementation activities.¹

¹ Chapter 1 – Introduction, Chapter 2 – Basin water resources and the context for their use, Chapter 3 – Water resource plan areas and water accounting periods, and Chapter 5 – Management objectives and outcomes are not Basin Plan implementation activities and therefore progress against these chapters is not in this report.



Other Basin Plan implementation activities, including management of risks to water resources (Chapter 4) and the monitoring and evaluation program (Chapter 13)

Non-Basin Plan supporting actvities such as water recovery programs and river operations

Figure 1: Basin Plan Program Logic

Context for 2020-21

The 12 months between July 2020 and June 2021 saw higher than average rainfall across the Basin. Above average levels of rainfall in spring 2020 led to average streamflow conditions through the last 6 months of 2020, while higher rainfall across most of the northern Basin in late March 2021 resulted in well above average river flows, including major flooding in valleys near the New South Wales– Queensland border.

Widespread natural flooding in 2020–21 improved flows along rivers as well as connection to wetlands in numerous catchments. For example, throughout April–May 2021 floodwaters from the March rainfall made their way downstream, filling the Menindee Lakes system to its highest level in four years. This improvement was not universal, however, with some areas, such as Chowilla Floodplain in South Australia, missing out. In addition, despite the above average rainfall, the Basin is

still recovering from its hottest and driest years on record between 2017 and 2019. Recovery of many rivers and wetland systems will take time and require large flows.

The ongoing COVID-19 pandemic, restrictions, border closures and requirements for social distancing continue to cause stress to communities and have added challenges for all Basin governments. Programs and initiatives, particularly those involving face-to-face consultation, have been impacted.

During the year, in response to several reviews of the Basin Plan's implementation, the Australian Government announced the creation of a new statutory compliance role separate from the MDBA. The new Inspector-General of Water Compliance role started in August 2021 with responsibility for enforcing compliance with the Basin Plan. The *Water Legislation Amendment (Inspector-General of Water Compliance and Other Measures) Act 2021* amended the Water Act to establish the Inspector-General of Water Compliance role. Consequential amendments were made to the Basin Plan.

Mr Rene Woods was appointed as the first dedicated Indigenous member of the board of the Murray–Darling Basin Authority by Minister Keith Pitt on 18 December 2020.

2020 Basin Plan Evaluation

The MDBA completed its evaluation of the effectiveness of the Basin Plan in 2020. The 2020 Basin Plan Evaluation made 12 recommendations, and from these the MDBA identified 6 priority areas for improvement:

- greater focus and collaboration by all Basin governments to implement the Basin Plan
- more resilience and better adaptation to climate challenges through adaptive management
- better support for Basin communities by making difficult decisions with them rather than for them
- more opportunities for First Nations people to be involved in water resource management and achieve enhanced cultural outcomes in the Basin
- integrating water management in broader natural resource management so that Basin governments and communities can achieve environmental restoration
- advancing science and monitoring through strategic investment in science, a structured monitoring framework and good collaboration between Basin governments.

More information about the 2020 Basin Plan Evaluation is available at <u>www.mdba.gov.au/2020-basin-plan-evaluation</u>.

Management of risks to Basin water resources

Chapter 4 of the Basin Plan is about the identification and management of risks to Basin water resources.

Key finding: Basin governments, the MDBA and the Commonwealth Environmental Water Holder are investing in new knowledge to better understand impacts on water resources from climate change.

The objectives of chapter 4 are to:

- provide a framework for the MDBA to identify and manage risks to the condition and continued availability of Basin water resources
- provide Basin States with information about the risk strategies they must have regard to when identifying strategies to manage medium or high risks that have been identified in water resource plans.

The strategies to manage risks to Basin water resources identified in chapter 4 include:

- continued implementation of the Basin Plan
- development of water resource plans
- effective monitoring, evaluation and compliance
- improvements in knowledge.

Key obligations and responsibilities in 2020–21

Table 1: Basin Plan chapter 4 – key obligations and responsibilities in 2020–21

Responsibilities	Basin Plan section	Who is responsible
Have regard to the strategies when undertaking its functions.	4.03(2)	MDBA

Implementation of the Basin Plan itself is one of the strategies for managing risks to the continued availability and condition of the Basin water resources (section 4.03(3)(a)). Limits on water use and management of environmental water help to protect water-dependent ecosystems. Improved water accounting and compliance help to ensure water use is within water use limits. Water quality targets and managing flows to meet the targets help manage risks to the condition of water resources. All of these critical Basin Plan elements are in place, and positive outcomes have been observed.

The risk framework set out in chapter 4 has proven to be useful for identifying and managing risks to surface water and groundwater resources. A comprehensive risk assessment was undertaken for each water resource plan area. In many cases it also provided transparency on causes of risk as well as management of risks in a water resource plan area for the first time. These risk assessments were

used to develop water resource plans and help ensure water resource plans meet the requirements of chapter 10 related to risk management.

Progress in 2020-21

The Basin governments, the MDBA and the Commonwealth Environmental Water Holder are investing in new knowledge to better understand the impacts that key risks such as climate change may have on the water resources, and identifying strategies to better mitigate and manage those risks.

The MDBA has developed a <u>climate workplan</u> that will guide work from 2021 to 2026: see Figure 2.



Figure 2: The 3 phases of the Murray–Darling Basin Authority climate workplan

The MDBA hosted a Basin Climate Resilience Summit on 11–12 March 2021. This provided an opportunity for leaders across 31 participating organisations to share climate adaptation knowledge and innovations. Momentum from this summit has been sustained through the establishment of the Climate Community of Practice. The MDBA also hosted a state and Commonwealth multilateral meeting in February 2021, bringing together partner water agencies to share their respective climate science and planning frameworks.

The Victorian Government requires the water sector to contribute to achieving a net-zero emissions future and to develop plans and strategies to adapt to the impacts of climate change. In May 2021 the Victorian Government released its first Climate Change Strategy. The strategy will inform the Department of Environment Land, Water and Planning's current review of emissions reduction pathways for Victoria's 18 water corporations. The pathways to net zero greenhouse gas emissions will align with other climate change adaptation initiatives. Victoria is developing climate change adaptation action plans for different sectors and regions. The first of the 5-yearly Water Cycle Climate Change Adaptation Action Plans will be finalised in early 2022.

Other activities supporting the development of knowledge to manage risk include:

- the Basin Science Platform
- Victorian Water and Climate Initiative
- <u>NSW and ACT Regional Climate Modelling</u> (NARCliM), which supports the state and regional water strategy work of New South Wales and the Australian Capital Territory's climate change strategy
- South Australia's <u>Climate Smart</u> program and the associated climate change science and knowledge plan
- the <u>National Environmental Science Program</u> and the <u>Future Drought Fund</u> supported by the Australian Government
- the <u>Murray–Darling Water and Environment Research Program</u>, communities of practice and collaborations with researchers and government agencies.

Challenges and areas for improvement

The implementation of the Basin Plan is vital to managing risks to Basin water resources. Completing implementation remains a challenge. Key challenges include the accreditation of 20 New South Wales water resource plans and completing some of the complex Sustainable Diversion Limit Adjustment Mechanism supply and constraint measures by 2024.²

It is unclear whether our existing policy frameworks and adaptive management instruments will be adequate to manage the risks posed by climate change, in particular the climate extremes and the high likelihood of less water in the Basin. Substantial efforts have been invested in climate science for many years, resulting in improvements in river operations and other sub-annual water management decisions. However, the application of climate science in the water planning framework is still a work in progress. Basin governments will need to deepen their cross-Basin partnerships to ensure that decision-making frameworks can accommodate the uncertainty posed by climate change, and to ensure that water planning supports sustainable water use under a hotter and drier climate.

Water that can be taken

Chapter 6 of the Basin Plan is about the establishment of sustainable diversion limits and compliance with sustainable diversion limits.

Key finding: In 2019–20 there was compliance with levels of permitted take in 97% of sustainable diversion limit resource units.

² 'Constraints measures' refers to measures that remove or ease 'a physical or other constraint on the capacity to delivery environmental water to the environmental assets of the Murray–Darling Basin' (section 7.02 Basin Plan 2012). 'Supply measures' are measures that operate to 'increase the quantity of water available to be taken in a set of surface water sustainable diversion limit resource units compared with the quantity available under the benchmark conditions' (section 7.03). Accordingly, some constraint measures are also notified as supply measures, but not all.

The Basin Plan aims for equitable and sustainable use of Basin water resources. This involves determining what water can be taken.

This chapter of the Basin Plan sets the limits of take – through long-term sustainable diversion limits and describes how compliance with these limits will be determined. The setting of sustainable diversion limits and ensuring compliance with the limits are an integral part of the Basin Plan.

The chapter also provides for the sustainable diversion limits or any other aspect of the Basin Plan to be reviewed. For example, the review of sustainable diversion limits in northern Basin resulted in a 70 gigalitre (GL)reduction to the water recovery target in the north. The review led to the New South Wales and Queensland governments adopting a suite of environmental works and measures (commonly referred to as toolkit measures) with assistance from the Australian Government.

Key obligations and responsibilities in 2020-21

Table 2: Basin Plan chapter 6 – key obligations and responsibilities in 2020–21

Responsibilities	Basin Plan section	Who is responsible
Establish, maintain and publish a register of take for each sustainable diversion limit resource unit. This is to assist with determining compliance with sustainable diversion limits.	6.08(1)	MDBA
Under certain circumstances, provide a claim for reasonable excuse to the MDBA if there is an exceedance of the sustainable diversion limits compliance trigger with a surface water sustainable diversion limit. If relying on a claim for providing a reasonable excuse, set out the steps to reduce the cumulative balance of the register of take to zero or less.	6.12	Basin states
Under certain circumstances, provide a claim for reasonable excuse to the MDBA if there is exceedance of non-compliance with the groundwater sustainable diversion limits compliance trigger. If relying on providing a claim for reasonable excuse for non-compliance, set out the steps to reach the point where there is no excess to compliance limits set out in section 6.12C(1)(a).	6.12C	Basin states

Note: From August 2021 the Inspector-General of Water Compliance took on the responsibility to monitor and audit water resource plan compliance and investigate and enforce non-compliance with sustainable diversion limits.

Progress in 2020-21

Sustainable diversion limits accounting and compliance

The Basin Plan introduced new water accounting and compliance arrangements based on sustainable diversion limits. These arrangements came into effect from 1 July 2019. There are 29 surface water and 80 groundwater sustainable diversion limit resource units.

In August 2021, the first compliance report that examines how water use by Basin state governments is tracking in accordance with the Basin Plan was published by the MDBA. The <u>Murray–Darling Basin</u> <u>sustainable diversion limit compliance outcomes 2019–20</u> includes the registers of take for 2019–20. The responsibility for sustainable diversion limit compliance has now shifted to the Inspector-General of Water Compliance.

The report shows there was a 97% compliance rate with the permitted water take as set out in the sustainable diversion limits. Three areas exceeded allowable limits in New South Wales, for which New South Wales claimed reasonable excuses. Two of these were deemed valid. One was found to be invalid and therefore non-compliant. All 3 areas are subject to 'make good actions' proposed by New South Wales to address the exceedance and return take to within the compliance thresholds.

Water resource plan compliance

Schedule 12 of the Basin Plan requires reporting on compliance with accredited water resource plans by Basin state governments. In 2020–21 the governments of Victoria, Queensland, South Australia and the Australian Capital Territory reported that they were not aware of any non-compliance with the rules and obligations created by water resource plans. The governments of Victoria, Queensland, South Australian and the Australian Capital Territory reported a high level of confidence that the rules and obligations in water resource plans were being complied with.

The New South Wales Government was not required to complete Schedule 12 reporting on compliance with water resource plans, as it did not have any accredited water resource plans in place during 2020–21.

Implementation of toolkit measures

There was good progress on delivering the toolkit measures. Significant milestones were achieved for both the policy and management measures and the environmental works and measures, demonstrating commitment by Basin governments. Implementation is at various stages, with some projects already delivered and others on track, while other projects are delayed.

New South Wales commenced a measure known as 'active management' during 2020–21. This is an enduring solution to protect water for the environment along the Barwon–Darling and through the lower Gwydir and lower Macquarie unregulated river.

In March 2021 the Australian Government minister responsible for water announced that 10 environmental works and measures projects in New South Wales and Queensland, including the 3 Gwydir constraints projects, had been approved. Also, \$90 million was made available to the New South Wales and Queensland governments to support accelerated implementation of 4 of the projects and develop business cases for the remaining 6 projects.

Engagement with stakeholders commenced for the Gwydir Constraints Measures Project. This project aims to reconnect the rivers, floodplains and wetlands in the west of the Gwydir valley. Insights provided by community engagement will be used to inform a business case for implementation and funding of the project by the Australian Government.

Transfer of compliance to Inspector-General of Water Compliance

In June 2021 legislation was passed to establish a new role of Inspector-General of Water Compliance to take on the regulatory and compliance responsibilities. The change was prompted by several reviews – including the 2018 review by the Productivity Commission – that found the need to separate compliance from Basin Plan implementation and create an independent compliance and enforcement office. The MDBA will support the work of the Inspector-General of Water Compliance and will continue to work with Australian and state government agencies to identify, report on and manage sustainable diversion limit compliance.

Progress with implementing the Compliance Compact

In 2020–21 Basin governments continued to work effectively together to implement the Compliance Compact. The <u>Murray–Darling Basin Compliance Compact Assurance Report 2020</u>, which is an assurance of Basin state and Australian Government progress in implementing their Compliance Compact commitments, was made public in June 2021. The report shows that overall there was positive progress against outstanding commitments and many Compliance Compact actions have been now completed.

The Victorian Government completed all its Compliance Compact commitments and set performance targets for water theft so that it is no more than 1% of total volume at any time. As of 30 June 2021, unauthorised take in Victoria was 0.1% of total water use, a reduction from 0.4% the previous year. The New South Wales Government has made significant progress on commitments relating to improving transparency and accountability as well as their framework for compliance and enforcement. The Queensland Government is making progress on a number of commitments. The South Australia Government has continued to progress towards completing its Compliance Compact commitments, with a number of commitments now completed and published, including a metering improvement plan, a plan and timetable for state-wide telemetry, a metering policy and implementation plan and annual reporting on implementation.

Progress with water metering and monitoring of floodplain harvesting

All states and territories have recently agreed to updated rules and guidelines to support the regulation of non-urban water meters.

Basin states require, or are moving to ensure, that new and replacement non-urban water meters comply with the Australian Standard for non-urban water meters (AS4747). Each Basin state has its own policy for non-urban water meters, and in time most meters will be renewed and will meet the Australian Standard.

The Queensland and New South Wales governments are working with the MDBA to improve the monitoring of floodplain harvesting. For example, in the Border Rivers and Moonie catchments individual stakeholders have been engaged and given opportunities to provide feedback on the modelled interpretation of the take for their property. The process has increased the accuracy of understanding about the capture of overland flow in the catchment. Landholder involvement has given individuals the opportunity to provide input into the process and an opportunity to be engaged in a conversation about the methodology for calculating floodplain harvesting.

Challenges and areas for improvement

Improving trust and community confidence

Accurate metering, measurement and monitoring are fundamental to public confidence about equitable and sustainable water use. The 2020 Compliance Compact annual assurance report showed there is more work to do before communities are confident that there is good compliance across the Basin.

Water accounting

The Authority published the <u>Sustainable diversion limit (SDL) accounting framework improvement</u> <u>strategy 2020–2025</u> in May 2020. The strategy outlines how the MDBA will continue to improve the sustainable diversion limit accounting framework in conjunction with the Basin states. It includes work to improve transparency of sustainable diversion limit accounting and water resource plan hydrological models, and to align water accounting concepts with the Bureau of Meteorology and the Australian Bureau of Statistics.

Toolkit measures

Progress on toolkit environmental works and measures infrastructure projects has been slower than expected due to a number of factors, including:

- More projects have been proposed than can be funded, and initial efforts have focused on developing a rigorous and transparent framework to prioritise a package of toolkit projects based on maximising environmental outcomes.
- The need to provide sufficient time for collaboration and consultation.
- The need to allow sufficient time for the due diligence process and to ensure value for money and ecological merit, including seeking independent scientific advice.

Adjustment of sustainable diversion limits

Chapter 7 of the Basin Plan is about adjustment of sustainable diversion limits (SDLs).

Key finding: Thirty SDLAM notified measures are on track or in operation. Seven measures have been assessed as at high or extreme risk of not being completed by 30 June 2024.

The chapter details the operation of the Sustainable Diversion Limit Adjustment Mechanism (SDLAM). The mechanism requires a suite of projects to be implemented. Some projects allow Basin Plan environmental outcomes to be achieved with less water recovery. This means that more water can remain in the system for other users, including households, industry and irrigated agriculture. Other projects improve water use so it's more efficient. The chapter also details how the MDBA can propose adjustments to groundwater sustainable diversion limits to reflect new or improved information relating to groundwater sustainable diversion limit resource units.

A suite of Sustainable Diversion Limit Adjustment Mechanism (SDLAM) measures have been notified by Basin governments. In 2017 the MDBA assessed Basin governments' notified measures and proposed an increase of the sustainable diversion limit by 605 gigalitres per year (GL/y) based on the environmental outcomes that the measures were expected to achieve. The Basin governments committed to implementing the SDLAM measures in full by 30 June 2024.

The constraint measures program has 6 projects spanning New South Wales, Victoria and South Australia. Constraints projects are extremely complex, requiring significant stakeholder engagement to ensure successful implementation. The New South Wales Government leads the management of the Yarrawonga to Wakool, Murrumbidgee and Lower Darling projects. The Victorian Government leads the Goulburn project. The management of the Hume to Yarrawonga project is shared between the governments of New South Wales and Victoria. The South Australian Government leads the South Australian Murray project. All of these governments are working collaboratively and in consultation with communities to implement the projects.

Key obligations and responsibilities in 2020–21

Table 3: Basin Plan chapter 7 – key obligations and responsibilities in 2020–21

Responsibilities	Basin Plan section	Who is responsible
Notification of measures and amendment of notifications	7.12	Basin states
Maintain a register of sustainable diversion limit adjustment measures	7.13	MDBA

Other responsibilities are:

- Basin state governments are responsible for implementing the SDLAM measures, including consulting and working with communities about the projects, undertaking detailed project design, obtaining the necessary approvals and undertaking construction.
- The MDBA provides technical advice and assistance to Basin governments as they proceed with implementing the notified measures, as well as sharing its expertise in river operations and management.
- The Australian Government, through the Department of Agriculture, Water and the Environment, provides funding for SDLAM supply, efficiency and constraint measures.

Progress in 2020-21

Supply and constraints measures

SDLAM measures are demonstrating examples of innovative ways the Basin state governments are working to achieve a range of outcomes with less water recovery. Positive environmental benefits from SDLAM measures are being observed. For example, new floodplain environmental watering infrastructure on the Pike and Katarapko floodplains in South Australia was operated for the first time in conjunction with River Murray weir pool raising at Locks 4 and 5 to provide benefits for floodplain flora and fauna. The combined floodplain and weir pool raising operations enabled additional inundation across both floodplains. The watering supported the improvement in the condition of floodplain trees and understorey and aquatic vegetation. It also supported the restoration of habitat and provision of feeding and breeding opportunities for a range of fauna.

The majority of infrastructure works and implementation of relevant rule changes are expected to be complete by 2024. However, there are 7 predominately large-scale and/or constraints relaxation-related measures in the SDLAM package that have been assessed as at high or extreme risk of not being completed by 30 June 2024.

In April 2021, the Murray–Darling Basin Ministerial Council agreed to New South Wales rescoping 2 of the identified 'at risk' measures (the Menindee Lakes Water Savings measure and Improved Flow Management Works at the Murrumbidgee River – Yanco Creek Offtake). The Ministerial Council also announced that New South Wales, with Commonwealth support, is accelerating a set of 5 measures or measure components. The Ministerial Council agreed to publish <u>quarterly update reports</u> to ensure communities have up-to-date information about how projects are tracking.

In April 2021 the Victorian and Australian governments agreed to bring forward project funding for the Victorian Murray Floodplain Restoration Project. The funding will enable work to progress the Victorian and Australian Government regulatory approval processes, including environmental and cultural heritage assessments. The community and stakeholders will have opportunities to provide input towards the project through the public consultation phase of the regulatory process. Aboriginal water assessments will be undertaken with the Traditional Owners to better understand the water and land aspirations across the project area. This will enable cultural objectives to be identified and inform environmental water use, and when available, cultural water use. Baseline ecological monitoring has commenced to ensure the project can demonstrate it is achieving objectives, while providing information to stakeholders, community and government. This will be expanded to include cultural and socioeconomic monitoring once determined in partnership with Traditional Owners.

The Enhanced Environmental Water Delivery measure is important to achieving the full 605 gigalitres (GL) supply contribution under the SDLAM. The measure is a collaboration between the governments of New South Wales, South Australia and Victoria, with the MDBA acting as a project delivery partner. It aims to improve the delivery of environmental water along the River Murray and its tributaries through the development of new forecasting and planning tools and streamlining processes to enable better coordination of releases for healthier rivers and floodplains. The first stage has started. It involves establishing project management and governance arrangements, commencing a series of technical investigations, and preparing an implementation plan to support any decision to proceed to implementation.

Efficiency measures

A major new project to further modernise the Goulburn–Murray Irrigation District (GMID) will contribute 15.9 GL to the efficiency measures target. The \$177.5 million project is underway, with off-farm system upgrades being undertaken to modernise and rationalise approximately 250km of channel across the GMID and improve service standards for approximately 1,000 customers. The project is on track to deliver its targeted 15.9 GL long-term annual average yield in water savings by

2024. To date the project has met its first 2 milestones to complete early planning and procurement and upgrading over 50 outlets to achieve 1 GL in water savings from completed works.

Sustainable Diversion Limit Adjustment Mechanism Reconciliation Framework

The MDBA is required to assess whether the notified measures have been implemented as proposed and have achieved the adjustment initially determined in 2017.

In May 2021 the MDBA published the <u>Sustainable Diversion Limit Adjustment Mechanism</u> <u>Reconciliation Framework</u>. The framework sets out the methodology to determine whether the SDLAM projects have been implemented as proposed and whether they have achieved the adjustment initially determined in 2017. This explains how the MDBA will conduct assurance on SDLAM projects leading to a decision by the MDBA on whether to undertake a formal reconciliation prior to 30 June 2024.

Challenges and areas for improvement

There is recognition that constraints projects are complex and need to be carefully planned with the community to address the barriers to delivering water for the environment.

Supply and constraints measures

Some of the highly complex measures are currently assessed as having a high risk of not being completed by the 2024 target date. In April 2021 the Australian Government Department of Agriculture, Water and Environment commissioned an <u>independent report</u> on the status of the supply and constraints projects. The report found that 30 measures were on track to be delivered before 30 June 2024, and 7 measures would require major intervention to meet the 2024 delivery target.

A reconciliation of the package of SDLAM measures remains likely to be required by 30 June 2024.

The MDBA will continue to monitor progress with implementation of measures. Basin governments should notify changes to the measures as soon as practicable, particularly where infrastructure or rule changes impact on the anticipated environmental outcomes of the measure.

Efficiency measures

In 2018 the Productivity Commission report noted that the enhanced environmental outcomes expected to be achieved with an extra 450 GL of water recovered through efficiency measures were at risk. This assessment was confirmed by the <u>First Review of the Water for the Environment Special Account</u> completed in September 2020. Basin governments are working to identify and fast-track suitable efficiency projects for delivery by 2024.

Environmental Watering Plan

Chapter 8 of the Basin Plan sets out the environmental watering plan, including setting out processes to coordinate the planning, prioritisation and use of environmental water and the principles to be applied in environmental watering.

Key finding: Basin state governments, the Commonwealth Environmental Water Office and the MDBA worked together to deliver about 2,900 GL of water for the environment, including about 2,400 GL in the southern Basin and about 500 GL in the northern Basin.

The Environmental Watering Plan is a key component of the Basin Plan. Its purpose is to achieve the best environmental outcomes with the amount of water made available by the Basin Plan. The Environmental Watering Plan aims to achieve its purpose by:

- setting environmental objectives for water-dependent ecosystems
- setting the targets by which to measure progress towards achieving those objectives
- providing a planning framework to guide the use of water for the environment over the longterm and annually
- identifying principles to be applied in environmental watering.

Key obligations and responsibilities in 2020–21

Responsibilities	Basin Plan section	Who is responsible
Identify annual watering priorities	8.23	Basin states
Prepare Basin-wide annual environmental watering priorities	8.27	MDBA
Apply environmental watering principles	8.33–8.43	MDBA, Basin states, Commonwealth Environmental Water Holder (CEWH)
Report where annual watering priorities are not followed	8.44	MDBA, Basin states, CEWH

Table 4: Basin Plan chapter 8 – key obligations and responsibilities in 2020–21

Progress in 2020-21

Basin-wide environmental watering priorities

The Basin-wide annual environmental watering priorities guide the annual planning and prioritisation of environmental watering across the Murray–Darling Basin. In 2020–21 the MDBA prepared Basin annual environmental watering priorities for river flows and connectivity, native vegetation, waterbirds and native fish.

For the first time, the MDBA has used guidance from First Nations in developing the priorities. Priorities were identified by First Nations groups through the First Nations Environmental Water Guidance project. This collaboration provides opportunities for First Nations to influence Basin-scale prioritisation of environmental outcomes, with complementary cultural benefits.

The Basin Plan requires reporting where the Basin-wide annual watering priorities were not followed. Where watering has not been in accordance with the annual watering priorities, a statement of reasons must be provided. In 2020–21 the MDBA, the Commonwealth Environmental Water Holder

and all Basin states reported that environmental watering was in accordance with the Basin-wide environmental watering priorities.

Water resource plan area environmental watering priorities and long-term watering plans

All Basin state governments prepared annual environmental watering priorities and provided the priorities to the MDBA by 31 May 2021 for the 2021–22 water year.

Long-term environmental watering plans for water resource plan areas are in place, and Basin governments are working with stakeholders to implement, and where appropriate review, the plans.

Two South Australian long-term environmental watering plans required review in 2020–21, and minor updates were made to the South Australian Murray Region and Eastern Mount Lofty Ranges long-term environmental watering plans. The Victorian Government delivered minor updates to the Wimmera–Mallee, Victorian Murray and Northern Victoria long-term environmental watering plans.

First Nations participation in environmental watering

The Southern Connected Basin Environmental Watering Committee's watering proposal template has been refined to better collect information on cultural objectives and outcomes associated with proposed watering actions at key sites. This provides a site-based overview of individual First Nations advice and priorities and improves the Southern Connected Basin Environmental Watering Committee's line of sight to how cultural values have been considered.

In 2020–21 Murray Lower Darling Rivers Indigenous Nations (MLDRIN) worked in partnership with the Commonwealth Environmental Water Office and the MDBA to establish a new mechanism for First Nations to have direct input into river system scale environmental water planning. This helped build upon the advice from the First Nations Environmental Water Guidance project in 2019–20. First Nations and Traditional Owners have informed perspectives on where, how and why water should be delivered on Country. Recognising this, the project partners agreed that providing an open forum where Traditional Owners could share their perspectives and provide direction to water holders was the best approach.

More information is provided in the <u>First Nations people participation in environmental watering</u> <u>reports</u>, Basin Plan Schedule 12 reports, and the 'Rivers Veins of our Country' report, which will be published in 2022.

Outcomes achieved from the use and management of environmental water

In 2020–21 Basin states, the Commonwealth Environmental Water Office and the MDBA worked together to deliver about 2,900 GL of water to environmental watering priorities,³ including about 2,400 GL in the southern Basin and about 500 GL in the northern Basin. About 82% of this water was

³ The total volume of water delivered included water from Australian Government environmental water holdings, state government environmental water holdings, planned environmental water and River Murray Increased Flows water.

delivered in watering events coordinated across multiple environmental water holders. There was 132 watering events recorded with 46 of these coordinated across environmental water holders.

A summary of information from Schedule 12 Matter 10 (the implementation of the environmental management framework) reports is below:

- The Killarney Fish Rescue Project salvaged rare cold water aquatic animals that were imperilled by extreme weather in southern Queensland over the summer of 2018–2019. More information is available in the Killarney Fish Rescue Project Case Study in Appendix A.
- The Tati Tati Wadi Wadi delivered their Cultural Flows Management Plan, which defines their aspirations for Margooya Lagoon outside Robinvale. The process to develop the plan began in 2018, with Tati Wadi members participating in workshops to determine nation objectives around cultural flows and the health of waterways and Country. More information is available in the Tati Wadi Delivers their Cultural Flows Management Plan Case Study in Appendix A.
- High rainfall and substantial flows into Wyangala Dam in New South Wales allowed environmental water managers to deliver environmental water to maintain connectivity between the Lachlan River and its floodplain habitats. More information is available in the Adaptive Management in the Lachlan River Case Study in Appendix A.
- Changes to flows in the Murrumbidgee resulting from upstream water resource management, including the operation of Tantangara Dam, are impacting the Australian Capital Territory's ability to contribute to the objectives and environmental outcomes of the Basin Plan.
 Communities in the Upper Murrumbidgee region are increasingly concerned about the impacts of water and land management on environmental, cultural and social values. More information is available in the Australian Capital Territory's Basin Plan Schedule 12 report at www.mdba.gov.au/publications.
- In spring 2020 environmental water managers worked together to coordinate the delivery of 320 GL of water from multiple environmental water holders in the River Murray system. This delivery created a spring pulse along the length of the River Murray and made water available for use at a range of downstream sites before finally supporting end-of-system outcomes at the Coorong and Murray Mouth.

Challenges and areas for improvement

The Basin Plan's Environmental Watering Plan is in place and working well. However, there are opportunities to improve the engagement and involvement of First Nations in environmental water planning and to increase collaboration between environmental water planners and river operators.

The 2020 Basin Plan Evaluation found that the Basin Plan is unable to effectively support many floodplain and wetland ecosystems until implementation of critical improved water infrastructure and river operating rules are in place.

Water quality and salinity management plan

Chapter 9 of the Basin Plan sets out the plan for managing water quality and salinity in the Basin.

Key finding: Targets were met at 3 of the 5 Basin Plan salinity reporting sites.

This chapter sets out a water quality and salinity management plan for the Murray–Darling Basin which aims to maintain appropriate water quality for environmental, social, cultural and economic activities within the Basin.

There are a number of objectives and targets for assessing whether water quality is fit for a range of purposes. These include:

- site specific salinity targets
- blue-green algae targets and dissolved oxygen targets
- water quality targets for water resource plans.

The chapter also includes a salt export objective, which provides an indicative figure against which the MDBA must assess the discharge of salt from the system into the Southern Ocean.

Key obligations and responsibilities in 2020-21

Table 5: Basin Plan chapter 9 – key obligations and responsibilities in 2020–21

Responsibilities	Basin Plan section	Who is responsible
Assess the achievement of the salt export objective	9.09	MDBA
Monitor salinity levels of the River Murray at 5 reporting sites – Murray Bridge, Morgan and Lock 6; Darling River at Burtundy; and Lower Lakes at Milang.	9.14	MDBA
Have regard to the water quality targets in section 9.14 when performing its functions related to the management of water flows	9.14	MDBA and Basin states
Have regard to the water quality targets in section 9.14 when making decisions about the use of environmental water	9.14	Environmental water holders

Progress in 2020-21

Assessment of the salt export objective

The Authority must estimate the discharge of salt from the River Murray system into the Southern Ocean every water accounting period. The assessment must compare the estimated number of tonnes of salt export per year averaged over the preceding 3 years against the indicative figure of 2 million tonnes of salt per year.

Generally, more salt is flushed out to the ocean during wet years and less in dry years. The level of salt export in a year is also impacted by river regulation, irrigation diversions and current levels of development, including salt interception works.

Over the 3-year period from July 2018 to June 2021, the rate of salt export over the barrages was 0.47 million tonnes per year.

Monitoring salinity at the 5 Basin Plan reporting sites

The Basin Plan requires the MDBA to monitor salinity levels at 5 reporting sites on a daily basis and, at the end of each water accounting period, assess whether the salinity targets at the reporting sites have been met over the last 5 years. The MDBA is required to publish the findings of each assessment. Results for the July 2016 to June 2021 reporting period in Table 1 show the targets have been met at 3 of the 5 reporting sites: Murray Bridge, Morgan and Lock 6. The salinity targets for Burtundy (830 EC) and Milang (1000 EC) were not achieved over the 5-year reporting period. Extended periods of low or no flow conditions in the lower Darling during the 5-year reporting period have made it difficult to achieve the target at Burtundy. Recorded salinity levels at Milang were slightly above the 1000 EC target.

Reporting site	Target value (EC μS/cm)	Achievement of target	% of days above the target value
River Murray at Murray Bridge	830	✓	0
River Murray at Morgan	800	\checkmark	0
River Murray Lock 6	580	\checkmark	0
Darling River at Burtundy	830	×	18.4
Lower Lakes at Milang	1,000	×	6.6

Table 6: Achievement of salinty targets for flow management over the 5-year reporting period from July 2016 to June 21 * EC > 800 μ S/cm is marginal for drinking, EC > 1,600 μ S/cm is brackish, EC > 4,800 μ S/cm is saline.

Consideration of the water quality and salinity targets when managing water flows and making decisions about the use of environmental water

All Basin governments, the MDBA and the Commonwealth Environmental Water Holder have had regard to the Basin Plan water quality and salinity targets when performing their functions and making decisions about the use of environmental water. Examples from Schedule 12, Matter 14 (the implementation of the water quality and salinity management plan) reporting for 2020–21 are below.

- In New South Wales water managers assess water quality risks prior to environmental water delivery. The risk assessment includes identification of mitigation strategies. On completion of a watering event any water quality issues are identified and documented. This information is used to inform adaptive management of environmental water delivery.
- The New South Wales Government operated a network of dissolved oxygen early warning sensors in the Murray, Murrumbidgee, Lachlan and Barwon–Darling regions. Management options are discussed by multi-agency river operation groups when a warning for a potential low dissolved oxygen or blackwater event is triggered.
- Maintaining water quality, particularly dissolved oxygen, was a key objective for the <u>Northern</u> <u>Waterhole Top-up watering event</u>. During December 2020 monitoring of refuge pools in the Barwon River between Mungindi and Walgett revealed some pools were stratified and contained low dissolved oxygen concentrations. The Commonwealth Environmental Water Holder made 6 GL available to replenish refuge pools. The 6 GL of Commonwealth environmental water holdings was augmented with 2 GL of New South Wales Government planned environmental water.
- With respect to environmental water, in Victoria there are 3 main processes for informing decisions about flows and the use of water for the environment to assist management of water quality. These processes are long-term and annual environmental flows planning; risk management processes; and authorising emergency watering actions to mitigate water quality risks.
- Victoria's water corporations are obligated to ensure the risks associated with the functions they perform and the services they provide are identified, assessed, prioritised and managed.
- The Objectives and Outcomes for Operating the River Murray in South Australia, the South Australian River Murray Operating Plan and the 2020–21 Annual Water for the Environment Plan for the South Australian River Murray guide transparent and coordinated River Murray operational decisions in South Australia, in a manner that is consistent with and has regard for Basin Plan objectives.
- Water quality in the Australian Capital Territory is managed through a range of regulations, policies and guidelines, including the Australian Capital Territory's *Environmental Protection Regulations 2005*, Guidelines for Recreational Water Quality 2014, Water Strategy (Striking the Balance) 2014 and the Environmental Flow Guideline. The guideline protects base flows and abstraction in unregulated rivers and requires environmental watering releases from the water supply dams. These flows ensure that streams are generally meeting the appropriate water quality targets. A review of the guideline's effectiveness for supporting the water quality targets will be conducted in 2024. The ACT Government monitors flow and water quality parameters.
- There are limited opportunities to influence water quality when making decisions about flow management or the use of environmental water in Queensland. This is due to the unregulated nature of flow and the rules-based approach to access flows in Queensland. One opportunity is through a requirement for resource operations licence holders of water supply schemes to minimise adverse impacts on water quality during operation and maintenance activities. There were no reported incidents where the operation of water supply schemes had an adverse on water quality during the 2020–21 water year.
- In October 2020 the MDBA organised a meeting with a diverse range of Basin officials to develop a cross-jurisdictional risk scan for the high-risk summer season ahead. The key

outcome of the meeting was the collation of a list of water quality watchpoints across the Basin, including information on management levers and limitations.

Challenges and areas for improvement

The Basin Plan does not directly regulate many of the actions that drive water quality, such as land use and land management. This means the influence of the Basin Plan and its ability to drive improvements in meeting water quality targets is limited. In the context of a changing climate and predicted climate extremes, Basin governments and the MDBA need to continue to adapt and improve how water quality and salinity is managed. There is a need for continued collaboration between the MDBA and Basin governments to prioritise actions and focus on areas that pose the greatest risk.

Water resource plan requirements

Chapter 10 of the Basin Plan sets out the requirements for water resource plans.

Key finding: Water resource plans are in place for Queensland, Victoria, the ACT and South Australia. The remaining 20 New South Wales water resource plans have not yet been accredited.

Chapter 10 details the essential components that water resource plans must include in order for them to be recommended for accreditation.

Water resource plan requirements include:

- sustainable diversion limit and water trade rules
- objectives and outcomes of Indigenous people based on their values and uses
- planning for environmental watering
- meeting the water quality and salinity objectives
- including information on how the water take will be measured and monitored
- planning for extreme events
- taking into account Indigenous value and uses
- setting out the approach to addressing risks.

When considering water resource plans for accreditation, the MDBA consults with relevant Indigenous organisations, such as Murray Lower Darling Rivers Indigenous Nations (MLDRIN) and Northern Basin Aboriginal Nations (NBAN) in relation to whether the requirements of the Indigenous values and uses component of the Basin Plan (Part 14 of Chapter 10) are met.

There are 33 water resource plan areas in total: 14 for surface water, 14 for groundwater and 5 that cover both. Thirteen water resource plans have been accredited and are currently operational, including all Queensland, Victorian, ACT and South Australian water resource plans.

Progress in 2020-21

New South Wales submitted all its water resource plans by 30 June 2020. The assessment of all 20 New South Wales water resource plans is now complete, including formal advice from the MLDRIN

and NBAN on the adequacy of the Aboriginal values and uses content of the proposed water resource plans. The assessment of these plans identified potential inconsistencies with Basin Plan requirements. As a result, New South Wales has withdrawn all 20 water resource plans and advised they will be amended to make them consistent with the Basin Plan before resubmitting them for assessment in 2021–22.

The Authority and the New South Wales government signed a new bilateral agreement to safeguard key Basin Plan commitments until water resource plans are accredited.

The MDBA has developed water resource plan <u>amendment guidelines</u> to help Basin states draft amendments to their water resource plan. In 2020–21 the South Australian Government reported that parts of statutory instruments that are referenced in their water resource plan had been amended or replaced and that work had begun to update the accredited South Australia water resource plan. The Queensland Government did not report any amendments to water resource, and the Australian Capital Territory Government reported that no amendments or changes had occurred. The Victorian Government reported that mechanisms are in place within Victoria's water resource plan to ensure any amendments or changes to the provisions of state instruments and policies described in WRPs do not impact on the obligations under the water resource plans.

Challenges and areas for improvement

The accreditation of all water resource plans from New South Wales is crucial to successful implementation of the Basin Plan.

Amendments to accredited WRPs are anticipated as new information comes to hand. The MDBA will undertake a tailored approach to assessment that is suited to the scale and complexity of an amendment when determining consistency with the Basin Plan.

Critical human water needs

Chapter 11 of the Basin Plan is about critical human water needs.

Key finding: Sufficient water was available to meet critical human water needs in the River Murray system.

This chapter of the Basin Plan sets out arrangements to ensure critical human water needs are met.

Explained simply, critical human water needs are the minimum amount of water required for:

- core human needs such as drinking, food preparation and hygiene
- essential community services including emergency services, hospitals and schools
- commercial and industrial purposes that are vital for the community or national security.

The Basin Plan and the Murray–Darling Basin Agreement work together to prioritise water for critical human needs in the River Murray system. This is done by:

- setting the amount of water required to meet critical human water needs
- using a tiered approach to sharing water in the River Murray system.

Key obligations and responsibilities in 2020-21

Table 7: Basin Plan chapter 11 – key obligations and responsibilities in 2020–21

Responsibilities	Basin Plan section	Who is responsible
Assess inflow prediction for the River Murray system	11.06	MDBA
Identify and manage the risks to critical human water needs in the River Murray system	11.07	MDBA
Undertake risk management for inter-annual planning related to critical human water needs	11.08	MDBA

Progress in 2020-21

Risk to critical human water needs in the River Murray were regularly assessed by the MDBA in consultation with the interjurisdictional Water Liaison Working Group.

During all water resource assessments for 2020–21, sufficient water resources were available to meet the conveyance water needs and conveyance reserve, and the water was of suitable quality under all inflow scenarios.

Throughout 2020–21 the River Murray was under Tier 1 – normal water availability arrangements. The MDBA published a notice on the status of water sharing arrangements on the MDBA website, found at: www.mdba.gov.au/river-information/water-sharing/critical-human-water-needs.

The MDBA undertook inter-annual planning water resource assessments. These assessments indicated there will be sufficient water to meet the conveyance water requirements and the conveyance reserve for 2021–22.

Challenges and areas for improvement

The 2020 evaluation found that the framework for supporting critical human water need in the Basin Plan is limited and is focused on the southern Basin. Further consideration of how to widen the focus to the northern Basin is required.

Water trading rules

Chapter 12 of the Basin Plan is about water trading rules.

Key finding: While water trading has brought substantial benefits to many water users across the Basin, continued reforms are needed for markets to operate effectively.

This chapter of the Basin Plan sets out rules for water trading. These water trading rules are designed to support the efficient functioning and ongoing operation of Basin water markets.

The rules aim to:

- reduce restrictions on trade
- improve access to information and transparency of the water market
- improve confidence in the market (such as ensuring no insider trading).

The rules apply to the Australian Government, the Basin states, irrigation infrastructure operators (IIOs) and individual market participants.

The Basin Plan water trading rules operate alongside existing Basin state government rules and irrigation infrastructure operator rules. Basin state governments set the trading rules within their jurisdictions. Each state has a multitude of complex rules relating to water trade.

The 2020 Basin Plan Evaluation found that trade rules implemented through Basin Plan reforms are supporting ongoing improvement to water markets (primarily surface water) across the Murray–Darling Basin. Market transparency and performance have improved across the Murray–Darling Basin through actions implemented by state governments, some driven by the Basin Plan trading rules.

Key obligations and responsibilities in 2020-21

Table 8: Basin Plan chapter 12 – key obligations and responsibilities in 2020–21

Responsibilities	Basin Plan section	Who is responsible
Ensure trades are consistent with the water trading rules.	12.02–12.36	MDBA
Publish information about water access rights and trading rules	12.40–12.51	MDBA
Make trading rules generally available	12.46, 12.47	Basin states, irrigation infrastructure operators
Make trading prices available	12.48	Approval authority
Make water announcements generally available	12.50	The person that makes a water announcement

Note: From August 2021 the Inspector-General of Water Compliance took on the responsibility to ensure compliance with and enforcement of water trading rules. This affects some of the responsibilities in this section.

Progress in 2020-21

The MDBA continued to work with Basin States to ensure consistency with the Basin Plan water trading rules. The MDBA prioritises its regulatory and compliance activities in accordance with the <u>Strategic Priorities — Basin Plan water trading rules</u>.

All Basin governments have ensured water announcements were made generally available, for example by making and publishing media releases, by publishing available water and allocation information, and by publishing information about water levels and flow rates.

Basin governments have recently made changes to improve general water market information. The New South Wales Government has launched Trade Dashboards and the Water Insights Portal. The Victorian Government has improved water market information on its website, including publishing water ownership statistics in northern Victoria. The Victorian Water Accounts are now available via a digital platform. From August 2020 all online Victorian allocation trades must provide a reason for trade as well as the date the agreed price was reached. From May 2021 this information was available for download. The South Australian Government has refined its allocation announcement process to address recommendations from an independent review and launched a SA River Murray Water Calculator to assist irrigators to plan for different allocation outlooks.

The first version of the Murray–Darling Basin Water Information Portal was released by the Bureau of Meteorology on 30 June 2021. The platform aims to provide a one-stop shop for water storage, instream flows and trade information.

The MDBA has continued to publish information about approximately 70 highly traded water market products, state trading rules and the trading rules for large irrigation infrastructure operators (IIOs). Links to state trading rules and IIO trade rules on the MDBA website are regularly updated on advice from the Basin States and IIOs.

The nature and stage of maturity of water trading rules is such that there are many smaller scale detailed activities underway at the state level. Refer to the Schedule Matter 16 reports of the Basin States for more information.

Challenges and areas for improvement

While progress continues with implementation of the water trading rules, there are opportunities for identifying and addressing issues related to water market transparency and improving market regulation.

Improving market transparency and market regulation

The 3 primary areas for improving market transparency and information across the Basin remain:

- improving the quality and accessibility of information needed to inform trading decisions and efforts to support equitable participation in the market through capacity building
- comprehensive and consistent reporting of market data
- harmonising trade processing across jurisdictions and entities.

Improvements to market-relevant information will need to be guided by end users in terms of the type of information, level of detail and access channels that suit their needs. This needs to be complemented by capacity building to ensure all water holders can use the information available to participate effectively in the water market.

In response to several inquiries, the ACCC was commissioned to investigate water trading in the Basin. The <u>report</u> released in March 2021 found that many participants in the water market do not believe that the water markets are fair or working to their benefit. Regaining the trust of these participants will be a significant challenge.

The report made a series of recommendations, including the need for:

- comprehensive reform of the governance of Basin water markets
- stronger market integrity and conduct regulations for Basin water markets
- improved trade processes and water market information
- market architecture the framework of laws, rules, policies to better reflect the physical characteristics of the river system.

Program for monitoring and evaluating the effectiveness of the Basin Plan

Chapter 13 of the Basin Plan is about the program for monitoring and evaluating the Basin Plan.

Key finding: A comprehensive evaluation of the Basin Plan was delivered in December 2020.

This chapter sets out the program that will be used to monitor, evaluate and review the effectiveness of the Basin Plan. It details:

- principles of responsibility for monitoring and evaluating the Basin Plan, and other principles to be applied in monitoring and evaluation
- key evaluation questions the Authority must ask in undertaking an evaluation
- requirements to undertake 5-yearly reviews of the water quality and salinity management plan targets in chapter 9, the Environmental Watering Plan and the social and economic impacts of the Basin Plan
- reporting and publication requirements.

Key obligations and responsibilities in 2020-21

Table 9: Basin Plan chapter 13 – key obligations and responsibilities in 2020–21

Responsibilities	Basin Plan section	Who is responsible
Lead monitoring and evaluation at the Basin scale	13.03	MDBA
Enable evaluations and reporting by collecting, analysing, and reporting information (including data) in a fit-for- purpose manner	13.03	Basin states
 Conduct reviews of: the water quality targets in the water quality and salinity management plan the environmental watering plan the social and economic impacts of the Basin Plan 	13.08, 13.09, 13.09A	MDBA

Progress in 2020-21

Monitoring and evaluation

The MDBA published the <u>2020 Basin Plan Evaluation</u>. The evaluation assessed progress in implementing the Basin Plan and considered the best available evidence to determine if outcomes from the Basin Plan are being met at a Basin-scale. The evaluation also identified a number of areas of improvement for future water use and management in the Basin. The evaluation incorporated the 5-yearly review of the social and economic impacts of the Basin Plan required under section 13.09A of the Basin Plan. The priority areas for improvement are described in the context section of this report.

The key findings of the evaluation are below.

Hydrology, water quality and environment

- In much of the southern Basin the Basin Plan has protected flow regimes and water for the environment has resulted in positive ecological responses.
- In the northern Basin the Basin Plan has protected some regulated rivers from the worst impacts of the drought where water can be delivered from storages. Implementation of the Basin Plan has meant improvements in flow regimes, including reducing the effects of dry spells and protecting first flows after much-needed rainfall.
- By enabling the delivery of water for the environment to support the Coorong, Lower Lakes and Murray Mouth ecosystems during the drought, the Basin Plan helped to avoid the environmental degradation that occurred during the Millennium drought.

Social, cultural and economic

- The Basin Plan has contributed to some positive social, economic and cultural change in the Basin. However, due to the many factors shaping conditions in Basin communities, the results are varied and include some significant negative impacts on small regional communities. Adjusting water use from an overused system is not something that can happen immediately.
- The timing, location and volume of demand for water across the Basin is changing. While
 market transparency and performance have improved through actions implemented by Basin
 states and the Basin Plan's trading rules, there are still issues including the timeliness of
 market information. The complexity of water policy and management and the number of
 government agencies involved has led to community distrust and is a barrier to effective
 engagement with Basin stakeholders.
- Evidence suggests that much of the past funding to support communities to adapt to water reform could have been better targeted.
- There are also opportunities to strengthen First Nations peoples involvement in water resource planning and delivery and water access for social, cultural and economic outcomes. The Basin Plan has formalised some of these partnerships with First Nations peoples.

In January 2021 the MDBA published a monitoring statement that summarises the data sets used and monitoring obligations. The document was developed to provide the basis for developing a Basin

Monitoring Strategy which will be used, with a revised Basin Plan Evaluation Framework and road map, for the 2025 Basin Plan evaluation.

Work on a revised Basin Plan Evaluation Framework and road map has commenced and is expected to be completed in 2022. The evaluation framework will build on the 2019 evaluation framework and incorporate lessons from the 2020 evaluation.

Review of the Environmental Watering Plan

The MDBA conducted a <u>review of the Environmental Watering Plan</u> and published the report in March 2021. The review assessed how the Environmental Watering Plan is contributing to achieving the environmental objectives for the Basin's water-dependent ecosystems. The MDBA undertook the review in consultation with a range of stakeholders, including Basin state governments, the Commonwealth Environmental Water Office (CEWO), the Australian Government Department of Agriculture, Water and the Environment (DAWE), state water planners, scientists, peak organisations and First Nations people.

Overall, the review found that the Environmental Watering Plan is effectively coordinating the planning, prioritisation and use of environmental water across the Basin. The key findings were:

- First Nations' values and uses, and methodology to have regard to these values and uses, should be strengthened through implementation of the Environmental Watering Plan.
- Adaptive management requires the continual incorporation of new environmental watering knowledge and better communication of uncertainty.
- SMARTer (Specific, Measurable, Achievable, Relevant and Timebound) objectives and targets should be explored where practical.
- Opportunities to streamline reviews, evaluations and long-term watering plans should be pursued over the next 5 years.
- Communication of how different components of the Environmental Watering Plan work together and link to other Basin Plan components should be improved.
- Inter-governmental cooperation in environmental water planning should be improved to enhance the effectiveness of the Environmental Watering Plan.

Review of water quality and salinity management plan targets

The Authority conducted a review as required under section 13.08 of the Basin Plan of water quality and salinity management plan targets and published the report in October 2020. Technical input for the review was captured through a series of online workshops involving representatives from the MDBA, Basin governments, the CEWO and DAWE. The review found that most targets are effective indicators of water quality and have played a key role in driving change in areas such as salinity. In general Basin jurisdictions support the targets, as they can also help to trigger action on potential problems.

Challenges and areas for improvement

Collectively, practitioners, researchers, advocates and MDBA staff agreed that substantial changes to the Environmental Watering Plan are not required and there are no critical gaps that require

legislative change at this time. However, the review did identify potential improvements in relation to implementing the Environmental Watering Plan and potential improvements that could be considered further during the Basin Plan review in 2026. These improvements were grouped into 5 specific areas:

- First Nations
- adaptive management
- climate adaptation and objective and target setting
- alignment within the Environmental Watering Plan and to other Basin Plan chapters
- regulatory power and interpretation of the Environmental Watering Plan

The review of the salinity and water quality targets found that the following targets and objectives should be further considered and improved ahead of the Basin Plan review in 2026:

- flow management target for dissolved oxygen
- the water resource plan groundwater and irrigation targets
- the salt export objective
- the cultural use objective
- the objective for raw water for treatment for human consumption

Non-Basin Plan supporting activities

The Basin governments support the implementation of the Basin Plan through a range of funding programs. These include direct investments in on- and off-farm through infrastructure and water recovery, and broader government investment and policy arrangements in Basin communities. Key programs include the Murray–Darling Communities Investment Package and the Sustainable Rural Water Use and Infrastructure Program. Other non-Basin Plan activities that support the implementation of the Basin Plan include river operations.

Murray–Darling Communities Investment Package

The Australian Government's <u>Murray–Darling Communities Investment Package</u> was announced on 4 September 2020. The package aims to put communities and jobs at the heart of the Murray–Darling Basin Plan.

The package includes:

- delivering \$34 million for economic assistance to communities struggling with the effects of water recovery, through an extension of the Murray–Darling Basin Economic Development Program
- delivering \$20 million to fund community-driven grants for on-ground projects that will improve the health of rivers and wetlands
- delivering \$37.6 million in practical projects to sustain environments in the South Australian Riverland
- delivering \$3.1 million for 4 new First Nations River Rangers teams, creating around 20 jobs. This builds on an existing commitment of \$40 million for a First Nations water entitlements program
- establishing a statutory and independent Inspector-General of Water Compliance
- delivering \$38.7 million to improve Commonwealth water compliance functions. This builds on the Commonwealth's existing commitment of \$60 million for improvements in water metering and remote sensing
- delivering \$7.5 million to monitor social, economic and environmental conditions in the Basin. This action builds on a \$20 million investment in Basin-specific research so river management can be based on the best available science
- bringing together water information from across governments in a more accessible format for water users and communities
- accelerating planning and delivering of SDLAM supply and constraint projects.

The package included shifting the focus of water efficiency programs to off-farm projects, through the <u>Off-farm Efficiency Program</u>. Projects funded under the program will improve the efficiency of water delivery infrastructure and increase the volume of water available for irrigators and communities. They will also help achieve the Basin Plan target of returning 450 GL/y by June 2024.

Each project funded through the Off-farm Efficiency Program is required have socioeconomic criteria applied prior to the approval of projects. The socioeconomic criteria were informed by socioeconomic analysis and Basin-wide community engagement. These criteria address the

cumulative and region-wide impacts that water recovery projects may have on water prices, regional communities and economies and the future viability of irrigation districts. The criteria also address the social, environmental and cultural impacts of projects.

A stocktake of potential off-farm projects that could provide regional stimulus, contribute to agricultural productivity or generate water savings was presented to the Ministerial Council on 27 November 2020. This stocktake identified over 50 concept proposals, with most identifying an opportunity for water recovery. The Goulburn Murray Water Efficiency Project was approved, with an investment of up to \$177.5 million from the Australian Government to continue to modernise and upgrade ageing off-farm water infrastructure in the Goulburn–Murray Irrigation District and generate 15.9 GL/y of water recovery.

Sustainable Rural Water Use and Infrastructure Program

The Sustainable Rural Water Use and Infrastructure Program is a national program investing in rural water use, management and efficiency, including improved water knowledge and market reform and water purchase for the environment. The Sustainable Rural Water Use and Infrastructure Program is the key mechanism to 'bridge the gap' to the sustainable diversion limits (SDLs) under the Basin Plan. It consists of 3 main components:

- irrigation infrastructure projects
- water purchase measures
- supply measures.

Under the Bridging the Gap program approximately 98% of surface water has been recovered as at 31 March 2021. This means only a further 46 GL/y of surface water needs to be recovered to meet the target of 2,075 GL per year. Achieving this target depends on the sustainable diversion limit adjustment mechanism projects being delivered by 2024.

As at 31 March 2021, 92% of groundwater has been recovered. There needs to be only a further 3.2 GL per year of groundwater recovered to meet the Basin target of 38.45 GL/y.

River operations

River operations support Basin Plan implementation and contribute to Basin Plan objectives and outcomes, including through:

- delivery of water to meet multiple objectives and outcomes
- management and monitoring of flows to manage risk to water quality and meet water quality targets.

The MDBA operates the River Murray system on behalf of the New South Wales, Victoria and South Australian Governments. Other rivers in the Murray–Darling Basin are managed by the states.

In addition to day-to-day river operations, activities that occurred in 2020–21 include:

- consulting with local communities about the operation of the Menindee Lakes.
- investigating the loss of capacity within the Barmah Choke and potential options to by-pass the choke and reduce shortfall risk.
- producing the fortnightly water quality reports that have evolved into monthly Basin condition reporting and Basin in Brief updates.

Appendix A: Case studies

Case Study: Killarney Fish Rescue

Provided by the Queensland Department of Regional Development, Manufacturing and Water

Cold streams in southern Queensland support significant freshwater biodiversity. Groundwater discharge maintains them as cold water 'islands' in a 'sea' of warmer streams, allowing species widespread in Australia millions of years ago to persist in Queensland despite the long-term warming of the continent. One of these species, the River Blackfish, has an extremely limited range in Queensland and is highlighted in the Basin Wide Environmental Watering strategy as a management priority.

Over summer 2019–2020 extreme conditions of drought and heat threatened to stop the discharge of Spring Creek, a key cold-water refuge stream. This threatened biodiversity loss with no natural process of recovery. The Queensland Government recognised this risk, assembled an interdisciplinary team of experts to formulate a plan, and obtained funding to implement it via the MDB Native Fish Recovery Strategy (NFRS). Surveys were conducted, risks confirmed, and representative captive aquarium populations established for key threatened aquatic species – blackfish, mountain galaxias and spiny crayfish – as 'ark populations'. These would allow reintroduction following system recovery in case the extreme weather caused local extinctions. As the rescued species had not previously been held together in this way, part of the exercise was also focused on learning how to house them effectively.

Rains came in early 2020, just in time to prevent the stream from drying. The biodiversity has remained intact. Consequently, in July 2020 the captive blackfish were used to reintroduce the species into another stream where they had previously gone extinct due to temporary sediment impacts on the habitat. Successful reintroduction, confirmed by ongoing monitoring, has added one additional population to the Queensland range of this very restricted fish. Overall, the principal outcomes from this project were securing the biodiversity of the region by preventing the extinction and expanding the range of relic cold water specialist aquatic species, meeting specific objectives in the Basin Wide Environmental Watering Strategy. Learning how to manage the protection of Queensland's freshwater biodiversity in the occurrence of future climate emergencies was also a key outcome.

Challenges included learning and managing the husbandry requirements of these species in captivity and building stakeholder relationships in the short turnaround time of the rescue. There are opportunities to work more closely with stakeholders as ongoing monitoring and management of these species continues. Environmental DNA is now being used to monitor the distributions of these species in Queensland. Sampling between November 2020 and April 2021 has shown that the range of blackfish and galaxias has contracted post-drought, so protecting the remaining locations is critical. With Queensland Government support, Southern Queensland Landscapes are now working with Traditional Owners, MDBA and local community to implement an NFRS Recovery Reach project to increase the suitable habitat for these species in the region. Killarney Fish Rescue was delivered as a close collaboration between scientists and policy staff from the Queensland departments of Environment and Science (DES) and Regional Development, Manufacturing and Water (DRDMW), Griffith and James Cook universities, and a specialist aquaculture company. Beyond the project team there was consultation in the planning and implementation phases with Department of Agriculture and Fisheries staff, Southern Queensland Landscapes, Githabul Nation Traditional Owners and local property owners. The rescue was the first time the Queensland Government had undertaken a rescue such as this for aquatic species, so much was learned. This is important, as future climate predictions highlight the increasing prevalence of extreme conditions. If we are to preserve this cold-water stream biodiversity, such measures may be again needed in future and this experience will be invaluable.

Case Study: Tati Tati Wadi Wadi Delivers their Cultural Flows Management Plan

Provided by the Victorian Department of Environment, Land, Water and Planning

In 2021, Tati Tati Wadi Wadi delivered their Cultural Flows Management Plan, which defines their aspirations for Margooya Lagoon outside Robinvale. The process to develop the plan began in 2018, with Tati Tati Wadi Wadi members participating in workshops to determine nation objectives around cultural flows and the health of waterways and Country. A total of 16 main objectives were outlined across water, animals, plants, and people – all of which are considered interconnected and central to cultural understandings of Country.

During 2020, a 15 megalitre allocation of environmental water was committed and delivered by Victorian authorities to a floodplain creek at the Murray River side of the Margooya Lagoon wetland. This 'test flow' was a way to simulate the original inundation of the creek and help revive the biodiversity of the surrounding area. Monitoring and evaluation surveys created by the Tati Tati Aboriginal Water Officers were used over the course of 5 weeks to survey and record the outcomes of the watering event on various key indicators. Increases were demonstrated during the flow event in the overall health of culturally significant plants and overall abundance of culturally significant animals. However, while the cultural wellbeing of people slightly increased during the one-week flow event as water was flowing into the dry creek bed, an overall decrease was observed once the flow event ended. Tati Tati Wadi Wadi reports that improvement in engagement between relevant stakeholders could lead to more positive, lasting outcomes for future watering events. To respect their rights and responsibilities to care for Country, Traditional Owners should be involved in all stages of the environmental watering process: before, during and after water is delivered.

Cultural flows are a lifelong concept. As such, the Cultural Flows Management Plan for Margooya Lagoon is an ongoing and live document that will grow and adapt as the people and Country that it concerns grow and change. Tati Tati Wadi Wadi members recommend that there be further test flow events to gain additional knowledge and understandings of natural creek inundation paths of Margooya Lagoon. Relevant stakeholders should ensure that genuine engagement occurs, with Traditional Owners involved in all stages of the environmental and cultural watering processes and traditional ecological knowledge embedded in the water space. The nation will also aim to continue developing the capacity for Traditional Owner employment, self-determination and autonomy in holding water workshops and educational projects.

Case Study: Supporting threatened species of smallbodied fish in the Lower Lakes

Provided by the South Australian Department for Environment and Water

Local knowledge and understanding informs a range of initiatives undertaken by the South Australian Department for Environment and Water (DEW) as part of Basin Plan implementation in South Australia. Of the many examples, one important activity is water level management in Lake Alexandrina and Lake Albert (the Lower Lakes) to support small-bodied threatened fish, such as the Murray hardyhead and the southern pygmy perch.

These small-bodied threatened fish reside in Lake Alexandrina and surrounding tributaries, but their occupation in this region remains precarious. During the millennium drought these fish populations, along with Yarra pygmy perch, were threatened with localised extinction as water levels in the Lower Lakes reduced to a metre below sea level. The available wetland habitat was fragmented, and food resources were depleted. This left the remaining populations stranded or susceptible to increased predation from alien fish.

Rescue attempts to secure the 3 species of threatened fish during the millennium drought resulted in fish being removed from drying habitat and adopting a captive breed and release program. The populations of Murray hardyhead and southern pygmy perch that now reside in the Lower Lakes are likely the generations of offspring from captive-bred fish released back into the wild. Unfortunately, Yarra pygmy perch has not been detected in recent years, with restocking efforts being unsuccessful to date. Following the devastating impacts of the Millennium drought, water level management in the Lower Lakes is now critical to the survival and recovery of Murray hardyhead and southern pygmy perch populations.

DEW works in partnership with several key reference groups, including the Coorong, Lower Lakes and Murray Mouth (CLLMM) Community Advisory Panel, the Ngarrindjeri Aboriginal Corporation (NAC) and the Lower Lakes, Coorong and Murray Mouth (LLCMM) Scientific Advisory Group. Consultation with these groups informs the development of annual watering priorities. Ecological objectives and targets that include supporting recruitment and survival of threatened small-bodied fish are considered as part of these priorities.

DEW held a joint CLLMM Community Advisory Panel/ Scientific Advisory Group meeting in October 2020, at which consultation took place on the preferred autumn 2021 Lower Lakes water level regime. Dr Wedderburn from the University of Adelaide and a member of the CLLMM Scientific Advisory Committee presented outcomes from threatened fish monitoring and modelling and the risks to southern pygmy perch recruitment if autumn lake levels were reduced to 0.5/0.55 m AHD for a fourth year in a row. His recommendation was for a minimum autumn 2021 lake level of 0.6 m AHD to support improvements in southern pygmy perch recruitment. After discussion amongst community members and scientists, support for a target autumn lake level of 0.6 m AHD with the use of water for the environment was agreed. During a meeting and field trip on 8 December 2020, which was attended by DEW staff, NAC representatives and Dr Wedderburn, further consultation on lake levels took place. The outcome resulted in NAC supporting a minimum lake level of 0.6 m AHD in autumn 2021.

In the lead up to autumn 2021, DEW water managers worked closely with staff from the Murray– Darling Basin Authority (MDBA), Commonwealth Environmental Water Office (CEWO) and SA Water via the Barrage Operations Advisory Group, to ensure lake levels and barrage releases were managed as per the advice received.

In April 2021 threatened fish monitoring in the Lower Lakes and surrounding tributaries detected a significant increase in the southern pygmy perch population with the higher late summer and autumn water levels potentially contributing to this outcome. The advice for future operations is that this water regime should be replicated at least every 2 to 3 years to help with the recruitment and survival of southern pygmy perch in the Lower Lakes.

Case Study: Adaptive management in the Lachlan River

Provided by the New South Wales Department of Planning, Industry and Environment

New South Wales environmental water managers follow the related principles as documented within New South Wales Department of Planning, Industry, and Environment (DPIE) – Environment, Energy and Science (EES) Environmental Water Manual (2020), which has been developed with line of sight to the Basin Plan's environmental watering principles. Environmental water deliveries are planned to meet the Basin annual environmental watering priorities and long-term watering plan objectives, in a collaborative and effective way.

Due to the continuation of drought conditions from the 2019–2020 water year, water managers prepared for the upcoming water year anticipating of nil to low water allocation. This corresponded to an expected very dry to dry resource availability scenario.

In response to the expected dry conditions, the 2020–2021 Lachlan Annual Environmental Watering Priorities aimed to maintain strategic drought refuges to avoid irretrievable loss of species and habitat. This priority aligns with the Lachlan long-term watering plan and Basin Plan objectives.

While the Lachlan experienced close to record minimum inflows in 2019, substantial inflows increased Wyangala Dam capacity from 16% in July 2020 to 70% in April 2021, with water allocations increasing accordingly. The first general security allocation in 3 years occurred in September, and again in November 2020 and April 2021. This meant the Environmental Water Allowance (20 GL also became available in April 2021. These substantial inflows quickly moved annual priorities from maintaining refuge pools and avoiding loss of species and habitats to delivering environmental water to maintain connectivity between the Lachlan River and its floodplain habitats and ecosystem functions, reflecting the change in resource availability.

This change in priorities meant that environmental watering activities shifted from maintaining key drought refuges such as Booberoi Creek and Great Cumbung Swamp by increasing unseasonably low base flows in early 2020–21, to supporting successful colonial waterbird breeding and inundating more in-channel habitat for native fish post-spawning, including for Murray cod and golden perch.

Environmental water deliveries to Booberoi Creek under the initial drought conditions saw unprecedented collaboration between WaterNSW, creek landholders, DPIE–EES, Dr Fish Consulting, DPI Fisheries and First Nations peoples, with subsequent translucent and licensed environmental watering actions exceeding expected hydrological and ecological outcomes. As resource availability increased and translucency was triggered, hundreds of kilometres of fringing channel habitat and lignum shrublands were watered after stock and domestic replenishment flows were delivered to Muggabah, Merrimajeel and Merrowie creeks. This included follow-up flows for Booligal Wetlands complex assets, Murrumbidgil Swamp, which received drought management flows in 2019–20 to build further resilience, and Lower Gum Swamp, last watered in 2016 floods.

These flows provided months of additional hydrological connectivity to thousands of hectares in these nationally significant and unique wetland types and the habitat and food they provide. They also inundated extensive areas of river red gum and black box woodland swamps, lignum shrublands, open lakes and tall emergent marshes in the Great Cumbung. Core areas of reed bed had not been flooded in over 4 years, and this watering event resulted in new growth and reproduction. Other ecological responses included southern bell frog breeding in late spring at multiple sites in the Great Cumbung region, and some of the largest abundances and diversity of waterbirds since 2016.

Office locations – *First Nations Country* Adelaide – Kaurna **Canberra** – *Ngunnawal* **Goondiwindi** – *Bigambul* **Griffith** – Wiradjuri Mildura – Latji Murray Bridge – Ngarrindjeri **Toowoomba** – Jarowair and Wakka Wodonga – Dhudhuroa



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