Australian Government

MURRAY–DARLING BASIN AUTHORITY

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ANNUAL REPORT

2018–19

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Cover: The cover is taken from artwork created by MDBA staff, inspired and facilitated by Indigenous artists Dale and Calvin Huddleston. The work represents a collaboration of all levels of the MDBA. It was part of activities to celebrate NAIDOC Week 2019, the theme of which was Truth, Treaty, Voice.

The MDBA gratefully acknowledges the assistance of Dale and Calvin, men of the Ngardi NT and Wiradjuri NSW Nations. We thank them for their expertise and their generosity in sharing their cultural knowledge.

Introduction

Acknowledgement of Country

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

We greatly value and appreciate the guidance and support received from the Murray Lower Darling Rivers Indigenous Nations, the Northern Basin Aboriginal Nations and our many Aboriginal First Nations friends and colleagues.

Aboriginal Nations of the Murray–Darling Basin

Barapa Barapa	Jarowair	Nari	Wakka Wakka
Barkandji (Paakantyi)	Kambuwal	Ngarrindjeri	Wamba Wamba
Barunggam	Kamilaroi	Ngemba	Waywurru
Bidjara	Kunja	Ngintait	Wegi Wegi
Bigambul	Kwiambul	Ngiyampaa	Wergaia
Budjiti	Latji Latji	Ngunnawal	Wiradjuri
Dhudhuroa	Maljangapa	Nyeri Nyeri	Wolgalu
Dja Dja Wurrung	Mandandanji	Tatti Tatti	Wotjabaluk
Euahlayi	Maraura	Taungurung	Yaitmathang
Githabul	Mardigan	Wadi Wadi	Yita Yita
Gunggari	Murrawarri	Wailwan (Wayilwan)	Yorta Yorta
Gwamu (Kooma)	Mutti Mutti		

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

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Letter to the Minister

Australian Government

MURRAY–DARLING BASIN AUTHORITY

The Hon. David Littleproud
Minister for Water Resources,
Drought, Rural Finance, Natural Disaster
and Emergency Management
Parliament House
Canberra ACT 2600

Dear Minister Littleproud,

It is my pleasure to present the Murray–Darling Basin Authority (MDBA) annual report for the 2018–19 financial year.

During the year the MDBA has continued to:

- lead the implementation of the Murray–Darling Basin Plan in collaboration with communities, governments and industries of the Basin
- direct the sharing of water of the River Murray on behalf of Basin governments.

The report has been prepared in accordance with the *Public Governance, Performance and Accountability Act 2013* (Cwlth) (s. 46) and the *Water Act 2007* (Cwlth) (s. 214).

I certify that the MDBA has prepared fraud risk assessments, fraud control plans and practices, fraud prevention, detection, investigation, and reporting, and data collection in compliance with the Commonwealth Fraud Control Framework. I also certify that I have taken all reasonable measures to minimise the incidence of fraud in the MDBA.

I would like to acknowledge the commitment of MDBA staff and their contribution to the work of the MDBA with the aim of achieving a healthy, productive Murray–Darling Basin.

Yours sincerely,

Phillip Glyde
8 October 2019

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Chief Executive's review

I am pleased to present the Murray–Darling Basin Authority (MDBA) report for 2018–19.

In 2018–19, drought, record summer heat and all-time low water availability placed immense pressure on families, farmers, communities and the environment. I too was devastated by the fish deaths around Menindee in December and January. The Australian community's confidence in the implementation of the Basin Plan has been shaken by these events. Across the Basin, communities and the environment are doing it tough, bringing the intent and progress of the Basin Plan into sharper focus for many. The Bureau of Meteorology's outlook for the coming water year suggests continuing warmer than average temperatures and dry conditions.

The Basin Plan is a long-term reform that will, when implemented, make the Basin's environment, and the people, communities and industries that depend on it, better able to withstand droughts. Governments have learned from the experience of the millennium drought and the partial implementation of the Basin Plan to date has meant that we are better placed than before. We still have a long way to go to implement the Basin Plan and this year a number of activities were delivered, framed by the operating context of a worsening drought.

Partnership with governments

This year we continued to work in close partnership with Basin state governments' officials in implementing the Basin Plan and running the river. Together we have continued to progress key elements of the remaining reform. I thank Basin state governments' officials for their continued engagement and hard work. While the MDBA is an active champion for implementing the Plan, success will depend on the cooperation of, and support from, all governments and the wider community.

Using the best science available

The knowledge that underpins our work is continually improving. We do our best to adapt implementation based on new knowledge. As an example, Professor Robert Vertessy, the Chair of the MDBA's Advisory Committee on Social, Economic and Environmental Sciences, led an independent review of the fish deaths near Menindee. The MDBA provided support to this independent review. The recommendations provide a clear way to improve implementation of the Basin Plan and present a significant opportunity for the MDBA and Basin governments to work together to improve outcomes for native fish.

We also continued to invest in improving our communication and ensuring we are a reliable, understandable and accessible source of information for communities, industry and governments.

Improving transparency

Committed to transparency in our work, we have again improved our efforts to communicate progress in this complex reform. A six-monthly report card and scientific reports are routinely published on our website. We are establishing processes and governance in support of the whole of government open data initiative and will increase our publicly available data in 2019–20. The report card at the end of June 2019 showed that governments and the MDBA have made good progress in water recovery, managing compliance with the rules of water use and delivering water for the environment. On the other hand, the adjustment to the sustainable diversion limits are at risk of delay; and finalisation of water resource plans is behind schedule and has been extended until the end of 2019.

More work is also required to implement initiatives in the northern Basin. An independent assessment showed the prerequisite policy measures that help protect water for the environment are operational, but ongoing work is needed to refine and adapt these. In summary, the report card shows that sustained effort and commitment by Basin governments is needed to get the Plan on track in this crucial year of implementation.

Increasing engagement

We have expanded opportunities to consult the community, to take account of stakeholder views and to engage them in our work. We want to hear the views of all interested people, and we want people to understand the work we are doing. We are also supporting an Independent Assessment of Social and Economic Conditions in the Murray Darling Basin, which will assess the status of Basin communities and their future development potential.

Engagement with Aboriginal Nations is a priority for all Basin governments, with numerous initiatives being progressed during the year, such as the Aboriginal Water Entitlement Program and the National Cultural Flows Mapping Project. I especially welcome the government's commitment to appoint an Indigenous person as the seventh member of the Murray–Darling Basin Authority.

By the end of this year, 10% of our staff were based in regional offices. In March 2019, the Australian Government announced further regionalisation of the MDBA, with approximately one-third of the workforce to be located across the Basin by mid-2021. This will see an additional 76 positions relocated to regional centres with new offices opening in Griffith, Mildura and Murray Bridge. We look forward to deepening our connection with communities across the Basin.

Improving compliance

Our regulatory capacity and capability has continued to improve. This year saw a number of important audits and assurance reviews, including one on Water Trade Price Reporting. We published a review of progress by governments in meeting their commitment to improve their regulation of water management and use.

Staying the course

The Basin Plan has been subject to continuous examination, review and public scrutiny, including the South Australian Royal Commission and the Productivity Commission's Murray–Darling Basin Plan: Five Year Assessment.

The Productivity Commission's assessment offers an important evaluation of progress to date and where improvements are needed. Basin Governments have agreed to the majority recommendations made by the Commission and are acting to implement these as soon as possible. This response is from all six governments of the Basin and represents a commitment to continue the task of implementing the Basin Plan in full and without delay.

While the Royal Commission report contained some analysis that the MDBA supports, our overwhelming view is that the principal implication of the report—that we should start all over again and remake the Basin Plan—would set back progress towards a healthy and sustainable Basin and cause substantial uncertainty for Basin communities.

The Basin Plan is a leading-edge and world-first improvement in water reform. The MDBA remains committed to implementing the Basin Plan and improving river management because it provides the best chance to achieve sustainable water use in Australia's most significant water basin.

Phillip Glyde

Chief Executive
8 October 2019

Murray–Darling Basin snapshot

>1 million[2]

2.6 million
PEOPLE LIVE IN BASIN

40+
ABORIGINAL NATIONS

77,000 km
OF RIVERS, INCLUDING FOUR OF AUSTRALIA'S LONGEST

30,000
WETLANDS, 16 INTERNATIONALLY RECOGNISED

166,000 h
AUSTRALIA'S LARGEST RIVER RED GUM FOREST

9,200
IRRIGATED AGRICULTURAL BUSINESSES

$8 billion
TOURISM INDUSTRY

120
SPECIES OF WATERBIRD

46
NATIVE FISH SPECIES

As at December 2017

About the Basin

The Murray–Darling Basin (the Basin) is a large, complex, diverse and dynamic system that is home to about two million people, including more than 40 Aboriginal Nations. Its water resources are relied upon and enjoyed by communities within the Basin, as well as by many other people who live outside of the Basin.

One of the flattest water catchment areas on earth, the Basin contains both highly developed and natural rivers, floodplains, and extensive groundwater resources—many of which are also heavily developed. These water systems provide home and habitat to millions of fish, birds and other animals, many of them protected under Australian legislation and international agreements. Overall, the Basin contains 77,000 km of rivers, with flows totalling some 35,000 GL on average.

One of Australia's most productive agricultural regions, the Basin produces more than one-third of the nation's food and $22 billion in agriculture on average each year. The Basin is constantly changing in response to the influences of people, climate and the way water is used for production, communities and the environment.

Significant sites/assets

The Basin water resources include over 30,000 wetlands, including 16 that are recognised internationally under the Convention on Wetlands of International Importance (Ramsar Convention). More than 120 species of waterbirds and 46 species of native fish live in the Basin's water systems. Australia's largest river red gum forest, covering 166,000 hectares, is also contained in the Basin. Attracting people to visit for leisure and sport, the Basin generates $8 billion annually in tourism.

Over the past 100 years, water has been a highly contested resource. The Murray–Darling Basin and its river systems are highly regulated due to the magnitude of the river system, its significant contribution to so many people and agriculture, and the complexity of the system needing to support five jurisdictions.

The Basin Plan

The Basin Plan 2012 is a major reform agenda that aims to ensure the Basin is a healthy working basin that delivers benefits for all Australians, and particularly the communities that live within it. The Basin Plan balances competing needs and shares water among all users, including the environment, in a sustainable way and is integrated across state boundaries.

The Plan is a legal commitment made under Commonwealth law. The task of implementation is complex and extends from 2012 until 2026. Implementation requires cooperation and commitment from six governments—four states, one territory and the Australian Government. Each element of Plan implementation works in concert with other elements, and all the elements will need to be completed to deliver the expected outcomes. Implementing the Basin Plan and associated water reforms is a long-term investment to which the Australian Government and Basin states have committed.

Operating context for 2018–19

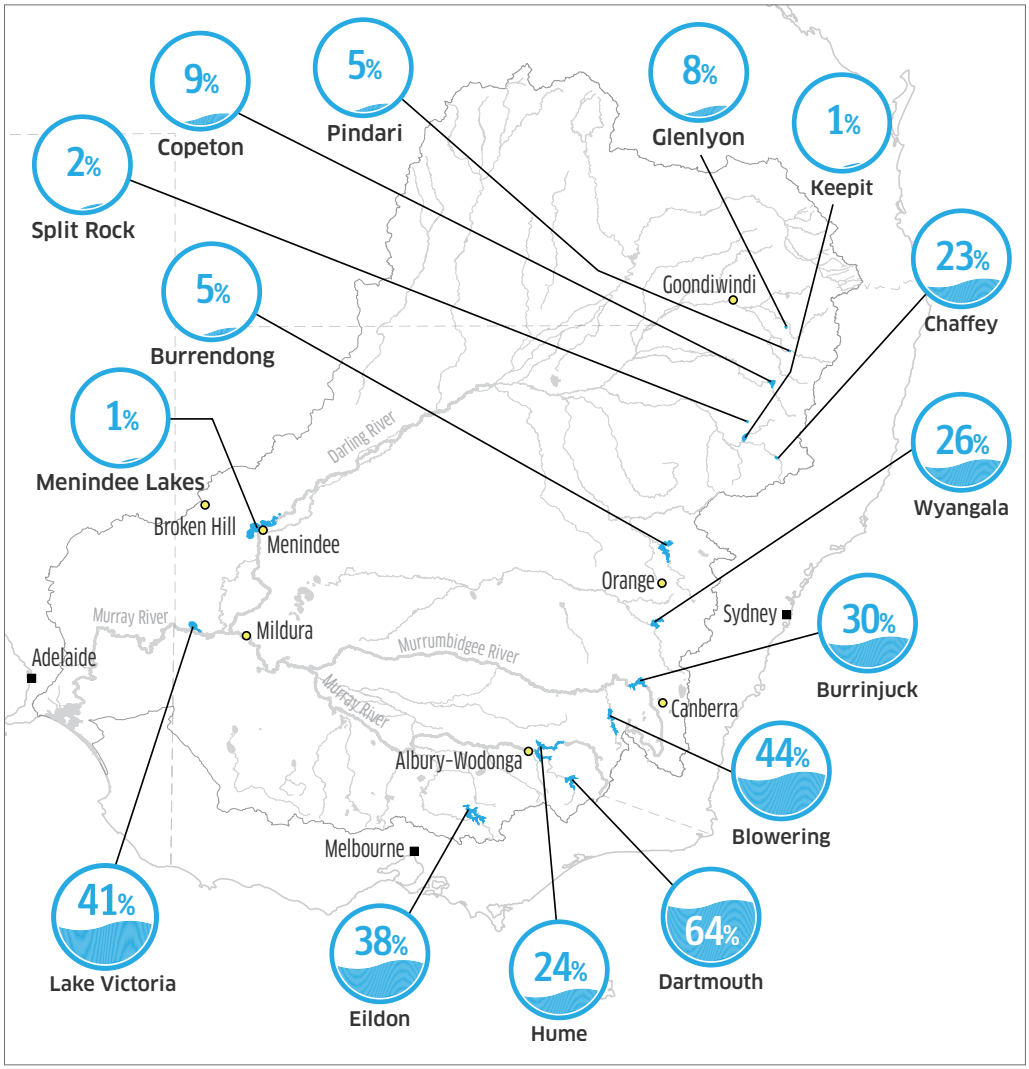
A considerable amount of work is required to implement the commitments agreed as part of both sets of Basin Plan amendments made in 2017–18, with some significant milestones set for 2018–19. This work was delivered in the operating context of a drought, with severe conditions in the northern Basin and worsening conditions in the southern Basin. During the year the low rainfall and extreme heat conditions were equivalent to the most severe climatic conditions on record. Total water storage is low, and communities and farmers are under stress. This makes the work of the Basin Plan even more important, with numerous competing needs to be managed fairly and transparently.

Several elements of the reform—such as the entitlements for water for the environment, water limits on consumptive use, water trade and water quality and salinity measures—have been delivered successfully and are working to improve water management and river health. However, it will take time for the environmental health of the river system to be improved, and climate change is having a significant impact. In a drought the environment of the river suffers, along with the industries and communities that rely on the river system. Water use and delivery needs are shifting, influenced by changes to the climate and water availability.

At the opening of 2018–19, the total storage capacity of all water holdings was an average of 48% capacity. By the end of 2018–19, the total storage was as low as 30%, with some locations in the northern Basin as low as 1% to 5%. In the northern Basin the drought is having a devastating effect on water quality and there will be little irrigated agriculture with water at historical lows. The southern Basin, while somewhat buffered by large public dam storages, is also experiencing restrictions in water allocations.

Over the past few years there has been increased scrutiny on the MDBA and the governments involved in the implementation of the plan. The MDBA is committed to transparency in its work. Scientific reports are routinely published on the MDBA's website, and we are establishing processes and governance in support of the whole of government open data initiative and will increase our publicly available data in 2019–20. We are committed to consulting the community, to taking account of stakeholder views and engaging them in our work. The MDBA's work is routinely peer-reviewed by experts and their reviews are published. Like any organisation, there is more we can do to improve communications and transparency, and this remains a priority for the MDBA.

Figure 1.1 Storage capacity across the Basin as at June 2019



Section 1
About the MDBA

About the MDBA

The Murray–Darling Basin Authority (MDBA) is an independent, corporate Commonwealth (Cwlth) entity that reports to the Commonwealth Minister responsible for water.

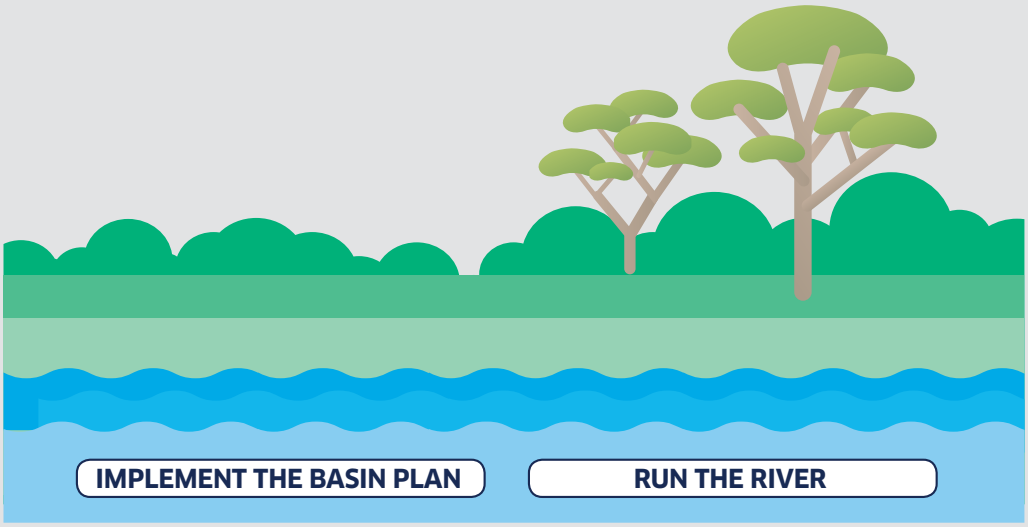
The MDBA works closely with other Australian Government agencies, Basin state governments (New South Wales, Queensland, South Australia, Victoria and the Australian Capital Territory), local governments, regional bodies, industry groups, landholders, environmental organisations, scientists, research organisations and communities, including Aboriginal people, and the broader Australian community.

MDBA staff are located in Adelaide, Albury–Wodonga, Canberra, Goondiwindi and Toowoomba.

Our purpose

To achieve a healthy working Basin through the integrated management of water resources for the long-term benefit of the Australian Community.

Figure 1.2 MDBA snapshot



IMPLEMENT THE BASIN PLAN | **RUN THE RIVER**

Improve transparency and confidence in the Basin Plan, the River Murray operations and the MDBA

Drive the successful implementation of the Basin Plan	Strengthen the culture of compliance in the Murray–Darling Basin	Operate the River Murray system efficiently for partner governments

Be the centre of excellence in the science and knowledge of the Murray–Darling Basin

RUN THE BUSINESS

Capabilities

Modelling and research	Engineering and science	Water policy expertise

Supporting capabilities

Accountability, audit and finances	ICT and data	People, planning and performance

Governance

Frameworks	Governing committees	Systems and controls	Executive oversight

Role

The MDBA's key roles are to:

	prepare, implement and review an integrated plan for the sustainable use of the Basin's water resources
	operate the River Murray system and efficiently deliver water to users on behalf of partner governments
	measure, monitor and record the quality and quantity of the Basin's water resources
	support, encourage and conduct research and investigations about the Basin's water resources and dependent ecosystems
	advise the Australian Government Minister for Water Resources on the accreditation of state water resource plans
	provide water rights information to facilitate water trading across the Basin
	engage and educate the Australian community about the Basin's water resources.

Legislation

The majority of MDBA operations are governed by:

- the *Water Act 2007* (Cwlth), including the Murray–Darling Basin Agreement
- the Basin Plan 2012.

The Water Act sets out the MDBA's role in developing a Basin Plan and performing functions under the 2008 Intergovernmental Agreement on Murray–Darling Basin Reform—in particular, managing River Murray operations. The MDBA delivers its functions under the Murray–Darling Basin Agreement in conjunction with, and on behalf of, the Basin governments.

The Basin Plan is premised on the MDBA and Basin governments working together to manage the Basin as a whole. The MDBA has a role in developing, reviewing and ensuring compliance with the Plan through the MDBA's Office of Compliance. Agencies from the Basin state governments and the Australian Government are involved in implementing the Plan and the associated water recovery programs.

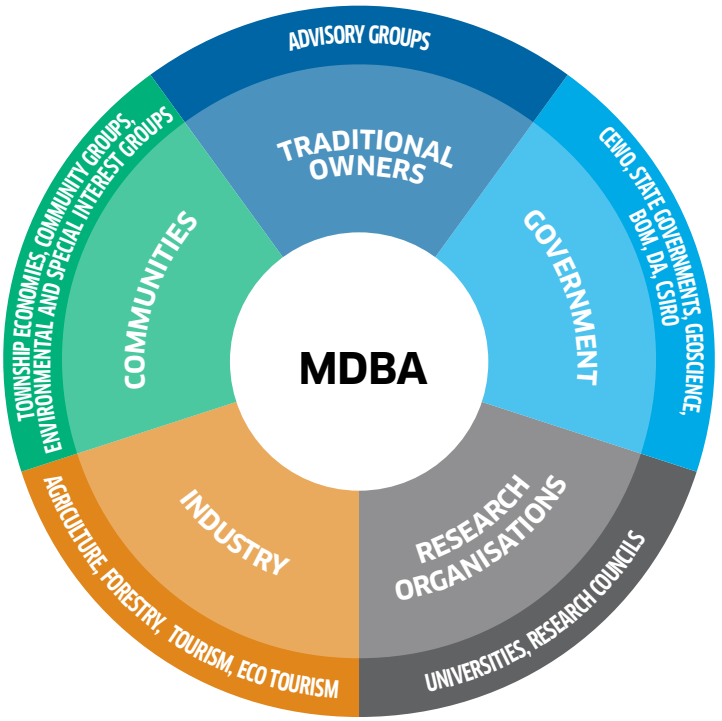
Interdependencies/collaborations

The MDBA works with the Basin governments under a range of governance arrangements to coordinate work programs and oversee the implementation of the Basin Plan and the Murray–Darling Basin Agreement. Other Australian Government agencies—such as the Commonwealth Environmental Water Office (CEWO), the Australian Competition and Consumer Commission (ACCC) and the Bureau of Meteorology (BoM)—also have important roles under the Water Act.

Basin governments and the Australian Government are all signatories to the Murray–Darling Basin Agreement and contribute funding to the joint management of the River Murray. The MDBA also works with the state constructing authorities appointed by Basin governments to investigate, design, construct, operate, maintain and renew River Murray operations assets.

Basin communities are involved in managing the Basin through mechanisms such as advisory committees, which help guide Basin Plan work. Basin governments also have their own arrangements for community consultation, such as the New South Wales environmental watering advisory groups.

Figure 1.3 MDBA collaboration and interdependencies



The MDBA engages with Aboriginal First Nations to ensure their perspectives are considered in implementing, monitoring and evaluating the Basin Plan, and in other effective water management. The MDBA also provides support to the Northern Basin Aboriginal Nations and the Murray Lower Darling Rivers Indigenous Nations. These groups enable the MDBA to be better connected to traditional owners across 40 plus Aboriginal Nations in the Basin with a focus on cultural values and uses of water.

The MDBA uses an adaptive management approach, and the various roles and responsibilities are progressively updated and refined as elements of the Basin Plan are implemented. The key roles and responsibilities as at 2018–19 are reflected in Figure 1.4.

Figure 1.4 Key roles and responsibilities

SUSTAINABLE DIVERSION LIMIT ADJUSTMENT MECHANISM

- Basin states propose and deliver projects
- MDBA program assessment and monitoring
- Department of Agriculture project funding and implementation

WATER RESOURCE PLANS

- Basin states development and implementation
- MDBA assessment and accreditation

WATER FOR THE ENVIRONMENT

- MDBA Basin-scale planning, coordination and prioritisation
- Basin states local-level planning and implementation
- Commonwealth Environmental Water Holder (CEWH) Planning and implementation across the Basin

RIVER MURRAY OPERATIONS

- MDBA operations and management
- Basin states day-to-day management of dams, locks, weirs and barrages

RECOVERING WATER

- Department of Agriculture and strategic purchases and efficiency programs
- Basin states implementation of some efficiency programs

COMPLIANCE

- Basin states implementation and enforcement
- MDBA monitoring and Basin-scale compliance

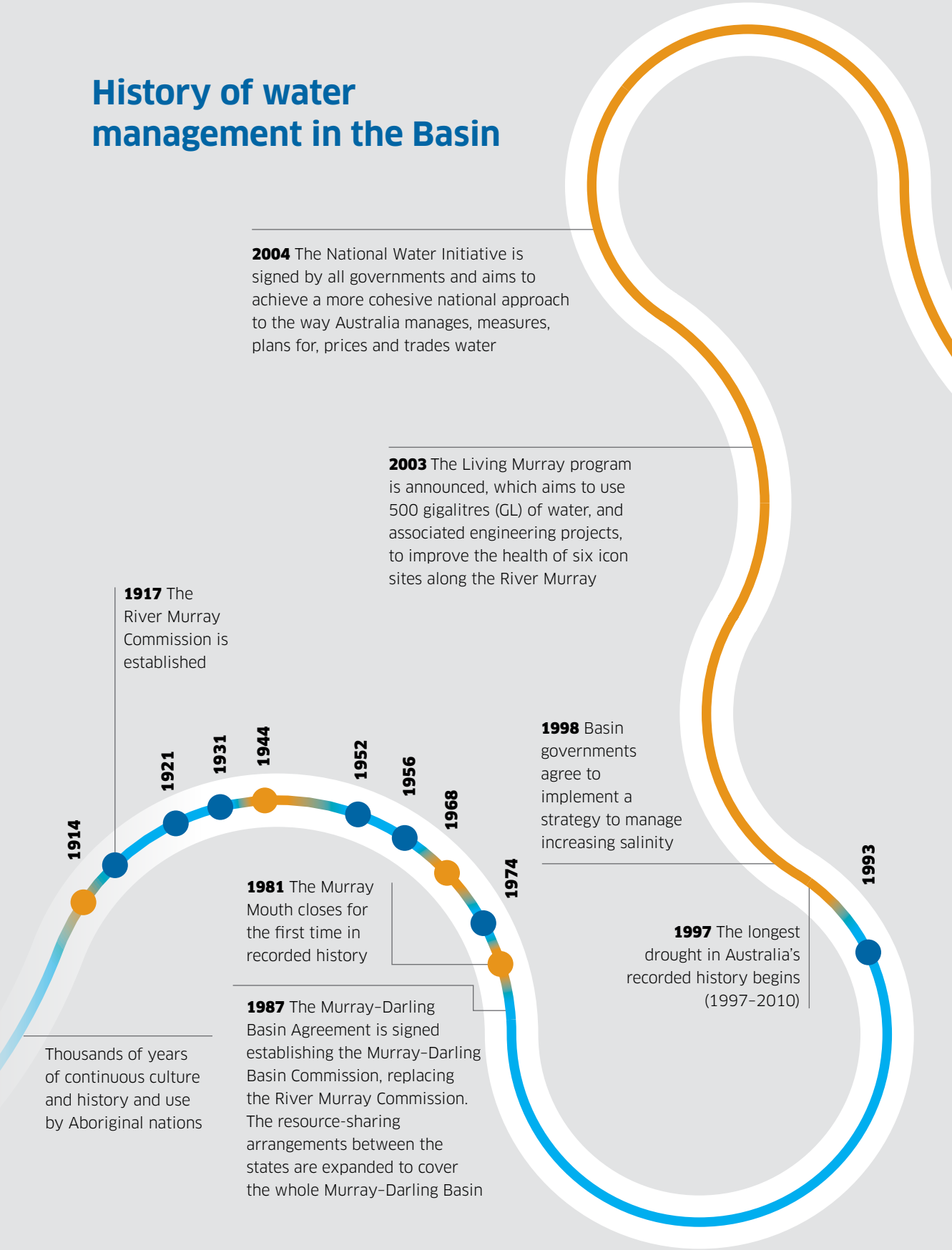
MONITORING AND EVALUATION

- MDBA Basin Plan evaluation and monitoring
- Department of Agriculture water recovery program monitoring
- Basin states reporting requirements
- CEWH monitoring results of environmental watering

WATER MARKETS AND TRADE

- MDBA information and compliance
- Basin states implement the rules
- Australian Competition and Consumer Commission advice on rules and complaints

History of water management in the Basin



2006 The drought gets worse. Lowest inflows into the River Murray since records began

2007 (early) The Australian Government announces a $10 billion plan to put water use within the Basin onto a sustainable footing. This includes new legislation and a substantial investment in water-efficient infrastructure

2007 (late) The *Water Act 2007* (Cwlth) implements key reforms for water management in Australia. It sets out the requirements for a Basin Plan that will set sustainable limits on the amount of surface and groundwater that can be taken from the Basin

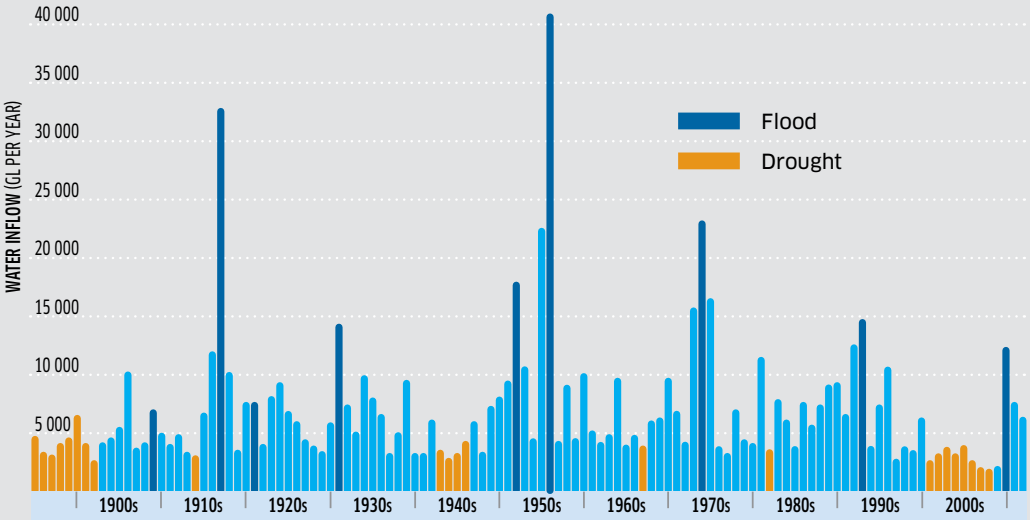
2008 The Murray–Darling Basin Authority takes over the functions of the Murray–Darling Basin Commission, as well as planning responsibility for the Basin's water resources, including groundwater

2010 The Basin Plan becomes law providing for the first time a coordinated sustainable approach to water use across the Basin's four states and the ACT

2015 Celebrated 100 years since the beginning of construction of Lock 1 in South Australia. This marked the start of joint construction work on the River Murray by South Australian, New South Wales, Victoria and the Australian governments

2017 Marked 100 years of collaborative water management in the Basin—on 14 February it was 100 years since the Commissioners of the newly formed River Murray Commission met in Melbourne

SIGNIFICANT FLOODS AND DROUGHTS



Section 2
Annual performance statements

Accountable Authority's statement

Introductory statement

I, as the accountable authority of the Murray–Darling Basin Authority, present the 2018–19 annual performance statement, as required under the *Public Governance, Performance and Accountability Act 2013* (Cwlth) (PGPA Act) (paragraph 39(1)(a)).

In my opinion, this annual performance statement is based on properly maintained records, accurately reflects the performance of the entity, and complies with the PGPA Act (subsection 39(2)).

Phillip Glyde
Chief Executive
8 October 2019

Reporting approach

The *Public Governance, Performance and Accountability Act 2013* (Cwlth) (PGPA Act) sets out how corporate Commonwealth entities, such as the MDBA, must report.

The MDBA manages its performance against a single outcome, and the key deliverables and key performance indicators are measured against the five strategic goals in the Corporate Plan 2018–19.

The entity purpose (Outcome 1) is:

> Equitable and sustainable use of the Murray–Darling Basin by governments and the community including through the development and implementation of a Basin Plan, operation of the River Murray system, and shared natural resource management programs, research information and advice.

The five strategic goals in the Corporate Plan 2018–19 were:

- **Goal 1**—Drive the successful implementation of the Basin Plan
- **Goal 2**—Strengthen the culture of compliance in the Murray–Darling Basin
- **Goal 3**—Efficiently operate the River Murray system for partner governments
- **Goal 4**—Improve transparency and confidence in the Basin Plan, River Murray operations and the Murray–Darling Basin Authority
- **Goal 5**—Be the centre of excellence in the science and knowledge of the Murray–Darling Basin.

The strategic goals are supported by seven key performance indicators (KPIs). The MDBA updated and refined its strategic goals and KPIs for the Corporate Plan 2018–19 to better reflect the agency's operating context and the stage of implementation of the Basin Plan.

Summary of performance

Outcome 1

Equitable and sustainable use of the Murray–Darling Basin by governments and the community including through the development and implementation of a Basin Plan, operation of the River Murray system, and shared natural resource management programs, research information and advice.

Program 1.1 Equitable and sustainable use of the Murray–Darling Basin
Strategic goals as specified in the Portfolio Budget Statements and Corporate Plan for 2018–19

Strategic goal 1: To drive the successful implementation of the Basin Plan

KPI	Source	Results
1. Collaborate with Basin governments to achieve accreditation of water resource plans, and transition to sustainable diversion limit accounting, while managing instances of non-compliance.	Corporate Plan 2018–19 Page 14	☑ Achieved • Significant progress made on the development and assessment of water resource plans. • The willingness to enter into bilateral agreements is evidence of enhanced collaborative working relationships with the Basin states. • Transitional sustainable diversion limit (SDL) accounting arrangements have established the foundation and preparations to come into effect from 1 July 2019. • The proof of concept for SDL compliance database was successful. This will enable the MDBA to more efficiently meet the publication requirements of the Register of Take under the Basin Plan.

For analysis of performance, see page 22

Strategic goal 2: Strengthen the culture of compliance in the Murray–Darling Basin		
KPI	**Source**	**Results**
2. Enhance the effectiveness of, and increase confidence in, the MDBA's compliance initiatives.	Corporate Plan 2018–19 Page 15	☑ Achieved • Compliance policy is aligned with the requirements of the National Framework for Compliance and Enforcement. • The MDBA improved its rating on the Modern Regulator Improvement Tool from the 2016 benchmark rating. • A number of water measurement guidelines were published. • Good progress has been made on delivering the Compliance Compact commitments, with a majority achieved and the remainder in progress.
For analysis of performance, see page 38		

Strategic goal 3: Operate the River Murray system efficiently for partner governments		
KPI	**Source**	**Results**
3. River operations and programs are managed in accordance with the: • Murray–Darling Basin Agreement 2008 • Service Level Agreement between the Murray–Darling Basin Ministerial Council and the Murray–Darling Basin Authority.	Corporate Plan 2018–19 Page 1	☑ Achieved • A positive report was received on River Murray system operations for 2017–18 from the Independent River Operations Review Group. This was endorsed by the Basin Officials Committee (KPI reported in arrears).
4. Build, maintain and improve the River Murray system assets to achieve best practice standards in accordance with the Murray–Darling Basin Agreement.	Corporate Plan 2018–19 Page 16	☑ Achieved • MDBA's ongoing inspection program ensured that all major infrastructure is managed in accordance with contemporary engineering practice. • Routine maintenance operations have generally continued as planned. All assets are maintained to best practice standards. • Dam safety is managed in accordance with the Australian National Committee on Large Dams guidelines. • State constructing authorities routinely report on asset program delivery through quarterly Asset Management Advisory Panel meetings.
5. Maintain and improve the health of the Basin in accordance with the Murray–Darling Basin Agreement and the associated agreements.	Corporate Plan 2018–19 Page 16	☑ Achieved • River Murray water quality parameters for recreation, irrigation and drinking water needs were within acceptable limits. • The Basin Salinity Management 2030 strategy target was met for the 10th consecutive year.
For analysis of performance, see page 56		

Strategic goal 4: Improve transparency and confidence in the Basin Plan, River Murray operations and the Murray–Darling Basin Authority		
KPI	**Source**	**Results**
6. Provide accessible evidence-based information and products, and undertake targeted engagement to obtain feedback and improve effectiveness of the MDBA activities.	Corporate Plan 2018–19 Page 17	☑ Achieved • The Basin Plan and River Murray operations continue to come under scrutiny, but awareness is improved through release of regular updated materials and publication of reports, policies and guidelines. • Stakeholder perceptions of the MDBA's transparency and independence were assessed through a major survey in 2018 and will be measured again in 2021. • Target audience understanding of MDBA key deliverables and their impacts was addressed through publication of the 'Understanding water management' suite of materials and regular update reporting across a range of Basin Plan activities. • There was increased regional presence to connect MDBA with key local stakeholders and support coordination and implementation of water management at the local level. The target of 10% of staff in regions was met.
For analysis of performance, see page 86		

Strategic goal 5: Be the centre of excellence in the science and knowledge of the Murray–Darling Basin		
KPI	**Source**	**Results**
7. Incorporate environmental, social and economic considerations in planning, implementation, monitoring, evaluation and reporting, and using best available science and data.	Corporate Plan 2018–19 Page 18	☑ Achieved • Environmental, social and economic impacts were included in Authority decisions as evidenced by practices including: – embedding these factors into templates – publishing case studies for major decisions where the triple bottom line was considered. • Deadlines for all reviews and evaluations were met as required under the Water Act. • Aboriginal engagement and participation in everyday work and projects across the MDBA continued to grow. • The MDBA had at least 10 formal Collaborative Head Agreements and a number of initiatives with external entities and research providers. • The MDBA's enterprise data initiative and other ICT enhancements showed improvement in the management of data to support decision-making. • The level of stakeholder satisfaction with access to MDBA information provides an indication of stakeholders' views on whether the MDBA is using the best available science and data. It is assessed against the 2018 baseline measures every three years. In the interim, the MDBA is able to monitor this by measuring website traffic and other engagement activities as outlined in strategic goal 4 (see p. 84).
For analysis of performance, see page 98		

Goal 1
Drive the successful implementation of the Basin Plan

The MDBA leads the implementation of the Basin Plan in collaboration with Basin state governments and other Australian Government agencies. The Basin Plan is a shared responsibility. As well as Australian Government and Basin state partners, the MDBA works with industry, environmental groups, the community and Aboriginal First Nations to implement the Plan.

The objective of the Basin Plan is to increase the health of the Basin through balancing the use and benefit to all water users.

Key to meeting this objective is collaborating with Basin governments to achieve accredited water resource plans and to transition to sustainable diversion limit accounting, while managing instances of non-compliance.

Priorities for 2018–19

- Assessing water resource plans and providing advice to the Minister on accreditation
- Putting in place transitional arrangements for sustainable diversion limits (SDLs)
- Implementing the toolkit measures of the northern Basin
- Implementing sustainable diversion limit adjustment mechanism (SDLAM) projects
- Managing constraints

Highlights

- Three water resource plans (WRPs) were submitted to the Australian Government Minister responsible for water for an accreditation decision.
- Twelve WRPs were submitted to the MDBA for assessment in 2018–19.
- Bilateral agreements were entered into with each Basin state government committing to key Basin Plan elements from 1 July 2019 as WRPs continue to be assessed and accredited.
- The 2017–18 transition period water take report was published in June 2019. This report applies the Basin Plan's SDL accounting retrospectively to SDL accounts, back to the 2012–13 water year. It did this before the SDL accounting formally took effect (on 1 July 2019) to help improve understanding of the complex SDL accounting arrangements.
- The SDL Reporting and Compliance Framework was published in November 2018. This is a significant step in embedding a transparent, balanced and procedurally fair SDL reporting and compliance process. It supports the MDBA and Basin states to deliver their ongoing compliance responsibilities.
- The final report on groundwater research with the National Centre for Groundwater Research and Training was published in May 2019.
- The Basin Officials Committee developed and endorsed a prioritisation assessment framework for northern Basin toolkit projects.

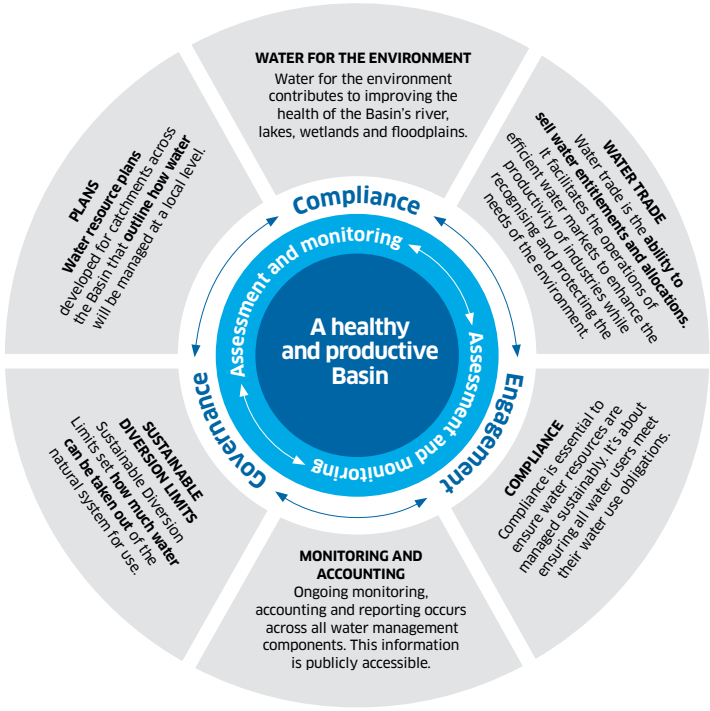
Analysis

The continuing drought, affecting a significant part of the Murray–Darling Basin, has created challenges for the successful implementation of the Basin Plan. In 2018–19, many parts of the Basin experienced well below average rainfall and, according to the Bureau of Meteorology, the beginning of 2018 was the third warmest start to the year on record.

These weather conditions make it even more important that the initiatives in the Basin Plan are put in place to ensure continued equitable and sustainable use of the Murray–Darling Basin. Successful implementation requires a collaborative effort by Basin states and all stakeholders, and during 2018–19 there were encouraging signs of this. Although extensions have been granted for the assessment of water resource plans for accreditation, good progress has been made. The process of preparing WRPs has strengthened relationships with stakeholders as they become more aware of all factors affecting water use.

The Basin Plan sets SDLs to control how much water can be used in the Murray–Darling Basin. In 2018–19 the MDBA worked with the Basin states to assist them to transition from the old water cap system to SDL accounting. The development of the SDL compliance database, progressed during the year, will make it a lot easier to record, track and access SDL compliance decisions.

Figure 2.1 Overview of the Basin Plan



> The Basin Plan is one of the most complex and ambitious water reforms in the world. It arose from an urgent need to secure the future of our nation's most important river system, and was forged in the spirit of cooperation and bipartisanship.
>
> *Phillip Glyde, 13 December 2018*

During the year there was progress on initiatives in the northern and southern Basin. In the northern Basin, work continued on the 'toolkit' measures that the New South Wales and Queensland governments are using to improve water management. As a result of the four-year review of the northern Basin, the Basin Plan was amended in July 2018, resulting in a reduction of the water recovery target.

In the southern Basin, SDL adjustment projects have provided some flexibility to adjust the diversion limits. This enables more water to remain for other users while environmental outcomes are achieved. The complexity of many of the projects means that some need fast-tracking. Some projects require little or no work, while others need much more work. The need to improve river management was highlighted by the fish deaths in the Darling River at Menindee in late 2018 and early 2019.

KPI Result

KPI1 is: Drive the successful implementation of the Basin Plan.

Result for 2018–19: Achieved.

Positive progress was made during the year as evidenced by the following four measures of success:

- Significant progress was made on the development and assessment of water resource plans.
- The willingness to enter into bilateral agreements is evidence of enhanced collaborative working relationships with the Basin states.
- Transitional SDL accounting arrangements have established the foundation for SDLs to come into effect from 1 July 2019.
- A successful proof of concept for the SDL compliance database was developed. This will enable the MDBA to more efficiently meet the publication requirements of the Register of Take under the Basin Plan.

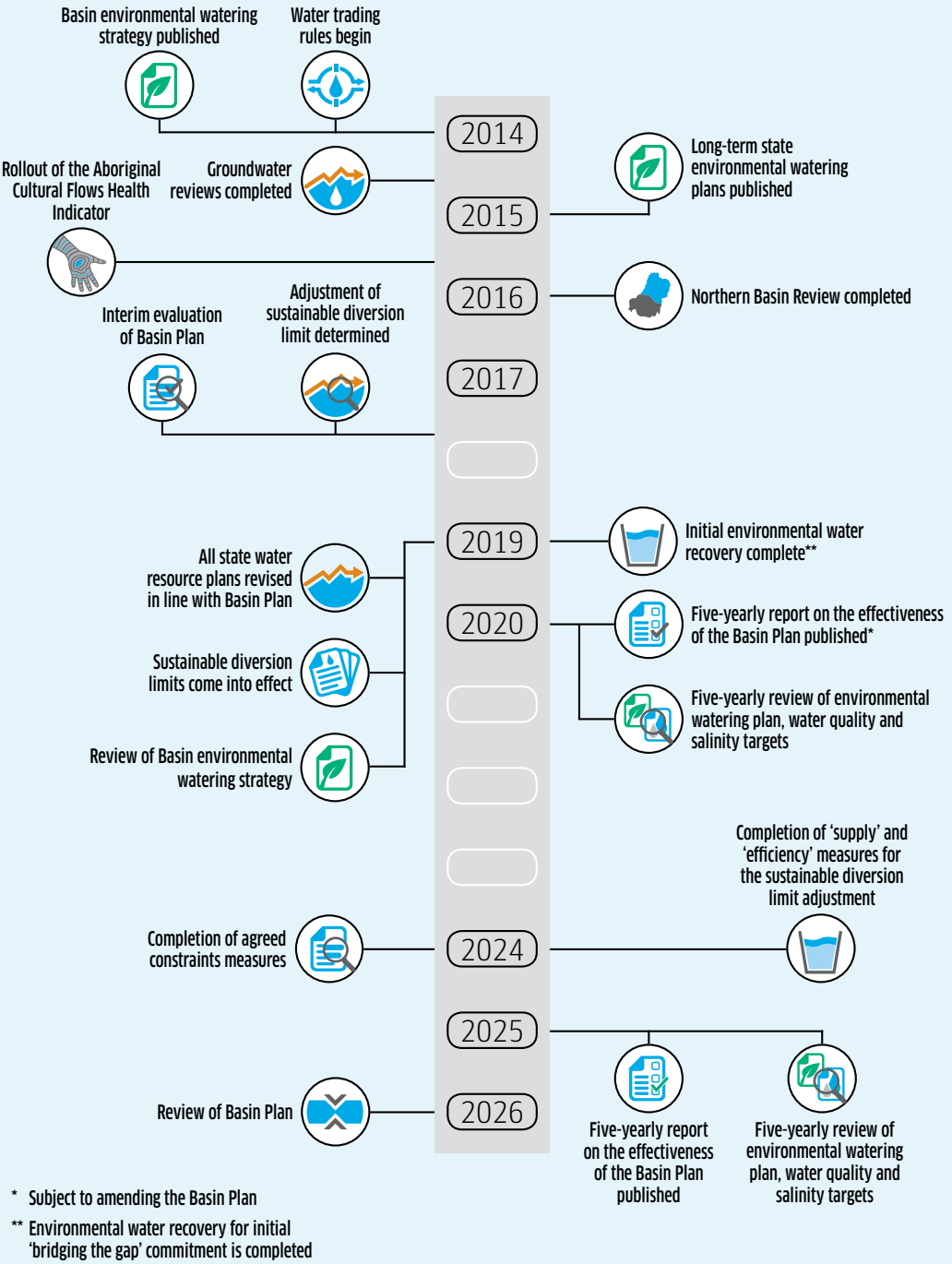
Collaborative relationships

Maintaining and enhancing collaborative relationships with states continues to be a key factor in successfully implementing the Basin Plan. The MDBA liaises with the Basin governments in the development and assessment of WRPs and the SDL accounting work.

During the year there was evidence of maintained or improved collaborative relationships through:

- bilateral agreements reached between Basin jurisdictions and the MDBA to ensure key Basin Plan outcomes come into effect from 1 July 2019, regardless of when WRPs are accredited
- regular discussions with the Basin states on the progress, assessment and development of WRPs through the Basin Plan Implementation Committee and the Basin Officials Committee
- Basin Officials Committee development and endorsement of a prioritisation framework to assess projects that deliver against the northern Basin toolkit
- collaboration with Basin states to finalise the redistribution of their Shared Reduction Amounts as well as updating their long-term diversion limit equivalence factors
- close consultation and technical discussions with Basin states to review baseline diversion limit re-estimates brought forward through the WRP development process
- development of a new schedule to the Intergovernmental Agreement on Implementing Water Reform in the Murray Darling Basin, specific to the implementation of the northern Basin toolkit, to be considered by the Council of Australian Governments (COAG) at its August 2019 meeting
- responses to 41 requests for technical advice on water quality and salinity issues across all five Basin states
- the preparation of WRP content by New South Wales and Queensland governments to better manage and protect environmental water achieved through intergovernmental collaborative forums.

Figure 2.2 Basin Plan timeline



* Subject to amending the Basin Plan

** Environmental water recovery for initial 'bridging the gap' commitment is completed

Assessing water resource plans for accreditation

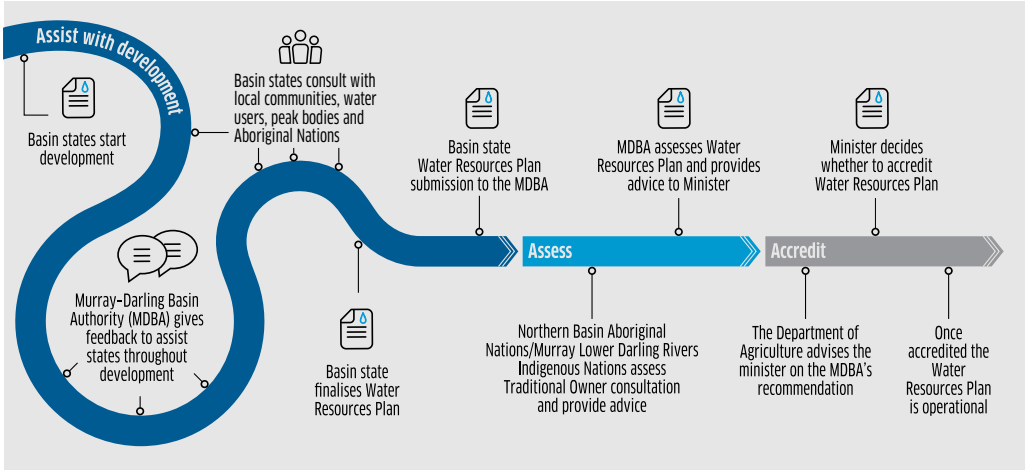
About water resource plans

WRPs are an integral aspect of implementing the Basin Plan. They:

- set new rules for how much water can be taken out of the system, ensuring the SDLs in each area are not exceeded over time
- ensure state management rules meet the Basin Plan objectives
- include new arrangements that strengthen water management at a local level.
- WRPs outline how each region aims to achieve community, environmental, economic and cultural outcomes.

WRPs are developed by Basin state governments, assessed by the MDBA, and accredited by the Australian Government Minister responsible for water (see Figure 2.3 below).

Figure 2.3 Responsibilities for water resource plans



CASE STUDY

Case study: Queensland completes water resource plans for assessment

At the end of February 2019, the Queensland Government submitted its final water resource plans to the MDBA for assessment.

After resolving a few minor matters and a resubmission, the MDBA provided its assessment of the water resource plans to the Minister. This completes the MDBA's plan assessment work for the Queensland part of the Murray–Darling Basin.

The MDBA has been working closely with the Queensland Government since it started preparing its two remaining water resource plans in 2017. The plans cover the Queensland parts of the Condamine–Balonne and the Border Rivers–Moonie catchments. All plans are prepared in consultation with the local communities.

In April 2018, Queensland released draft water plans, water management protocols, healthy waters management plans, and an Aboriginal people's water needs report for formal public consultation. These state instruments and plans are key parts of water resource plans submitted to meet the accreditation requirements set out in chapter 10 of the Basin Plan. The complete water resource plan package includes additional documents and information that address all the Basin Plan requirements.

As part of the process of preparing the water resource plans, the MDBA provided advice and feedback to Queensland at key stages, including before the formal consultation period started. It also conducted a review of the near-complete draft water resource plans at the end of August 2018 and during the final stages.

The MDBA assesses each proposed WRP formally submitted to the MDBA. It does this by assessing each WRP against the requirements in chapter 10 of the Basin Plan. A detailed WRP assessment template helps to determine if the WRP is consistent with the requirements of the Basin Plan.

WRPs cover a wide range of water management subjects, including:

- compliance with SDLs and water trade rules
- protection of water for the environment
- water quality and salinity objectives
- Aboriginal values and uses
- measuring and monitoring
- arrangements for extreme weather events.

All WRPs were to be submitted to the MDBA for assessment by 28 February 2019. The Australian Government Minister responsible for water granted time frame extensions for some individual water resource plans. These are expected to be submitted to the MDBA for assessment by 31 December 2019. There are 33 plan areas in total: 19 for surface water, 19 for groundwater, and five that cover both surface water and groundwater.

During 2018–19, there was significant progress on the development and accreditation of WRPs. As of 30 June 2019, 13 WRPs are being assessed for an accreditation decision or have been accredited. The remaining 20 WRPs are in various stages of progress, but under the agreed extension they are required to be submitted to the MDBA before the end of 2019.

Transitional arrangements for sustainable diversion limits

About sustainable diversion limits and baseline diversion limits

The Basin Plan sets SDLs—long-term annual average limits for both surface and groundwater systems. SDLs are the limits on how much water can be used in the Murray–Darling Basin while leaving enough to sustain the environment. Each area also has a baseline diversion limit, which is an estimate of how much water was used in the Basin before the Basin Plan.

The deadline for Basin states to transition to management under the new SDLs for both groundwater and surface water is 1 July 2019. Accordingly, the MDBA continued to work during 2018–19 to ensure Basin state governments have the information they need for this transition.

Having processes in place to support an annual reporting cycle was an important aspect of this work. The MDBA started developing a cost-effective and efficient SDL compliance database to streamline SDL accounting and reporting. The development of the SDL reporting and compliance framework will enable the MDBA to manage instances of non-compliance.

Under s. 71 of the Water Act, Basin states and the Commonwealth Environmental Water Office (CEWO) are required to account for SDLs by reporting annual water accounts. Under the Basin Plan, the MDBA is required to establish, maintain and publish an annual Register of Take from 1 July 2019.

To ensure the robustness of the process, in 2018–19 the MDBA:

- commissioned an independent panel to conduct a health check of the SDL accounting framework
- published the SDL Reporting and Compliance Framework in November 2018
- presented a trial of SDL accounts in the 2017–18 Transition Period Water Take Report as a 'proof of concept'. This establishes and tests the types of arrangements that will need to be in place from 1 July 2019 to ensure compliance with the SDLs.

Floodplain harvesting is a form of take that is not well regulated in the Basin. Both Queensland and New South Wales have been working to implement appropriate regulation. In New South Wales, with the support of the MDBA, an independent review was commissioned to provide advice on floodplain harvesting and the work that needs to be done before licensing and accounting can happen. The draft report was released in May 2019.

SDL compliance database

The MDBA currently has a manual process for entering, cross-checking and validating SDL reporting and compliance. The transition to SDL accounting requires an automated database to enhance the integrity of SDL reporting and compliance and make it more efficient.

During the year, the MDBA began work on the underlying platform that will enable the development of an SDL compliance database. A proof of concept of a data pipeline initiative was successfully executed at a small scale with the platform. Further proofs of concept are being considered for other areas. The learnings from these efforts will feed into the development of the project plan for the implementation of an SDL compliance database.

The database will enable tracking of SDL compliance decisions and would make it easier for the public to access this data. In addition, the database will help the MDBA to efficiently fulfil the publication requirements of the Register of Take under s. 6.08 of the Basin Plan.

Sustainable diversion limit adjustment mechanism projects

About the sustainable diversion limit adjustment mechanism

The SDLAM is an adjustment to SDLs in the southern Basin focusing on achieving the same environmental outcomes with less water.

It is a suite of projects that will:

- improve river management
- collectively manage the river system to optimise the use of available water for the environment.

The SDLAM was developed as a result of a request by Basin governments. It involves three elements working together:

- supply
- constraints
- efficiency measures.

Supply and constraints projects improve river management and achieve environmental outcomes with less water, while efficiency measures recover water for the environment.

In May 2018 the Basin Plan was amended to include 36 supply and constraints projects put forward by Basin governments. The original target of recovering 2,750 GL of water per year was adjusted in 2018, which resulted in:

- a reduction of 70 GL/year through the Northern Basin Review
- a further reduction of up to 605 GL/year under the SDLAM projects.

To help the public better understand the changes, during the year the MDBA embarked on proactive communication and engagement activities. This included a new table on the MDBA website that lists every original baseline diversion limit and SDL estimate for each SDL resource unit along with updated estimates and the reason for the change. This is presented along with two animations that explain baseline diversion limits and SDLs and how these limits can be updated.

Basin state governments are responsible for the design and implementation of SDLAM projects. Many of them received first-phase funding from the Australian Government in the first half of 2019. Basin state governments have been progressing some projects while others are developing more slowly. Some projects need little work. Others, such as the constraints projects—the Menindee Lakes Water Savings Project and Enhanced Environmental Water Delivery Project—need more effort, particularly around community consultation, which is yet to start.

In February 2019, the MDBA published the first annual progress report on the projects. The report noted progress in some areas but also noted that a substantial amount of work was yet to be done:

- The fish death events in Menindee highlighted concerns with the Menindee Lakes Water Savings Project. The MDBA has been working with the New South Wales Government during 2018–19 on the design and implementation of this important project.
- Several rules-based projects and the New South Wales Nimmie–Caira Project are expected to be completed soon.
- Several projects related to The Living Murray have been completed.

The Australian Government Department of Agriculture manages the Efficiency Measures Program. This program needed to recover 62 GL/year by 30 June 2019 in order for the full adjustment of 605 GL/year to occur for this water year.

In December 2018 the Ministerial Council supported additional socio-economic criteria for the Efficiency Measures Program. These new criteria mean that projects bought forward need to meet extensive requirements.

CASE STUDY

Case study: Response to climate change

Climate change will have a significant impact on water availability in the Basin.

The Bureau of Meteorology, for example, says the Basin will continue to get hotter and drier. Average rainfall in the Basin is projected to decrease, particularly in autumn and winter in the southern Basin, with declines less certain in the northern Basin.

Projections also suggest a likely increase in drought frequency and severity while, at the same time, heavy rainfall is expected to increase.

The CSIRO warns that outflows at the River Murray mouth in South Australia are likely to decrease as a result of climate change.

In February 2019, the MDBA released a discussion paper, Climate change and the Murray–Darling Basin Plan. The paper signalled the MDBA's commitment to a major research program on climate change in the Basin, which will be informed by a series of workshops convened by MDBA's Advisory Committee on Social, Economic and Environmental Sciences.

The MDBA is committed to this work and it will be prioritised over the coming years. It is expected this research will be critical to ongoing adaptive management decisions, along with the formal built-in reviews of the Basin Plan.

The MDBA is focusing on key actions that respond to these risks and prepare for the impacts of climate change:

- refining existing arrangements—supporting adaptation to climate change to avoid duplication and disrupting stakeholder operations
- buffering the system from stress—preparing the Basin for climate-related stress (including recovering water for the environment) to mitigate the impact climate change has on its ecosystems
- enhancing new arrangements—exploring opportunities to implement initiatives that address climate change, including greater collaboration with the research community
- further development of adaptive responses to climate change following monitoring and investigations of climate change impacts. These are articulated in longer-term plans and on a shorter time scale in annual environmental watering priorities
- regular reviews, monitoring and evaluation, including monitoring of the social and economic conditions of the Basin and the impact of the Plan on communities.

Managing constraints

About managing constraints

'Constraints' cover anything that restricts the flow of water for the environment. They can include:

- physical restrictions such as low-lying bridges, crossings or private land
- operational aspects such as river rules or operating practices.

Constraints projects are designed to ensure the water goes where it is needed when it is needed, while avoiding or mitigating the impact on riparian landholders, communities and industries. By managing constraints the river system can be run more efficiently.

Of the notified SDLAM projects, the constraints measures contribute to approximately one third of the total supply adjustments and are co-dependent.

A Constraints Measures Program Coordinating Work Plan was developed by the Constraints Measures Working Group (CMWG) to assist in delivering the Constraints Measures Program (CMP). The work plan provides mechanisms for coordinating the Basin states' projects and outlines milestones to provide the basis for reporting on progress to ministers. At its meeting in December 2018, the Murray–Darling Basin Ministerial Council endorsed the work plan.

In the second half of 2018–19, New South Wales, South Australia and Victoria made gradual progress against the work plan milestones. The funding agreements with the Australian Government have taken time to resolve.

The MDBA continues to promote and provide the frameworks for coordination through its function as the secretariat for the program and provider of technical, planning and system operational expertise. In May 2019 the MDBA held a technical and modelling workshop to reinforce the fundamental issue of the achievability of the Basin Plan flows for the CMWG.

The CMWG has developed a CMP risk management strategy and will develop a communication and engagement strategy in the second half of 2019.

Northern Basin initiatives

About the northern Basin toolkit measures

The 'toolkit measures' are a series of projects underway in the northern Basin. They developed out of the four-year review of the northern Basin that was completed in 2016. The review resulted in a 70 GL reduction to the 390 GL water recovery target in the north.

The toolkit measures, combined with a Basin commitments package announced in 2018, are intended to:

- better protect water for the environment
- improve compliance and monitoring with water laws
- improve river management across the northern Basin
- create opportunities for local communities, including First Nations.

In 2018–19 there was good initial progress on implementing some of the toolkit projects—particularly those associated with improving the management and protection of water for the environment.

Notable events included:

- the Basin Officials Committee's endorsement of a prioritisation assessment framework for northern Basin toolkit projects
- the development of a new schedule to the Intergovernmental Agreement on Implementing Water Reform in the Murray Darling Basin, specific to the implementation of the northern Basin toolkit, to be considered by COAG
- the development of content in Queensland and New South Wales WRPs to improve management of environmental water.

Overall progress has been slower than expected, but Basin governments have remained committed to implementing the toolkit arrangements. In December 2018 ministers agreed that some funding be made available to assist Basin states to prepare business cases for these projects.

Projects associated with infrastructure measures are a key focus for governments for the next year.

Challenges in the year ahead

Last year's annual report identified a risk that not all WRPs would be accredited by the deadline of 1 July 2019 and this has proven to be the case. The finalisation of WRPs continues to be slower than expected and one of the challenges for the next year will be ensuring all WRPs have been assessed and submitted for accreditation.

There are also challenges in communicating the new water accounting system in simple terms. The MDBA is developing a range of communication products to help explain SDLs to a wider audience.

Work is continuing on a key tool in the new accounting system—the SDL compliance database. The aim is to have it tested and in use for all SDL data by the end of December 2021.

Improved compliance and accounting of water use will assist the MDBA in meeting the challenge of restoring flows in the northern Basin. Projects associated with infrastructure measures and better coordination of flow events are key focus areas for Basin governments for the next year.

The environmental health of the Basin continues to be affected by the drought. Environmental watering priorities for the next year will focus on using water to protect the Basin's birds, animals and fish.

A key challenge for the MDBA in the year ahead is to encourage the Basin states to engage with their communities and start the detailed co-design processes needed to deliver all SDLAM projects. Basin state governments have until 2024 to design and implement these projects, in consultation with local communities.

Each of the Basin states has a different approach to community engagement, including engagement with Aboriginal Nations. This poses challenges around stakeholder expectations. The MDBA will be exploring ways to strengthen Aboriginal involvement in water management.

Goal 2

Strengthen the culture of compliance in the Murray–Darling Basin

Compliance with the Basin Plan is paramount to achieving a healthy working Basin. The environmental, social and economic benefits cannot be achieved if water users are not compliant with water take rules. The aim of this goal is to enhance the effectiveness of, and increase confidence in, the MDBA's compliance initiatives.

Priorities for 2018–19

- Monitor and report improvement in compliance and enforcement across Basin governments, including progress on implementing the Basin Compliance Compact.
- Assist Basin governments to improve metering and monitoring of water take.
- Conduct and publish compliance audits.
- Manage allegations of non-compliance efficiently and systematically.
- Support the implementation of the Basin Plan water trading rules through policy advice to Basin governments on compliance matters and acting on non-compliance.
- Facilitate interstate trade through the joint venture program.
- Support and facilitate the development of a regulatory culture within the MDBA.
- Implement the MDBA's Compliance and Enforcement Policy.

Highlights

- The Council of Australian Governments (COAG) endorsed the Murray–Darling Basin Compliance Compact (the Compact) in December 2018.

- The MDBA engaged in consultation and collaboration with Mick Keelty, the Northern Basin Commissioner. The Commissioner was appointed by the Australian Government in September 2018 to monitor and report on compliance measures, technology and the protection of environmental water in the Northern Basin
- Mapping of MDBA's regulatory framework against the National Framework for Compliance and Enforcement Systems for Water Resource Management shows high level of alignment.
- There was an improved assessment against the Modern Regulator Improvement Tool (MRIT) from the benchmark assessment of 2016.
- The national Water Compliance Community of Practice was launched in Adelaide in November 2018.
- The Interim Assurance Report of progress in implementing the Compact was published in December 2018.
- MDBA worked with the Basin states to improve monitoring and measurement arrangements through remote sensing, satellite monitoring and other technologies.
- Successful trials of satellite tracking of environmental water releases were conducted in the northern Basin in 2018 and 2019.
- The review of major risks to Basin Plan and Water Act compliance was completed in May 2019 through consultation with MDBA Independent Assurance Committee (IAC).
- A hydrologic assessment of flow changes in the northern Basin was published in October 2018.
- The audit of Water Trade Price Reporting was published in June 2019.
- Two assurance reviews of water metering—one in Queensland and one in New South Wales—are to be published in July–August.
- Guidance documents were published to drive improvement and consistency in water measurement. They included a Water Information Quality Assurance Framework, the Model Improvement Program and practice notes for incorporating an accounting for floodplain harvesting in hydrological models.
- An interim register of state measures to protect environmental water was developed. It will be updated once water resource plans are accredited.

Analysis

Effective compliance arrangements are critical to the success of the Basin Plan. The MDBA's primary role in compliance is overseeing the state water regulatory agencies with a focus on auditing and reporting on state performance, developing standards and guidelines, and helping to improve capability and a Basin-wide culture of compliance. The intended outcome of this goal is for compliance and enforcement actions that:

- build confidence in the regulation of the Basin through a strong MDBA compliance program
- improve the quality of water measurement in the Murray–Darling Basin
- facilitate fair and transparent water trade within the Murray–Darling Basin.

There was a strong focus on compliance across the Basin during 2018–19. In response to various reviews and investigations in 2017, all Basin states and the Commonwealth signed up to the Compact. With an ambitious time frame for delivery, the Compact sets out commitments in a number of key areas and includes detailed work programs for each Basin state and the Australian Government to improve their compliance and enforcement arrangements. The Interim Assessment Report in December 2018 noted that, while some commitments were at risk of delays, there were many instances of progress and improvement.

The independent audit of Water Trade Price Reporting was published in June 2019, as well as several policies and guidelines aimed at improving the accuracy of water measuring and metering. The Water Trade Price Audit identified a number of issues that need to be addressed, and Basin states have agreed to work together to resolve these through the Trade Rules Working Group.

The Office of Compliance has increased its capacity and capability throughout the year and commenced a work program to strengthen the regulatory culture internally and across the Basin. New technology, including remote sensing, is being used to support compliance monitoring and intelligence gathering. A series of policies and guidelines aligned with national frameworks and compliance best practice have also been released. In October 2018, the MDBA undertook the MRIT self-assessment of its regulatory culture. The MRIT showed improvement from the benchmark assessment undertaken in 2016.

KPI result

KPI2 is: To enhance the effectiveness of, and increase confidence in, the MDBA's compliance objectives.

Result for 2018–19: Achieved.

This is evidenced by the following measures of success:

- The mapping of MDBA's regulatory framework against the NFCE showed a high level of alignment.
- Assessment against the MRIT showed improvement from the benchmark assessment of 2016.
- The MDBA published a series of guidelines for improving water measurement.
- Achievement of Compact commitments—the Interim Assessment Report showed significant progress had been made, with a majority of commitments completed and the remainder in progress.

Monitoring and reporting improvement in compliance

The MDBA monitors and enforces compliance with the Water Act and the Basin Plan. This involves working with state water agencies, which have the frontline responsibility for developing Basin Plan compliant water resource plans, ensuring that water users operate in accordance with their water licences and that take is within allowable limits, and regulating the implementation of water trade rules.

The MDBA has a range of powers and tools available to monitor, detect and respond to non compliance, including auditing, undertaking investigations and seeking court orders. The MDBA is developing its capability to gather evidence using contemporary technologies, such as remote sensing.

Figure 2.4 MDBA Compliance responsibilities for seven areas of water management

WATER RESOURCE PLANS

MDBA role: monitoring and enforcing compliance with accredited Water Resource Plans.

Basin states role: implementing Water Resource Plans, accounting for water taken, managing local water consistent with rules in Water Resource Plans and Basin Plan.

SUSTAINABLE DIVERSION LIMITS

MDBA role: ensuring water use is within SDL—publishing a register of water taken each year in each Basin region. First compliance report due early 2021.

Basin states role: monitoring water users' compliance with state rules and licences. Ensuring state compliance systems are effective and enforcing the rules, many are in Water Resource Plans.

COMPLIANCE AND ENFORCEMENT OF ILLEGAL WATER TAKE

MDBA role: providing assurance of Basin state compliance and enforcement systems. May take action against illegal water take in Water Resource Plan area if Basin state fails to do so effectively.

Basin states role: investigating and prosecuting instances of non-compliance with state water laws, publishing annual statements of compliance activities.

WATER METERING AND MEASUREMENT OF WATER TAKE

MDBA role: working with Basin states to improve accuracy of water measurement, promote best practice standards and increase transparency of water take. Includes using remote sensing and emerging technologies.

Basin states role: developing and implementing meter policies, monitoring meter compliance and water take, reporting water take to MDBA.

PLANNING AND PROTECTION OF WATER FOR THE ENVIRONMENT

MDBA role: preparing Basin-wide environmental watering strategy and annual priorities. Ensuring state measures to protect environmental water are properly implemented and adhered to.

Basin states role: preparing Basin Plan compliant long-term environmental water plans and Water Resource Plans, implementing rules to manage Basin waters to meet environmental requirements and outcomes.

WATER TRADE

MDBA role: reviewing state restrictions for compliance with Basin Plan, enforcing compliance with Plan's water trading rules.

Basin states role: developing Basin Plan compliant trade rules, facilitating state trade, monitoring compliance, reporting to MDBA.

WATER QUALITY AND SALINITY

MDBA role: providing assurance that Basin states and environmental water holders consider water quality and salinity when managing flows and using environmental water. Monitoring and reporting on salinity levels in River Murray.

Basin states role: having regard to targets when making water management decisions, reporting to MDBA.

The Compliance Compact

About the Compliance Compact

The Compact was agreed to by the Murray–Darling Basin Ministerial Council in June 2018 and by the Council of Australian Governments (COAG) in December 2018. It is a commitment by Basin governments to address the serious issues identified in a number of reviews in 2017 and 2018 that examined compliance and the integrity of water management in the Basin. Through the Compact Basin, governments have agreed collectively to priority actions across five key themes:

- transparency and accountability
- compliance and enforcement frameworks
- metering and measurement
- finalising water resource plans
- protecting environmental water.

Basin governments commenced implementing Compact commitments from June 2018.

Under the Compact, the MDBA coordinates an annual progress report to COAG and the Murray–Darling Basin Ministerial Council against the Compact commitments. This reporting is important to ensure accountability and help restore public confidence in the way water is managed across the Basin.

In December 2018 the MDBA published an Interim Assurance Report on the implementation of the Compact to date.

The Interim Assurance Report found that Basin states and the Australian Government had made considerable progress in the relatively short time since the Compact was agreed and that it was vital for Basin states to retain momentum (see the summary in Table 2.1). The report noted the positive steps taken by the Basin governments, including:

- the launch of the national Water Compliance Community of Practice
- the work to improve the metering standard
- the reviews of both the joint governance arrangements for water in the Basin and of the appointments process for Authority members
- work to amend water compliance legislation and frameworks
- additional resources focused on compliance across the Basin.

It also noted that some actions were not on track—for example, accreditation of WRPs in all states; and the commitments around the development of a metering and measurement program in Queensland.

Table 2.1 MDBA Report summary of state progress against Compliance Compact commitments as at December 2018

		2018 commitments			Forward commitments		
Total		**Complete or substantially complete**	**Insufficient evidence**	**Inadequate**	**Adequate**	**Insufficient evidence**	**Inadequate**
NSW	58	39	1	0	14	2	2
Vic.	38	19	0	2	10	7	0
Qld	42	9	4	2	10	17	0
SA	44	28	0	0	13	1	0
DAWR	8	5	0	0	3	0	0
Total	**190**	**100**	**5**	**4**	**50**	**27**	**2**

*DAWR–Department of Agriculture and Water Resources.

The MDBA's progress in implementing its Compact commitments was assessed by the IAC, which concluded that, of 31 actions required, the MDBA had:

- completed 20
- substantially completed five
- progressed and was likely to complete two by the due date
- made inadequate progress in four.

Since December 2018, the MDBA has made good progress in the four areas identified as having inadequate progress: scoping work for a Basin-wide system for real-time advice on environmental watering; developing guidelines for reviewing metering thresholds; a timetable for delivering a range of pattern approved meters; and a practice note on floodplain harvesting.

The first full Annual Assurance Report will be published in late 2019.

Improving metering and monitoring of water take

About measuring water take

Accurate metering and monitoring of water take is crucial to ensure compliance with the Plan. The need for accurate and widespread metering was an important theme of the *Murray–Darling Basin Water Compliance Review* (MDBA, 2017). Under the Compact, Basin states agreed to work with the MDBA towards a consistent method for determining a threshold for metering and to review and reform their metering policies and requirements.

The MDBA is focused on facilitating access to best practice information, resources and joint projects to enable improvement in the accuracy of data about water take. This work includes:

- developing practice notes and guidance material
- building capacity—for example, through establishing and participating in communities of practice
- supporting intergovernmental initiatives and joint work, such as the Compact and cooperative audits
- use of innovative technologies, such as remote sensing through satellite imagery, to improve water compliance activities
- improving transparency and accountability through better public reporting and registers
- conducting reviews, audits and investigations.

Water measurement information and guidelines published by the MDBA during the year include:

- a list of pattern approved 'non-urban' water meters—to assist manufacturers to market, and water users to identify, pattern-approved meters that comply with the Australian Standard
- the MDBA Water Information Quality Assurance Framework
- floodplain harvesting practice notes on accounting for floodplain harvesting in hydrological models
- the Model Improvement Program, which outlines the components and time frames for three key models used in Basin Plan implementation, as well as Hydrologic Modelling practice notes.

MDBA is also leading an Australia-wide project to review the Metrological Assurance Framework. This project covers the installation and post-installation requirements for water metering.

Compliance audits

Auditing is one of the MDBA's key tools for monitoring compliance with the Basin Plan—audits or reviews may be undertaken as part of the annual work program or may be instigated in response to specific incidents or intelligence reports. The MDBA publishes the results of its audits on its website.

In 2018–19 four assurance audits were undertaken and two reports were published on the MDBA website. The reports of the other two audits will be published once completed.

Review of the Northern Connectivity event

In June 2018, the MDBA conducted a joint review with the NSW Natural Resources Access Regulator (NRAR) of compliance arrangements for the Northern Connectivity Environmental Watering Event. The review assessed the arrangements NRAR had in place to ensure compliance with the Temporary Water Restriction rules put in place to protect environmental water flows during the event. The report was published in October 2018.

The event involved the release of around 32 GL of environmental water to improve river connectivity, water quality and fish health following extremely dry conditions in the Barwon–Darling system. Concurrently, a temporary embargo was put in place to protect the environmental water from take by water users. The then newly established NSW NRAR was assigned the task of enforcing the embargo. The MDBA used satellite imagery to track the flow of water through the system.

Overall, the review found that the NRAR had appropriate processes in place to ensure Water Access Licence holders complied with the embargo. The review also identified opportunities for improvement and provided a means to document the lessons learned, improving the systems being put in place to support future compliance activities associated with environmental flow events.

CASE STUDY

Case study: Satellite imagery—eyes in the sky

Two eyes are better than one in remote sensing.

The MDBA's increasing use of remote monitoring technologies, like satellite imagery, to watch over the Murray–Darling Basin's one million square kilometre footprint is proving a game changer for water management.

Those two eyes—the European Space Agency's Sentinel 2A and 2B satellites—allow the MDBA to monitor water flows across the landscape and pick up any unexpected changes, which can help pinpoint water theft from the rivers.

The MDBA has built the capability to analyse the imagery for a range of needs, including ecological mapping and monitoring, river operations and compliance.

The satellite imagery allows the MDBA to make decisions based on a better understanding of how water behaves and how it moves through waterways and the surrounding landscape.

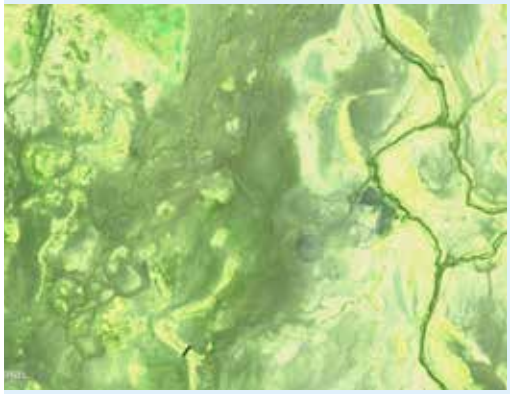
At the same time, by coupling gauge flow data analysis the MDBA can find any unexpected, significant, sudden or unusual flow changes that might indicate unauthorised take.

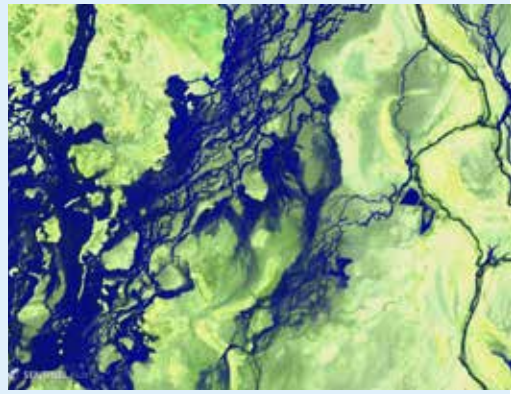
Since mid-2018 the MDBA has used Sentinel-2 satellite imagery to:

- track a large-scale environmental flow released from the Border Rivers and Gwydir catchments to provide connection flows to Menindee Lakes (mid-2018) and ensure it was not extracted during an embargo
- track environmental flow releases in the Namoi, Gwydir and Macquarie catchments (mid-2018) for increasing wetland and Ramsar site health
- monitor vegetation condition change in the Gunbower Forest as a result of environmental water releases (late 2018)
- monitor flows in the Warrego, Namoi and Macquarie catchments, which resulted from rainfall, to help ensure it was not extracted during a period of flow extraction embargo (early 2019)
- monitor a large-scale fish refuge environmental flow in the Border Rivers, Gwydir and Barwon–Darling catchments and help ensure it was not extracted during a period of embargo (mid 2019).

The MDBA is continuing to build its capability to use satellite imagery to monitor water use across the Basin.

The images below show the Warrego River before rainfall on 1 April 2018 and after the rain on 6 April 2018.





Water Trade Price Reporting Audit

Water trade markets are one of the key mechanisms for managing water scarcity in the Basin while maintaining industry development and growth. The Basin Plan water trade rules commenced in 2014. The rules include a requirement that all water trade prices must be reported by a seller to the relevant Basin state government agency overseeing water trade. These agencies record and report the water trade prices, which are also provided to the Bureau of Meteorology for inclusion in the Consolidated Water Markets Dashboard.

During 2018–19, the MDBA undertook a two-part audit with Deloitte to examine how well water price reporting for allocation and entitlement trade across the Basin states was operating. The audit also explored areas for improvement to make price reporting easier and increase the accuracy and integrity of the information provided to market participants.

CASE STUDY

Case study—Better governance through water trade audit

The billion-dollar trade in water across the Murray–Darling Basin came under audit examination in 2018–19. The audits looked at how the Basin states record, verify, compile and report trade price data.

Water trade allows water holders to decide whether they need to buy or sell water at a particular time. The price of water reflects supply and demand factors and differs across regions and type of rights, and with time. As a result, current and accurate price information is imperative to support fair trade.

Water trade markets are one of the key mechanisms for managing water scarcity in the Basin while maintaining industry development and growth. It is estimated that in 2017–18 some 8.5 million ML of water, valued at approximately $2 billion, were traded in the Basin.

Accurate, accessible price information provides equal access for all market participants leads to informed investment and encourages market participants to make the best use of water depending on their needs.

Basin state government agencies record and report water trade prices within individual public registers. This information is provided to the Bureau of Meteorology and collated for inclusion in the publicly available Consolidated Water Markets Dashboard.

During 2018–19, the MDBA conducted a two-part audit of water trade price reporting. The first part of the audit assessed the effectiveness of the processes and procedures of each Basin state to collect, validate, record and report accurate water trade pricing information for the water year 2017–18. There was evidence that the price data reported by each Basin state was both inaccurate and incomplete.

The second part of the audit was conducted by Deloitte and examined individual water trade transactions to ascertain the accuracy of prices reported and the integrity of the water trade market.

Deloitte uncovered a range of issues in relation to confusion about the requirements, inconsistent approaches to reporting price and an inability to verify the price. Deloitte concluded that the issues existed due to flaws in the Basin state systems and processes—consistent with the MDBA findings in part one of the audit.

The central finding of this audit was that Basin states do not have sufficiently robust processes in place to capture and produce comprehensive, accurate price information.

The overarching recommendation was that the MDBA, Basin states and Bureau of Meteorology should work together to build a more effective governance framework to improve the water trade within the Basin Plan.

Audit and assurance work program

In 2019, the MDBA conducted two assurance reviews of state reporting and compliance processes around water metering—one in the Condamine Alluvium in Queensland and one in the Murrumbidgee in New South Wales. Field work for these reviews was completed in June 2019 and, once finalised, the reports of these audits will be published on the MDBA website in August 2019.

As the Office of Compliance builds in capacity and capability the number of reviews and audits conducted will rise. The monitoring of compliance with the new sustainable diversion limits (SDLs) commences in 2019–20.

The work program for 2019–20 is based on a comprehensive assessment of risk and priorities. The identified priorities are:

- unmeasured water extraction (particularly floodplain harvesting)
- better water metering
- trade restrictions
- protection of water for the environment
- state government compliance and enforcement arrangements
- state government accounting for the use of water in accordance with the new SDLs and any adjustment of those limits.

Managing allegations of non-compliance

From time to time, the MDBA receives information or allegations relating to potential breaches of the Water Act or the Basin Plan.

It is the MDBA's view that compliance and enforcement activities should be initiated at the appropriate jurisdictional level for the compliance issue. In most cases this will be at the Basin state level, as Basin state water agencies have day-to-day responsibility for water planning, water licensing, rule-setting, river operations and state-level water compliance (including meter inspections and readings).

For example, in line with the MDBA's Escalation Protocol, in the first instance the MDBA will refer allegations of illegal take to the relevant Basin state regulatory agency for investigation. However, if there is evidence that a Basin state is not adequately discharging its regulatory responsibilities, the MDBA may conduct its own investigations and may take direct enforcement action where appropriate.

Of the allegations received by the MDBA in 2018–19:

- five were about unauthorised interception activities, such as filling of storages reducing downstream water flow
- seven were about unauthorised take of water, such as water take in excess of allocation or outside of licence conditions

- five were about metering and measurement—that is, meter tampering or lack of meter records
- two were about water quality, such as algal blooms or water pollution
- five were about water for the environment, such as water not flowing as expected during an environmental watering event.

The MDBA also receives allegations of non-compliance relating to water markets and trade; however, none were received in 2018–19.

Just over 85% of allegations received concerned potential non-compliant activities in the northern Basin. The MDBA considers the information received and patterns in allegations reported when developing its annual compliance priorities. Reports may also trigger specific investigations or audits.

Supporting implementation of water trading rules

About water trade

Water in the Murray–Darling Basin can be bought and sold, either permanently or temporarily.

This water is traded on markets—within catchments, between catchments (where possible) or along river systems. This form of trading allows water users to buy and sell water in response to their individual needs. Water trading has become a vital business tool for many irrigators. Water markets encourage more efficient water use throughout the Murray–Darling Basin, as a range of water entitlements and allocations can be bought and sold on these markets.

Basin state governments are responsible for developing and maintaining Basin Plan compliant rules around water access and use in their jurisdictions. The Basin Plan requires all states to provide MDBA with a copy of their trading rules. MDBA publishes these rules on its website to make them easier to find for water users.

The MDBA enforces compliance with the Basin Plan's water trading rules.

In 2018–19, the MDBA undertook the Water Trade Price Reporting Audit (See 'Case study: Better governance through water trade audit') and developed an assessment framework to determine whether state trade restrictions are compliant with the Basin Plan. This assessment framework will be implemented in 2019–20.

Facilitate interstate trade through the Joint Venture Program

The MDBA and Basin governments worked together to investigate and review options to ensure that the bulk water accounting for interstate water trades effectively support the efficient function of water markets as they mature. As a result of this review, new ways to adjust the states' bulk water accounts to match the volumes of interstate retail water trades will be trialled, commencing on 1 July 2019.

These trials are expected to continue for three years. The aim of the trials is to reduce the frequency of water trade closures and thereby increase opportunities for interstate water trades for the benefit of water market participants. Other recommendations of the review will be prioritised in the coming year.

The MDBA continues to support Basin governments with bulk water accounting for interstate water trades, maintenance of the Barmah Choke trade balance and facilitation of information sharing between Basin governments regarding water trade operations.

Developing a regulatory culture

About the Office of Compliance

The MDBA established the Office of Compliance in November 2017 to undertake its compliance and enforcement functions. During 2018–19, the Office of Compliance focused on building internal capacity and capability. This included targeted recruitment of staff with expertise in regulation and audit or assurance and providing audit and investigation training.

In September 2018, the MDBA self-assessed how mature it is as a regulatory agency against the best-practice criteria developed by the Australasian Environmental Law Enforcement and Regulators neTwork (AELERT).

The AELERT developed the MRIT, which enables regulatory agencies to self-assess where they are on their journey towards being an effective regulator and identifies areas for further development. The MDBA previously completed the self-assessment in 2016.

The 2018 MRIT assessment showed that MDBA had improved in several areas from the benchmark assessment in 2016 and reflected that the Office of Compliance was ready to transition from the establishment phase to progressing its capability and regulatory maturity plan.

Implement Compliance and Enforcement Policy 2018–21

The Compliance and Enforcement Policy 2018–21 was published in June 2018 and sets out the MDBA's compliance areas of focus and escalation protocols for each area. In line with the policy, in May 2019 the MDBA developed a Compliance Decision-Making Framework—a risk-based approach for choosing how to react to non-compliance or proactively plan to prevent future non-compliance. The framework will ensure that the MDBA's regulatory actions are appropriate, proportionate and consistent.

The MDBA also published the SDL Reporting and Compliance Framework in September 2018. This framework outlines the approach the MDBA will take when monitoring and reporting on compliance with the SDLs that came into effect from July 2019. The first assessment will be due in 2021.

Through the Murray–Darling Basin Water Compliance Review (2017) and the Compact, the Basin states agreed to revive the best practice targets established under the NFCE. These targets included ensuring state compliance policies and procedures included certain components, such as risk-based monitoring, and provided for a range of regulatory responses to non-compliance.

The MDBA also reviewed its framework to align with the NFCE where possible, noting that the MDBA has a different regulatory function from the states. The MDBA completed a mapping against the NFCE framework in 2019. The results showed that MDBA has completed, or is progressing to meet, the requirements of the NFCE that are applicable to the MDBA's functions.

Water Compliance Community of Practice

The Water Compliance Community of Practice (CoP) was launched at its first meeting in Adelaide in November 2018. The establishment of a national network of water compliance regulators was recommended in a number of reviews in 2017 and 2018 and was agreed as an action under the Compact. The MDBA coordinates the CoP, which has members from all Australian states and territories, membership having been broadened beyond the Basin.

The CoP was established as a sub-group of AELERT. The objectives of the CoP are to:

- create a network of water compliance practitioners focused on sharing and promoting best practices and improving jurisdictional information
- identify and exchange information about appropriate systems and processes
- identify and consider effective strategies and campaigns to promote compliance and improve community confidence in compliance
- strengthen jurisdictional capabilities through information sharing and training events
- identify and review emerging technologies
- work together to identify common risks and propose solutions.

CASE STUDY

Case study—New community of practice leans in

The inaugural forum of the Water Compliance Community of Practice was held in November 2018 in Adelaide. The forum was co-hosted by the South Australian Department of Environment and Water. Keynote addresses were delivered by John Merritt, previous head of the Victorian EPA; and Mick Keelty, the then newly appointed Northern Basin Commissioner.

Representatives from 15 water agencies across Australia attended the community of practice forum and field trip to observe water infrastructure in operation in South Australia.

Two thematic subgroups were formed at the inaugural meeting and these hold teleconferences every two months. The subgroups are the:

- Governance and Compliance Group
- Compliance Operations Group.

The Water Compliance Community of Practice provides the mechanism for peer-to-peer learning across the regulatory differences in jurisdictions, keeping up to date with technological developments, applying consistent methods in measuring and monitoring water take, and considering strategies and campaigns to engage communities and improve their confidence and trust in water management approaches.

The second forum will be held in Queensland in August 2019.

Feedback from attendees at the Adelaide forum included the following:

I am very excited to be a part of this Community of Practice.

Participant in Adelaide meeting

Thank you, great opportunity to network and work together. Looking forward to learning more.

Participant in Adelaide meeting

Challenges in the year ahead

The year ahead is likely to be framed by continued drought and ongoing focus on water availability and compliance.

Varying degrees of transparency, consistency and effectiveness in compliance and enforcement arrangements across the Basin continue to fuel the lack of community trust in the regulation of the Basin.

Delay in the development and accreditation of most Basin state water resource plans, and the subsequent commencement of interim arrangements for implementing the SDLs continues to have an impact on the confidence in and clarity around regulatory requirements.

In 2019–20 the MDBA and Basin government agencies need to maintain momentum on delivering the commitments under the Compliance Compact as well as improving the monitoring and measurement of water take and data collection. The MDBA will continue to build compliance capability, and the Compliance Priorities for 2019–20 will focus on the areas of unmeasured take; metering coverage, reporting and regulation; SDL accounting; improving water trade markets; reviewing state arrangements for protected recovered water and delivering environmental water; and also state compliance and enforcement arrangements. Further work will be done to progress investment in the Northern Basin remote sensing capability and water information portal.

While the MDBA has identified these priorities, it will also respond to changing circumstances and emerging issues as necessary.

Goal 3

Operate the River Murray system for partner governments

The MDBA, in partnership with Basin governments, will ensure the efficient, cost-effective and transparent governance and delivery of the joint programs to safeguard the sustainable use of the Basin's water resources in a manner that protects the environment and benefits the communities and industries that depend on it.

Priorities for 2018–19

- Operate and maintain existing River Murray assets fit for purpose to deliver Basin government water shares.
- Implement a program for the monitoring and management of water quality and salinity within the Basin.
- Operate and maintain existing salt interception schemes, including the three-year trial of responsive management based on periodic review of the salinity risk.
- Coordinate the delivery of water for the environment, including jointly held water portfolio and monitor outcomes.

Highlights

- The MDBA continued to plan and direct the operation of the River Murray to ensure the equitable and efficient sharing of water resources.
- State water entitlements were determined transparently in accordance with the Murray–Darling Basin Agreement.
- The River Murray system was operated to ensure delivery of state water entitlements as efficiently as possible through the second consecutive year of low inflows and record high temperatures.
- A detailed report on River Murray system losses was published in response to concerns and to promote transparency after disparity in state water allocations and the need to undertake overbank transfers lead to tensions in the New South Wales community regarding system losses.
- Ministerial Council approval was gained to operate Lake Victoria to a lower level at the end of the water year to reduce evaporative losses given the expanding drought across the Basin. This was subsequently done. By June, Lake Victoria was the fifth lowest it has been in the last 50 years.
- The MDBA implemented amendments to the 'Objectives and Outcomes for the River Murray System' approved by the Basin Officials Committee to give effect to the implementation of Prerequisite Policy Measures—improved environmental water delivery provisions being undertaken by the states.
- The MDBA reported on the shortfall risk through the hot, dry summer of 2018–19 and continued to work with Basin governments to examine capacity and shortfall risks across the River Murray system and tributaries.
- Erosion protection works were deployed on the Murray and Mitta Mitta rivers.
- The River Murray assets were maintained and improved to a continued high standard and consistent with contemporary engineering practices.
- The River Murray water quality was maintained in line with all standards despite the dry conditions.
- The salinity target was met for the 10th consecutive year.

Analysis

The river operations and programs were managed in accordance with the Murray–Darling Basin Agreement and the Service Level Agreement between the Murray–Darling Basin Ministerial Council and the MDBA. The MDBA took into account seasonal and environmental factors influencing the River Murray system and the agreed priorities for the year.

After a dry and hot year, the storages at the start of 2018–19 held a total active storage volume of 4,617 GL (48% capacity). This was lower than the previous year and less than the long-term average. With the majority of the resource stored in Dartmouth and Hume dams, these upper system storages provided important relief from the dry winter and spring that followed. A combination of water in storage and state and system reserves facilitated the following opening allocations across the Murray System:

- 100% for South Australian entitlement holders
- 41% for Victorian Murray high with access to carryover volumes equivalent to ~30% allocation and 0% low reliability water shares
- 97% for NSW Murray high and 0% general security water shares with access to carryover volumes equivalent to ~30% general security allocation
- 100% for NSW lower Darling high security and 0% for general security water shares.

The low tributary inflows from the Ovens River and other state tributaries downstream of Hume during winter and spring meant the majority of the demands throughout 2018–19 needed to be met from the resources located in Hume and Dartmouth dams. There was also significant pressure placed on the Goulburn River (via the supply of Inter-Valley Trade (IVT) water) to assist in meeting all deliveries downstream of the Choke during summer. Pressure on the Goulburn resource was accentuated by the lack of IVT water available from the Murrumbidgee and no access to the water in Menindee Lakes.

In preparation for peak demand periods, water was transferred from Dartmouth Dam to Hume Dam and from Hume Dam to Lake Victoria through winter and spring. Releases from Hume Dam were required at rates of up to 15,000 ML/day downstream of Yarrawonga between August and November. At these flows, areas of the Barmah–Millewa Forest were inundated. These transfers were necessary to ensure there was sufficient water in the right parts of the system so demands could be met throughout the year. The timing and rate of these transfers were managed to minimise the risk of spill at Lake Victoria if conditions turned wet and to avoid the need to transfer through the forest after December, which would be undesirable ecologically and would contribute to higher system losses.

Murray Irrigation Limited infrastructure was also utilised to maximise the water transfers around the Choke in spring. Environmental water was released from Hume Dam in November and December to prolong the inundation of the forest after operational transfers were reduced.

As a result of the system transfers, Lake Victoria peaked at 572 GL (84.6% capacity) on 21 December 2018 before declining to 167 GL (24.8% capacity) on 30 April 2019—the fifth lowest level in the last 50 years. The lake was drawn on throughout summer and autumn to supply consumptive and environmental demands in South Australia.

During the year the water quality parameters and the salinity targets continued to be met, despite the ongoing dry conditions.

KPI results

The three KPIs relating to this strategic goal cover the:

- **management of river operations and programs in accordance with agreements (KPI3)**
- **maintenance and improvement of the River Murray system assets to achieve best practice standards (KPI4)**
- **maintenance and improvement of the health of the Basin in accordance with agreements (KPI5).**

Result for 2018–19: Achieved

The KPIs were achieved, as evidenced by the following measures of success:

- In September 2018, the MDBA provided the Annual Summary of River Operations report to the Independent River Operations Review Group (IRORG). The report addressed performance of the MDBA in 2017–18 against the objectives and outcomes for river operations in the River Murray system set by the Basin Officials Committee. IRORG confirmed that the MDBA operations in 2017–18 meet the objectives set by governments. IRORG's review of MDBA operations for 2018–19 will commence in August 2019 and be reported in next year's annual report.
- The MDBA's ongoing inspection program ensured that all major River Murray infrastructure was managed in accordance with contemporary engineering practices. The routine maintenance operations generally continued as planned throughout the year.
- The River Murray water quality parameters were also met with respect to recreation, irrigation and drinking water needs. All results were within acceptable limits. The salinity target was met for the 10th consecutive year.

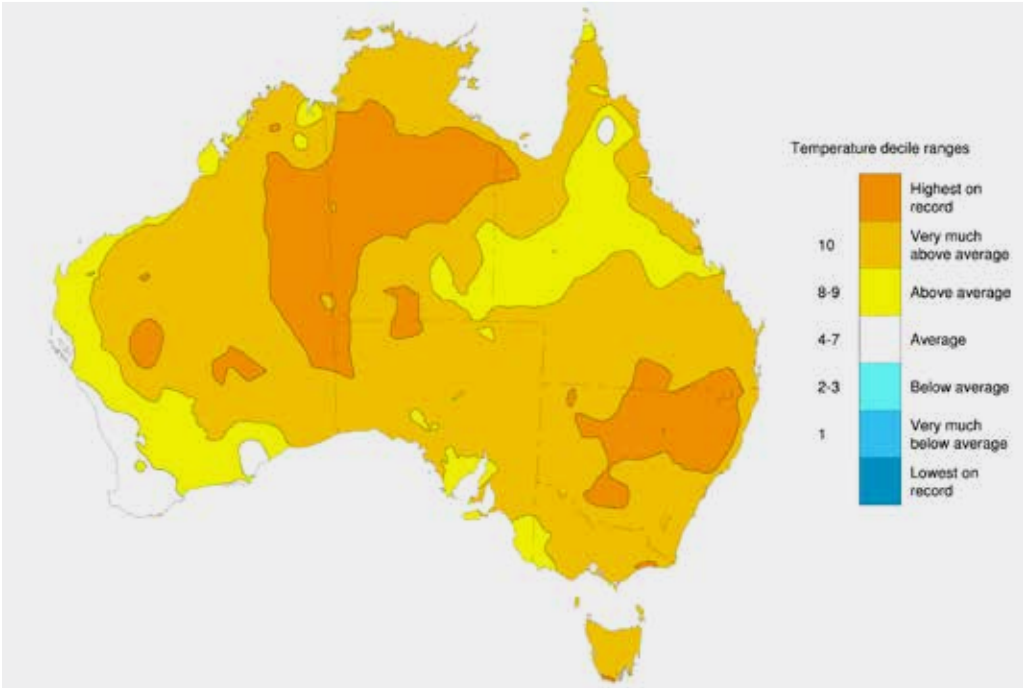
Rainfall, temperature and stream flows

The 2018–19 water year was hot and dry. Mean temperatures across the Basin were very much above average for the water year, with a significant portion of New South Wales and the southern border region of Queensland experiencing the highest recorded mean daily temperatures.

Rainfall for 2018–19 was below average to very much below average across the Basin, with significant patches of lowest on record rainfall in the northern Basin. Rainfall for winter and spring was below average for much of the southern and western Basin whereas, in summer and autumn, below average to very much below average rainfall dominated in the northern Basin and South Australia.

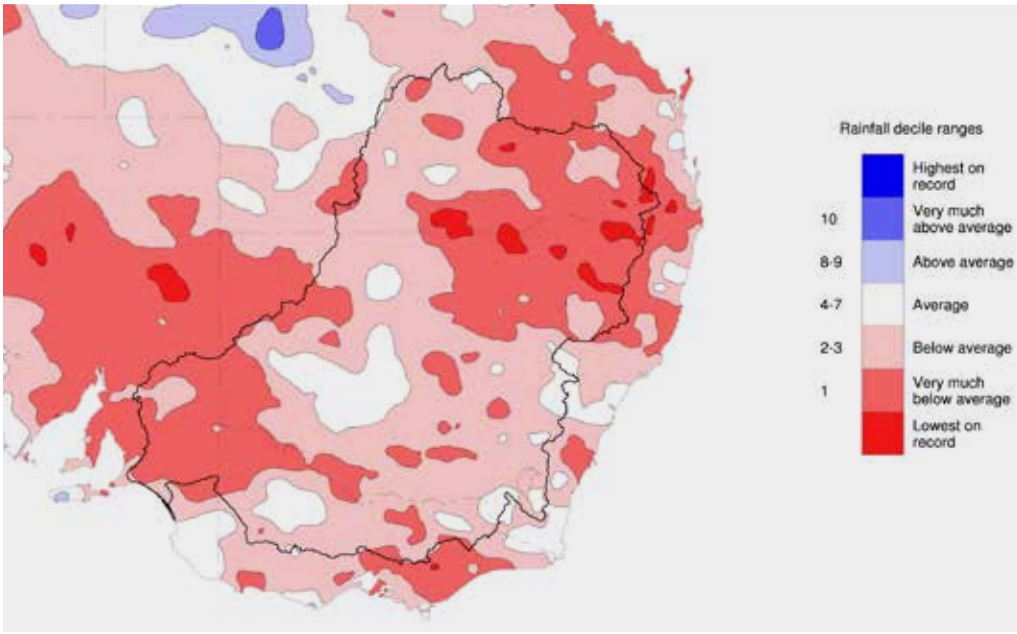
River Murray system inflows (not including Snowy Hydro inflows, IVT delivery, managed environmental inflows or inflows to Menindee Lakes) during the 2018–19 water year were close to 2,810 GL. This places 2018–19 within the driest 7% of years during the 128 years of historic observation. This volume compares with inflows of 4,100 GL (87% annual exceedance probability (AEP)) recorded in 2017–18 and the median inflow during the 128 years of historic observation of 7,620 GL. Of note is that, for the two consecutive water years 2017–18 and 2018–19 combined, River Murray system inflows were 96% AEP, or the lowest 4% of two-year June–May sequences on record. And, when factoring in northern Basin inflows to Menindee Lakes, the two-year system inflow sequence is within the lowest 2% of records.

Figure 2.5 Mean temperature deciles from 1 June 2018 to 31 May 2019



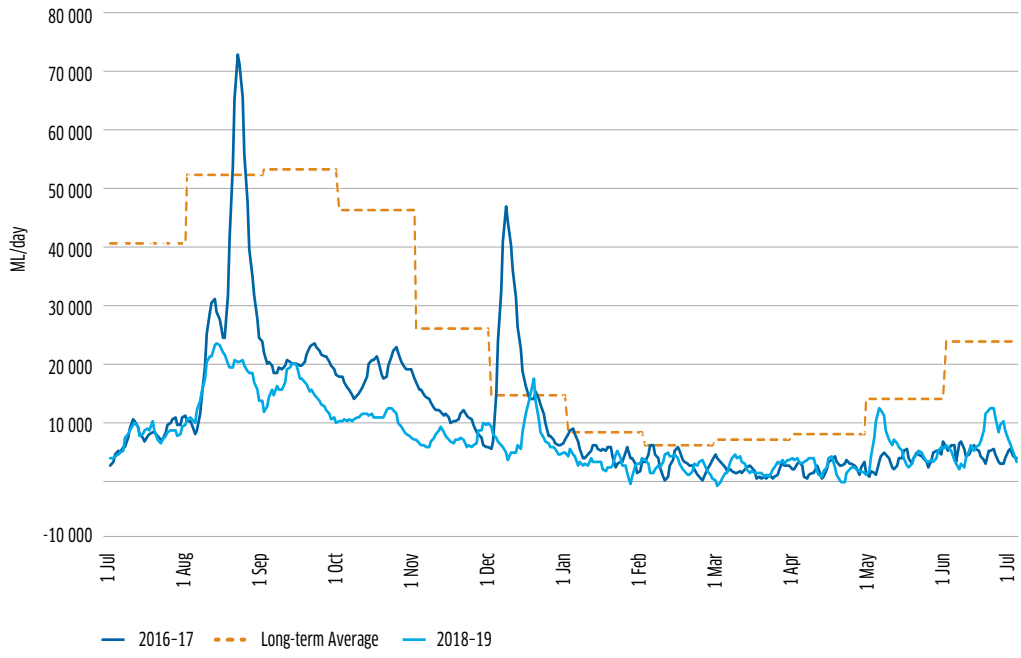
Source: Bureau of Meteorology

Figure 2.6 Murray–Darling rainfall deciles, 1 June 2018 to 31 May 2019



Source: Bureau of Meteorology

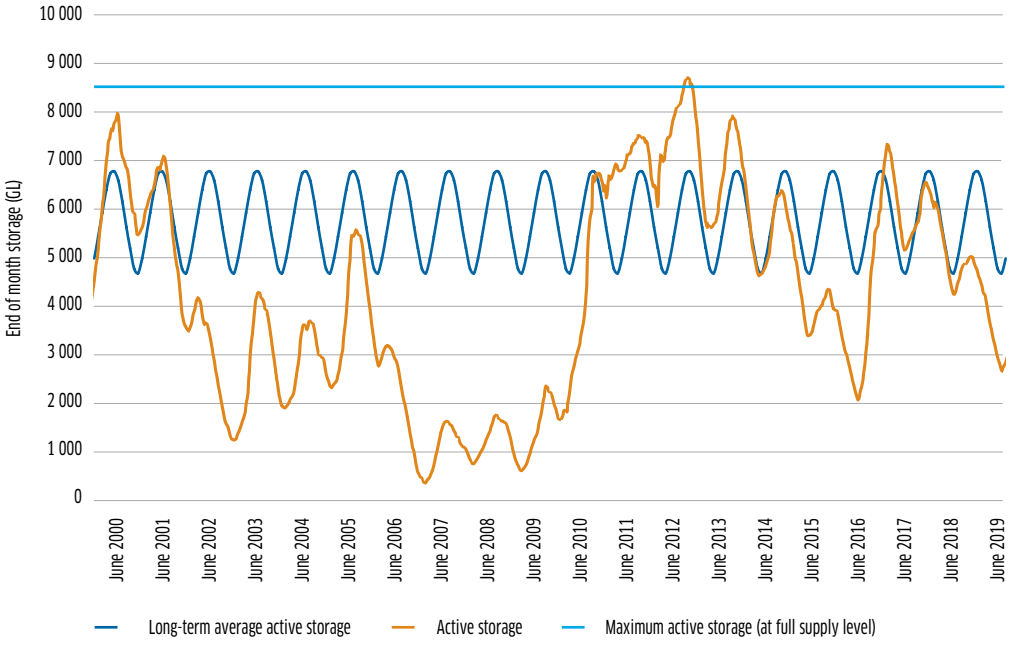
Figure 2.7 Daily River Murray system inflows for 2017–18 and 2018–19, excluding Snowy, Darling, inter-valley trade and environmental inflows



Available water resources

MDBA active storage started the 2018–19 water year at 4,617 GL (this excludes water stored in Menindee Lakes, as it is not currently available to meet Murray demands). This is about 470 GL below the long-term average for the start of June (Figure 2.8). Active storage peaked around 5,150 GL in mid-September and then declined steadily to 2,820 GL by the beginning of May. By the end of May 2019, total active storage had increased to 3,006 GL. This volume is around 2,080 GL below the long-term average for this time of year.

Figure 2.8 MDBA active storage, 1 June 2000 to 31 May 2019 in Dartmouth and Hume reservoirs, Lake Victoria and the Menindee Lakes



State water allocations, diversions and carryover

MDBA is responsible for sharing the water of the River Murray system between the states as part of the Murray–Darling Basin Agreement.

After tracking or 'accounting' for the water in the River Murray system, factoring in the volumes currently held in storage along with previous inflows, diversions and system losses, MDBA applies the water-sharing rules of the agreement to determine state ownership of this water.

MDBA also calculates what inflows can be relied on for the remainder of the water year and any water that must be set aside to meet reserves and future system requirements. The remaining water is then shared between New South Wales, Victoria and South Australia in accordance with the rules of the agreement.

Opening and closing allocations in 2018–19, as announced by state water agencies, are shown in Table 2.2.

Table 2.2 Opening and closing allocations in 2018–19

	Opening allocation, %	Closing allocation, %
South Australian entitlement holders	100	100
Victorian Murray high reliability water shares	41	100
Victorian Murray low reliability water shares	0	0
Victorian Goulburn high reliability water shares	32	100
Victorian Goulburn low reliability water shares	0	0
NSW Murray high security water shares	97	97
NSW Murray general security water shares	0	0
NSW Lower Darling high security water shares	100	100
NSW Lower Darling general security water shares	0	0
NSW Murrumbidgee high security water shares	95	95
NSW Murrumbidgee general security water shares	3	7

Total water use in the River Murray system for 2018–19, including use in the Lower Darling River, was estimated at 2,806 GL. By comparison, the total water use for 2017–18 was estimated at 3,250 GL and for 2016–17 it was estimated at 2,950 GL.

The high water availability in Victoria and South Australia plus available carryover combined with the persistent hot and dry conditions drove high demand.

Total water use reported here includes water diverted from the system for consumptive and environmental use, and water for the environment used along the River Murray itself, in the Lower Lakes and over the barrages.

Operating the River Murray system

The MDBA directs the river operations in the River Murray system in accordance with the objectives and outcomes set by the Basin Officials Committee. These are based on the themes of water storage, delivery and accounting, assets, people and communities, the environment, and information and communication.

Upper Murray

Dartmouth

The total volume of water transferred from Dartmouth Dam and Hume Reservoir, which commenced in August 2018 and continued to March 2019, was approximately 1,200 GL.

Table 2.3 Storage and inflows at Dartmouth Reservoir

Storage volume at 1 June 2017	3,410 GL (88% capacity)
Storage volume at 31 May 2019	2,477 GL (64% capacity)
Inflows for 2018–19	461 GL (91% AEP*)
Peak inflow—May 2019	6,500 ML/day

*AEP—annual exceedence probability

Hume

Releases from Hume Reservoir to meet environmental, irrigation and other system demands during 2018–19 totalled 3,467 GL. Of this release, 154 GL was delivered as directed release of environmental water. The storage was drawn down to a minimum of 403 GL (13.4% capacity) by 1 May 2019.

Table 2.4 Storage and inflows at Hume Reservoir

Storage volume at 1 June 2018	1,102 GL (37% capacity)
Storage volume peak at 19 September 2018	1,598 GL (53% capacity)
Storage volume at 31 May 2019	480 GL (16% capacity)
Inflows for 2018–19	756 GL (93% AEP*)
Long-term average inflow	2,541 GL

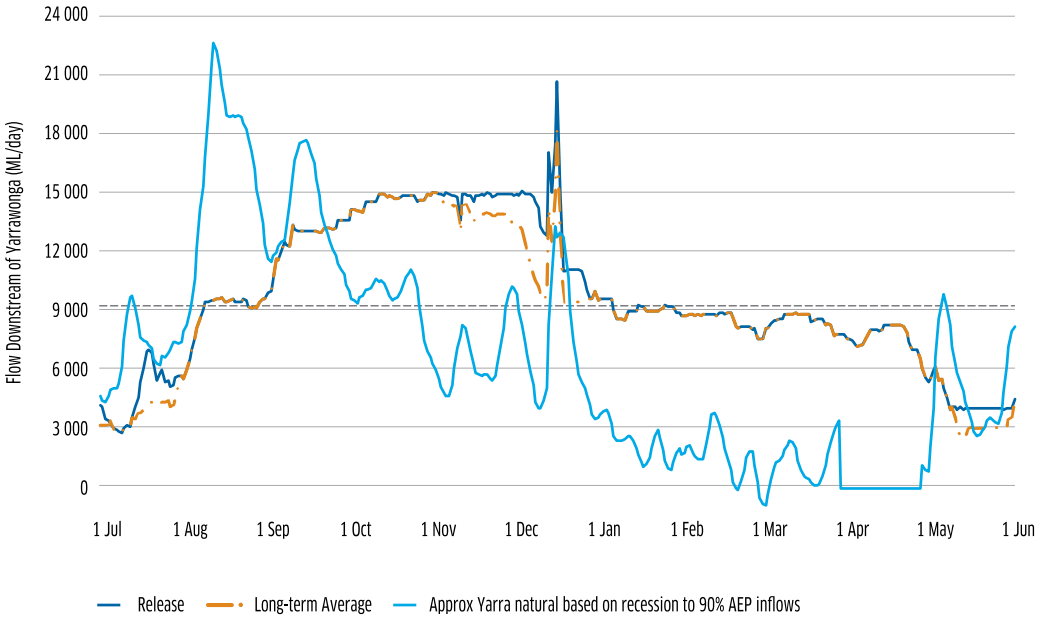
*AEP—annual exceedence probability

Mid-Murray

The MDBA, in conjunction with Goulburn–Murray Water (GMW), lowered Lake Mulwala over the winter period to facilitate structural works and manage the invasive water weed Egeria densa. The lake was drawn down to 120.2 m AHD (4.5 m below the normal operating range) to ensure effective weed control. The lake level reached this target in early June 2018 and remained around this level until mid-July 2018, when the lakes were gradually refilled ahead of the irrigation season. Water released from Lake Mulwala during the drawdown was captured in Lake Victoria. Hume releases were required to refill Lake Mulwala due to low tributary inflows from the Ovens and Kiewa rivers as anticipated under very dry conditions.

The capacity of the Barmah Choke during 2018–19 was approximately 9,000 ML/day downstream of Yarrawonga, representing a decline from the previously adopted channel capacity of 10,000 ML/day set in 2010. The total volume that flowed downstream of Yarrawonga Weir in 2018–19 was 3,418 GL. From mid-July 2018, Barmah–Millewa Forest regulators were operated to facilitate an in-channel forest watering activity on behalf of environmental water holders. Between September and December, releases downstream of Yarrawonga Weir increased above channel capacity to facilitate Hume to Lake Victoria bulk transfers of up to 15,000 ML/day through pre-wetted forest channels of the Barmah–Millewa Forest. In November and December, environmental water was used to prolong the period of above-channel capacity releases. From January, the release from Yarrawonga remained within downstream channel capacity.

Figure 2.9. Release of operational and environmental water from Yarrawonga in 2018–19



Goulburn

The total flow in the Goulburn River passing at McCoys Bridge for 2018–19 was 816 GL (57% AEP). Of the 816 GL of water that passed McCoys Bridge, 257 GL was environmental water, 396 GL was IVT delivery and the remainder consisted of rainfall rejections and minimum flow contributions.

The MDBA drew heavily on the Goulburn Valley IVT account throughout summer, delivering around 195 GL. In January and February 2019 delivery rates from the Goulburn River remained high, varying only between 2,500 and 3,000 ML/day. In late February, as system demands eased, greater variation in the pattern of IVT delivery was introduced in consultation with the Goulburn Broken Catchment Management Authority for lower Goulburn bank vegetation outcomes.

For 2018–19, the total Goulburn Valley IVT delivery was 443.8 GL and included IVT water delivered via the Broken Creek at Rices Weir, Campaspe River at Rochester and the Goulburn River at McCoys Bridge. This was a record volume, with the previous largest volume of IVT delivered being 305.4 GL in 2017–18.

The Murray bypass, which takes water from Yarrawonga Escape to the Broken Creek, was used by MDBA to assist with the delivery of water around the Choke from late August to mid-May. The volume of water delivered via the Murray bypass totalled 30.5 GL in 2018–19, compared with 5.9 GL in 2017–18.

Edward–Wakool

In September 2018, the MDBA and WaterNSW secured an interim access arrangement with Murray Irrigation Limited (MIL) for access to the Mulwala Canal for 2018–19. Approximately 188 GL was delivered around the Barmah Choke via the Edward, Finley, Perricoota and Wakool escapes. Transfers through the MIL escapes continued until River Murray system demands eased enough to cease all the escape orders by the end of March. The access agreement between MDBA and MIL required the MDBA to order at least 100 GL through the Mulwala Canal and incur a 10% 'loss' tariff for the use of the escape infrastructure.

In the Edward–Wakool system, flow through the Edward River Offtake regulator and the Gulpa Creek Offtake regulator remained near maximums for the majority of 2018–19, as the flow through the Barmah Choke remained at channel capacity. Between October and November 2018, flow downstream of Stevens Weir increased above channel capacity to 3,000 ML/day as releases from the Edward Escape were maximised to bypass water around the Barmah Choke. At this rate, the Werai Forest Regulators were opened, in consultation with forest managers.

Murrumbidgee

The MDBA was unable to call on any IVT for delivery from the Murrumbidgee River to meet system demands in the 2018–19 water year. Flow in the Murrumbidgee River at Balranald totalled 255 GL in 2018–19, compared with 456 GL in 2017–18. Of the 255 GL, 11.9 GL was environmental water delivered for water quality outcomes and the remainder consisted of rainfall rejections and minimum flow contributions.

Lower Murray

At Euston Weir, the peak flow in 2018–19 was 16,700 ML/day, which occurred in late October 2018. The high River Murray flows at the weir were the result of an environmental water and IVT shared pulse from the Goulburn River, and above-channel releases from downstream Yarrawonga Weir to transfer water to Lake Victoria and meet system demands, including South Australian entitlement.

Demands and losses, particularly in the lower Murray, were persistently high in summer and early autumn 2018–19. The flow downstream of Euston Weir remained above 7,500 ML/day to help meet all system demands. This flow helped support a flow over Wentworth Weir between 4,500 and 7,500 ML/day, which, combined with releases from Lake Victoria, helped to meet South Australia's consumptive and environmental demands throughout summer and autumn. While the risk of water delivery shortfall persisted throughout the summer, River Murray operations were able to meet all system demands in 2018–19.

The MDBA undertook variable weir pool operations throughout 2018–19. Locks 7, 8, 9, 15 and 26 were varied throughout the year consistent with weir pool variability targets. At Lock 10, the weir pool was raised to target 10 cm above Full Supply Level (FSL) from August 2018 to assist river pumpers to access water in the Wentworth arm of the Darling River. At Lock 15 the weir pool was raised to a maximum of 20 cm above FSL over summer to reduce the risk of mid-river short-term supply constraints during peak demands. Locks 2, 5 and 6 were operated by South Australian water agencies to achieve weir pool variability targets and facilitate environmental watering of the Chowilla Floodplain.

Menindee Lakes, Lower Darling River and Great Darling Anabranch

There was effectively no inflow to the Menindee Lakes System in 2018–19. This followed on from no inflow during 2017–18. Around 9.5 GL of flow was recorded at Wilcannia (the closest flow measurement point upstream of Menindee Lakes) between June and early August 2018. This small flow occurred as a result of the release of water from the Gwydir Valley and Border Rivers catchments in April 2018, on behalf of environmental water holders, to re-establish longitudinal connectivity in the Barwon–Darling system. After August 2018 there was no inflow to Menindee Lakes.

The combined Menindee Lake storage volume fell from 216 GL (12.4% capacity) on 1 June 2018 to ~16 GL (less than 1% capacity) on 31 May 2019.The MDBA was therefore not able to call on water from the Menindee Lakes during this water year, as the combined volume of the lakes remained well below the 480 GL threshold. WaterNSW directed releases from Weir 32 to fill four temporary block banks across the lower Darling as part of their drought contingency measures while there was water available in accessible lakes. The block banks were located below Pooncarie near Jamesville, below Burtundy near Ashvale, and upstream of Pooncarie at Court Nareen and Karoola. The release at Weir 32 ceased on 12 February 2019 and did not recommence.

Lake Victoria

The MDBA gained Ministerial Council approval in the previous water year to delay the end of system target volume for Lake Victoria of 350 GL from the end of May 2018 to the end of June 2018. Relaxing the end of May target volume reflected the ongoing dry conditions, high autumn demands and sustained pressure on the Barmah Choke and the Lower Goulburn River. The relaxed target also took into account the volume captured in Lake Victoria from the Lake Mulwala drawdown (~100 GL) that arrived during June 2018.

The Lake Victoria storage reached the 350 GL target on 17 June 2018 but struggled to continue rising in July due to a lack of natural inflows and early-starting season demand. Significant transfers through the Barmah–Millewa Forest and other bypasses were required to increase the storage level in Lake Victoria ahead of peak summer demands. Approximately 1,270 GL was transferred from Hume Reservoir to Lake Victoria in 2018–19. The storage volume peaked at 572 GL (84.6% capacity) on 21 December 2018.

The MDBA gained Basin Official Committee approval to waive the end of system target volume at Lake Victoria for May 2018, allowing the storage to be operated more flexibly during autumn to meet system requirements. Lake Victoria storage reached 167 GL (24.8% capacity) on 30 April 2019—the fifth lowest level in 50 years. Drawing Lake Victoria down also assisted in meeting demands, including 150 GL of trade for immediate delivery and 50 GL of traded South Australian entitlement for the environment.

The low storage volume maximised the ability for inflows during autumn and in winter to be captured in Lake Victoria to conserve the volume stored in the more efficient upstream storages.

Flow to South Australia

South Australia began the season with the full entitlement volume of 1,850 GL. The actual flow across the South Australian border totalled 2,456 GL (77% AEP), boosted by the delivery of 617 GL of environmental water, with further adjustments resulting from trade and deferral of South Australian entitlement during the year.

Lower Murray and barrage operations in South Australia

Operations of the Lower Lakes and barrages continued to be undertaken by South Australian water agencies in collaboration with the MDBA. Operational decisions were also informed through regular meetings of the Barrages Operational Advisory Group, which includes representatives from environmental entitlement holders such as the Commonwealth Environmental Water Office. Discussions focused on overall system conditions, advice on upstream operations, operational and water resource risks, environmental water planning, delivery to South Australia, environmental objectives, and risks in the Lower Lakes and Coorong. The Lower Lakes underwent a managed lake cycling. The lakes declined throughout spring and summer, reaching a minimum five-day average lake level of 0.54 m AHD in February.

Overall barrage releases this year totalled around 342 GL. Barrages generally remained open across the year apart from short periods when barrages were closed to manage high tides or storm conditions that prevented outflow or risked reverse flow of seawater into Lake Alexandrina. Fish ways were kept open at all times, maintaining a minimum release of around 440 ML/day.

Dredging of the Murray Mouth continued throughout the water year, maintaining the targets for connectivity.

Improving river operations

The way the MDBA operates and manages the River Murray system is set out in two documents:

1. The governance and operational framework for River Murray system operations is set out in the Murray–Darling Basin Agreement.
2. The objectives and outcomes for river operations in the River Murray system Objectives and Outcomes document (O&O document) provides a transparent and adaptable decision-making framework for operations. It is produced by the Basin Officials Committee and is available on the MDBA website.

The MDBA works closely with river operators and Basin government agencies to update the O&O document by developing or amending specific objectives and outcomes to reflect contemporary practice. Work in 2018–19 included:

- updating the MDBA's Source model of the River Murray system to allow continuing assessment of risks to channel capacity and delivery shortfalls
- assisting Basin governments in a range of technical and communication activities around capacity and delivery shortfall risks in the River Murray system. These activities included updated modelling, public communications, a shortfall exercise to test operational arrangements, and commencement of a multi-jurisdictional work plan
- continuing to document evidence-based practices that improve environmental outcomes of river operations
- developing O&O amendments on behalf of Basin governments to complete the implementation of prerequisite policy measures for the River Murray system
- continuing to develop strategies and plans to combine seasonal variability in weir pool levels with water for the environment and river operations requirements and meet local, whole-of-reach and system-wide outcomes
- developing an ongoing review process of the operational delivery prerequisite policy measures and environmental water delivery in general
- updating flood and emergency management manuals and testing them during flood training exercises with river operators
- responding progressively to recommendations of IRORG arising from its annual review of river operations in the River Murray system
- providing assistance across a range of projects, led by the MDBA and Basin governments, such as the development of water resource plans, the water trade review, River Murray Increased Flows, the sustainable diversion limits adjustment mechanism and the reviews of fish deaths in the lower Darling River
- supporting projects such as the National Carp Control Project
- liaising with the Bureau of Meteorology.

The Basin Officials Committee undertook an annual review of the O&O document in May 2019 and made amendments to streamline the document.

Other improvements to river operations included the following:

- The MDBA released water from Dartmouth Reservoir in 2018–19 as required, but it did so in accordance with operational guidelines aimed at improving environmental outcomes of the water releases as far as possible. For instance, routine practice is to 'pulse' releases so that river levels rise and fall (more similar to natural flow variability). The guidance for pulsing releases was initially developed based on studies of in-stream health using biofilm as an indicator. MDBA is expanding these guidelines to include new knowledge relating to improving river bank stability and Murray cod population outcomes in the Mitta Mitta River.

- Another example of achieving environmental and community aims in river operations that is working successfully is periodic lowering of the water level of Lake Mulwala (also known as 'drawing down the lake'). Lake Mulwala was last drawn down during winter 2018, and prior to this in winter 2015. The 2018 drawdown was aimed at controlling the amount of the water weed Egeria densa and where it grows across the lake in accordance with local community aims, as well as to allow for certain works on the lake foreshore to be undertaken while water levels were lowered.

Critical human water needs

The Murray–Darling Basin Agreement ensures that the southern Basin states set aside and deliver water for critical human water needs. It also establishes processes for managing periods when normal water-sharing arrangements would not provide enough water for critical human needs.

The Basin Plan sets triggers, or tiers, for changing water-sharing arrangements.

Tier 1 arrangements are normal water-sharing arrangements. Tier 2 arrangements apply during periods of very low water availability. Tier 3 arrangements are for extreme and unprecedented conditions.

In 2018–19, Tier 1 water-sharing arrangements were in place, meaning that critical human water needs were met, as well as conveyance water needs that ensure sufficient flow in the river system to meet those needs.

Maintaining and improving River Murray infrastructure

The River Murray operations assets include:

- Hume and Dartmouth dams
- Lake Victoria
- 14 weirs (with 13 locks)
- barrages at the Lower Lakes
- 13 salt interception schemes
- a range of regulating structures.

The assets are jointly controlled by the Australian Government and the governments of New South Wales, Victoria and South Australia. The governments' control is exercised through the Murray–Darling Basin Ministerial Council and the Basin Officials Committee. By agreement of the four asset-controlling governments, the MDBA, under the provisions set out in the Murray–Darling Basin Agreement, manages the River Murray operations assets.

Basin governments appoint state constructing authorities to investigate, design, construct, operate, maintain and renew River Murray operations assets. These authorities are:

- WaterNSW and the New South Wales Department of Industries—Water (DOI Water)
- GMW, Victoria
- the South Australian Minister for the River Murray, including the operating agents South Australian Water Corporation (SA Water) and the then South Australian Department for Environment, Water and Natural Resources (Department for Environment and Water since 1 July 2018).

A strong relationship has developed between the MDBA and state constructing authorities, ensuring that maintenance and renewal is proactive, decision-making is generally by consensus, and issues are raised sufficiently early to enable timely resolutions.

Environmental Works and Measures Program

The Environmental Works and Measures Program builds and operates water management structures that deliver and manage water for the environment at important target sites. Major structures have been constructed and tested at six locations to help deliver water to environmentally significant areas. In 2018, a major environmental watering event was completed at Gunbower Forest, using the works constructed under the Environmental Works and Measures Program. This watering event enabled further studies and investigations to be undertaken to better understand the capacity constraints in the Gunbower Creek system currently preventing full operation of the works. A major pump station maintenance program was commenced at the Hattah Lakes pump station and routine maintenance and operations were completed across the other sites.

Complementary environmental works

The MDBA also takes part in other environmental works programs that affect River Murray operations assets. Work has progressed on the $155 million South Australian Riverland Floodplain Integrated Infrastructure Program (SARFIIP), which is funded by the Australian Government. This program will improve the health of the River Murray below Locks 4 and 5. Structures built under SARFIIP will use the level of the weir pools to direct water onto the floodplains. In 2018–19 the project achieved a number of significant milestones, including:

- commencement of construction of the Pike Floodplain Inundation Measures projects
- commencement of construction of the Katarapko Inundation Measures project
- completion of construction of the first tranche of Salinity Management Measures groundwater management scheme
- completion of design work and commencement of procurement of the final tranche of the Salinity Management Measures groundwater management scheme.

In addition to the infrastructure components, significant progress was made on developing additional tools and support systems used by the South Australian Government to integrate and optimise environmental watering operations in the South Australian River Murray.

Improving the physical assets base

During the year the MDBA conducted the ongoing maintenance inspection program generally as was planned. Inspections are carried out annually at each of the MDBA's major dams in accordance with guidelines issued by the Australian National Committee on Large Dams. All the assets were maintained in accordance with contemporary engineering practice, and improvements were made where possible.

Hume Dam

Detailed seismic studies of the embankments continued to improve understanding of the Hume Dam's performance under extreme earthquake loading. Dam break and consequence assessments are being carried out. These investigations build on the work of previous years in examining the characteristics of extreme rainfall events and flood risk at Hume Dam and will ultimately inform the comprehensive risk assessment that will provide clarity to the extent and priority of further upgrade works. Dam surveillance of the structures has not identified any concerns.

Dartmouth Dam

The dam failure risk assessment for Dartmouth Dam has been completed following updates to the dam break and consequence assessment. Dam surveillance has not identified any concerns.

Lake Victoria

The protection of cultural heritage in accordance with the Aboriginal Heritage Impact Permit continued to be a major focus of water management and on-ground works at Lake Victoria in 2018–19. The operation of the lake is guided by the Lake Victoria Operating Strategy. The strategy encourages annual variability in lake levels to promote the growth of spiny sedge and other riparian vegetation, which stabilises the shoreline and helps protect cultural heritage sites.

The growing involvement of the Barkindji Maraura Elders Council members enhanced the management of Lake Victoria and surrounding properties. The council works with the SA Water cultural heritage team and New South Wales DOI Water management personnel. Surveys and inspections of the foreshore area found ongoing issues with soil erosion in some areas and significant vegetation growth in others. The MDBA and program partners will seek a new Aboriginal Heritage Impact Permit to replace the existing one, which expires in late 2020. The Lake Victoria Operating Strategy continues to guide the operations of the lake to maximise water storage and minimise any harmful effects on Aboriginal cultural heritage.

The risk assessment of the outlet regulator has confirmed concerns that will be further considered in detail. A staged approach to remediation of the regulator is planned. Dam surveillance identified a few minor concerns that will be investigated.

Locks and weirs

Planned maintenance at each lock and weir continued this year without major issue. Maintenance activities included lock refurbishment works at Lock 26 (Torrumbarry) and Lock 3 (Overland Corner). Works continued to repair erosion resulting from the 2016 high waters. Dam surveillance identified a few concerns at some of the locks and weirs. These will be investigated.

Hume to Yarrawonga river reach

Throughout the year a program of bank stabilisation, revegetation and fencing continued along the Hume to Yarrawonga reach of the Murray River. This program seeks to mitigate the effects of river regulation caused by the operation of Hume Dam. This work was funded through the joint venture program overseen by the MDBA and project managed by New South Wales DOI Water with on ground delivery undertaken by the New South Wales Soil Conservation Service.

A trial erosion management plan for the River Murray along the South Corowa to Bundalong Reach of the Murray River continues to be explored. The plan proposes that wake-enhancing boating be restricted within the reach. New South Wales Roads and Maritime Services will implement the plan, ideally to maintain boating numbers while removing the erosive effects to the banks of the river from large wakes. In 2018–19 a study was commenced to evaluate the potential economic implications of the proposed plan, with the plan to be completed in mid-2019.

An investigation of the channel capacity and geomorphology of the Barmah Choke commenced in early 2019, to inform future management for maintaining channel capacity through the Choke to meet the requirements of water users in New South Wales, Victoria and South Australia. The reliance on the River Murray for flows for requirements downstream of the Barmah Choke will continue to place stress on the natural levee of the Barmah–Millewa Forest.

Dredging the Murray Mouth

In conjunction with the South Australian Government, the MDBA routinely monitors the build-up of sand at the Murray Mouth. Tides, waves and currents cause natural movement of sand around the mouth of the River Murray. Over time, and as flows through the mouth have reduced due to river regulation and upstream extraction of water, the sand builds up, restricting the flow and reducing the tidal exchange of water between the sea and the Coorong. The Coorong ecosystem relies on cooler oxygenated water coming in from the sea on high tides. It takes a very large flood to scour significant amounts of sand from the mouth back out to sea.

In late 2014, so much sand deposited in the river mouth that, without intervention, the connection between the Coorong and the sea would drop below the level needed to maintain a healthy system. It was also possible the mouth would close altogether.

Dredging began in January 2015 and two dredges have operated for most of the time since then. More than 4.2 million m3 of sand has been dredged from the mouth and pumped to the beach, where it is dispersed by the breaking waves. This has helped to maintain the exchange of water between the Coorong and the sea above the target level.

Because of the dry conditions there was an increase in dredging in 2018–19 to keep the river mouth open.

Reducing bank erosion along the Mitta Mitta River

Throughout the year a program of bank stabilisation, revegetation and fencing continued along the Mitta Mitta River. This program seeks to mitigate the effects of river regulation caused by the operation of Dartmouth Dam. This work was funded through the joint venture program overseen by the MDBA and project managed by GMW with on-ground delivery coordinated by the North East Catchment Management Authority. The 2018–19 program of works included an annual condition assessment by boat of the river bank, 27 property inspections, and works completed at 19 high-priority sites where channel capacity was compromised by blockage or active erosion.

CASE STUDY

Case study: Mitta Mitta River gets a little help

The alpine Mitta Mitta River in Victoria is taking a gentle turn for the better.

Rising on the high plains beneath Mount Bogong, the main channel of the Mitta Mitta forms at the confluence of Cobungra River and the Big River and then flows northwards through near-pristine forest to Dartmouth Dam.

The dam is the largest storage in the Murray–Darling Basin and has the capacity to hold up to 40% of the water for the River Murray system. After Dartmouth Dam, the Mitta Mitta meanders north-west through a wide valley to the south arm of the Hume Dam.

The river is vitally important for transferring water between the two storages of Dartmouth Dam and Lake Hume. However, since the commissioning of Dartmouth Dam in 1979, the transfer of water between Dartmouth and Hume has altered the natural flow regime of this stretch of the Mitta Mitta.

In 2018–19, a program of bank stabilisation, revegetation and fencing continued along the Mitta Mitta to mitigate the effects of river regulation through the operation of Dartmouth Dam.

The work is funded through the joint venture program overseen by the MDBA with on-ground delivery coordinated by the North East Catchment Management Authority.

Winding rivers like the Mitta Mitta change constantly through the gradual erosion of bends. Sediment is removed from the outside of river bends and deposited again on the inside bends further downstream. Although erosion occurs naturally, the regulation of the river flow, including significant increases in the total flow, contributes to river bank erosion.

Above: Mitta Mitta River showing riparian work along the banks.

Other factors that increase erosion include the loss of native vegetation, invasive willow related issues, de-snagging of the rivers and stock accessing the river frontage.

Over the last 20 years there has been a progressive adaptive management approach to addressing the challenges of regulation on the Mitta Mitta River, leading to improved practice and increased collaboration across the industry.

Today, the Mitta Mitta River program involves variable flow releases, annual channel condition assessments, prioritisation of erosion issues for investment, integration of instream habitat, fish monitoring and a holistic approach to rehabilitating sites, to build a more resilient river system for the future.

Erosion sites are addressed through a combination of carefully placed rock or timber to initially stabilise the bank, along with removal of invasive weed species at the site, and finally the introduction of native vegetation to provide long-term stability, habitat and shade, as well as nutrients and food for the little bugs that feed the fish in the river.

Further investment is being made along the river as part of the collaborative approach of the industry on this system, which complements the MDBA's annual program works with the introduction of fish habitat to boost survival rates and provide better spawning opportunities for native species.

Inspecting the assets—Senator Collings trophy

Each year, MDBA senior staff inspect all River Murray operations assets to assess their operational performance. Assessment criteria include:

- condition of the assets
- operations and maintenance documentation
- workplace health and safety documentation and performance
- achievement of the works program set for the year
- expenditure against the budget.

The Senator Collings trophy has been awarded annually since 1943 to the team that has the most effectively maintained site on the River Murray. The award was instituted by Senator JS Collings, the Minister for the Interior from 1941 to 1945 and President of the River Murray Commission at the time.

The award is keenly contested along the length of the river. The major dams and barrages have only been eligible for the award since 2003. The 2018 winner was Yarrawonga Weir, managed by GMW as the state constructing authority.

CASE STUDY

Case study: Yarrawonga Weir—a winner at 80

Yarrawonga Weir is the 2018 winner of a prestigious award that dates back 75 years.

The award—the Senator JS Collings Trophy—has been awarded annually since 1943 to the most effectively maintained asset in the River Murray system.

Named after a former Minister for the Interior, the award recognises the contribution made by lock managers and their staff in taking the best care of the weir and lock structures and in making improvements to their surrounding areas, including beautification schemes and bank protection works.

In recent years the award has been expanded to include dams and other structures. The award highlights the social and economic importance of maintaining river infrastructure like locks and weirs.

In August 2018 MDBA named Yarrawonga Weir as the winner of the trophy for 2018. The Yarrawonga Weir, located between the towns of Yarrawonga in Victoria and Mulwala in New South Wales, is a critical piece of infrastructure that provides water to some of Australia's biggest agricultural regions.

The team at Yarrawonga delivered a number of improvement projects while ensuring routine maintenance and presentation of the site overall was of a very high standard.

Goulburn-Murray Water maintains and operates the weir on behalf of the MDBA. According to Goulburn-Murray Water, Yarrawonga Weir, at nearly 80 years of age, is a good example of keeping major infrastructure operating efficiently, effectively and safely. The award recognises not only the hard work but also the innovation and passion people bring to keeping such critical irrigation assets in peak operating order.

Around 17% of the River Murray's annual flow is diverted each year from the Yarrawonga Weir to irrigators in Victoria and southern New South Wales.

The weir forms Lake Mulwala and provides water to more than 8,000 km2 of prime agricultural land. The system of 16 locks and weirs along the River Murray from Hume Dam down to the mouth is essential infrastructure. It underpins the $7 billion generated each year by irrigated agriculture and also contributes significantly to the recreation and amenity all Australians can enjoy.

Above: Yarrawonga Weir showing new stairs

River Murray water quality

The River Murray water quality monitoring program, which was established in 1978, continued to be implemented in partnership with Basin governments. During 2018–19, water quality monitoring for physico-chemical properties was carried out at 28 sites, and at 12 sites for phytoplankton (including blue-green algae).

Across the Basin, water quality through the summer of 2018–19 was affected by high temperatures. The northern Basin was also affected by very low flows. Extensive blue-green algae outbreaks occurred. The outbreaks were monitored and managed where possible by the responsible Basin government authorities.

Along stretches of the lower Darling River, low or no flows combined with extended hot and dry weather conditions resulted in poor water quality, including high levels of blue-green algae. In the weir pools near Menindee, sudden changes in weather caused mixing of the stratified water column, resulting in low oxygen levels in the water, which led to the lower Darling River fish mortality events.

Under the Murray–Darling Basin Agreement, Basin governments and public authorities are required to refer any development proposals that may significantly affect the flow, use, control or quality of the River Murray to the MDBA for assessment. In 2018–19, the MDBA received and assessed 54 proposals from various New South Wales councils under the provisions of the Murray Regional Environmental Plan 2, none of which were considered to have a significant impact on the River Murray water quality.

During 2018–19, the MDBA initiated a strategic review of the River Murray Health program, which includes the River Murray water quality monitoring program. The strategic review aims to understand how the program is meeting the current needs of the MDBA and the Basin governments, and it will make recommendations on required changes to ensure the program will meet the future requirements. The review will be completed in August 2019.

Salinity management

The MDBA, with Basin governments, continued to implement the Basin Salinity Management 2030 strategy (BSM2030).

Highlights of the achievements of BSM2030 implementation during 2018–19 included:

- Under the Basin Plan, levels of salinity at four of the five reporting sites were assessed to have met the target values over the reporting period.
- The Basin salinity target was achieved for the 10th consecutive year.
- Eleven Basin salinity management procedures were finalised for application and drafts of the remaining five procedures were prepared.
- Five reviews of salinity register entries were completed and several other reviews were commenced and progressed.
- Knowledge priority projects to reduce uncertainty around future salinity risks were progressed.
- Implementation of the trial of responsive management of salt interception schemes continued.

Salt interception

Salt interception schemes are a significant component of BSM2030 and help to achieve and maintain the agreed salinity levels in the River Murray. In 2018–19, salt interception schemes diverted approximately 474,201 tonnes of salt away from the River Murray system.

The trial of responsive management of salt interception schemes continued throughout 2018–19. The trial is investigating opportunities to reduce scheme operations during periods of low salinity, thereby saving on operating costs. The MDBA and state constructing authorities have progressed investigations to better understand the responsive management of salt interception operations in response to forecast river flows and salinity conditions.

Registering the impacts of actions on salinity

Under BSM2030, actions that increase and decrease average river salinity are accounted as debits and credits and are recorded in a register. Actions such as new irrigation developments may generate a debit (negative impact on salinity) on the register because they may increase salt loads to the River Murray. Conversely, actions such as commissioning salt interception schemes and improving irrigation practices may generate credits (positive impacts on salinity).

Each entry in the register covers salinity impacts on the river arising from recent actions (Register A), as well as from major historical land and water use decisions (Register B) in tributary valleys. Each year the Basin governments inform the MDBA about new activities that may have significant salinity effects and undertake reviews of existing register entries.

The MDBA calculates the salinity debits and credits of these activities and updates the salinity registers accordingly. A summary of the registers is included in the BSM2030 reporting. The 2018 salinity registers confirmed that the contracting governments of New South Wales, Victoria and South Australia remained in net credit on the salinity register (the Australian Capital Territory and Queensland do not have significant salinity impacts). The MDBA reported these outcomes to the Murray–Darling Basin Ministerial Council and published them on its website.

Coordination of water for the environment

Coordination of water for the environment and icon site monitoring are important elements of maintaining and improving the health of the Basin in accordance with various agreements.

In the context of a relatively dry year in 2018–19, environmental water managers in the southern Basin focused on protecting river health and supporting critical environmental needs.

Highlights for the year included the following:

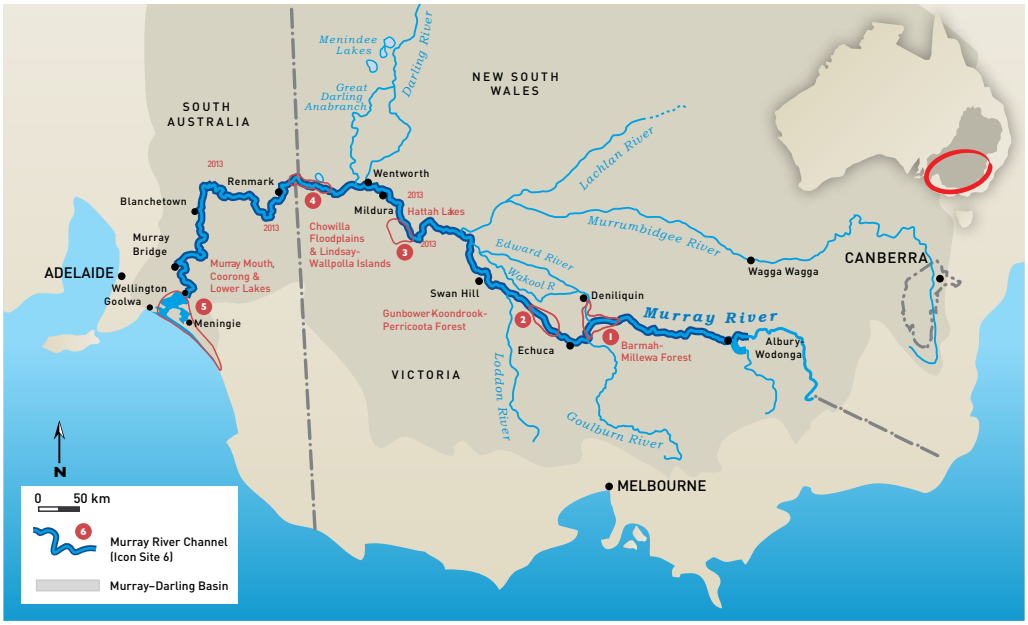
- The regulators that control water flow into and out of the Barmah–Millewa Forest were opened early in winter. This was to allow a more gradual and natural inflow of water into the creeks as the River Murray level rose during winter and spring. Large-bodied fish, such as Murray cod and golden perch, were observed moving in and out of the forest creeks to access important breeding and feeding habitat. There are promising signs of successful native fish breeding and survival, with numbers of juvenile fish increasing throughout the mid-Murray.
- At Gunbower Forest environmental flows were delivered to around 1,200 ha of wetlands and 3,230 ha of river red gums. Given the dry conditions across much of the Basin, these flows provided important top-ups for refuge habitats for fish, frogs, waterbirds, bush birds and other animals.
- Between late January and early April 2019, several environmental water holders worked together to deliver a fish refuge event in the Murrumbidgee River for improved water quality conditions for native fish. The action was shown to have assisted in limiting further mass fish deaths in the lower Murrumbidgee River following an initial death of approximately 2,000 native fish at Redbank weir in January 2019.
- Following natural flooding in 2016 and delivery of water for the environment in 2017 and 2018, a drying phase was started for Hattah Lakes. Drying cycles as well as wetting cycles are important for wetland health. Receding lake water levels allow wetland plants to germinate, grow and set seed.
- Fringing vegetation on the Chowilla floodplain responded well to an in-channel rise facilitated through operation of the Chowilla regulator and use of water for the environment. Much of the water was then returned to the River Murray to achieve outcomes down through the lower Murray to the Lower Lakes, Coorong and Murray Mouth.
- Water for the environment maintained connectivity between the Lower Lakes and Coorong, providing a range of habitats for migratory wading birds, estuarine fish species and invertebrates. Baby black bream detected in 2017–18 were detected again this year as small juveniles, indicating favourable conditions were created to support this important species through critical early life stages.
- Spring delivery of water through Barmah–Millewa Forest preferenced flows to Barmah as part of the strategy of the river operators to deliver water as efficiently as possible to Lake Victoria. This resulted in excellent growth of threatened Moira grass and river swamp wallaby grass in Barmah Forest wetlands.
- Winter and spring freshes in the Goulburn River were delivered to improve the condition of bank vegetation, water quality and habitats. The flow pulses were protected through to the end of the Basin river system and helped to cue a range of native fish to migrate upstream from the Coorong (e.g. lamprey).

Icon site monitoring

Key sites along the Murray are monitored with funding from the Joint Venture Living Murray initiative. The monitoring includes:

- monitoring site condition to provide information about the health of icon sites, including how the condition changes over time. This monitoring focuses on fish, waterbirds and vegetation
- monitoring intervention to assess ecological and other responses to watering and management actions. This provides the major link to understanding how specific environmental management actions result in changes at icon sites.

Figure 2.10 Icon site locations



Jurisdictions have delivered the 2018–19 icon site monitoring activities as approved by the Southern Connected Basin Environmental Watering Committee (SCBEWC).

To ensure monitoring findings are linked back into water planning at a site and system scale, managers prepare annual site-based report cards. Report cards are used as a direct input to the annual planning cycle as part of adaptive management. This helps incorporate lessons from monitoring back into the delivery of water for the environment, especially when prioritising and coordinating watering events at the system scale. Annual asset report cards results from 2006 to 2017 are now available on the MDBA website.

Looking ahead, during 2019–20 the SCBEWC will continue to assess how The Living Murray monitoring activities align with the Basin Plan framework. To progress this, the MDBA undertook a project to assess alignment between the monitoring objectives of The Living Murray and the environmental objectives of the Basin Plan.

Table 2.5. Results from water for the environment

Barmah–Millewa Forest	• Moira grass grew where combined with management actions such as fencing off areas to keep out feral animals.
Koondrook–Perricoota Forest	• The forest remains in poor condition due to lack of watering. However, a small delivery of water for the environment to the Pollack wetland improved plant and tree health and supported a wide range of waterbirds, including the Eastern Great Egret.
Gunbower Forest	• Around 4,500 ha of river red gum forest and wetlands were watered. • River red gums showed a flush of new canopy growth and the cover and diversity of floodplain plants increased. • Colonial waterbird breeding occurred at Long Lagoon, with 150 little pied, little black and great cormorant juveniles recorded. • 695 waterbirds from 17 species were recorded at Little Reedy Lagoon and Corduroy Swamp. • Good numbers of Murray cod were recorded in Gunbower Creek.
Lindsay Mulcra Wallpolla Islands	• 133 Murray cod were recorded in Mullaroo Creek and upper Lindsay River. The majority were juveniles, indicating high food availability for small fish. • Water for the environment delivered to Lake Wallawalla supported large numbers of waterbirds, including 500 red-necked avocets, 195 pink-eared ducks, and over 400 grey teal ducks. For the second year in a row, three out of five threatened wetland plant species were recorded.
Chowilla Floodplain	• 2,500 hectares of creeks and wetlands were inundated, improving the health of fringing trees and wetlands plants.
Coorong, Lower Lakes and Murray Mouth	• Moderate barrage releases provided connectivity for the movement of lamprey, common galaxias and congolli. • Water for the environment created conditions in the Coorong for black bream to successfully breed. • While overall shorebird numbers are low, there was a slight increase compared to the previous year. • Ruppia extent declined. This may be due to low waters in spring in the Coorong

Water trade—dual responsibility

The MDBA and the Victorian Government developed an online tool that allows allocation trades subject to the Barmah Choke restriction to be processed automatically. These improvements mean that people wanting to trade water across the Barmah Choke will have equal access and more accurate information.

The MDBA, in conjunction with Basin governments, is reviewing trade adjustment processes that support the current trade rules in the southern Murray–Darling Basin. These rules adjust state resources when water is traded between states. Since it began in the mid-2000s, interstate water trade has grown substantially, and trading patterns and water use have changed, while the rules have remained generally unchanged. This review will ensure the trade rules continue to support the efficient functioning of water markets as they mature.

Challenges in the year ahead

The River Murray system inflows during the 2018–19 water year were 2,803 GL. This puts 2018–19 in the driest 7% of years on record. In some regards, the prospect of ongoing dry conditions increases the importance of Basin Plan work to integrate the management of the river for consumptive use with the delivery of water for environmental outcomes. The river operations are complex. Management of the river, as well as maintaining positive and productive relationships between water resource managers and environmental water holders, will continue to be important.

The MDBA's infrastructure program will include the completion of construction of the major works packages on the Pike and Katarapko floodplains, and associated salinity management measures works, as part of SARFIIP. The work includes construction of large regulators and blocking banks to allow water stored by Locks 4 and 5 to inundate significant areas of the floodplain. The final tranche of a groundwater pumping scheme will be constructed to prevent more salt from entering and to remove saline groundwater. It will progressively introduce fresher water lenses (freshwater layers above saline water) to the Pike floodplain. This work, combined with more regular inundation, is important to improve the health of vegetation across the floodplain.

Investigations will continue to resolve outstanding issues that prevent full operation of environmental works at Gunbower Forest and Koondrook–Perricoota Forest.

Investigations of the maintenance of channel capacity through the Barmah Choke will continue. MDBA will continue to work with Basin governments to assess capacity and shortfall risks across the River Murray system and tributaries. Coordinated work and engagement plans will be accelerated to inform governments and stakeholders of risks and potential mitigating measures. Next year will also see the first of the triennial reviews of River Murray operations.

Monitoring of bank condition due to regulated flows downstream of Dartmouth and Hume dams will continue in 2019–20, including consideration of the impacts associated with increasing vessel use along the river and in weir pools.

MDBA will implement dam safety upgrade works at Lake Victoria following the completion of the risk assessment and business case approval.

A new Aboriginal Heritage Impact Permit for Lake Victoria will be developed to ensure that operation of the lake meets environmental and cultural requirements.

A native fish management and recovery strategy will be developed to coordinate and priorities activities.

Other challenges relate to improving the efficiency of the delivery arrangements for water for the environment, which is linked to the sustainable diversion limit adjustment mechanism and the Enhanced Environmental Water Delivery project. The predicted dry conditions will require careful consideration.

Goal 4

Improve transparency and confidence in the Basin Plan, River Murray operations and the MDBA

Improved transparency and confidence in the Basin Plan, River Murray operations and the MDBA is critical to achieving a healthy, working Basin. Transparency allows all governments, industries and communities to access the legislative settings and key documents that govern the Basin's water resources and, in turn, understand the rules and regulations that protect and share water resources.

Priorities for 2018–19

- Develop, implement and manage stakeholder engagement, communications, education and media support for key MDBA tasks and activities.
- Maintain and expand regional presence and engagement.
- Support the Basin Community Committee.

Highlights

- The MDBA enhanced its engagement activities and across the board increased the public release of materials relating to all MDBA operations.
- The first annual report card was published in December 2018 and the second was published in June 2019.
- The MDBA discussion paper, *Climate change and the Murray–Darling Basin Plan*, was released in February 2019—a series of workshops is to be convened by Advisory Committee on Social, Economic and Environmental Sciences (ACSEES)
- The 'Basin and Eggs' breakfast seminar series was initiated.
- The coverage and style of educational materials was increased.
- The 'Understanding water management' suite of materials was released.
- The Regional Engagement Officer (REO) program was expanded and the MDBA worked to relocate 30% of MDBA staff to regions by mid-2021.
- The MDBA worked towards creating an Indigenous position as a permanent seventh position to the currently six-member Murray–Darling Basin Authority—a ministerial announcement was made in February 2019.
- Twelve new members were appointed to the Basin Community Committee, representing a diverse range of experience and perspectives and increased consultation with the committee on selected MDBA projects.

Analysis

The Basin Plan reforms are complex and balance competing interests—the environmental health of the Basin, irrigated and dryland agriculture, community needs, cultural values and recreational users. In the context of an ongoing drought and raised levels of stress, there has been added scrutiny and pressure on the MDBA and all governments involved in the Plan. MDBA is working to enhance Basin communities' awareness and understanding of and support for the Plan and its components. MDBA remains committed to transparency and open engagement with all stakeholders and has worked hard this year to find ways to maintain trust and confidence.

MDBA conducts regular communication and engagement with Basin communities to provide information on drought conditions and the impact upon water availability and conditions. Extensive market research in 2018 found that basic understanding of water management and policy arrangements was low in Basin communities, resulting in discussion that was not well informed.

In 2018–19 MDBA expanded its public reporting across all aspects of operations and engaged broadly in discussion about topics of interest and concern to the community and industry. For example, in early 2019 the MDBA initiated its 'Basin and Eggs' public engagement breakfast seminar series, inviting prominent speakers to discuss topics of Basin interest with community leaders. The 'Understanding water management' suite of materials was published on the website. The MBDA has also continued to publish all material used to guide decision-making. This has included water resource plan material, a discussion paper on climate change in the Murray–Darling Basin, and information on floodplain harvesting and conveyance losses in the River Murray system. MDBA also publishes a six-monthly report card on progress across six key deliverables.

MDBA's regional presence has been strengthened. By the end of the year MDBA had met its target of 10% of staff in regional locations throughout the Basin. A ministerial decision was announced to increase this to 30% by mid-2021. In addition to the existing regional offices in Adelaide, Albury–Wodonga, Goondiwindi and Toowoomba, and another three offices will be opened.

Membership of the Basin Community Committee was renewed and increased, resulting in a diverse range of membership with an impressive depth of cumulative knowledge and expertise. The committee has reactivated an Indigenous subcommittee. Legislation is being prepared to create a permanent Indigenous position as the seventh member of the Authority.

The success of the MDBA engagement strategies is measured by the increasing public release of reports and data; number of visits to the website; feedback from Basin governments, industry and communities; feedback via the consultative bodies; and direct feedback through interactions with staff in the regions and the Regional Champions.

KPI result

KPI6 is: Provide accessible evidence-based information and products, and undertake targeted engagement to obtain feedback and improve the effectiveness of the MDBA activities.

Result for 2018–19: Achieved.

This is evidenced by the following measures of success:

- Effectiveness is measured by an extensive market research survey—a benchmark study in 2018 has informed many of the initiatives and activities this year. The next survey in 2021 will allow for comparison over time.
- An increase in website traffic shows heightened interest by stakeholders and increased engagement.
- The amount of materials made available has increased and feedback has been positive.
- The Basin Community Committee has expanded and there is increased participation in MDBA operations.
- Escalated regionalisation and appointment of Regional Executive Champions allows for on-the-ground local engagement.

Stakeholder engagement

Improved transparency and confidence in the Basin Plan, River Murray operations and the Murray–Darling Basin Authority is critical to achieving a healthy, working Basin. The MDBA engages with a broad range of stakeholders, including governments, peak bodies, industry, communities and the public. In 2018–19 MDBA enhanced its engagement and reporting with a focus on achieving:

- increased awareness, understanding and support for the Basin Plan and River Murray operations
- improved stakeholder perceptions of the MDBA's transparency and independence
- better understanding and acceptance of key deliverables and their impacts by target audiences
- increased regional presence that connects MDBA with key local stakeholders and supports coordination and implementation of water management at the local level.

The MDBA has endeavoured to strengthen and expand its engagement across the range of diverse stakeholders and to significantly enhance the information made available on its website. Over the past few years a significant number of reviews have taken place. The results of these, and MDBA's responses, are all available on the website. The drought conditions and the fish death events have activated public opinion and have been the subject of much media activity. Through this, it became apparent that there is general confusion in relation to the roles and responsibilities of the MDBA and Basin states.

Basin Plan annual report card

In December 2018 the MDBA published its first annual report card. It responds to feedback from the community seeking short, timely updates on progress. In preparing the report card, MDBA considered a number of technical reports and sources of information. The assessment accounted for project status, delivery time frames, governance and funding, and community consultation.

Six key elements of Basin Plan implementation have been assessed. Some elements are on track, some need more resourcing and immediate actions, and others are at risk of delay. These elements are interconnected; the Basin Plan needs progress in all areas to set the groundwork for a healthy and sustainable Basin.

The MDBA also publishes the detailed Basin Plan Annual Report, which tracks the progress of the Basin Plan and associated water reforms.

Figure 2.11 Basin Plan report card at 1 July 2019

On track
Good progress
Some progress
Substantial work ahead
At risk of delay
High risk

WATER RESOURCE PLANS

As anticipated, Water Resource Plans were not completed by the original June 2019 deadline. Continued effort and commitment is needed to deliver these plans.

ENVIRONMENTAL WATER DELIVERY

In drought, this water is working to protect habitats, but like all entitlement holders there is limited water available for use. Challenges with the delivery of water for the environment in the past year are concerning.

COMPLIANCE

Governments continue to deliver against the Compliance Compact—additional resourcing and monitoring will strengthen compliance with water management rules across the Basin.

WATER RECOVERY

Bridging the gap—Water recovery is close to completion, although targeted local recovery still needs to be completed.

NORTHERN BASIN INITIATIVES

Some initiatives are progressing, others need fast-tracking and continued liaison with communities. Reforms to protect low flows and water for the environment need to be fully implemented.

SUSTAINABLE DIVERSION LIMIT ADJUSTMENT MECHANISM

Supply and constraints projects—Basin state governments are progressing some projects, others need fast-tracking to achieve completion by 2024 deadline.

Efficiency measures—The required 62 GL/y of efficiency measures has not been recovered, and Sustainable Diversion Limit will adjust from 605 GL/y to 544 GL/y for 2019–20.

Public consultation

As part of the MDBA's engagement strategy, stakeholders can contact the MDBA directly through email or through the 1800 number. The MDBA also runs engagement activities across the Basin.

During 2018–19 the MDBA:

- attended more than 671 meetings or engagement activities (631 being face-to-face, 40 teleconferences), nearly two-thirds of which were held outside Canberra
- held five webinars
- received more than 650 public requests for information via email or phone.

The engagement strategy to support consultation in the southern Basin on the River Murray losses report was an important engagement initiative undertaken during the year. The April release of the report was supported by three stakeholder meetings held in Deniliquin and Shepparton, providing the opportunity for stakeholders to discuss the content of the report.

Consultation has also occurred through the release of the climate change discussion paper, calling for public submissions. While the Basin Plan is an adaptive plan with regular evaluations and reviews, it has been increasingly recognised that a dedicated climate change program is required to draw in more information and strategically position the MBDA and the Basin Plan ahead of the 2026 review. The MDBA is keen to hear from the public to guide this work, which is being progressed in collaboration with ACSEES.

Understanding water management

Water management is complex. In 2018–19, the MDBA developed a suite of timeless, factual material to increase understanding of water management and water use in the Basin. This suite of material was developed in consultation with the MDBA's REOs and the Basin Community Committee to ensure the information in the suite met the needs of stakeholders across the Basin.

The suite consists of fact sheets, animations, web content and presentation material, all of which have been shared across all government agencies responsible for water management in the Basin.

Qualitative analysis suggests this content is meeting audience needs by providing entry-level information on water management.

Murray–Darling Basin Authority website

The MDBA website received between 30,000 and 40,000 visitors every month during the year. This is a slight increase from the last financial year.

The MDBA has improved its approach in communicating the benefits of water for environment. Water for the environment is used to improve the health of our rivers,

wetlands and floodplains. Water is allocated to federal and state environmental water holders across the Basin, who make decisions about when, where and how much water is released for the environment, and with measurable environmental outcomes in mind.

In 2018–19, the MDBA developed a digital report card to communicate the environmental outcomes being achieved at specific sites in the Basin through use of water for the environment. A robust methodology has been applied to give each indicator a grade (A through to D)—a simple way to summarise the detailed technical report. Data for the last 10 years was also used to provide a narrative of the use of water for the environment over time. These elements of the website will be updated with new data at the end of each water year.

'Basin and Eggs' breakfast seminar series

The MDBA marked World Water Day on 21 March 2019 with the first in a series of 'Basin and Eggs' breakfast seminars. The aim of the series is to promote different views and ideas about water reform in Australia, with the first breakfast attendees hearing how the world is closely watching Australia's leadership on water management. Speakers at the breakfast included:

- Katrina Myers—an avocado farmer who spoke about importance of water planning in farming life
- Professor Nick Bond—from La Trobe University, who gave updates on river ecology
- Will Fargher—director of Aither, a water advisory firm, who spoke about how the Basin is being watched by other countries that also grapple with the challenge of responding to water scarcity and drought.

The theme for this year's World Water Day was 'Leaving no one behind'.

This breakfast series has been delivered in Griffith and Melbourne to date, with the series continuing into 2019–20.

International engagement

In 2018–19, the MDBA briefed visiting government and non-government delegates from Myanmar, USA, Brazil, Pakistan, New Zealand, Bangladesh, Nepal, India, Tajikistan, Kazakhstan, Bhutan, South Korea, Iraq, Papua New Guinea and representatives from Eco Peace representing the Jordan River countries of Palestine, Israel and Jordon.

The MDBA hosted a visit by a Texas State Representative to provide insights into water markets, water sharing and the science behind the implementation and evaluation of the Basin Plan.

The MDBA was invited to provide the keynote presentation at the Mekong River Commission 5th Stakeholder forum on Mekong Integrated Water Resources Transboundary water resources management in Bangkok.

MDBA progressed phase 2 of the Ayeyarwaddy Murray–Darling Basin twinning relationship—sharing knowledge and basin planning expertise as requested by the Government of Myanmar. MDBA also attended the Myanmar World Water Day Celebrations in Yangon, Myanmar.

The Memorandum of Understanding with the Mekong River Commission was renewed until 2024.

Schools program

The audit results were used to develop themed units of work around the topic 'Water as a resource', 'Environmental change and management' and 'Life and the environment'. To support these new products, the MDBA redesigned the education web pages.

MDBA also partnered with Petaurus to deliver Basin-themed lessons in schools in the southern Basin and at the Wirraminna Environmental Education Centre (a regional hub for school excursions). Hundreds of school students participated in interactive lessons to engage them in the local significance of the Basin and how they are connected to the whole Basin. The value of the Basin is fundamental in these curriculum-linked lessons, which have proved to be popular.

The curriculum-linked lesson packages are also popular and useful for teachers, with over 7,290 visits to the lesson packages page. This translates to on average 15 to 35 students per teacher being exposed to Basin materials and messages.

The downloads page had 10,270 visitors to the page. This allows visitors to view, download and order printed materials, which are some of Education's most popular resources.

As an example of demand for printed materials, almost 2,000 copies of the Basin map poster have been ordered in the month since it was reprinted in April 2019. As a result of this ongoing popularity the resources are being updated as stocks are ordered.

Questacon

MDBA staff took over Q Lab at Questacon for a week in March and presented a range of exhibits centred on World Water Day. The displays and activities made the Murray–Darling Basin relevant to visitors' everyday use of water. Over 3,000 members of the public, mostly school students, visited during the week. The MDBA partnered with ACT Waterwatch, which contributed its popular tanks of macroinvertebrates (such as insects, molluscs and worms) to allow members of the public to engage with their local river ecosystem. Overall, the exhibition helps to build the connection between how everyday items visitors use require water and how and why we need to manage it sustainably.

Apps

The MDBA website has two interactive apps available for download:

- Run the River
- Waterweed Wipeout.

The ever-popular Run the River app was downloaded 2,701 times, which is excellent for a six-year-old app. The Waterweed Wipeout app was downloaded 411 times. The apps are supported by teachers' notes and links to further resources. The Run the River teachers' notes were downloaded 874 times in 2018–19 (on average a teacher has a class of 15 to 35 students, which means each download translates to a higher level of student exposure).

Atlas of Living Australia

The MDBA partnered with the Atlas of Living Australia last year to map the distribution of flora and fauna across the Basin. People accessing the map can browse by species, wetland, catchment area, MDBA Plan area or resources available. The platform also connects interested people in citizen science projects across the Basin.

Regional presence and engagement

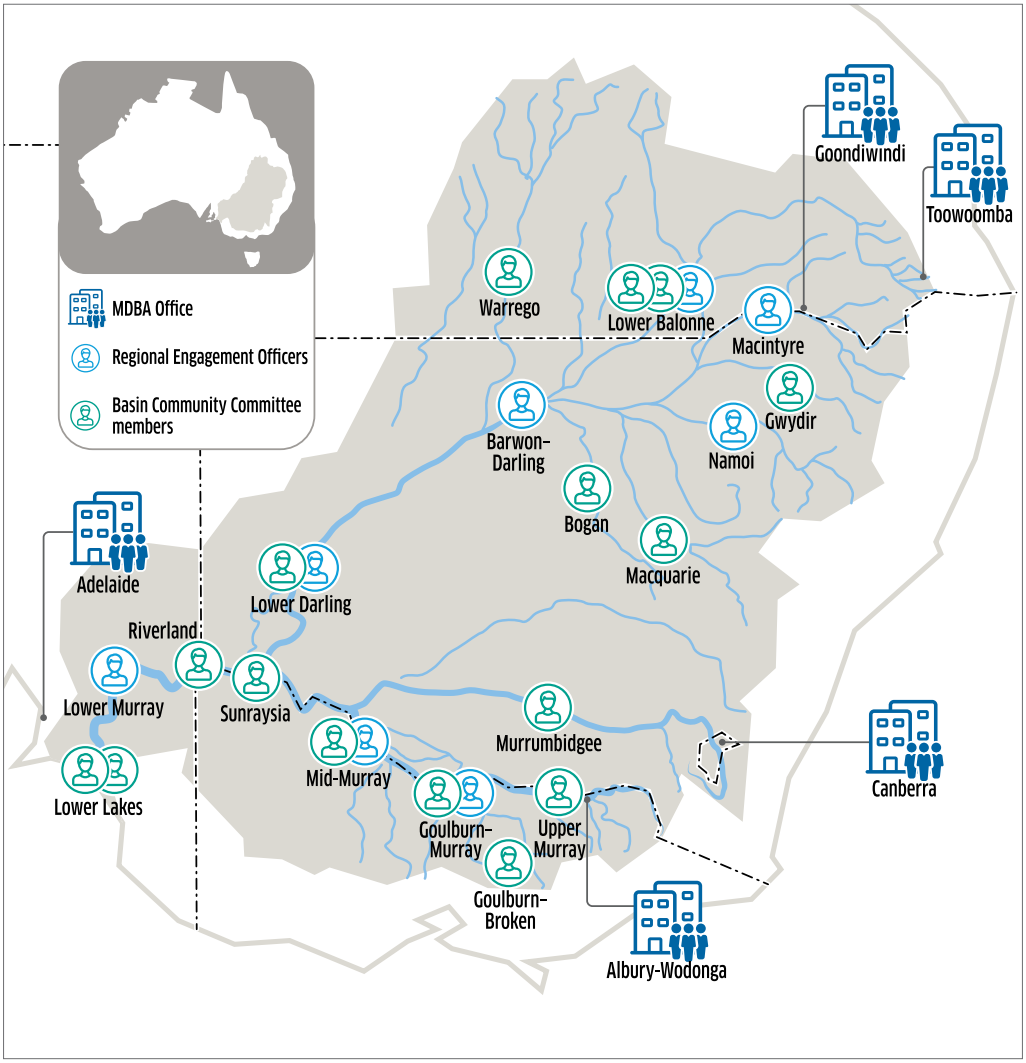
The MDBA embarked on a program of increased regionalisation in 2017 with the establishment of eight REOs and regionalisation of some staff of the organisation. Offices were opened in Albury–Wodonga, Toowoomba and Adelaide. The MDBA continued to increase staff numbers in these regional offices. In November 2018, the MDBA opened a fourth regional office in Goondiwindi to increase the MDBA presence in the northern Basin area. By early 2019, approximately 10% of MDBA staff were located outside of Canberra, achieving the MDBA target.

In early March 2019 the Australian Government announced that the MDBA would be further decentralising, with approximately one-third of MDBA to be located in regions across the Basin by mid-2021. The decision by the Australian Government will see a further 76 positions, in addition to the MDBA's current regional staff, relocated to regional centres. There will also be an expansion of the MDBA's Goondiwindi and northern presence to 20 staff, along with new offices in Griffith (20 to 30 staff), Mildura (20 to 25 staff) and Griffith (25 to 30 staff) and Murray Bridge (10 to 12 staff).

MDBA has also appointed Regional Executive Champions to specific areas of the Basin. The Regional Executive Champions focus on increasing their regional networks and their understanding of the regions challenges and opportunities in the context of Basin water management.

The expanded regional presence (regional staff; REOs and Regional Executive Champions) allows MBDA to develop a greater understanding of stakeholder concerns, improve stakeholder relationships and enhance its regional water management connections. The regionalisation program is considered in the context of, and complements, many other engagement strategies such as the Basin Community Committee, work with Murray Lower Darling Rivers Indigenous Nations and Northern Basin Aboriginal Nations, and many other Indigenous engagement projects.

Figure 2.12 Locations of MDBA offices, Regional Engagement Officers and Basin Community Committee members



Engagement with communities

In addition to the on-the-ground engagement in the regions where MDBA staff are located, MDBA engages with a number of committees.

Basin Community Committee and Advisory Committee on Social, Economic and Environmental Sciences

The Basin Community Committee is the MDBA community advisory body guiding the management of the Basin.

Members of ACSEES contribute their expertise and provide advice to the MDBA on a range of matters relating to the implementation of the Basin Plan.

See Appendix A for more information about membership of these committees and their key areas of business focus during 2018–19.

Challenges in the year ahead

With the forecast of ongoing dry conditions, the focus for 2019–20 will be on continuing to provide accessible information that keeps the broad range of stakeholders informed about water conditions across the Basin and how the delivery of water is being adapted and managed. Retaining trust and confidence in the Plan, and reporting transparently on progress, will be paramount. MDBA will continue to build on the range of communication and engagement programs already in place. MDBA will continue to work with and support the expanded BCC across a range of programs.

The expanding location of staff in regions across the Basin will bring further opportunities for collaboration with communities and to forge stronger networks. MDBA also looks forward to working with the new seventh member of the Authority. These changes provide the opportunity to develop new long-term operating and capability models, supported by a new workforce strategy to begin during the 2019–20 year. The models and strategy will focus on developing a strong workforce, with the required technical expertise, supported by a strong data management platform and access to external data-rich sources.

Goal 5

Be the centre of excellence in the science and knowledge of the Murray–Darling

The MDBA collects and collates the data, knowledge and analysis to inform its decisions. It uses this information to guide the implementation, monitoring, evaluation and reporting of the Basin Plan.

Incorporating environmental, social and economic considerations into policy decisions is essential to a healthy, working Basin.

Access to the best available science and data will mean that:

- the MDBA is recognised as having a deep understanding of the social, economic, hydrological and ecological conditions of the Murray–Darling Basin
- the data and analysis used in decision-making is robust and defensible
- the MDBA has a cost-effective data and knowledge acquisition strategy.

Priorities for 2018–19

- Undertaking reviews and evaluations as required by legislation including those relating to:
  - the Water Quality and Salinity Management Plan
  - the Basin Watering Strategy
- Providing MDBA staff with the right technical and scientific information, at the right time, to input into key decisions
- Partnering with research institutes and other external entities to generate new knowledge and collect data in accordance with the MDBA's Knowledge Acquisition Strategy
- Planning and developing enhanced data and information communication technology systems, processes and frameworks
- Providing more efficient data storage, access and retrieval
- Providing high-quality, ongoing support to River Murray operations and Source model adoption
- Undertaking hydrological studies to support Basin Plan implementation

Highlights

- Basin annual environmental watering priorities were published on 25 June 2019.
- The review of the Basin-wide environmental watering strategy was completed in April 2019. This will inform the next version of the strategy to be published in November 2019.
- Two full-time cultural flow officers were appointed to work with the Murray Lower Darling Rivers Indigenous Nations (MLDRIN) and the Northern Basin Aboriginal Nations (NBAN). The positions are funded by the Australian Government for three years.
- Engagement activities were held with agency and jurisdiction staff across the Basin as part of Basin Science Platform project.
- The Source Murray Model was adopted for the purpose of water resource planning by South Australia, Victoria and New South Wales. This is the culmination of a number of years of work on a contemporary model for the Murray and lower Darling river systems.
- The findings of an independent review of potential impacts of groundwater sustainable diversion limits and irrigation efficiency projects on return flows to the Basin were published.
- The Basin Salinity Management Register was updated with entries for salinity impacts of accountable actions. Updates were based on the latest groundwater modelling and new data.
- Basin Plan salinity targets and salt export objective were achieved.
- A floodplain inundation model set up for Hume to Yarrawonga river reach was completed.
- The draft report of an independent review on floodplain harvesting, and what needs to be done before licensing and accounting can happen, was released.
- The MDBA published a study of rainfall and run-off in the northern Basin.
- The Revised Evaluation Framework for the Basin Plan was published in May 2019.
- The MDBA Knowledge Framework process was finalised.

Analysis

In the year, when the ongoing drought continued to create the need for difficult decisions across the Basin, there was renewed emphasis on having access to the best science and data to inform these decisions.

The MDBA aims to be a centre of excellence in the science and knowledge of the Murray–Darling, knowing that this will also promote confidence that decisions are based on defensible data and analysis. This includes making information available in a timely way. For example, in February 2019 the MDBA published a discussion paper, Climate change and the Murray–Darling Basin Plan, to explain how the Basin Plan helps manage and adapt to the impact of climate change.

Under the *Water Act 2007* (Cwlth) the MDBA is obliged to conduct reviews and evaluations, including the Basin Watering Strategy and five-yearly evaluations of the Basin Plan. The MDBA not only met these deadlines in 2018–19 but also enhanced the evaluation process to maximise the value from the review. Changes to the Evaluation Framework for the Basin Plan were informed by lessons and recommendations from a variety of sources including the Productivity Commission's report on National Water Reform.

Commitment to the findings of the National Cultural Flows Research Project has resulted in new sources of knowledge and more engagement with the Aboriginal people who make up approximately 3.5% of the Basin's population. During the year, two cultural flows project officers were employed—this is one of the ways the MDBA is demonstrating commitment to ensuring Aboriginal interests are considered in the management of the Basin.

The MDBA continues to tap into external parties' knowledge through collaborations with institutions including the CSIRO and universities. Communities of practice provide another source of knowledge collection and sharing and in 2018–19 the Ministerial Council endorsed the establishment of a new community of practice to support Aboriginal engagement in the Basin.

In 2018–19 considerable effort was invested in enhancing ICT and data systems. This is essential to support business tools, such as the new sustainable diversion limit (SDL) compliance database (see p. 195) and the use of satellite imagery for compliance activities. It also enables the use of sophisticated modelling systems, such the Source Murray Model.

KPI result

KPI7 is: Incorporate environmental, social and economic considerations in planning, implementation, monitoring, evaluation and reporting, and using the best available science and data.

Result for 2018–19: Achieved.

Measurement of achievement of this KPI is mainly qualitative based on incremental enhancements. There are six measures showing evidence of success:

- environmental, social and economic impacts included in Authority decisions as evidenced by practices including:
  - embedding these factors into templates
  - publishing case studies for major decisions where the triple bottom line was considered
- deadlines for all reviews and evaluations met as required under the Water Act
- Aboriginal engagement and participation in everyday work and projects across the MDBA continued to grow with implementation of the cultural flows assessment methodology across the Basin and the development of a community of practice to support Aboriginal engagement in the Basin
- the MDBA had at least 10 formal Collaborative Head Agreements with a range of key research institutions and external bodies for strategic research into the Basin. It also had a number of initiatives with external entities and research providers
- the MDBA's enterprise data initiative and other ICT enhancements showed improvement in the management of data to support decision-making
- the level of stakeholder satisfaction with access to MDBA information provides an indication of stakeholders' views of whether the MDBA is using the best available science and data. It is assessed against the 2018 baseline measures every three years. In the interim, the MDBA is able to monitor this through measuring website traffic and other engagement activities as outlined in strategic goal 4 (see p. 84).

Reviews and evaluations

The MDBA is required under the Water Act to do certain reviews and evaluations.

Basin watering strategy

The *Basin-wide environmental watering strategy*, first published in 2014, must be reviewed and updated no later than five years after it was first made (no later than 24 November 2019). The Authority has chosen to do a thorough review but to stage the updates so that they inform the next two editions.

To avoid triggering a review of state long-term environmental watering plans that are still being developed, the 2019 review will not make substantial changes to the overarching goals and objectives. However, the review will highlight key issues to be considered when a full review is undertaken in 2022.

Updates for the 2019 strategy include:

- reinforcing the importance of constraints relaxation and implementation of prerequisite policy measures
- refining water management strategies to promote greater collaboration between water managers
- a clearer explanation of how monitoring, evaluation, reporting and improvement are undertaken in Basin Plan evaluations
- climate change
- adaptive management.

About adaptive management

The approach to the 2019 review is consistent with adaptive management—a structured decision-making process widely used in environmental management.

Adaptive management uses an iterative process to test management approaches to see which are most effective at achieving specified environmental outcomes. It allows for continual improvement, because management actions can be changed in response to a monitored system response.

The third edition will be published in 2022 and will have material changes. It will capture learnings from the 2020 review of the Environmental Watering Plan (see below) as well as the 2020 evaluation of the Basin Plan. Updates for the 2022 strategy include:

- First Nations' objectives and outcomes for shared benefits of environmental water
- improved SMARTness (Specific, Measurable, Achievable, Relevant, Time-bound) of expected environmental outcomes
- assessment of climate change vulnerability and risks.

Climate change is likely to have a significant impact on the Basin's rivers and water-dependent ecosystems. Longer-term projections indicate that the Basin's climate is likely to trend towards hotter and drier conditions, with the longer droughts interspersed by more extreme rainfall. If these trends eventuate, there is a risk the Basin Plan will not achieve many of its intended environmental objectives and have slower progress towards others. Consistent with the principles of adaptive management, the MDBA is taking steps to understand the impact of climate change on the strategy's expected environmental outcomes and water management strategies. See also 'Case study: Response to climate change' (page 32).

Environmental Watering Plan

The MDBA is required to review the Environmental Watering Plan before the end of 2020 and every five years thereafter. The plan sets out:

- environmental objectives and targets for water-dependent ecosystems
- a framework for managing planned and held environmental water
- methods to identify environmental assets
- principles and methods to be applied when prioritising the application of environmental water, in line with the requirements of s. 28 of the Water Act.

Section 13.09 of the Basin Plan Guidance provides guidance about how the Authority should conduct the review. A review of the targets set out in Schedule 7 is mandatory; however, the decision to extend beyond them is at the MDBA's discretion.

In 2018–19 the MDBA started a review consisting of an external component followed by an internal component. The external component is being done by Alluvium Consulting. It will explore and determine:

- innovative governance and planning frameworks
- how knowledge on best practice in planning and natural resource management may have changed since the Environmental Watering Plan was last drafted
- the perspectives of key stakeholders on how the Environmental Watering Plan operates on the ground
- the implications of particular clauses for practitioners.

The findings and recommendations of the external review will be used to guide the MDBA's internal review in 2020.

Water Quality and Salinity Management Plan

The MDBA is required to review the targets in the Water Quality and Salinity Management Plan of the Basin Plan before the end of 2020 and every five years thereafter. The purpose of the review is to assess the effectiveness of the water quality targets in the plan. The review must be undertaken in consultation with Basin states, the Commonwealth Environmental Water Holder and other relevant Commonwealth agencies.

In 2018–19 the MDBA developed a draft project plan for this review. The project plan will consider:

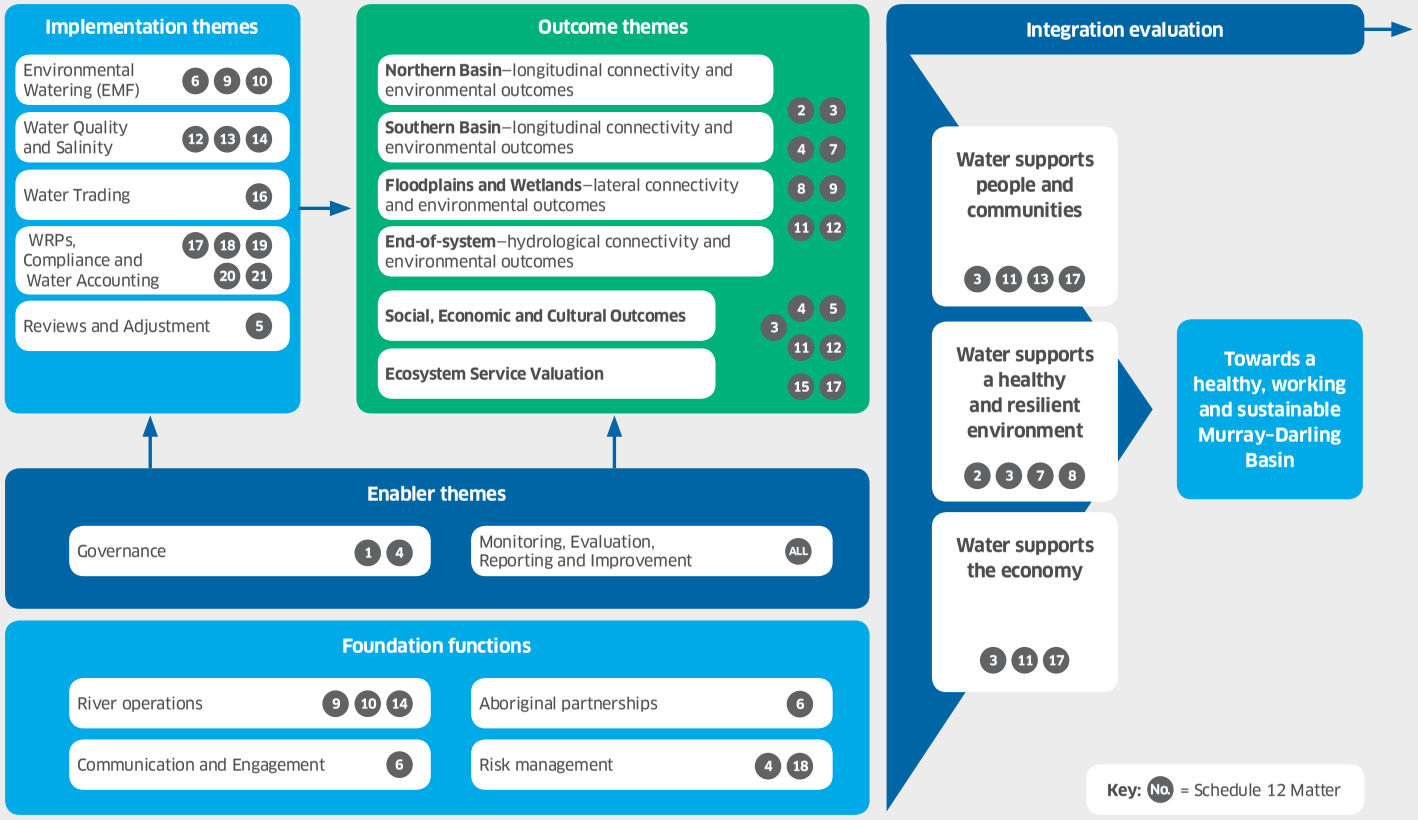
- the alternative water quality targets proposed by the states when they developed their water resource plans (WRPs)
- the recommendations of the Productivity Commission and 2017 Basin Plan evaluation.

Basin annual environmental watering priorities

The MDBA publishes Basin environmental watering priorities at the beginning of each water year. This guides the planning and delivery of environmental water by environmental water holders. The priorities are the annual steps needed in order to achieve the environmental outcomes of the Basin Watering Strategy and the Basin Plan.

In February 2019 the MDBA published a Basin environmental watering outlook (two months earlier than usual). This helped guide the actions of environmental water holders to partially respond to the fish death crisis. The MDBA then prepared the Basin annual environmental watering priorities in consultation with relevant parties and published them on 25 June 2019.

Figure 2.13 Overview program logic of the Murray–Darling Basin Plan



(Source: Framework for evaluating the Murray–Darling Basin Plan, Murray–Darling Basin Authority, Canberra, 2019, p. 14)

2020 evaluation

The Basin Plan must be evaluated every five years. It was reviewed for the first time in 2017 and the next review is due in 2020. After the 2017 evaluation the MDBA reviewed and revised the evaluation framework to ensure future evaluations better met the requirements of the Water Act and the Basin Plan. The revised framework includes lessons and recommendations from:

- the 2017 Basin Plan Evaluation
- an independent review of the 2017 Basin Plan Evaluation
- the Productivity Commission's report on National Water Reform.

The revised Framework for evaluating the Murray–Darling Basin Plan was published on 30 May 2019 and is available on the MDBA's website. The framework will inform the early development and collaboration on methods and analysis for the 2020 evaluation.

During 2018–19 the MDBA consulted with the Basin states to develop water quality and salinity questions for the 2020 Basin Plan Evaluation. As part of this process, the MDBA is revising the Basin Plan Schedule 12 reporting guidelines to assist the Basin states to meet their reporting obligations.

Science and knowledge to support decision-making

The MDBA uses modelling to support river management and inform policy development. Knowledge gained through the modelling contributes to the Science Platform project.

Water resource plan models

In 2018–19, the MDBA continued to work with Basin state governments to review river system models to be used to develop their WRPs. The models are to be used for:

- computing the annual permitted water take
- demonstrating compliance with the long-term annual diversion limit for the take from regulated and major unregulated rivers.

The reviews included fit-for-purpose assessment and consistency with the Basin Plan and Water Act provisions for use of the best available information and science.

Working with partner governments assisted the preparation and submission of WRPs for the surface water areas of the Australian Capital Territory, New South Wales, Queensland, South Australia and Victoria. Final advice has been provided for models in Queensland, South Australian and Victoria. The MDBA is continuing to work with the Australian Capital Territory and New South Wales to finalise assessment and advice on models in New South Wales sustainable diversion limit units.

Water resource plan environmental watering provisions

WRPs must provide for effective environmental watering. To ensure that this is the case, the MDBA has provided technical advice on numerous WRPs. In this process, several key policy issues have been resolved, such as:

- the definition of 'planned environmental water'
- the protection of environmental water (also called 'no net reduction')
- connectivity with downstream catchments.

This has ensured that accredited WRPs can play their part in achieving the Basin Plan's environmental objectives.

CASE STUDY

Case study—Prompt action on fish deaths

Fish deaths in the lower Darling in December 2018 and January 2019 made international media headlines and focused community attention on the MDBA and the Basin governments.

The three events took place within a 40 km stretch of the Darling River, downstream of the Menindee Lakes, with fish mortality estimates in the range of hundreds of thousands to more than a million.

All segments of Australian society—in particular, distressed communities, in addition to a critical national media—looked to the MDBA and the New South Wales Government for answers to two questions: how and why it happened and then what can be done to prevent it happening again.

Soon after the events, the MDBA brought together Basin governments to discuss the crisis and determine next steps and actions. This resulted in an action plan that guided short- and medium-term activities by governments, environmental water holders and the MDBA.

The January action plan report outlined catchments at immediate risk of fish deaths across the Murray–Darling Basin, collated information about what is being done on the ground, and recommended actions for the Australian Government to consider.

It noted the stark influence of the drought on the environment, with fish death events common across Australia, particularly during summer and in drought, and flagged the risk of further fish kill events occurring across the Murray–Darling Basin before the current drought breaks.

The action plan reported on the extensive amount of work already underway to help prevent further fish deaths and stressed the importance of transparency and community involvement in the response.

Actions recommended and implemented by governments and the MDBA include:

- support for critical on-ground incident response across the Basin through identifying priority and at risk fish populations and refuge habitats using scientific and community knowledge
- extra monitoring of water quality and fish
- supplementing measures to protect critical refuges including additional aerators, community-initiated activities and investigation of new technologies
- earlier publication of the MDBA Basin Annual Environmental Watering Outlook to provide guidance to environmental water holders and communities on strategies to maintain water quality and critical fish habitats to facilitate recovery in the coming year
- river operators and environmental water holders to have regard to water quality and work closely to identify further opportunities to protect fish populations in areas at risk, with available water
- increased interagency collaboration to improve communication and engagement with communities in relation to river operations and water resource availability and risks to fish or other flora and fauna, communities and water users.

In January 2019 the government announced a $5 million Native Fish Management and Recovery Strategy to protect and restore native fish populations in the Murray–Darling Basin. A business case is being developed in consultation with Basin governments, scientists and community representatives (including Aboriginal stakeholders) and is expected to be finalised early in 2019–20. The development of the strategy will follow after the business case is approved by the Basin Officials Committee.

Also in January 2019, Minister Littleproud commissioned an independent panel chaired by Professor Rob Vertessy which investigated the fish deaths and provided findings and recommendations to Basin governments.

The panel found that hot conditions and low flows resulted in significant algal blooms. These factors combined caused stratification of the waterholes followed by a sudden change in temperature and wind, resulting in a sudden de-stratification and low oxygen throughout the water column and no space for the fish.

The panel found that the implementation of the Basin Plan should be accelerated in order to reduce the risk of similar events in the future.

The panel made 27 recommendations for Basin policy makers and water managers for implementation within one, two or three years, including the need for greater investment in water research and for action to improve the health of the rivers by safeguarding low flows and environmental flows in the Basin.

MDBA Science Platform project

During 2018–19 the MDBA continued work on the Basin Science Platform project. The project aims to identify the science and knowledge needed to inform the decision-making to successfully implement the Basin Plan.

The Basin Science Platform Working Group oversees the project. Members include representatives from:

- the MDBA
- each Basin jurisdiction
- the Commonwealth Environmental Water Office (CEWO)
- the Australian Department of Agriculture.

In February 2019 the MDBA commissioned a consortium led by Alluvium Consulting to provide a gap analysis and strategic plan for the project. In the first half of 2019 workshops and meetings were held with agency and jurisdiction staff across the Basin. There has also been targeted engagement with First Nations representative bodies and with the broader scientific community.

Information gathered will be used to develop a model and implementation and management plan for the Basin Science Platform. The project is on track for delivery in 2019–20.

Aboriginal participation in environmental water management

The MDBA continues to undertake genuine engagement with Aboriginal people across the Basin. This includes the design and implementation of projects that allow meaningful Aboriginal participation in environmental water planning and management activities.

For example, the First Nations Environmental Water Guidance Project started in 2018–19. The project aims to develop a defined and transparent methodology for First Nations' environmental watering objectives to be incorporated in environmental water planning. By engaging First Nations peoples in a collaborative design process, the MDBA and CEWO hope to:

- foster a partnership with key representative bodies (NBAN and MLDRIN)
- establish an enduring mechanism for including First Nations objectives into Basin environmental water planning.

In 2018–19, traditional owners were also involved in:

- developing a business case for the Native Fish Management and Recovery Strategy
- revising the Basin-wide Watering Strategy
- developing evaluation questions for Aboriginal outcomes in the 2020 Basin Plan Evaluation.

Following the completion of the National Cultural Flows Research Project in mid-2018, the MDBA is assisting NBAN and MLDRIN to implement the cultural flows assessment methodology across the Basin. This work commenced in 2018–19 with workshops in both the northern and the southern Basin. The workshops allow Aboriginal Nations to identify cultural flows priorities and objectives, develop a cultural flows management plan and ultimately, secure water entitlements. The community—and governments'—understanding of cultural flows is increasing as this work progresses.

Community of practice

In December 2018, the Ministerial Council endorsed the development of a community of practice to support Aboriginal engagement in the Basin. When established, such a community will provide regular opportunities for engagement practitioners across the Basin (both government and non-government) and Aboriginal people to share information and coordinate water planning and management activities. This includes those that provide for the achievement of cultural objectives in water resource plans. The community of practice will further embed the notion that Aboriginal engagement is included in our everyday work and projects.

MDBA staff attend MLDRIN and NBAN board meetings and 'full gatherings' of member Nation delegates. This provides a two-way opportunity to share information on relevant projects or initiatives, engagement protocols and opportunities for future engagement and participation.

Knowledge acquisition and partnerships

In 2018–19 the MDBA continued to develop the Knowledge Framework and Knowledge Collaboration Strategy. Activities to identify knowledge needs included:

- using the Knowledge Framework to integrate and prioritise areas of knowledge nominated by MDBA staff
- having the MDBA Executive review knowledge priorities and identify strategic gaps to be addressed, specifically
  - hydrology and hydrological modelling
  - Geographic Information System (GIS) and remote sensing
  - climate change
  - social, economic and cultural factors
- developing a Collaboration Statement to communicate the MDBA's knowledge needs to external stakeholders. The Collaboration Statement will be used to inform discussions with the Department of Agriculture and CEWO about overall Commonwealth knowledge needs.

The MDBA had at least 10 formal Collaborative Head Agreements with a range of key research institutions and external bodies used for strategic research into the Basin. These were established through the Department of Finance's National Collaboration Framework. The MDBA also had a range of cooperative initiatives with external entities and research providers through MDBA contracts and grants, MDBA-led communities of practice and state and Australian Government funded programs.

The MDBA's three-year strategic research partnership with the National Centre for Groundwater Research and Training (NCGRT) that ended in 2017 considerably enhanced knowledge of groundwater. It also provided a basis for further work. The final report on research findings was published in March 2019 and is available on the NCGRT website.

Chief Scientist

Professor Peter Davies was appointed as Chief Scientist for the MDBA in 2018–19. Professor Davies provided expert scientific advice about a number of priority issues in the MDBA, including:

- developing the evaluation framework for the Basin Plan
- establishing a prioritisation framework for the northern Basin toolkit and the Basin Watering Strategy Review.

CASE STUDY

Case study—Communities of practice improving the application of scientific knowledge

Expert advice provided by the three communities of practice is influencing the shape of future policy work and decision-making within the MDBA.

In 2018 the MDBA established communities of practice for waterbirds, native vegetation and eco-hydrology to improve the application of scientific knowledge to environmental water management.

The **Waterbird Community of Practice** is comprised of waterbird, wetland and river ecology experts, wetland managers and policy advisers. During 2018–19 this community of practice provided input into core business areas for the MDBA waterbird theme, including providing expert advice on:

- long-term waterbird targets
- managing waterbirds with environmental water
- climate change impacts on waterbirds
- performance story reporting
- 2020 evaluation data requirements and the Basin-wide environmental watering strategy review.

The **Native Vegetation Community of Practice** is comprised of native vegetation experts, including aquatic vegetation ecologists, research directors and science advisers. During 2018–19 this community of practice provided input into core business areas for the MDBA native vegetation theme by providing different perspectives and expert advice on how the MDBA could approach new work, including:

- input into reviewing the Basin-wide environmental watering strategy
- measuring progress towards Basin-scale outcomes for non-woody vegetation
- climate change impacts to the Basin's vegetation communities
- updating the Basin-wide environmental watering strategy to manage environmental water for vegetation outcomes.

The **Hydrology/Eco-hydrology Community of Practice** held two meetings in 2018–19. These meetings were an excellent opportunity for subject-matter experts to exchange ideas and provide advice to MDBA on ongoing water reform issues.

At the first meeting in December 2018, participants were asked to provide feedback on hydrological/eco-hydrological methods to assess the effectiveness of water reforms such as the Basin Plan. This included the types of metrics that should be used to assess progress, and the ability to measure against these metrics.

Climate change was the primary topic of the second meeting. Participants also provided feedback on the benefits of relaxing operational constraints and the use of science for adaptive management of environmental water.

Research projects

The MDBA continues to invest in research projects to better understand the Basin's ecology and inform policies and decision-making using the findings from these research projects. In 2018–19, the MDBA's focus was on understanding flow needs for fish in the northern Basin, fish movement at the Basin-scale, waterbird ecology, and management of non-woody vegetation.

The MDBA provided funding:

- to the New South Wales Department of Primary Industries—Fisheries to review the flow needs for native fish in the northern Basin catchments. The review has focused on the flow needs of fish in individual catchments and, more importantly, the connectivity requirements between catchments to support system-scale movement and breeding of native fish
- to the South Australian Research and Development Institute to understand the movements of lamprey into the River Murray. Lamprey move into the River Murray from the ocean. Understanding these movements helps better manage flows through the River Murray and the end of system.

The MDBA also funded a study of the data gathered by the monitoring system that detects Passive Integrated Transponder (PIT) tagged fish. The system tracks the movements of fish carrying PIT tags in the southern connected Basin. This study of the data collected over the past seven years provides information about fish movement patterns and a baseline to compare against for future Basin Plan evaluations.

The MDBA continues to partner with key research institutes to improve its understanding of waterbird ecology and, ultimately, improve the effectiveness of environmental watering. For example, the University of New South Wales monitors waterbird populations on MDBA's behalf and brings considerable expertise in eco-hydrological modelling. A waterbird community of practice is now in its second year of operation and is proving to be an invaluable forum for improving our science, as well providing increased networking opportunities for scientists. The CSIRO, University of New South Wales, Deakin University and others participate.

In terms of Basin ecology, non-woody vegetation is relatively poorly understood. The MDBA engaged expert consultants to do:

- a stocktake of the current understandings and previous approaches
- a literature review of the rational and methods of national and international wetland vegetation adaptive management practices.

The stocktake will capture the rationales, datasets, resources, tools, analysis and experts that underpinned or contributed to the development of the non-woody vegetation components of key environmental water planning deliverables. This will ensure this valuable corporate knowledge is retained within the MDBA.

Monitoring projects

In 2018–19 the MDBA continued to collaborate with government and independent organisations on three annual Basin-scale monitoring programs. These programs improve understanding of the condition of vegetation, waterbirds and native fish. These Basin-scale monitoring programs provide data that is used to inform the MDBA's evaluations and adaptive management of the Basin Plan.

The MDBA continues to fund two waterbird surveys:

- the Significant Environmental Assets survey—an aerial survey of 37 major wetlands across the Basin that tracks waterbird abundance, species richness and breeding
- the Coorong and Lower Lakes waterbird census—tracks the abundance and species richness of migratory shorebirds in the Coorong and Lower Lakes.

Data collected by the two surveys is used in environmental water planning and management, as well as Basin Plan evaluations.

The vegetation monitoring program uses a Stand Condition Assessment Tool. The tool generates maps of the condition of floodplain trees using:

- remotely sensed data
- field observations
- machine learning.

The MDBA continues to work collaboratively with relevant experts from the Basin states to enhance the utility of the tool.

The native fish monitoring program includes a Basin-scale assessment of fish using sampling methods derived during the Sustainable Rivers Audit, supported by targeted monitoring where required. The Basin-scale assessment is conducted by state government agencies (New South Wales Department of Primary Industries—Fisheries, SARDI, DELWP and Qld DAF) using electrofishing in main river channels. The targeted monitoring—in 2018–19 for Yarra pygmy perch in the Lower Lakes—is used to fill known information gaps in the Basin-scale assessment.

Improving the monitoring and evaluation programs at the Basin-scale are the subject of ongoing work. The MDBA continues to work with government-based and independent scientists to refine and develop better monitoring programs so that we can better understand the environmental outcomes of the Basin Plan and the Water Act.

The MDBA supplements its staff resources for monitoring and evaluation with the collection of on-ground data through commissioned projects.

In January 2019, in response to the fish deaths in the lower Darling between December 2018 and January 2019, Minister Littleproud announced an additional $5 million for a Native Fish Management and Recovery Strategy. Part of this funding is expected to be used for additional monitoring activities to support future evaluation of the effectiveness of actions taken under the strategy.

Support for River Murray operations

Source Murray Model

About the Source Murray Model

The Source Murray Model is a river system planning and management tool. It incorporates the arrangements of the Murray–Darling Basin Agreement and each Basin government's process for allocating water to water users.

The Source Murray Model implementation was independently reviewed by Professor Jakeman and team from the Australian National University in February 2009. It was found to be fit for purpose for estimating baseline diversion limits as part of estimating the annual permitted take in water resource plans.

The model's software is an outcome of more than a decade of research and partnership between a number of state and federal government agencies under the National Hydrological Modelling Strategy. The MDBA applied the software developed by EWater to the River Murray and Lower Darling system in consultation with the partner governments.

To ensure consistency in new source applications, the Basin states and MDBA modelling staff have been collaborating through the Source Community of Practice for the last four years to develop a suite of modelling practice notes. These notes provide guidance on recommended approaches for building, configuring and running hydrological models. Four practice notes were developed during 2018–19 and are available on the MDBA website.

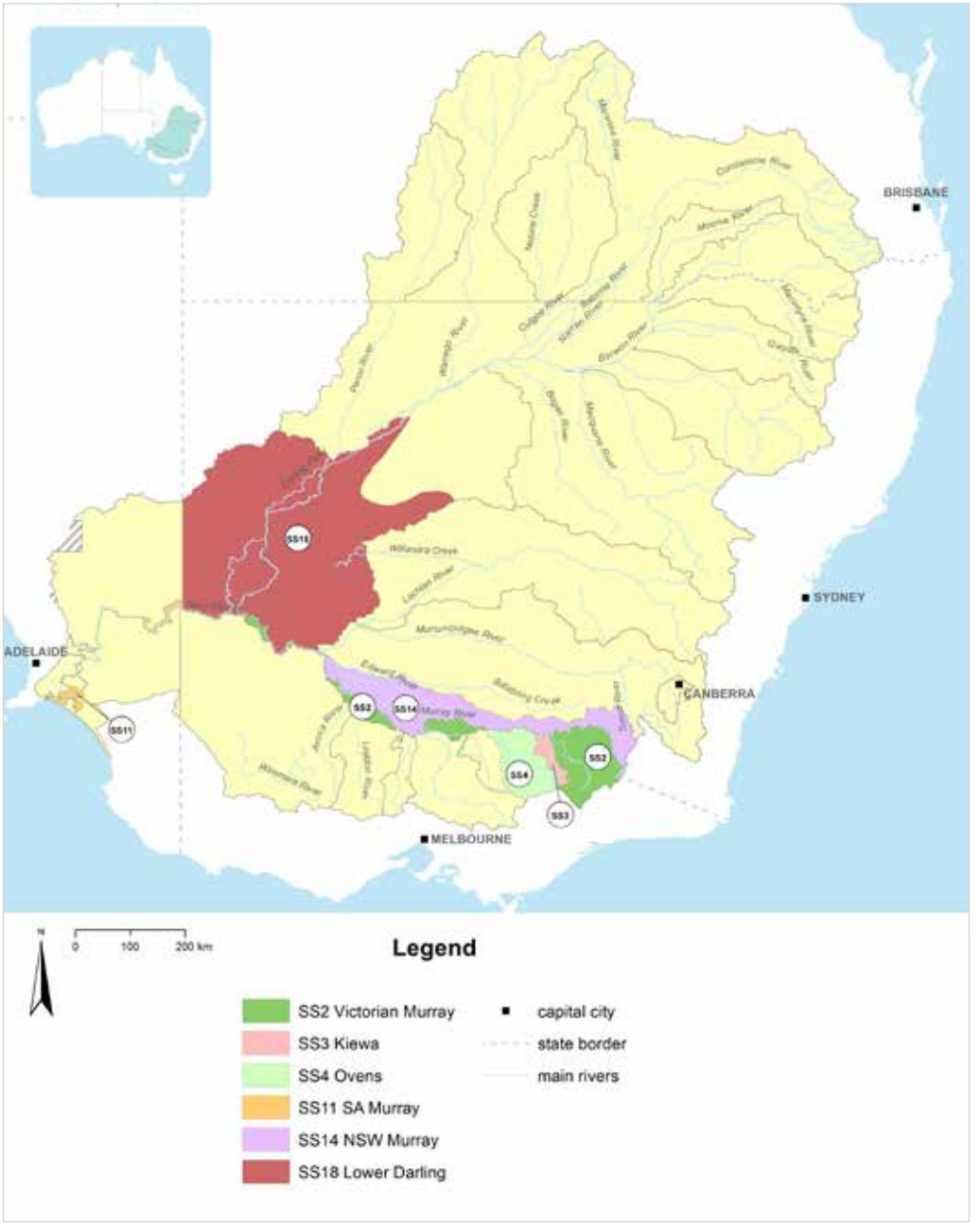
In 2018–19 the Source Murray Model reached a major milestone when it was adopted by South Australia, Victoria and New South Wales.

The model was submitted in February–March 2019 as part of water resource plans by Victoria and South Australia for:

- demonstrating compliance with SDLs
- undertaking annual permitted take calculations for the regulated diversions from the Victorian Murray and South Australian Murray SDL resource units.

New South Wales will be submitting the Source Murray Model as part of the water resource plans for the New South Wales Murray and Lower Darling SDL resource units. In the meantime, it is to be used as the compliance tool for these SDL resource units of New South Wales.

Figure 2.14 Surface water sustainable diversion limit resource units



Hydrological studies to support Basin Plan implementation

Return flows review

The MDBA engaged Melbourne University from July to October 2018 to undertake an independent review to look at two areas which are hard to measure and subject to a degree of uncertainty:

- the effect improved irrigation efficiency projects have had on the volume of water returning to the rivers
- the effect that the groundwater SDLs might have on river flows.

The investigation was in response to concerns by some stakeholders about:

- the effectiveness of Australian Government investment in irrigation infrastructure
- the possible growth in groundwater use from some aquifers under the SDLs of the Basin Plan.

The review included a technical workshop hosted by a member of the MDBA's Advisory Committee on Social, Economic and Environmental Sciences to review the approach taken by the independent experts.

The review's results showed that reduced return flows are likely to be small. The time frame for reduction in groundwater return flow is 20 years or longer, depending on the catchment. The reviewers also concluded that slow change and high uncertainty of the estimated impact suggests that an adaptive management strategy may be appropriate.

The review was an example of the MDBA's commitment to developing and engaging with new science and evidence to continually improve implementation of the Basin Plan. The final report was published on the MDBA website on 15 October 2018.

Northern Basin inflows

In response to the cessation of flow conditions in the Barwon–Darling river system, the MDBA did a study on rainfall and run-off responses in the northern Basin in recent years. The study, 'Hydrologic assessment of flow changes in the Northern Basin', was completed in October 2018 and is published on the MDBA's website. It looked at the impact on flow from different drivers such as climate variability, climate change, river regulation and development.

The analysis showed that, although annual rainfall of recent years at times was not too different from that of previous historical data, in recent years there has been a strong reduction in intense storm events. There was also evidence of increased small rainfall events during warmer months. These changes in rainfall patterns lead to less favorable soil moisture conditions to generate stream flow.

The analysis could only be conducted for a few locations due to the lack of long-term data for catchments not affected by development. However, it clearly demonstrated that recent climate patterns have had a significant impact on flow changes in the northern Basin. The MDBA has shared this analysis with researchers through webinar for further research.

> ' ... recent climate patterns have had a significant impact on flow changes in the northern Basin'

CASE STUDY

Case study—Science that stays ahead of the flow

Australia's best science is at work in the computer programs that make up the MDBA's modelling of the Murray–Darling river systems.

Leading edge river systems modelling (see 'About the Source Murray Model', page 113) can show the impact of various policies and operational decisions for different users ranging from flood and drought behaviour to estimates of environmental water use.

For the MDBA it allows water management ideas to be tested first and for the impact of events like environmental watering to be analysed and predicted.

For the more site-specific studies, hydrodynamic models have been built which consider the topography of the river channel and floodplain and can include structures such as wetland regulators. These models are calibrated using the best available data, including measured flows, water levels and satellite images of flooding (see 'Case study: Satellite imagery: eyes in the sky', page 45).

The MDBA has developed and maintained hydrodynamic models covering all TLM icon sites and additional reaches such as Hume–Yarrawonga and is currently developing a model for the Edward–Wakool river system.

Most models have been developed and refined over many years, with data being collected in conjunction with the state agencies during environmental watering events. The agencies rely on model predictions for estimating water use and the extent of inundation and for developing their operational plans and communication products.

As an example, in 2018–19, the hydrodynamic model of the Chowilla floodplain was used to develop environmental safe operating rules when raising Lock 6 and the Chowilla environmental regulator.

The model was run many times to determine what combination of regulator heights would achieve the required creek velocities for maintaining fish populations and turnover of floodplain volume for maintaining adequate water quality.

The model is then run in real time during environmental watering events to ensure these operating conditions are being achieved.

Challenges in the year ahead

The MDBA will continue to work towards becoming a centre of excellence in the science and knowledge of the Murray–Darling. The scientific knowledge behind the MDBA's decisions was once again heavily scrutinised during the year, highlighting the need for the MDBA to be able to prove its capabilities in this area.

Being accepted for robust science and knowledge of the Basin will assist in understanding of the need for the Basin Plan to be fully implemented. The level of resourcing for monitoring and evaluating the Basin Plan continues to be a challenge. This has been raised at the Productivity Commission and in other reviews. The MDBA needs to maintain investment in research and science to support ongoing adaptive management practices while improving transparency and accountability of decisions.

One way of dealing with the challenge of having access to the best available data and knowledge is to partner with external organisations. The MDBA will continue to develop these partnerships.

The review to assess the effectiveness of the Basin Plan's water quality targets in contributing to the achievement of the Basin Plan's water quality objectives is one of three statutory reviews that must be completed by the end of 2020. The project is currently in the planning phase.

During the next year the MDBA will continue to enhance its information technology and data management capacity. Sophisticated systems are needed to support the MDBA's science and knowledge requirements and the regionalisation of workers. There are challenges in maintaining support for current operations while developing systems for the future.

Section 3
Management and accountability

03

Governance

Key points

The MDBA's governance arrangements reflect its two distinct functions:

The first function—to oversee the rollout of the Basin Plan—requires the Authority to make decisions and recommendations.

The second function—to operate the River Murray and joint programs—is guided by decision-making from the Basin governments.

The Australian Government minister responsible for water is the Chair of the Murray–Darling Basin Ministerial Council. The MDBA provides secretariat support to the Ministerial Council and the other committees mentioned in Figure 3.1.

Governance arrangements

The Murray–Darling Basin Authority (MDBA) is a Corporate Commonwealth entity of the Australian Government.

The governance details are set out in the *Water Act 2007* (Cwlth), which established a cooperative arrangement for managing water resources in the Basin. Figure 3.1 shows the committees and their core functions that make up this arrangement.

The Authority

At 30 June the Authority comprises a part-time Chair, full-time Chief Executive, and two part-time members (see page 124). Four Authority members constitute a quorum for meetings and decision-making.

The functions of the Authority are supported by the MDBA office, currently consisting of, at 30 June 2019, 283.1 full-time equivalent staff based at several locations around the Basin and led by the Chief Executive.

Australian Government minister for water

For Basin Plan matters the MDBA is accountable to the Australian Government Minister for Water Resources, Drought, Rural Finance, Natural Disaster and Emergency Management, the Hon. David Littleproud MP. The Minister may direct the MDBA on the performance of its functions and plays an important role in key processes, such as the making of, or amendment to, the Basin Plan and accreditation of water resource plans.

Ministerial Council

For matters under the Murray–Darling Basin Agreement the MDBA is accountable to the Murray–Darling Ministerial Council (Ministerial Council). The Ministerial Council is comprised of a minister from each of the Basin state governments and is chaired by the Commonwealth Minister. The Ministerial Council has the power to set objectives and outcomes for the MDBA in relation to certain matters. There are also a number of MDBA functions that require the approval of the Ministerial Council.

Basin Officials Committee

The Basin Officials Committee provides direction to the MDBA in certain functions under the Murray–Darling Basin Agreement. It also provides advice to the MDBA in its role of implementing the Basin Plan.

Governance reviews

The Murray–Darling Basin Compliance Compact (the Compact) approved by the Ministerial Council on 8 June 2018 recommended two reviews relating the governance of the Murray–Darling Basin Authority and the Basin Officials Committee:

- a review of the Authority appointment process to ensure a broad range of experience be considered as part of the selection process to appoint Authority members. The review was to analyse existing processes and provide advice on the effectiveness of the process in appointing eligible members to achieve the objectives of the Water Act.
- a review of the joint governments' governance arrangements in the Basin to take into account the governance recommendations in the Murray–Darling Basin Water Compliance Review and seek to improve the efficiency and effectiveness of joint governance arrangements. It aims to:
  - ensure streamlined decision-making
  - improve clarity of the roles and responsibilities of the various committees
  - improve efficiency and cost effectiveness of joint governance arrangements
  - increase transparency and community confidence.

The Ministerial Council will address the outcome of these reviews at a future meeting.

Advisory committees and organisations

The MDBA has two statutory advisory committees:

- Basin Community Committee (BCC)
- Advisory Committee for Social, Environmental and Economic and Sciences.

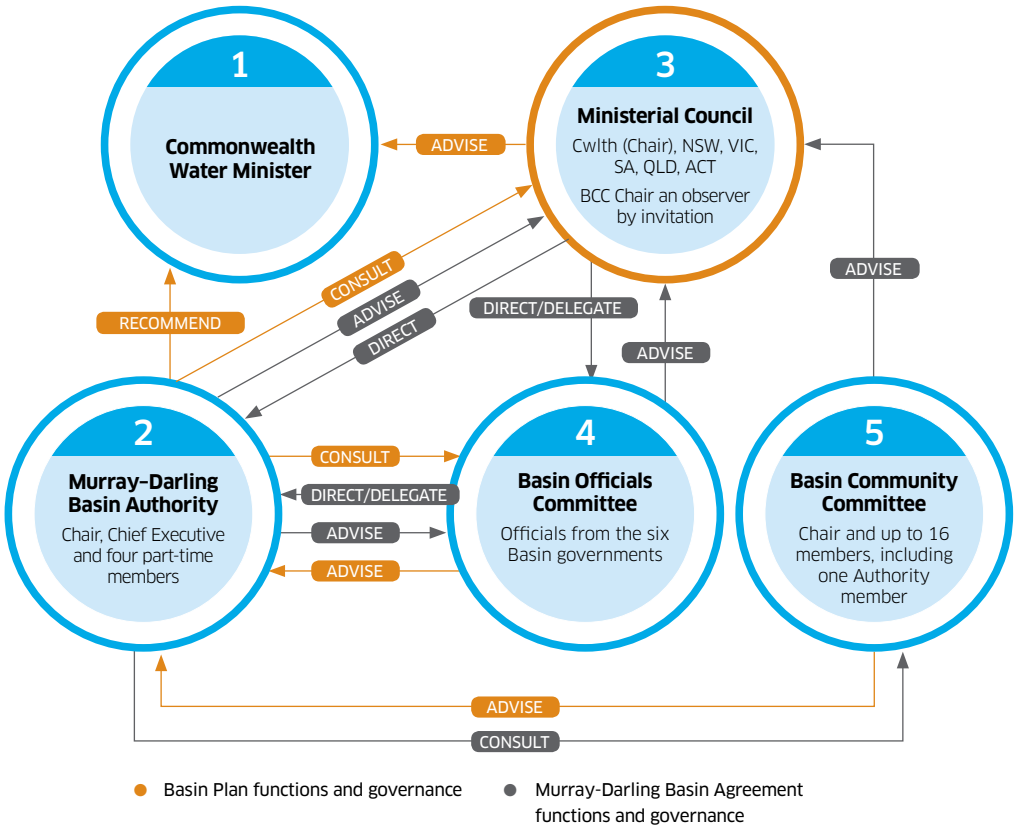
The MDBA also has an Independent Assurance Committee that provides expert advice on the design, implementation and adequacy of the Murray–Darling Basin Authority's Basin Plan compliance program.

The MDBA also works closely with, and supports, two self-determining Aboriginal First Nation organisations:

- Murray–Lower Darling Rivers Indigenous Nations (MLDRIN)
- Northern Basin Aboriginal Nations (NBAN).

For more information about the committees see Appendix A.

Figure 3.1 Governance of the Murray–Darling Basin Authority



CORE FUNCTIONS

1. The decision maker on the Basin Plan and chairs Ministerial Council
2. Responsible for developing, implementing, evaluating and reviewing the Basin Plan
3. Manages the River Murray system on behalf of joint governments
4. Policy and decision-making roles on state water shares and funding of joint programs as per the Murray–Darling Basin Agreement
5. Makes decisions consistent with the delegations from the Ministerial Council and advises on the Basin Plan
6. Provides advice to the Authority and Ministerial Council on Basin community issues

The Authority

Joanna Hewitt AO (Acting Chair)

Joanna Hewitt was appointed to the Authority in May 2018 and is currently interim Chair. She has held senior government appointments including Secretary of the Department of Agriculture, Fisheries and Forestry (2004 to 2007) and Deputy Secretary, Department of Foreign Affairs and Trade.

Joanna is the Chair of the Scientific Advisory Group of the Department of Agriculture. She was Commission Chair of the Australian Centre for International Agricultural Research from 2011 to 2014. Joanna has worked at the Organisation for Economic Co-operation and Development's Agriculture Directorate and has consulted internationally.

Joanna has a Bachelor of Economics (with First Class Honours) from the University of Western Australia and a Master of Science (Economics) from the London School of Economics. She is an Officer of the Order of Australia and has been awarded a Centenary Medal and an honorary doctorate in economics from the University of Western Australia.

Phillip Glyde (Chief Executive)

Phillip Glyde joined the Authority as Chief Executive on 4 January 2016. Before this he was a deputy secretary at the Department of Agriculture, where he was responsible for agriculture, fisheries and forestry policy; corporate and governance functions; international trade and market access; export certification services; and the research divisions of the then Australian Bureau of Agricultural and Resource Economics and Sciences.

A member of the Australian Public Service since 1980, Phillip has worked on natural resource management, industry and environmental policies in a number of Australian government departments, including Prime Minister and Cabinet, Environment, and Resources and Energy.

Phillip has worked overseas with the Environmental Directorate of the Organisation for Economic Co-operation and Development in Paris, and the Cabinet Office and the Department of Environment, Food and Rural Affairs in the United Kingdom.

Phillip has an honours degree in Natural Resource Management from the University of New England and a Bachelor of Economics from the Australian National University.

Professor Stuart Bunn

Professor Stuart Bunn was appointed to the Authority in May 2018. Stuart is the Director of the Australian Rivers Institute at Griffith University in Brisbane. Stuart's major research interests are in the ecology of river and wetland systems, with a particular focus on the science that underpins river management. This research includes more than 250 technical publications, most of which are refereed journal articles and conference proceedings.

Stuart has extensive experience working with international and Australian government agencies on water management issues. From 2008 to 2012 Stuart was a National Water Commissioner. He previously served as Chair of the Scientific Advisory Panel for the Lake Eyre Basin Ministerial Forum and as a director of Land and Water Australia.

Stuart is Chair of the Science Committee for Healthy Land and Water and a member of the International Planning Committee for the Sustainable Water Future Programme. He was appointed to the Authority in May 2018. Stuart continues to play an observational role of the MDBA's Advisory Committee on Social, Economic and Environmental Sciences, which he chaired from May 2016 to June 2018, when he was appointed to the Authority.

Stuart has a Bachelor of Science Zoology (First Class Honours) from the University of Western Australia and a PhD in Zoology, also from the University of Western Australia.

Susan Madden

Susan Madden was appointed to the Authority in March 2016. Susan is Principal Economist in the Natural Resources and Agriculture team for international consulting firm GHD. She has over 15 years of experience working in agricultural and natural resource management and a background in family farming. Susan was appointed to the Authority in March 2016.

Before joining the Authority, Susan spent nearly seven years as Executive Officer for regional farming group Macquarie River Food and Fibre. Since March 2017 Susan has been Chair of the Central West Local Land Services Board. She also sits on the Local Land Services Board of Chairs.

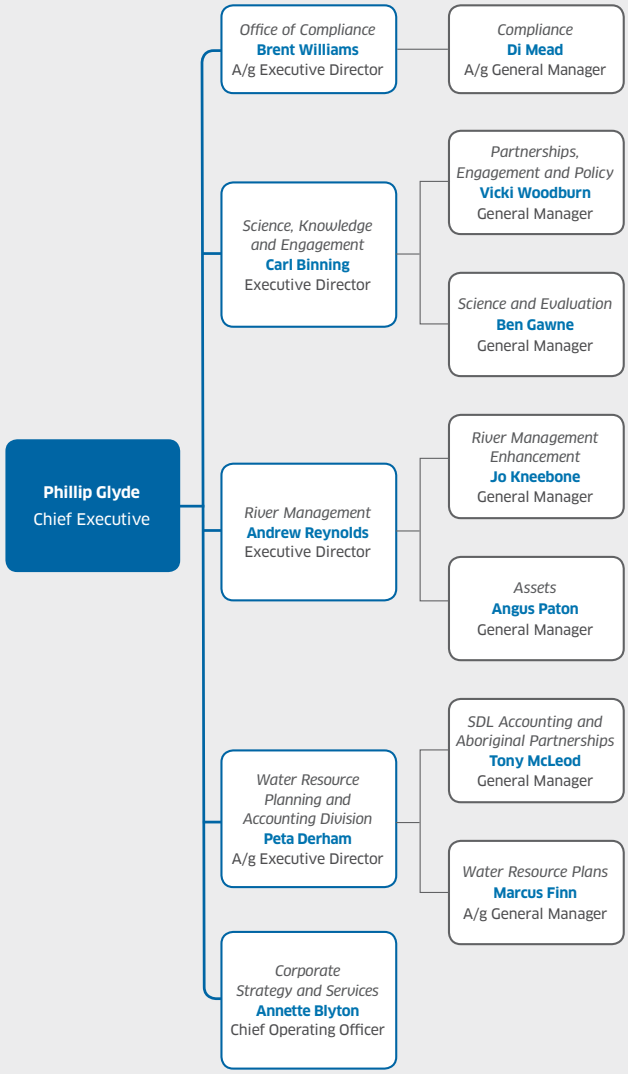
Susan is a Fellow of the Peter Cullen Trust and was a finalist in the 2013 Australian Cotton Industry Young Achiever of the Year Award. She has a Bachelor of Agriculture and Economics (First Class Honours) from the University of Sydney and was awarded the Sydney University Medal in 2002.

Table 3.1 Meetings attended and member status

Name	Number of meetings	Details	Executive status
Neil Andrew	7	• Last meeting 22 January 2019 • (plus 1 as an observer: 4–5 February 2019)	Non-executive
Joanna Hewitt	12	• Incoming member • Acting Chair February 2019 to current • First meeting 7 August 2018	Non-executive
Phillip Glyde	11	• Member all year	Executive
Stuart Bunn	12	• Incoming member • First meeting 7 August 2018	Non-executive
Susan Madden	11	• Member all year	Non-executive
George Warne	8	• Outgoing member • Last meeting 12 March 2019	Non-executive
Russell James	1	• Acting Chief Executive, 11 September 2018	Executive

Structure of the MDBA

Figure 3.2 Organisational structure as at 30 June 2019



MDBA divisions

The MDBA carries out its work through five divisions:

- **Science, Knowledge and Engagement**—ensures best practice science and robust evaluation outcomes of the Basin Plan; is central to enhancing collaborative relationships with Basin state governments and building trust with community partners
- **River Management**—works with state partners to lead the integration and delivery of environmental and operational water needs and manage all areas of river operations
- **Water Resource Planning and Accounting**—works with Basin state governments to complete water resource plans and manage the system of accounts that keeps track of how much water is taken each year from the Basin's rivers, valleys and groundwater systems
- **Office of Compliance**—advises on the appropriateness of and compliance with state laws and statutory instruments (including water resource plans), the terms and conditions of water licenses and entitlements and any other relevant powers or approvals
- **Corporate Strategy and Services**—runs the business of the MDBA providing strategic and support services including financial management; procurement and planning; advice on people and culture; legal, parliamentary and secretariat services; governance, risk and audit advice; and management of data and information.

Members of MDBA Authority in 2018–19. Back: Susan Madden, Stuart Bunn, George Warne, Joanna Hewitt
Front: Phillip Glyde, Neil Andrews

MDBA Executive team

Phillip Glyde

Chief Executive

Refer to Phillip's biographical details on page 124.

Carl Binning

Executive Director, Science, Knowledge and Engagement

Carl Binning joined the MDBA in September 2016 as Executive Director, Environmental Management.

Building on a background on a family farm near Yass in New South Wales, Carl has more than 25 years of experience in natural resource management. He has had executive roles in the government, research, not-for-profit, mining and consulting sectors. These include the then Department of the Environment, the Department of the Prime Minister and Cabinet, CSIRO, Creating Communities, BHP Billiton, and Greening Australia.

Carl brings to the role a depth of experience and understanding of the social, economic and environmental drivers in Australia's landscapes. He is passionate about facilitating sustainable development.

Andrew Reynolds

Executive Director, River Management

Andrew Reynolds joined the MDBA in 2013. He has more than 24 years of experience in the water industry managing major water supply infrastructure. This includes extensive knowledge in engineering and project management, dam safety and construction management.

Before joining the MDBA Andrew held various roles with Goulburn–Murray Water. His work there included managing the headworks business responsible for 16 large dams and associated infrastructure, delivering several major dam safety upgrades, and leading the business's engineering and scientific resources.

Andrew has a Bachelor of Engineering (Agricultural) (Hons) from the University of Melbourne. He is Deputy Chair of the Australian National Committee on Large Dams.

Peta Derham

Acting Executive Director, Water Resource Planning and Accounting Division

Dr Peta-Joanne Derham joined the MDBA in 2012 and has been involved in the development of the Basin Plan since 2010.

Peta has over 20 years of experience in natural resource management across all tiers of government. Since 2012, Peta has led the implementation of key elements of the Basin Plan including the Northern Basin Review and sustainable diversion limit (SDL) adjustment mechanism. She is currently assisting with assessing Basin governments' Basin Plan compliant water resource plans (WRPs). Her early career was focused on water quality and dryland salinity management.

Peta has a Bachelor of Science from the University of Sydney, an Honours degree in Botany from the University of New South Wales, and a PhD in Chemistry from the University of Queensland.

Brent Williams

Acting Executive Director, Office of Compliance

Brent joined the MDBA in 2009. He has led several elements of the development and implementation of the Basin Plan, including, more recently, the Northern Basin Review and the establishment of the MDBA compliance program. Before joining the MDBA he had over 20 years of nature conservation and natural resource management policy and operational experience in the South Australian National Parks and Wildlife Service and the Northern Territory Parks and Wildlife Commission and NRM agencies.

Annette Blyton

Chief Operating Officer, Corporate Strategy and Services

Annette Blyton joined the MDBA as head of Corporate Strategy and Services in June 2017. She has worked in a broad range of corporate areas since starting her public service career in 1986. These include corporate and business management, farm surveys, data, social research, finance, property, and major projects and procurements—notably, the machinery of government transition of water functions to the Department of Agriculture and Water Resources in late 2015.

From 2002 to 2012, Annette was Corporate Manager for the Australian Bureau of Agriculture and Resource Economics and Sciences. She then joined the Office of the Commonwealth Director of Public Prosecutions where she worked as National Manager, People from 2012 to 2015. In 2015 Annette moved to the Department of Agriculture and Water Resources, where she was responsible for the department's national property interests.

Senior management committees

The MDBA's functions are supported by the following key committees:

- Senior Executive Meeting
- Information Management and Technology Committee
- Health and Safety Committee
- Employee Consultative Committee
- Audit Committee.

Senior Executive Meeting

The purpose of the Senior Executive Meeting is to:

- manage and drive agency efforts to address cross-cutting pressures, risks and policy challenges
- oversee and manage organisational business.

It comprises the:

- Chief Executive (Chair)
- Executive Directors
- Chief Operating Officer.

In 2018–19 the Executive Committee dealt with the key issues including:

- the MDBA's growing regional presence
- a range of reviews related to the MDBA
- a range of business management issues
- overall budget management.

Information Management and Technology Committee

The Information Management and Technology Committee (IMTC) is an advisory body that provides recommendations on IT and information management matters to the Executive. This includes:

- overseeing the development and implementation of high-level organisational IT and information investments and policies to help ensure the MDBA can effectively manage its performance and risks
- making recommendations to the Executive about IT and information investments, policies and practices across the MDBA
- reporting to the Executive on IT and information strategic governance and performance.

It is chaired by the Chief Operating Officer. Each division has a representative on the committee to ensure IMTC decisions meet the needs of the business. The committee also has an independent adviser.

During 2018–19 the committee's work included overseeing:

- the development of a Business Capability Model that describes the capabilities the MDBA needs to fulfill its objectives
- the Billabong (intranet) redesign project
- a review of the Integrated River System Modelling Framework
- the development of the SDL compliance database (see page 14 and 35)
- the MDBA's compliance with the Information Publication Scheme and Digital Continuity 2020.

Health and Safety Committee

The MDBA's Health and Safety Committee operates in accordance with the W*ork Health and Safety Act 2011* (Cwlth).

Its main functions are to:

- ensure health and safety at work
- assist in developing standards, rules and procedures supporting health and safety.

The committee meets four times a year. Its members are:

- as Chair, the Senior Director, River Management
- Chief Operating Officer
- as Secretary, a person (usually the Work Health and Safety Coordinator) nominated by the Director, People and Culture

- a health and safety representative from each designated workgroup. Deputies can attend for the representative and are encouraged to attend meetings as observers
- the Chief Emergency Warden
- a representative from the Employee Consultative Committee
- the Director, People and Culture (or their delegate).

During 2018–19 a number of policies were developed and reviewed, and the committee coordinated activities for Health Week 2018.

Employee Consultative Committee

The Employee Consultative Committee is established under clause 11 of the Murray–Darling Basin Authority Enterprise Agreement 2017–2020.

The committee provides a forum for:

- involving staff in the decision-making process for changes to existing policies, guidelines or procedures, or development of new ones
- getting staff consultation and agreement before the Chief Executive makes a formal variation under the *Fair Work Act 2009* (Cwlth) to any condition or entitlement in the enterprise agreement
- providing advice to the Chief Executive on matters related to the operation of the enterprise agreement.

Membership of the committee consists of:

- the Chief Executive as Chair
- an elected employee representative from each division or regional office
- an employee representative from the relevant unions, including the Community and Public Sector Union and Professionals Australia
- management representatives.

Audit Committee

The Audit Committee operates in accordance with the requirements of s. 17(2) of the Public Governance, Performance and Accountability Rule 2014 (PGPA Rule). Its responsibilities include reviewing and providing independent advice on the appropriateness of the MDBA's:

- financial reporting
- performance reporting
- system of risk oversight and management
- system of internal controls.

During the year the committee continued to review internal audit reports and the implementation of audit recommendations.

The committee met five times during 2018–19 on the following dates: 10 August 2018, 26 September 2018, 26 November 2018, 27 March 2019 and 22 May 2019.

Table 3.2. Audit Committee membership and number of meetings attended

Audit committee member	Number of meetings attended
Jenny Morison, Chair and independent member	5
Andrew Reynolds, Deputy Chair/advisory member (joint venture)*	4
Karen Hogan, independent member	5
Carl Binning, advisory member/Deputy Chair (joint venture) *	4
Tony McLeod, advisory member*	5

* Advisory members not appointed under the Public Governance, Performance and Accountability Act 2013.

**From 1/9/2018 Andrew Reynolds was Deputy Chair for the non-joint venture part of the meeting and adviser for the joint venture part; Carl Binning was Deputy Chair for the joint venture part of the meeting and adviser for the non-joint venture part.

Running the business

Highlights and overview

- To progress the MDBA regionalisation agenda the MDBA opened a new office in Goondiwindi in late 2018. The MDBA's increased regional presence is helping to build stakeholder engagement and strengthen connections with Basin communities.
- To progress the government's decentralisation decision, work to develop a new operating model for a more decentralised MDBA started in May 2019.
- Under the Shared Services model the MDBA's payroll function was transferred to Department of Industry, Innovation and Science Shared Services in February 2019. This was transferred from Treasury Shared Services, which was no longer providing this service.
- The MDBA introduced the Chief Executive Award on a quarterly basis. This award recognises individuals or teams who have demonstrated outstanding performance and contribution towards the strategic goals through effective mentoring and role modelling or knowledge-sharing with teams.
- In the 2019 Australian Public Service employee census the MDBA had a response rate of 83.6%. Since the 2018 employee census the MDBA has implemented an eLearning package, developed a draft Diversity and Inclusion Strategy, and placed a strong focus on mental health and wellbeing for Health Week.
- In 2019 the MDBA became an accredited breastfeeding-friendly workplace. This reflects the MDBA's commitment to providing a supportive workplace environment for mothers returning to the workplace.
- The Rehabilitation Management System achieved a compliance rating of 100% in an external audit.

Developments and improvements

- In 2018 work commenced on a People Capability Framework aligned to business priorities. This overarching framework is intended to drive a more future-focused strategic approach to people capability, policy and programs
- A draft diversity and inclusion strategy was developed and distributed to staff for consultation. The strategy reflects the high value the MDBA places on diversity within the workplace.
- In 2018 the MDBA introduced Learnhub. This interactive online learning portal is designed to help build employees' skills and knowledge. The system is an important training tool.
- Substantial progress was made on the upgrade of the MDBA intranet to the Office 365 platform. This work will be completed early in 2019.
- The whole of Australian government Parliamentary and Document Management System was implemented, starting from August 2018.

Audit and risk

The Audit Committee and the Senior Executive Meeting monitor the risk management framework and how enterprise risk treatments are implemented across the MDBA. This includes monitoring the fraud control plan, which is informed by a risk assessment.

Risk management is also monitored at a sub-program level as part of quarterly corporate planning and reporting processes. For example, the Health and Safety Committee monitors health and safety risks for workers, ICT manages information and communication technology risks, and the Agency Security Adviser and Chief Risk Officer monitor physical and personnel security risks.

As part of managing risk, all new employees and contractors receive mandatory risk management induction and online training in ethics, fraud and conflicts of interest (this includes managing sensitive water market information).

Comcover

Comcover provides the MDBA's insurance cover. Insurable risks are identified and assessed annually through Comcover's insurance renewal process. The MDBA is separately insured by Comcare for workers compensation for employees.

A key feature of the Comcover program is the annual risk management benchmarking survey used to measure Commonwealth agencies' risk management maturity. The survey is based on quantitative rather than qualitative assessment.

The MDBA rated as 'advanced' this year. The survey showed the MDBA's strengths were:

- establishing a risk management policy
- embedding systematic risk management into business processes
- establishing a risk management framework

Areas for improvement were:

- maintaining a risk management capability
- understanding and managing shared risk
- reviewing and continuously improving the management of risk.

Fraud

The MDBA's fraud control arrangements align with the Commonwealth Fraud Control Framework. This framework establishes the systems and processes for preventing, detecting, monitoring, evaluating, reporting and responding to fraud. The MDBA regularly reviews its fraud prevention and control measures, which include fraud risk assessment and the fraud control plan.

In 2018–19 there was a report of suspected fraud related to an external entity. An analysis by an independent provider indicated that there were business improvement opportunities and no evidence was found of fraud.

Business continuity and ICT disaster recovery plans

The MDBA has three main documents that outline arrangements for recovering from a business disruption:

- River Murray system emergency action plan
- MDBA business continuity plan
- ICT disaster recovery plan.

Each plan is updated annually and the ICT disaster recovery arrangements are tested at desktop level.

During 2018–19 there were two business continuity events, both related to poor air quality. The MDBA's Canberra office was evacuated as a precautionary measure. There was a minor disruption as workers moved to other locations to continue their work.

Internal audit

Internal audit services were provided by KPMG in 2018–19. Internal audit plans were developed in consultation with senior managers and the risk management plan.

The internal audit reports finalised during the year were:

- Review of Compliance with Enabling Legislation—a review of whether the MDBA was complying with the enabling legislation related to the agency's functions. The review was limited to the Water Act, focusing on s. 172, which outlines the Authority's core functions
- Targeted Controls—a high-level examination of staff travel and credit cards.

The audit reports did not raise any serious matters.

The Audit Committee monitors the implementation of internal audit report recommendations.

Compliance reporting

It is a requirement of the *Public, Governance, Performance and Accountability Act 2013* (PGPA Act) that the MDBA report significant non-compliance with finance law. Finance law includes:

- the PGPA Act
- the Public, Governance, Performance and Accountability Rule 2014 (PGPA Rule)
- instruments made under the PGPA Act (including Accountable Authority Instructions) and Appropriation Acts.

The compliance report process helps to identify and disclose instances of non-compliance with the PGPA framework, as a basis for continuous improvement.

There were no significant reportable breaches of the PGPA Act, the PGPA Rule or Australian Government policies in 2018–19.

External scrutiny

Under section 17BE(r) of the PGPA Rule, the MDBA is required to report on external scrutiny of the MDBA by certain bodies. These include parliamentary committees, the courts and the Commonwealth Ombudsman.

Auditor-General reports

The MDBA's financial statements are audited by the Auditor-General. The Australian National Audit Office made no formal reports relating to the MDBA during 2018–19.

Commonwealth Ombudsman

The Commonwealth Ombudsman made no formal reports relating to the MDBA during 2018–19.

Parliamentary committees

Two ongoing inquiries were completed during 2018–19:

- the Senate Standing Committee on Rural and Regional Affairs and Transport completed published their report, *The integrity of the water market in the Murray–Darling Basin* on 29 November 2018
- the Senate Standing Committee on the Environment and Energy tabled their report, Inquiry into the management and use of Commonwealth environmental water on 7 December 2018.

No Australian Government responses to MDBA-related parliamentary committees were tabled during 2018–19.

Judicial decisions and tribunals

There were no judicial decisions or decisions of administrative tribunals relating to the MDBA made during 2018–19.

Office of the Australian Information Commissioner

The Office of the Australian Information Commissioner made no formal reports relating to the MDBA during 2018–19.

Freedom of information

Under the *Freedom of Information Act 1982* (Cwlth) (FOI Act), individuals have the right to access copies of documents held by Australian Government ministers and agencies.

During 2018–19, the MDBA received 15 freedom of information requests. All requests were processed in accordance with the statutory timeframes and the MDBA met all reporting obligations under the FOI Act.

Under the FOI Act the MDBA is required to publish a range of information on its website as part of the Information Publication Scheme.

The MDBA's approach is outlined in the Information Publication Scheme agency plan.

Directions under the Water Act

The Minister did not make any directions under s. 175 of the Water Act during 2018–19.

People and Culture

The MDBA aims to attract the best people by providing a work environment that offers opportunities for all employees to achieve their potential. It is committed to the principles of equity and diversity and values safety and harmony.

Workforce planning and recruitment

During 2018–19 the MDBA continued to use the MDBA Strategic Workforce Plan 2016–26 to build a high-performing organisation. People and Culture continue to deliver on the Strategic Workforce plan and align HR practices to meet the MDBA's strategic outcomes.

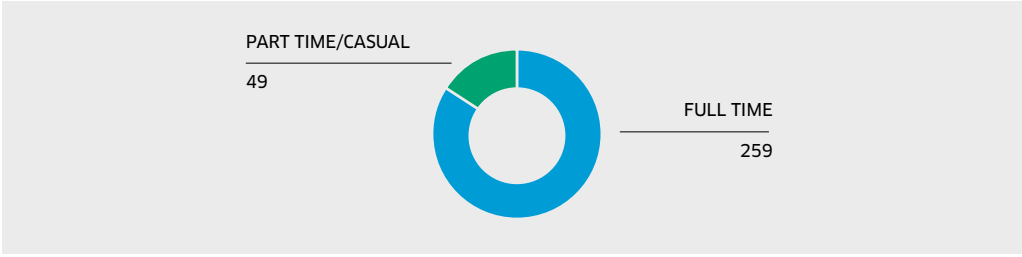
Recruitment practices support flexible working arrangements and embrace diversity, both in the employees and the range of opportunities open to them. This creates an environment in which employees can do their best work. Throughout 2018–19 the MDBA focused on career progression, performance and engagement, as a result of staff feedback in the 2018 APS census.

Flexible working arrangements

Flexible working arrangements help employees maintain a healthy work–life balance. The MDBA has implemented this through:

- adopting new working practices such as working in remote teams and changing work styles to meet the needs of the business and the team
- taking advantage of improved technological equipment and services
- using office space designed to encourage collaboration and flexibility.

Figure 3.3 Full time/Part time employees



Graduate Development Program

The MDBA's Graduate Development Program continues to be a successful way to attract new talent into the organisation. Under the program, new graduates embark on an 11-month learning and development course.

In February 2019, six graduates joined the MDBA. Applications for the 2020 program were advertised in May 2018.

In this year's program, for the first time, one of the graduates will be based in a regional location. This pilot will allow the MDBA to assess the arrangement and identify how a future operating model for regional placements may work. The pilot presents a number of changes to the standard graduate program format but is designed to provide the maximum benefit to employees.

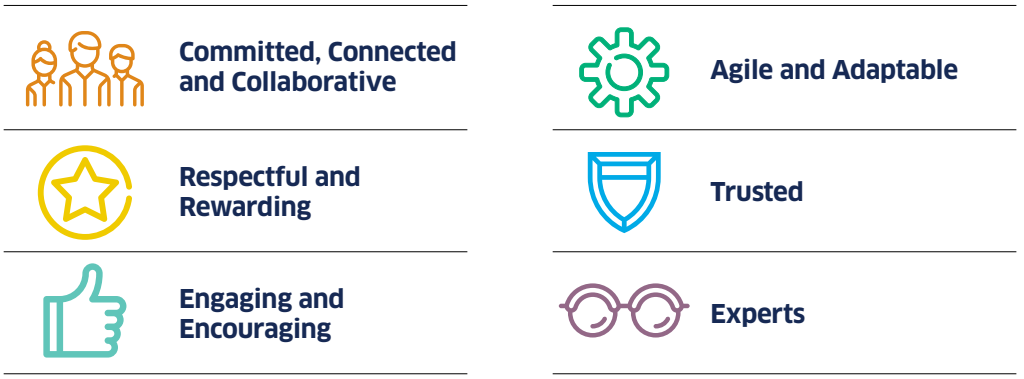
Valuing staff

The MDBA prides itself on a workplace that encourages and values the contributions of all employees. In addition to celebrating achievements with awards, it offers training opportunities and development initiatives.

CREATE-ing a positive culture

During 2018–19 the MDBA continued to use the successful CREATE strategy, initially launched in 2016. CREATE is designed to foster an engaged and proactive workplace culture. Each letter of CREATE represents a positive workplace behaviour or value (see Figure 3.4).

Figure 3.4 CREATE-ing change



Developing talent

In 2018–19 the MDBA's Talent Management Program was reviewed. The review showed the program was a valuable development opportunity for participants. The review recommended further opportunities, which have been grouped under three key themes:

- develop a Talent Management Strategy
- integrate talent management with Strategic Workforce Plan initiatives
- redesign the Talent Management Program.

Training

During the year, the MDBA continued to support employees who chose to do tertiary study. Sixteen employees were approved to receive study assistance in 2018–19. Popular study choices included business management, engineering, and environmental management.

Building an inclusive and diverse culture

The MDBA is committed to building an inclusive and diverse culture. It values diversity by harnessing individual differences to enhance the organisation's overall performance.

In 2018–19 the MDBA supported equity and diversity through the following strategies:

- raising awareness through internal communication channels on cultural days of significance to support diversity in the workplace
- empowering and educating managers to understand the importance of workplace diversity and how to hire and manage diverse employees
- access to flexible working arrangements such as part-time work and flexible hours
- training and awareness programs and support for managers, staff and teams, including Indigenous cultural awareness and disability awareness training
- celebrating diversity days and events to promote awareness and inclusion.

Figure 3.5 MDBA staff by gender as at 30 June 2019

Maintaining safe and healthy workplaces

During the year, the MDBA continued to strengthen systems supporting work health and safety. Reducing injuries and maintaining a healthy workplace continued to be a key focus.

Initiatives delivered in 2018–19 included:

- regular workplace inspections and risk assessments monitored by the Health and Safety Committee
- members of the Health and Safety Committee and other managers attending mental health first aid training
- promotion of R U OK Day events and activities
- early intervention services to prevent and mitigate chronic injuries or illnesses developing
- annual flu vaccinations
- rehabilitation support
- workplace assessments by qualified occupational therapists
- confidential support services for employees and eligible family members through the Employee Assistance Program
- programs to encourage health and wellbeing
- an annual health and wellbeing allowance
- activities for the annual health and wellbeing week.

During 2018–19 there were no reported incidents or dangerous occurrences. The MDBA's Rehabilitation Policy supports staff to minimise the impact of work-related and non-work-related injuries on themselves and their colleagues.

In 2018 an external audit of the Rehabilitation Management System was conducted. It found that the MDBA's compliance rate was maintained at 100% for the second year in a row.

Table 3.3 Health and safety statistics over a seven-year period

	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19
Internal reports on workplace hazards and incidents	50	70	44	16	7	23	12
Lost time caused by incidents and injuries not reported to Comcare (staff days)	8	26.3	4.5	1.5	58	14.5	2.5
Lost time caused by incidents and injuries reported to Comcare (staff days)	0	0	10	0	0	3	0
Incidents reported to Comcare	0	0	1	0	0	1	0

The MDBA maintained a low number of accepted claims: one claim in 2017–18 and no claims in 2018–19. As a result, the indicative workers compensation premium for 2019–20 was reduced by $238,386. The workers compensation premium for 2018-19 was reduced by $669,610.

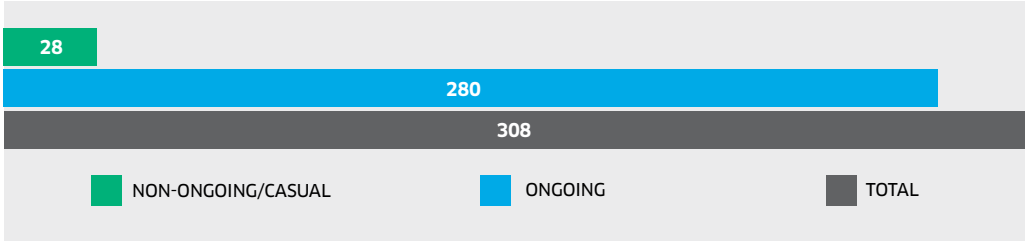
Table 3.4 Comparison of Comcare claims and premiums over a seven-year period

	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19
Number of new claims	4	4	1	0	0	1	0
Total cost of new claims ($)	105 682	61 754	11 625	0	0	2 552	0
Average cost of new claims ($)	26 421	10 292	11 625	0	0	2 552	0
Comcare premium ($)	628 621	1 094 118	1 080 859	1 062 746	1 040 669	1 026 752	357 142

Employee arrangements

As at 30 June 2019 the MDBA had 308 staff. Of these 280 were ongoing and 28 were non-ongoing.

Figure 3.6 Ongoing and non-ongoing staff numbers as at 30 June 2019



Staff are covered by the MDBA's Enterprise Agreement 2017–2020, which came into effect on 10 July 2017. Under the agreement staff received a 6% pay increase over three years: 3% in 2017, 2% in 2018 and 1% in 2019.

Tables 3.5 to 3.8 show ongoing and non-ongoing employees for the current period and 2017–18.

Table 3.5 Ongoing employees 2018–19

	Full time male	Part time male	Total male	Full time female	Part time female	Total female	Total
Qld	2	–	2	–	–	0	2
SA	4	–	4	1	–	1	5
Vic	3	–	3	5	2	7	10
ACT	114	8	122	108	33	141	263
Total	**123**	**8**	**131**	**114**	**35**	**149**	**280**

Notes:
There is no record of staff who identify as indeterminate.
Only states and territories where MDBA staff are employed are included.

Table 3.6 Non-ongoing employees 2018–19

	Full time male	Part time male	Total male	Full time female	Part time female	Total female	Total
Qld	1	–	1	2	–	2	3
SA	1	–	1	1	–	1	2
Vic	1	–	1	1	–	1	2
ACT	9	1	10	8	3	11	21
Total	**12**	**1**	**13**	**12**	**3**	**15**	**28**

Notes:
There is no record of staff who identify as indeterminate.
Only states and territories where MDBA staff are employed are included.

Table 3.7 Ongoing employees 2017–18

	Full time male	Part time male	Total male	Full time female	Part time female	Total female	Total
Qld	2	–	2	–	–	–	2
SA	2	–	2	2	–	2	4
Vic	4	–	4	4	1	5	9
ACT	115	8	123	130	21	151	274
Total	**123**	**8**	**131**	**136**	**22**	**158**	**289**

Notes:
There is no record of staff who identify as indeterminate.
Only states and territories where MDBA staff are employed are included.

Table 3.8 Non-ongoing employees 2017–18

	Full time male	Part time male	Total male	Full time female	Part time female	Total female	Total
Qld	1	–	1	–	–	–	1
SA	2	–	2	–	–	–	2
Vic	–	–	–	–	–	–	0
ACT	6	–	6	7	2	9	15
Total	**9**	**0**	**9**	**7**	**2**	**9**	**18**

Notes:
There is no record of staff who identify as indeterminate.
Only states and territories where MDBA staff are employed are included.

Executive remuneration

The Remuneration Tribunal is the independent statutory body that determines the remuneration of key Commonwealth Office Holders. The MDBA Authority members—the Chair, Chief Executive and four part-time members—are Commonwealth Office Holders. The Authority members' total remuneration is in accordance with the Remuneration Tribunal's 2019 Full-Time and Part-Time Office Holder determinations.

The Chief Executive determines the remuneration for the MDBA's Senior Executive Service (SES) officers using a Determination under section 24(1) of the Public Service Act 1999 (Cwlth).

The MDBA remuneration policy allows variations in remuneration between individual jobs, based on market and work-value considerations with regard to the APSC Executive Remuneration Management Policy and the APS Workplace Bargaining Policy.

SES employees and employees acting in an SES classification are required to participate in the MDBA's Performance Management Scheme.

With the exception of those with termination payments, other highly paid staff are in a very narrow and limited range of specific MDBA roles that have a work value assessed as exceeding that of the EL2 standards but which are not able to be classified at the SES work value. These roles are highly specialised, technical positions and would be extremely difficult to fill if required to go to market within the scope of the existing EL2 parameters.

Decisions made by a person performing a role determined to be at this higher-level:

- have significant impact on other parts of the MDBA as well as the medium-term operation of the immediate work area
- have a direct and significant impact on the outcome of a program or major project, or on components of a number of programs, and/or
- involve the exercise of considerable delegated authority or significant accountability for the delivery of outcomes.

Advice provided at this level will be technically authoritative and often have a considerable influence on the work of a key function or a segment of the MDBA's operations or have effect beyond the MDBA.

Non-salary benefits provided to SES employees are part of the SES remuneration package, which includes conditions such as superannuation and payment for car parking (where applicable).

Tables 3.9, 3.10 and 3.11 provide information about remuneration of senior executives, key management personnel and other highly paid staff.

Table 3.9. Remuneration for key management personnel

Key management personnel remuneration ($)		Short-term benefits ($)			Post-employment benefits ($)	Other long-term benefits ($)		Termination benefits ($)	Total remuneration ($)
Name	Position title	Base salary ($)	Bonuses ($)	Other benefits and allowances ($)	Superannuation contributions ($)	Long service leave ($)	Other long-term benefits ($)		
Phillip Glyde	Chief Executive	351,729	–	5,210	63,573	32,251	–	–	452,763
Annette Blyton	Chief Operating Officer	234,848	–	4,576	45,818	17,969	–	–	303,211
Russell James	Executive Director (commenced long-term leave on 1/7/19)	290,529	–	4,576	50,991	10,186	–	–	356,282
Carl Binning	Executive Director	274,429	–	83,156	50,952	2,876	–	–	411,413
Andrew Reynolds	Executive Director	261,877	–	4,576	41,125	14,788	–	–	322,366
Colin Mues	Executive Director (commenced long-term leave on 26/4/19)	224,202	–	4,576	44,064	9,652	–	–	282,494

Notes:
Base salary includes the current reporting period's annual leave accrual and excludes the leave paid in the current reporting period.
The remaining KMP is the Minister for Water Resources, Drought, Rural Finance, Natural Disaster and Emergency Management.

Table 3.10. Remuneration for Authority members

Key management personnel remuneration ($)		Short-term benefits ($)			Post-employment benefits ($)	Other long-term benefits ($)		Termination benefits ($)	Total remuneration ($)
Name	Position title	Base salary ($)	Bonuses ($)	Other benefits and allowances ($)	Superannuation contributions ($)	Long service leave ($)	Other long-term benefits ($)		
George Warne	Authority Member (ceased 23/3/19)	50,409	–	–	4,789	–	–	–	55,198
Neil Andrew	Authority Chair (ceased 31/1/19)	69,084	–	–	6,289	–	–	–	75,373
Susan Madden	Authority Member	69,225	–	–	6,572	–	–	–	75,797
Stuart Bunn	Authority Member	69,225	–	–	6,576	–	–	–	75,801
Joanna Hewitt AO	Acting Authority Chair	88,215	–	–	8,381	–	–	–	96,596

Notes:
The remaining KMP is the Minister for Water Resources, Drought, Rural Finance, Natural Disaster and Emergency Management.

Table 3.11 Remuneration for senior executives

		Short-term benefits ($)			Post-employment benefits ($)	Other long-term benefits ($)		Termination benefits ($)	Total remuneration ($)
Total remuneration bands	Number of senior executives	Average base salary	Average bonuses	Average other benefits and allowances	Average superannuation contributions	Average long service leave	Average other long-term benefits	Average termination benefits	Average total remuneration
$0–$220,000	2	129,760	–	1,139	22,303	2,278	–	–	155,480
$220,001–$245,000									
$245,001–$270,000	2	216,990	–	4,576	37,140	4,760	–	–	263,466
$270,001–$295,000	3	223,308	–	3,753	36,435	11,887	–	–	275,383

Table 3.12 Remuneration for other highly paid staff

		Short-term benefits ($)			Post-employment benefits ($)	Other long-term benefits ($)		Termination benefits ($)	Total remuneration ($)
Total remuneration bands	Number of other highly paid staff	Average base salary	Average bonuses	Average other benefits and allowances	Average superannuation contributions	Average long service leave	Average other long-term benefits	Average termination benefits	Average total remuneration
$220,001–$245,000	2	190,636	–	–	31,627	8,935	–	–	231,198
$245,001–$270,000	1	39,976	–	–	15,615	40,150	–	169,188	264,929
$270,001–$295,000									
$295,001–$320,000									
$320,001–$345,000									
$345,001–$370,000									
$370,001–$395,000									
$395,001–$420,000									
$420,001–$445,000	1	90,624	–	–	28,086	28,187	–	289,685	436,582

Regionalisation of the MDBA

During 2018–19 the MDBA continued to focus on its regional staffing presence. This initiative has been in place for the past two years with the aim of strengthening information sharing and connections with communities across the Murray–Darling Basin.

In 2017, the MDBA committed to moving 25–30 jobs (10% of its staff) to regional locations outside of Canberra. By December 2018, offices had been established in Adelaide, Albury–Wodonga, Toowoomba and Goondiwindi (see Figure 3.7 for details of staff in regional locations). By early 2019, the MDBA had achieved this initial goal.

A review in December 2018 found that our regional offices have transitioned out of the initial set-up phase into mature offices with strong and supportive cultures. Regional staff are successfully performing their core duties, and progress is being made towards their regional engagement duties.

Figure 3.7 Map showing MDBA regional presence

Commitment to further regionalisation

The Australian Government committed to the further regionalisation of the MDBA, as part of its broader decentralisation agenda. In March 2019 the then Australian Government Minister for Agriculture and Water Resources, the Hon. David Littleproud, announced that approximately 103 MDBA positions would be located in regional areas of the Basin by mid-2021.

This decision will result in a further 76 positions relocated from Canberra, including an expansion of the MDBA's Goondiwindi and northern presence to 20 staff. New offices will be opened in Griffith, Mildura and Murray Bridge.

The MDBA is well positioned to increase its regional footprint, with planning for fulfilling this commitment underway.

The Aboriginal and Torres Strait Islander Employees Network

The MDBA is pleased to have a Network of Aboriginal and Torres Strait Islander employees where those employees can discuss matters of interest, share experiences and opportunities, and provide support to fellow colleagues as well as provide education to the wider MDBA staff on how to work with First Nations People within the Basin.

The Network priorities for the 2018–19 included organising the 2018 National Reconciliation Week (NRW) events and activities, NAIDOC Week events and activities, progressing the Indigenous Employment Strategy 2015–2020 (IES), working with the Strengthening Connections Committee (SCC) to review and update the Reconciliation Action Plan working with the Senior Executives, drafting and adopting a Terms of Reference (TOR) for the ATSIEN, electing members to network roles, collaborating with People and Culture (P&C) to implement the recommendations embraced by the Senior executives, continuing to work alongside the SCC on 2019 NRW activities along with facilitating six cultural information sessions within MDBA and the Commonwealth Environmental Water Office (CEWO).

The Network also provides advice to the MDBA on cultural sensitivities, recruitment and retention of Aboriginal and Torres Strait Islander staff. Monthly meetings are held, with members taking on leading roles in organising a myriad of cultural events throughout the organisation and other Departments.

Additionally, the Network is actively involved in the development and implementation of policy that impacts on Aboriginal and Torres Strait Islander staff members within the MDBA. Membership is open to all Aboriginal and Torres Strait Islander people employed by the MDBA.

Section 4
CFO report and financial statements

04

Chief Finance Officer's report

Financial performance

For 2018–19 the MDBA reported a total operating surplus of $23.3 million. A significant portion this will be carried over into the 2019–20 financial year to complete the projects in progress relating to the Murray–Darling Basin Agreement functions. The balance will then be added to the accumulated underspends of the Commonwealth and relevant Basin states.

The surplus was primarily due to lower spending than anticipated on the Murray–Darling Basin Agreement programs and additional revenue received from Hydropower generation fees, due to more water being released in the dry conditions.

The Murray–Darling Basin Agreement programs are complex and reflect a high level of inherent risk associated with capital construction and environmental projects.

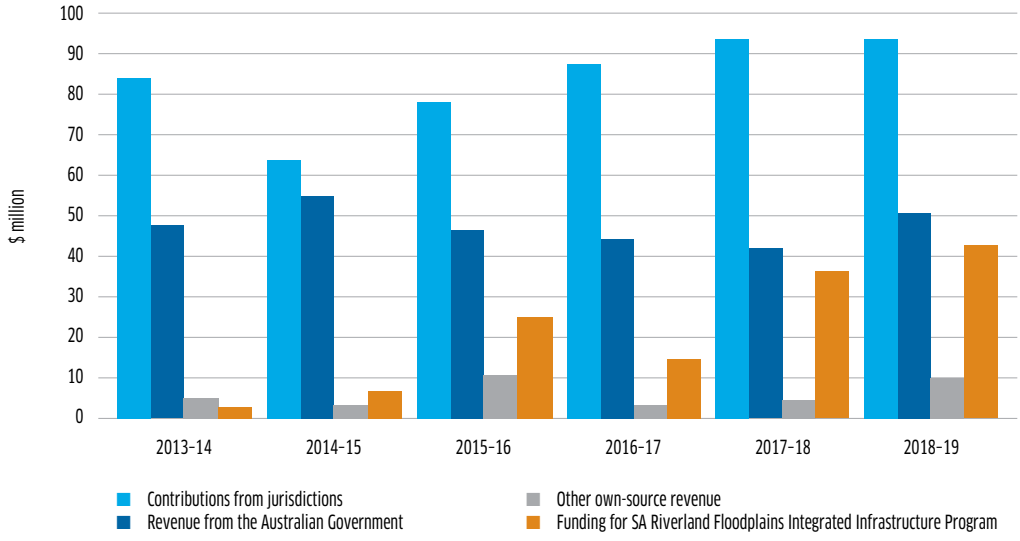
The primary reasons impacting the delivery of programs are a number of large programs that are scalable depending on seasonal conditions, river and storage levels, and the associated lengthy and complex approval processes. During 2018–19 this resulted in reduced expenditure on some of the infrastructure assets in Victoria, New South Wales and South Australia which include the Hume Dam, Dartmouth Dam, Floating plant and Lock 6. Reduced water storage levels have also resulted in less water entitlement usage for environmental purpose and therefore lower fees being paid.

Revenues

During 2018–19, the MDBA's revenue comprised:

- Revenue from the Australian Government totalling $94.2 million (2017–18: $78.9 million). This was higher in 2018–19 due to the additional funding received for the implementation of Basin-wide Compliance Review recommendations ($9.1 million) and the National Cultural Flows Research Program ($2.5 million) and included $43.5 million (2017–18: $36.5 million) for the South Australian Riverland Floodplains Integrated Infrastructure Project (which was classified as Administered funding until 2015–16).
- Contributions from jurisdictions of $93.5 million (compared to $94.1 million in 2017–18).
- Other revenue (including interest received) of $12.8 million (compared to $6.7 million in 2017–18) comprised interest, rent for land and cottages, royalty from hydropower generation and grant funding. As 2018–19 was a dry year, and to meet States' water shares, more water was released from Dartmouth Dam which resulted in increased revenue generation from Hydropower, resulting in higher Hydropower generation fees.

Figure 4.1 MDBA revenue trends (2013–14 to 2018–19)

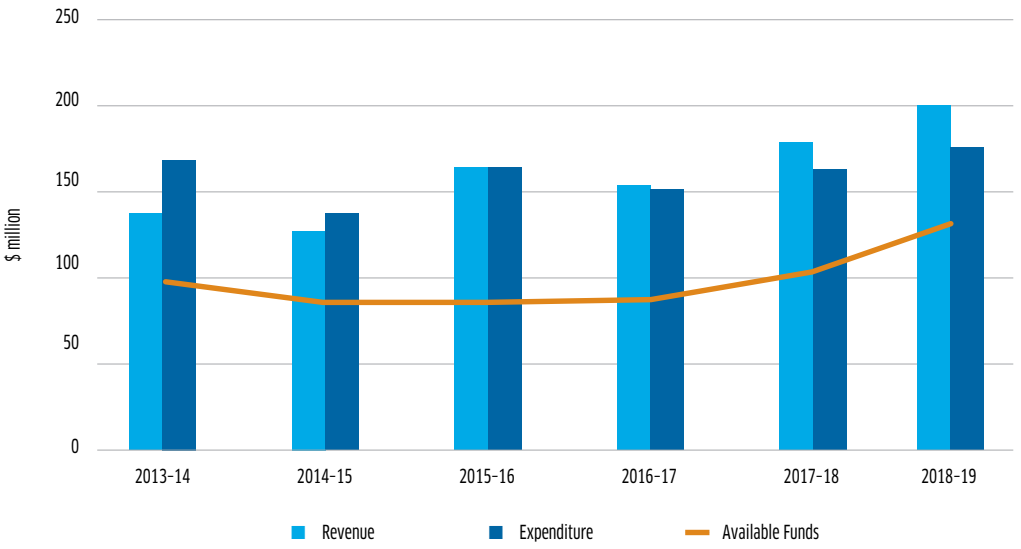


Expenditures

The MDBA's total expenditure for 2018–19 was $177.2 million (compared to $163.4 million in 2017–18). The increase is due to the South Australian Riverland Floodplains Integrated Infrastructure Program (with $3.5 million more paid in 2018–19 compared to the prior year), increase in expenditure on the Water Assets NSW, Murray Mouth Dredging and Salt Interception Schemes, the enhancement of the Regionalisation project and development of data management strategies.

Figure 4.2 shows revenue received, expenditure incurred and the available funds. On transition from the Murray–Darling Basin Commission to the MDBA during 2008, the available funds were $441.5 million. A significant component of these funds have been applied for key RMO construction projects including the Environmental Works and Measures Program; and the MDBA share in the acquisition of water entitlements for LMI which resulted in declining cash reserves. These reserves have now started to increase again due to the recent surpluses in the joint program activities from lower than anticipated expenditure on capital infrastructure projects. The balance held in the special account primarily relates to previously accumulated underspends of the joint program.

Figure 4.2 MDBA revenue, expenditure and special account (2013–14 to 2018–19)



The MDBA's operating bank account is a special account under section 209 of the *Water Act 2007 (Water Act)*. The account is not a special account for the purposes of the *Public Governance, Performance and Accountability Act 2013 (PGPA Act)*. The Water Act specifies that all amounts received by the MDBA in connection with the performance of its functions under the Water Act must be credited to this special account. The bank account opening balance at 1 July 2018 was $97.9 million. This increased to $126.2 million at the end of the year after receipts of $207.7 million and payments of $179.4 million.

Managing our assets

Assets and asset management

The MDBA's financial statements include nominal assets at the end of 2018–19 of $138.5 million. When the Murray–Darling Basin Commission transferred to the Murray–Darling Basin Authority in December 2008, a significant amount of the assets were transferred into the River Murray Operations and Living Murray Initiative joint ventures.

Managed assets: Joint ventures

The two joint ventures were established through separate agreements: Asset Agreement for River Murray Operations Assets; and the *Further Agreement on Addressing Water Over allocation and Achieving Environmental Objectives in the Murray–Darling Basin—Control and Management of The Living Murray Assets.*

Under the agreements the MDBA has responsibility for managing the following classes of assets:

- infrastructure assets which are recorded in the RMO joint venture; and
- water entitlements which are recorded in the LMI joint venture.

At 30 June 2019, the RMO joint venture held net assets of $2.7 billion including the Hume and Dartmouth dams and the locks and weirs on the River Murray. The RMO infrastructure asset base remained fairly constant during 2018–19. Assets acquired under the asset agreement comprise plant and equipment purchases of $2.9 million and assets constructed and held in work in progress of $2.3 million. The revaluation resulted in assets being increased in value by $52.1 million in 2018–19.

The LMI joint venture held net assets of $667.2 million comprising gross investment in water recovery measures of $695.9 million and accumulated impairment losses of $28.8 million. The significant change in the LMI asset values during 2018–19 was the impairment reversal on water entitlements of $34.8 million.

Financial management

During the year the major focus has been on:

- the transfer of River Murray Operations assets to a customised assets module in the Financial Management Information System (FMIS);
- development of an investment framework to achieve a better return on investment for the funds held by the MDBA whilst maintaining the required level of funding to meet the operational needs;
- reconfiguring the FMIS to support the new operating model under the decentralised environment; and
- further enhancing business partnering model by developing campions to assist business line management to better understand and meet their corporate obligations and also take informed decisions.

Special purpose reporting

One of the key functions of the MDBA is to act as an asset manager (on behalf of the assets controlling governments) for key infrastructure assets throughout the Basin. Infrastructure assets primarily comprise River Murray Operations (RMO) assets such as the Hume and Dartmouth dams, and the locks and weirs on the River Murray (written down value of $2.6 billion).

The MDBA also manages water entitlements worth $667 million on behalf of Basin states and the Commonwealth, as part of the Living Murray Initiative (LMI) joint venture. These assets were either purchased from the willing sellers or acquired as a result of infrastructure improvement based savings projects to achieve the objectives of The Living Murray Initiative.

RMO and LMI assets do not form part of the MDBA's general purpose financial statements. They are reported separately in the RMO joint venture and LMI joint venture special purpose financial statements. These special purpose financial statements do not form part of this annual report but are independently audited on an annual basis.

As part of the preparation of RMO financial statements, the infrastructure assets are revalued by an independent external valuer on a three year cycle. An independent external valuation was undertaken at 30 June 2018. In the intervening financial years, including 2018–19, the MDBA conducts an internal revaluation by adjusting the value of its infrastructure assets using the Building Price Index.

As part of the preparation of LMI financial statements, an impairment assessment is undertaken based on independent valuation report. Water entitlements trading prices are recorded in the state registers. The state registries water trading data is refined to reliably undertake an impairment assessment that is recorded in the LMI joint venture special purpose financial statements in accordance with Australian Accounting Standards.

Internal controls

The MDBA has appropriate financial controls in place and these operated effectively and reliably during the past year. Similarly, no major issues have been identified by the MDBA's internal audit process. There is a sound internal control framework in place including effective identification and management of business risks and a reliable financial and management reporting system.

Related entity transactions

The MDBA has entered into transactions with related parties as part of whole of government initiatives and acquired goods and services from a number of entities including Comcover, Comcare, DIIS, the Department of Treasury and the Department of Finance to the value of $2.3 million.

INDEPENDENT AUDITOR'S REPORT

To the Minister for Water Resources, Drought, Rural Finance, Natural Disaster and Emergency Management

Opinion

In my opinion, the financial statements of the Murray-Darling Basin Authority ('the Entity') for the year ended 30 June 2019:

(a) comply with Australian Accounting Standards–Reduced Disclosure Requirements and the *Public Governance, Performance and Accountability (Financial Reporting) Rule 2015*; and

(b) present fairly the financial position of the Entity as at 30 June 2019 and its financial performance and cash flows for the year then ended.

The financial statements of the Entity, which I have audited, comprise the following statements as at 30 June 2019 and for the year then ended:

- Statement by the Accountable Authority and Chief Finance Officer;
- Statement of Comprehensive Income;
- Statement of Financial Position;
- Statement of Changes in Equity;
- Cash Flow Statement; and
- Notes to the financial statements, comprising a summary of significant accounting policies and other explanatory information.

Basis for opinion

I conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. My responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Statements* section of my report. I am independent of the Entity in accordance with the relevant ethical requirements for financial statement audits conducted by the Auditor-General and his delegates. These include the relevant independence requirements of the Accounting Professional and Ethical Standards Board's APES 110 *Code of Ethics for Professional Accountants* (the Code) to the extent that they are not in conflict with the *Auditor-General Act 1997*. I have also fulfilled my other responsibilities in accordance with the Code. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

GPO Box 707 CANBERRA ACT 2601
19 National Circuit BARTON ACT
Phone (02) 6203 7300 Fax (02) 6203 7777

Accountable Authority's responsibility for the financial statements

As the Accountable Authority of the Entity, the Chief Executive is responsible under the *Public Governance, Performance and Accountability Act 2013* (the Act) for the preparation and fair presentation of annual financial statements that comply with Australian Accounting Standards—Reduced Disclosure Requirements and the rules made under the Act. The Chief Executive is also responsible for such internal control as the Chief Executive determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Chief Executive is responsible for assessing the ability of the Entity to continue as a going concern, taking into account whether the Entity's operations will cease as a result of an administrative restructure or for any other reason. The Chief Executive is also responsible for disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the assessment indicates that it is not appropriate.

Auditor's responsibilities for the audit of the financial statements

My objective is to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the Australian National Audit Office Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

As part of an audit in accordance with the Australian National Audit Office Auditing Standards, I exercise professional judgement and maintain professional scepticism throughout the audit. I also:

- identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control;
- obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Entity's internal control;
- evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Accountable Authority;

- conclude on the appropriateness of the Accountable Authority's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Entity's ability to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify my opinion. My conclusions are based on the audit evidence obtained up to the date of my auditor's report. However, future events or conditions may cause the Entity to cease to continue as a going concern; and
- evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

I communicate with the Accountable Authority regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.

Australian National Audit Office

Serena Buchanan
Senior Executive Director
Delegate of the Auditor-General
Canberra
17 September 2019

Murray-Darling Basin Authority

Statement by the Accountable Authority and Chief Finance Officer

In our opinion, the attached financial statements for the year ended 30 June 2019 comply with subsection 42(2) of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act), and are based on properly maintained financial records as per subsection 41(2) of the PGPA Act.

In our opinion, at the date of this statement, there are reasonable grounds to believe that the Murray-Darling Basin Authority will be able to pay its debts as and when they fall due.

Signed....

Phillip Glyde
Chief Executive
17 September 2019

Signed.....

Harish Madan
Chief Finance Officer
17 September 2019

Statement of Comprehensive Income

for the year ended 30 June 2019

	Notes	2019 $'000	2018 $'000	Original Budget $'000
NET COST OF SERVICES				
Expenses				
Employee benefits	1.1A	**39,098**	36,636	38,597
Suppliers	1.1B	**85,181**	78,331	110,219
Grants	1.1C	**51,007**	46,220	43,500
Depreciation and amortisation	2.2	**1,862**	1,640	1,768
Write-down and impairment of assets	1.1D	**-**	520	-
Finance costs	1.1E	**24**	32	-
Total expenses		**177,172**	163,379	194,084
Own-source Income				
Own-source revenue				
Contributions from jurisdictions	1.2A	**93,545**	94,063	89,581
Interest		**2,295**	2,160	-
Other revenue	1.2B	**10,482**	4,510	4,803
Total own-source revenue		**106,322**	100,733	94,384
Gains/(Losses)				
Other Gains/(Losses)	1.2C	**(1)**	(97)	-
Total Gains/(Losses)		**(1)**	(97)	-
Total own-source income		**106,321**	100,636	94,384
Net cost of services		**(70,851)**	(62,743)	(99,700)
Revenue from Government	1.2D	**94,200**	78,910	91,700
Surplus/(Deficit) attributable to the Australian Government		**23,349**	16,167	(8,000)
OTHER COMPREHENSIVE INCOME				
Changes in asset revaluation surplus		**-**	2	-
Total comprehensive income		**23,349**	16,169	(8,000)
Total comprehensive income attributable to the Australian Government		**23,349**	16,169	(8,000)

The original budget comprises the Departmental budget as disclosed in the Portfolio Budget Statements (PBS) 2018–19.

The above statement should be read in conjunction with the accompanying notes.

Budget Variances Commentary

Budget variance explanations are outlined in Note 5. The original budget balances have been adjusted so as to be consistent with the financial statements classification.

Statement of Financial Position

as at 30 June 2019

	Notes	2019 $'000	2018 $'000	Original Budget $'000
ASSETS				
Financial assets				
Cash and cash equivalents	2.1A	**126,241**	97,950	71,251
Trade and other receivables	2.1B	**5,171**	3,421	4,099
Total financial assets		**131,412**	101,371	75,350
Non-financial assets				
Leasehold improvements	2.2	**4,364**	4,947	-
Property, plant and equipment	2.2	**1,638**	1,856	7,810
Intangibles	2.2	**584**	923	1,237
Prepayments		**510**	581	803
Total non-financial assets		**7,096**	8,307	9,850
Total assets		**138,508**	109,678	85,200
LIABILITIES				
Payables				
Suppliers	2.3A	**18,243**	12,859	16,401
Other payables	2.3B	**5,688**	5,856	4,994
Total payables		**23,931**	18,715	21,395
Provisions				
Employee provisions	3.1	**10,584**	10,335	10,011
Other provisions	2.4	**1,256**	1,240	1,280
Total provisions		**11,840**	11,575	11,291
Total liabilities		**35,771**	30,290	32,686
Net assets		**102,737**	79,388	52,514
EQUITY				
Contributed equity		**(11,199)**	(11,199)	(11,199)
Reserves		**2**	2	-
Retained surplus		**113,934**	90,585	63,713
Total equity		**102,737**	79,388	52,514

The above statement should be read in conjunction with the accompanying notes.

Budget Variances Commentary

Budget variance explanations are outlined in Note 5. The original budget balances have been adjusted so as to be consistent with the financial statements classification.

Statement of Changes in Equity

for the year ended 30 June 2019

	2019 $'000	2018 $'000	Original Budget $'000
CONTRIBUTED EQUITY/CAPITAL[1]			
Opening balance			
Balance carried forward from previous year	**(11,199)**	(11,199)	(11,199)
Closing balance	**(11,199)**	(11,199)	(11,199)
RETAINED EARNINGS			
Opening balance			
Balance carried forward from previous year	**90,585**	74,418	71,713
Adjusted opening balance	**90,585**	74,418	71,713
Comprehensive income			
Surplus/(Deficit) for the year	**23,349**	16,167	(8,000)
Other comprehensive income	**-**	-	-
Total comprehensive income	**23,349**	16,167	(8,000)
Closing balance	**113,934**	90,585	63,713
ASSET REVALUATION RESERVE			
Balance carried forward from previous year	**2**	-	-
Comprehensive income			
Other comprehensive income	-	2	-
Total comprehensive income	**-**	2	-
Closing balance	**2**	2	-
TOTAL EQUITY			
Opening balance			
Balance carried forward from previous year	**79,388**	63,219	60,514
Adjusted opening balance	**79,388**	63,219	60,514
Comprehensive income			
Surplus/(Deficit) for the year	**23,349**	16,167	(8,000)
Other comprehensive income	**-**	2	-
Total comprehensive income	**23,349**	16,169	(8,000)
Closing balance	**102,737**	79,388	52,514

The above statement should be read in conjunction with the accompanying notes.

1 The negative contributed equity is a historical legacy relating back to the transition of the Murray-Darling Basin Commission (MDBC) to the Murray-Darling Basin Authority on 15 December 2008. As part of the transition arrangement, all cash held by the MDBC totalling $441.488m was paid back to the Official Public Account (OPA) before being appropriated to the Authority. Once appropriated to the Authority these funds were recorded as revenue in the Authority's accounts.

Liabilities of $19.180m and assets of $7.981m were transferred to the Authority during the 2008–09 financial year. The excess of liabilities over assets of $11.199m continues to be shown in the Financial Statements of the Authority as negative contributed equity.

Budget Variances Commentary

Budget variance explanations are outlined in Note 5. The original budget balances have been adjusted so as to be consistent with the financial statements classification.

Cash Flow Statement

for the year ended 30 June 2019

	Notes	2019 $'000	2018 $'000	Original Budget $'000
OPERATING ACTIVITIES				
Cash received				
Receipts from Government		**94,200**	78,910	91,700
Contributions from jurisdictions		**93,490**	94,063	89,581
Interest		**2,023**	1,798	-
Net GST received		**8,323**	8,386	10,124
Other		**9,703**	5,595	4,803
Total cash received		**207,739**	188,752	196,208
Cash used				
Employees		**38,273**	36,241	38,597
Suppliers		**88,336**	88,709	120,343
Grants		**52,108**	47,180	43,500
Other		**8**	-	-
Total cash used		**178,725**	172,130	202,440
Net cash received from operating activities		**29,014**	16,622	(6,232)
INVESTING ACTIVITIES				
Cash received				
Proceeds from sales		**-**	20	-
Total cash received		**-**	20	-
Cash used				
Purchase of property, plant and equipment		**436**	402	1,768
Purchase of intangible assets		**287**	245	-
Total cash used		**723**	647	1,768
Net cash (used by) investing activities		**(723)**	(627)	(1,768)
Net Increase/(decrease) in cash held		**28,291**	15,995	(8,000)
Cash and cash equivalents at the beginning of the reporting period		**97,950**	81,955	79,251
Cash and cash equivalents at the end of the reporting period	2.1A	**126,241**	97,950	71,251

The above statement should be read in conjunction with the accompanying notes.

Budget Variances Commentary

Budget variance explanations are outlined in Note 5. The original budget balances have been adjusted so as to be consistent with the financial statements classification.

Overview

Objectives of the Murray-Darling Basin Authority

The Murray-Darling Basin Authority (the Authority) is an Australian Government controlled corporate Commonwealth entity established by the *Water Act 2007*. It is a not-for-profit entity. The principal objective of the Authority is to manage the Murray-Darling Basin's water resources in the national interest so that there may be an equitable and sustainable use of the Basin's resources.

The continued existence of the Authority in its present form and with its present programs is dependent on:

- Funding from Basin jurisdictions towards meeting the cost of Murray-Darling Basin Agreement functions; and
- Government policy and on continuing funding by Federal Government for the Authority's administration and programs relating to the Basin Plan and Murray-Darling Basin Agreement functions.

The Authority's activities are classified as departmental. Departmental activities involve the use of assets, liabilities, income and expenses controlled or incurred by the Authority in its own right.

From 1 July 2013, the Authority became responsible for the South Australian Riverland Floodplains Integrated Infrastructure Project (SARFIIP). SARFIIP aims to enhance the effectiveness of improved environmental flows to South Australia in particular at the Pike and Katarapko–Eckert's Creek (Katfish Reach) Floodplains and is expected to extend over 7 years, with an estimated cost of $155 million. While these activities are not controlled by the Authority it exercises effective project oversight and funding on behalf of the Commonwealth. SARFIIP funding is recorded as revenue from government and expenses are recorded as a grant expense in the Authority's Statement of Comprehensive Income. Prior to 2014–15, the project was reported as an Administered item.

Basis of Preparation of the Financial Statements

The financial statements are general-purpose financial statements and are required by section 42 of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act).

The financial statements have been prepared in accordance with:

a. *Public Governance, Performance and Accountability (Financial Reporting) Rule 2015* (FRR) for reporting periods ending on or after 1 July 2018; and
b. Australian Accounting Standards and Interpretations–Reduced Disclosure Requirements issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period.

The financial statements have been prepared on an accrual basis and in accordance with the historical cost convention except for certain assets and liabilities at fair value. Except where stated, no allowance is made for the effect of changing prices on the results or the financial position.

The financial statements are presented in Australian dollars and values are rounded to the nearest thousand dollars unless otherwise specified.

Unless alternative treatment is specifically required by an accounting standard, income and expenses are recognised in the Statement of Comprehensive Income, when and only when the flow, consumption or loss of economic benefits has occurred and can be reliably measured.

New Accounting Standards

All new, revised or amended standards and interpretations that were issued prior to the sign-off date and are applicable to the current reporting date did not have a material effect on the entity's financial statements.

Taxation

The Authority is exempt from all forms of taxation except Fringe Benefits Tax (FBT) and the Goods and Services Tax (GST).

Revenues, expenses and assets are recognised net of GST except:

- where the amount of GST incurred is not recoverable from the Australian Taxation Office; and
- for receivables and payables which are recognised inclusive of GST.

Comparative Figures

Comparative figures are adjusted so that they conform with changes in the presentation of the financial statements where required.

Events After the Reporting Period

No matters or circumstances have arisen since the end of the financial year which significantly affected or may affect the operations of the Authority, the results of these operations or state of affairs of the Authority in subsequent years.

Financial Performance

This section analyses the financial performance of the Authority for the year ended 30 June 2019.

Note 1.1: Expenses

	2019 $'000	2018 $'000
NOTE 1.1A: EMPLOYEE BENEFITS		
Wages and salaries	**27,576**	26,078
Superannuation:		
Defined contribution plans	**3,305**	2,922
Defined benefit plans	**2,285**	1,999
Leave and other entitlements	**5,481**	5,135
Separation and redundancies	**451**	502
Total employee benefits	**39,098**	36,636

Accounting policy

Accounting policies for employee related expenses are outlined in Note 3.1.

NOTE 1.1B: SUPPLIERS		
Goods and services supplied or rendered		
Expenditure by State Constructing Authorities	**57,856**	54,743
Water licence fee	**3,548**	3,457
Consultants and contractors	**13,899**	10,269
Communication & IT services	**2,601**	1,881
Other employment expenses	**1,169**	1,186
Committee expenses	**583**	854
Travel	**1,426**	1,344
Other provision of goods & services	**1,528**	1,482
Goods and services supplied or rendered	**82,610**	75,216
Goods and services are made up of:		
Provision of goods	**423**	285
Rendering of services	**82,187**	74,931
Total goods and services supplied or rendered	**82,610**	75,216
Other suppliers		
Operating lease rentals	**2,163**	2,062
Workers compensation expenses–government entity	**408**	1,053
Total other suppliers	**2,571**	3,115
Total suppliers	**85,181**	78,331

Note 1.1: Expenses–continued

Leasing Commitments

The Authority in its capacity as a lessee holds the following leases in Canberra, ACT:

Commencing on 31 March 2017 a 10 year lease was initiated in respect of premises at 33 Allara Street. Lease payments are subject to fixed annual increases of 3.75% on review date (April each year).

Commencing on 31 March 2017 a 2 year and 6 months lease option was exercised in respect of premises at 40 Allara Street. Lease payments are subject to fixed annual increases of 4% on review date (April each year).

Commencing on 1 October 2018 a 2 year lease was initiated in respect of premises at 72 Callandoon Street, Goondiwindi, QLD. There is an option to extend the lease by 1 year.

Commencing on 28 November 2017 a 5 year lease was initiated in respect of a Canon Oce ColorWave 500 Multifunctional–4 Roll-feed printer.

Commencing on 6 June 2016 a 3 year lease was initiated in respect of space and racks at Canberra Data Centre with 2 one year extension options. On 14 May 2019 the first extension option was exercised.

The Authority has also entered into 4 motor vehicle leases with varying commencement dates and lease terms with SG Fleet Australia Pty Limited.

Operating leases held by the Authority are effectively non-cancellable.

Note: Commitments are GST inclusive where relevant.

	2019	2018
	$'000	$'000
Commitments for minimum lease payments in relation to non-cancellable operating leases are payable as follows:		
Within 1 year	**2,459**	2,568
Between 1 to 5 years	**9,730**	9,401
More than 5 years	**7,515**	10,058
Total operating lease commitments	**19,704**	22,027

Accounting policy

Operating lease payments are expensed on a straight-line basis which is representative of the pattern of benefits derived from the leased assets.

NOTE 1.1C: GRANTS

Grants		
Australian Government entities		
State and Territory Governments	**9,133**	8,340
South Australian Riverland Floodplains Integrated Infrastructure Project	**40,000**	36,500
Local Governments	**5**	-
Private sector:		
Commercial entities	**47**	157
Non-profit institutions	**1,741**	1,207
Other	**81**	16
Total grants	**51,007**	46,220

Note 1.1: Expenses–continued

	2019 $'000	2018 $'000
NOTE 1.1D: WRITE-DOWN AND IMPAIRMENT OF ASSETS		
Impairment of intangible assets	-	142
Revaluation decrement of other property plant and equipment	-	378
Total write-down and impairment of assets	-	520

NOTE 1.1E: FINANCE COSTS		
Unwinding of discount on make good provision	**16**	32
Unwinding of interest on finance leases	**8**	-
Total finance costs	**24**	32

Note 1.2: Own-Source Income

Own-Source Revenue	2019 $'000	2018 $'000
NOTE 1.2A: CONTRIBUTIONS FROM JURISDICTIONS		
Australian Government	**12,006**	11,701
New South Wales	**29,727**	30,479
Victoria	**28,703**	28,685
South Australia	**22,687**	22,784
Queensland	**106**	104
Australian Capital Territory	**316**	310
Total contributions from jurisdictions	**93,545**	94,063

Accounting policy

The Authority receives contributions from jurisdictions based on an agreed contributions model (the model). The model is based on a number of different requirements including specific provisions under the Murray-Darling Basin Agreement. These Contributions are recognised as revenue when received.

NOTE 1.2B: OTHER REVENUE		
Hydropower generation	**7,364**	2,132
Contributions by States–Salinity program	**877**	879
Land and cottage rents	**331**	336
Other	**1,910**	1,163
Total other revenue	**10,482**	4,510

Accounting policy

Other revenue is for rendering of services and is recognised by reference to the stage of completion of contracts at the reporting date. The revenue is recognised when:

- the amount of revenue, stage of completion and transaction costs incurred can be reliably measured; and
- the probable economic benefits associated with the transaction will flow to the Authority.

The stage of completion of contracts at the reporting date is determined by reference to the proportion that costs incurred to date bear to the estimated total costs of the transaction.

Gains/(Losses)

NOTE 1.2C: OTHER GAINS/(LOSSES)		
(Loss) on disposal/write-off of assets	**(1)**	(97)
Total other gains/(losses)	**(1)**	(97)

Revenue from Government

NOTE 1.2D: REVENUE FROM GOVERNMENT		
Departmental appropriations	**94,200**	78,910
Total revenue from Government	**94,200**	78,910

Financial Position

This section analyses the Authority's assets used to conduct its operations and the operating liabilities incurred as a result. Employee related information is disclosed in the People and Relationships section.

Note 2.1: Financial Assets

	2019	2018
	$'000	$'000
NOTE 2.1A: CASH AND CASH EQUIVALENTS		
Cash on hand	**126,241**	97,950
Total cash and cash equivalents	**126,241**	97,950

Accounting policy

Cash is recognised at its nominal amount. Cash and cash equivalents include cash on hand and any deposits in bank accounts with an original maturity of 3 months or less that are readily convertible to known amounts of cash and subject to insignificant risk of changes in value.

NOTE 2.1B: TRADE AND OTHER RECEIVABLES		
Goods and services receivable		
Trade Receivables	**263**	150
Net GST receivable from the Australian Taxation Office	**3,174**	2,239
Other Receivables	**1,734**	1,032
Total goods and services receivable (gross)	**5,171**	3,421
Total trade and other receivables (net)	**5,171**	3,421

Credit terms for goods and services were within 30 days (2018: 30 days).

Accounting policy

Trade receivables and other receivables that are held for the purpose of collecting the contractual cash flows where the cash flows are solely payments of principal and interest, that are not provided at below-market interest rates, are subsequently measured at amortised cost using the effective interest method adjusted for any loss allowance.

Note 2.2: Non-Financial Assets

Note 2.2: Reconciliation of the Opening and Closing Balances of Property, Plant and Equipment and Intangibles

Reconciliation of the opening and closing balances for 2019

			Intangible assets		
	Leasehold improve-ments $'000	Other property, plant & equipment $'000	Computer software[1] $'000	Data sets $'000	Total $'000
AS AT 1 JULY 2018					
Gross book value	**5,083**	**1,954**	**7,392**	**872**	**15,301**
Accumulated depreciation, amortisation and impairment	**(136)**	**(98)**	**(6,757)**	**(584)**	**(7,575)**
Total as at 1 July 2018	**4,947**	**1,856**	**635**	**288**	**7,726**
Additions					
Purchased	**-**	**436**	**-**	**287**	**723**
Depreciation and amortisation	**(583)**	**(653)**	**(336)**	**(290)**	**(1,862)**
Other movements					
Disposals (Net Book Value)	**-**	**(1)**	**-**	**-**	**(1)**
Total as at 30 June 2019	**4,364**	**1,638**	**299**	**285**	**6,586**
Total as at 30 June 2019 represented by					
Gross book value	**5,083**	**2,389**	**7,392**	**1,159**	**16,023**
Accumulated depreciation, amortisation and impairment	**(719)**	**(751)**	**(7,093)**	**(874)**	**(9,437)**
Total as at 30 June 2019	**4,364**	**1,638**	**299**	**285**	**6,586**
Total intangible assets			**584**		

[1] The carrying amount of computer software in-use includes purchased and internally developed software.

There is no commitment or expectation to dispose or sell any leasehold improvement, other property, plant & equipment or intangible assets within the next 12 months.

There is a capital commitment value of $12,000 expected within the next 12 months (2018: $36,000).

Note 2.2: Non-Financial Assets–continued

Accounting policy

Acquisition of Assets

Assets are recorded at cost on acquisition except as stated below. The cost of acquisition includes the fair value of assets transferred in exchange and liabilities undertaken. Financial assets are initially measured at their fair value plus transaction costs where appropriate.

Assets acquired at no cost, or for nominal consideration, are initially recognised as assets and income at their fair value at the date of acquisition, unless acquired as a consequence of restructuring of administrative arrangements. In the latter case, assets are initially recognised as contributions by owners at the amounts at which they were recognised in the transferor's accounts immediately prior to the restructuring.

Asset Recognition Threshold

Purchases of property, plant and equipment are recognised initially at cost in the statement of financial position, except for purchases costing less than $2,000, which are expensed in the year of acquisition (other than where they form part of a group of similar items which are significant in total).

The initial cost of an asset includes an estimate of the cost of dismantling and removing the item and restoring the site on which it is located. This is particularly relevant to 'make good' provisions in property leases taken up by the Authority where there exists an obligation to restore the property to its original condition. These costs are included in the value of the Authority's leasehold improvements with a corresponding provision for the 'make good' recognised.

Revaluation

Following initial recognition at cost, property, plant and equipment is carried at fair value less subsequent accumulated depreciation and accumulated impairment losses. Valuations are conducted with sufficient frequency to ensure the carrying amounts of assets do not differ materially from the assets' fair values as at the reporting date. The regularity of independent valuations depends upon the volatility of movements in market values for the relevant assets.

All leasehold improvements and property, plant and equipment assets were reviewed and assessed for fair value in March 2018 by Deloitte Touche and Tohmatsu.

Revaluation adjustments are made on a class basis. Any revaluation increment is credited to equity under the heading of asset revaluation reserve except to the extent that it reverses a previous revaluation decrement of the same asset class that was previously recognised in the surplus/deficit.

Revaluation decrements for a class of assets are recognised directly in the surplus/deficit except to the extent that they reverse a previous revaluation increment for that class.

Any accumulated depreciation as at the revaluation date is eliminated against the gross carrying amount of the asset and the asset restated to the revalued amount.

Depreciation

Depreciable property, plant and equipment assets are written-off to their estimated residual values over their estimated useful lives using the straight-line method of depreciation.

Note 2.2: Non-Financial Assets–continued

Depreciation rates (useful lives), residual values and methods are reviewed at each reporting date and necessary adjustments are recognised in the current, or current and future reporting periods, as appropriate.

Depreciation and/or amortisation rates applying to each class of asset are based on the following useful lives:

Asset Class	**2018–19**
Computers and IT equipment	**3–7 years**
Office equipment	**6–9 years**
Leasehold improvements	**Lease term**
Data sets	**3–20 years**
Software applications	**2–4 years**
Software licences	**Length of licence** (2018: Length of licence but within range of 1–4 years)

Impairment

All assets were assessed for indications of impairment at 30 June 2019. Where indications of impairment exist, the asset's recoverable amount is estimated and an impairment adjustment made if the asset's recoverable amount is less than its carrying amount. The recoverable amount of an asset is the higher of its fair value less costs of disposal and its value in use. Value in use is the present value of the future cash flows expected to be derived from the asset. Where the future economic benefit of an asset is not primarily dependent on the asset's ability to generate future cash flows, and the asset would be replaced if the Authority were deprived of the asset, its value in use is taken to be its depreciated replacement cost.

Derecognition

An item of property, plant and equipment is derecognised upon disposal or when no further future economic benefits are expected from its use or disposal.

Intangibles

The Authority's intangibles comprise internally developed software; acquired data-sets for internal use and software licences. These assets are carried at cost less accumulated amortisation and accumulated impairment losses.

Software is amortised on a straight-line basis over its anticipated useful life. All software assets were assessed for indications of impairment as at 30 June 2019.

Note 2.3: Payables

	2019	2018
	$'000	$'000
NOTE 2.3A: SUPPLIERS		
Trade creditors and accruals	**18,243**	12,859
Total suppliers	**18,243**	12,859

Note 2.3B: Other Payables		
Wages and salaries	**908**	582
Superannuation	**41**	40
Lease incentive	**3,253**	3,672
Finance lease liability	**114**	-
Prepayments received/unearned income	**684**	1,123
Other	**688**	439
Total other payables	**5,688**	5,856

Accounting policy

The Authority's financial liabilities consist of trade creditors and accruals. These liabilities are recognised at their nominal amounts, being the amounts at which the Authority expects the liabilities will be settled. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

Unearned income represents assets received from another party in advance of the Authority fulfilling its contracted obligations. The Authority releases unearned income to revenue when the services required to be performed have been performed.

Lease incentives received under operating leases are recognised as a liability. The aggregate benefit of incentives is recognised as a reduction of rental expense on a straight-line basis over the lease term.

Note 2.4: Other Provisions

	2019 $'000	2018 $'000
NOTE 2.4: OTHER PROVISIONS		
Provision for make good	**1,256**	1,240
Total other provisions	**1,256**	1,240

	Provision for restoration $'000	Total $'000
Carrying amount 1 July 2018	**1,240**	1,240
Unwinding of discount or change in discount rate	**16**	16
Closing balance 30 June 2019	**1,256**	1,256

The Authority currently has 2 (2018: 2) agreements for the leasing of premises which have provisions requiring the Authority to restore the premises at the conclusion of the lease. The Authority has made a provision to reflect the present value of this obligation.

People and Relationships

This section describes a range of employment and post employment benefits provided to our people and our relationships with other key people.

Note 3.1: Employee Provisions

	2019	2018
	$'000	$'000
NOTE 3.1: EMPLOYEE PROVISIONS		
Leave	**10,584**	10,231
Separations and redundancies	**-**	104
Total employee provisions	**10,584**	10,335

Accounting policy

Employee related expenses are recognised in the period that employee services are received.

Liabilities for 'short-term employee benefits' (as defined in AASB 119 *Employee Benefits*) and termination benefits due within twelve months of the end of reporting period are measured at their nominal amounts.

The nominal amount is calculated with regard to the rates expected to be paid on settlement of the liability.

Other long-term employee benefits are measured at the present value of the defined benefit obligation at the end of the reporting period.

Leave

The liability for employee benefits includes provision for annual leave and long service leave. No provision has been made for sick leave as all sick leave is non-vesting and the average sick leave taken in future years by employees of the Authority is estimated to be less than the annual entitlement for sick leave.

The leave liabilities are calculated on the basis of employees' remuneration at the estimated salary rates that will be applied at the time the leave is taken, including the Authority's employer superannuation contribution rates to the extent that the leave is likely to be taken during service rather than paid out on termination.

The liability for long service leave has been determined using a detailed calculation (employee by employee) basis as per the *Public Governance, Performance and Accountability (Financial Reporting) Rule* (FRR) and Commonwealth Entity Financial Statements Guide. The estimate of the present value of the liability takes into account attrition rates and pay increases through promotion and inflation.

Separation and Redundancy

Provision is made for separation and redundancy benefit payments. The Authority recognises a provision for termination when it has developed a detailed formal plan for the terminations and has informed those employees affected that it will carry out the terminations.

Superannuation

The Authority's staff are members of the Commonwealth Superannuation Scheme (CSS), the Public Sector Superannuation Scheme (PSS), the PSS accumulation plan (PSSap) or other employee nominated superannuation funds.

The CSS and PSS are defined benefit schemes for the Australian Government. The remaining funds are defined contribution schemes.

The liability for defined benefits is recognised in the financial statements of the Australian Government and is settled by the Australian Government in due course. This liability is reported in the Department of Finance's administered schedules and notes.

The Authority makes employer contributions to the employees' superannuation schemes at rates determined by an actuary to be sufficient to meet the current cost to the Government. The Authority accounts for the contributions as if they were contributions to defined contribution plans.

The liability for superannuation recognised as at 30 June represents outstanding contributions for the reporting period.

The Authority also contributes to a number of complying funds to discharge the Authority's liability in regard to individual employees and the *Superannuation Guarantee (Administration) Act 1992* as well as to facilitate the salary sacrifice options of employees.

Note 3.2: Key Management Personnel Remuneration

Key management personnel are those persons having authority and responsibility for planning, directing and controlling the activities of the entity, directly or indirectly, including any director (whether executive or otherwise) of that entity. The entity has determined the key management personnel to include the Commonwealth Minister of Agriculture, Authority members, the Chief Executive and Divisional heads within the Authority and any staff member who has acted in one of the divisional head roles for longer than 3 months. Key management personnel remuneration is reported in the table below:

	2019	2018
	$'000	$'000
Short-term employee benefits	**2,090**	1,803
Other long-term employee benefits	**88**	168
Post-employment benefits	**329**	318
Total key management personnel remuneration expenses[1]	**2,507**	2,289

The total number of key management personnel included in the above table is 12 (2018: 16).

1 The above key management personnel remuneration excludes the remuneration and other benefits of the Portfolio Minister. The Portfolio Minister's remuneration and other benefits are set by the Remuneration Tribunal and are not paid by the entity.

Note 3.3: Related Party Disclosures

Related party relationships:

The Authority is an Australian Government controlled entity. Related parties to this entity are Key Management Personnel (as detailed in Note 3.2), Members of the Ministerial Council, the Living Murray Initiatives & River Management Operations joint ventures and other Australian Government entities.

Transactions with related parties:

Given the breadth of Government activities, related parties may transact with the government sector in the same capacity as ordinary citizens. Such transactions include the payment or refund of taxes, receipt of a Medicare rebate or higher education loans. These transactions have not been separately disclosed in this note. The Authority does not pay any member of the Ministerial Council for the services they provide to the MDBA under the Murray-Darling Basin Agreement.

The following transactions with related parties occurred during the 2019 financial year:

- There were no new transactions with related parties in the current year. An amount of $51,529 was paid to a former member of the Authority relating to services provided in 2018 detailed below.

The following transactions with related parties occurred during the 2018 financial year:

- A member of the Authority has an ownership interest in, and is a director of, a consulting company which provided services to the MDBA to the value of $128,194. A balance of $51,529 remained outstanding at year end. The services were provided under standard terms and conditions.

Managing uncertainties

This section analyses how the Authority manages financial risks within its operating environment.

Note 4.1: Contingent Assets and Liabilities

There are no contingent assets or liabilities in current year or prior year.

Quantifiable Contingencies

There were no estimated contingent liabilities as at 30 June 2019.

Unquantifiable Contingencies

There is one unquantifiable contingency that relates to a claim asserting negligence in relation to the Authority's performance of function under the Murray-Darling Basin Agreement. Damages are unquantifiable. The Authority's insurer Comcover has been formally notified of this claim. The Authority's policy covers this claim.

In addition to the above matter, there are a number of unquantifiable contingencies where it is not possible to estimate the amounts of any eventual payments. These pertain to the former Murray-Darling Basin Commission (the Commission). Under Section 239F of the *Water Act 2007*, the liabilities of the Commission became liabilities of the Authority.

This includes any liability, duty or obligation, whether contingent or prospective; but does not include a liability, duty or obligation imposed by:

- an Act; or
- regulations or other subordinate legislation made under an Act; or
- the *Murray–Darling Basin Act 1992* of New South Wales; or
- the *Murray–Darling Basin Act 1993* of Victoria; or
- the *Murray–Darling Basin Act 1996* of Queensland; or
- the *Murray–Darling Basin Act 1993* of South Australia; or
- the former Murray-Darling Basin Agreement.

Accounting policy

Contingent liabilities and contingent assets are not recognised in the statement of financial position but are reported in the notes. They may arise from uncertainty as to the existence of a liability or asset or represent an asset or liability in respect of which the amount cannot be reliably measured. Contingent assets are disclosed when settlement is probable but not virtually certain and contingent liabilities are disclosed when settlement is greater than remote.

Note 4.2: Financial Instruments

	2019 $'000	2018 $'000
NOTE 4.2: CATEGORIES OF FINANCIAL INSTRUMENTS		
Financial Assets under AASB 139		
Loans and receivables		
Cash and cash equivalents		97,950
Trade and other receivables		1,182
Total loans and receivables		99,132
Financial Assets under AASB 9		
Financial assets measured at amortised cost		
Cash and cash equivalents	**126,241**	
Trade and other receivables	**1,997**	
Total financial assets at amortised cost	**128,238**	
Total financial assets	**128,238**	99,132
Financial Liabilities		
Financial liabilities measured at amortised cost		
Trade creditors and accruals	**18,243**	12,859
Total financial liabilities measured at amortised cost	**18,243**	12,859
Total financial liabilities	**18,243**	12,859

Classification of financial assets on the date of initial application of AASB 9

Financial asset by class	Note	AASB 139 Original classification	AASB 9 new classification	AASB 139 Carrying amount at 1 July 2018 $'000	AASB 9 Carrying amount at 1 July 2018 $'000
Cash and cash equivalents	2.1A	Loans and receivables	Amortised cost	97,950	97,950
Trade and other receivables	2.1B	Loans and receivables	Amortised cost	1,182	1,182
Total financial assets				**99,132**	**99,132**

Accounting policy

Financial Assets

With the implementation of AASB 9 Financial Instruments for the first time in 2019, the entity classifies its financial assets in the following categories:

a. financial assets at fair value through profit or loss;

b. financial assets at fair value through other comprehensive income; and

c. financial assets measured at amortised cost.

The classification depends on both the entity's business model for managing the financial assets and contractual cash flow characteristics at the time of initial recognition. Financial assets are recognised when the entity becomes a party to the contract and, as a consequence, has a legal right to receive or a legal obligation to pay cash and derecognised when the contractual rights to the cash flows from the financial asset expire or are transferred upon trade date. Comparatives have not been restated on initial application.

Note 4.2: Financial Instruments–continued

Financial liabilities

Financial liabilities are classified as either financial liabilities 'at fair value through profit or loss' or other financial liabilities.

The Authority only holds financial instruments carried at amortised cost.

Financial Assets at Amortised Cost

Financial assets included in this category need to meet two criteria:

1. the financial asset is held in order to collect the contractual cash flows; and
2. the cash flows are solely payments of principal and interest (SPPI) on the principal outstanding amount. Amortised cost is determined using the effective interest method.

Effective Interest Method

Income is recognised on an effective interest rate basis for financial assets that are recognised at amortised cost.

Impairment of Financial Assets

Financial assets are assessed for impairment at the end of each reporting period based on Expected Credit Losses, using the general approach which measures the loss allowance based on an amount equal to lifetime expected credit losses where risk has significantly increased, or an amount equal to 12 month expected credit losses if risk has not increased.

The simplified approach for trade and other receivables is used. This approach always measures the loss allowance as the amount equal to the lifetime expected credit losses.

A write-off constitutes a derecognition event where the write-off directly reduces the gross carrying amount of the financial asset.

Financial Liabilities at Amortised Cost

Financial liabilities are recognised and derecognised upon 'trade date'. Financial liabilities, including borrowings, are initially measured at fair value, net of transaction costs. These liabilities are subsequently measured at amortised cost using the effective interest method, with interest expense recognised on an effective interest basis.

Supplier and other payables are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

Note 4.3: Fair Value Measurements

Accounting policy

The Authority's assets are held for operational purposes and not held for the purposes of deriving a profit. The current use of all non-financial assets is considered their highest and best use.

The Authority's policy is to recognise transfers into and transfers out of fair value hierarchy levels as at the end of the reporting period. There have been no transfers between level 1 and level 2 of the hierarchy during the year.

NOTE 4.3: FAIR VALUE MEASUREMENTS

	Fair value measurements at the end of the reporting period	
	2019	2018
	$'000	$'000
ASSETS		
Assets measured at fair value		
Leasehold improvements	**4,364**	4,947
Other property, plant and equipment	**1,638**	1,856
Total assets measured at fair value	**6,002**	6,803
Assets measured at other than fair value, but approximate fair value[1]		
Cash and cash equivalents	**126,241**	97,950
Trade and other receivables	**5,171**	3,421
Total assets measured at other than fair value, but approximate fair value	**131,412**	101,371
Assets measured at cost		
Intangibles	**584**	923
Other non-financial assets	**510**	581
Total assets measured at cost	**1,094**	1,504
Total assets stated in the Statement of Financial Position	**138,508**	109,677
LIABILITIES		
Liabilities measured at fair value		
Provision for restoration	**1,256**	1,240
Total liabilities measured at fair value	**1,256**	1,240
Liabilities measured at other than fair value, but approximate fair value[2]		
Suppliers	**18,243**	12,859
Other payables	**5,688**	5,856
Total liabilities measured at other than fair value, but approximate fair value	**23,931**	18,715
Liabilities measured at cost		
Employee provisions	**10,584**	10,335
Total liabilities measured at cost	**10,584**	10,335
Total liabilities stated in the Statement of Financial Position	**35,771**	30,290

1. The Authority did not measure any non-financial assets at fair value on a non-recurring basis as at 30 June 2019 (2018:Nil).
2. These items' carrying amounts equate to their fair values.

Note 4.4: Aggregate Assets and Liabilities

	2019 $'000	2018 $'000
NOTE 4.4: AGGREGATE ASSETS AND LIABILITIES		
Assets expected to be recovered in:		
No more than 12 months	**131,844**	101,914
More than 12 months	**6,664**	7,764
Total Assets	**138,508**	109,678
Liabilities expected to settled in:		
No more than 12 months	**23,986**	18,498
More than 12 months	**11,785**	11,792
Total Liabilities	**35,771**	30,290

Budget Variances

Note 5: Explanations of Major Budget Variances

Variances are considered to be 'major' if they are core to the Authority's activities and based on the following criteria:

- the variance between budget and actual is greater than +/- 10% of the original budget for a line item; and
- the variance between budget and actual is greater than $1,000,000; or
- an item is below this threshold but is considered important for the reader's understanding or is relevant to an assessment of the discharge of accountability and to an analysis of the Authority's performance.

The budget is not audited.

Budget Variance Explanation	Affected statements and line items
The Authority experiences significant fluctuations in its spending against budget due to the complex nature of the joint programs, which reflects a high level of inherent risk associated with capital construction and environmental projects. There are two major reasons impacting the delivery of programs: a number of large programs that are scalable depending on seasonal conditions, river and storage levels, and the associated lengthy and complex approval processes. Some infrastructure are only accessible when water levels are low or may only be taken out of service at times of the year when the risk to water supply is low. The infrastructure require investigation to determine the condition of these assets and the extent of maintenance required. Budget is generally allocated to progress works, however, depending on assets' conditions, it may require less maintenance/replacement than anticipated. As such, the Authority budgeted for a significant increase in expenditure in relation to these infrastructure projects. Despite the higher budgeted costs, the ability of the Authority to undertake these projects to the extent budgeted was delayed as a result of challenges in procurement processes, including: local councils permits and statutory approvals taking longer than anticipated, industry resource capacity limitations has resulted in major projects tenders not awarded in the first attempt, and specific assets are no longer manufactured in Australia and must be sourced overseas resulting in longer delays in timing. During 2018–19 the above resulted in reduced expenditure on Water Infrastructure Assets in Victoria, New South Wales and South Australia which include Hume Dam, Dartmouth Dam, Floating plant, and Lock 6. Reduced water storage levels have resulted in less water entitlement usage for The Living Murray program. Similarly, there was a decrease in the related cash out flows (including GST).	Statement of Comprehensive Income: • Suppliers • Grants • Contribution from Jurisdictions • Revenue from Government Statement of Financial Position: • Cash and cash equivalents • Suppliers • Other payables Cash Flow Statements: • Net GST received • Suppliers • Grants
Budgeted expenditure related to fitouts at 33 Allara Street was postponed to 2019-20 due to exercising of an option to extend the lease for 40 Allara Street.	Statement of Financial Position: • Leasehold improvements and Property, Plant and Equipment Cash Flow Statements: • Purchase of property, plant and equipment
Interest revenue was not budgeted. Due to the dry season the release of water from Dartmouth Dam created an increase in the generation of hydropower. There is a consequential impact on other revenue as represented by Hydropower generation fees.	Statement of Comprehensive Income: • Interest • Other revenue Cash Flow Statements: • Other cash received • Interest

Appendixes

Appendix A
Governance bodies, meetings and outcomes

The Authority

The Authority takes advice on Basin-wide strategy, policy and planning from the MDBA, and collaborates with government and community groups to secure Basin water resources.

The appointment process for members is set out in the:

- Intergovernmental Agreement of Murray–Basin Reform
- *Water Act 2007* (Cwlth).

Authority members must have substantial expertise in fields relevant to the MDBA's activities. This includes water management, economics, the environment and agriculture.

The terms of Neil Andrew (Chair) and George Warne came to an end. Neil finished his term in January 2019 and George in March 2019. Joanna Hewitt has been acting Chair since January 2019.

The Authority met 12 times in 2018–19.

Further details about members of the Authority are on pages 124.

Key areas of work

- Water resource availability and drought conditions
- Basin compliance with regular updates from the Chair of the Independent Assurance Committee, Allan Holmes, and the Northern Basin Commissioner, Mick Keelty
- Sustainable diversion limit compliance and reporting
- The Productivity Commission's five-yearly review of the Basin Plan
- Basin water markets and trade
- Basin community concerns, with regular updates from the Chair of the Basin Community Committee, Rory Treweeke
- Fish deaths and the independent assessment of fish deaths in the Lower Darling in 2018–19
- Climate change

Since the start of the 2019 calendar year the Authority has been involved in a major program of work to recommend water resource plans (prepared by the Basin states) to the Australian Government minister responsible for water for accreditation. Since January 2019, the Authority has increased the frequency and duration of their meetings to two days every month to deal with this issue.

Murray–Darling Basin Ministerial Council

The Ministerial Council was established under the Murray–Darling Basin Agreement (Schedule 1) of the Water Act. The council's responsibilities include:

- dealing with major policy issues relating to the management of water in the Basin
- providing direction to the Basin Officials Committee
- making amendments to the Murray–Darling Basin Agreement.

Membership comprises the Australian Government minister responsible for water and ministers from each of the Basin states. The council met once in 2018–19.

Table A.1 Members of the Ministerial Council (as at 30 June 2019)

Committee member	Who they represent
Hon. David Littleproud (Chair)	Commonwealth
Hon. Melinda Pavey MP	New South Wales
Hon. Lisa Neville MP	Victoria
Hon. Dr Anthony Lynham MP	Queensland
Hon. David Speirs MP	South Australia
Mr Mick Gentleman MLA	Australian Capital Territory

Key areas of work

- Basin compliance
- Water availability and ongoing drought conditions
- Community involvement in designing and implementing the Basin Plan
- Sustainable diversion limit supply and constraints projects and infrastructure efficiency programs
- Environmental watering outcomes, protection of environmental water and channel capacity constraints
- Aboriginal participation in water management
- Progress on water resource plans

Basin Officials Committee

The Murray–Darling Basin Officials Committee was established under the Murray–Darling Basin Agreement (Schedule 1) of the Water Act.

The committee gives advice to the Murray–Darling Basin Ministerial Council and implements council policy on matters such as state water shares. It also has high-level responsibilities for river operations, including:

- giving effect to policies or decisions by the Ministerial Council
- making high-level decisions in relation to river operations
- setting objectives and outcomes to be achieved by the MDBA in relation to river operations.

Membership comprises representatives from the six Basin governments. The Chair is the Australian Government member. The Authority Chair and MDBA Chief Executive are non-voting members of the committee.

The committee met eight times in 2018–19.

Basin Officials Committee governance review

The Murray–Darling Basin Compliance Compact stated that 'the Australian Government and Basin states were to review the Murray–Darling Basin joint governance arrangements to improve the efficiency and effectiveness of current arrangements'.

Mr Greg Claydon was engaged as the independent reviewer on 20 September 2018. The review was to examine the:

- efficiency and effectiveness of committee structures
- respective roles, responsibilities and performance of the committees and secretariats
- level of authority and expertise required for each committee
- scope and membership of the Basin Officials Committee and relevant committees and subcommittees related to the delivery of the Basin Plan and the agreement.

The review was completed in March 2019, with the final report due to be provided to the Ministerial Council later in 2019.

Table A.2 Members of the Basin Officials Committee (as at 30 June 2019)

Committee member	Who they represent
Malcolm Thompson (Chair)	Commonwealth
Paul Morris (Deputy Chair)	Commonwealth
Rachel Connell	New South Wales
Helen Vaughan	Victoria
David Wiskar	Queensland
Ben Bruce	South Australia
Ian Walker	Australian Capital Territory

Key areas of work

- Basin compliance and the northern 'toolkit' measures
- Water availability and ongoing drought conditions
- Community involvement in designing and implementing the Basin Plan
- Sustainable diversion limit supply and constraints projects and infrastructure efficiency programs
- Environmental watering outcomes, protection of environmental water and channel capacity constraints
- Aboriginal participation in water management
- The Productivity Commission's five-yearly review on Basin Plan implementation
- Review of the Murray–Darling Basin joint governance arrangements
- The development of the Basin Science Platform

Basin Plan Implementation Committee

The Basin Plan Implementation Committee (BPIC) is a high-level body established to monitor, review and make decisions associated with the Basin Plan Implementation Agreement.

The committee met four times in 2018–19.

In 2018–19, BPIC were involved with furthering short-term, strategic matters critical to the implementation of the Basin Plan.

Table A.3 Members of the Basin Plan Implementation Committee (as at 30 June 2019)

Committee member	Alternative member	Who they represent
Carl Binning (Chair)	NA	MDBA
Peter Hyde	Jeanine Murray	New South Wales–Department of Primary Industries
Derek Rutherford	Justen Simpson	New South Wales–Office of Environment and Heritage
Rozi Juniper	Melinda Stuart-Adams	Victoria
John Ritchie	Juliette Giavon	Queensland
Dan Jordan	Joshua Kaplan	South Australia
Matt Kendall	Nigel Dears	Australian Capital Territory
Jody Swirepik	Mark Taylor	Commonwealth Environmental Water Office
Margaret Allan	Matthew Dadswell	Department of Agriculture

Key areas of work

- The process for amending accredited water resource plans, including preparing regulations to support minor amendments
- Ongoing improvement in prerequisite policy measures implementation through an assurance program, and the development of a position statement for publication
- Strategic input and jurisdictional oversight of the planning stages for the MDBA's 2020 evaluation
- Progressing improvements in monitoring, evaluation and reporting (MER) as recommended by the independent MER capability assessment report
- Setting priorities for BPIC working groups including the monitoring and evaluation working group and environmental watering working group
- The formation of a Basin-scale community of practice for Aboriginal engagement and participation

River Murray Operations Committee

The River Murray Operations Committee (RMOC) provides support and advice to the Basin Officials Committee on River Murray operations (RMOs). It oversees RMOs, which the MDBA manages of behalf of the contracting governments in accordance with the provisions of the agreement.

The committee met four times in 2018–19.

Table A.4 Members of the River Murray Operations Committee (as at 30 June 2019)

Committee member	Who they represent
Paul Morris (Chair)	Australian Government
Daniel Blacker	New South Wales
Adrian Langdon	New South Wales
Dr Grace Mitchell	Victoria
Scott Barber	Victoria
Mark Gobbie	South Australia
Dan Jordan	South Australia

Key areas of work

- Providing advice to the relevant contracting governments, through the Basin Officials Committee, on
  - policy matters with regard to asset use, construction and planned maintenance
  - policy matters relating to the delivery and accounting for the water available to the relevant contracting governments under the agreement's water-sharing arrangements
  - cost-sharing arrangements to meet the costs of constructing, managing, controlling, operating, using, maintaining, repairing and renewing River Murray Operations assets
  - advising the relevant contracting governments of any associated issues and risks, and potential actions to address those issues and risks
  - proposals for the future development of River Murray Operations
- Providing advice to the MDBA on
  - preparing corporate plans in relation to River Murray Operations
  - preparing the asset management plan and any amendments to the asset management plan
  - coordinating waterway management functions of New South Wales, Victoria, and South Australia in relation to the River Murray system

Basin Community Committee

The Basin Community Committee (BCC) was established under the Water Act to ensure the diverse communities across the Basin have their issues heard by senior decision makers. The BCC acts as an independent advisory committee to the Murray–Darling Basin Authority and the Ministerial Council.

BCC members are key local contacts for the Authority. In 2017 a new committee was appointed for a three-year term beginning in 2018. Four members were extended from the previous committee and given an 18-month extension to February 2020. When new members are needed the MDBA calls for nominees. It recommends a shortlist of nominees to the Ministerial Council, which determines the final membership. See page 94 for a map showing locations of BCC members across the Basin.

Table A.5 Members of the Basin Community Committee (as at 30 June 2019)

Committee member	Who they represent
Rory Treweeke (Chair)	Lower Balonne, New South Wales
Karen Hutchinson	Murrumbidgee, New South Wales
Howard Jones	Lower Darling, New South Wales
Phil Duncan	Gomeroi man from Moree, Gwydir, New South Wales
Amy Fay	Goulburn–Murray, New South Wales
Susan Madden	Dubbo, New South Wales
Katrina Myers	Mid-Murray, New South Wales
David Thurley	Upper Murray, New South Wales
Sandra Peckham	Descendant of Wiradjuri people, Bogan, New South Wales
Sue Rudd	Sunraysia, Victoria
Adrian Weston	Goulburn–Broken catchment, Victoria
Samantha O'Toole	Lower Balonne, St George, Queensland
Joanne Pfeiffer	Lower Lakes, South Australia
Emily Jenke	Lower Lakes, South Australia
Neil Martinson	Riverland, South Australia

Floyd Robinson represented the Condamine–Balonne until his resignation in May 2019.

The committee met six times in 2018–19.

Key areas of work
• Water resource planning • How the river runs—past and future • Aboriginal water policy, engagement, cultural flows • Basin Plan evaluation

Members resolved that the focus should always be on the people who live in the Basin. They reported back to the MDBA on how the drought is affecting people in the northern and southern Basins.

Committee members reported positive and negative outcomes of the Basin Plan implementation and noted the need to restore community trust. They called for consistency and connectivity across water resource plan areas and urged the Basin states to work as quickly as possible to deliver the Basin Plan.

Independent Assurance Committee

The Independent Assurance Committee (IAC) provides expert advice on the design, implementation and adequacy of the MDBA's Basin Plan compliance program. Members are independent experts in their chosen field. The IAC's advice to the MDBA is published on the MDBA website. The committee met four times in 2018–19.

Table A.6 Members of the Independent Assurance Committee (as at 30 June 2019)

Committee member	Area of expertise
Allan Holmes (Chair)	Mr Holmes is a fellow of the Victorian Leadership Institute and of the Institute of Public Administration Australia. In South Australia, he is a member of the Environment Protection Authority, chairs the Coast Protection Board, is a commissioner on the State Planning Commission, and a director of Arid Recovery (a not-for-profit research and conservation organisation). He was chief executive of the South Australian Department of Environment, Water and Natural Resources for 15 years and has been involved in water management and regulation for many years. He also chaired the independent panel which undertook the 2017 Murray–Darling Basin Water Compliance Review. Mr Holmes is a graduate of the University of Adelaide and the University of Melbourne.

Committee member	Area of expertise
Lisa Corbyn	Ms Corbyn was Director General of the New South Wales Environment Department and NSW Environmental Protection Authority (EPA) from 2000–2012. From 2012–2015, she served as the inaugural Chair of the statutory, Independent Expert Scientific Committee (IESC) on the water impacts of coal seam gas and large coal mining developments. Recently, she has been providing advice to state and Commonwealth government agencies on compliance and regulatory programs. She has also participated on national Ministerial Council standing committees, and served as a Commissioner of the Murray–Darling Basin Commission. Ms Corbyn is a graduate of the University of Washington (USA). She did a fellowship in Environmental Economics at Princeton University. In 2016, she was awarded the Australian Public Service Medal for outstanding public service to environmental protection and policy reform and natural resource management in NSW.
Garry Smith	Mr Smith is a civil engineer with broad-ranging expertise in the water industry, including at Goulburn–Murray Water and Melbourne Water. He is a director with DG Consulting and a director of Melbourne Water. Mr Smith is a member of the MDBA's Independent River Operations Review Group and the Independent Audit Group for Salinity.
Martin Dolan	Mr Dolan has extensive experience in the development and operation of compliance and regulatory systems in a range of Commonwealth sectors. His 37-year career as a Commonwealth public servant included 20 years in senior executive roles.

Key areas of work

- The MDBA's compliance strategy and approach, program design and agency capability
- Water resource planning, Office of Compliance work plan and MDBA compliance priorities
- High-risk areas for Basin Plan implementation, including progress on state water resource plans and improved management of environmental water
- Productivity Commission advice
- Audit governance
- Water trade rule assessment framework

Details of the Compliance Independent Assurance Committee reports and advice are available on the MDBA's website.

Advisory Committee on Social, Economic and Environmental Sciences

The MDBA established the Advisory Committee on Social, Economic and Environmental Sciences (ACSEES) under s. 203 of the Water Act, alongside other bodies including the Basin Community Committee.

Members of ACSEES contribute their expertise and provide advice to the MDBA on a range of matters relating to the implementation of the Basin Plan.

The committee re-established itself in 2018. It met twice in 2019: in October 2018 and again in April 2019.

ACSEES provided advice to inform independent reviews on how Return Flows have been considered in the Basin Plan development and implementation as well as the health of the MDBA's SDL Accounting Frameworks. ACSEES also advised on MDBA's approach to the Basin Plan Evaluation and the development of the Climate Change Program.

Table A.7 Members of the Advisory Committee on Social, Economic and Environmental Sciences (as at 30 June 2019)

Committee member	Area of expertise
Professor Rob Vertessy (Chair)	Professor Vertessy conducts research on climate change and water security as an enterprise professor with the University of Melbourne's School of Engineering. He also chairs the Australian Academy of Technology and Engineering's water forum. Professor Vertessy's consulting company focuses on environmental intelligence. He has travelled to Asia on behalf of the Australian Water Partnership and the Commonwealth Government to share Australia's water reform experience. He chairs a number of state and Commonwealth technical committees concerned with climate and water matters.
Professor Michael Stewardson	Professor Stewardson leads the Environmental Hydrology and Water Resources Group in the School of Engineering at the University of Melbourne.
Professor Poh-Ling Tan	Professor Tan is the International Water Centre's Professor for Water Law and Governance at Griffith University. A background in legal practice has provided a problem-solving approach to her teaching and research.
Professor Sue Jackson	Professor Jackson is a cultural geographer with a PhD from Macquarie University. She has 25 years of experience researching the social dimensions of natural resource management, currently with the Australian Rivers Institute at Griffith University.

Committee member	Area of expertise
Professor Roger Stone	Professor Stone's career in both meteorological and climatological research extends over 35 years. His career has focused on research and development in climate systems, extreme drought preparedness and climate modelling targeted for global agricultural production and trading.
Professor Nick Bond	Professor Bond is the Director of the Centre for Freshwater Ecosystems at La Trobe University. He has more than 20 years of experience working on the ecology and hydrology of rivers and streams, with a focus on Australia's water-stressed regions. His primary research interest is in modelling the effects of flow variability on stream biota and ecosystem processes. He has been involved in environmental flow research and monitoring in Australia, Asia and South America.
Professor Stuart Bunn	Observer to ACSEES
Professor Steve Hatfield-Dodds	Technical adviser to ACSEES

Professor David James resigned from ACSEES in May 2019.

Key areas of work

- An independent scientific review on how return flows have been considered in the Basin Plan development and implementation. This included an ACSEES-hosted workshop with leading hydrologists from state governments, universities, the private sector and CSIRO
- An independent review of the health of the MDBA's SDL Accounting Frameworks. The aim was to assist with ensuring the frameworks are conceptually sound and will provide scope for continuous improvement
- The MDBA's approach to the Basin Plan evaluation
- The development of the MDBA's Climate Change Program. This included an ACSEES-hosted workshop with climate specialists from the CSIRO, the Bureau of Meteorology, the Australian National University, the Department of the Environment and Energy and the University of Melbourne to assist with identifying climate change vulnerabilities in the Basin and methods for quantifying them

Appendix B
Advertising and market research

This table of expenditure for 2018–19 is presented in accordance with the reporting requirements in s.311A of the *Commonwealth Electoral Act 1918*.

Agency	Purpose	Expenditure, $ (including GST)
iSentia Pty Ltd	Media Monitoring	76,813
Orima Research Pty Ltd	Market Research	120,357
Orima Research Pty Ltd	Stakeholder Research	23,540
Total		**220,710**

Appendix C
Ecologically sustainable development and environmental performance

Overview

Ecologically sustainable development is at the core of our activities and business. The *Water Act 2007* (Cwlth) requires the MDBA to take into account the principles of ecologically sustainable development.

The principles of ecologically sustainable development include:

- Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.
- If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- Intergenerational equity—the present generation should ensure that the health, biodiversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
- The conservation of biodiversity and ecological integrity should be a fundamental consideration in decision-making; improved valuation, pricing and incentive mechanisms should be promoted.

The MDBA takes into account these principles as part of its core business activities:

- developing and implementing the Basin Plan, which will help to ensure that the environmental health of the Murray–Darling Basin is maintained for future generations. Decision-making processes have included extensive consultation to ensure that economic, environmental, social and equitable aspects are considered
- developing an environmental watering management plan and annual watering priorities that will help to maximise environmental outcomes and contribute to the conservation of biodiversity and ecological integrity within the Basin
- using The Living Murray's water for the environment portfolio to meet the environmental objectives of the target sites, which include Australia's largest river red gum forest and internationally significant wetlands
- constructing and operating fishways, including the Sea to Hume Fishway Program, to allow for greater movement of native fish

- funding strategies to reduce pest fish species in the Basin
- commissioning salt interception schemes to divert salt from the River Murray.

Internal operations

The MDBA follows the principles of ecologically sustainable development in internal operations and has implemented a number of internal sustainability initiatives, including:

- recycling by
  - operating a paper, soft plastic, cardboard, battery, coffee pod, comingled and organic waste recycling program
  - using 100% recycled or partially recycled stock for all print publications
  - using toilet paper supplies from a company that uses 100% renewable resources and donates 50% of their profits to help build toilets for those in need.
- reducing by
  - minimising paper and toner use by setting printers to double-sided, black-and-white printing
  - publishing only in electronic format unless a need for print copies is identified
  - carefully planning print runs, which has significantly reduced our excess hard copy stock
  - using water-saving flushes and low-flow shower heads and sensor-operated taps in bathrooms and using low-flow taps in all kitchen areas.
- reducing power consumption by
  - implementing server virtualisation for the IT network, enabling the MDBA to host a number of virtual servers (approximately 10) per each physical server. This reduces the MDBA's physical footprint by about 80%, in turn reducing the power bill. The MDBA has also moved its onsite data centre to a commercial provider
  - enabling computer monitors to turn off overnight to save power
  - using power-efficient centralised multi-function devices instead of distributed desktop printing
  - installing, wherever possible, LED lighting that operates through movement sensors, daylight harvesting and timers in all work spaces, so that lights turn off when areas are not in use
  - purchasing energy-saving whitegoods and ICT equipment
  - directly heating all hot water and using blade hand dryers to reduce waste paper in washrooms
  - achieving a 5.5 star NABERS Energy Tenancy rating for the MDBA's main office space.

Travel

In 2018–19, MDBA staff travelled 145,554 km by car (an average of 505 km per employee), and 602,336 km by plane (an average of 2,091 km per employee) and worked away from home for a total of 1,698 nights.

The MDBA actively supports staff who cycle to work by providing secure bike storage, lockers and showers. Around 40% of staff regularly cycle to work.

Glossary

Airspace
The difference between the actual volume of water in storage and the volume when full. The airspace is used to capture a proportion of the peak inflow during a flood event.

Allocation
The water to which the holder of an access licence is entitled from time to time under licence, as recorded in the water allocation account for the licence.

Antecedent condition
How wet or dry a catchment is before rain. This can have a very significant effect on the flow responses of rivers during wet weather.

Australian height datum
In 1971 the mean sea level for 1966–68 was assigned the value of zero on the Australian height datum at 30 tide gauges around the coast of Australia. The resulting datum surface, with minor modifications in two metropolitan areas, was termed the Australian height datum and was adopted by the National Mapping Council of Australia as the datum to which all vertical control for mapping is to be referred. Elevations quoted using this datum are normally followed with the acronym 'AHD'.

Australian National Committee on Large Dams
An incorporated voluntary association of organisations and individual professionals with an interest in dams in Australia.

Barmah Choke
A narrow section of the River Murray that constrains the volume of water that can pass during major floods. During floods, large volumes of water are temporarily banked up behind the Barmah Choke, flooding the Barmah–Millewa Forest wetland system.

Barrages
Five low and wide weirs built at the Murray Mouth in South Australia to reduce the amount of sea water flowing in and out of the mouth due to tidal movement, and to help control water levels in the Lower Lakes and River Murray below Lock 1 (Blanchetown, South Australia).

Baseline
Conditions regarded as a reference point for the purpose of comparison.

Baseline diversion limit
The baseline limit of take from a sustainable diversion limit (SDL) resource unit.

Basin governments
The Australian Government and the governments of New South Wales, Victoria, Queensland, South Australia and the Australian Capital Territory.

Basin states
New South Wales, Victoria, Queensland, South Australia and the Australian Capital Territory.

Basin water resources
Water resources within or beneath the Murray–Darling Basin, except for resources that are prescribed by the regulations and groundwater that forms part of the Great Artesian Basin.

Cap (the Cap on diversions)
A limit, implemented in 1997, on the volume of surface water that can be diverted from rivers for consumptive use. Under the Basin Plan, the Cap is replaced by long-term average sustainable diversion limits.

Carryover
A way to manage water resources and allocations that allows irrigators to take a portion of unused water from one season into the new irrigation season.

Connectivity
Connections between natural habitats, such as between a river channel and adjacent wetland areas. Connectivity is a measure or indicator of whether a water body (river, wetland, floodplain) has water connections or flow connections to another body.

Constraints
Anything that affects the delivery of water for the environment. Constraints can be physical, such as low-lying bridges and river channel capacity; or operational, such as river rules or operating practices that affect when and how much water can be delivered.

Consumptive use
Use of water for irrigation, industry, urban, stock, and domestic and other private consumptive purposes.

Conveyance water
The water needed to physically run the river system. Extra water must then be supplied on top of the conveyance water in order to meet deliveries along the river system. The conveyance reserve is water set aside for the next year to minimise the risk of not having enough conveyance water. Water is set aside water for conveyance and critical human needs to safeguard fundamental water requirements during a drought more severe than the millennium drought.

Critical human water needs
Under the Water Act, the minimum amount of water required to meet core requirements of communities dependent on Basin water resources. The definition also includes non-human requirements that, if not met, would cause prohibitively high social, economic or national security costs.

Cultural flows (or cultural water flows)
Water entitlements legally and beneficially owned by the Aboriginal Nations of the Murray–Darling Basin. They are of sufficient and adequate quantity and quality to improve the spiritual, cultural, environmental, social and economic conditions of Aboriginal people.

Electrical conductivity (EC)
Unit of measurement for electrical conductivity (1 EC = 1 µS/cm) measured at 25 degrees Celsius. It is commonly used as an indicator of water and soil salinity (salt concentration). Water and soil salinity levels are measured by passing an electrical current between the two electrodes of a salinity meter. EC is influenced by the concentration and composition of dissolved salts. Salts increase the ability of a solution to conduct an electric current, so a high EC indicates a high salinity level. Fresh water above 800 EC becomes marginal for drinking; above 1,600 EC it is brackish; and above 4,800 EC it is saline.

Efficiency measure
Action that provides more water for the environment by making water delivery systems for irrigation more efficient. This can include replacing or upgrading on-farm irrigation, or lining channels to reduce water losses within an irrigation network.

Entitlement (or water entitlement)
The volume of water authorised to be taken and used by an irrigator or water authority. It includes bulk entitlements, environmental entitlements, water rights, sales water and surface water and groundwater licences.

Environmental flow
Any river flow pattern provided with the intention of maintaining or improving river health.

Environmental water
Water used to achieve environmental outcomes, including benefits to ecosystem functions, biodiversity, water quality and water resource health.

Environmental water requirements
The amount of water needed to meet an ecological or environmental objective.

Fishway
A structure that provides fish with passage past an obstruction in a stream.

Flow
The movement of water—the rate of water discharged from a source, given in volume with respect to time.

Flow event
A single occurrence of water flow in a river, sometimes required to achieve environmental targets. A series of flow events comprises a flow history.

Flow regime
The characteristic pattern of a river's flow quantity, timing and variability.

Groundwater
Water occurring naturally below ground level (in an aquifer or otherwise).
Held environmental water
Water that is available under a water access right, a water delivery right or an irrigation right for the purpose of achieving environmental outcomes.

Inflow
Source of the water that flows into a specific body of water. For a lake, inflow could be a stream or river; for a stream or river, inflow could be rain.

Irrigator
Primary producer who uses river water to irrigate crops or water livestock.

Irrigation Infrastructure Operator (IIO)
Owner or operator of water service infrastructure for delivering water for the primary purpose of irrigation.

Modelling
Application of a mathematical process or simulation framework (e.g. a mathematical or econometric model) to describe various phenomena and analyse the effects of changes in some characteristics on others.

Murray Lower Darling Rivers Indigenous Nations (MLDRIN)
Confederation formed in 1998 of Indigenous Nations from the southern part of the Basin. It comprises representatives of the Barapa, Barkindji (Paakantyi), Dhudhuroa, Dja Wurrung, Latji, Maraura, Mutti, Nari, Ngarrindjeri, Ngintait, Nyeri, Tatti, Taungurung, Wadi, Wamba, Waywurru, Wegi, Wergaia, Wiradjuri, Wolgalu, Wotjabaluk, Yaitmathang, Yita and Yorta Nations.

Northern Basin Aboriginal Nations (NBAN)
Confederation formed in April 2010 that comprises Aboriginal Nation representatives from the northern part of the Basin and representatives from the New South Wales Aboriginal Land Council, the Queensland Murray–Darling Committee, the Condamine Alliance and South West Queensland Natural Resource Management. It comprises Traditional Owner nominated representatives from the Barkindji (Paakantyi), Barunggam, Bidjara, Bigambul, Budjiti, Euahlayi, Gamilaroi, Githabul, Gunggari, Gwamu (Kooma), Jarowair, Kambuwal, Kunja, Kwiambul, Maljangapa, Mandandanji, Mardigan, Murrawarri, Ngemba, Ngiyampaa, Wailwan and Wakka Nations.

Ramsar Convention
The Convention on Wetlands of International Importance, an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

Regulated
A water system in which water is stored and/or flow levels are controlled through the use of structures such as dams and weirs.

Salt interception scheme
Large-scale groundwater pumping and drainage project that intercepts saline groundwater flowing into rivers, and disposes of the saline waters by evaporation and aquifer storage at more distant locations.

Surface water
Includes water in a watercourse, lake or wetland, and any water flowing over or lying on the land after having precipitated naturally or risen to the surface naturally from underground (see s. 4 of the Water Act).

Sustainable diversion limit
The maximum long-term annual average quantity of water that can be taken, on a sustainable basis, from the Basin water resources as a whole, and the water resources, or particular parts of the water resources, of each water resource plan area.

Sustainable diversion limit adjustment mechanism
Basin Plan provision that allows for adjustment of the sustainable diversion limit under certain circumstances.

Take
Removal of water from, or reduction in flow of water into, a water resource.

Water accounting
A systematic process of identifying, recognising, quantifying, reporting and assuring information about water, the rights or other claims to water, and the obligations against water.

Water allocation
The specific volume allocated to water entitlement holders in a given season, often quoted as a percentage of the volume of each entitlement. For example, a 20% allocation in a particular season allows a water user with a 100 ML entitlement to take 20 ML of water.

Water Access Licences

Entitlements to:

- hold specified shares in the available water within a particular water management area or water source (the share component)
- take water at specified times, rates or circumstances from specified areas or locations (the extraction component).

Water for the environment

Water used to achieve environmental outcomes, including benefits to ecosystem functions, biodiversity, water quality and water resource health.

Water for the environment requirements

The amount of water needed to meet an ecological or environmental objective.

Water resource

Of groundwater, water that occurs naturally beneath the ground level (whether in an aquifer or otherwise), or water that has been pumped, diverted or released to an aquifer for the purpose of being stored there. Murray–Darling Basin groundwater resources exclude groundwater in the Great Artesian Basin.

Of surface water, includes water in a watercourse, lake or wetland, and any water flowing over or lying on land after having precipitated naturally or risen to the surface naturally from beneath the ground level.

Water resource plans

Statutory management plans developed for particular surface water and groundwater systems, currently known by different names throughout the Murray–Darling Basin (e.g. 'water sharing plans' in New South Wales and 'water allocation plans' in South Australia).

Water trading rules

A set of overarching consistent rules enabling market participants to buy, sell and transfer tradeable water rights.

Water year

A continuous 12-month period starting from July, or any other month as prescribed under the water regulation or a resource operations plan but usually selected to begin and end during a relatively dry season. Used as a basis for processing stream flow and other hydrologic data.

Abbreviations

ACSEES	Advisory Committee on Social, Economic and Environmental Sciences
AEP	annual exceedance probability
AHD	Australian height datum
BCC	Basin Community Committee
BoM	Bureau of Meteorology
BPIC	Basin Plan Implementation Committee
BSM2030	Basin Salinity Management 2030 strategy
Cap	Murray–Darling Basin Cap on diversions
CEWO	Commonwealth Environmental Water Office
CMP	Constraints Measures Program
CMWG	Constraints Measures Working Group
CoP	community of practice
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DO	dissolved oxygen
EC	electrical conductivity unit
GL	gigalitre (one billion litres)
IAC	Independent Assurance Committee
IRORG	Independent River Operations Review Group
IVT	Inter Valley Trade
LMI	Living Murray Initiative
MDBA / the Authority	Murray–Darling Basin Authority: the agency/ the six member Authority
ML	megalitre (one million litres)

ML/day	megalitres per day
MLDRIN	Murray Lower Darling Rivers Indigenous Nations
Ministerial Council	Murray–Darling Basin Ministerial Council
MRIT	Modern Regulator Improvement Tool
NBAN	Northern Basin Aboriginal Nations
O&O document	The objectives and outcomes for river operation in the River Murray system
PIT	passive integrated transponder
REOs	regional engagement officers
RMIF	River Murray Increased Flows
RMO	River Murray Operations
SARFIIP	South Australian Riverland Floodplains Integrated Infrastructure Program
SDL	Sustainable Diversion Limit
SDLAM	Sustainable Diversion Limit Adjustment Mechanism
WRP	water resource plan
WQM	water quality management

Annual report requirements

PGPA Rule reference	Part of report	Description	Requirement
17BE	**Contents of annual report**		
17BE(a)	Section 1—About the MDBA	Details of the legislation establishing the body	Mandatory
17BE(b)(i)	Section 1—About the MDBA	A summary of the objects and functions of the entity as set out in legislation	Mandatory
17BE(b)(ii)	Section 2—Annual performance statement	The purposes of the entity as included in the entity's corporate plan for that period	Mandatory
17BE(c)	Section 3—Management and accountability	The names of the persons holding the position of responsible Minister or responsible Ministers during the period, and the titles of those responsible Ministers	Mandatory
17BE(d)	Section 3—Management and accountability	Directions given to the entity by the Minister under an Act or instrument during the reporting period	If applicable, mandatory
17BE(e)	N/A	Any government policy order that applied in relation to the entity during the reporting period under section 22 of the Act	If applicable, mandatory
17BE(f)	N/A	Particulars of non-compliance with: • a direction given to the entity by the Minister under an Act or instrument during the reporting period, or • a government policy order that applied in relation to the entity during the reporting period under section 22 of the Act	If applicable, mandatory

PGPA Rule reference	Part of report	Description	Requirement
17BE(g)	Section 2–Annual performance statement	Annual performance statements in accordance with paragraph 39(1)(b) of the Act and section 16F of the Rule	Mandatory
17BE(h) 17BE(i)	N/A	A statement of any significant issue reported to the Minister under paragraph 19(1)(e) of the Act that relates to non-compliance with the finance law and action taken to remedy non-compliance	If applicable, mandatory
17BE(j)	Section 3–Management and accountability	Information on the accountable authority, or each member of the accountable authority, of the entity during the reporting period	Mandatory
17BE(k)	Section 3–Management and accountability	An outline of the organisational structure of the entity (including subsidiaries of the entity)	Mandatory
17BE(ka)	Section 3–Management and accountability	Statistics on the number of the entity's employees on an ongoing and non-ongoing basis, including the following: • statistics on full-time employees • statistics on part-time employees • statistics on gender • statistics on staff location	Mandatory
17BE(l)	Section 1–Introduction Section 3–Management and accountability	An outline of the location (whether or not in Australia) of major activities or facilities of the entity	Mandatory
17BE(m)	Section 3–Management and accountability	Information relating to the main corporate governance practices used by the entity during the reporting period	Mandatory

PGPA Rule reference	Part of report	Description	Requirement
17BE(n) 17BE(o)	Section 4–CFO report and financial statements	For transactions with a related Commonwealth entity or related company where the value of the transaction, or if there is more than one transaction, the aggregate of those transactions, is more than $10,000 (inclusive of GST): • the decision-making process undertaken by the accountable authority to approve the entity paying for a good or service from, or providing a grant to, the related Commonwealth entity or related company • the value of the transaction, or if there is more than one transaction, the number of transactions and the aggregate of value of the transactions	If applicable, mandatory
17BE(p)	Section 1–About the MDBA Chief Executive's review Section 2–Annual performance statement	Any significant activities and changes that affected the operations or structure of the entity during the reporting period	If applicable, mandatory
17BE(q)	Section 3–Management and accountability	Particulars of judicial decisions or decisions of administrative tribunals that may have a significant effect on the operations of the entity	If applicable, mandatory
17BE(r)	Section 3–Management and accountability	Particulars of any reports on the entity given by: • the Auditor-General (other than a report under section 43 of the Act), or • a Parliamentary Committee, or • the Commonwealth Ombudsman, or • the Office of the Australian Information Commissioner	If applicable, mandatory
17BE(s)	N/A	An explanation of information not obtained from a subsidiary of the entity and the effect of not having the information on the annual report	If applicable, mandatory

PGPA Rule reference	Part of report	Description	Requirement
17BE(t)	Section 3– Management and accountability	Details of an indemnity that applied during the period to the accountable authority, any member of the accountable authority or officer of the entity against a liability (including premiums paid, or agreed to be paid, for insurance against the authority, member or officer's liability for legal costs)	If applicable, mandatory
17BE(ta)	Section 3– Management and accountability	Information about executive remuneration	Mandatory
17BF	**Disclosure requirements for government business enterprises**		
17BF(1)(a)(i)	N/A	An assessment of significant changes in the entity's overall financial structure and financial conditions	If applicable, mandatory
17BF(1)(a)(ii)	N/A	An assessment of any events or risks that could cause financial information that is reported not to be indicative of future operations or financial conditions	If applicable, mandatory
17BF(1)(b)	N/A	Information on dividends paid or recommended	If applicable, mandatory
17BF(1)(c)	N/A	Details of any community service obligations the government business enterprise has including: • an outline of actions taken to fulfill those obligations • an assessment of the cost of fulfilling those obligations	If applicable, mandatory
17BF(2)	N/A	A statement regarding the exclusion of information on the grounds that the information is commercially sensitive and would be likely to result in unreasonable commercial prejudice to the government business enterprise	If applicable, mandatory

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Connect with us.

The MDBA has offices in Adelaide, Albury–Wodonga, Canberra, Toowoomba, Goondiwindi, and regional engagement officers around the Basin. In 2019, the MDBA will open offices in Griffith, Mildura and Murray Bridge.

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