



Australian Government



MURRAY-DARLING
BASIN AUTHORITY

ANNUAL REPORT 2016-17



ACKNOWLEDGEMENT OF THE TRADITIONAL OWNERS OF THE MURRAY-DARLING BASIN



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

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

ABORIGINAL NATIONS OF THE MURRAY-DARLING BASIN

BARAPA BARAPA	JAROWAIR	NARI NARI	WAKKA WAKKA
BARKANDJI (PAAKANTYI)	KAMBUWAL	NGARRINDJERI	WAMBA WAMBA
BARUNGAM	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
EU AHLAYI	MARAURA	TAUNGURUNG	YAITMATHANG
GITHABUL	MARDIGAN	WADI WADI	YITA YITA
GUNGGARI	MURRAWARRI	WAILWAN (WAYILWAN)	YORTA YORTA
GUWAMU (KOOMA)	MUTTI MUTTI		

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

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Office of the Chief Executive

TRIM Ref: D17/23909

Senator the Hon. Anne Ruston
Assistant Minister for Agriculture and Water Resources
Parliament House
Canberra ACT 2600

Dear Minister

It is my pleasure to present the Murray-Darling Basin Authority's annual report for the 2016-17 financial year.

During the year the Murray-Darling Basin Authority (MDBA) has continued to lead the implementation of the Murray-Darling Basin Plan in collaboration with the communities, governments and industries of the Basin.

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

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

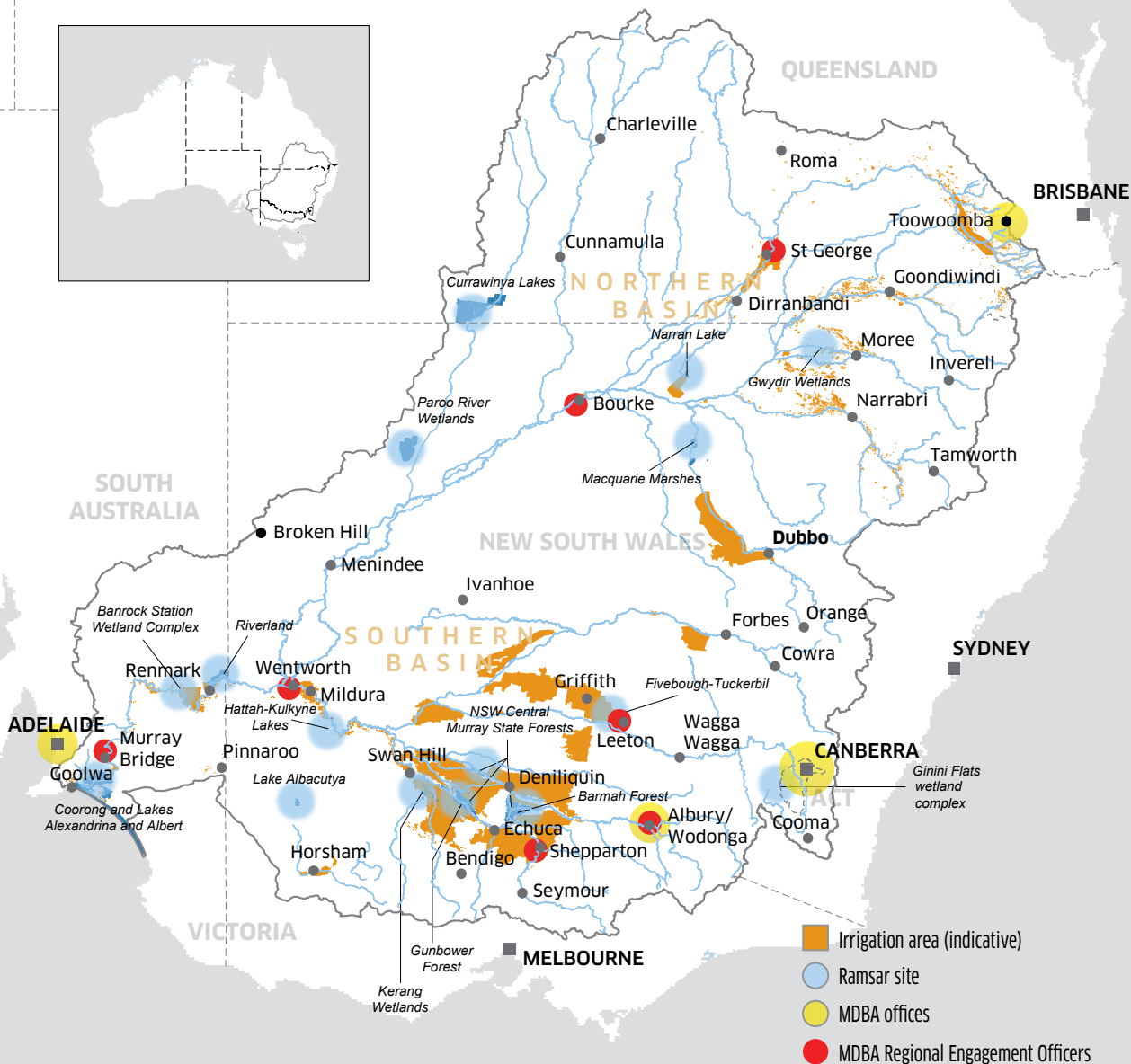
I would like to acknowledge the commitment of MDBA staff and their contribution to achieving a healthy and productive Murray-Darling Basin.

Yours sincerely



Phillip Glyde

17 November 2017



Murray-Darling Basin snapshot



Within the Basin, there are over **46 Aboriginal Nations**



Around **46%** of the aggregate value of irrigated agricultural production



Around **40% of all farms in Australia** are in the Basin – around 38% of Australia's agriculture production



Around **64%** of Australia's irrigated land is in the Basin



There are **16 wetlands** listed as internationally significant (Ramsar sites)



Population more than **2 million people** (around 10% of Australia's population)



Left to right: George Warne, Phillip Glyde, Chair Neil Andrew AO, Professor Barry Hart AM, Di Davidson AM and Susan Madden.

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The MDBA met in Melbourne in February 2017, 100 years after their predecessors, the River Murray Commission met for the first time.

ABOUT US

The Murray-Darling Basin Authority establishes and monitors the sustainable and integrated management of water resources of the Murray-Darling Basin. We do this in a way that best meets the social, economic and environmental needs of the Basin and its communities.

We work in collaboration with other Australian Government agencies, Basin state governments, local governments, regional bodies, industry groups, landholders, environmental organisations, scientists, research organisations and Murray-Darling Basin communities, including Aboriginal communities, and the broader Australian community.

Our vision

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

Our mission

We lead the planning and management of Basin water resources in collaboration with partner governments and the community.

Our guiding principles

We adhere to the Australian Public Service Values and Code of Conduct, meaning we are apolitical, impartial, professional, accountable, respectful, careful and diligent.

We value and support collaboration and have shown this by working closely with communities, governments and industries. We have continued to work with Basin state governments (which includes the Australian Capital Territory), the Commonwealth Environmental Water Office, other Australian Government agencies and Basin communities to implement the Basin Plan. We continue to make changes to our strategies and frameworks based on feedback we receive.



2016 graduates and mentors at Dartmouth Dam.

Our role

Key functions of the MDBA include:

- » preparing, implementing and reviewing an integrated plan for the sustainable use of the Basin's water resources
- » operating the River Murray system and efficiently delivering water to users on behalf of partner governments
- » measuring, monitoring and recording the quality and quantity of the Basin's water resources and the condition of associated rivers, wetlands and floodplains
- » supporting, encouraging and conducting research and investigations about the Basin's water resources and dependent ecosystems
- » disseminating information about the Basin's water resources and dependent ecosystems
- » engaging and educating the Australian community about the Basin's water resources.

Our legislation

The *Water Act 2007 (Cth)* establishes the MDBA as a statutory authority. The Act also sets out the role of the MDBA in developing a Basin Plan and performing functions under the Murray-Darling Basin Agreement 2008 (the Agreement), in particular the management of River Murray operations.

The functions under the Agreement, which forms Schedule 1 to the Act, include giving effect to decisions of the Murray-Darling Basin Ministerial Council and the Basin Officials Committee in relation to the Basin governments' joint programs.

The MDBA delivers its functions under the Agreement in conjunction with, and on behalf of, the contracting governments – the Australian Government and the governments of Victoria, South Australia, New South Wales, Queensland and the Australian Capital Territory.



OUR HISTORY

2004 the National Water Initiative is signed by all governments and aims to achieve a more cohesive national approach to the way Australia manages, measures, plans for, prices and trades water

2003 The Living Murray program is announced, which aims to use 500 gigalitres (GL) of water, and associated engineering projects, to improve the health of six icon sites along the River Murray

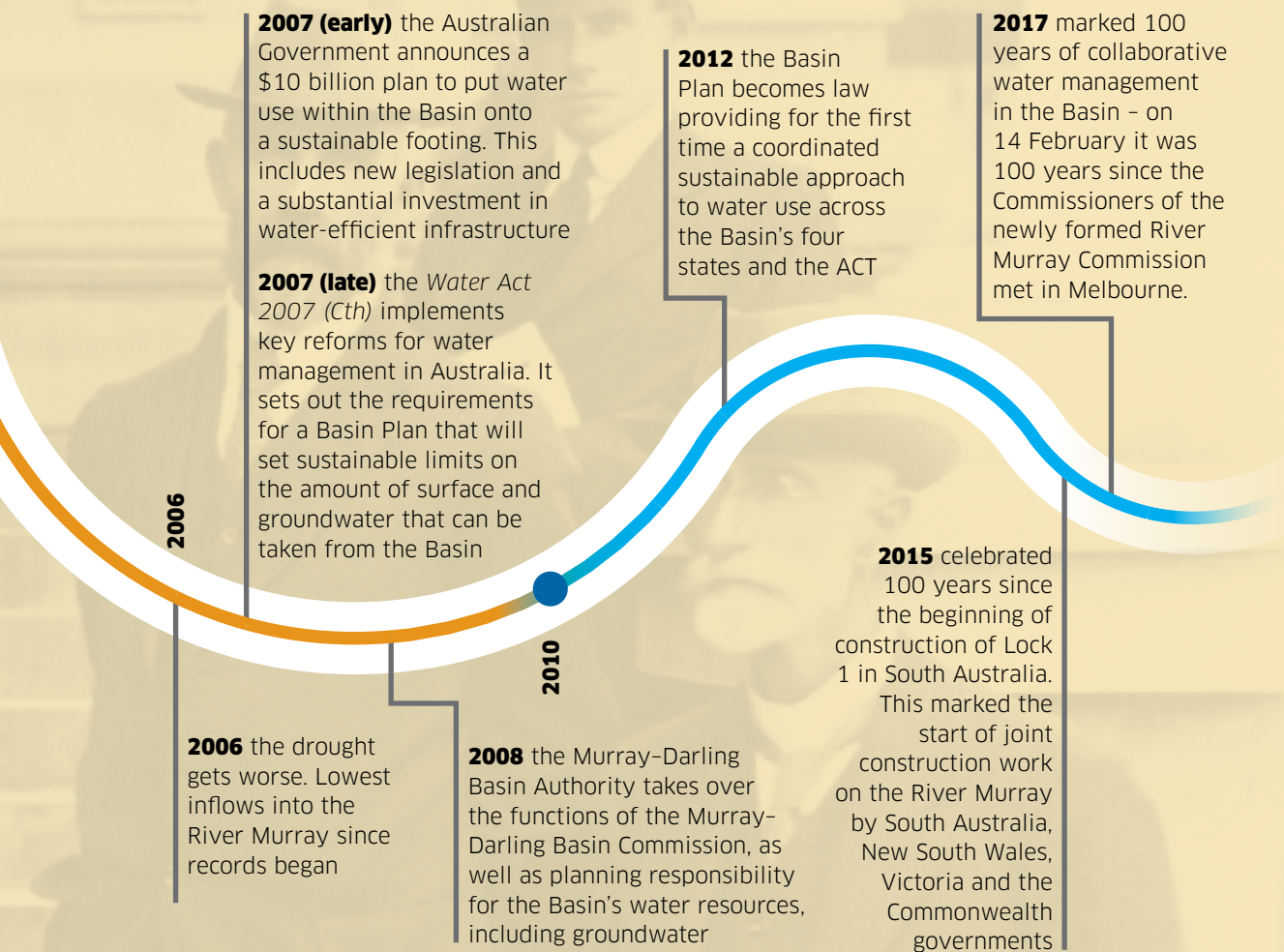
1917 the River Murray Commission is established

1981 the Murray Mouth closes for the first time in recorded history

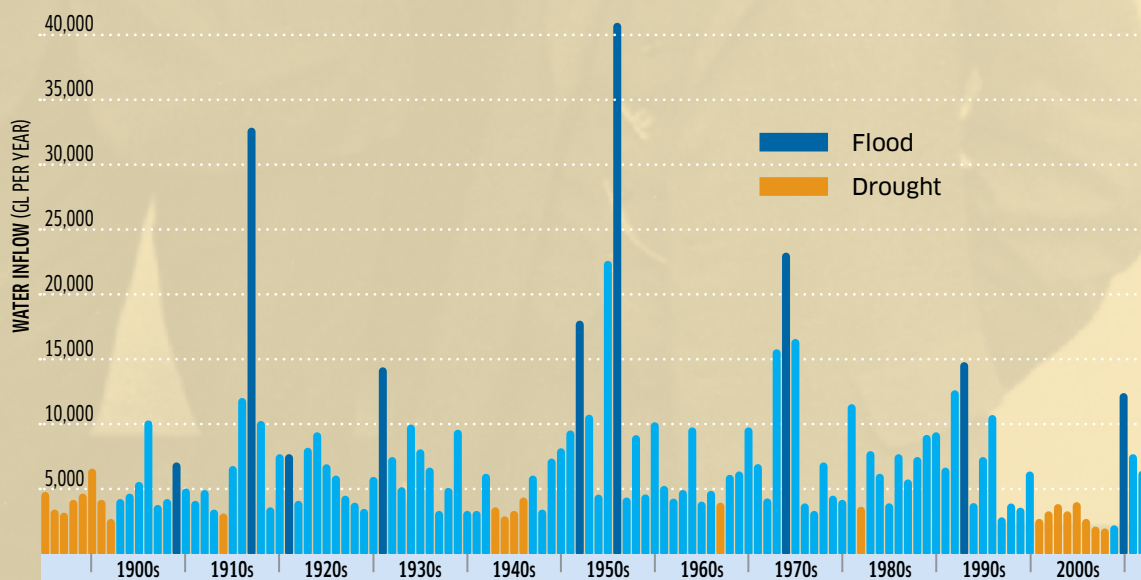
1987 the Murray-Darling Basin Agreement is signed establishing the Murray-Darling Basin Commission, replacing the River Murray Commission. The resource-sharing arrangements between the states are expanded to cover the whole Murray-Darling Basin

1997 the longest drought in Australia's recorded history begins (1997–2010)

1993



SIGNIFICANT FLOODS AND DROUGHTS





CHIEF EXECUTIVE'S REVIEW

It is my pleasure to present the Murray-Darling Basin Authority (MDBA) annual report for 2016-17.

This year was significant for the Murray-Darling Basin Authority as it marked a century since the appointment of the first River Murray Commission in 1917.

One hundred years later, we are still facing the same key challenge: how to share the waters of the Basin in a fair and equitable manner.

In 1917, the Commissioners were convinced successful water management could only be achieved through cooperation and, in that sense, nothing has changed. The outcomes outlined in the Murray-Darling Basin Plan can only be achieved through collaborative effort to achieve mutual goals.

In this spirit, the MDBA continues to work closely with our Basin state and territory government partners to implement the Basin Plan and operate the River Murray.

Regional expansion

The success and progress of the Murray-Darling Basin Plan also depends on the support and understanding of local Basin communities.

This year, the Murray-Darling Basin Authority announced the establishment of three new regional offices in Adelaide, Albury-Wodonga and Toowoomba. These offices provide opportunities to build better relationships with Basin communities, source quality local information, and ultimately make better policy decisions.

Our regionalisation efforts include the Regional Engagement Officer (REO) pilot that employed seven part-time officers located with community, natural resource management or local government organisations across the Basin. The Regional Engagement Officers are a conduit for direct communications between the MDBA and communities, and vice versa. They provide information and help facilitate improved engagement with Basin communities.

Basin Plan progress

I am pleased to report on the progress in implementing the Basin Plan. The first state water resource plan (from the Warrego-Paroo-Nebine area in Queensland) has been accredited. This leaves 35 water resource plans to be submitted by Basin state governments for accreditation over the next two years before full implementation of sustainable diversion limit-based water accounting and reporting comes into effect on 1 July 2019.

Northern Basin Review

I would like to thank everyone involved with the Northern Basin Review, particularly the 450 or so organisations and individuals who made the time to meet with us or write submissions and give their views on the proposed amendment. The submissions received from scientists, irrigators, dryland farmers, local business people, environmentalists and community members provided valuable economic, environmental and social knowledge and perspective about the current application of water rules and regulations.

Each submission was considered and used to inform the Review's final recommendations.

Based on the Northern Basin Review findings, the Murray–Darling Basin Authority proposed changes to the Basin Plan, including a range of measures (known as 'toolkit' measures). A key action in the toolkit aims to improve water management and, if approved, it will be an important step towards protection of environmental water in some local areas of the northern Basin.

Southern Basin

In the southern Basin, Basin state governments nominated a suite of projects that will enable environmental outcomes to be delivered without the need for further water recovery.

Over the year, environmental water holders took advantage of wet conditions and released water to augment natural flows to ensure fish breeding and life cycle stages were completed.

One environmental water release in autumn meant that young perch were able to move out of Menindee Lakes and into the lower Darling and eventually the River Murray for the first time in years.

River Murray operations, in collaboration with partner governments, continues as core business for the Murray–Darling Basin Authority. Despite the dry conditions at the start of the last financial water year, by October 2016 operators found themselves managing a significant flood event.

We study and learn from these events and are working with the New South Wales and Victorian Governments on future flood prevention and ways to improve early warning network services.

Looking ahead

Basin state and territory governments have begun the big job of developing water resource plans for accreditation before 1 July 2019. The Murray–Darling Basin Authority is already providing guidance, sharing data and collaboration to help Basin state governments through this process.

In 2017–18, the Murray–Darling Basin Authority will deliver an interim evaluation of the Basin Plan which will provide an evidence-based picture of the Basin Plan's first five years. Preliminary findings indicate that five years into the implementation of the Basin Plan, there are early signs of improvement in the health of the Basin. We aim to learn from the evaluation – what aspects of the Basin Plan work well and what can we do better – and share this knowledge widely.

Basin state governments are responsible for managing water issues at the local level, including setting and enforcing water-take rules. In 2017–18, the MDBA will continue to work constructively with Basin states and stakeholders to improve water management practices that protect environmental water and low flows, while ensuring a productive and sustainable future for Basin industries.

FINANCIAL OVERVIEW

During 2016–17, the Murray–Darling Basin Authority (MDBA) reported an operating surplus of \$2.4 million, which compared favourably with its approved operating deficit of \$9.4 million. This result was achieved despite continuing uncertainty surrounding the level of future funding contributions from Basin state governments.

Programs costing \$151.8 million were delivered. The MDBA continued to manage over \$4.9 billion in assets (gross value), including River Murray Operations infrastructure and water entitlements acquired under The Living Murray Initiative.

Key financial challenges included:

- » maintaining the condition of River Murray Operations infrastructure assets without creating a funding burden for future generations
- » managing the outcomes of the Functional Efficiency Review and other strategic reviews
- » effectively implementing productivity improvements and planning for other structural changes.

The Chief Finance Officer's report on page 96 provides more detailed information on our financial performance for 2016–17.



Tidbinbilla River, ACT.

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Annual performance statement

Introductory statement

I, as the accountable authority of the Murray–Darling Basin Authority, present the 2016–17 annual performance statement, as required under paragraph 39(1)(a) of the *Public Governance, Performance and Accountability Act 2013 (PGPA Act)*.

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

A handwritten signature in black ink, appearing to read "P Glyde".

Mr Phillip Glyde
Chief Executive
4 October 2017

OUR REPORTING APPROACH

The *Public Governance, Performance and Accountability Act 2013* (PGPA Act) establishes a performance reporting framework for all Commonwealth entities and companies.

As a corporate Commonwealth entity, we have developed a new performance framework in response to the PGPA Act and the Australian Government's Regulator Performance Framework.

We manage our performance against a single outcome and our deliverables and key performance indicators are measured against the five strategic goals in our corporate plan. These are:

- » lead the implementation of the Basin Plan to achieve a healthy working Basin
- » strengthen engagement with the community
- » evaluate and report the social, economic and environmental outcomes of Basin water reforms

- » operate the River Murray system efficiently for partner governments
- » improve the knowledge base to support sustainable water resource management.

Corporate Commonwealth entities

A corporate Commonwealth entity is a body corporate that has a separate legal personality from the Commonwealth and can act in its own right exercising certain legal rights, such as entering into contracts and owning property.

Some provisions of the PGPA Act apply to corporate Commonwealth entities differently to non-corporate Commonwealth entities because of their different legal status, for example the provisions relating to appropriations, banking, investments and the use of indemnities.



*Centre pivots near Hillston (photo by Kirsten Henderson).
This photo was the winning entry in the MDBA's annual report photo competition for staff.*

Outcome 1

Equitable and sustainable use of the Murray–Darling Basin by governments and the community including through 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

Goals in both the Portfolio Budget Statements and Corporate plan 2016–17	Lead the implementation of the Basin Plan to achieve a healthy working Basin.	Strengthen engagement with the community.	Evaluate and review the social, economic and environmental outcomes of Basin water reforms.	Operate the River Murray system efficiently for partner governments.	Improve the knowledge base to support sustainable water resource management.
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Figure 2.1 Alignment of the portfolio budget statements 2016–17 and the MDBA Corporate Plan 2016–17

Entity purpose

The MDBA has a range of tasks under the *Water Act 2007 (Cth)* and *Basin Plan Agreement 2012*. These tasks are set out in the Basin Plan Implementation Agreement. Each task required of the MDBA can be defined as either:

- » due on a certain date
- » due annually
- » ongoing (i.e. no due date).

For the purposes of the annual performance statements, where the MDBA has performed a task identified as ‘ongoing’ throughout the year, the result for the corresponding Key Performance Indicator has been listed as ‘achieved’.

Strategic goal 1: Lead the implementation of the Basin Plan to achieve a healthy working Basin

Key Performance Indicator	Source	Results
Implement the MDBA responsibilities of the Basin Plan in accordance with legislative timeframes.	Corporate Plan 2016–17 p.12	 ACHIEVED All legislative timeframes have been adhered to in relation to the Basin Plan and Basin Plan Implementation Agreement.

Analysis – (see ‘Strategic goal 1’ on page 21)

There was significant progress in implementing the Basin Plan effectively and optimised social, economic and environmental outcomes for Basin stakeholders. Key elements of the implementation for 2016–17 were:

- » completion of the Northern Basin Review. The review analysed social, economic and environmental impacts in the northern Basin and led to proposed adjustments to the water recovery target.
- » publication of the Basin Plan environmental watering priorities, providing information to Basin state governments on the Basin-wide outcomes for flows and connectivity, native vegetation, waterbirds, and native fish.
- » further development of the MDBA’s compliance

function including the establishment of a compliance committee with an independent expert panel.

- » achieved Basin Plan salinity target values in four out of five monitoring sites.
- » supported Basin state governments in:
 - » implementation of the Sustainable Diversion Limit Adjustment Mechanism
 - » water quality management plans
 - » support and advice on their water resource plans
 - » resolving priority water trade issues and risk-based regulation of water markets in the Basin.

Additionally, the MDBA has taken steps to improve reporting processes to make them more efficient, robust and accessible.

Strategic goal 2: Strengthen Engagement with the community

Key Performance Indicator	Source	Results
Based on feedback through consultation, respond and adjust the MDBA's activities to improve effectiveness.	Corporate Plan 2016-17 Pg.13	 ACHIEVED The MDBA has travelled extensively in the Basin, meeting with key communities about the Basin Plan and listening to community experiences. Through its Regional Engagement Officer (REO) pilot, the MDBA employed seven part-time officers to customise the MDBA's engagement approach at the local level. We have also received feedback from stakeholders through the Northern Basin Review.
Informing and educating stakeholders and the community on the importance of sustaining a healthy working Basin through a range of communications and education platforms.	Corporate Plan 2016-17 Pg.13	 ACHIEVED The MDBA communicated the benefits of sustaining a healthy working Basin through conferences, educational resources, published data sets and research, annual reporting and face to face engagement.

Analysis – (see 'Strategic goal 2' on page 29)
 Basin Plan implementation will only succeed if communities continue to participate in and understand its progress. To increase accessibility to Basin communities, the MDBA:

- » improved relationships and partnerships with Basin communities through the Regional Engagement Officer pilot and established three new regional offices (Adelaide, Albury-Wodonga and Toowoomba).
- » conducted community consultations on the progress of the Northern Basin Review.
- » received feedback from stakeholders relating to the Basin Plan amendments arising from the Northern Basin Review.
- » engaged with more than 1,000 stakeholders through the Basin Plan amendment consultation and submission process.
- » diversified communications to increase knowledge about the Basin Plan, including outcomes achieved so far, and what it means for local communities and the environment.
- » reinforced its commitment to a strong and productive relationship with Aboriginal people, including establishing a four-year funding agreement with Murray Lower

Darling Indeginous Nations and Northern Basin Aboriginal Nations.

Feedback received has been used to inform Basin Plan amendments designed to improve outcomes for stakeholders.

Informing and educating stakeholders has taken many forms throughout 2016-17, including:

- » published data sets on www.data.gov.au
- » redesigned Live River Data on the MDBA website
- » production of community profiles including social, economic and environment data as well as perspectives from local community members
- » publication of the 2015-16 Basin Plan annual report
- » public release of the environmental watering priorities through developing web content and animations
- » launch of the *Water Weed Wipeout* education app.

We reached over 20,000 downloads of the *Run the River* app released in 2014, almost 3,000 downloads of teacher resources, and had face-to-face interactions with 30,768 students, teachers and members of the general public.

Strategic goal 3: Evaluate and report the social, economic and environmental outcomes of Basin water reforms

Key Performance Indicator	Source	Results
100% of monitoring and evaluation reviews conducted within statutory regulations.	Corporate Plan 2016–17 Pg.14	 ACHIEVED – WITH EXCEPTIONS Annual reporting required under Schedule 12 of the Basin Plan 2012 was completed on time. Monitoring and evaluation of Basin water reforms (without legislated due dates) is ongoing. Additional reporting, such as the Basin Plan interim evaluation is to be delivered in December 2017. A range of amendments to the Basin Plan have been proposed including changes to timeframes for evaluation and reporting (Basin Plan Amendments 2017). As of 30 June 2017, the amendments are awaiting comment from the Ministerial Council.

Analysis – (see ‘Strategic goal 3’ on page 35)

Continually tracking the implementation and outcomes of Basin water reforms, to determine the effects on the communities and environment throughout the Basin. This measurement is essential to assess whether intended outcomes of the Basin Plan are achieved. Throughout the year, the MDBA:

- » completed the third Basin Plan annual report (and began preparations for the Basin Plan interim evaluation). This includes social and economic analysis to determine the impact of the Basin Plan on communities, industries and environment.
- » continued cross-cultural evaluation methodologies to track implementation of the Basin Plan taking Aboriginal interests into account.
- » improved collaboration between environment water holders and river operators to encourage breeding and recruitment (life-stage) cycles for waterbirds and native fish.
- » completed long-term environmental monitoring projects.

The MDBA also worked with Basin state governments to:

- » carry out the River Murray Water Quality Monitoring Program.

- » respond to the blackwater event in the River Murray and its tributaries.
- » manage The Living Murray water portfolio with associated monitoring, evaluation and Aboriginal engagement.
- » finalise agreements for technical aspects of the sustainable diversion limit (SDL) water accounting and reporting obligations, enabling the release of the annual transitional water take reports in 2017–18 (noting that SDL compliance will commence in 2019 once water resource plans are in place).

The exceptions to the achievement of this key performance indicator relate to changes to dates for monitoring and evaluation activities that were due as at 30 June 2017:

- » conduct a review of the water quality targets in the water quality and salinity management plan and conduct a review of the environmental watering plan (due November 2017)
- » conduct an assessment of monitoring, evaluation and reporting capabilities (due June 2017).

Strategic goal 4: Operate the River Murray system efficiently for partner governments

Key Performance Indicator	Source	Results
River operations and programs are managed in accordance with the: » Murray-Darling Basin Agreement » service level agreement between the Murray-Darling Basin Ministerial Council and the MDBA.	Corporate Plan 2016-17 Pg.15	 ACHIEVED In December, a positive review of River Operations was received from the Independent Review Group. This review examined performance against the objectives and outcomes for River Operations set by the Basin Officials Committee. An annual review of the objectives and outcomes for the River Murray system was carried out and approved by the Basin Officials Committee in May 2017. Only minor amendments were made and three amendments to specific objectives and outcomes have been added.
Build, maintain, and improve the River Murray system assets to achieve best practice standards in accordance with the Murray-Darling Basin Agreement.	Corporate Plan 2016-17 Pg.15	 ACHIEVED Routine maintenance operations have generally continued as planned, except for some impacts associated with the high river flows in spring 2016. All assets are maintained to best practice standards through the dam safety program and reported quarterly to the Asset Management Advisory Panel.
Maintain and improve the health of the Basin in accordance with the Murray-Darling Basin Agreement and the associated agreements.	Corporate Plan 2016-17 Pg.15	 ACHIEVED River Murray water quality parameters with respect to recreation, irrigation and drinking water needs, were within acceptable limits, with the exception of the short-term low dissolved oxygen in some locations. The data collected, particularly during the blackwater event in late 2016, will be used to investigate the causes of the event and determine future management options.

Analysis – (see ‘Strategic goal 4’ on page 46)

The MDBA partnered with Basin governments to deliver on two key elements under goal four:

- » build, operate, maintain and improve River Murray system assets to achieve contemporary best practice standards.
- » improve and maintain a healthy river system through the implementation of joint natural resource management (NRM) programs for partner governments.

Maintaining and improving River Murray infrastructure included:

- » construction and design of assets under the Environmental Works and Measures Program.

- » studies of embankments at Hume Dam.
- » protection of cultural heritage at Lake Victoria.
- » inspection and repair of steel components of locks and weirs following 2016 floods.
- » Repairs along the Hume to Yarrawonga river reach.
- » Dredging the Murray Mouth.
- » Reducing bank erosion along the Mitta Mitta River.

Above-average winter and spring rainfall in the Murray catchment, resulted in substantial inflows to the River Murray system. Agreed water shares in the River Murray system to the states were delivered despite the extreme

range of conditions (from dry to flood). The key actions of the MDBA were to:

- » regularly assess the water resources of the River Murray system to determine the volume of water available to New South Wales, Victoria and South Australia.
- » operate structures under the control of the MDBA and determine and review procedures for their efficient and effective operation.
- » establish, operate and maintain a system of continuous monitoring of the volumes and quality of stored water, and of flows in the River Murray and from its tributaries.
- » liaise with state and Australian Government agencies on matters related to the River

Murray system to provide up-to-date and comprehensive flow of information.

The river flows include delivery of environmental water, which is a key focus for the MDBA and partner governments. In exercising the operational functions under the Murray–Darling Basin Agreement, MDBA staff play an important role in coordinating the delivery and accounting of environmental water across the River Murray system. During 2016–17, the MDBA delivered a large volume of environmental water held by the Basin state governments, The Living Murray and the Commonwealth Environmental Water Holder to achieve a range of environmental outcomes.

Strategic goal 5: Improve the knowledge base to support sustainable water resource management		
Key Performance Indicator	Source	Results
The MDBA will provide Basin-wide technical advice, analysis and evidence to governments, industries and the wider community to support better decision making.	Corporate Plan 2016–17 Pg. 16	 ACHIEVED The MDBA focused on commissioning research and monitoring activities. Through collaboration arrangements with governments, scientists and communities, the MDBA has access to the best available data, information and knowledge to assist in implementing the Basin Plan.

Analysis – (see ‘Strategic goal 5’ on page 66)
Continued to work collaboratively with Basin state governments, Australian Government agencies, scientists and communities to generate, access and make available data and information on water resource management. Technical advice continued to be provided in the form of Basin-wide modelling on water flows, including inundation extent, the Source Murray model and the Basin stand condition tool.

Extensive research was conducted through the Northern Basin Review, which included social and economic assessments, water recovery modelling and environmental science projects. Improving understanding of water management on native fish outcomes, and communicating this with communities has also been a key focus this year.

Throughout the year, the MDBA have:

- » completed the Northern Basin Review.

- » contributed to a multi-year project on water interests and cultural benefits for Aboriginal people.
- » continued social, economic, cultural and environmental work to inform the Basin Plan interim evaluation (due December 2017).
- » developed, operated and maintained a variety of environmental and water flow modelling/mapping to inform Basin Plan implementation. This also includes flood inundation modelling.
- » continued several collaborations to investigate movements and results of environmental water flows on native and pest fish populations.
- » continued to form strategic alliances with international and national bodies to strengthen MDBA’s science and research capabilities.
- » established a Chief Data Officer to improve internal data governance arrangements and increase accessibility and sharing of information.

STRATEGIC GOAL 1

Lead the implementation of the Basin Plan to achieve a healthy working Basin

Implementing the Basin Plan will lead to a healthy working Basin and deliver:

- communities with sufficient and reliable water that is fit for a range of intended purposes, including domestic, recreational and cultural use.
- productive and resilient water-dependent industries and communities with confidence in their long-term future.
- healthy and resilient ecosystems with rivers and creeks regularly connected to their floodplains and ultimately the ocean.

Highlights

- Completed the review of the Basin Plan settings in the north and proposed Basin Plan amendments to implement the outcomes of the review.
- Made recommendations to the Commonwealth Minister for water to accredit the first state water resource plan (the Warrego-Paroo-Nebine area in Queensland) which was accredited in June 2017.
- Published the Basin environmental watering outlook and the 2017–18 environmental watering priorities, which is the first time the MDBA has published multi-year priorities that can adapt to different climate conditions.
- Supported Basin state governments with delivering their sustainable diversion limit adjustment project proposals, which culminated in Basin state governments agreeing to a package of projects for MDBA to model and determine the adjustments to the sustainable diversion limits (SDL).
- Carried out the River Murray Water Quality Monitoring Program, supported by Basin governments. Worked with Basin governments to respond to the blackwater event in the River Murray and its tributaries.

Overview

There was significant progress in implementing the Basin Plan. Central to this is the completion of the Northern Basin Review and progress with the Sustainable Diversion Limit Adjustment Mechanism.

The Northern Basin Review involved an extensive program of research and investigations to understand the Basin Plan settings in the north. In November 2016, as a result of this work, the Authority recommended that the water recovery target for the northern Basin be reduced from 390 gigalitres (GL) to 320 GL. This reduction would be supported by a range of measures to improve water management and help the environment in the north through toolkit measures. The MDBA used this opportunity to propose other changes to the Basin Plan to implement the results of groundwater reviews and make the roll-out of the Basin Plan more effective.

In late 2016 and early 2017, the MDBA consulted on amendments to implement the Authority's

recommendations – these were considered by Basin state ministers in May and June of 2017.

Throughout 2016–17, the MDBA supported Basin state governments to prepare for the operation of the Sustainable Diversion Limit Adjustment Mechanism. Basin state governments have agreed on a suite of 36 projects. The initial assessment of the potential adjustment of about 600 GL that may be achieved through the identified supply projects, was provided to the Ministerial Council in June 2017. The full modelling process will be completed in the second half of 2017 in order to propose an adjustment to the sustainable diversion limits by 15 December 2017.

The Basin Plan environmental watering outlook and Basin environmental watering priorities were published. This is the first year the MDBA developed priorities with a multi-year outlook taking account of a range of climate conditions. This will help environmental water managers to manage water resources for better outcomes. The MDBA continued to help coordinate environmental watering across the southern Basin through the Southern Connected Basin Environmental Watering Committee.

Good outcomes from environmental watering were achieved, helped by environmental water managers and operators responding to the change from dry to wet conditions in mid-2016.

Continued to provide Basin state governments with support and advice on their water resource plans. In December 2016, the MDBA provided the Commonwealth minister responsible for water with a recommendation to accredit the first water resource plan submitted by a Basin state, for the Warrego-Paroo-Nebine area in Queensland. The Minister accredited this plan in June 2017 and it is now in effect. The MDBA also reviewed its processes for improvements for the future. As a result, the MDBA has made processes more efficient, improving the advice to Basin state governments, provide more guidance material and made sure the assessment approach is clear.

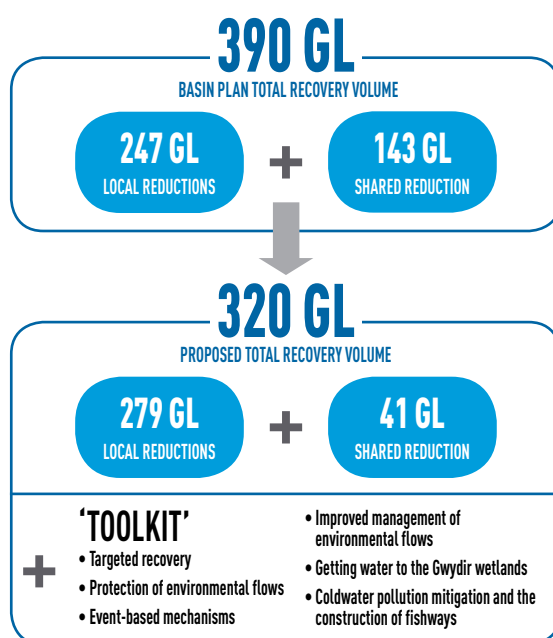
Continued to work with the Basin state governments on the transition to sustainable diversion limits and to report on water take. The MDBA has also improved the reporting processes to make them more efficient and robust. In addition, provided Basin state governments with advice about their water quality management plans, and the Basin Plan salinity target values were achieved in four out of five monitoring sites. Similarly, continued to work with Basin state governments on priority trade issues, taking a risk-based approach to regulating water markets in the Basin.

Northern Basin Review and Basin Plan amendment

Between 2012-16, the MDBA carried out an extensive program of research and investigations as part of the Northern Basin Review.

In November 2016, informed by this work, the Authority recommended that the water recovery target for the northern Basin be reduced from 390 giganalitres (GL) to 320 GL, if it was supported by the implementation of a range of measures aimed at improved water management and helping the environment in the north (toolkit measures). Public consultations helped guide final recommendations.

In light of findings arising from the review, proposed changes in allowable take from three groundwater systems and other minor practical changes that will streamline



implementation and make the roll-out of the Basin Plan more effective.

In May 2017, the proposed amendment was provided to Basin ministers and their comments were received after it was discussed at the Murray-Darling Basin Ministerial Council meeting on 16 June 2017.

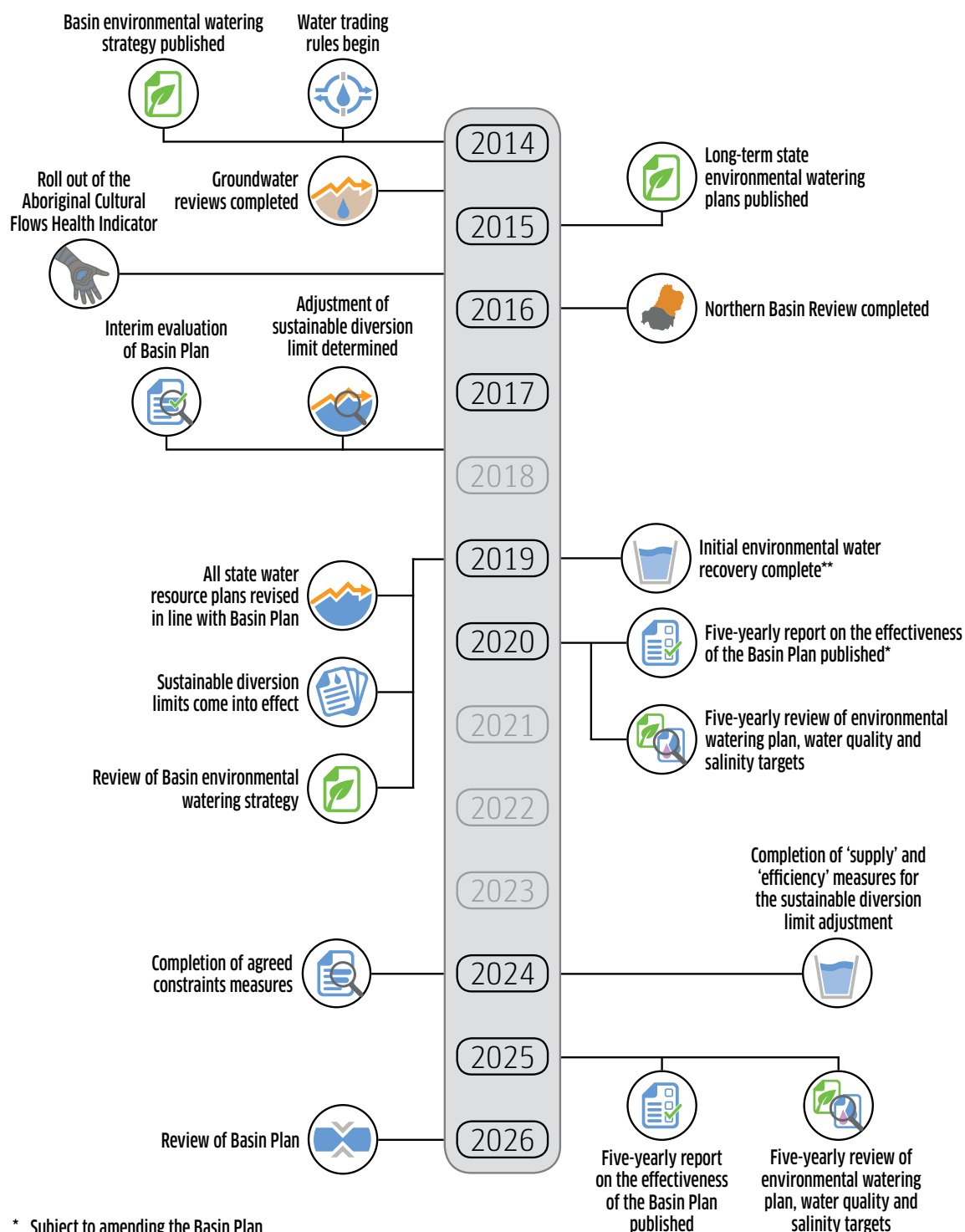
Compliance

The MDBA has a regulatory role in administering and enforcing aspects of the Water Act and the Basin Plan as they relate to external entities. The compliance approach, powers and principles of the MDBA are set out in the Compliance Strategy (2014). The MDBA is in the process of reviewing the strategy.

The MBDA is responsible for monitoring and dealing with breaches of parts of the Water Act and the Basin Plan. To date, the MDBA has taken an indirect role in ensuring compliance by individual water users on the expectation that Basin state governments are effectively implementing compliance strategies for their water management legislation.

Allegations of non-compliance can be made through MDBA’s online ‘Report a Breach’ portal, as well as through less formal processes such as emails or meetings.

Basin Plan timeline



* Subject to amending the Basin Plan

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

Coordinating environmental watering

At the beginning of the 2016–17 watering year, the total volume of held environmental water in the Basin was about 2,732 GL (in long-term available volume terms). This water is owned and managed by a number of different environmental water holders, including:

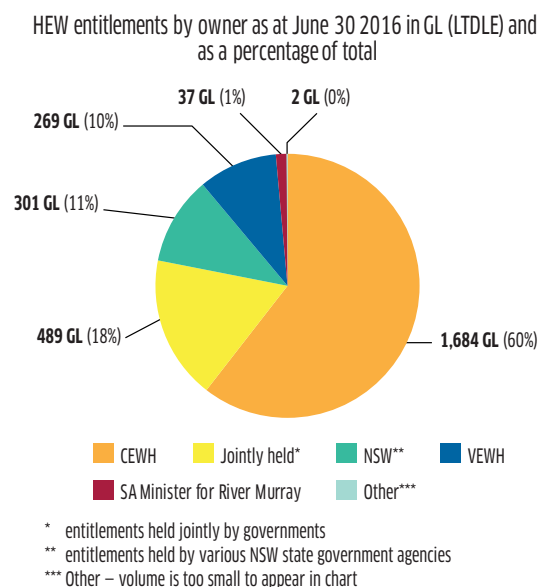


Figure 2.1 Proportions of held environmental water (HEW) owned by the different environmental water holders. Note: In addition, joint governments also have up to 70 GL/year available as River Murray Increased Flows from the Snowy Hydro Scheme

- » Commonwealth Environmental Water Holder
- » Victorian Environmental Water Holder
- » New South Wales Office of Environment and Heritage
- » South Australian Department of Environment, Water and Natural Resources
- » joint government programs (The Living Murray portfolio and River Murray Increased Flows).

The Southern Connected Basin Environmental Water Committee is made up of Basin state and Australian Government environmental water holders, water managers and key river operators. The Committee coordinates the delivery of all environmental water to maximise environmental outcomes in the southern connected Basin. It also makes decisions on the use of water available under The Living Murray portfolio, River Murray Increased Flows, and River Murray unregulated flows.

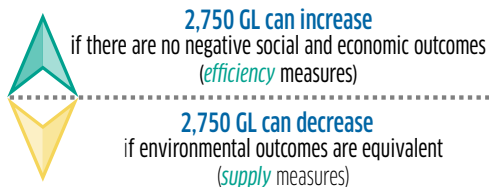
Environmental water managers plan for a range of conditions from very dry to very wet. This provides the capacity to respond quickly to changing and emerging conditions. In response to the shift from dry to wet conditions in the second half of 2016, plans were quickly shifted from providing drought refuges to maximising the environmental outcomes associated with wide spread inundation of the floodplains. Key outcomes from the year provided:

- » conditions to support a large scale Murray cod spawning event in the Lower Darling
- » follow-up watering after the natural overbank flows to important vegetation communities, including the Barmah-Millewa Forest
- » local refuge habitat for native fish from hypoxic blackwater across the southern Basin
- » conditions to support waterbird breeding at a number of locations
- » connecting flows from the northern Basin, Murrumbidgee, Goulburn and upper Murray through to the Murray Mouth to get fish (such as golden perch that bred in the north during the floods) to move into and through the southern Basin, to boost fish numbers
- » supporting flows to the lower lakes during the recession of the flood to support ecological outcomes in the Lower Lakes, including flowering and seed set for *Ruppia* grass, a key species in the Coorong system.

In 2016–17, environmental water managers continued to build their capacity to coordinate the use of the available environmental water and worked with river operators to deliver water efficiently, while avoiding third party impacts. Environmental water did not contribute to flooding and was not a significant factor in contributing to adverse water quality issues (such as the blue-green algae outbreaks or hypoxic blackwater).

Sustainable Diversion Limit Adjustment Mechanism

The Basin Plan provides an opportunity to adjust the sustainable diversion limit up or down by as much as 5% as long as environmental, social and economic outcomes are maintained or improved. Adjustments can be achieved through supply measures – projects which allow equivalent



environmental outcomes to be achieved using less water, or efficiency measures – and projects which allow more water to be recovered for the environment without negative social or economic impacts.

The Murray–Darling Basin Ministerial Council endorsed the package of SDL adjustment supply projects presented by Basin state governments on 16 June 2017. As part of the MDBA's obligations set out under the Basin Plan, a register of all notified SDL adjustment projects were published on the website.

The Commonwealth has allocated \$1.57 billion for efficiency measures. This year, the MDBA continued to devote considerable resources to working with the Basin state governments on: the technical aspects of developing SDL adjustment projects; begin to model the SDL adjustment project package; and determine how river flows in the Basin are affected. Now that a package of projects has been agreed by Basin governments, the MDBA's role is to model the projects to propose the volume of the SDL adjustments to the Commonwealth Minister for water by 15 December 2017. Proposed SDL adjustments will be open for public submissions in October – November 2017.

Identifying watering priorities for the Murray–Darling Basin

On 30 June 2017, the Basin environmental watering priorities were published. Conditions in most catchments (as a result of high flows in 2016) combined with relatively large volumes of held environmental water in storages, presented the best opportunity in 25 years to improve the condition of the Basin's water-dependent ecosystems and boost their resilience for the dry periods that will inevitably return. The priorities were developed to encourage water managers to capitalise on this opportunity to:

- » improve the condition of native vegetation

- » support healthier populations of waterbirds and native fish
- » improve flows throughout the river system.

Previously, the Basin annual environmental watering priorities were published for the upcoming water year. This year, the priorities identified have components across multiple years and priorities that recommend watering actions for different climate conditions.

The MDBA is also working with the Murray Lower Darling Rivers Indigenous Nations (MLDRIN) and the Northern Basin Aboriginal Nations (NBAN) on ways to bring Aboriginal people's views into long-term and annual environmental water planning. For the 2017–18 water year, this includes two case studies on Aboriginal environmental outcomes involving delegates from the Wayilwan (NSW) and Barapa Barapa (NSW/VIC) Nations. Over time, information on Aboriginal environmental outcomes will be expanded Basin-wide, drawing on knowledge gained through projects like the Use and Occupancy Mapping and the Aboriginal Waterways Assessment. The aim is for MLDRIN and NBAN to be able to give long-term strategic advice on Aboriginal environmental outcomes Basin-wide and contribute to environmental water planning and decision making.

Water quality and salinity

In 2016–17, the MDBA continued to work with states to help them develop their water quality management plans, including advice on draft plans and holding forums to exchange information. Each Basin state must develop a water quality management plan as part of their water resource plans.

In 2016–17, the target values for salinity were achieved 95% of the time for four out of five reporting sites, Figure 2.2. In addition, the operation of salt interception schemes helped protect the river from salinity by diverting about 395,388 tonnes of salt away from riverine landscapes, see page 64. In late 2016 a low dissolved oxygen event was triggered by extensive flooding of floodplains and transfer of carbon into the river system. This event was managed to enable the river to reach normal dissolved oxygen conditions by January 2017. There were no major blue green algae outbreaks in the Basin in 2016–17.

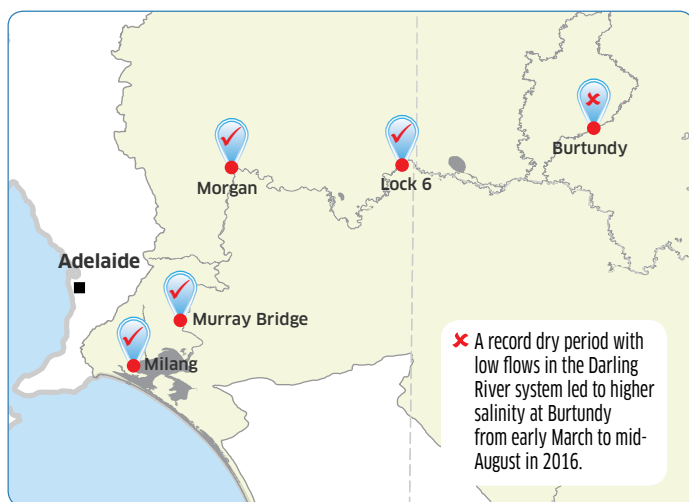


Figure 2.2 Salinity results 2016-17

Accrediting state water resource plans

Water resource plans are essential to secure the on-ground achievement of Basin Plan outcomes. These plans support the implementation of sustainable diversion limits at the local scale. They also take account of potential and emerging risks to the water resources for each area and establish rules to meet environmental and water quality objectives.

This year, the MDBA provided support to all Basin state governments by providing comments on draft plans, attending stakeholder meetings, and providing briefings on technical issues.

This included hosting meetings and forums to help water planners and Aboriginal groups (including NBAN and MLDRIN) learn from each other and to promote consistent approaches to water planning. The MDBA convened the third Joint workshop with MLDRIN, NBAN and state government representatives as well as the fourth annual water planners' forum to share knowledge and improve the approach to water planning. This year's forum was on the theme 'toward accreditation', reflecting the changing focus as Basin state governments progress through the water planning process, towards the aim of having accredited water resource plans across the Basin by 30 June 2019.

In December 2016, the MDBA provided a recommendation to the Commonwealth minister responsible for water to accredit the first water resource plan submitted by a state – the Warrego-Paroo-Nebine water resource plan in Queensland. The Minister accredited this plan in June 2017.

As the Warrego-Paroo-Nebine plan was the first full water resource plan assessment, the MDBA reviewed processes to identify potential improvements. The Queensland Government shared their experience and lessons. As a result, the MDBA is making its processes more efficient, improving the clarity of advice to Basin state governments, developing further guidance material and making sure its assessment approach is clear.

The Basin state governments have made progress to develop their water resource plans during 2016-17. Basin state governments have started developing water resource

plans for all areas across the Basin, with plans at different stages of development. During the year, the MDBA received and provided comments on full drafts of plans from South Australia and Victoria. It is anticipated that South Australia will submit its first plan for accreditation – the South Australian Murray Region plan – in late 2017. While planning is progressing, completing all 36 water resource plans by 30 June 2019 remains a challenge.

Transitioning to sustainable diversion limits

Progress towards implementing the sustainable diversion limits continued this year, with more water recovered for the environment.

Sustainable diversion limits (SDLs) will come into effect on 1 July 2019, and in the transitional period, working with the Basin state governments to implement the annual reporting requirements set out in the *Water Act 2007 (Cth)*.

Using the annual reporting information provided by Basin state governments, the MDBA has prepared a trial register of take. This trial tests the water accounting concepts of annual permitted take, annual actual take and diversion limits. The trial register also helps test the method used to determine sustainable diversion limit compliance.

The MDBA also continued to address technical and policy issues relating to sustainable diversion limit implementation. This includes developing the regulatory framework around sustainable

diversion limits and developing administrative and technical guidance around how the MDBA will assess whether there is a reasonable excuse for exceeding the limits on take.

The MDBA also commenced a project to help automate the way it receives and processes annual water take reporting data provided by Basin state governments and the Commonwealth Environmental Water Holder. When the project is completed, the annual processing of reporting data should be quicker and easier and able to generate a range of useful reporting outputs. In the long term, the project will enhance the integrity of the compliance arrangements associated with ensuring water take remains within the SDLs.

Groundwater

The Basin Plan sets limits on the amount of groundwater that can be taken from all groundwater resources of the Basin for the first time. This year, the recommendations from the groundwater reviews (completed in 2014–15) were included in the proposed amendment to the Basin Plan.

The proposed changes announced in November 2016 included increasing the sustainable diversion limits and adding local management rules in three groundwater areas, based on outcomes from the reviews. Also proposed were other minor changes to groundwater management to enable effective and consistent implementation of the Basin Plan. These include: the compliance methodology adjustments to review provisions; separating the provisions for the groundwater water quality management plans from those for surface water; and refining water resource plan area boundaries and sustainable diversion limit (SDL) resource unit boundary definitions.

The MDBA continued to work with Basin state governments to address a number of technical and policy issues that will support management of the Basin's groundwater resources. During 2016–17, trialled arrangements for estimating and reporting actual and permitted groundwater take in ways that will support SDL compliance from the 2019–20 water year. The MDBA also made good progress in providing guidance to state agencies on the Basin Plan's requirements for defining groundwater held and planned environmental water.

Efficient and effective water markets

Water markets in the Basin help water move to its highest value use. They also help businesses adapt to changing economic and environmental conditions by providing more flexible options to meet water needs.

The Basin Plan's water trading rules aim to reduce restrictions on trade, improve transparency and access to information, and improve confidence in the water market. Water markets are evolving and growing so implementing the water trading rules is an ongoing task.

Some barriers to trade have been removed since the Basin Plan commenced, however, there are still some restrictions in place. The MDBA worked with Basin state governments to determine if different trade restrictions are necessary, with a focus on the restrictions that have the biggest impact on the function of the water market. The MDBA aims to work with Basin state governments to resolve these restrictions by the time water resource plans are completed in 2019.

Challenges and the year ahead

The year ahead will see the culmination of two significant bodies of work – the Northern Basin Review and Sustainable Diversion Limit Adjustment Mechanism. The focus over the next year will be modelling projects to propose the sustainable diversion limit adjustments, and managing the associated Basin Plan amendment processes. As a result, it is anticipated that the Basin Plan will be amended twice in the next year to implement both the Northern Basin Review and Sustainable Diversion Limit Adjustment Mechanism.

These amendments are just the beginning of the process. Toolkit measures arising from the Northern Basin Review and the Sustainable Diversion Limit Adjustment Mechanism projects will need to be implemented in coming years. Toolkit measures aim to improve water management and help the environment in the north, and will be implemented by the Australian, Queensland and New South Wales governments in coming years. For the Sustainable Diversion Limit Adjustment Mechanism, Basin state governments are responsible for delivering the projects by 2024. The MDBA recognises that these processes are complex and challenging, and will continue to support Basin state governments to help them effectively implement the Basin Plan.

While there is good progress underway on water resource plans, accrediting 36 water resource plans by June 2019 remains a significant challenge for the Basin state governments and the MDBA. All parties are working to meet this deadline, and the MDBA is looking at ways to make processes run more smoothly and build water planning capacity. Once each state completes its first water resource plan, it is anticipated that the development of subsequent

plans will be more efficient. The MDBA is providing guidance on how states can best satisfy the requirements of the Basin Plan.

Compliance is also a key focus of the MDBA, as it is essential to ensure water resources across the Basin are managed sustainably. As water users continue to adapt to the Basin Plan, the MDBA will work with Basin states to ensure all water users meet their water use obligations.

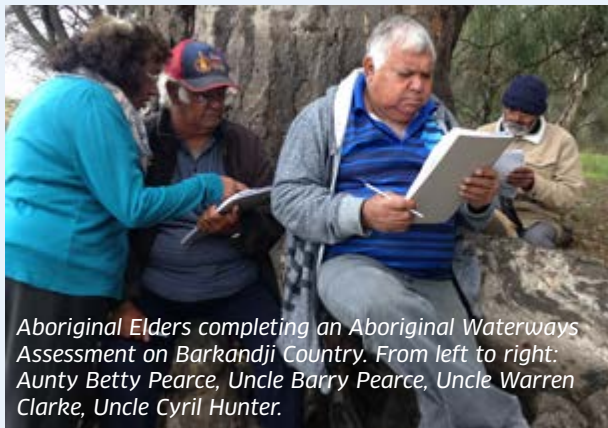
Getting Aboriginal voices into water planning

Historically, Aboriginal people have been excluded from government water planning processes. The Basin Plan requires water resource plans to take into account the views of Aboriginal people on a range of matters, including their objectives and outcomes for water management. To achieve this it is important to build the capacity of water planners and Aboriginal people so there can be meaningful involvement in water planning processes.

Work on this mutual capacity building continued throughout 2016–17. In February 2017, the MDBA held a joint workshop with MLDRIN, NBAN and representatives from the Basin states to discuss the Basin Plan requirements for Aboriginal involvement in water planning. This included discussion about how to meet the Basin Plan requirements, as well as best practice

guidance for engaging Traditional Owners and Aboriginal groups and considering their information in planning. A presentation on the risk assessment process and how Aboriginal values and uses can be identified and considered in the planning process, also supported the discussion. An animation (*Grandma Cod's Big Splash*) was produced to explain water resource planning based on recommendations from the joint workshops. Workshop participants felt it was important to communicate water planning in ways that are more meaningful to Aboriginal people. The animation was presented at this workshop for feedback and has since been finalised and is available on YouTube.

At the fourth water planners' forum in May, representatives from MLDRIN and the Victorian Government, and NBAN and the Queensland Government made presentations about involving Aboriginal people in water resource planning. These presentations, along with the Australian Capital Territory Government's overview presentation on having regard for Aboriginal values and uses in water resource plans, were seen as highlights of the forum. The presentations gave an insight into how planning processes have evolved to engage Aboriginal people in a culturally appropriate manner, to inform the planning process, lessons learned and future challenges. It was recognised this is a key area of planning that has significantly improved through the development of water resource plans and recent state initiatives.



Aboriginal Elders completing an Aboriginal Waterways Assessment on Barkandji Country. From left to right: Auntie Betty Pearce, Uncle Barry Pearce, Uncle Warren Clarke, Uncle Cyril Hunter.

STRATEGIC GOAL 2

Strengthen engagement with the community

Sustaining a healthy working Basin relies on effective engagement with the community to build relationships, identify common interests and local knowledge, implement policy, administer governance and manage the river system and its assets.

Highlights

- Built relationships and partnerships with Basin communities through Regional Engagement Officer roles and the announcement of three new regional offices.
- Sought feedback from stakeholders relating to the Basin Plan amendments arising from the Northern Basin Review. Engaged with more than 1,000 stakeholders across the Basin through the Basin Plan amendment consultation and submission process.
- Diversified communications to increase knowledge about the Basin Plan, including outcomes achieved so far, and what it means for local communities and the environment.
- Reinforced the MDBA's commitment to a strong and productive relationship with Aboriginal people, including agreeing a four-year funding agreement with MLDRIN and NBAN.

Overview

This year, the MDBA prioritised enhancing its regional presence with the appointment of Regional Engagement Officers (REOs) at a number of locations across the Basin. Our REOs complement the establishment of three regional offices – Albury–Wodonga, Adelaide and Toowoomba.

The Northern Basin Review required a substantial amount of engagement with stakeholders and the public to ascertain feedback and concerns around suggested changes to the sustainable diversion limits in the northern Basin. Public meetings were held in 13 towns, supplemented by a number of briefing sessions for industry and environment groups. A 14-week submission period resulted in over 2,000 submissions from a wide range of stakeholders.

The Basin Community Committee continued to be active in strengthening community connections, especially in support of the Northern Basin Review. The Northern Basin Advisory Committee (NBAC) was set up to advise the MDBA specifically during the Northern Basin Review. The NBAC was active until December 2016 and contributed greatly to the Review.

Aboriginal involvement in the water reform process continued to grow stronger through engagement with Aboriginal communities. The MDBA also commenced a long-term research project looking at the impacts of weather and river flows on Aboriginal people in the Basin.

Achievements in communications included the launch of *Sharing the water* book that was launched 100 years to the day since the Commissioners of the River Murray Commission met. Other major communication achievements included the *River Stories* website and a series of videos about the benefits of our work. Social media acceptance and use grew during the year – in excess of 4,000 followers across the MDBA's social media channels. The media team was kept busy with a large number of interviews, releases and responses to media enquiries.

Regional Engagement Officers and regional offices

To support stronger partnerships with Basin communities, the MDBA has created a Regional Engagement Officer (REO) network and committed to opening three regional offices in Albury–Wodonga, Adelaide and Toowoomba.

In November 2016, a 12-month pilot program commenced with the recruitment of six part-time Regional Engagement Officers hosted by organisations, including Regional Development Australia, Natural Resource Management/Catchment Management Authority organisations and local councils across the Basin. These host partners have a rich understanding of water issues in their region, which helps build the local relevance of the Basin Plan.



Concerns and feedback from the regions are now provided directly to the MDBA policy staff to better inform their work.

The pilot was part of the MDBA's broader regionalisation approach which includes the opening of three regional MDBA offices in July 2017 in Toowoomba, Albury-Wodonga and Adelaide. The MDBA is committed to increasing its presence and links with Basin communities. Regionally based staff will help improve information exchange between communities and the

MDBA, strengthen policy and program decisions through better consideration of local impacts, and give communities a better understanding of the MDBA's work. These regional offices combined with the REO network will ensure there is a physical presence in each Basin state.

Public consultation on proposed Basin Plan amendments

As part of the Northern Basin Review process, Chief Executive, Phillip Glyde, other senior MDBA executive staff and technical experts held community meetings in the northern Basin to listen to issues and concerns raised by residents to inform the review on the SDLs in the northern system. Public meetings were held in Warren, Walgett, Wee Waa, Brewarrina, Bourke,

The host organisations along with their respective REOs are based in Wodonga and Shepparton in Victoria, Wentworth and Leeton in New South Wales, Murray Bridge in South Australia, and Dirranbandi and St George in Queensland. The REOs all have different backgrounds – some are floodplain graziers, irrigators, catchment managers and business people – but they all share a passion for their regions.

The response to the REOs, both within regional communities and the MDBA, has been very positive. The REOs understand the importance of their role to their communities and are improving and enhancing the connection between the MDBA with their region, by facilitating a two-way exchange of information.

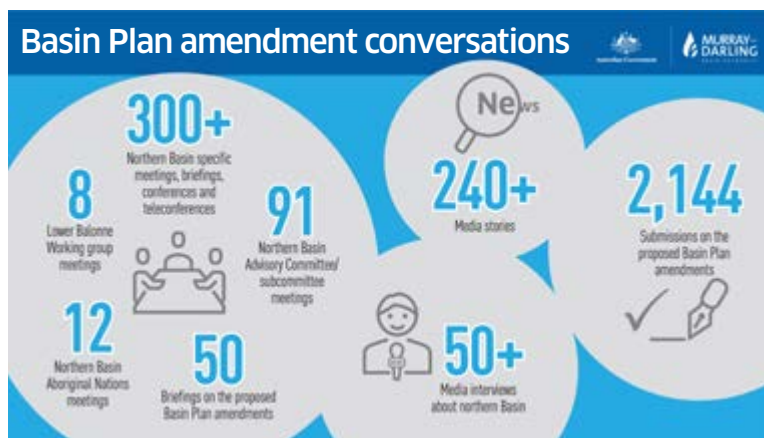
Reflections from a REO

By Elizabeth Stott

'When the MDBA announced its intentions to improve regional engagement by appointing a group of Regional Engagement Officers (REOs) across the Basin, members of our community approached me to see whether I would be interested in taking on the part-time role. With my background in water reform extending back to the early days of the Basin Plan in 2009, and strong interest in water policy and management, the role was a fantastic opportunity to continue the constructive work on the implementation of the Basin Plan that I had been doing prior to having my little boy in 2015.

I am hosted by Leeton Shire Council and work two days a week covering the irrigation areas of the Murrumbidgee region. This includes towns like Griffith, Hay, Narrandera, Coleambally and Leeton. For the last eight months, along with my fellow REOs, I have been out and about meeting with community groups, industry associations and local government to provide them with the information they want to know about the Basin Plan and how it affects the local community.

Importantly for me though, this role is not a one-way street. Feeding information back into the MDBA Head Office to help my colleagues understand the impact of the Basin Plan in my community and better ways to communicate with those affected, has been invaluable, both for the staff in Canberra and my region.'



Murray-Darling Basin – who does what which provides an overview of the key government agencies and advisory committees involved in implementing the Basin Plan, and *The Murray-Darling Basin – at a glance* which contains key facts and statistics.

Considerable effort focused on increasing people's understanding of the Northern Basin Review and the consequential Basin Plan

amendments. Summary documents and web content were produced to support the engagement and consultation activities accompanying the Basin Plan amendment process.

Wilcannia, Gunnedah, Moree, Dirranbandi, St George, Goondiwindi and Toowoomba. Information sessions in the southern Basin towns of Echuca-Moama, Shepparton, Griffith and Loxton were held. Briefing sessions were held for industry, government and environmental groups in Sydney, Narrabri, Cobar and Dubbo.

The submission period occurred over 14 weeks and concluded in February 2017, with 2,144 submissions received from a wide range of stakeholders including individuals and town residents, local business and industry, peak bodies, Traditional Owners, local and state governments, tourism operators and a wide range of groups representing environment, irrigation and graziers. Stakeholder concerns on the recommended change to the sustainable diversion limit varied from catchment to catchment and articulated the diverse range of stakeholder groups' views and interests throughout the Basin. All submissions received were published on the MDBA website.

The MDBA values the feedback received during the Basin Plan amendment consultations, including the submissions and the issues raised during the public meetings. The MDBA published a separate report on its website that summarised the themes raised throughout the consultation process as well as its response to the submissions.

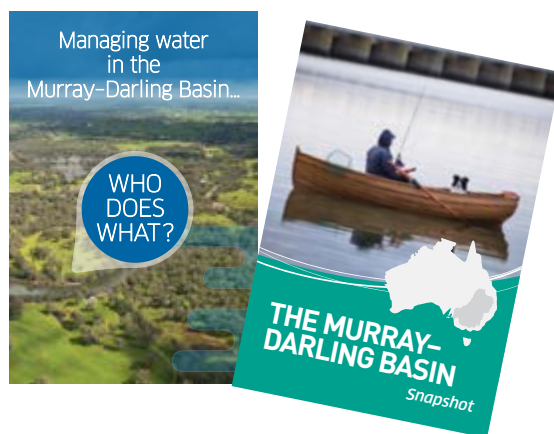
Communicating messages

The MDBA continued to inform and educate the community on the importance of sustaining a healthy working Basin through a range of communications and education platforms. Examples include *Managing water in the*

The MDBA provided media comment as part of its commitment to engage and educate the Australian community about the Basin's water resources. It is also helpful in informing people about its management and operations work.

The MDBA used a combination of traditional and social media to communicate its work with specific Basin communities, as well as the broader Australian public. MDBA staff members were regularly interviewed on radio and for local and national newspapers. The MDBA also maintained active social media (Facebook and Twitter) accounts.

Media activities focused on topics including the Northern Basin Review, Basin Plan amendments, our regional offices and Regional Engagement Officer pilot, environmental watering priorities and advice on releases from Hume Dam.





River Stories website

In April 2017, the MDBA launched a new part of its website called River Stories which lays out the social, environmental and political history of water resource management and collaboration in the Murray-Darling Basin. It challenges people to think about the past, present and future management of water resources in the Basin in particular, but also on a broader national scale.

Stories of people, their lives and their links with the rivers provide a local 'lived' history alongside the key events and changing perspectives on water and the environment that have shaped the Basin over the last 100 years.

The Basin is where many people have made their lives and where their ancestors are buried. Many have spiritual and emotional connections and deeply care for the Basin's rivers.

The MDBA encourages people to explore the site and contribute stories or story ideas to build on the current story collection.

Salt of the earth – video

An MDBA video *Salt of the Earth* was unveiled to the public for the first time at the Mildura Field Day, launched by the MDBA's Chair, Neil Andrew AO. The salinity story recognises the achievements of all the stakeholders involved in tackling salinity in the Murray-Darling Basin.

The video and an accompanying brochure tell the story behind the salt interception schemes in the River Murray and the people who made them happen.

Book launch – Sharing the water – One hundred years of River Murray politics

In 2017, the MDBA celebrated 100 years of collaborative cross-border water management in the Murray-Darling Basin.

A history of this period titled *Sharing the water* was launched on 14 February 2017, one hundred years to the day since the Commissioners of the newly formed River Murray Commission met for the first time. The book covers the conflict over the control and sharing of the waters of the River Murray, one of the most contentious issues at the time of Federation.



Education

This year, the MDBA launched the *Water Weed Wipeout* smart device app, developed with assistance from Goulburn Murray Water. The app uses an innovative approach to help students and community members learn about using river operations to manage the aquatic weed *Egeria densa* in Lake Mulwala, while optimising social, economic and environmental outcomes.

MDBA's *Run the River* app was launched in 2014 and continues to be popular with 4,575 people downloading the app last year, with a total of 20,915 downloads since it was launched. The app has users from across the world, although most are in Australia.

Authority meetings in Basin communities

In 2017, the Authority committed to regularly holding its meetings in regional communities. Its first regional meeting was held in Albury in May 2017 and included a community meeting to give an update on the Basin Plan and the River Murray. Previous to this, the Authority met in Melbourne – this meeting coincided with the 100 year anniversary of the first meeting of the River Murray Commission.

Basin Community Committee

The Basin Community Committee (BCC) continued to actively strengthen community connections throughout the Basin. The northern Basin-based members assisted the Northern Basin Advisory Committee during the community consultation phase of the Northern Basin Review, attending and contributing to several regional consultation meetings.

The BCC provided advice for the proposed Basin Plan amendments and provided input to the engagement strategy for the community consultation. The BCC endorsed and supported the appointment of the Regional Engagement Officers and select BCC members are providing a supportive, mentoring role for them.

Advisory Committee on Social, Economic and Environmental Sciences

Established under Section 203 of the *Water Act 2007 (Cth)*, the six members of the Advisory Committee on Social, Economic and Environmental Sciences (ACSEES) met three times in 2016–17 to workshop and advise on issues including adjustment of Sustainable Diversion Limits, environmental watering priorities, adaptive management and the Basin Plan monitoring and evaluation framework (see Appendix B for more information).

Northern Basin Advisory Committee

The Northern Basin Advisory Committee (NBAC) met three times in 2016–17. NBAC played an important role in Basin Plan amendment engagement tours in the northern Basin to help explain the reasoning behind changes to the sustainable diversion limit and results of the studies of socio-economic impacts. NBAC's term concluded on 31 December 2016 after the finalisation of the Northern Basin Review. The MDBA appreciates the work of NBAC members to improve the outcomes of the Basin Plan in the northern Basin (see Appendix B).



Students from Yarrawonga primary at the launch of the Water Weed Wipeout app at Lake Mulwala Water Ski Club.

Engagement with Aboriginal communities

In support of the objectives of the Aboriginal Partnerships Action Plan, the MDBA is committed to help grow the capacity of Aboriginal people to be effectively involved in water planning and management. The MDBA recognises that the authority and responsibility to speak for and about Aboriginal culture rests with Traditional Owners. All partnerships with Aboriginal people must be based on respect, the ability to participate in an equitable manner, and free, prior and informed consent.

The Murray Lower Darling Rivers Indigenous Nations (MLDRIN) and Northern Basin Aboriginal Nations (NBAN) have proven to be the most culturally appropriate and respectful way to achieve these objectives. By working with these organisations, the MDBA has forged new ways to strengthen Aboriginal voices and their involvement in water research, planning and implementation.

The MDBA remained steadfast in its commitment to a strong and productive

relationship with MLDRIN and NBAN and has committed to a four-year funding agreement with these organisations. This relationship will be especially important during the next phase of the Basin Plan's implementation, water resource planning and evaluation.

Combined, MLDRIN and NBAN held 10 board meetings and six gatherings during 2016–17, including some events involving both organisations.

At the meetings, Nation delegates covered a diverse range of business such as: how to strengthen the partnership between MLDRIN, NBAN and the MDBA; participating in water resource planning consultations; participating in the Traditional Owner monitoring and evaluation; and consulting with other governments about related matters such as the impending release of the carp herpes virus.

Case study: Impacts of weather and river flows on Aboriginal people

Working in collaboration with NBAN, MLDRIN and the Bureau of Meteorology, the MDBA is undertaking a long-term participatory research project looking at the impacts of weather and river flows on Aboriginal people in the Basin. The project involves up to 30 Aboriginal families and organisations in an ongoing partnership that represents a significant increase in the MDBA's engagement with Aboriginal communities.

Currently there is a lack of knowledge about how the Basin's hydrological cycles affect customary economies such as fishing, hunting and harvesting culturally valued species. The Basin exhibits varied weather conditions and the opportunities and threats they present to Aboriginal health and wellbeing is not known. Such knowledge will help to understand the risk factors related to Aboriginal uses and values of water in water resource planning in the Basin.

To date, 15 professional standard weather stations have been set up with the consent of Traditional Owners and Aboriginal organisations in the Basin. The projects are widespread – from Charleville (Queensland) to Raukkan (South Australia). The Aboriginal Partnerships team will regularly visit each location to download weather data and interview participants to find out how their lives were affected by the recorded weather events and trends. An Advisory Group with Traditional Owner leadership and academic and MDBA participation oversees the approach and use of the research. The project also provides opportunities for cultural training for MDBA staff, as well as disseminating information about the many other activities that may be of interest to Traditional Owners.

STRATEGIC GOAL 3

Evaluate and report the social, economic and environmental outcomes of Basin water reforms

Continued tracking the implementation and outcomes of Basin water reforms. Measuring the effect of the reforms is essential to understand whether intended outcomes are being achieved, identify problems as they arise and to adjust management practices (adaptive management). This transparent approach to monitoring and reporting is fundamental to gain community confidence in the implementation process and support the reforms in the future.

Highlights

- Published the third Basin Plan annual effectiveness report, which showed implementation is on track.
- Commenced work on the Basin Plan interim evaluation of the first five years of the implementation and outcomes.
- Commenced social and economic analysis to inform the interim evaluation. These projects will provide insights into the social and economic outcomes of Basin Plan implementation.
- Managed The Living Murray water portfolio as well as associated monitoring, evaluation and Aboriginal engagement, on behalf of the Basin governments.
- Collaborated with water holders and river operators resulting in the augmentation of natural flows using environmental water to ensure important breeding and recruitment cycles for waterbirds and native fish were completed.
- Completed long-term environmental monitoring projects.
- Finalised agreements with each of the Basin state governments for the approach to technical aspects of the new sustainable diversion limit water accounting and reporting obligations, enabling the release of the annual water take reports in 2017–18.

Overview

During 2016–17, the MDBA successfully produced the third Basin Plan annual report and began preparations for the first interim evaluation of the Basin Plan. The interim evaluation will provide the foundation for supporting continual improvement of Basin Plan implementation and outcomes.

An ongoing strength of the monitoring and evaluation program is the collaborative relationships established between the MDBA and partner governments and agencies, including the Commonwealth Environmental Water Office, Department of Agriculture and Water Resources and Basin state governments. These partners meet regularly and collaborate to deliver the monitoring and evaluation program, including through contributing to the Basin Plan annual report, developing approaches for longer term evaluation and developing a joint program of monitoring activities.

Reporting on the effectiveness of the Basin Plan

In February 2017, the MDBA published the third Basin Plan annual report, outlining how the Basin Plan and associated reforms were progressing. A particular highlight was the level of collaboration between environmental water holders. In 2015–16, 86% of environmental water was delivered through coordinated watering events, achieving good outcomes locally for waterbirds and fish. However, it will take many years to see local success reflected in wide scale environmental recovery.

Low water availability in 2015–16 and ongoing system constraints restricted the achievement of environmental objectives, and the constraints will need to be addressed by Basin governments if the best possible outcomes are to be achieved.

The MDBA has been looking at the monitoring results for the first five years of

implementation and has been undertaking new research. Together, this will give a picture of how the Basin Plan is tracking and help assess whether the environmental, social, economic and cultural outcomes are consistent with what is expected at this stage of the Basin Plan's implementation.

The interim evaluation will cover all elements of Basin Plan's implementation including:

- » environmental water planning, management and outcomes
- » water recovery to bridge the gap to the new sustainable diversion limits (SDLs)
- » implementation of the water trade rules and the water quality and salinity management plan
- » progress in developing water resource plans
- » implementation of the adaptive elements of the Basin Plan, such as the Northern Basin Review, groundwater reviews and the Sustainable Diversion Limit Adjustment Mechanism
- » social, economic and cultural outcomes from all of these activities.

The interim evaluation will be released in December 2017, with supplementary analysis to follow in April 2018 after final Australian Bureau of Statistics census data has been collated and analysed.

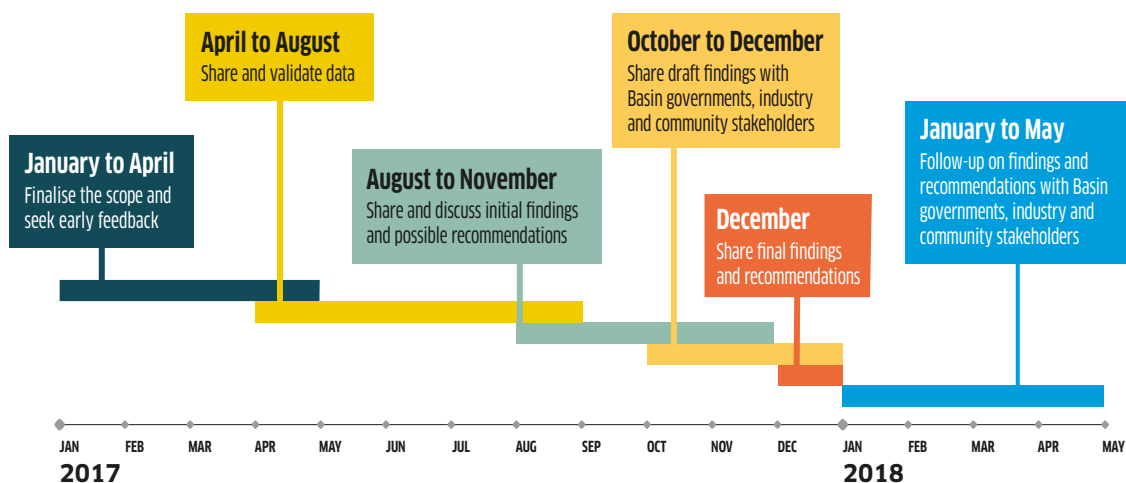
There will be a phased approach to sharing data and evaluation findings in 2017–18, seeking feedback on the data and early results with key stakeholders.

Social and economic analysis

In 2016–17, Basin-wide and regional social and economic analysis program continued to gather data to inform the 2017 interim evaluation of the social and economic outcomes of the Basin Plan, including:

- » data to help us to better understand the impact of policy changes, changing demographics, fluctuations in the economic returns to agricultural activities, changing patterns of water use and emerging technology and agricultural production trends.
- » direct evidence from farmers and others in the community about changes they have made in response to the Basin Plan and interviewed farmers from the Murrumbidgee, Lachlan, Victorian Murray, Goulburn, Campaspe and South Australian Murray catchments. Some key themes have been identified, and combined with information about changes in social and economic conditions show how Basin communities are adapting.
- » supporting the Regional Wellbeing Survey by the University of Canberra, particularly how people think the Basin Plan might affect them and their community.

Proposed timeline for Basin Plan interim evaluation



- » data about irrigation farms and industries from the Australian Bureau of Agricultural and Resource Economics and Sciences. The MDBA continues to support their survey and analysis of changes in the irrigation industry. Reports that examine Basin-wide and industry-level data collected through irrigated farm surveys since 2006–07 were published in 2016.

This data is being used in a number of ways, including how the Australian Government's water recovery programs have helped smooth the transition to the new water sharing arrangements, and whether environmental watering is providing improved social, recreational and amenity outcomes for Basin communities.

Involving Aboriginal people in water planning and management

The MDBA commenced a participatory and cross-cultural evaluation methodology that will be re-used between now and 2020 to track how the implementation of the Basin Plan is taking Aboriginal interests into account. The evaluation process will:

- » be useful for decision-making by the MDBA and Traditional Owners
- » be valuable for informing ongoing implementation of the Basin Plan with greater inclusion of Traditional Owners' interests
- » assist and inform the process to deliver the full evaluation of the Basin Plan in 2020 with regard to Traditional Owners' interests.

Evaluation research and analysis will include evaluating the full range of Basin Plan elements and mechanisms in relation to their approaches to delivery, impacts and outcomes for Traditional Owners and Aboriginal populations in the Basin. The work will contribute to the interim evaluation in 2017.

Cap to sustainable diversion limit

Transitioning from the Cap to the sustainable diversion limit

The MDBA continued work on the Murray-Darling Basin *Transition Period Water Take Report 2012–13 to 2015–16*. It will be released in late 2017 and will present information from

the combined reporting process about the availability and use of all Basin water resources, including groundwater, since 2012–13. It will also include the updated Cap Register for the four water years. From 2016–17 onwards, annual water take reports will be produced.

Annual water take reports had not been released since the commencement of the Basin Plan because the MDBA has been working with Basin state governments to reach agreement on some of the technical aspects of the new sustainable diversion limit water accounting and reporting obligations. One of the aspect is how to separate annual changes in environmental water recovery from the assessment of how much water is available for consumptive use and how much of that water was actually used. The agreements on the approach to be taken for each Basin state was finalised in late 2016. Data collected according to the agreed approaches is now being compiled for each water year since 2012–13.

Administration of the Cap during the transition period

The MDBA completed the process of auditing the 2015–16 performance of the Basin state governments in implementing the Cap. The key findings are:

- » total Cap diversions of 6,279 gigalitres (GL) were the fifth lowest on record (in 33 years of records, 1983–2016).
- » all Cap valleys that run a cumulative balance are expected to remain in cumulative Cap credit at June 2016. Further work is required during 2016–17 to finalise this auditing.
- » a minor compliance issue in the Queensland Moonie Cap valley has been identified and is being investigated in partnership with the Queensland Government. Subsequently, the MDBA has established an Independent Audit Group to conduct a special audit to determine whether or not the long-term Cap limit has been exceeded.

The MDBA is in the process of auditing the 2016–17 performance of Basin state governments in implementing the Cap.

The MDBA continues to assist Basin state governments to maintain existing or accredit new Cap models during the transition period.



Paroo River, Wilcannia, New South Wales.

Delivering more water for the environment

Improving the ecological condition of the Basin is a long-term goal of the Basin Plan. It will take time for Basin ecosystems to respond, especially slower-growing species and those with long life cycles. During this lag phase a muted response is anticipated with greater improvements in some areas compared to others. The MDBA aims to maintain ecological conditions to 2019 and achieve improved ecological outcomes from 2019. The total volume of environmental water has not yet been recovered and the Basin Plan will not be fully implemented until 2024.

After a dry start to the 2016–17 year, higher than average rainfall in late 2016 resulted in much higher river flows and the widespread inundation of wetlands and floodplains when compared to 2015. These natural events watered many of the Basin's wetlands and floodplains, including the Gwydir Wetlands, the Macquarie Marshes, mid-Murrumbidgee Wetlands and parts of the floodplains of the Murray, Murrumbidgee, Lachlan and Goulburn rivers.

In 2016–17, environmental water holders and managers augmented natural flows in selected

instances to ensure important breeding and recruitment (life-stage) cycles were completed. Initial monitoring indicates that river, riparian, wetland and floodplain communities across the Basin responded to the wet conditions and delivery of environmental water. Many areas and species will greatly benefit from follow-up watering in 2017–18 to make the most of the 2016–17 flows and boost their resilience for the dry periods that will inevitably return.

Some environmental outcomes observed to date are:

- » environmental water flows in the Murrumbidgee River in addition to unregulated flows provided vegetation improvements along the river, including at the mid-Murrumbidgee wetlands. This type of watering provides more benefits than watering that promotes the recovery of vegetation at a single site. Healthy vegetation then in turn supports the survival of a range of waterbird and native aquatic species and improves the condition and function of ecosystems.
- » in the Barmah-Millewa forest, Moira grass has shown improvements in the past year following a decline in its extent. This grass provides

nesting and foraging habitat for waterbirds and native fish. In 2016, environmental water delivery resulted in growth and flowering, with Moira grass growing in places where it had previously disappeared.

- » There was widespread flooding throughout the Macquarie Marshes which attracted a moderate number of waterbirds such as the Australian painted snipe and Australasian bittern. River red gum woodlands in the northern Marshes improved in condition, along with other floodplain vegetation and understorey species.
- » Natural high flows in the Darling River upstream of Menindee Lakes, resulted in a large golden perch spawning event, with a high number of eggs and larvae drifting downstream into the Menindee Lakes nursery habitat. Environmental flows in autumn encouraged young golden perch out of the Menindee Lakes and into the Lower Darling River and the Darling Anabranch, eventually connecting to the River Murray.

Monitoring and evaluating the environmental health of the Basin

Surveying vegetation, fish and waterbirds across the Murray–Darling Basin was successfully carried out at a Basin-wide scale as well as for sites along

the River Murray, see page 42. The contribution that the Basin Plan has made to observed changes in these components will be explored in detail in the Basin Plan 2017 interim evaluation, see page 35.

The Basin-wide vegetation monitoring focuses on the condition of red gum, black box and coolabah stands. The monitoring is satellite-based, and this year the MDBA developed new Landsat-based tools, working with Geoscience Australia and the Arthur Rylah Institute in Victoria, see page 67.

The annual fish survey provided data across the Basin. An additional netting technique was added to the standard electrofishing method in cloudy turbid rivers in Queensland and Victoria to ensure small and young fish and bottom-dwelling species such as catfish and tandan were sampled. The fish data now extends back more than 10 years and is being drawn in the Basin Plan interim evaluation, particularly to assess the targets in the Basin-wide environmental watering strategy.

The annual waterbird survey data was received. The flooding rain in spring 2016 coincided with the survey and waterbirds were spread across the Basin. As a result, abundances were generally low at the key wetlands surveyed, but there were widespread waterbird sightings and breeding had commenced. The breeding at the Macquarie Marshes has been followed all season by staff



Looking south west over farmland on the banks of the Murray River. Tol Tol, Victoria.

from NSW Office of Environment and Heritage, including 24-hour video cameras. Satellite tracking devices were also placed on some birds under the Australian Government Department of Environment's environmental water knowledge and research program.

Assessing interactions between water and the environment

The MDBA is developing a better foundation for assessing the hydrology of rivers and floodplains, and understanding how the Basin Plan is changing flows to benefit the environment. This includes collecting information about flows throughout the Basin, building new tools and using satellite imagery to better examine the interactions between water and the environment. These advances in knowledge and capability will support the interim evaluation of the Basin Plan by examining three ecologically important components of hydrology for the 2012–2017 period:

- » lateral connectivity – assessing the pattern of river flow and the connectivity between rivers and their floodplains
- » longitudinal connectivity – assessing how water flows through rivers, between catchments and ultimately to the sea
- » conditions of the Coorong, Lower Lakes and the Murray Mouth.

To help understand how the Basin Plan has contributed to these changes, the MDBA will explore how computer simulations (using river system models) are being applied to help approximate how river flows might have looked without the Basin Plan or water recovered for the environment.

The Joint Venture Monitoring and Evaluation program

The Joint Venture Monitoring and Evaluation program was established by the Australian and Basin state governments in recognition of a common monitoring need at regional, state and Basin level.

Now in its second year, the program includes native fish and vegetation projects that enhance current monitoring.

The projects are:

- » additional sampling in the Coorong

- » utilising fyke netting in Victoria and Queensland as part of the Murray–Darling Basin fish survey
- » field work as part of the Basin-wide stand condition tool development.

The program invested in projects that explored:

- » the need for reliable and accessible Basin-wide inundation mapping
- » developing a fish genetic monitoring program
- » establishing a Murray–Darling Basin acoustic receiver array to monitor fish movement, behaviour and distribution.

The review of state and Commonwealth requirements under the Basin Plan and opportunities for program investment was completed this year. A strategic review of the governance and investment criteria has commenced and will be completed early next year.

Monitoring at sites of high environmental value along the River Murray – 2016–17

Monitoring funded by the joint governments is conducted at individual sites as part of The Living Murray monitoring program. It includes:

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

Floodplain tree-stand condition monitoring (now in its ninth year – 2009–17) combines field measurements, satellite imagery and other data to calculate the condition of river red gum, black box forests and woodlands at target sites. This monitoring allows conditions across the sites to be compared, as well as changes within the sites and across the Murray system. This work has been adopted Basin-wide, with the first assessment to contribute to the interim evaluation.

Environmental water and works were used to extend the inundation of floodplain wetlands

and vegetation at Barmah-Millewa forest, Hattah Lakes and on the Chowilla floodplain. Early monitoring results indicate that the condition of vegetation improved across the system with some areas of the floodplain receiving water for the first time in 20 years. Environmental water also augmented natural flows to ensure waterbird breeding and native fish recruitment (life-stage) cycles were completed.

Each year, the owners and managers of environmental water report on how water has been used and on early indications of outcomes, noting that it can take some time for scientifically measured results to become available. Similarly, environmental watering carried out as part of The Living Murray program has shown signs of positive outcomes.

Managing salinity

The impact of increasing salinity has long been recognised as a significant issue in the Murray-Darling Basin. The MDBA continues to coordinate the response to the salinity threat through a

partnership with Australian and Basin state governments. Consistent effort by partners over the past 27 years has helped achieve the Basin salinity target at Morgan in South Australia, which aims to maintain salinity below 800 EC for 95% of the time, and has had a positive impact on river salinity levels (see Table 2.1 and Figure 2.4). Throughout 2016–17, salinity at Morgan was generally below 531 EC with a short lived peak of 732 EC (see Table 2.1).

Highlights from 2016–17

Following on from the approval of the Basin salinity management 2030 strategy (BSM2030) by the Murray-Darling Basin Ministerial Council in November 2015, the MDBA began implementation of the strategy. The achievements of BSM2030 implementation during 2016–17 include:

- » launching a video highlighting the achievements of successive salinity management strategies in the Murray-Darling Basin

Table 2.1 Summary of salinity levels (EC) recorded at Morgan, South Australia*

Period	Time interval	Average	Median	95 th percentile	Peak	% time >800 EC
1 year	July 2016–June 2017	361	382	531	732	0%
5 years	July 2012–June 2017	327	303	522	732	0%
10 years	July 2007–June 2017	368	344	625	768	0%
25 years	July 1992–June 2017	449	428	729	1,087	2%

* When hydrographically corrected data (mean daily values) are not available, operational data (readings taken at about 8 am each day) were used.

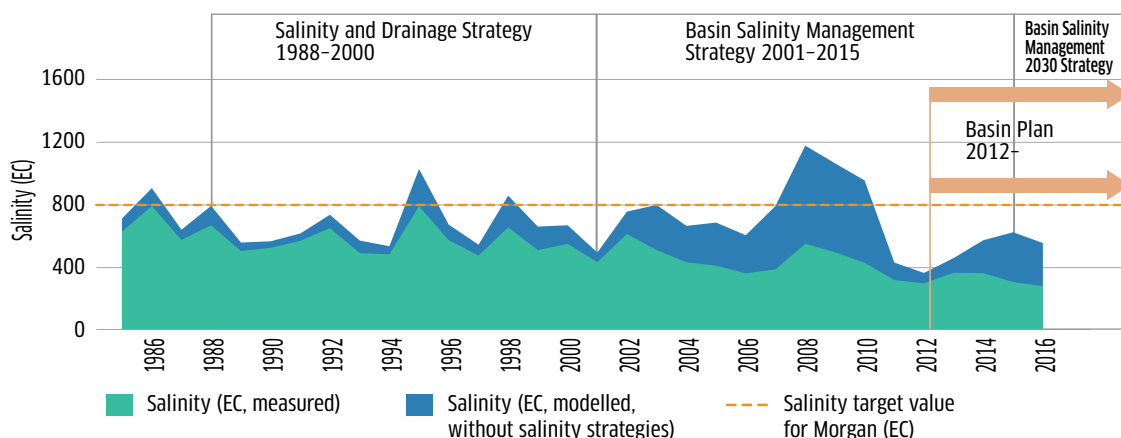


Figure 2.4 River Murray salinity at Morgan and impact of management strategies

River Murray sites

Joint environmental watering events involved the New South Wales Office of Environment and Heritage; the South Australian Department of Environment, Water and Natural Resources; the Victorian Environmental Water Holder; the Commonwealth Environmental Water Holder; and The Living Murray program across six sites. These events also benefited other key areas across the southern Basin and helped meet the 2016–17 Basin Plan watering priorities.



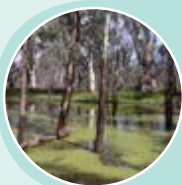
Barmah-Millewa forest

Moir grass growth in the Millewa floodplain, significant colonial waterbird breeding events and habitat for an estimated 200 Australasian bitterns. Also observed 230 pairs of royal spoonbills, 325 pairs of Australian white ibis, 430 pairs of straw-necked ibis, 65 pairs of eastern great egrets and little pied cormorants.



Gunbower forest

Improved wetland and floodplain vegetation condition following natural inundation. Improving Murray cod numbers in Gunbower Creek and forest through the targeted delivery of water through the creek over multiple years.



Koondrook-Perricoota forest

Improved condition of wetland and floodplain vegetation due to extensive inundation. Increased numbers of small-bodied native fish. Return flows from the forest provided nutrients and carbon to the River Murray. At Pollacks Swamp, an estimated 1,000 colonial waterbird nests were observed – the largest breeding event in over 25 years.



Hattah Lakes

Improved vegetation condition included inundation of black box communities at a higher elevation on the floodplain. Good numbers of large-bodied fish were observed in the lakes. A large scale waterbird breeding event occurred.



Chowilla floodplain

A positive response by riparian and floodplain vegetation including black box communities at higher elevations. High numbers of native fish species were detected across wetlands and the floodplains including golden perch, bony bream, carp gudgeon, un-specked hardyhead, Australian smelt and flat-headed gudgeon, with flows through the anabranch returning carbon and nutrients to the River Murray channel.



Lower Lakes, Coorong and Murray Mouth

At the Lower Lakes, improved health of fringing vegetation and animals occurred with colonial waterbirds nesting and the southern bell frog and threatened species (such as the southern pygmy perch and Murray hardyhead) detected. Significant all-year round flows through the barrages supported the migration of fish between the Coorong and Lower Lakes, with an estimated 1.5 million fish detected moving through the barrages. There was improvement in the cover and abundance of *Ruppia tuberosa* in the south lagoon.

Figure 2.3 Early results from environmental watering at sites along the River Murray

- » Basin Officials Committee endorsing the BSM2030 Review Plan which sets out the timing and frequency of reviews of salinity models and accountable actions on the salinity register
- » completing knowledge priority projects to reduce uncertainty about future salinity risks from past land clearing (pre 1988) and irrigation activities.

Salt interception

A significant achievement of salinity management in the Basin has been the commissioning of strategically located salt interception schemes to divert hyper-saline water from entering the River Murray system. In 2016–17, salt interception schemes diverted about 395,388 tonnes of salt away from the River Murray system, see page 64.

Registering the impacts of actions on salinity

Under the Basin salinity management strategy, 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 on

the register because they may increase salt loads to the River Murray. By comparison, actions such as commissioning salt interception schemes and improving irrigation practices may generate credits (a positive impact 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 state governments inform the MDBA about reviews of existing register entries and new activities that have significant salinity effects.

The MDBA calculates the salinity debits and credits of these activities and update the salinity registers. The summary of the registers is included in the BSM2030 status report. The 2016 salinity registers confirm 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). These outcomes were reported to the Murray–Darling Basin Ministerial Council and published on the MDBA website.



Saline water from Buronga salt interception scheme diverted for salt harvesting at Mourquong Basin.

River Murray water quality monitoring program

Under the Murray–Darling Basin Agreement, the River Murray water quality monitoring program was established in 1978 to monitor River Murray water quality changes on an ongoing basis. The MDBA, in partnership with Basin state governments, implements this program, which is unique in its coverage (2,500 km of the River Murray) and its duration (36 years and ongoing).

During the 2016–17 year, extensive sampling (mostly weekly) for physico-chemical properties was carried out at 28 sites and phytoplankton (including blue-green algae) was surveyed at 12 sites.

In 2016–17, River Murray water quality parameters in respect to recreation, irrigation and drinking water needs were within acceptable limits, except for short-term low dissolved oxygen at some

locations. There was a significant hypoxic (low dissolved oxygen) blackwater event that affected the River Murray and its tributaries (Edward, Wakool, Murrumbidgee, Neimur, Broken and Goulburn rivers) between October 2016 and January 2017, (Figure 2.5).

The data collected, particularly during the blackwater event will be crucial in further investigations on the causes of the event and determining management options.

Under the Murray–Darling Basin Agreement, the Basin state governments or any public authority need to refer any development proposals that may significantly affect the flow, use, control or quality of River Murray water to the MDBA for assessment. During 2016–17, the MDBA received 37 proposals from various councils within the Basin. None of the proposals had a significant impact on the quality and quantity of River Murray water.

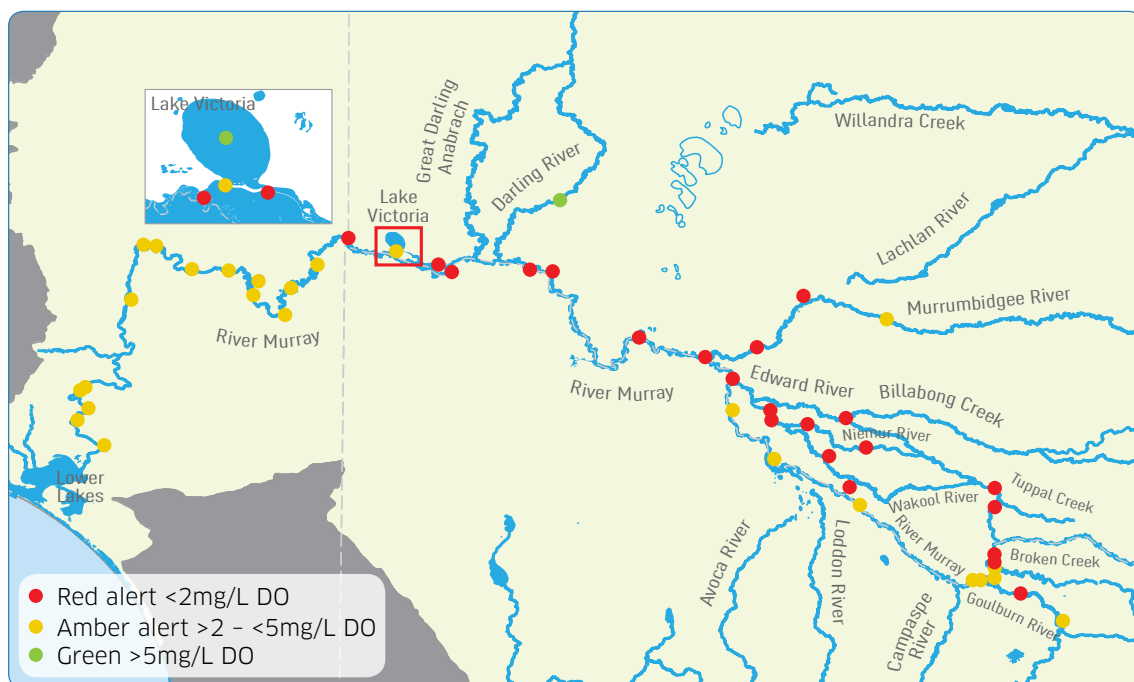


Figure 2.5 Hypoxic (low dissolved oxygen) blackwater.

Data used for this map is between 15 October 2016 and 1 January 2017. The lowest dissolved oxygen (DO) is shown in this map. The location of alert levels in this map are indicative only and not to scale. DO levels shown in South Australia were measured after agitating the samples hence, DO concentrations within the river may be lower than the recorded value.

Sources: Goulburn Murray Water, SA Water, WaterNSW, Goulburn Broken CMA.

Challenges and the year ahead

The interim evaluation will be a wide-ranging assessment that looks in detail at the social, economic and environmental outcomes of the Basin Plan so far. It will draw on data and evidence from a wide range of sources and involve extensive consultation and engagement with key stakeholders, including partner governments, community representatives and

industry experts. The MDBA is confident in the robust nature of the evaluation approach. However, it will be challenging to discern the effects on the social and economic conditions in the Basin, from other drivers of change. Further, restoring the environmental health of the Basin will take time. At this early stage of implementation, the MDBA is focused on finding the initial signs of ecological response.

Case study: Hypoxic blackwater in the River Murray 2016–17

The 2016–17 blackwater event was notable for its severity and whole-of-system impact. Widespread flooding transported organic materials from the floodplains to the rivers. Some floodplains saw water for the first time in decades.

Blackwater is a natural environmental response and is an essential part of the ecology of lowland river systems. Such events have been reported for the Murray and its tributaries before river regulation. Floods and associated blackwater occurrences are beneficial to the floodplain forests and wetlands. The carbon and other nutrients transported to the river are a vital food source for crustaceans, aquatic plants and insects that in turn support the native fish population.

The organic material in the water is oxidised by bacteria. Under certain conditions, a large amount of the oxygen in the water is used and results in critically low levels of dissolved oxygen (DO). These events are known as hypoxic blackwater events.

The 2016–17 event was exacerbated by higher water temperatures which increased biologic activity and the rate at which bacteria consumed oxygen from the water. This resulted

in a hypoxic blackwater event. Significant fish deaths were reported in the Murray downstream of Wakool junction to South Australia and in the Murrumbidgee, Edward, Wakool, Broken and Goulburn rivers. Large-bodied native fish (e.g. Murray Cod) require at least 2 milligrams DO per litre in the water to survive, but may begin to suffer at levels below 4–5 milligrams DO per litre.

The MDBA closely monitored the situation and worked with the Commonwealth Environmental Water Office and Basin state government authorities to develop solutions, including the creation of refuges for fish, by delivering good quality water in targeted parts of the effected rivers. For example, from early November releases from Lake Victoria were used to create a fish refuge by improving water quality in the Rufus River.

Localised solutions (such as enhanced aeration) were tried in a few locations in the Wakool and Edward rivers. Such interventions were found to be less effective in reducing native fish mortality compared to good quality water releases.

STRATEGIC GOAL 4

Operate the River Murray system efficiently 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, as well as benefits the communities and industries that depend on it.

Highlights

- Continued to plan and direct the operation of the River Murray to ensure the equitable and efficient sharing of the water resources.
- Transparently determined state water entitlements in accordance with the Murray-Darling Basin Agreement.
- Operated the River Murray system to manage the impacts of significant flooding resulting from one of the wettest Septembers on record.
- Constructed five new fishways at the Lower Lakes barrages.
- Constructed and installed equipment to enable refurbishment of the 50 tonne Dartmouth Dam coaster gate.

Overview

Following consecutive years of below-average rainfall and above-average temperatures, the year began with storages of 2,300 GL below the long-term end of June average of 5,500 GL. A significant turnaround to wetter conditions saw above-average winter and spring rainfall in the Murray catchment, resulting in substantial inflows to the River Murray system (in the highest 14% of historic inflows). Significant flooding occurred in many locations across the Murray-Darling Basin, including the River Murray where flood levels for some sites were the highest in 20 to 40 years.

Opening water allocations were low, reflecting the low water availability at the start of the year. However, the significant inflows and improvements in storage levels saw Murray allocations increase steadily to reach 100% in New South Wales, Victoria (except for Low Reliability Water Share) and South Australia.

A large amount of rain fell in September 2016 so managing the airspace at Hume Dam quickly transitioned to flood operations, with inflows climbing to around 75,000 megalitres (ML)/day, before reaching rates of around 110,000 ML/day in early October. This was the most significant flood in this part of the Murray since 1993. Downstream in the Edward-Wakool system, the water levels at some locations were the highest since 1975.

In the following weeks the flood peak progressed downstream so that ultimately a peak of around 94,500 ML/day passed into South Australia in late November – the highest flow since 1993.

After a number of delays caused by high river flows and to prevent further erosion of the river bed, work to place rocks in the river channel immediately downstream of the Euston weir was completed. A purpose-built barge is used across the River Murray program for this type of work.

Preparations were completed to enable the refurbishment of the 50 tonne coaster gate at Dartmouth Dam. This included fabricating a special purpose trolley and the installation of rails to allow the gate to be moved into position so it can be disassembled, inspected and repaired. Refurbishment of the coaster gate now awaits the next opportunity when the storage level is low enough for the gate to be taken out of service.

At the Lower Lakes barrages, five new fishways were constructed to allow fish to move between the Coorong and Lake Alexandrina. These new fishways provide a number of paths for fish to move upstream. This is critical to the breeding cycle for several species including the threatened Lamprey, some of which have been observed to travel more than 2,000 kilometres from the Murray Mouth to Hume Dam.

Maintaining and improving River Murray infrastructure

The structures that are managed and maintained by River Murray Operations include Hume and Dartmouth dams, Lake Victoria, 14 weirs (with 13 locks), barrages at the Lower Lakes, 13 salt interceptions schemes and a range of regulating structures to support environmental watering. The structures 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 governments, the MDBA manages the River Murray Operations structures in accordance with the functions, powers and duties set out in the Murray-Darling Basin Agreement. The State Constructing Authorities appointed by state governments to carry out investigation, design, construction, operation, maintenance and renewal of River Murray Operations assets, are:

- » WaterNSW. The New South Wales Department of Primary Industries – Water (DPI Water) carry out work relating to salt interception schemes, river improvement, water quality monitoring, and land management.

Management of the hydrometric network in NSW was transferred from DPI Water to WaterNSW mid-year.

- » Goulburn-Murray Water, Victoria.
- » South Australian Minister for the River Murray, including the operating agents South Australian Water Corporation (SA Water) and the South Australian Department for Environment, Water and Natural Resources.

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 resolution.

The Environmental Works and Measures Program

The Environmental Works and Measures Program aims to improve the health of the River Murray system by building and operating water management structures that deliver and manage environmental water at important target sites, see page 42. Major structures have been constructed and tested at six locations to assist in delivering water to environmentally significant areas.



Mildura Lock and weir in Mildura, Victoria.

Complementary environmental works

We provide support and input to other environmental works programs that impact on River Murray assets. Work has progressed on the \$155 million Australian Government funded South Australian Riverland Floodplain Integrated Infrastructure Program (SARFIIP), to improve the health of the River Murray below locks four and five. Structures built under SARFIIP will use the level of the weir pools to direct water onto the floodplains. In 2016–17, construction of the Margaret Dowling regulator was completed. Construction of a new regulator to replace the Bank J block bank neared completion. Design work also progressed for the major floodplain inundation and salinity management components of the program.

Improving the physical assets base

Hume Dam

Detailed studies of the embankments continued throughout the year to better understand how the earth and concrete elements interact. 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 priority and extent of further upgrade works. This activity is part of our ongoing program to ensure all major infrastructure is managed in accordance with contemporary engineering practices.

Dartmouth Dam

The annual dam safety inspection of Dartmouth Dam in May 2017 confirmed that the dam and associated infrastructure is in good condition, well maintained and performing as expected. 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.

Lake Victoria

The protection of cultural heritage in accordance with the Aboriginal Heritage Impact Permit (AHIP) continued to be a major focus of water management and on-ground works at Lake Victoria in 2016–17. The lake continued to be operated in accordance with the Lake Victoria Operating Strategy, which aims to provide annual variability in lake levels to promote the growth of spiny sedge and other riparian vegetation

which stabilise the shoreline and assists to protect cultural heritage sites.

The lowering of the Lake in April 2017 provided ideal conditions for the annual inspection by representatives of the Barkindji and Maraura Elders Council (BMEC), the Scientific Review Panel, the Lake Victoria Advisory Committee, SA Water and the MDBA. This on-ground inspection as well as the aerial (drone) monitoring program confirmed that the north-east shoreline continues to be the highest risk for disturbance to cultural heritage. This is an area where spiny sedge has not been able to establish and the shoreline remains prone to wind and wave erosion. Further field inspections by the Barkindji and Maraura Traditional Owners and SA Water revealed additional burials in this area that have since been protected by approved works.

In 2016–17, the MDBA signed a protocol with partner governments to assist the efficient and effective implementation of cultural heritage conservation measures on MDBA-managed land just outside the Aboriginal Heritage boundary. The protocol demonstrates a commitment by the MDBA and partner governments to consult and work closely with the Barkindji Traditional Owners and the Tar-Ru Lands Board (which now manage the former State Forest land to south-east of Lake Victoria), as well as maintaining a longstanding commitment to the Barkindji and Maraura through the AHIP. Partner governments also have five dedicated Aboriginal positions to undertake and co-ordinate cultural heritage protection measures at the lake.

Locks and weirs

The routine activity of planned maintenance at each lock and weir continued this year without major issue. The significant flooding along the river in late 2016 required each of the weirs to be stripped to pass the high flows. This provided opportunity to inspect and repair the steel components of the navigable passes that are submerged during normal operation. Some of these components have been in service for more than 10 years. The modern paint coatings used on these assets continue to perform well with only minor repairs being required.

When the floods receded, a range of reinstatement works were required to manage debris deposited by floodwaters and to repair erosion caused by high flows. This is a normal part of working in a dynamic river environment.

Hume to Yarrawonga river reach

The Hume to Yarrawonga works program continued in 2016–17, including repairs following the floods of spring 2016. This included repairs to rock beaching, bridge abutments and fencing, planting 15,000 tube stock and re-planting 600 cubic metres of *Phragmites* rhizomes. Although these repairs required about 40% (\$650,000) of the annual budget provided for this reach, the vast majority of river works performed well during the flood.

Other works in the reach included the placing of 522 logs across 11 sites and rock repairs to a number of sites where excessive vessel wash had undermined existing log revetment. A large in-channel deflector structure was also constructed at the offtake to Dights Creek to help to direct flows down the River Murray's main channel. In conjunction with the engineered log jam, the aim is to reduce the chance of Dights Creek becoming the main flow path.

Dredging 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.

Along with South Australia, the MDBA routinely monitors the build-up of sand at the Murray Mouth. In late 2014, so much sand had settled that it was likely that without intervention the connection between the Coorong and the sea would drop below the level needed to maintain a healthy system. There was also the possibility that the mouth would close altogether.

Dredging began in January 2015 and has continued. Two dredges have operated for most of the time and more than 2 million cubic metres of sand has been dredged from within the mouth and pumped to the beach where it is dispersed by the breaking waves. The dredging has helped to maintain the exchange of water between the Coorong and sea above the target level.

With favourable weather conditions and increased flow over the barrages, one of the two dredges

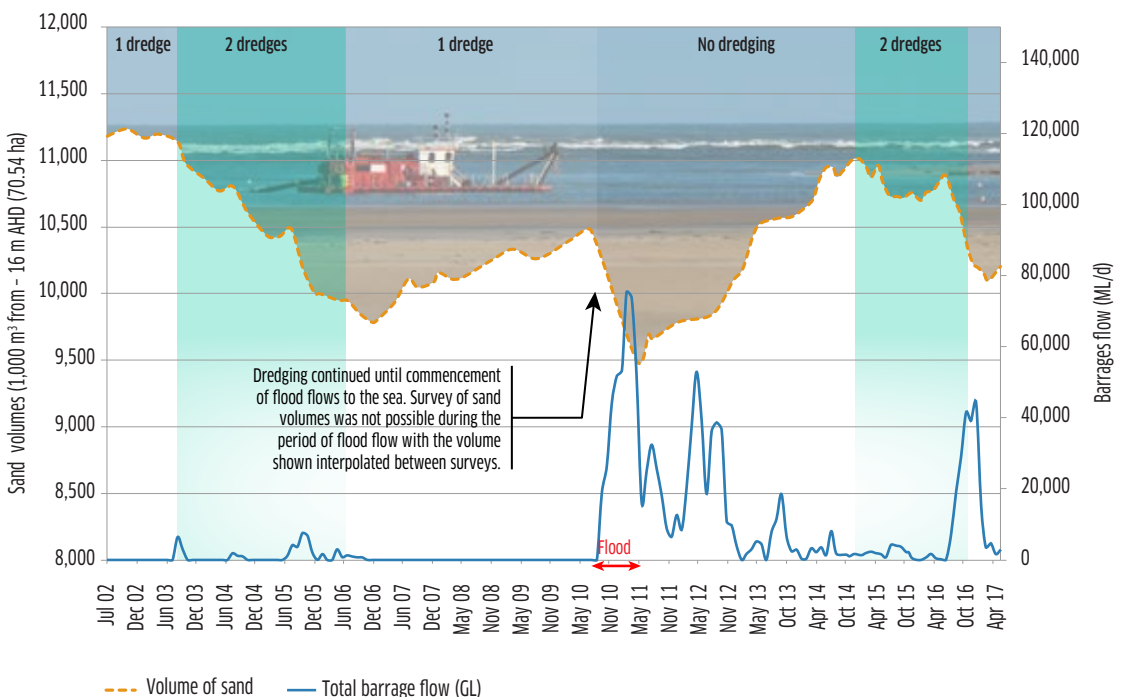


Figure 2.6 Murray Mouth sand volume and flow to sea



Dawn at Lake Victoria

was stood down and work continued with a single dredge for most of the year. Open channels were able to be maintained although sand continued to build up around Bird Island. Floods originating in the upper Murray catchment meant that from late September dredging was scaled back to areas that floodwaters were not expected to scour. Although the flood waters scoured a large volume of sand from the river's mouth, it was necessary to recommence dredging soon after the flood had passed.

Reducing bank erosion along the Mitta Mitta River

In 2016–17, the Mitta Mitta River works program continued to focus on erosion and other channel capacity issues as a result of the high volume of water transferred between Dartmouth and Hume Dams in 2015–16. The relatively dry conditions and low flows in autumn 2017 enabled work to be undertaken at eight sites. There was also an extensive control program of young willow trees in the upper section of the Mitta Mitta, with the aim to reduce the spread of this weed species and reduce the risk of future channel capacity issues.

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 budget in meeting the program.

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 J S Collings, the Minister for the Interior from 1941 to 1945 and President of the River Murray Commission at the time. The major dams and barrages have only been eligible for the award since 2003.

The award is keenly contested along the length of the river, and the 2016 winner was Weir and Lock 5 (Paringa). The award recognised the efforts of the local Weir staff in renewing the public spaces after several years of major upgrade works, as well as exemplary maintenance of the asset. Weir and Lock 5 is managed by SA Water, as the state constructing authority.

Delivering water

Agreed water shares delivered to the states

The following key actions are carried out to deliver agreed water shares in the River Murray system to the states, including during extreme conditions:

- » regularly assess the water resources of

the River Murray system to determine the volume of water available to New South Wales, Victoria and South Australia

- » operate structures under the control of the MDBA and determine and review procedures for their efficient and effective operation
- » establish, operate and maintain a system of continuous monitoring of the volumes and quality of stored water, and of flows in the River Murray and from its tributaries
- » liaise with state and Australian Government authorities on matters related to the River Murray system to provide an up-to-date and comprehensive flow of information.

Rainfall and inflows

Rainfall in 2016-17 was above-average across most of the Basin and it was significantly wetter than 2015-16 (the wettest year Basin-wide since 2011-12). The northern Victorian catchments that flow into the Murray received substantial above-average rainfall in 2016-17. The upper Murray region that provides runoff to the major headwater storages of Dartmouth

and Hume storages also experienced above-average rainfall.

Rainfall during winter and spring was also above-average. September rainfall was the highest on record for the Basin and the second wettest September on record for Australia. The majority of the rain in October fell within the first half of the month. Persistent rainfall on already wet catchments resulted in significant stream flows and major floods in some areas.

In the northern Basin, the upper Darling catchments received average to above-average rainfall in 2016-17. This was in contrast to previous years when the expected summer wet seasons did not occur. The three years preceding 2016-17 resulted in the lowest inflows on record for the Menindee Lakes – lower than the previous record low inflows recorded during the recent Millennium Drought in 2016-17, the Menindee Lakes started with very low levels in storage. Above-average rainfall in the northern Basin resulted in significant flows in upstream tributaries and inflows to Menindee totalled approximately 1,770 GL.

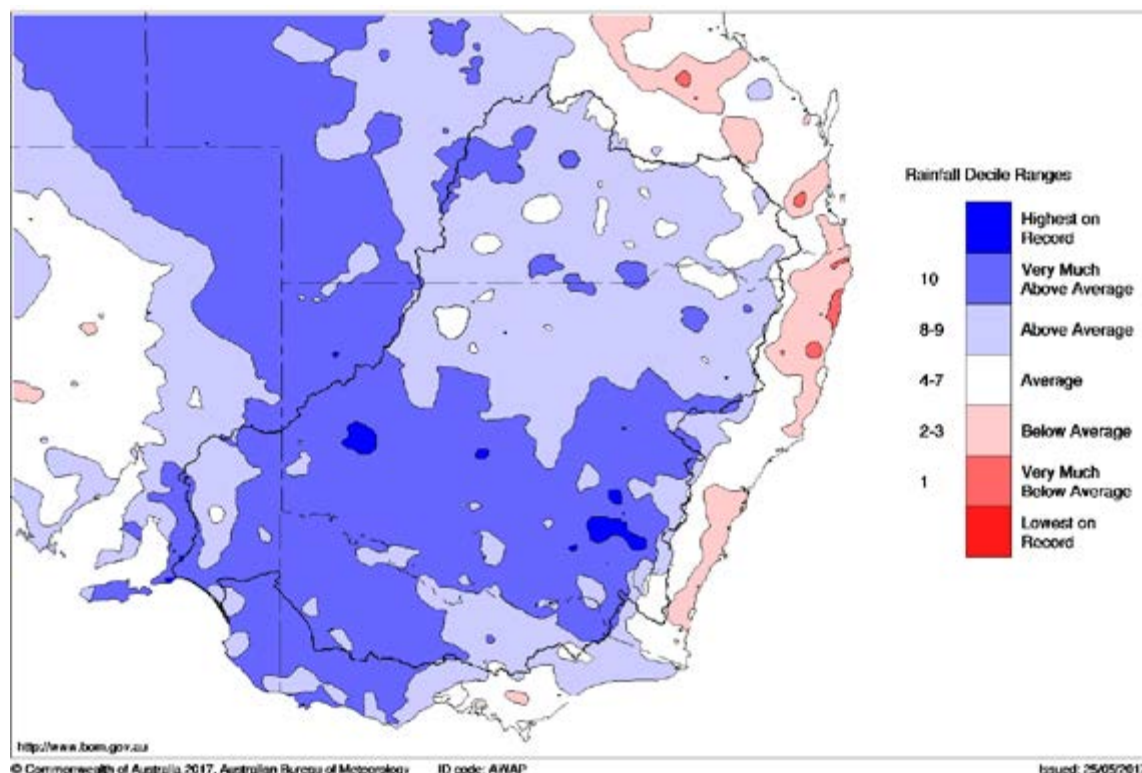


Figure 2.7 Murray-Darling Basin rainfall deciles 1 July 2016 to 30 June 2017 (courtesy Bureau of Meteorology)

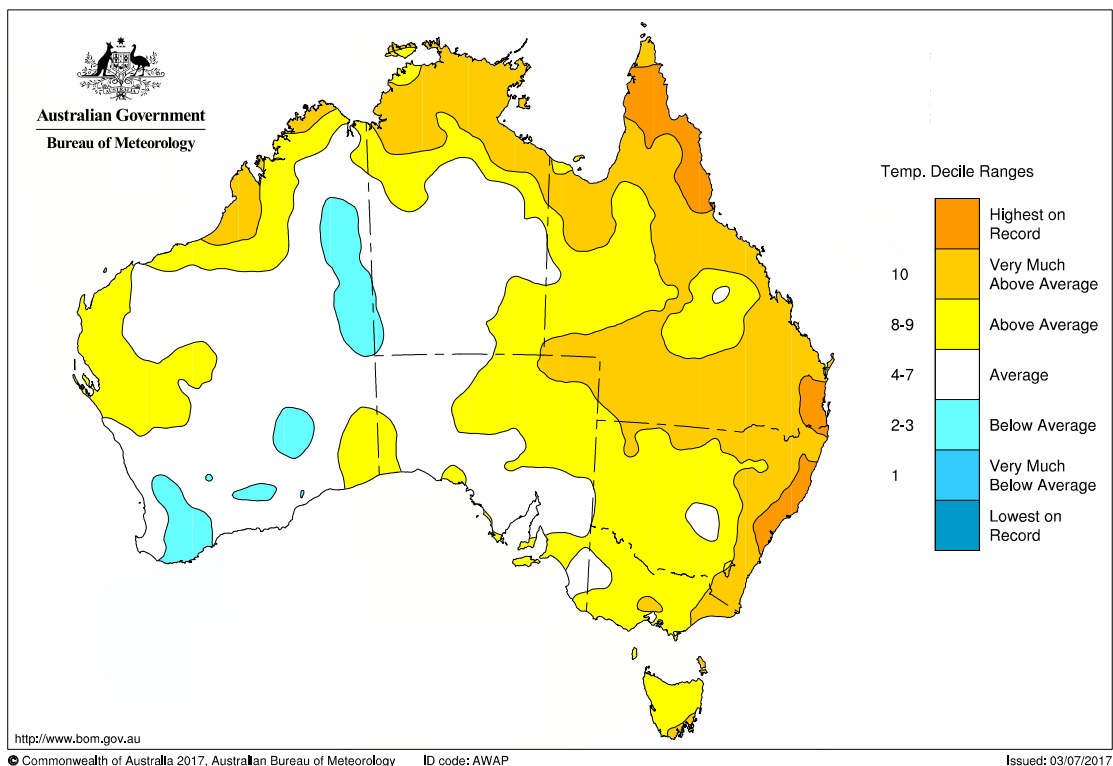


Figure 2.8 Murray-Darling Basin mean temperature deciles from 1 July 2016 to 30 June 2017 (courtesy Bureau of Meteorology)

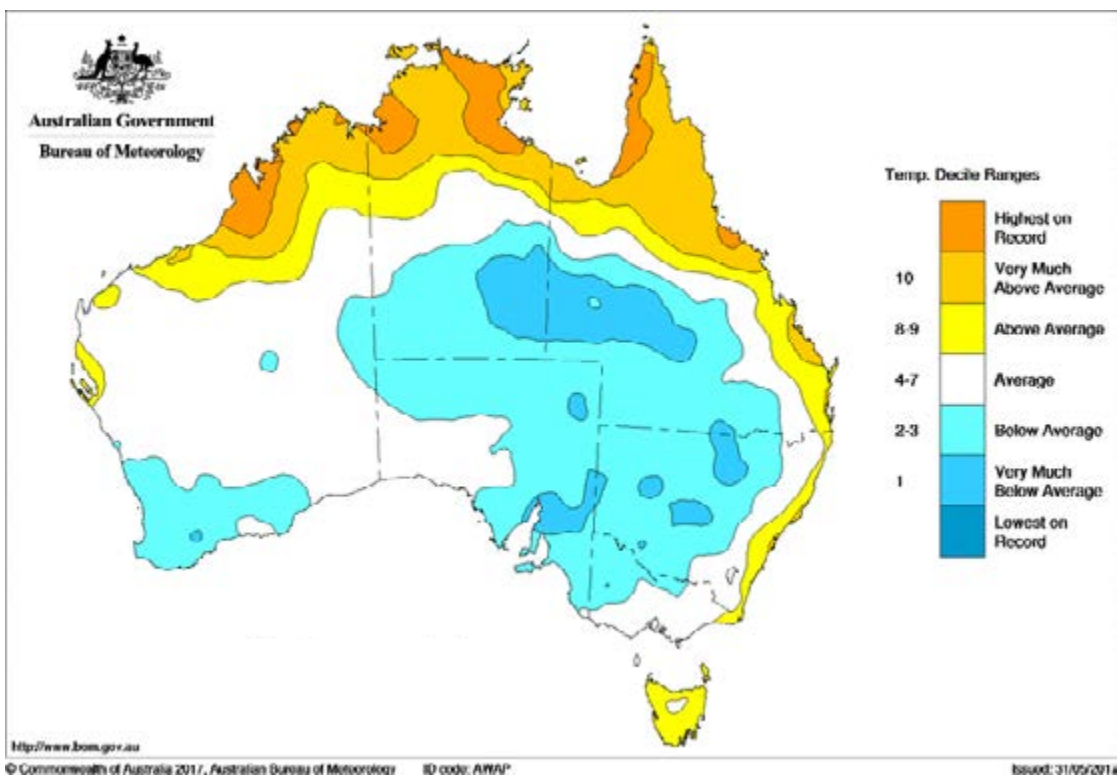


Figure 2.9 Murray-Darling Basin mean temperature deciles from 1 September to 30 November 2016 (courtesy Bureau of Meteorology)

Annual average temperatures across the Basin ranged from above-average to very much above-average. Notably, spring temperatures were below average to very much below-average, Figure 2.9. Hot and dry conditions returned to the Basin in late spring and summer. Average temperatures were generally higher with some areas of central New South Wales and southern Queensland experiencing the highest average temperatures on record.

Overall, the River Murray system inflows during 2016–17 (including inflows to Menindee Lakes, but excluding the Snowy Mountains Scheme, inter-valley transfers and environmental water inflows) totalled 16,120 GL, Figure 2.10. This is almost twice as much as the long-term average of 9,285 GL and in the highest 17% of records. By comparison, total River Murray system inflows during 2015–16 were around 3,570 GL.

Active storage

Active storage is the water held in a reservoir above the level of the water outlet and can be released. At the beginning of the year, MDBA active storage was approximately 2,551 GL (30% capacity) – around half the long-term average level of 5,500 GL.

Significant rainfall in winter and spring 2016 resulted in substantial inflows to River Murray system storages. Water storage in Hume Reservoir was 1,180 GL

(39% capacity) at the start of the year, however, inflows throughout the year saw the storage reach effective full supply level (99%) in late October. Dartmouth reservoir storage level was 1,804 GL (47% capacity) at the beginning of the year and on 30 June 2017 Dartmouth storage was 3,016 GL (78% capacity).

The Menindee Lakes also received significant inflows in 2016–17. The storage level on 1 July 2016 was only 2.7% but substantial rainfall in the northern Basin saw the level in Menindee Lakes increase to 91% in December 2016. The lakes were available to meet River Murray system demands from 21 October 2016. Storage in Menindee at 30 June 2017 was 772 GL (45% capacity).

A return to drier conditions over summer and autumn increased system demands and storages helped to meet this demand. On 30 June 2017 the total MDBA active storage was 5,645 (66% capacity). This is around 115 GL more than the long-term average.

State water shares

South Australia again deferred a portion of its entitlement flows in 2016–17 for later use. Under schedule G of the Murray–Darling Basin Agreement, South Australia may defer some of its entitlement flow, which is then stored in River

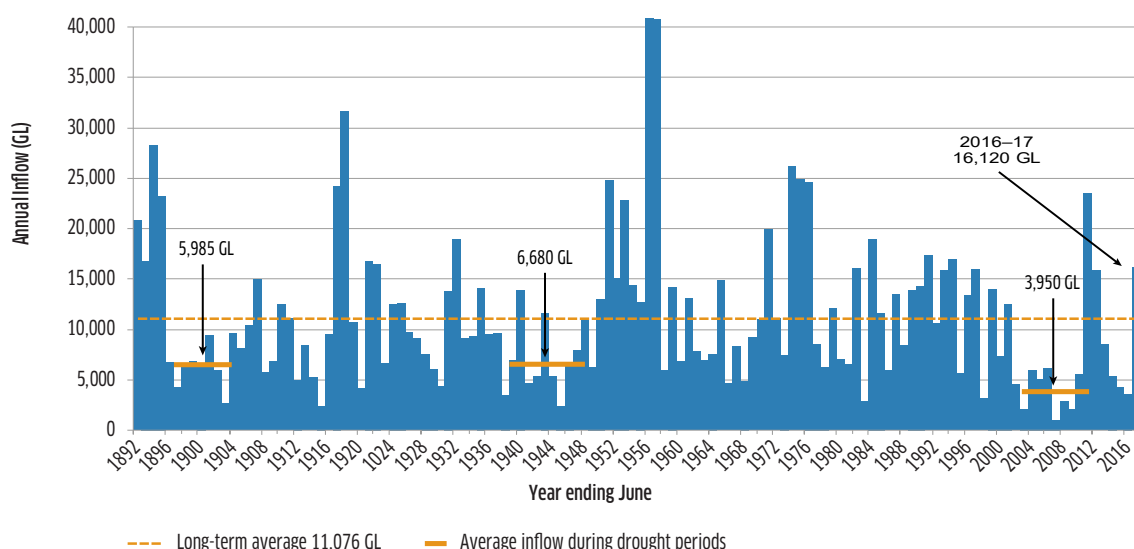


Figure 2.10 River Murray system annual inflows (including inflows to Menindee Lakes, but excluding release from the Snowy Mountains Scheme, inter-valley transfers and environmental water inflows) since 1892, assuming modelled current conditions

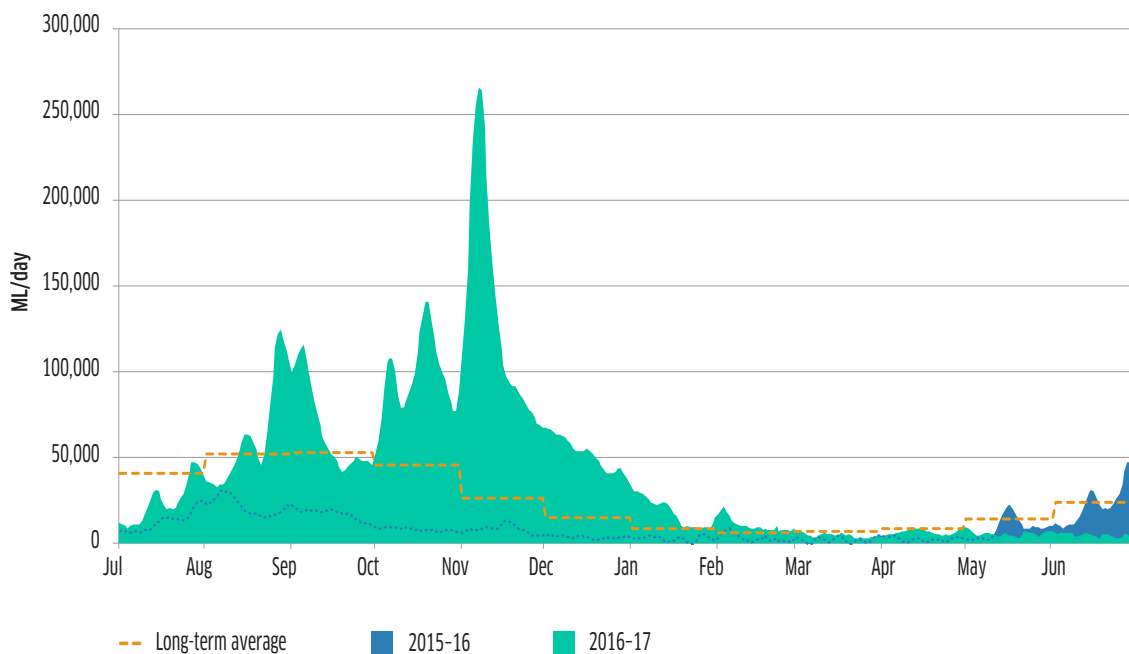


Figure 2.11 Inflows to River Murray (excluding Snowy, Darling, inter-valley trade and environmental inflows)

Murray storages under specific provisions, in order to build a reserve for critical human water needs and private carryover. South Australia used these provisions to defer 92.1 GL of entitlement in 2016-17. In July 2016, 57.7 GL spilled from Lake Victoria due to unregulated flows and was delivered to South Australia. In September, 9.7 GL spilled from Hume Reservoir, and in May 2017 a further 66.9 GL spilled from Lake Victoria, due to widespread rain. In all cases, the water spilled was delivered to South Australia in accordance with Schedule G.

State water shares in MDBA storages at the beginning and end of 2016-17 are shown in Table 2.2. The following volumes were also available for use in the River Murray in 2016-17:

- » about 175 GL of water in inter-valley transfer accounts in the Murrumbidgee and Goulburn valleys
- » 502 GL of River Murray Increased Flow environmental water (stored in the Snowy Mountains scheme)

Table 2.2 Water shares for New South Wales, Victoria and South Australia – end of June 2016 and June 2017

Storage	Storage at end of June 2016 (GL)				Storage at end of June 2017 (GL)			
	NSW	Vic	SA	Total	NSW	Vic	SA	Total
Dartmouth Reservoir	623	1,037	142	1,802	1185	1690	141	3016
Hume Reservoir	568	585	10	1,162	837	1273	0	2109
Lake Victoria	165	215	58	438	212	204	9	425
Menindee Lakes	48	0	0	48	516	253	0	769
Total	1,404	1,837	209	3,450	2750	3419	150	6319

- » 225 GL of water in the River Murray drought account. The drought account is a reserve held in the Snowy storages that the states can call on to supply critical human water needs in times of severe shortage.

State water allocations diversions and carryover

The year began with relatively low water availability and this was reflected in opening allocations. Water availability improved significantly as the year progressed as a result of above average rainfall and inflows in winter. Opening allocation in 2016–17 for South Australian entitlement holders was 36%. This was low compared to recent years and 2016–17 was the first year since 2011–12 that South Australian allocations opened at less than 100% entitlement. However, allocations increased quickly and reached 100% by the start of September.

Although opening allocations were low, water availability was strengthened by relatively high levels of carryover. Average carryover in the NSW Murray at the start of 2016–17 was 30%. Average carryover in Victoria at the start of 2016–17 was 38% for Murray high reliability.

In Victoria, Murray Valley high reliability water shares opened with an allocation of 1%, compared with a starting allocation of 35% in the previous year. These allocations steadily improved and reached 100% on 17 October 2016. Victorian low reliability water shares opened with 0% allocation and finished the season with 5% allocation.

Allocations for New South Wales Murray Valley high security water shares started at 97%, while NSW Murray general security access license holders started at 4% allocation. NSW general security allocation steadily improved and reached 100% by mid-November 2016, boosting large inflows into Menindee Lakes. Lower Darling high reliability allocations opened with 20% allocation, and reached 100% by 15 November 2016.

Total water diversions (not including environmental water) during 2016–17 for Victoria, New South Wales and South Australia were around 2,950 GL. This was relatively low given high allocations, with the

wet conditions suppressing usage over the early parts of the season. Consequently, large volumes of carryover remained at the end of the season. In the NSW Murray, estimates suggest that 64% of water users may have at least 45% carryover, with 73% of water users having at least 25% carryover (maximum carryover is 50%).

Delivering environmental water

Delivering environmental water is a relatively new challenge for the MDBA and partner governments. In exercising the operational functions under the Murray-Darling Basin Agreement, MDBA staff play an important role in coordinating the delivery and accounting of environmental water across the River Murray system. We work closely with partner agencies in Victoria, New South Wales and South Australia to ensure the best outcomes can be achieved across the southern connected system. The water management tools, policies and procedures – which evolved largely before the additional focus on environmental water delivery – are being reviewed and renewed to meet current and future requirements.

During 2016–17, the MDBA delivered a large volume of environmental water held by the Basin state governments, The Living Murray and the Commonwealth Environmental Water Holder to achieve a range of environmental outcomes.

Environmental water delivery was closely coordinated with river management operations at many sites in the southern Basin. Releases from Hume Dam provided base flows to the Murray and environmental flows to multiple sites such as the Barmah-Millewa forest and the Edward-Wakool system. Hume releases were also coordinated with Goulburn River flows to provide an ecological trigger for fish to move from the mid-Murray reaches into the Victorian tributaries as environmental pulses arrived.

Environmental water from Victorian tributaries provided flows for the Broken, Campaspe and Goulburn rivers and was used to support sustained flows to Gunbower Creek throughout the year.

Pumping of environmental water increased water levels in Hattah Lakes before the flood arrived and inundated higher areas of the wetlands. The Chowilla infrastructure allowed inundation of the

Chowilla floodplain prior to the flood's arrival, enabling a more natural inundation period.

In the lower Darling, environmental water provided increased flows downstream of Weir 32 to support golden perch movement between the Darling River (upstream of Menindee Lakes) and the Murray. Water was also delivered to the Great Darling Anabranch.

In combination, these environmental watering actions resulted in a total of 900 GL of environmental water being delivered to South Australia, providing benefits all the way to the Murray Mouth.

The MDBA continued to support the variation of weir pool levels to achieve a more natural wetting and drying cycle for the riverine environment. The weir pools raised and lowered included locks 7, 8 and 15. Torrumbarry Weir pool was also lowered and South Australia managed their weir pool variation trial for locks in the lower Murray. Further weir pool variations are planned for the River Murray system in 2017–18, to continue the work of making weir pool variations 'normal business'.

Throughout the year, we provided technical advice, coordination and accounting to

environmental water holders and managers, to achieve their desired outcomes throughout the southern Basin.

Flow to South Australia

South Australia began the year with its full entitlement of 1,850 GL for the sixth consecutive year. Additional Dilution Flow (ADF) of 3,000 ML/day was added to South Australia's entitlement while the combined storage volume of Hume and Dartmouth remained above 2,000 GL, and the total volume stored in the Menindee Lakes remained above the monthly trigger levels. Additional dilution flow is designed to provide flows to improve water quality in South Australia without jeopardising the overall availability of water to the southern states. While additional dilution flow was required to be added to South Australia's entitlement in December, additional releases from storage were not required to meet additional dilution flow until the end of unregulated flows in the River Murray (31 December). Until this time, floodwaters fully met the obligations to supply these volumes.

South Australia's annual entitlement flow was boosted during the year by delivery of around 740 GL of environmental water for testing of the Chowilla regulator and to provide environmental

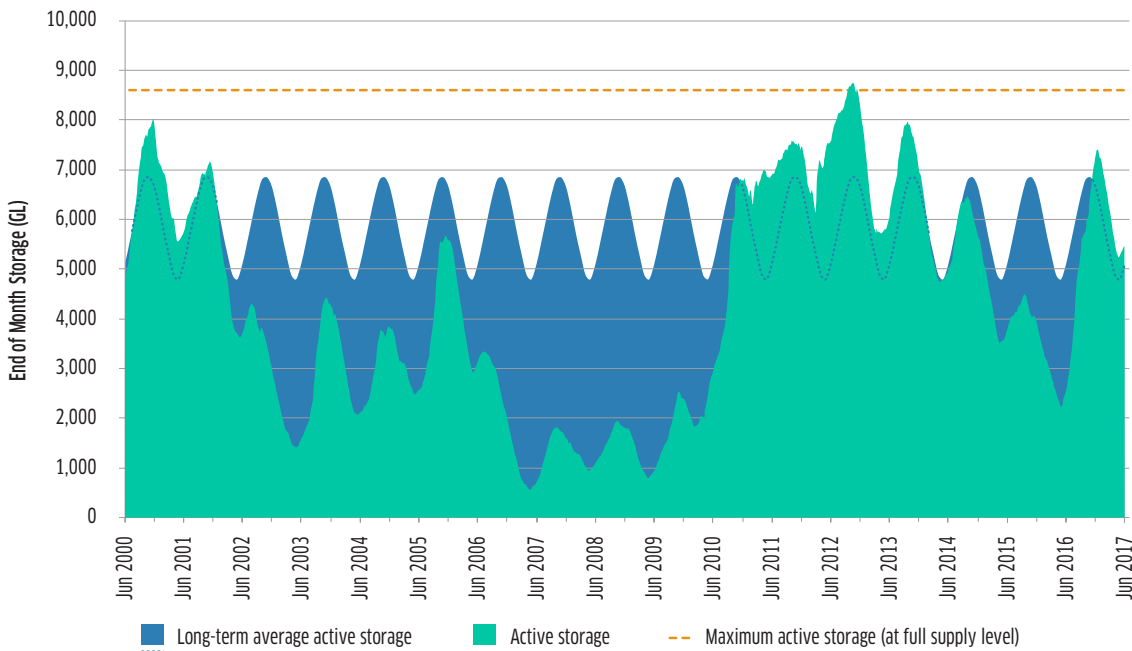


Figure 2.12 MDBA active storage June 2000 to June 2017

outcomes to the Coorong and Lower Lakes, compared with 810 GL in 2015–16.

The total annual flow across the South Australian border (including environmental water and traded water) was about 9,245 GL (highest 23% of records) compared with 2,490 GL (lowest 22% of records) in 2015–16 and the long-term median of 4,812 GL (based on modelling the current level of development).

Murray component of the Snowy Mountains scheme

The Snowy scheme's terms of operation are defined in the Snowy Water Licence. This sets a minimum release that must be achieved by the licensee (Snowy Hydro Limited) over the course of the Snowy scheme's water year, which runs from 1 May to 30 April. The required annual release volume may change during the Snowy water year and Snowy Hydro Limited can release volumes in excess of the required release.

In the 2016–17 water year, Snowy Hydro Limited entered into a special arrangement with

irrigators to advance releases of up to 200 GL for irrigation use and to increase the volume of optional advance releases available to Snowy Hydro Limited.

The required annual release at the start of the 2016–17 Snowy water year was 171 GL, incorporating a dry inflow sequence volume reduction of 608 GL and a 198 GL reduction for water pre-released in 2015–16. The dry inflow sequence volume is a measure of how much the inflows to the Snowy scheme are below the level required to ensure a reliable supply through a repeat of drought conditions, and reduces the release obligation.

In August 2016, irrigators confirmed 'exercised options' totalling 58 GL of future release water to be advanced in 2016–17. During the course of the year, inflows recovered sufficiently so there was no dry inflow reduction in releases and the 58 GL advance to irrigators was fully repaid. Following water releases from Hume Dam, the release rules contained in the Snowy Water Licence were triggered, requiring an

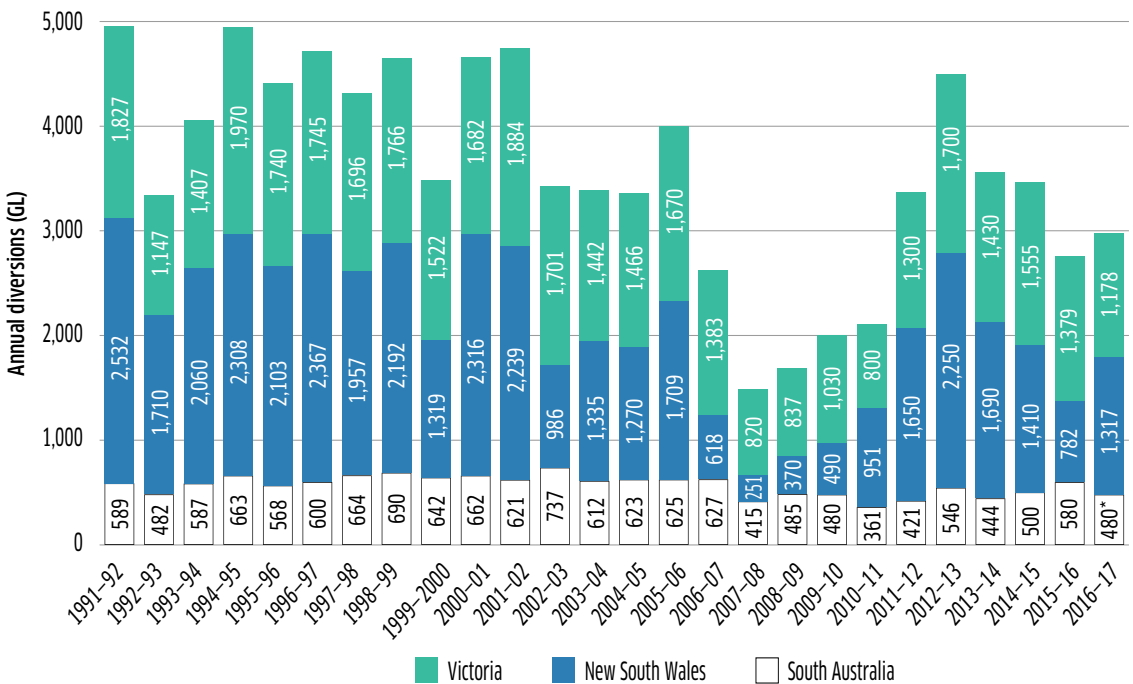


Figure 2.13 State diversions River Murray system (not including environmental water) 1991-92 to 2016-17. (Diversions include the lower Darling and any inter-valley trade received by a state. 2016-17 figures are indicative only and may change as updated data becomes available.)

* South Australian figures are provisional and subject to confirmation as part of section 71 reporting.

additional release of around 170 GL (the exact volume is still to be determined). The end of year required annual release of 950 GL.

The 2015–16 accounted release to the Murray was around 1,470 GL. The flexibility arrangements contained in the Snowy Water Licence allowed Snowy Hydro Limited advance releases (flex) for up to 330 GL – the special arrangements in 2016–17 allowed for an additional 200 GL of flex. Consequently, the 1,470 GL released comprised: the 2016–17 required release; more than 500 GL advanced release of 2017–18 water; and a small volume of ‘above target water’ which is released at the discretion of Snowy Hydro Limited, in excess of mandated requirements.

The Drought Reserve is a maximum 225 GL held in Snowy storages that will be used to increase releases to the Murray in periods of extreme shortages. There was 215 GL held in the reserve at the end of 2015–16. During the course of 2016–17, 10 GL was added to the Drought Reserve bringing it to a maximum allowable volume of 225 GL.

The River Murray Increased Flows (RMIF) in Snowy Storages continues to build, reaching 502 GL in the 2016–17 water year. This year, for the first time, RMIF was made available on the Murray through substitution, where environmental managers are able to call on existing resources in Hume in return for transferring to state water resource managers the right to call on that volume from the Snowy Scheme.

The substitution approach provides environmental managers with increased flexibility in managing RMIF and allows states

to build ‘callable reserves’ in the Snowy scheme for the benefit of all entitlement holders.

Operating the River Murray system

Overview of flood operations

The winter and spring of 2016 was notable as being one of the wettest on record for the Basin, however, this was in marked contrast to the preceding period. With overall conditions tending to relatively hot and dry across the region during 2015 and the first five months of 2016, River Murray system inflows had continued to remain quite low, catchments were dry and storage levels were at their lowest level for a number of years. For example, Hume storage fell to as low as 18% capacity during autumn 2016.

The rapid turnaround to wet conditions started in May and June 2016. The wet weather continued through July and, although the rainfall diminished in August, high flows continued and catchments remained wet. Storage levels climbed steadily through winter and Hume Reservoir airspace releases commenced on 29 August.

Inflows between August and October 2016 were in the highest 8% of records. September was noteworthy for the frequency of rain and it was reported by the Bureau of Meteorology as being the wettest winter or spring month ever recorded in the Basin. The arrival of closely spaced rainfall in September meant that airspace management quickly transitioned to flood operations at Hume Dam, with inflows to the dam climbing to around 75,000 ML/day, before reaching rates of around 110,000 ML/day in early October.



The upper Murray.

Overall inflow volumes were substantial for both Hume and Dartmouth reservoirs, resulting in many weeks of flood operations and relatively high releases at Hume Reservoir that peaked at 80,000 ML/day in early October. In contrast, at Dartmouth Dam the relatively smaller catchment and large available storage capacity meant that flood management was not required as inflows were able to be fully stored. Dartmouth releases throughout the winter-spring period occurred in accordance with minimum release provisions or AGL Hydro entitlement releases for electricity generation.

Flows downstream of Hume were further boosted by very high Kiewa River inflows that peaked at over 30,000 ML/day and resulted in river levels just below major flood level at the Albury gauge. Flood operations at Hume Dam mitigated the main inflow peak by more than 25% and without this mitigation the flood levels at Albury would have exceeded the major flood level.

This was the most significant flood in this part of the Murray since 1993. Downstream at Yarrawonga, there were significant inflows from the Ovens River. Major flooding along the lower Ovens peaked in Wangaratta at levels just below those recorded during the spring 2010 floods, with flow rates peaking just below 100,000 ML/day. Once entering the Murray at Lake Mulwala, these combined flows resulted in a period of extended flood operations at Yarrawonga Weir and significant flooding downstream of the weir where flows reached 182,000 ML/day on 7 October. Downstream in the Edward-Wakool system, the water levels at some locations were the highest seen since 1975. In the following weeks, the flood peak progressed downstream, influenced by inflows from the Goulburn and Murrumbidgee Rivers so that ultimately a peak of around 94,500 ML/day passed into South Australia in late November – the highest flow since 1993.

In late 2016, the MDBA met with community representatives downstream of Hume Dam at a series of meetings to discuss their concerns relating to the provision of information and the priority given to flood mitigation. The priorities for the operation of Hume Dam were discussed by the Basin Officials Committee in May and by the Ministerial Council in June 2017. All governments acknowledged the flood risks of riparian landholders yet reaffirmed that the

priority of operations of headwater dams (such as Hume) is to provide water security.

The MDBA worked with the Bureau of Meteorology (BoM) and WaterNSW on ways to improve communications with the community. A revision to the Hume Dam Early Warning Network (EWN) service is one of these improvements and is planned for implementation later in 2017. The MDBA is also working with the agencies responsible for flood planning, forecasting and event response to achieve closer coordination.

The upper Murray system

At the start of the year, the storage volume at Dartmouth Reservoir was 1,805 GL (47% capacity). Storage levels improved significantly throughout the year. Total inflows to Dartmouth for 2016–17 totalled around 1,360 GL, only 7% of years in the historical record have seen higher inflows. Inflow in 2016–17 was significantly higher than the 2015–16 inflow of 485 GL and the long-term average of 890 GL. The peak daily inflow was around 37,000 ML/day in early October 2016. By the end of the year the storage volume at Dartmouth had risen to 3,016 GL (78% capacity).

Hume Reservoir remained relatively high throughout the irrigation season and no bulk transfers were required from Dartmouth to Hume in 2016–17.

From mid-December, the release from Dartmouth was mostly maintained at around 300 ML/day to improve water access for Victorian entitlement holders along the Mitta Mitta River downstream of the dam. The release was reduced to the minimum rate of 200 ML/day in early April 2017. AGL Hydro released 38 GL of entitlement water across the year in five separate pulses, the largest peaking at around 5,000 ML/day.

Hume Reservoir started the year at a low storage level, 970 GL (33% of capacity), the lowest starting volume in Hume since the end of the Millennium Drought in 2010. A wet winter suppressed demands for Hume Reservoir water, as downstream demands were able to be met by local rain and inflows from the Kiewa and Ovens Rivers. Hume releases remained minimal until mid-August when additional releases briefly supplemented Kiewa and Ovens flows to meet downstream environmental demands. By mid-late August,

Hume releases had returned to a minimum flow. Significant winter inflows to Hume totalling 1,500 GL (in the highest 15% of historical records) increased the storage to 90% capacity by late August, at which time airspace management releases commenced.

A large amount of rain resulted in a very wet spring in 2016, when Hume Reservoir's unregulated inflows totalled around 2,420 GL (in the highest 4% of records). The highest inflows to Hume occurred in early October, with peak inflow of more than 110,000 ML/day – more than 30,000 ML/day above the dam's peak release. Hume Reservoir reached the effective full supply level (99%) in late October, and reached 99.5% (2,990 GL) on 18 November before downstream demand exceeded inflows. During winter and spring releases from Hume totalled around 2,830 GL.

Inflows from the Kiewa River combined with Hume releases to reach a peak height at Albury only 11 cm below the Major Flood Level. The Ovens River at Wangaratta reached 12.76 metres (the Major Flood level is 12.70 metres – 96,100 ML/day) on 6 October. These flows combined with an already swollen River Murray to bring widespread flooding to downstream reaches.

The Hume storage was drawn down to around 1,760 GL (58.5% capacity) by late April. Hume storage level then began increasing and ended the year at 2,110 GL (70% capacity).

Mid-Murray

High upstream inflows resulted in lengthy flood operations at Yarrawonga Weir between early September and early November. Kiewa and Ovens rivers inflows resulted in a release from Yarrawonga of 66,000 ML/day in early August 2016 and was followed by a release of 87,000 ML/day in late September. The passing of flood waters saw releases from Yarrawonga rise above 100,000 ML/day for 10 days in early October, with a peak of 182,000 ML/day – the highest since 1993 and just below the major flood level.

Widespread flooding occurred throughout the mid-Murray and Edward-Wakool rivers. Most locations in the Edward-Wakool experienced the highest levels since 1993, with the level at Deniliquin the highest since 1975. In October, the Goulburn River at McCoys Bridge reached its

highest level since the 2010–11 floods with a peak height of 9.88 m (around 49,000 ML/day) in early October. Similarly, the Murrumbidgee experienced very high flows resulting in the highest recorded height at Balranald since the gauge began in 1979.

Total flow in the Goulburn River passing McCoys Bridge was around 1,730 GL (highest 29% of records) for 2016–17 compared with 490 GL (lowest 28% of records) in 2015–16. The long-term average is 1,410 GL.

Large volumes of inter-valley trade water were called upon in 2016–17 to assist meeting demands in the lower Murray. Significant volumes of Inter Valley Trade (IVT) were again sourced from the Goulburn system. In total, 108 GL was sourced from the Goulburn system and 86 GL from the Murrumbidgee system. The ability to call on water from Menindee Lakes, combined with the ability to call on IVT resulted in reduced pressure on the Barmah Choke and lower transfers from Hume meant more water could be conserved in upper storages.

Flow in the Murrumbidgee River at Balranald totalled around 2,565 GL for 2016–17, compared with 570 GL the previous year. As mentioned, IVT accounted for 86 GL, which is lower than the 191 GL in 2015–16. The reduced call on IVT was primarily due to increased water availability via River Murray unregulated flows, high storage in Lake Victoria and the ability to call on Menindee Lakes to meet downstream Murray valley demands. About 85 GL of environmental water from the Murrumbidgee was delivered to South Australia.

At Torrumbarry Weir, the river height peaked at the Major Flood Level of 7.80 metres (around 57,500 ML/day) on 16 October 2016. At Euston, the level peaked at 50.88 metres (AHD) (around 134,000 ML/day), while downstream at Mildura the level peaked below the moderate flood level (37.5 metres (AHD)) at 36.52 metres. Wentworth reached 32.72 (AHD) metres (minor flooding) in late November.

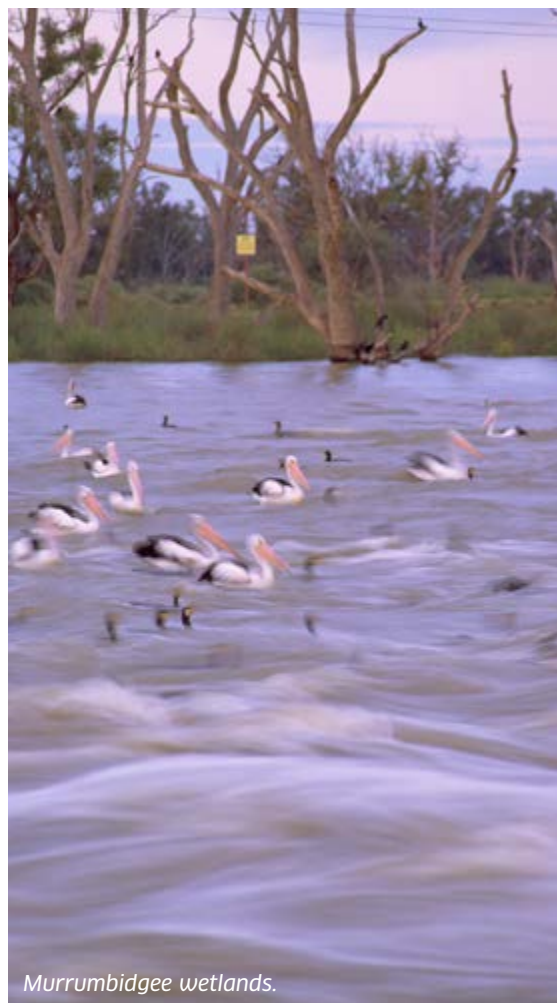
Menindee Lakes, lower Darling River and the Great Darling Anabranch

After record low flows over the previous three years, the Menindee Lakes began the year below 3% capacity. Inflows from heavy upstream rains began arriving in early July 2016 and by 21 October the

storage had reached 640 GL, meaning the storage became a shared resource between New South Wales, Victoria and South Australia. The storage peaked at 1,588 GL (91.6%) on 16 December 2016 with total inflows to the storage for 2016–17 year of 1,800 GL (highest 30% of records).

Water from Menindee Lakes was called upon to help supply Murray Valley demands from October 2016 to late April 2017. During this time releases from Weir 32 totalled around 424 GL. This was comprised of approximately 113 GL of environmental water and 340 GL transferred to the Murray to meet demands.

Environmental water was delivered by NSW to the Great Darling Anabranch in autumn 2017 for the benefit of native fish. 100 GL of water was delivered from Lake Cawndilla to the Anabranch with about 46 GL arriving in the Murray and flowing to South Australia.



As of 30 June 2017, Menindee Lakes total storage was steady at 770 GL (44% capacity). Lower Darling diversions in 2016–17 totalled 123 GL.

Lake Victoria

As a result of unregulated flows, the MDBA delayed filling Lake Victoria until mid-December, with the storage reaching 672 GL (99.3% capacity) on 14 December. Environmental water released from Lake Victoria in December helped slow the flood recession and totalled around 59 GL.

In May 2017 around 67 GL of South Australia's deferred water held in Lake Victoria spilled. More than 100 mm of rain over major irrigation districts in late April resulted in a widespread flow that was passed downstream. The Lake Victoria Operating Strategy limited the storage level in Lake Victoria to 24.5 metres at the end of May to protect the environment and cultural heritage aspects of the lake. We commenced refilling Weir pools to minimise the volume of South Australian deferred water spilled.

At the end of June 2017 the storage level was 424 GL (63% capacity).

Lower Murray and barrage operation in South Australia

The Lower Lakes barrages continued to be managed to optimise water levels, water quality, and other environmental and social outcomes. Day to day management is undertaken by South Australia, with input from the MDBA and other key stakeholders via the Barrage Operating Advisory Group (BOAG). Flows into the lower system were heavily influenced by the wet conditions and floodwater inflows from the upper Murray and its tributaries during the winter and spring of 2016.

The year started with Lake Alexandrina a little below full supply level at 0.68 metres and flows across the South Australian border fully regulated. Releases through the barrages were restricted to the fishways during late autumn in an effort to re-build the level of the lower lakes and help to manage the high likelihood of sea water intrusion (reverse flow) to Lake Alexandrina due to storms and swells that often increase at that time of year.

As the wet winter conditions set in and unregulated flows began in early July, inflows to

the lower lakes started to build. By early August, flows over Lock 1 had increased to around 25,000 ML/day.

Peak flows over Lock 1 were in excess of 80,000 ML/day in mid-December as spring flood waters moved through the lower system. The levels in the lower lakes were boosted by locally wet conditions including rain in South Australia's Mount Lofty Ranges (which experienced one of its wettest winter-spring periods on record). Flows through the barrages ranged from around 40,000–80,000 ML/day from early October until the end of December when flood waters receded and regulated flow conditions returned upstream. Around 5,000 GL of water is estimated to have flowed to the sea from August until the end of December. When barrage releases were reduced to below 10,000 ML/day in early January, Lake Alexandrina was surcharged at around 0.85 metres.

The passing of floodwater through the barrages also helped to connect the lower lakes with the sea and export salt out of the Basin. The high barrage flows also increased sand scouring and led to a temporary halt to the continuous sand dredging which had occurred downstream of the barrages (including the Murray Mouth) prior to the floods. Despite the high flows, post-flood surveys indicate the total amount of sand washed out was less than during the 2010–11 floods. A single dredge was re-mobilised once flows had receded and continues to operate to manage sand build up through the Murray Mouth.

During the second half of summer and autumn 2017, flows into the lower Murray continued to be boosted by the delivery of environmental water. This water helped maintain barrage flow rates during this period, which were maintained at an average flow rate just over 3,000 ML/day between January and the end of May.

Releases during this period also helped to manage water levels to allow for planned winter barrage releases that aim to improve diadromous fish movement. These releases combined with periods of high temperatures and evaporative losses resulted in the lower lakes levels falling to 0.57 metres by mid-April before increasing again to 0.68 metres by late June.

Similar to past years, barrage operations in 2016–17 continued to support fish passage

and recruitment for a range of fish species. Fishways remained open at Goolwa and Tauwichee and flows were provided to encourage fish to enter the fishways when conditions were suitable.

Blackwater

An extensive hypoxic blackwater event driven by widespread natural flooding in upstream catchments affected large parts of the River Murray system and the southern Basin between October and December 2016. Floodplains were inundated to the highest levels seen in decades with high levels of dissolved organic carbon entering waterways, resulting in a widespread hypoxic blackwater event in the Edward-Wakool system and the River Murray downstream of Wakool Junction. As the Goulburn River experienced high flushing flows during the 2010–11 floods, dissolved oxygen levels in the Goulburn remained relatively high during this year's flooding, and helped keep the Murray relatively oxygenated down to the Wakool Junction.

However, the blackwater resulted in fish kills in the Edward-Wakool, lower Murrumbidgee and in the River Murray downstream of the Wakool junction and into South Australia. Significant volumes of water provided by environmental entitlement holders and delivered via Murray Irrigation Limited infrastructure were delivered in an effort to provide refuges for fish at various locations in the Edward-Wakool.



Barrage at Goolwa, South Australia.

The available information indicates that Lake Victoria and the lower Darling River, including the Menindee Lakes, were the only sources of water with adequate dissolved oxygen levels in the River Murray system downstream of the Wakool Junction. Reports of fish deaths in the Rufus River prompted the collection of daily manual readings of dissolved oxygen in the Rufus River and Lake Victoria, and we increased the release from Lake Victoria to maintain Rufus River as a refuge for fish. The median dissolved oxygen level at the upper Rufus River sampling point was above 6 micrograms (mg)/L, and always remained above 4 mg/L throughout the entire event. For more information on the blackwater event, refer to the 'Case study: Hypoxic blackwater in the River Murray 2016-17' on page 45.

Improving river operations

The river operations team has worked to document and improve existing River Murray system operations to address current and future requirements. This is set out in the Murray-Darling Basin Agreement and the objectives and outcomes for River Murray system operations. The objectives and outcomes document is set by the Basin Officials Committee and provides a transparent decision-making framework for operations. It is available on the MDBA website.

The team works closely with river operators and state agencies to identify efficient and effective ways to develop or amend specific objectives and outcomes to reflect contemporary practice. Work in 2016-17 included:

- » taking steps to integrate environmental water delivery into everyday river operations.
- » capturing and documenting the lessons learned in operating the River Murray system during the Millennium Drought. The report also documents the changes made since the drought to improve water resource management under extreme dry conditions and identifies potential issues.
- » reviewing processes and developing tools to meet our obligations under the Basin Plan to 'have regard to' water quality targets and risk management strategies when making river operations decisions.
- » updating the River Murray System Emergency Action Plan and conducting refresher training.
- » reviewing possible changes to the Murray-Darling Basin Agreement and specific objectives and outcomes that would be required to implement the sustainable diversion limit proposals.
- » using adaptive management principles to learn and develop improved ways of operating the River Murray system – for example, through the Environmental Guidelines Program the MDBA commenced a project to inform guidelines for improved variability in releases from Dartmouth Reservoir to minimise river bank erosion.
- » adding another set of approved Environmental Guidelines – Environmental Guidelines for periodic winter drawdown of Lake Mulwala for management of submersed aquatic vegetation in the lake, including the water weed *Egeria densa*.
- » launching a new innovative product – *Waterweed wipeout* app. The app is supported by an information sheet and teacher supplements with lesson plans for primary students.
- » continuing to track the movements of 25 adult Murray cod in the Mitta Mitta River, relating the movement data to the river's flow and water temperature to identify ways to help protect and increase Murray cod numbers in this river.
- » working collaboratively with state constructing authority and environmental agency staff to develop improved practices for water level variability in some River Murray weirpools.
- » working with partner governments to better understand the risk of shortfall as impacted by recent and possible future horticultural development, mainly almonds. From this work the MDBA will develop some potential longer term risk mitigation measures.

An annual review of the objectives and outcomes for the River Murray system was carried out and approved by the Basin Officials Committee in May 2017. Only minor amendments were made in the 2017 review and three amendments to specific objectives and outcomes have been added:

- a) specific objective and outcome 5.3 – minimum flow at Gulpa Creek and downstream of Yarrawonga Weir was amended to establish a trial to test alternative daily minimum regulated flow rates through the Gulpa Creek Offtake.
- b) specific objective and outcome 3.5 – minimum planned regulated release from Yarrawonga Weir was edited to increase consistency with intent and with the change to 5.3.
- c) the temporary amendment to specific objective and outcome 2.2 – maximum rate of fall in river level during planned regulated releases (Hume Dam and Reservoir) was extended to permit ongoing testing of more flexible rates of fall.

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 is ‘normal’ water sharing arrangements. Tier 2 arrangements apply during periods of very low water availability, and Tier 3 arrangements are for extreme and unprecedented conditions.

During 2016–17, Tier 1 water sharing arrangements were in place, meaning that critical human water needs were met, as well as the conveyance water needed to ensure sufficient flow in the river system to deliver critical human water needs.

Despite the relatively low allocations at the beginning of the water year, critical human water needs were assured.

Salt interception schemes

The River Murray salt interception schemes are a significant component of the Basin salinity management 2030 strategy and help us to achieve and maintain agreed salinity levels in the River Murray. Around 395,388 tonnes of salt were diverted from the River Murray in 2016–17, Figure 2.14 and Table 2.3.



Figure 2.14 Total salt load diverted from the River Murray 2011–12 to 2016–17

The salinity management strategy includes a three-year trial of responsive management of salt interception schemes. This includes investigations of salt interception operations in response to forecast river flows and salinity conditions.

For more information about the salinity management strategy, see page 41.

Challenges and the year ahead

The total storage in the River Murray ended the year at close to long-term average levels. This means that overall water availability at the start of 2017–18 will be higher than it was in 2016–17. However, the Bureau of Meteorology is forecasting a bias towards warmer and drier conditions for the opening months of 2017–18. Should such conditions prevail and continue through the year, could see large volumes of water being used and storage levels drawn down. The primary challenge under these conditions will be to supply large quantities of water within the system’s capacity constraints.

Table 2.3 Joint/shared salt interception scheme performance reporting 2016-17

Salt interception schemes	Volume pumped (ML)	Salt load diverted (tonnes)	Average salinity (EC units)	Target achieved (% of time)	Power consumption kWh (totals)
Pyramid Creek	860	21,375	41,647	100%	136,145
Barr Creek	3,784	16,969	7,063	100%	76,042
Mildura-Merbein	1,050	48,286	79,546	86%	189,282
Mallee Cliffs	823	26,276	49,909	96%	264,588
Buronga	1,997	51,739	40,483	100%	430,776
Upper Darling	1,091	29,953	42,878	100%	178,304
Pike River	104	4,373	54,750	NA	36,454
Murtho	898	21,349	39,245	37%	811,509
Bookpurnong	334	8,535	42,155	80%	126,638
Loxton	356	5,719	23,444	92%	139,877
Woolpunda	5,281	104,383	30,973	95%	3,195,110
Waikerie	3,336	56,430	30,038	86%	1,275,980
Rufus River	0	2	42,348	100%	1,016
Total	19,913	395,388			6,861,721

Construction of the major works packages on the Pike and Katarapko floodplains as part of the South Australian Riverland Floodplain Integrated Infrastructure Program (SARFIIP) will commence in the coming year. The work includes construction of large regulators and blocking banks to allow water stored by Locks 4 and 5 to inundate large areas of the floodplain. A groundwater pumping scheme will be constructed to prevent further salt entering and to remove saline groundwater and 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.

Studies of the Hume Dam embankments will continue, to develop a geotechnical model that represents the observed deformations and be suitable to predict how the embankment will perform in the future. This will inform the requirements for future works to ensure the embankment meets contemporary engineering practice.

STRATEGIC GOAL 5

Improve the knowledge base to support sustainable water resource management

To support sustainable water resource management across the Basin, we recognise that knowledge, data and evidence is crucial in assisting with Basin Plan implementation and reviews, River Murray operations as well as informing policy and decision makers.

Highlights

- Northern Basin Review completed and supporting technical reports published.
- Ongoing social, economic, cultural and environmental work to inform the Basin Plan interim evaluation (due December 2017).
- Development of a modelling platform to estimate future floodplain inundation patterns almost complete.
- Independent review of the Source Murray model completed.
- Continued to work with partner research institutions to strengthen MDBA's science and research capabilities.

Overview

This year, the MDBA continued information collection and collaboration arrangements with governments, scientists and communities. This ensured access to the best available data, information and knowledge to help implement the Basin Plan.

The MDBA continued to invest in new water resource knowledge and to deliver integrated water resource modelling across the Murray-Darling Basin. Several models, including inundation extent, the Source Murray model and the Basin stand condition tool, have been progressed this year. Improving the understanding of water management on native fish outcomes, and communicating this with communities, has also been a focus.

Continued to work with Basin state governments to deliver hydrometric information on the River Murray. This information underpins key operational responsibilities and enabled the MDBA to deliver consistent operations and reliable water supplies. Information sharing through a range of resources has been ongoing.

The MDBA published the Northern Basin Review and several supporting technical reports. The Northern Basin Review involved social and economic assessments, water recovery modelling and environmental science projects. This work has helped the MDBA understand: the effects of changing water availability on primary producers and communities; relationships between environmental water and the wellbeing of Aboriginal people; and the importance of river flows to the environment.

The MDBA continues to share its knowledge and experience with international water managers and worked with partners and other institutions to strengthen science and research capabilities.

Challenges and the year ahead

Through the work of the Northern Basin Review, the MDBA has more knowledge about what a healthy river system needs, and a much improved understanding of the effects of environmental water recovery on Basin communities. In the coming year, the MDBA will conduct an interim evaluation of the first five years of Basin Plan implementation, drawing on this new knowledge and the best available monitoring information supported by extensive community consultation. The evaluation will assess if the implementation is on track and if the environmental, social, economic and cultural outcomes are consistent with what was expected at this stage of Basin Plan implementation. The evaluation will be released in December 2017.

The MDBA's focus on Compliance will establish best practice for non-urban water measuring, monitoring and compliance and assess how each Basin state's compliance arrangements line up against best practice. The MDBA will also assess how each Basin state assigns resources and manages the implementation of its compliance responsibilities.

Providing information on the Basin

The MDBA is responsible for providing the Murray-Darling Basin Ministerial Council and Basin Officials Committee with advice and information

that informs joint government decision making about the Basin's water resources and related ecosystems. Information on water management, the environment and the Basin's economy also informs the work of the MDBA and Basin governments as the Basin Plan is implemented.

This year the MDBA continued to gather data to inform the interim evaluation of the social, economic and environmental outcomes of the Basin Plan, see page 45. This included gathering social and economic data from several sources and reporting this at a Basin, catchment and community scale, as well as undertaking Basin-scale surveys of vegetation, fish and waterbirds.

Modelling the Basin

Continue to develop, operate and maintain river models to support river management, water sharing and salinity management as well as help develop water resource policies, including the Basin Plan. Modelling is central to determining state water accounts and calculating state water shares through the water resources assessment for the River Murray system.

Flood inundation modelling and mapping

The MDBA collaborated with Basin governments to develop better ways to detect water on the landscape. These observations are made from satellites (e.g. Landsat) or aerial photography and provide a valuable tool to relate river flow to inundation extent. This is important for anticipating the extent of future high flows and floods or for measuring the environmental outcomes that occur as a result of inundation. The ability to relate high flows to extend watering is a key input to the decision making process for environmental watering.

The MDBA is working with the Commonwealth Scientific and Industrial Research Organisation to develop a new generation of models to determine inundation extents based on different catchment moisture content or 'antecedent condition'. The Condamine-Balonne and Barwon-Darling models were delivered this year, and the Edward-Wakool model is scheduled for delivery in late 2018.

The Source Murray model

The Source model of the Murray and lower Darling systems reflects a major investment by Basin governments over the last 16 years. A daily model for the River Murray system is configured

to represent a 'without development scenario' and the baseline diversion limit. It has also been configured to model salinity in these regions. This year, the Source Murray model was independently reviewed and determined to be at a stage where it can soon be adopted as the preferred hydrologic simulation tool in the Murray and lower Darling river systems. The model is suitable to be used for assessing the baseline diversion limits, implementing of the Basin salinity management strategy and supporting water resource planning.

Basin-wide stand condition tool development

The MDBA worked with the Arthur Rylah Institute to rebuild the Murray Stand Condition Tool for Basin-wide application. The new Landsat satellite-based tool will predict and map the stand condition of floodplain forest types (river red gum, black box and coolabah dominated forests and woodlands) across the Murray-Darling Basin.

The new stand condition tool uses Geoscience Australia's data cube and field training data from hundreds of sites across the Basin. The data will be used to track progress toward the expected outcomes for river red gums, black box and coolabah. The vegetation field work was carried out in a collaborative manner to ensure the efficient collection of data that can be used by the MDBA, the Commonwealth Environmental Water Office and Basin state governments for their reporting.

Waterbird trajectories

The MDBA commissioned the University of New South Wales to provide expert advice and analysis on achieving waterbird targets in the Basin-wide environmental watering strategy. This work includes: mapping possible trajectories of waterbird response over the next 10-20 years; developing methodology to compare observed waterbird response to these expected trajectories; and determining the management effort required to address targets that are not on track. Early outcomes of the project show a strong relationship between waterbird numbers and water flow in the previous year.

Improving knowledge for native fish outcomes

Native fish response to flows

The MDBA is working with scientists from government and independent organisations to investigate the links between flows and

native fish. These projects will inform water management in the Basin for years to come. A major initiative that is now coming to fruition is the development of native fish population models that bring together the latest scientific knowledge on eight of the Basin's most important native fish species, see case study on page 68.

Incorporating new knowledge into water management is important. The MDBA is collaborating with Basin state governments and independent fish scientists to develop options to boost native fish populations. In the southern Basin, the MDBA is developing a southern connected Basin flow management plan to identify when and where rivers need to connect and other flow actions within the working river that benefit native fish. In the northern Basin, the MDBA has identified the important native fish populations and the connectivity they require as a first step towards a northern Basin flow management plan.

The South Australian Research and Development Corporation and the Arthur Rylah Institute for Environmental Research are undertaking several research projects to investigate the birthplace and population structure for golden perch, silver perch and Murray cod. This information,

when combined with current data about fish movement, will help target appropriate flows to boost native fish recruitment. The Basin watering priorities use the information developed by this and other projects to guide environmental watering in the Basin, see page 25.

The MDBA provided funding to the New South Wales Department of Primary Industries (Fisheries) to undertake a review of environmental water requirements for native fish in the southern-connected Basin. This complements similar work undertaken last year as part of the Northern Basin Review. The review has grouped fish species by flow requirements and produced a series of 'conceptual hydrographs' that can be used to identify components of the flow regime that are important for native fish recruitment.

Showcasing river rehabilitation – demonstration reaches

Continue to invest in activities showcasing river rehabilitation as a key initiative of the native fish strategy. Demonstration reaches help to communicate the benefits for native fish when river-rehabilitation works are integrated and focused in one section of a river, rather than being thinly spread across the catchment.

Case study: Fish population models

Populations of native fishes in the Murray-Darling Basin are thought to have declined by 90% since European settlement. Developing an understanding of fish populations and how they respond to flows is important to maximise the benefits of all water managed under the Basin Plan.

The MDBA commissioned the Arthur Rylah Institute for Environmental Research, who collaborated with a range of government and independent experts, to develop fish population models for eight Murray-Darling Basin native fish species. The species chosen (golden perch, silver perch, Murray cod, trout cod, Macquarie perch, southern pygmy perch, olive perchlet and Murray hardyhead) represent species across a range of habitats and flow requirements.

The models are based on the best conceptual understanding for each species' ecology and life cycle needs, drawn from literature reviews and expert knowledge. A total of 27 workshops

involving 63 experts were conducted to conceptualise, develop and test the models. The successful engagement with key fish experts exceeded expectations for the project.

The models can predict likely outcomes from flow management scenarios, allowing outcomes to be compared. We will apply the models to a range of case studies in the coming years, such as with or without Basin Plan scenarios, comparing natural and current scenarios or predicting population responses to new flow management approaches. They can also be used to test the effect of important structural or management changes outside of flow.

By undertaking this work, the MDBA now has tools that will assist with develop practical water management recommendations that maximise benefits to a range of fish species. The MDBA will also use the models to demonstrate the potential benefits and risks of environmental water management for fish to the broader community.

This year's activities included the production of a children's story book highlighting the restoration work in the Katfish Reach (South Australia), and an educational video on the rehabilitation efforts along the Ovens River and Hollands Creek (Victoria), benefiting the recovery of Macquarie perch. The upper Murrumbidgee demonstration reach (Australian Capital Territory) continued to deliver improved riparian rehabilitation through community and stakeholder engagement.

Managing pest fish

Tilapia is one of the worst invasive freshwater pest fish threats to Australia's aquatic ecosystems. At least four catchments adjoining the northern Basin are known to have tilapia. In 2016–17, the MDBA appointed Watercourse Consulting to deliver a range of engagement and educational activities to continue raising awareness of tilapia in the northern Basin.

Delivering River Murray information

Continued to work with the Basin state governments to support the operation and maintenance of hydrometric stations. These stations are predominantly in the Murray and lower Darling and they collect water quality and quantity data. Data and information is collated to underpin key operational responsibilities, including:

- » storing and delivering water to meet consumptive and environmental needs
- » operating salt interception schemes
- » enabling navigation and supporting recreation and tourism
- » understanding emerging water quality issues such as 'blackwater' and blue-green algae
- » preparing water resource assessments.

This information is used to direct daily releases from a number of water storages along the River Murray, working closely with state agencies and constructing authorities (whose staff physically control these structures) to deliver consistent operations and reliable water supplies for all users in a fair and efficient way.

The MDBA shared information in a number of ways, including:

- » regular meetings with Basin state government authorities
- » close liaison with the Bureau of Meteorology, particularly before and during floods

- » online publication of information resources, including River Murray data, weekly reports and storage, flow and salinity reports
- » advising southern Basin states on River Murray water availability and accounts
- » responding to information requests.

Social and economic research

To better understand northern Basin economies, the MDBA researched 21 communities to understand how locations with differences in their dependence on irrigation have changed over time. The research found the volume of water recovery affects communities and the communities' resilience. Uncertainty around future water recovery also affects community confidence. The research also examined on-farm decisions made by floodplain graziers after floods, during dry periods and through times of change.

Working with the Northern Basin Aboriginal Nations, the MDBA was able to identify the direct relationship between environmental water and the effect it has on Aboriginal peoples' lives in Basin communities. Evidence showed the cultural and physical health of Aboriginal people is directly linked to the health of the river.

Environmental research

This year, the MDBA published the remaining reports from seven core research projects, designed to address knowledge gaps about the Condamine–Balonne and Barwon–Darling river systems. The MDBA now has a better understanding of the types of river flows that are important for the various life-cycle stages of plants, waterbirds and fish. The northern Basin rivers need a variety of flows to be healthy, with water recovery delivering some improvements, such as allowing movement of fish, frogs and turtles in the Condamine–Balonne. The analysis also highlighted the types of flow that are unlikely to improve the rivers through recovery alone, under current water management arrangements.

Hydrologic modelling

The MDBA modelled a number of water recovery volumes (between 278 GL and 415 GL) to understand how industries, communities and the environment respond to changes in flow. Different approaches to water sharing and recovery were explored along with investigating what would

happen if different types of entitlements were recovered and in different locations.

Key outcomes of the modelling were:

- » water recovery will restore some key elements of the flow regime
- » the effectiveness of water recovery depends on where and what water is recovered
- » targeted water recovery can help achieve particular flow indicators, and therefore environmental outcomes with less water.

Aboriginal partnerships

National Cultural Flows Research Project

The MDBA was the major contributor to this multi-year project to provide rigorous and defensible knowledge on water interests for the benefit of Aboriginal people. The project draws on a range of research methodologies to:

- » provide Australia with a greater understanding of Aboriginal values relating to water and other natural resources
- » provide Aboriginal people with information to ensure that Aboriginal water requirements and preferences are understood
- » inform the development of new governance approaches to water management.

The project's planning and research committee comprises representatives from the Northern Basin Aboriginal Nations (NBAN), the Murray Lower Darling Rivers Indigenous Nations (MLDRIN), the Northern Australia Land and Sea Management Alliance (NALSMA), Basin state water agencies, the Commonwealth Environmental Water Office and the MDBA. Only representatives of the Aboriginal organisations have decision-making power. A literature review and case study research helped clarify how cultural flows benefit Aboriginal populations and how much water is needed for such benefits to be realised. Now in its fourth year, the planning and research committee has selected a team of internationally recognised specialists in Aboriginal law and policy reform to look into the institutional opportunities and possibilities.

The Aboriginal Waterways Assessment initiative (the AWA)

Drawn from New Zealand's Maori science and following extensive field testing conducted in partnership with Murray Lower Darling

Indigenous Nations and Northern Basin Aboriginal Nations, the MDBA produced an assessment tool to enable Traditional Owners to measure the spiritual, cultural and environmental value of chosen wetland and river sites. The results of the assessments are owned by the participating Nations, and are used to advise governments about using environmental water to produce environmental improvements that have cultural value to Traditional Owners.

The intention of the initiative was to enable Nations to take ownership of the tool for their own uses. This year the South Australian, Victorian and Australian Capital Territory governments each funded Nations in the Basin to carry out waterways assessments. The tool has proved its success by: enabling modest adaptation to suit local conditions; being facilitated by trained Aboriginal project managers; and leading to significantly improved waterways planning that involves Aboriginal people.

Strategic alliances

International engagement

In 2016–17, the MDBA briefed visiting government delegations from Thailand, Vietnam, South Korea, United States, Bangladesh, Malawi and Iran. MDBA staff were also invited to share their expertise at the Hydrogeologist International Congress and Colorado Foundation for Water Education. MDBA's technical knowledge and skills in hydrological modelling were also requested by the Government of Myanmar as part of the Ayeyarwaddy Murray–Darling Basin twinning relationship.

Sponsorship

The MDBA continues to develop and maintain strong relationships with communities in the Murray–Darling Basin through support for community events, leadership programs and meetings. Support during the past year included:

- » community based events, such as the Taste of Coleambally Food and Farm Festival, Dartmouth Cup Fishing Classic, Easter Burrendong Classic, Darlington Point Riverina Classic and the Massive Murray River Paddle.
- » leadership and capacity-building initiatives such as the Regional Victorian Leadership Program, Australian Climate and Water Summit, and the Peter Cullen Trust.

- » meetings and conferences of groups such as the Murray Darling Association, New South Wales Farmers Association, Rice Growers Association, Cotton Australia and NSW Local Government Association.

Education

The education team continued to strengthen engagement with communities by providing education resources and initiatives targeted at teachers, students and the public. Uptake of our education resources remained strong, with 3,000 downloads of teacher presentations and activities from the education website. An estimated 75,000 students have completed an MDBA lesson sequence. The MDBA also had displays at the *Science Alive! Expo* in Adelaide and a week-long display at Questacon Canberra, Australia's National science and technology centre.

Sponsorship of key teacher professional organisations continued to be an effective mechanism to increase awareness of resources and ensure strong uptake. Sponsorships and presentations included the Geography Teachers' Associations of New South Wales, Queensland and Victoria, the National Youth Science Forum and the Australian Science Teachers' Association. The MDBA also successfully provided bursaries for two teachers from regional areas within the Murray-Darling Basin to attend key conferences.

Research partnerships

The MDBA continued to work with partners and other institutions to strengthen science and research capabilities. These partnerships aim to deliver benefits to the MDBA and partners, while aligning with priority research areas.

National Centre for Groundwater Research and Training

In early 2015, the MDBA started a strong strategic alliance with the National Centre for Groundwater Research and Training, which focuses on: groundwater and surface water interactions; groundwater replenishment processes; and the impact of social and economic factors may have on groundwater management in the future. This research partnership will continue until mid-2018. The alliance is expected to enhance the risk assessment method used to determine a groundwater sustainable diversion limit in the Basin Plan. This method may be used in future reviews of the Basin Plan.

Murray-Darling Freshwater Research Centre

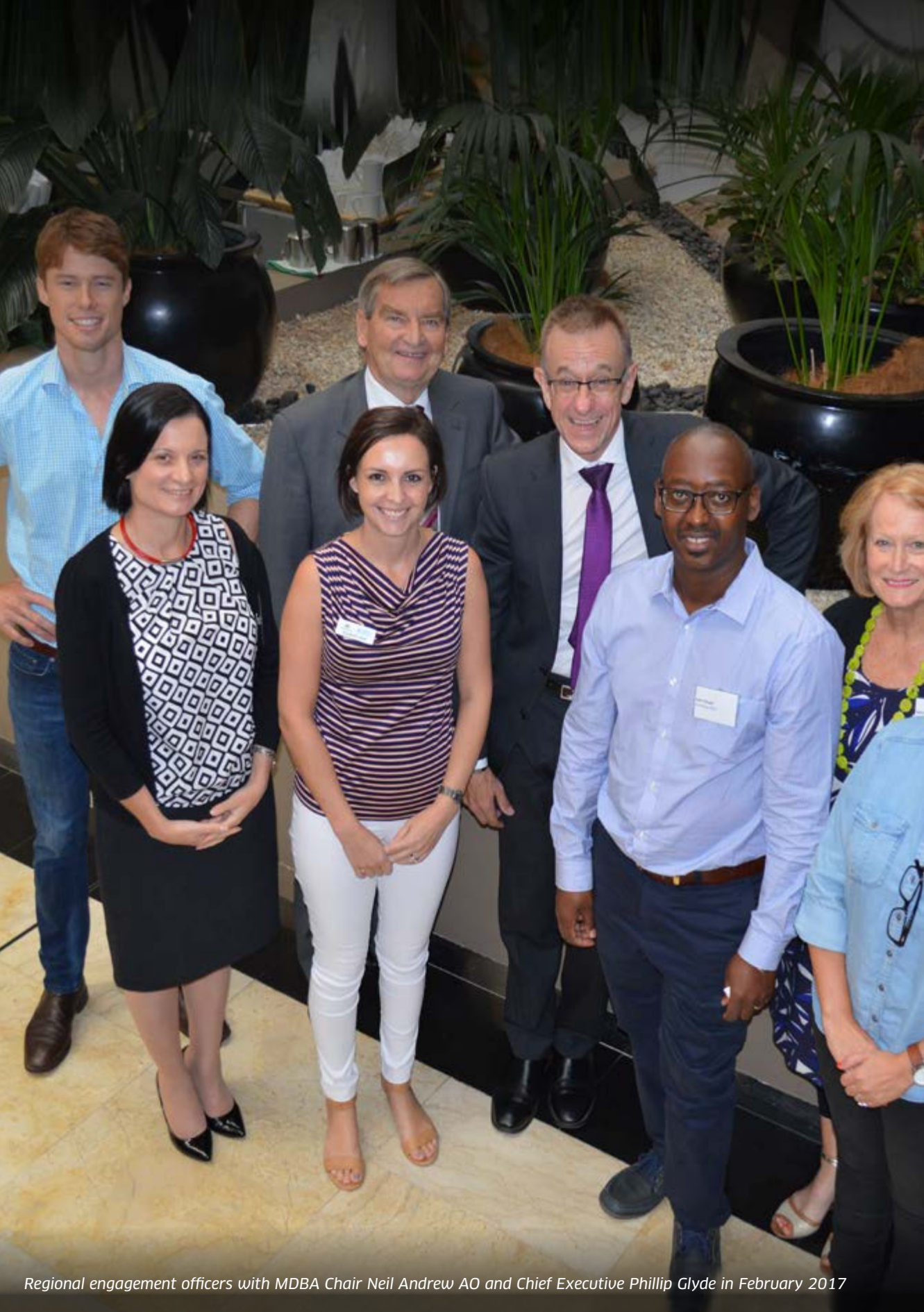
The MDBA oversees a research partnership with the Murray-Darling Freshwater Research Centre on behalf of the Basin governments, with 2016-17 being the third year of the five-year partnership. The research centre provides specialist skills and knowledge in riverine ecology in the southern Basin and the River Murray in particular. Multi-year research is being undertaken on vegetation dispersal, fish movement, the influence of flows and climate on fish growth, and linking macroinvertebrate community structural changes to ecosystem outcomes.

CSIRO

The MDBA has a long history of collaboration with CSIRO. Projects underway relate to consistent platforms for hydrological, improving the understanding of floods and floodplain inundation, and improving monitoring and evaluating the Basin health. The latter project is a two-year collaboration that will develop and demonstrate a method to predict change in ecology – in time and across the floodplain, as a consequence of future water management decisions. The project will also describe and demonstrate the use of methods for evaluating benefits of water management decisions.

Visiting fellows

Hosting academics enables the MDBA to better connect with the research community and improve how research informs policy and management in the Basin. The MDBA hosted scientists from the University of Adelaide, the Australian National University and the Massachusetts Institute of Technology (USA). Their research topics focused on water markets and blue-green algae. Collaborations with the scientific community assist in ensuring scientific enquiries are relevant to policy and access current knowledge and build partnerships with the research community.



Regional engagement officers with MDBA Chair Neil Andrew AO and Chief Executive Phillip Glyde in February 2017



03

MANAGEMENT AND ACCOUNTABILITY

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MANAGEMENT AND ACCOUNTABILITY

Highlights

- Development of a framework to CREATE a more positive and proactive workplace culture at the MDBA
- Launch of the MDBA Gender Equality Strategy to boost performance, innovation and engagement for staff of all genders
- Implementation of Flexible Working Arrangements assisting all MDBA employees to achieve a balance between work and their personal lives
- Pilot a Talent Management Program to promote competence, commitment and contribution across the key milestones and organisational goals
- Reduced the occurrence of injuries through the Work Health and Safety Program.

Overview

There were significant shifts in the operating environment during 2016-17.

As part of the Mid-Year Economic and Fiscal Outlook, the Australian Government announced funding security for national water functions and programs. This secured ongoing long-term funding for the Murray-Darling Basin Authority's Basin Plan functions.

In August 2016, the MDBA announced options to enhance its presence with regional stakeholders in the Murray-Darling Basin. The first phase was a pilot of Regional Engagement Officers (REOs) in a range of locations. The second phase was to establish regional offices in Toowoomba, Albury-Wodonga and Adelaide, in addition to operating a REO network. Refer Goal 2 for more information.

In December 2016, the MDBA launched the CREATE workplace culture initiative. CREATE is the organisational culture needed to meet the expectations of our various stakeholders and deliver on our commitment to lead the planning and management of the Murray-Darling Basin.

In March 2017, the MDBA relocated to new premises at 33 Allara Street, Canberra after the expiry of the lease at 51 Allara

Street. This provided an opportunity to think about how the new work environment might stimulate better communication, collaboration and response to change throughout the organisation. The MDBA developed a new work environment that seeks to build a dynamic, flexible and capable workforce with a 'one organisation' culture. It has been an opportunity to strengthen leadership, trust and accountability, while enhancing the way staff engage with stakeholders.

During the year, the MDBA also developed a Strategic Workforce Plan 2016-26 to identify key workforce requirements for the medium to long term, and prioritise the implementation of strategies. The workforce plan will guide efforts to recruit, develop and retain MDBA staff in order to successfully deliver objectives and outcomes.

Challenges and the year ahead

In 2017-18, the MDBA will move its in-house payroll system to a shared services arrangement with Treasury.

The MDBA Governance and Risk Management Frameworks will be reviewed to ensure best practice and compliance with relevant law and policy.

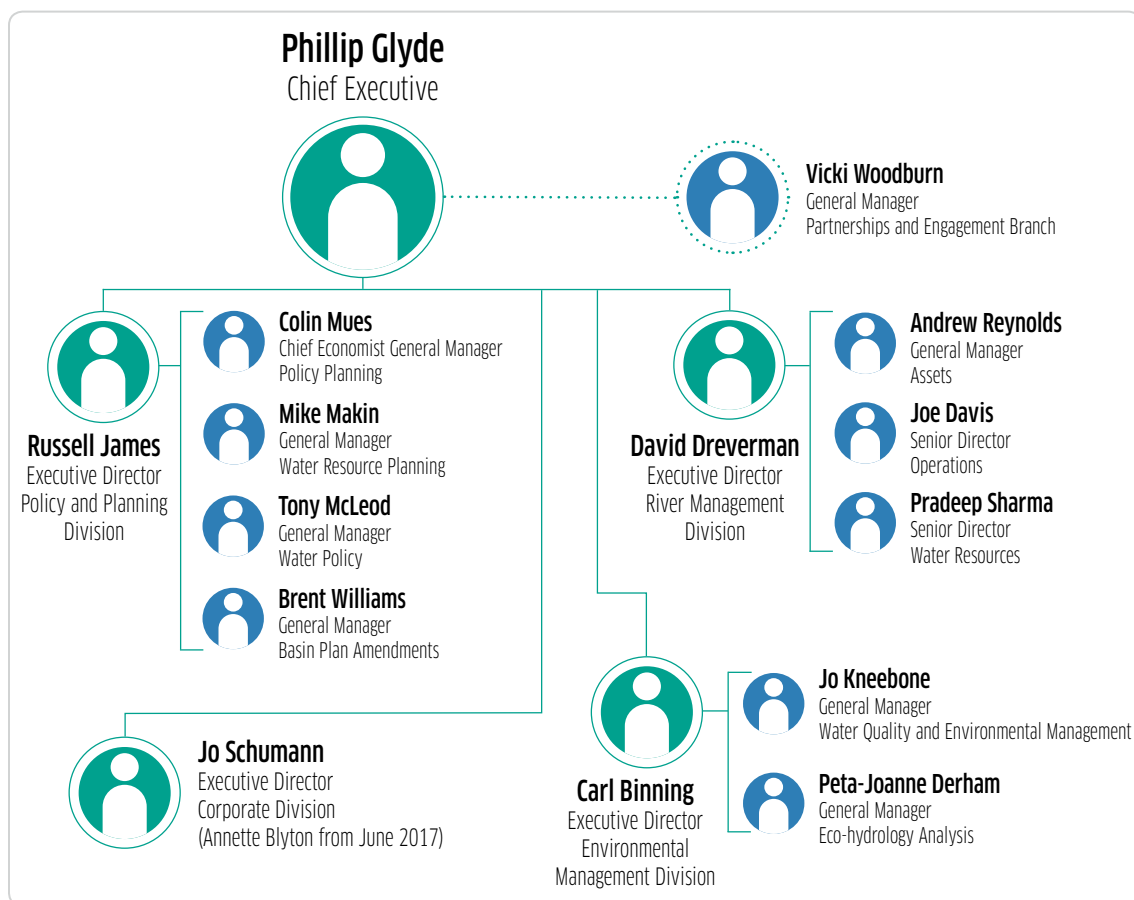


Figure 3.1 The MDBA organisational structure as at 30 June 2017

Our structure

Figure 3.1 shows the MDBA's organisational structure, made up of four divisions.

The River Management Division manages the operation and maintenance of River Murray assets, and the sharing of River Murray water between New South Wales, Victoria and South Australia.

The Policy and Planning Division oversees implementation of the Basin Plan.

The Environmental Management Division manages the delivery of environmental management programs and components of the Basin Plan.

The Corporate Division provides legal, finance, human resources, governance, performance reporting, information technology, office administration, security and communications services to the agency as well as secretariat support to high-level committees.

Our governance

The MDBA reports to the Minister for Agriculture and Water Resources. The MDBA's governance comprises:

- » the Minister for Agriculture and Water Resources, the Hon. Barnaby Joyce MP
- » six member Murray-Darling Basin Authority
- » Ministerial Council
- » Basin Officials Committee
- » Basin Community Committee.

THE AUTHORITY

The Authority consists of the Chief Executive, a part-time Chair and four part-time members. Authority members are appointed by the Governor-General and each must have substantial expertise in one or more fields relevant to the activities of the agency – for example, water resource management, hydrology, freshwater ecology, resource economics, irrigated agriculture, public sector management and financial management.

At 30 June 2017, Authority members were:



Neil Andrew AO (Chair)

Chair of the Authority, the Hon. Neil Andrew's achievements include election to the Australian House of Representatives in 1983 and appointments as Government Whip (1997) and Speaker of the House of Representatives (1998). He served the Australian Parliament until 2004.

Since retiring from Parliament, Neil has continued a lifelong association with the irrigation industry – particularly horticulture and viticulture. He chaired a review of the South Australian citrus industry and was also chairman of the Crawford Fund in Australia, which provides agricultural research and training to farmers in developing countries. He was appointed an Officer of the Order of Australia in 2008.



Phillip Glyde (Chief Executive)

Phillip Glyde joined the Authority as Chief Executive on 4 January 2016. Previously, Phillip was a deputy secretary at the Department of Agriculture, where he held positions with responsibility for agriculture, fisheries and forestry policy, corporate and governance functions, international trade and market access, export certification services and the research division – the Australian Bureau of Agricultural and Resource Economics.

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 also worked overseas with the Environment Directorate of the Organisation of Economic Cooperation and Development in Paris, and the Cabinet Office and the Department of Environment, Food and Rural Affairs in the United Kingdom.



Dianne Davidson AM

Dianne Davidson is an agricultural scientist and horticulturist, and has a strong management background in natural resources, particularly water and irrigated agriculture. She is a fourth generation farmer in the Lower Lakes region of the Basin and manages her own mixed agricultural business, as well as carrying out consulting work throughout Australia and internationally.

In the 2015 Queen's Birthday Honours, Dianne was made a Member of the Order of Australia for services to the wine-making industry, horticultural management science, and to higher education administration.



Susan Madden

Susan Madden is an agricultural economist with professional services firm GHD and has more than 15 years' experience working in agricultural and natural resource management in the public and private sector. Her leadership capabilities and contribution to agricultural and natural resource management have been recognised through a number of industry awards and achievements.

Susan lives in Dubbo in central west New South Wales, and is the Chair of the Central West Local Land Services. Previously, she was the Executive Officer of regional farming group Macquarie River Food and Fibre. In this role she participated in major government planning reform processes including the review of New South Wales water sharing plans and development of the Basin Plan, as well as water pricing determinations carried out by the Independent Pricing and Regulatory Tribunal and the Australian Competition and Consumer Commission.



Barry Hart AM

Professor Barry Hart is an Emeritus Professor at Monash University and has established an international reputation in the fields of ecological risk assessment, environmental flow decision making, water quality, environmental chemistry and catchment management.

Barry chairs a number of government scientific and strategic advisory committees, and is director of an environmental consulting company. In the 2012 Queen's Birthday Honours, Barry was made a Member of the Order of Australia for services to conservation and the environment.



George Warne

George Warne is a recognised leader in the rural sector, with a strong understanding of rural communities. He has extensive experience in water reform and has worked in the water industry for more than 25 years, including as Chief Executive Officer of Murray Irrigation Limited and State Water New South Wales.

Between 2011 and 2013, he was appointed interim Chief Executive Officer of the Northern Victorian Irrigation Renewal Program and facilitated its transition to form part of Goulburn-Murray Water.

Meetings attended and member status

Name	Number of meetings	Executive status
Neil Andrew	12	Non-executive
Phillip Glyde	12	Executive
Dianne Davidson	12	Non-executive
Susan Madden	12	Non-executive
Barry Hart	12	Non-executive
George Warne	12	Non-executive

EXECUTIVE TEAM

Executive leadership of the Murray–Darling Basin Authority comprises:



Phillip Glyde
Chief Executive

Refer to Phillip's biography on page 76.



David Dreverman
Executive Director
River Management

David Dreverman joined the Murray–Darling Basin Commission in 2000 as Manager Assets and was appointed General Manager River Murray Water in 2003. David transferred to the MDBA in late 2008, when it subsumed the functions of the Murray–Darling Basin Commission.

From 1974 until he joined the Commission, David worked in the consulting engineering industry with SMEC, the Hydro-Electric Commission of Tasmania and Australian Power and Water. He was involved with large dam, hydropower and irrigation projects in Australia and overseas. He has led the management of the River Murray system through the millennium drought and the reforms that followed. David also led a major asset renewals program covering all River Murray Operations assets, including the construction of new environmental works and salt interception schemes.



Russell James
Executive Director
Policy and Planning

Russell James joined the MDBA in 2011, having worked with other Australian Government agencies on water reform, including developing the National Water Initiative and the *Water Act 2007 (Cth)*.

Russell has worked extensively with state government agencies and community stakeholders to finalise the Basin Plan and develop strategies for its implementation. In addition to coordinating Basin Plan implementation across the MDBA, his division also leads water resource planning, social and economic analysis and advice, and policy development.



Carl Binning

Executive Director
Environmental Management

Carl Binning joined the MDBA in September 2016 as Executive Director, Environmental Management Division. The division is responsible for managing the delivery of environmental management programs and leading implementation of the Basin Plan in relation to environmental water planning and management, ecological monitoring and evaluation and providing ecological science and model-based advice.

Building on a family farm background near Yass in NSW, Carl has more than 25 years experience in natural resources management, with executive roles in government, research, not-for-profit, mining and consulting sectors. He brings a depth of experience and understanding of the social, economic and environmental drivers in Australia's landscapes and is passionate about facilitating sustainable development.

Carl brings extensive executive experience from the Department of the Environment, Prime Minister and Cabinet, CSIRO, Creating Communities, BHP Billiton and Greening Australia.



Jo Schumann

Executive Director
Corporate Services

Jo Schumann joined the MDBA in 2015 to lead the Corporate Division. Before this, Jo was responsible for the Australian Competition and Consumer Commission's corporate services division. Jo is a very experienced corporate manager, having worked in similar roles in the Department of Veterans' Affairs and the Australian Capital Territory Government.

Throughout her career, Jo has been closely involved in managing organisational change. She has led the integration of strategic business approaches and was responsible for substantial improvements in business processes in these agencies.

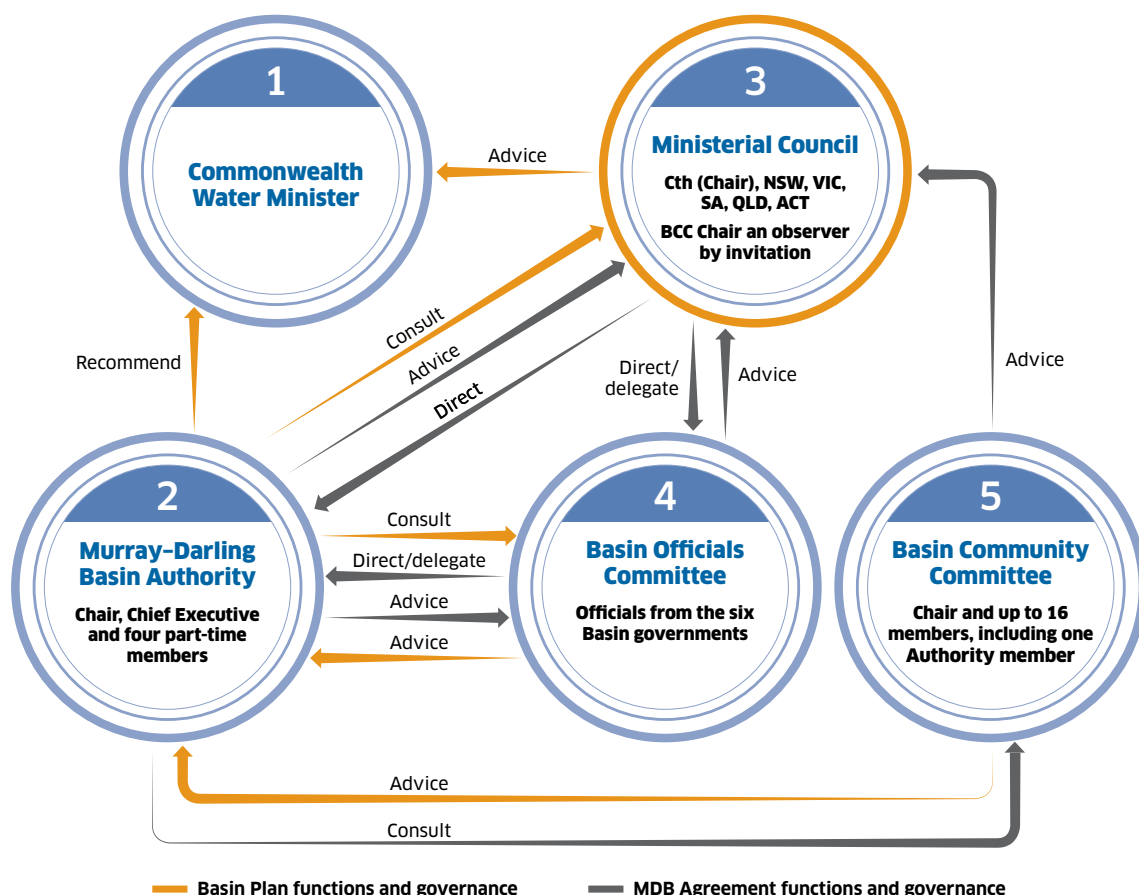
Annette Blyton commenced as Acting Executive Director, Corporate in June 2017. Annette has a wealth of experience in the delivery of corporate services across a range of government departments.

Senior management committees

During the year the senior management committees provided advice and assurance to the Chief Executive and were integral to the management of cross-agency business.

Executive Committee

The Executive Committee (chaired by the Chief Executive) is the key forum in which cross-agency issues on policy and corporate governance are discussed. The committee meets weekly and comprises the executive directors, General Manager Partnerships and Engagement and the Chief Economist. Meetings have an alternating corporate or outcomes focus.



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
Manages the River Murray system on behalf of joint governments
- 3** Policy and decision-making roles on state water shares and funding of joint programs as per the Murray-Darling Basin Agreement
- 4** Makes decisions consistent with the delegations from the Ministerial Council and advises on the Basin Plan
- 5** Provides advice to the Authority and Ministerial Council on Basin community issues

Figure 3.2 Governance of the Murray-Darling Basin Authority

During 2016–17, the Executive Committee considered strategic and critical management issues such as:

- » finalising the Northern Basin Review and the Sustainable Diversion Limit Adjustment Mechanism
- » refining compliance policy positions
- » streamlining the water resource planning process
- » the move to new office premises
- » overseeing the winter–spring 2016 flood operation.

Information Management and Technology Committee

The Information Management and Technology Committee (IMTC) advises on and provides strategic direction for the MDBA's information management and information technology initiatives. It also evaluates and endorses major projects which have information management, or information technology components or impacts.

During 2016–17 the committee oversaw the data centre relocation and enabling ICT projects, which included new personal computing, Windows 10 operating system upgrade and office relocation projects.

Data governance projects and initiatives including sustainable diversion limit reporting and the appointment of a Chief Data Officer, underline the MDBA's commitment to enhancing data management and discovery across business and government.

During the year the Chief Executive passed the Chair responsibility to the Executive Director, Corporate Services, emphasising the change in focus of the IMTC from planning to delivery of the initiatives developed. The committee retained the services of their external advisor to contribute expertise and value by interrogating reports from a different perspective.

People and Culture Committee

The People and Culture Committee provide high level strategic leadership and governance of workforce strategies, programs and policy to enable the Authority to deliver on its objectives. Areas covered by the Committee include:

- » strategic workforce planning

- » performance management
- » organisational culture programs, e.g. workplace diversity and values and behaviour frameworks
- » work health and safety
- » attraction and retention strategies
- » entry level programs, e.g. graduate and interns
- » learning and development.

The People and Culture Committee met throughout 2016–17 providing strategic advice to the People and Culture team to deliver successful programs, targeted initiatives and a review of HR policies.

Budget and Review Committee

The Budget and Review Committee has an overarching role in relation to the MDBA's budget management and financial reporting. It provides advice on key matters concerning the effective management and alignment of MDBA's resources to strategic priorities.

Health and Safety Committee

The Health and Safety Committee operates in accordance with the *Work Health and Safety Act 2011 (Cth)*. The committee meets quarterly to oversee work health and safety matters. The committee has the following members:

- » the Chair who is a member of the MDBA Senior Executive Service and is appointed by the Chief Executive. The Chair for 2016–17 continued to be the General Manager, Policy Coordination
- » the health and safety representative for each of the two identified work groups, or their deputy in the event they are unavailable (deputies are encouraged to attend all health and safety committee meetings as observers)
- » the Chief Emergency Warden as a representative of workers in the MDBA's emergency management team
- » one employee representative from the Employee Consultative Committee
- » the Director People and Culture
- » a work health and safety practitioner from the People and Culture team as nominated by the director.

Work health and safety issues considered by the committee in 2016–17 include:

- » sponsoring employee wellbeing activities and promoting staff awareness in conjunction with fostering healthy activity and eating habits, flu vaccination program and health assessments
- » improving the work health and safety framework through new and revised policies and guidelines, including the Rehabilitation Policy
- » overseeing the rehabilitation management system and actively reviewing compensation and non-compensation rehabilitation matters to address issues or hazards
- » overseeing the workplace inspection regime and actively addressing potential hazards
- » improving the workplace incident and injury reporting arrangements by initiating automated workflows and notifications
- » initiating a 'test and tag' program for all appropriate electrical appliances
- » consulting on rural, regional and remote travel arrangements
- » endorsing the transition to a new employee assistance provider and the proactive monitoring of trends and issues in reporting
- » facilitating involvement of first aid officers, emergency wardens and harassment contact officers in proactive work health and safety preventative arrangements
- » overseeing work health and safety action for specific workplace issues and incidents, such as issuing instructions on health and safety matters to staff
- » engaging with other 'persons conducting a business or undertaking' as required by the Work Health and Safety Act.

Employee Consultative Committee

The Employee Consultative Committee was established following the certification of the MDBA Enterprise Agreement 2011–14. The Consultative Committee comprises an elected employee representative from each of our four divisions, elected employee organisation representatives from Professionals Australia and the Community and Public Sector Union, two management representatives and the Chief Executive as Chair. It facilitates communication, consultation and cooperation with employees on matters affecting the workplace and

the enterprise agreement. The consultative committee provides a forum for:

- » staff consultation and input into the decision-making process in relation to: changes to existing policies, guidelines or procedures or developing new policies, guidelines or procedures referred to in the enterprise agreement
- » consultation and agreement prior to the commencement of a formal variation process under the *Fair Work Act 2009 (Cth)*, in relation to changes to conditions or entitlements included in the enterprise agreement
- » providing advice to the Chief Executive on matters arising from the operation of the enterprise agreement.

Audit Committee

The Audit Committee was established under the PGPA Act to provide independent advice and assurance to the Chief Executive. The committee's functions include reviewing the appropriateness of:

- » financial reporting
- » performance reporting
- » risk oversight and management
- » internal control.

The Audit Committee charter was updated during the year and a review of the audit protocol during 2016–17 was commenced with completion scheduled for the first half of 2017–18.

The committee met six times during 2016–17: 15 August 2016, 31 August 2016, 21 September 2016, 29 November 2016, 14 March 2017 and 1 June 2017. The 15 August 2016 meeting considered the Joint Venture Special Purpose Financial Statements, while the 21 September 2016 meeting considered our Financial Statements.

The Committee's membership did not change during the year Table 3.1.

The committee considered financial management and reporting at each meeting. The committee paid attention to the PGPA Act requirements, the management of financial risks, the new PGPA performance reporting requirements and our readiness to meet these requirements.

Table 3.1 Audit Committee membership and number of meetings attended

Member and position appointed under the PGPA Act	Number of meetings attended
Jenny Morison, Chair and independent member	5
Colin Mues, Deputy Chair	5
Jenny Goddard, independent member	5
Advisory members not appointed under the PGPA Act	
Andrew Reynolds, advisory member	5
Michael Makin, advisory member	1
Carl Binning, advisory member	3

The committee considered MDBA's systems of internal control (including policies and procedures, delegations, authorisations and legislation) and activities to monitor compliance with the internal legal control framework.

The committee continued to review internal audit reports and the implementation of audit recommendations. It is pleasing to note a continued reduction in the number of outstanding audit recommendations over the year.

Regulatory Governance Committee

The MDBA Regulatory Governance Committee is chaired by Philip Glyde and met twice in 2016–2017. The purpose of the Regulatory Governance Committee is to identify regulatory issues and provide strategic advice about the delivery of the MDBA's regulatory activities in line with the MDBA's legislative responsibilities.

Lisa Corbyn is the Committee's independent expert advisor.

Risk management

The MDBA continued to focus on effective risk management as a key area in the overall management of the MDBA. During 2016–17 a comprehensive review of our risk management framework commenced. The business management continuity plan was also reviewed and updated.

The Audit Committee and the Executive Committee monitor the risk management framework and the implementation of enterprise-

risk treatments. At a sub-program level, risk management is monitored as part of quarterly corporate planning and reporting processes. The Health and Safety Committee monitors health and safety risks, ICT manage ICT security risks and the Security Group monitors physical security risks.

The fraud control plan continues to be monitored by the Executive Committee and the Audit Committee. Mandatory risk management induction and online training on ethics, fraud and conflict of interest (including managing sensitive water market information) was provided to all new employees and contractors during the year. A complementary mandatory training program was also developed for existing staff.

During the year the MDBA appointed a Chief Risk Officer to provide strategic and operational advice and assistance to our risk management program.

Comcover

Comcover provides the MDBA's insurance cover. Identifying and assessing our insurable risks is done annually through Comcover's insurance renewal process. The MDBA is separately insured by Comcare for worker's compensation for employees.

A key feature of the Comcover program is the annual risk management benchmarking survey. The survey measures Commonwealth agency risk management maturity. The 2017 survey found that the MDBA again achieved risk maturity at the 'advanced' level, which was above the average and in the top 30% of Australian Government entities. The survey determined the MDBA's strengths in risk management were in relation to defining responsibility for managing risk, establishing a risk management policy and embedding systematic risk management into business processes.

Elements identified for improvement are understanding and managing shared risk, communicating and consulting about risk, and reviewing and continuously improving the management of risk.

Fraud investigations

One instance of suspected fraud was reported in 2016–17. On investigation this activity was determined not to be fraud and no action was taken against an individual. Procedures were enhanced to minimise the risk of the event recurring.

Business continuity and ICT disaster recovery plans

The arrangements for recovering from a business disruption are set out in the River Murray system emergency action plan and the MDBA business continuity and ICT disaster recovery plans. All these plans were updated during the year. The MDBA also carried out desktop testing of the emergency action plan and the business continuity plan. Business impact assessment and ICT disaster recovery arrangements were reviewed during the year.

Internal audit

In 2016–17, the consultancy firm KPMG provided internal audit services. The internal audit plans were developed in light of the risk management plan and following consultation with senior managers.

The internal audit reports finalised in 2016–17 were:

- » River Management Emergency Action Plan and Business Continuity Plan testing report
- » ICT Health Check
- » ICT Project Assurance Review
- » Targeted Controls Review
- » Segregation of Payroll Duties
- » Workforce Planning
- » Procurement and Contract Management

No serious matters were raised in the reports. Implementing internal audit report recommendations is monitored by the Audit Committee.

Compliance reporting

The PGPA Act requires the MDBA to report significant non-compliance with the finance law. Finance law includes the PGPA Act, the 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. The MDBA refined its internal Resource Management Framework during the year. These changes to the governance

framework have allowed for the further improvement and streamlining of operations against a background of strengthened and improved internal controls and risk management.

The MDBA now operates on best practice, which incorporates the spirit of government policy guidance material issued by the Department of Finance, and mandatory aspects of finance law. Compliance requirements have been tailored to business and balanced to attain a strong level of assurance while minimising processing requirements. The MDBA uses a 'Financial Management Compliance System' to gather data and increase awareness of the Resource Management Framework, by requiring all authorised officials to complete a questionnaire. This information is then reviewed to ensure breaches are reported correctly.

There were no 'significant' reportable breaches of the PGPA Act, Rules or Australian Government policies for 2016–17.

Secretariat services

The secretariat team provides support to the Authority and a range of committees established to help deliver the MDBA's business. The team also supports the Murray-Darling Basin Ministerial Council and the Basin Officials Committee established under the Murray-Darling Basin Agreement, under which the joint programs operate.

During 2016–17, the secretariat provided support to 82 committee meetings including three Ministerial Council meetings. The secretariat initiated more than 24 papers for out-of-session consideration by committees, including nine for the Ministerial Council and 10 for the Basin Officials Committee. The team also provided support to sub-committees, including working groups and technical panels across MDBA.

Appendix B provides more information.

External scrutiny

Auditor-General reports

The MDBA's financial statements are audited by the Auditor-General. No additional audits carried out by the Auditor-General specifically involved the MDBA in 2016–17.

Commonwealth Ombudsman

The Commonwealth Ombudsman made no formal reports relating to the MDBA during 2016–17.

Parliamentary committees

On 16 February 2017, the Australian Government tabled a response to the recommendations in the report of the *Select Committee on the Murray-Darling Basin Plan*, which had inquired into the positive and negative impacts of the Basin Plan on regional communities.

Judicial decisions and tribunals

No judicial decisions or decisions of administrative tribunals relating to the MDBA were made during 2016–17.

Legal services

The MDBA's legal services are provided principally through an in-house legal team. The MDBA also access external legal services through the legal services multi-use list established by the Attorney-General's Department.

During 2016–17, demand for legal services included:

- » advising all MDBA divisions in relation to implementing the Basin Plan
- » coordinating internal and external legal advice for the commercial lease of MDBA's move to new premises
- » contributing to the development of legislation including amendments to the *Water Act 2007 (Cth)* and the Basin Plan
- » providing advice to MDBA staff about program delivery and legislative obligations, particularly under the *Freedom of Information Act 1982 (Cth)*
- » coordinating a review of agency policies, procedures and documentation and providing related training to staff.

Privacy

The MDBA treats the personal information in accordance with the *Privacy Act 1988 (Cth)* and the Australian Privacy Principles, which set out how the MDBA must collect, store, use or disclose, and allow access to and correction of personal information. The MDBA's privacy notice is available on its website.

The MDBA participated in Privacy Awareness Week 2017, which ran from 15–19 May 2017. Privacy Awareness Week is the major privacy education event in the Asia-Pacific region. The theme for 2017 was 'Trust and Transparency', reinforcing strong security and good handling practices. Training and other activities were provided to allow staff to refresh their knowledge and application of our privacy obligations.

Privacy education is a continuing process and the Privacy Contact Officer provides training, as well as timely and best practice support and advice for privacy issues.

Freedom of information

The *Freedom of Information Act 1982 (Cth)* (FOI Act) gives individuals the right to access copies of documents held by Australian Government ministers and agencies (with some exceptions).

During 2016–17, the MDBA received eight freedom of information requests. All requests were processed in accordance with the statutory timeframes. Reporting obligations under the FOI Act were also met. The MDBA's freedom of information policy and procedures were updated in line with the Australian Information Commissioner's freedom of information guidelines.

Information we hold

Under the FOI Act, the MDBA must publish a range of information on its website as part of the Information Publication Scheme. This information includes our structure, what we do and how we do it, statutory appointments, annual reports and consultation arrangements and other information we hold.

Details of how to obtain information released, following freedom of information requests, and information routinely provided to parliament are also published on the website. The MDBA's Information Publication Scheme agency plan outlines approach to the scheme and what is included in the entry and published online.

Directions under section 175 of the Water Act

No directions were given by the Commonwealth Minister under section 175 of the Water Act.

Ministerial and parliamentary business

The MDBA provides the portfolio minister with timely, evidence-based advice or information on key issues, through written briefs and meetings.

The preparation of responses to ministerial correspondence with information on policies and programs supports an important function of government. The MDBA attended Senate estimates committee hearings and responded to questions on notice.

Our people

Overview

The MDBA is a multi-disciplinary organisation with a unique combination of talented and committed employees. MDBA staff have highly specialised skills and qualifications in a range of areas including engineering, business, hydrology, environmental science and river operation.

In 2016–17, the MDBA budgeted average staffing level (ASL) of 316, as outlined in the Portfolio Budget Statement (PBS). An end of year ASL target of 291 addressed the upcoming 2017–18 PBS ASL of 288. A reduction in staffing level was achieved during 2016–17 through natural attrition and strategic workforce planning.

The 2016–17 workforce strategies were driven by the Strategic Workforce Plan 2016–26 (SWP) and in response to emerging Murray–Darling Basin issues.

Building organisational capability

Workforce planning

The MDBA strengthened workforce planning practices in 2016–17 through the implementation of the MDBA Strategic Workforce Plan (SWP) 2016–26 initiatives. This was recognised by the Deputy Australian Public Service Commissioner at the Unlocking Potential event held on 1 March 2017. The MDBA's achievements and approach to workforce planning, particularly as a small agency, were acknowledged.

The SWP aims to identify key workforce requirements for the medium to long term (10 years), by proactively managing risks associated with workforce capacity, capability and flexibility. The SWP guides recruitment, development and retention strategies to successfully deliver the MDBA's objectives. The establishment of regional offices is an example of how the MDBA developed an initiative to better deliver its responsibilities within the Basin, and to signal to stakeholders the MDBA is committed to changing our engagement approach.

Improved reporting practices were designed to strengthen understanding and management of the workforce. This includes quarterly workforce profile metrics and tracking trends through a scorecard.

Recruitment

The MDBA continues to attract high level candidates who play a critical part in achieving its objectives and ensure the MDBA continues to fulfil an important role in leading the sustainable, collaborative Basin-wide approach to the planning and management of Basin water resources. Stakeholder engagement is a critical element of this work.

The MDBA seeks to provide a rewarding and stimulating work environment that values and embraces efficient and innovative work practices. Recruitment practices are based on the Australian Public Service Employment Principles and support flexible working arrangements and embrace diversity, both in employees and the range of opportunities available. Recruitment strategies include Commonwealth Government and MDBA initiatives, including intern and graduate programs.

In 2016, the MDBA participated in a whole-of-government entry level program, The Indigenous Australian Government Development Program (IAGDP), successfully engaging one trainee.

The MDBA piloted a 2016–17 Summer Employment program offering undergraduate students the opportunity to gain insight into the MDBA's operations and the Australian Public Service over a 10-week period. This program attracted 63 applications with eight positions offered. A program evaluation provided positive feedback from students and managers, resulting in the program continuing in 2017–18.

The interns worked on a range of projects, including the development of our Gender Equality Strategy, in line with the Australian Public Service principles. The MDBA Gender Equality Strategy was launched in April 2017 and aims to embed gender equality in employment through innovation to review recruitment practices and policies, provide a more flexible approach to job advertisements and develop more opportunities for internal and external secondments and shadowing positions.

Graduate Program

In February 2017, nine graduates joined the MDBA through the Graduate Program. Graduates undertaking training and development in the program prepare for a career in the MDBA and the broader APS. The graduates are supported in their professional development with additional training, including in-house seminars, mentoring, and an annual field trip providing an opportunity for graduates to further develop their understanding of the MDBA's responsibilities and activities.

Our workforce

A people and culture focus

The MDBA recognises the importance of staff engagement, and therefore workforce development is a critical issue if the organisation is successful in achieving our outcomes.

In 2016, the MDBA successfully implemented the People (HR) Business Partner model, providing strategic and tactical people-related support and advice to Senior Managers through a partnership arrangement. The People Business Partners are supported by a team of HR generalists, who together deliver an improved strategic and operational people service.

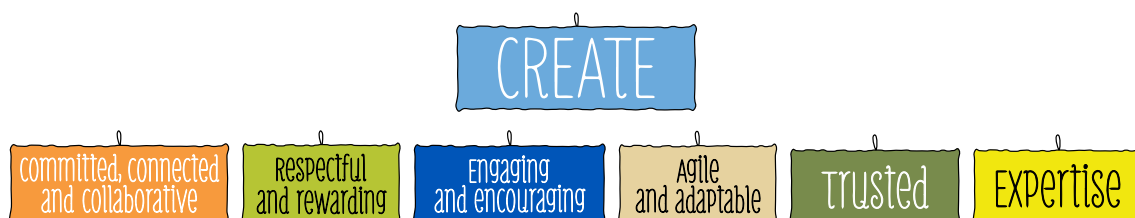
The MDBA focused on four priority areas to build the right workforce and organisational culture:

- » build a dynamic, flexible and capable workforce with a 'one organisation' culture

- » strengthen culture and leadership within the organisation
- » secure a competent workforce
- » be an organisation that respectfully engages its stakeholders.

This focus resulted in the development and implementation of a number of employee focused initiatives to support staff engagement and talent development, including:

- » **CREATE** – A Working Group developed a statement and strategy as a vehicle for a renaissance at the MDBA. Each letter of CREATE represents a different positive workplace behaviour or value. CREATE was officially launched in December 2016 providing staff with strategies to embed a more positive and proactive workplace culture at the MDBA.
- » **MDBA Gender Equality Strategy** – The MDBA values and respects the diverse skills and experiences of all employees, regardless of their gender. The MDBA is committed to attracting, developing and retaining a diverse and talented workforce, and providing a workplace where merit is applied properly and fairly, and staff of all genders are treated equally and with respect. The Gender Equality Strategy is aligned to current and planned actions and initiatives with CREATE cultural values and the Balancing the future: The Australian Public Service gender equality strategy 2016–2019. The five pillars to boost performance, innovation and engagement for staff of all genders are:
 - » driving a supportive and enabling culture
 - » gender equality in APS leadership
 - » innovation to embed gender equality in employment
 - » increased take-up of flexible work arrangements by men and women
 - » measurement and evaluation.



- » **Flexible Working Arrangements** – the MDBA is committed to providing a flexible approach to work arrangements for all employees, to help them maintain a healthy work-life balance. Flexible Working Arrangements have been implemented through new working practices, improved technological equipment and services and moving to new accommodation designed to increase collaboration and flexibility.

Developing our people

Continued to prioritise the development of staff and offered a wide range of training and development opportunities throughout 2016–17.

Courses held in-house include cultural awareness, foundation writing skills, writing influential briefs, financial skills, flexible working training, procurement training, regulatory training and conducting performance conversations. IT training included Skype for business, OneNote, Surface Book, Windows 10 and audio-visual training.

The MDBA continued to invest in external specialist training programs. There was also strong attendance at Australian Public Service Commission-facilitated courses such as strategic thinking and innovation and report writing, along with continued demand for external IT training.

Continue to support employees who choose to study at a tertiary level. In 2016–17, 18 employees received study assistance. The more common study disciplines were business, project management and environmental management.

Talent Management Program

In December 2016, the MDBA launched a pilot Talent Management Program for APS 6 and EL 1 level employees.

The six-month program is aimed at developing the capability of employees who have been identified with high potential and assist with the development of future leaders.

The program was based on the principles of the Australian Public Service Commission (APSC) Talent Management Program.

The key areas of skill development were leadership, presentation skills, project management and engagement with Senior Executive Staff.

Mentoring program

In February 2016, the MDBA implemented a formal 12-month mentoring program for employees. Two cohorts have now completed the program.

The second program included a partnering program with the Australian Fisheries Management Authority (AFMA). The partnership initiative (25 pairs) has been particularly successful in expanding the experience and knowledge base for participants and has led to increased opportunities for collaboration across agencies.

The mentoring program aims to develop and retain talented staff, provide ongoing support and encouragement and the opportunity for staff to learn from the experiences of others, while also providing greater opportunities for staff to build networks outside of their home agency.

The MDBA will continue to offer an annual mentoring program in conjunction with other portfolio agencies.

Performance Management

The MDBA continues to create and maintain a culture of high performance. The Performance Management Development Scheme requires all employees to establish an annual Performance Management Plan (PMP) to align performance to strategic and individual objectives and provide targeted learning and development opportunities.

In 2016, workshops were facilitated by Professor Deborah Blackman, a specialist in performance management, to identify opportunities for improvement in performance management process. Findings indicated a need for a greater focus on the PMP discussion and the incorporation of shared behaviours to contribute to building the culture and delivering the objectives of the MDBA.

As a result, a new PMP framework was designed to support a more effective approach to performance management through three key elements:

1. How a person's objectives will be achieved and their alignment to the goals of the team, division or the strategic objectives of the Corporate or Basin Plan.
2. Discuss and identify how greater engagement can be demonstrated with co-workers,

internal and external stakeholders and members of the community.

3. Identify any learning and development opportunities to support achieving the goals of the PMP or to support a career path.

Australia Day Awards

The MDBA recognises high performance by individual employees and teams. The MDBA recognises that building a culture that values its employees and recognises and rewards outstanding performance is a critical element in attracting and retaining the best people. The Australia Day Awards are amongst the highest individual and team accolades. Hosted annually by the Chief Executive, the awards celebrate outstanding achievements and acknowledge employee performance.

Two team nominations were awarded at an all staff meeting in January 2017. The first team award recognised the Northern Basin Review Taskforce (32 employees) for the outstanding and ground-breaking technical, engagement, communications and coordination work done to deliver this key achievement for the MDBA. The river operations team and supporting media team (13 employees) were recognised for the outstanding achievement in managing significant flooding on the River Murray, through operating the River to limit flood impacts and effectively responding to community concerns.

Making the most of our diversity

The MDBA continues to support equity and diversity in the workplace through a range of key strategies and programs, namely the Workplace Diversity and Inclusion Program 2016–20, the Indigenous Employment Strategy 2015–20, the Disability Action Plan 2015–20 and the MDBA Gender Equality Strategy.

The MDBA is committed to embracing the principles of equity and diversity in our daily business by providing an inclusive work environment that is fair, harmonious, safe and offers opportunities for all employees to achieve their potential.

In May 2017, the Chief Executive launched the MDBA Gender Equality Strategy. The strategy focuses on changing culture through

leadership, flexibility, and innovation. It sets down a foundation to continue to develop into an organisation that recognises and rewards diversity by supporting staff to participate equally in the workplace, irrespective of gender.

The review of MDBA data against APS data and targets related to the gender balance of all staff, including female staff in leadership roles. The review found the MDBA is performing strongly, however there is room for improving our gender balance at the EL2 level. The MDBA also has higher levels (compared to the APS average) of men taking up flexible work opportunities. The Gender Equality Strategy has been shaped to continue to sustain and enhance these levels.

Activities and initiatives outlined in the strategy include support for women to enter leadership positions, training for flexible work and unconscious bias, mentoring, supporting staff on parental leave and the inclusion of a Gender Officer.

Aboriginal and Torres Strait Islander people

The MDBA has an active Aboriginal and Torres Strait Islander staff network who deliver major cultural events and assist in promoting reconciliation in the MDBA. Each year the MDBA celebrates several cultural events and recognised days of significance for Aboriginal and Torres Strait Islander people, including Reconciliation Week and NAIDOC Week.

The Strengthening Connections Reconciliation Action Plan outlines a work program to connect with Aboriginal culture through relationships, respect and opportunities. The Strengthening Connections Working Group and the MDBA staff continue to implement the actions and strategies.

Committed to increasing the MDBA's Indigenous representation, with a target of 3% by the end of 2018. The MDBA Indigenous representation has continued to increase since the implementation of this strategy. The MDBA is actively involved in Indigenous whole-of-government entry level programs focused on Indigenous graduates, trainees and cadets. During 2016–17, the MDBA participated in the Indigenous Australian Government Development Program.

Disability

The *MDBA Disability Strategy and Action Plan 2015-20* identifies strategies and support measures that assist people with a disability to access programs, policies and information.

The MDBA is a bronze member of the Australian Network on Disability and with the assistance of the Disability Champion, is seeking ways to support staff with a disability and provide support for awareness raising events such as International Day of People with a Disability.

Supporting our people

The MDBA is committed to a proactive and collaborative approach to managing work health and safety.

The work health and safety management arrangements are overseen by the MDBA Health and Safety Committee and the commitment of all parties to workplace safety is outlined in the MDBA Enterprise Agreement. The Work Health and Safety Committee comprises staff and management representatives. The committee focuses on continuous improvement in the management of workplace health and safety issues and provides a consultative mechanism for employees and their representatives to raise and address workplace health and safety concerns.

After extensive consultation with staff, the MDBA implemented a Rehabilitation Policy in April 2016. This provides an overarching framework for a rehabilitation management system and supports staff to minimise the impact of work-related and non work-related injuries on themselves and their teams. The MDBA participated in an audit of the rehabilitation management system during 2016-17 and received a conformance rating of 100%.

Initiatives ensuring workers' health and safety

Initiatives to ensure workers' health and safety included:

- » regular workplace inspections, risk assessments and monitoring by the Health and Safety Committee
- » flu vaccinations
- » annual health and wellbeing allowance
- » delivering of programs during the annual Health and Wellbeing week

- » conducting workstation assessments by qualified occupational therapists and providing ergonomically suitable equipment recommended as part of these assessments
- » providing early intervention services to prevent and mitigate development of chronic injury or illness.

Wellbeing program

The 2015 Australian Public Service State of the Service Employee Census stated that the wellbeing of MDBA employees should be a focus. The Executive committed to action by establishing an ongoing wellbeing program to complement existing wellbeing initiatives, such as the annual Health Week and the Employee Assistance Program.

The 2016-17 Wellbeing Program initiatives included:

- » training with a focus on mental health, resilience and managing through periods of change; and creating a mentally healthy culture
- » celebrating Men's Health Week by providing training, discussions and activities designed to generate a conversation about improving and sustaining men's health
- » structuring wellbeing activities throughout the year to deliver a variety of initiatives and raise awareness.

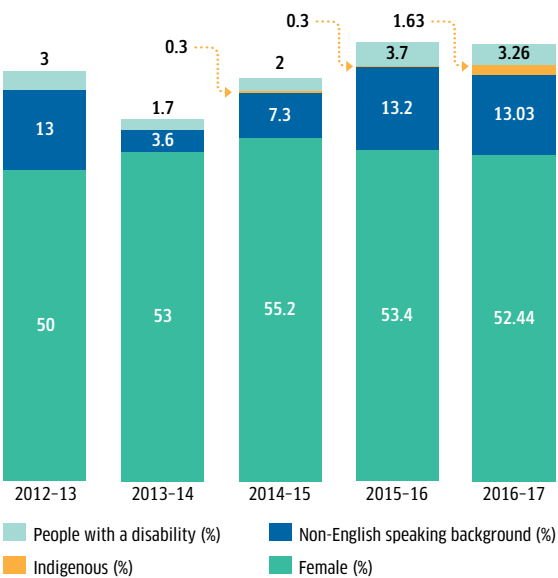


Figure 3.3 MDBA staff by equal employment opportunity group 2012-13 to 2016-17

Health and safety outcomes achieved as a result of initiatives

All issues identified through hazard and incident reports and regular workplace inspections were investigated and action taken. The Health and Safety Committee monitors incidents and uses harassment contact officer's and the Employee Assistant Program for feedback.

MDBA established a number of initiatives to help reduce the number of compensable claims such as:

- » the implementation of the MDBA Rehabilitation Policy
- » early intervention practices to provide tailored support to staff to assist them to sustain their work attendance, return to work early and reduce the risk of workers compensation claims
- » targeted activities through the MDBA Wellbeing Program, such as greater mental health awareness.

Table 3.2 compares work health and safety statistics from 2012-13 to 2016-17.

The MDBA had no workers compensation claims for the 2016-17 period (Table 3.3).

Comcare investigations conducted or notices issued

Comcare did not conduct any investigations or issue any notices to the MDBA under the Work Health and Safety Act during 2016-17.

Accident and dangerous occurrence statistics

There were no reported accident and dangerous occurrences in 2016-17.

Figure 3.4 shows the number of accidents and dangerous incidents notified from 2012-13 to 2016-17.

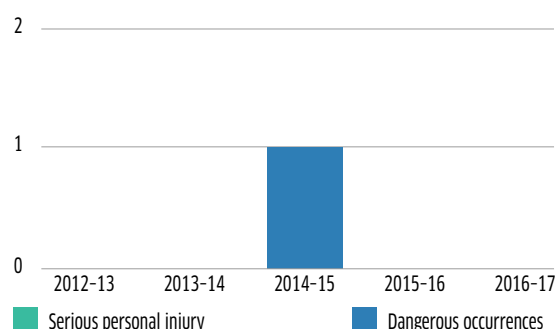


Figure 3.4 Number of accidents and dangerous occurrences

Table 3.2 Work health and safety statistics

	2012-13	2013-14	2014-15	2015-16	2016-17
Internal reports on workplace hazards and incidents	50	70	44	16	7
Lost time caused by incident and injury not reported to Comcare (staff days)	8	26.3	4.5	1.5	58
Lost time caused by incident and injury reported to Comcare (staff days)	0	0	10	0	0
Incidents reported to Comcare	0	0	1	0	0

Table 3.3 Comparison between Comcare claims and premiums

	2012-13	2013-14	2014-15	2015-16	2016-17
Number of new claims	4	4	1	0	0
Total cost of new claims (\$)	105,682	61,754	11,625	0	0
Average cost of new claims (\$)	26,421	10,292	11,625	0	0
Comcare premium (\$)	628,621	1,094,118	1,080,859	1,062,746	1,040,669

Employment arrangements

Senior Executive remuneration

The MDBA had 11 substantive and one acting Senior Executive Service employees at 30 June 2017, in 12 approved Senior Executive positions. This does not include the Chief Executive who is employed as a statutory office holder.

Rates of pay for Senior Executive Service employees are set by the Chief Executive after consultation with individual employees and in accordance with the APS Executive Remuneration Management Policy. MDBA senior executive service remuneration policy. All substantive Senior Executive service employees' terms and conditions of employment, including remuneration, are covered by determinations made under Section 24(1) of the *Public Service Act 1999* (Cth).

Performance pay

Senior Executive Service employees are not eligible for performance pay. Non-Senior Executive Service employees at the top, or at the penultimate increment point in their salary range may be eligible for one-off bonus as a result of achieving an 'outstanding' performance rating at the end of the performance cycle.

Individual flexibility arrangements

In certain circumstances, terms and employment conditions may allow for an individual flexibility arrangement between the Chief Executive and a Non-Senior Executive Service employee.

Enterprise agreement

MDBA Enterprise Agreement bargaining progressed in 2016-17. Following significant progress, the Chief Executive announced on 13 June 2017 that the proposed Enterprise Agreement was agreed by the majority of staff who participated in voting.

The formal application for the approval of the Murray-Darling Basin Authority Enterprise Agreement 2017-2020 was lodged with the Fair Work Commission on 14 June 2017. Following approval, the Enterprise Agreement commenced from July 2017.

Staffing profile

Table 3.4 outlines the MDBA staff by age profile. On 30 June 2017, the MDBA was operating within the allocated Senior Executive Service level cap level. Individual flexibility arrangements supplement terms and conditions in the enterprise agreement, so these staff are also counted in the enterprise agreement numbers. The Chair and the other part-time members of the Authority are not included in the following figures.

The age profile of the MDBA (Figure 3.5) has remained fairly consistent.

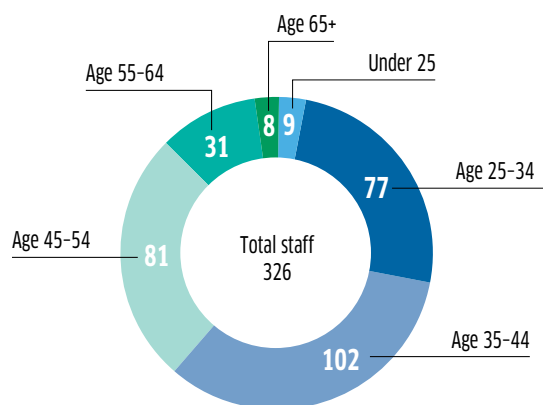


Figure 3.5 Age profile of MDBA staff, as at 30 June 2017

Table 3.4 The MDBA's staff by employment agreement as at 30 June 2017

Category	2012-13	2013-14	2014-15	2015-16	2016-17
Enterprise agreement	287	276	275	306	270
Non-senior executive service individual flexibility agreements	14	14	15	11	24
SES individuals s. 24(1) determinations	12	11	12	8	12
Chief Executive	1	1	1	1	1
Total	314	302	303	326	307

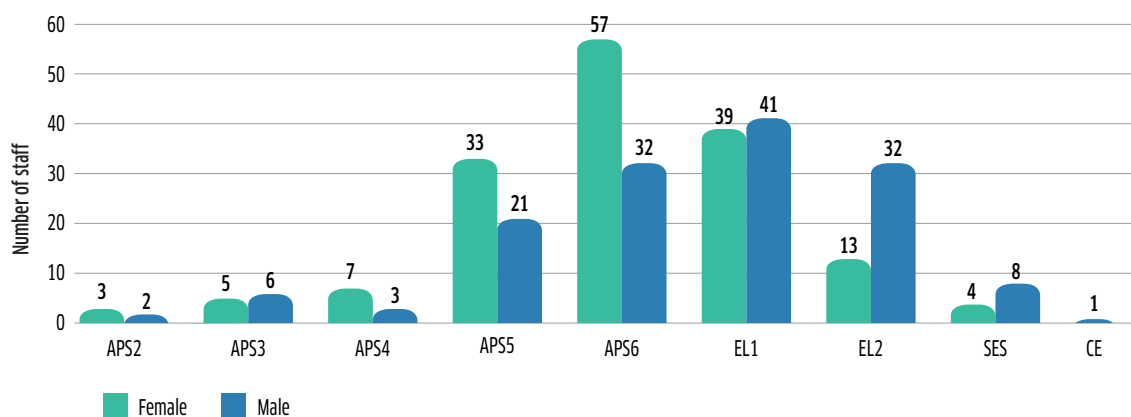


Figure 3.6 The MDBA's classification profile by gender as at 30 June 2017

Table 3.5 The MDBA's staff by employment status as at 30 June 2017

	2012-13	2013-14	2014-15	2015-16	2016-17
Ongoing staff	289	283	275	301	283
Non-ongoing staff	25	19	28	25	24
Total	314	302	303	326	307

During the past 12 months, the MDBA has seen shifts in gender representation at the APS level, Executive Level (EL) and Senior Executive Service (SES) level. The APS and EL classifications have increased male representation, while the female representation at the SES level has increased. (Figure 3.6).

Table 3.5 depicts the MDBA's staffing profile by employment status, and illustrates the changes to headcount and employment status over the last five years.



Beef cattle at Echuca, Victoria.

FINANCIAL PERFORMANCE

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CHIEF FINANCE OFFICER'S REPORT

During 2016–17 the MDBA reported an operating surplus of \$2.4 million, compared to an approved operating deficit of \$9.4 million. Significant fluctuations in spending against the budget are due to the impact of the complex nature of joint programs, which reflect a high level of inherent risk associated with capital construction and environmental projects. For example, work at the major dam sites is only possible at certain points of the year; many other works are also impacted by the levels in the rivers; accessibility of the terrain around construction sites (e.g. wetlands) may be restricted at points in the year and cultural heritage issues (e.g. preservation of cultural sites which may require complex and lengthy approvals), may lead to further delays. In the current year this resulted in actual expenditure being less than budget in particular due to lower activity relating to Murray Mouth dredging program and the salt interception schemes.

Programs were delivered costing \$151.8 million (compared to \$164.4 million in 2015–16). Contributions from jurisdictions were \$88.3 million (compared to \$77.7 million in 2015–16) and revenue from government was \$59.7 million (compared to \$71.7 million in 2015–16). The MDBA continued to manage over \$4.9 billion (gross value) in assets comprising dams, weirs, locks and water entitlements used for achieving The Living Murray Initiative (LMI) objectives.

Other revenue received of \$6.3 million (compared to \$14.7 million in 2015–16) comprises interest, rent for land and cottages, royalty from hydropower generation and grant funding.

The *Public Governance, Performance and Accountability Act 2013 (Cth)* has brought about significant changes to the way in which the MDBA approached its overall resource management. Consistent with 2015–16, the MDBA's operating account sits outside of the consolidated revenue fund.

The MDBA's closing equity (net assets) is \$63.2 million (compared to \$60.8 million in 2015–16).

On 21 September 2015, Machinery of Government (MOG) changes transferred responsibility for water policy and resources from the Department of the Environment to the Department of Agriculture and Water Resources. In 2015–16, MDBA received its departmental and administered appropriations directly under the Appropriations Act. In 2016–17 funding was appropriated to the Department of Agriculture and Water Resources and is specified within the Annual Appropriation Bill as a payment to the MDBA.

Financial results

Figure 4.1 shows there has been an increase in contributions received from the jurisdictions and there has been a steady level of revenue received from the Australian Government, which represents core funding for Basin Plan related functions.

Other own source revenue decreased in 2016–17 primarily due to the impact of water volumes released from Dartmouth Dam during 2015–16 being much greater than the current financial year.

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 River Murray Operations (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 the declining cash reserves.

General and special purpose reporting

The financial statements are general-purpose financial report and refers to the economic dependency on the Australian Government in order to administer the entity and its functions.

One of the key functions of the MDBA is to act as an asset manager for key infrastructure assets throughout the Basin. Infrastructure assets comprise of \$2.6 billion (written down value) in RMO assets (such as Hume and Dartmouth dams, and the locks and weirs on the River Murray). More assets are being added as major water management structures are completed under the Environmental Works and Measures Program.

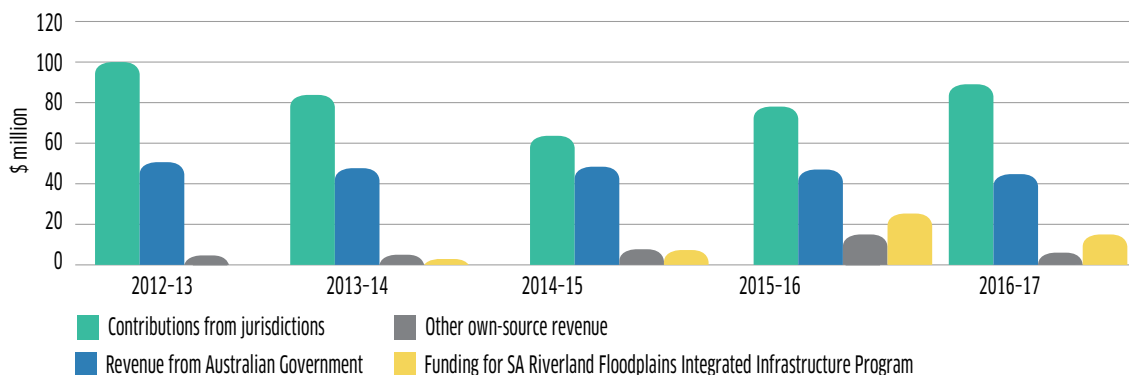


Figure 4.1 MDBA revenue (2012-13 to 2016-17)

Notes:

- The 2012-13 contributions include a one-off contribution of \$10 million for the Hume Dam Improvement project.
- The 2012-13 revenue from government figures include a \$3.3 million one-off contribution for the above Hume Dam Improvement project.

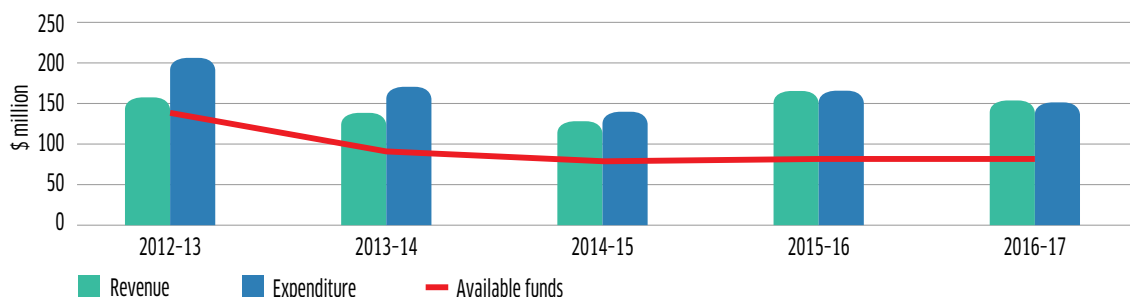


Figure 4.2 MDBA expenditure and special account (2012-13 to 2016-17)

Notes:

- Available funds have been in decline due to the additional expenditure on Environmental Works and Measures Program, the acquisition of water entitlements for LMI and other capital projects.
- The MDBA became a corporate Commonwealth entity with the commencement of the *Public Governance, Performance and Accountability Act 2013*; one implication was that the MDBA special account under the *Financial Management and Accountability Act 1997* was abolished and the funds were drawn from the Special Account on 30 June 2014. The table above includes previous balances of the special account and amounts now held in cash at bank for comparative purposes.
- The Murray-Darling special account is not a Special Account for the purpose of the *Public Governance, Performance and Accountability Act 2013*.

The MDBA also manages water entitlements worth \$623 million on behalf of Basin states and the Commonwealth, as part of the LMI joint venture. These assets were either purchased from the market or acquired as a result of infrastructure improvement based saving projects. These assets are subject to valuation on an annual basis and are valued (on a consistent basis) in accordance with Australian Accounting Standards (AAS).

RMO and LMI assets do not form part of the MDBA's general-purpose financial statements. They are reported separately in 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.

In turn, the asset values reported in the special-purpose financial statements provide the formal basis for the Australian Government, and other state controlling governments, to reflect their controlling shares in these assets in their respective financial statements.

Internal controls

The MDBA has appropriate financial controls in place and that these operated effectively and reliably during the past year. Similarly, no major issues have been identified by the MDBA's internal audit process.

It is relevant to note that we have:

- » a sound internal control framework, including effective identification and management of business risks in the MDBA, with supporting procedures in place
- » reliable financial and management reporting systems
- » complied with applicable laws, regulation and government policies (including assessing the need to report any 'significant' non-compliance breaches with Finance Law to the Minister for Agriculture and Water Resources).

Compliance

Section 19 of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act) requires, among other things, that accountable authorities of Commonwealth entities notify their responsible Minister, as soon as practicable, of any significant issue that has affected the entity.

Compliance surveys were carried out throughout the 2016–17 financial year to capture non-compliance with the PGPA Act, Rules or Australian Government policies.

There are no 'significant' breaches of the PGPA Act, Rules or Australian Government policies for 2016–17.

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 Comcover, Comcare, Department of Treasury and the Department of Finance to the value of \$1.185 million.

FINANCIAL MANAGEMENT

During the year the major focus has been on:

- » re-engineering the MDBA's performance planning and reporting processes
- » completing a scoping study to transfer RMO assets from Microsoft Excel into the Financial Management Information System (FMIS)
- » successfully implementing a Strategic Business Partner model that improved the communication and knowledge sharing between the finance section and the business units
- » preparing the financial statements of the MDBA for 2016–17 based on the reduced disclosure requirements (RDR) as required under the Public Governance, Performance and Accountability (Financial Reporting) Rule 2015 (FRR)
- » effectively managing the process of movement of funds to forward years related to the South Australian Riverland Floodplains Integrated Infrastructure Project (SARFIIP). The SARFIIP movement of funds has been approved by the Minister for Finance
- » implementing 'red tape' reduction initiatives such as moving spending proposals from paper based approval process to electronic approval process within the financial management information system (FMIS) and aligning the FMIS with other business systems.

The MDBA was successful in securing ongoing funding for 2017–18 and the forward estimates as part of the a joint submission on the extension of funding for Australian Government water functions from 2017–18, including effective management of the Functional and Efficiency Review of the Murray–Darling Basin Authority and other Australian Government water-related agencies.

The MDBA continued to investigate share service arrangements opportunities. In line with the recommendations from the Functional Efficiency Review (FER) a prudent approach is being adopted to shared services as the shared services market takes time to mature.

The payroll functions within the MDBA will be outsourced during the first quarter of the 2017–18 financial year.

FINANCIAL PERFORMANCE

Revenues

The MDBA receives revenue from three sources:

- » funding from Australian Government (for Basin Plan related functions)
- » contributions from Australian, state and territory governments (for Murray-Darling Basin Agreement related functions)
- » other miscellaneous revenue including, rent from land and cottages, royalty from hydropower generation and interest.

During 2016–17, the MDBA received revenues from the Australian Government totalling \$59.7 million (2015–16: \$71.7 million). In 2016–17, revenue from government included \$15 million (2015–16: \$25 million) for the South Australian Riverland Floodplains Integrated Infrastructure Project. Until 2015–16 this funding was classified as Administered funding.

During 2016–17, contributions from jurisdictions was \$88.3 million (compared to \$77.7 million in 2015–16). The increase in contributions was due to the restoration of previously deferred maintenance and construction activities and improvements to asset management processes.

Other revenue received of \$6.3 million (compared to \$14.7 million in 2015–16) comprises of interest, rent for land and cottages, royalty from hydropower generation and grant funding.

Expenditures

The MDBA's total expenditure for 2016–17 was \$151.8 million (compared to \$164.4 million in 2015–16). The change is primarily due to the South Australian Riverland Floodplains Integrated Infrastructure Program. Table 4.1 outlines the main features of our financial performance.

Table 4.1 MDBA financial performance from 2012–13 to 2016–17

MDBA		2012–13 Actuals \$'000	2013–14 Actuals \$'000	2014–15 Actuals \$'000	2015–16 Actuals \$'000	2016–17 Actuals \$'000
Outcome 1 and total departmental	Revenue	155,802	137,434	127,058	164,136	154,218
	Expenses	204,729	169,274	138,244	164,416	151,794
	Surplus (deficit)	-49,126	-31,876	-11,186	-280	2,424

FINANCIAL POSITION

The MDBA's net equity position increased in 2016–17 by \$2.4 million to \$63.2 million. The increase is primarily due to the capitalisation of leasehold improvements partly offset by an increase in other payables in relation to the lease incentive.

The lease incentive is deferred and amortised over the lease term.

Assets and asset management

The MDBA's financial and non-financial assets at the end of 2016–17 were \$86.0 million and \$9.9 million respectively. Financial assets primarily consist of cash and cash equivalents. Non-financial assets primarily consist of leasehold improvements, intangible assets and property, plant and equipment.

Liabilities

Liabilities administered directly by the MDBA at the end of 2016–17 amounted to \$32.6 million. Liabilities mainly consist of amounts owing to suppliers, provisions for employee entitlements and payables in relation to the lease incentive.

Total equity

The MDBA ended the year with a total equity of \$63.2 million, Table 4.2, consisting mainly of cash resources, minor fixed assets offset by trade creditors, employee entitlements and the lease incentive payable.

Managed assets: joint ventures

Two joint ventures were established through separate agreements: *Asset Agreement for River Murray Operations Assets*; and the *Further Agreement on Addressing Water Overallocation 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 achieve the objective of River Murray Operations (RMO)
- » water entitlements acquired to achieve the objective of The Living Murray Initiative (LMI).

The assets are controlled and held by the two unincorporated joint ventures.

At 30 June 2017, the RMO joint venture held net assets of \$2.6 billion including the Hume and Dartmouth dams and the locks and weirs on the River Murray. As the larger construction projects have now been completed, the RMO infrastructure asset base remained fairly constant during 2016–17. This is reflected in a similar depreciation charge for 2016–17 of \$38.6 million (2015–16 \$37.9 million). Assets acquired under the asset agreement comprise plant and equipment purchases of \$2.1 million and assets constructed and held in Work In Progress (WIP) of \$8.4 million. The internal management revaluation using the Building Price Indexation movement for Sydney, Melbourne, and Adelaide from June 2016 to June 2017 resulted in assets being increased in value by \$67.4 million in 2016–17.

The LMI joint venture held net assets of \$623.0 million comprising gross investment in water recovery measures of \$695.9 million and accumulated impairment losses of \$72.9 million. The significant change in the LMI asset values during 2016–17 was the impairment reversal on water entitlements of \$16.1 million.

Table 4.2 MDBA equity from 2012–13 to 2016–17

Measurement	2012–13	2013–14	2014–15	2015–16	2016–17
Assets	154,456	108,038	96,695	88,648	95,837
Liabilities	48,310	33,768	33,611	27,853	32,618
Total equity	106,146	74,270	63,084	60,795	63,219



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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 2017 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
13 September 2017

Signed.....
Harish Madan
Chief Finance Officer
13 September 2017



INDEPENDENT AUDITOR'S REPORT

To the Minister for Agriculture and Water Resources

Opinion

In my opinion, the financial statements of the Murray-Darling Basin Authority for the year ended 30 June 2017:

- (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 Murray-Darling Basin Authority as at 30 June 2017 and its financial performance and cash flows for the year then ended.

The financial statements of the Murray-Darling Basin Authority, which I have audited, comprise the following statements as at 30 June 2017 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 and forming part of 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 Murray-Darling Basin Authority 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* to the extent that they are not in conflict with the *Auditor-General Act 1997* (the Code). 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.

Accountable Authority's Responsibility for the Financial Statements

As the Accountable Authority of the Murray-Darling Basin Authority the Chief Executive is responsible under the *Public Governance, Performance and Accountability Act 2013* for the preparation and fair presentation of annual financial statements that comply with Australian Accounting Standards – Reduced Disclosure Requirements and the rules made under that Act. The Chief Executive is also responsible for such internal control as the Chief Executive determines is necessary to enable the preparation and fair presentation 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 Murray-Darling Basin Authority's ability 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 matters related to going concern as applicable 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

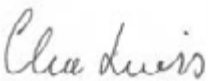
My objective is to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that 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 those charged with governance 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



Clea Lewis

Executive Director

Delegate of the Auditor-General

Canberra

13 September 2017

Statement of Comprehensive Income
for the period ended 30 June 2017

	Notes	2017 \$'000	2016 \$'000	Original Budget \$'000
NET COST OF SERVICES				
Expenses				
Employee benefits	1.1A	37,052	36,920	38,048
Suppliers	1.1B	86,479	87,504	104,911
Grants	1.1C	26,181	37,483	40,000
Depreciation and amortisation	2.2A	1,768	2,034	2,322
Write-down and impairment of assets	1.1D	302	460	-
Finance costs	1.1E	12	4	-
Total expenses		151,794	164,405	185,281
Own-Source Income				
Own-source revenue				
Contributions from jurisdictions	1.2A	88,332	77,708	88,332
Grants	1.2B	1,632	1,742	-
Interest		1,256	1,698	-
Other revenue	1.2C	3,406	11,279	2,852
Total own-source revenue		94,626	92,427	91,184
Gains/(Losses)				
Other Gains/(Losses)	1.2D	(185)	(27)	-
Reversal of write-downs and impairment		38	-	-
Total Gains/(Losses)		(147)	(27)	-
Total own-source income		94,479	92,400	91,184
Net cost of services		(57,315)	(72,005)	(94,097)
Revenue from Government	1.2E	59,739	71,736	84,746
Surplus/(Deficit) attributable to the Australian Government		2,424	(269)	(9,351)
OTHER COMPREHENSIVE INCOME				
Changes in asset revaluation surplus		-	(11)	-
Total comprehensive income		2,424	(280)	(9,351)
Total comprehensive income attributable to the Australian Government		2,424	(280)	(9,351)

The original budget comprises the Departmental budget as disclosed in the Portfolio Budget Statements (PBS) 2016-17.

The above statement should be read in conjunction with the accompanying notes.

Budget Variances Commentary

Budget variance explanations are outlined in Note 6. The original budget balances have been adjusted so as to be consistent with the financial statement classification.

Statement of Financial Position
as at 30 June 2017

	Notes	2017 \$'000	2016 \$'000	Original Budget \$'000
ASSETS				
Financial assets				
Cash and cash equivalents	2.1A	81,955	80,963	51,244
Trade and other receivables	2.1B	4,031	2,975	4,066
Total financial assets		85,986	83,938	55,310
Non-financial assets				
Leasehold improvements	2.2A	5,514	414	-
Property, plant and equipment	2.2A	2,298	1,205	1,425
Intangibles	2.2A	1,533	1,601	9,261
Other non-financial assets	2.2B	506	1,490	54
Total non-financial assets		9,851	4,710	10,740
Total assets		95,837	88,648	66,050
LIABILITIES				
Payables				
Suppliers	2.3A	15,532	15,935	13,082
Other payables	2.3B	5,660	1,702	4,968
Total payables		21,192	17,637	18,050
Provisions				
Employee provisions	4.1A	10,218	9,968	11,774
Other provisions	2.4A	1,208	248	217
Total provisions		11,426	10,216	11,991
Total liabilities		32,618	27,853	30,041
Net assets		63,219	60,795	36,009
EQUITY				
Contributed equity ¹		(11,199)	(11,199)	(11,199)
Reserves		-	-	11
Retained surplus		74,418	71,994	47,197
Total equity		63,219	60,795	36,009

The above statement should be read in conjunction with the accompanying notes.

1. Please refer to the Statement of Changes in Equity for more information.

Budget Variances Commentary

Budget variance explanations are outlined in Note 6. The original budget balances have been adjusted so as to be consistent with the financial statement classification.

Statement of Changes in Equity
for the period ended 30 June 2017

	2017 \$'000	2016 \$'000	Original Budget \$'000
CONTRIBUTED EQUITY/CAPITAL¹			
Opening balance			
Balance carried forward from previous year	(11,199)	(11,199)	(11,199)
Closing balance as at 30 June	(11,199)	(11,199)	(11,199)
RETAINED EARNINGS			
Opening balance			
Balance carried forward from previous year	71,994	74,272	56,548
Adjustment for errors	-	(2,009)	-
Adjusted opening balance	71,994	72,263	56,548
Comprehensive income			
Surplus/(Deficit) for the year	2,424	(269)	(9,351)
Other comprehensive income	-	-	-
Total comprehensive income	2,424	(269)	(9,351)
Closing balance as at 30 June	74,418	71,994	47,197
ASSET REVALUATION RESERVE			
Balance carried forward from previous year	-	11	11
Comprehensive income			
Other comprehensive income	-	(11)	-
Total comprehensive income	-	(11)	-
Closing balance as at 30 June	-	-	11
TOTAL EQUITY			
Opening balance			
Balance carried forward from previous year	60,795	63,084	45,360
Adjustment for errors	-	(2,009)	-
Adjusted opening balance	60,795	61,075	45,360
Comprehensive income			
Surplus/(Deficit) for the year	2,424	(269)	(9,351)
Other comprehensive income	-	(11)	-
Total comprehensive income	2,424	(280)	(9,351)
Closing balance as at 30 June	63,219	60,795	36,009

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 6. The original budget balances have been adjusted so as to be consistent with the financial statement classification.

Cash Flow Statement
for the period ended 30 June 2017

	Notes	2017 \$'000	2016 \$'000	Original Budget \$'000
OPERATING ACTIVITIES				
Cash received				
Receipts from Government		59,739	71,736	84,746
Contributions from jurisdictions		88,332	77,708	88,332
Grants		1,393	1,530	-
Interest		1,268	1,674	-
Net GST received		9,126	8,756	10,491
Other		3,099	8,867	2,852
Total cash received		162,957	170,271	186,421
Cash used				
Employees		36,667	39,017	38,013
Suppliers		94,963	92,267	115,437
Grants		27,299	37,483	40,000
Other		133	-	-
Total cash used		159,062	168,767	193,450
Net cash received/(used by) operating activities		3,895	1,504	(7,029)
INVESTING ACTIVITIES				
Cash used				
Purchase of property, plant and equipment		2,365	1,153	2,010
Purchase of intangible assets		538	659	-
Total cash used		2,903	1,812	2,010
Net cash used by investing activities		(2,903)	(1,812)	(2,010)
Net Increase/(decrease) in cash held		992	(308)	(9,039)
Cash and cash equivalents at the beginning of the reporting period		80,963	81,271	60,283
Cash and cash equivalents at the end of the reporting period	2.1A	81,955	80,963	51,244

The above statement should be read in conjunction with the accompanying notes.

Budget Variances Commentary

Budget variance explanations are outlined in Note 6. The original budget balances have been adjusted so as to be consistent with the financial statement classification.

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 administered activities in respect of 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* (the 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 2016; 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 2017

Note 1.1: Expenses

	2017 \$'000	2016 \$'000
Note 1.1A: Employee Benefits		
Wages and salaries	26,655	26,219
Superannuation:		
Defined contribution plans	2,861	2,810
Defined benefit plans	2,118	2,475
Leave and other entitlements	4,445	4,271
Separation and redundancies	973	1,145
Total employee benefits	37,052	36,920

Accounting policy

Accounting policies for employee related expenses are outlined in Note 4.1.

Note 1.1B: Suppliers

Goods and services supplied or rendered

Expenditure by State Constructing Authorities	53,280	54,820
Water licence fee	4,572	3,888
Consultants and contractors	15,566	14,357
Communication & IT services	3,392	5,510
Other employment expenses	1,566	1,758
Committee expenses	1,135	1,143
Travel	1,507	1,148
Other provision of goods & services	2,524	2,071
Goods and services supplied or rendered	83,542	84,695

Goods and services are made up of:

Provision of goods	1,218	1,448
Rendering of services	82,324	83,247
Total goods and services supplied or rendered	83,542	84,695

Other suppliers

Operating lease rentals	1,870	1,800
Workers compensation expenses - government entity	1,067	1,009
Total other suppliers	2,937	2,809
Total suppliers	86,479	87,504

Leasing Commitments

The Authority in its capacity as a lessee holds the following leases:

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).

Operating leases held by the Authority are effectively non-cancellable.

Note: Commitments are GST inclusive where relevant.

Note 1.1: Expenses - continued

	2017 \$'000	2016 \$'000
Commitments for minimum lease payments in relation to non-cancellable operating leases are payable as follows:		
Within 1 year	2,306	1,866
Between 1 to 5 years	9,519	-
More than 5 years	12,509	-
Total operating lease commitments	24,334	1,866

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

State and Territory Governments ¹	23,564	33,843
Local Governments	-	11
Private sector:		
Commercial entities	1,158	1,811
Non-profit institutions	1,403	1,525
Other	56	293
Total grants	26,181	37,483

1. Includes the South Australian Riverland Floodplains Integrated Infrastructure Project of \$15m (2016:\$25m).

Note 1.1D: Write-Down and Impairment of Assets

Impairment of financial instruments	6	2
Impairment of computer software	-	54
Revaluation decrement of leasehold improvements	-	354
Revaluation decrement of other property plant and equipment	296	50
Total write-down and impairment of assets	302	460

Note 1.1E: Finance Costs

Unwinding of discount on make good provision	12	4
Total finance costs	12	4

Note 1.2: Own-Source Income

	2017	2016
Own-Source Revenue	\$'000	\$'000

Note 1.2A: Contributions from Jurisdictions

Australian Government	12,960	9,989
New South Wales	28,454	24,699
Victoria	27,068	23,568
South Australia	19,444	19,054
Queensland	102	100
Australian Capital Territory	304	298
Total contributions from jurisdictions	88,332	77,708

Accounting policy

The Authority receives contributions from jurisdictions based on an agreed contributions model (the model). The model, which has been carried forward from the Authority's predecessor agency, the Murray-Darling Basin Commission, is based on a number of different requirements including specific provisions under the Murray-Darling Basin Agreement.

Note 1.2B: Grants Received

South Australia Barrage Fishways	550	1,118
Victorian River Murray Constraints	-	624
NSW Constraints Business Case Development Project	1,082	-
Total grants received	1,632	1,742

Note 1.2C: Other Revenue

Hydropower generation	1,194	5,073
Contributions by States - Salinity program	747	805
Victoria's contribution to Lindsay Island project	-	3,394
Land and cottage rents	333	352
Other	1,132	1,655
Total other revenue	3,406	11,279

Accounting policy

Revenue from rendering of services 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.

Note 1.2: Own-Source Income - continued

	2017	2016
Gains/(Losses)	\$'000	\$'000

Note 1.2D: Other Gains/(Losses)

Gain/(loss) on movement in provisions	(28)	(27)
Additional expense not recognised through provision on settlement of restoration provision	(53)	-
Loss on disposal/write-off of assets	(104)	-
Total other gains/(losses)	(185)	(27)

Revenue from Government

Note 1.2E: Revenue from Government

Departmental appropriations:		
- Basin Plan Activities	44,739	46,736
- South Australian Riverland Floodprints Integrated Infrastructure Project	15,000	25,000
Total revenue from Government	59,739	71,736

The South Australian Riverland Floodplains Integrated Infrastructure Project (SARFIIP) aims to enhance the effectiveness of improved environmental flows to South Australia (SA) in particular at the Pike and Katarapko - Eckert's Creek (Katfish Reach) Floodplains. A budget of \$40 million for 2016-17 financial year was allocated for the SARFIIP project. Based on the updated delivery schedule for 2016-17 from SA, only \$15 million was provided to SA for 2016-17 out of the total available funding of \$40 million. The SARFIIP movement of funds have been approved by the Minister for Finance.

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

	2017 \$'000	2016 \$'000
Note 2.1A: Cash and Cash Equivalents		
Cash on hand	81,955	80,963
Total cash and cash equivalents	81,955	80,963

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	565	74
Net GST receivable from the Australian Taxation Office	2,577	1,962
Other Receivables	889	971
Total goods and services receivable	4,031	3,007

Less impairment allowance

Goods and services	-	32
Total impairment allowance	-	32
Total trade and other receivables (net)	4,031	2,975

Credit terms for goods and services were within 30 days (2016: 30 days).

The Authority has not provided any loans (2016: no loans).

Accounting policy

Trade and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as 'loans and receivables'. Receivables for goods and services, which have 30 day terms, are recognised at the nominal amounts due less any impairment allowance account. Collectability of debts is reviewed at the end of the reporting period. Allowances are made when collectability of the debt is no longer probable.

Note 2.1: Financial Assets - continued**Reconciliation of the Impairment Allowance****Movements in relation to 2016**

	Goods and services	Total
	\$'000	\$'000
As at 1 July 2015	30	30
Increase recognised in net cost of services	2	2
Amounts written off	-	-
Total as at 30 June 2016	32	32

Movements in relation to 2017

	Goods and services	Total
	\$'000	\$'000
As at 1 July 2016	32	32
Increase recognised in net cost of services	-	-
Amounts written off	(32)	(32)
Total as at 30 June 2017	-	-

Accounting policy

Financial assets are assessed for impairment at the end of each reporting period.

If there is an indication that receivables may be impaired, the Authority makes an estimation of the receivable's recoverable amount. When the carrying amount of the receivable exceeds the recoverable amount, it is considered impaired and is written down to its recoverable amount.

Note 2.2: Non-Financial Assets

Note 2.2A: Reconciliation of the Opening and Closing Balances of Property, Plant and Equipment and Intangibles

Reconciliation of the opening and closing balances for 2017

	Leasehold improvements \$'000	Other property, plant & equipment \$'000	Intangible assets		Total \$'000
			Computer software ¹ \$'000	Data sets \$'000	
As at 1 July 2016					
Gross book value	414	1,205	6,758	817	9,193
Accumulated depreciation, amortisation and impairment	-	-	(5,972)	(2)	(5,974)
Total as at 1 July 2016	414	1,205	786	815	3,220
Additions					
Purchased	5,619	1,943	638	55	8,255
Revaluation decrements and reversals recognised in net cost of services	38	(296)	-	-	(258)
Depreciation and amortisation	(526)	(481)	(488)	(273)	(1,768)
Disposals (Net Book Value)	(31)	(73)	-	-	(104)
Total as at 30 June 2017	5,514	2,298	936	597	9,345
Total as at 30 June 2017 represented by					
Gross book value	5,658	2,394	7,396	872	16,320
Accumulated depreciation, amortisation and impairment	(144)	(96)	(6,460)	(275)	(6,975)
Total as at 30 June 2017	5,514	2,298	936	597	9,345
Total intangible assets			1,533		

¹ The carrying amount of computer software in-use only includes purchased software.

All non-financial assets have been assessed for impairment indicators. Where indicators have been identified due to physical damage, obsolescence or performance short falls, an impairment calculation has been performed.

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.

A revaluation of leasehold improvements, property, plant and equipment was undertaken as at 31 March 2017. This resulted in a decrement and a reversal of a previous decrement recognised in net cost of services.

The Authority has a contractual commitment to purchase Data sets for \$40,000 in FY19. There are no contractual commitments for the acquisition of property, plant and equipment.

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 as at 31 March 2017 by Deloitte Touche 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 to the Authority using, in all cases, the straight-line method of depreciation.

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	2016-17
Computers and IT equipment	3-7 years (2016; 3-4 years)
Office equipment	2-5 years
Leasehold improvements	Lease term
Data sets	3-20 years
Software applications	3-4 years
Software licences	Length of licence but within range of 1-4 years

Impairment

All assets were assessed for impairment at 30 June 2017. 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 2017.

	2017 \$'000	2016 \$'000
Note 2.2B: Other Non-Financial Assets		
Prepayments	506	1,490
Total other non-financial assets	506	1,490

No indicators of impairment were found for other non-financial assets.

Note 2.3: Payables

	2017 \$'000	2016 \$'000
Note 2.3A: Suppliers		
Trade creditors and accruals	15,532	15,809
Operating lease rentals	-	126
Total suppliers	15,532	15,935

Settlement terms are 30 days. The total represents Financial Liabilities measurement at amortised cost.

Note 2.3B: Other Payables

Wages and salaries	306	189
Superannuation	38	20
Lease incentive	4,092	131
Prepayments received/unearned income	1,123	1,362
Other	101	-
Total other payables	5,660	1,702
Other payables expected to be settled		
No more than 12 months	1,805	1,702
More than 12 months	3,855	-
Total other payables	5,660	1,702

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.

Note 2.4: Other Provisions

	2017 \$'000	2016 \$'000
Note 2.4: Other Provisions		
Provision for make good	1,208	248
Total other provisions	1,208	248

	Provision for restoration \$'000	Total \$'000
Carrying amount 1 July 2016	217	217
Unwinding of discount or change in discount rate	4	4
Additional provisions made	27	27
Closing balance 2016	248	248

	Provision for restoration \$'000	Total \$'000
Carrying amount 1 July 2017	248	248
Unwinding of discount or change in discount rate	12	12
Amounts paid on settlement	(80)	(80)
Revaluation increment of provision	28	28
Additional provisions made	1,000	1,000
Closing balance 2017	1,208	1,208

The Authority currently has 2 (2016: 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.

Funding

This section identifies the Authority's funding.

Note 3.1: Appropriations

Note 3.1A: Annual Appropriations (Recoverable GST exclusive)

Annual Appropriations for 2017

	Appropriation Act		PGPA Act		Total appropriation \$'000	Appropriation applied in 2017 (current and prior years) \$'000	Variance \$'000
	Annual Appropriation \$'000	AFM \$'000	Section 74 \$'000	Section 75 \$'000			
Departmental							
Ordinary annual services	-	-	-	-	-	-	-
Total departmental	-	-	-	-	-	-	-

In 2016-17 the MDBA received Government funding through the portfolio department and as such no appropriation disclosure is required.

Annual Appropriations for 2016

	Appropriation Act ¹		PGPA Act		Total appropriation \$'000	Appropriation applied in 2016 \$'000	Variance \$'000
	Appropriation ² \$'000	AFM \$'000	Section 74 \$'000	Section 75 \$'000			
Departmental							
Ordinary annual services	46,736	-	-	-	46,736	46,736	-
Total departmental	46,736	-	-	-	46,736	46,736	-
Administered³							
Ordinary annual services							
Administered items	25,000	-	-	-	25,000	25,000	-
Total administered	25,000	-	-	-	25,000	25,000	-

1. As at 30 June 2016, the Appropriations Receivable balance was Nil.

2. In 2015-16, there were no appropriations that have been withheld (Section 51 of the PGPA Act) or quarantined for administrative purposes.

3. Due to the transition of the Authority from an Agency under the FMA Act 1997 to a corporate Commonwealth entity, for the purposes of the PGPA Act 2013, the administered item 'South Australian Riverland Floodplains Integrated Infrastructure Project' (SARFILP) is recorded in the Authority's Statement of Comprehensive Income.

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 4.1: Employee Provisions

	2017 \$'000	2016 \$'000
Note 4.1: Employee Provisions		
Leave	10,011	9,729
Separations and redundancies	207	239
Total employee provisions	10,218	9,968
Employee provisions expected to be settled		
No more than 12 months	3,555	3,640
More than 12 months	6,663	6,328
Total employee provisions	10,218	9,968

Accounting policy

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 by reference to the shorthand method 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 scheme 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 final fortnight of 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 4.2: 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 and Water Resources, 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:

	2017 \$'000
Short-term employee benefits	1,721
Other long-term employee benefits	138
Post-employment benefits	240
Total key management personnel remuneration expenses¹	2,099

The total number of key management personnel included in the above table is 12.

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 4.3: 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 4.2), 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 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 \$118,000. There is nil balance 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 5.1: 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 2017.

Unquantifiable Contingencies

In addition to the above matters, 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 included 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 5.2: Financial Instruments

	2017 \$'000	2016 \$'000
Note 5.2A: Categories of Financial Instruments		
Financial Assets		
Loans and receivables		
Cash and cash equivalents	81,955	80,963
Trade and other receivables	1,454	1,013
Total loans and receivables	83,409	81,976
Total financial assets	83,409	81,976
Financial Liabilities		
Financial liabilities measured at amortised cost		
Trade creditors and accruals	15,532	15,809
Total financial liabilities measured at amortised cost	15,532	15,809
Total financial liabilities	15,532	15,809

Accounting policy

Financial Assets

The Authority classifies its financial assets in the following categories:

- held-to-maturity investments; and
- loans and receivables.

The classification depends on the nature and purpose of the financial assets and is determined at the time of initial recognition. Financial assets are recognised and derecognised upon trade date.

Loans and Receivables

Trade and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as 'loans and receivables'. The Authority did not have any loans during 2016-17. Receivables are measured at cost less impairment.

Impairment of Financial Assets

Financial assets are assessed for impairment at the end of each reporting period.

If there is an indication that receivables may be impaired, the Authority makes an estimation of the receivable's recoverable amount. When the carrying amount of the receivable exceeds the recoverable amount, it is considered impaired and it is written down to its recoverable amount.

Financial Liabilities

The Authority's financial liabilities consist of trade creditors and accruals, amounts owing to research providers and other payables. These liabilities are recognised at their nominal amounts, being the amounts which the Authority expects the liabilities will be settled. Liabilities are recognised to the extent the goods and services have been received (and irrespective of having been invoiced).

Note 5.3: Fair Value Measurements

Accounting policy

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.

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 5.3A: Fair Value Measurements

	Fair value measurements at the end of the reporting	
	2017	2016
	\$'000	\$'000
ASSETS		
Assets measured at fair value		
Leasehold improvements	5,514	414
Other property, plant and equipment	2,298	1,205
Total assets measured at fair value	7,812	1,619
Assets measured at other than fair value, but approximate fair value²		
Cash and cash equivalents	81,955	80,963
Trade and other receivables	4,031	2,975
Total assets measured at other than fair value, but approximate fair value	85,986	83,938
Assets measured at cost		
Intangibles	1,533	1,601
Other non-financial assets	506	1,490
Total assets measured at cost	2,039	3,091
Total assets stated in the Statement of Financial Position	95,837	88,648
LIABILITIES		
Liabilities measured at fair value		
Provision for restoration	1,208	248
Total liabilities measured at fair value	1,208	248
Liabilities measured at other than fair value, but approximate fair value²		
Suppliers	15,532	15,935
Other payables	5,660	1,702
Total liabilities measured at other than fair value, but approximate fair value	21,192	17,637
Liabilities measured at cost		
Employee provisions	10,218	9,968
Total liabilities measured at cost	10,218	9,968
Total liabilities stated in the Statement of Financial Position	32,618	27,853

1. The Authority did not measure any non-financial assets at fair value on a non-recurring basis as at 30 June 2017 (2016: Nil).

2. These items carrying amount equate to their fair values.

Budget Variances

Note 6: 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
In the current year actual expenditure for the South Australian Riverland Floodplains Integrated Infrastructure Project was less than the anticipated budget. While the general scheme of works was understood when funding was committed to South Australia in 2013-14 there has been a range of engineering, ecological and cultural heritage studies required to refine the scheme and optimise design to achieve desired outcomes within budget. This activity has taken longer than envisaged when the original funding profile was established. As a result major construction has not commenced as planned. Some early works to construct two major regulators have been approved but construction was delayed by recent major flooding on the River Murray. Furthermore, the Authority has experienced significant fluctuations in its spending against budget due to the impact of the complex nature of joint programs, which reflect a high level of inherent risk associated with capital construction and environmental projects. For example, work at the major dam sites is only possible at certain points of the year; many other works are also impacted by the levels in the rivers; accessibility of the terrain around construction sites (e.g. wetlands) may be restricted at points in the year and cultural heritage issues (e.g. preservation of cultural sites which may require complex and lengthy approvals), may lead to further delays. Similarly, there was a decrease in the related cashflows (including GST).	Statement of Comprehensive Income: - Suppliers - Grants Statement of Financial Position: - Cash and cash equivalents - Suppliers - Other payables Cash Flow Statements: - Net GST received - Suppliers - Grants
The variance is due to the SARFIP movement of funds approved by the Minister of Finance of \$25 million to out years. See commentary under Suppliers and Grants expenditure.	Statement of Comprehensive Income: -Revenue from Government Cash Flow Statement: -Receipts from Government
Two grant agreements were entered into after the original budget estimate was determined. The grants relate to the South Australia Barrage Fishways and the NSW Constraints Business Case Development Project.	Statement of Comprehensive Income: - Grants Cash Flow Statement: - Cash received - grants
Budget did not anticipate interest income being derived.	Statement of Comprehensive Income: - Interest Cash Flow Statement: - Cash received - Interest
MDBA acquired leasehold improvement and property plant and equipment assets during the 2016-17 financial year due to the accommodation move. The cost associated with the move was not budgeted for the 2016-17 financial year. At the time of preparing the 2016-17 PBS, Data sets were recognised as intangibles. Subsequent to the preparation of the budget, the LiDar Data sets were made public and therefore expensed in the financial statements of the MDBA.	Statement of Financial Position: - Leasehold improvements - Property plant and equipment - Intangibles
Suppliers are higher than the anticipated budget due to greater work being done in June 2017 than the previous year. Major contributors to expenditure in June were: (i) a second dredging operation was reinstated at Murray Mouth and reached full production in June; (ii) riparian works program continued into June to complete planned works. In June 2016 the same program was hampered by higher river flows; and (iii) repairs caused by Oct-Nov floods were completed in June. Some of these required lower river flows to complete. This occurred after the irrigation season finished.	Statement of Financial Position: - Suppliers
Employee provision actuals are less than the anticipated budget due to a combination of (i) an increase in leave taken by employees; and (ii) a net reduction in the leave provisions due to employees with high entitlements leaving the Authority.	Statement of Financial Position: - Employee provisions
Other provisions increased due to the new make good provision required on signing of the new accommodation lease of 33 Allara street.	Statement of Financial Position: - Other provisions

APPENDICES AND REFERENCES

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Aerial view of Macquarie Marshes.

APPENDIX A

The Regulator Performance Framework

The Australian Government has committed to reducing the cost of unnecessary or inefficient regulation imposed on individuals, business and community organisations.

The Regulator Performance Framework is intended to assist in highlighting where improvement of regulatory frameworks could reduce compliance costs. The framework requires Australian Government regulators to self-assess their regulatory performance once every 12 months. Regulatory performance is based on six key performance indicators and each regulator has developed its own metrics based on these indicators.

The Murray–Darling Basin Authority's self-assessment against its agreed framework metrics for the 2016–17 reporting period is still in the process of being externally verified. The Murray–Darling Basin Authority is committed to the process and will publish the self-assessment online once it has been released.

The MDBA's regulatory activity subject to the Regulator Performance Framework

There are contextual factors that influence how much of the MDBA's work is subject to the framework. It is important to understand these factors as they influence the MDBA's self-assessment.

Firstly, the entities regulated by the MDBA are primarily Basin State governments or their agencies. Only a very small portion of the work involves direct regulation of non-government entities. Given that the focus of the framework is on impacts of regulation on individuals, business and community organisations (i.e. non-government entities), only a very small portion of the MDBA's work is subject to the framework.

The Regulator Performance Framework does, however, cover the administration of the Basin Plan water trading rules as those rules apply to individual traders and irrigation infrastructure operators. This is a relatively minor component of the MDBA's overall work and imposes a minimal regulatory burden – the annual compliance cost has been estimated at less than \$15,000 for the entire regulated community.

Secondly, the relevant regulatory work is already well into the implementation phase guided by comprehensive stakeholder consultation that included irrigation infrastructure operators and irrigation bodies. This included Bilateral meetings held with regulated entities at each major stage of the decision-making process, prior to the enactment of the water trading rules in July 2014.

The consultation included a strong focus on how to minimise compliance burden on individuals, business and community organisations. As well as helping to promote transparency and accountability, this ultimately resulted in a trade rules system that imposes minimal burden on those concerned.

APPENDIX B

Governance bodies meetings and outcomes

The Authority

The six member Authority met 12 times during the financial year. Ten meetings were held in Canberra, one in Albury, and one in Melbourne to coincide with the 100th anniversary of the first meeting of the River Murray Commission and the launch of the book *Sharing the water – 100 years of River Murray politics*. The Authority agreed to meet more regularly in regional areas to improve engagement with Basin stakeholders.

The Authority's key areas of work this year included developing amendments to the Basin Plan, particularly in the northern Basin, facilitating the operation of the Sustainable Diversion Limit Adjustment Mechanism, progressing the assessment of state water resource plans and commencing the 2017 evaluation of Basin Plan outcomes.

Significant outcomes include:

- » finalising the Northern Basin Review and proposing amendments to the Basin Plan to change the sustainable diversion limit settings in the northern Basin, change Sustainable Diversion Limits in some groundwater areas and to make minor improvements to the Basin Plan
- » advising the Murray–Darling Basin Ministerial Council on the Sustainable Diversion Limit Adjustment Mechanism and the above mentioned Basin Plan amendments including in relation to pre-requisite policy measures
- » recommending accreditation of the first water resource plan for the Warrego–Paroo–Nebine catchments in Queensland to the Minister for Agriculture and Water Resources
- » commencement of the 2017 evaluation of the first five years of operation of the Basin Plan
- » progressing technical advice on a range of issues including sustainable diversion limit accounting, constraints, and multi-year environmental watering priorities.

Murray–Darling Basin Ministerial Council

The Murray–Darling Basin Ministerial Council is comprised of the Australian Government Minister for Agriculture and Water Resources, the Hon. Barnaby Joyce MP, and the Basin state ministers with responsibility for the Murray–Darling Basin. At 30 June 2017 Basin state ministers were:

- » Mr Mick Gentleman (Australian Capital Territory)
- » The Hon. Niall Blair MP (New South Wales)
- » The Hon. Anthony Lynham MP (Queensland)
- » The Hon. Ian Hunter MLC (South Australia)
- » The Hon. Lisa Neville MP (Victoria).

Meetings and outcomes

The Murray–Darling Basin Ministerial Council met three times in 2016–17: Adelaide in November 2016, Mildura in March 2017 and Canberra in June 2017. The communiqués from these meetings are available on our website.

The Ministerial Council achieved a number of significant outcomes during 2016–17, both in and out of session, including:

- » obtaining endorsement from the Council of Australian Governments for the Ministerial Council's plan to provide credible and balanced pathways to implement and deliver the Basin Plan package agreed in 2012
- » agreeing to increase the Ministerial Council's focus on Aboriginal engagement to improve the inclusion of Aboriginal interests in water resource management, in order to achieve cultural and economic outcomes without impacting existing rights
- » agreeing to continue funding for the Indigenous Partnership Program in 2016–17
- » agreeing to broaden the terms of reference for the Southern Connected Basin Environmental Watering Committee so that it could approve jointly funded The Living Murray activities
- » agreeing to our proposal to amend the Basin Plan in the northern Basin, including in-principle agreement for Queensland, New South Wales and the Commonwealth governments to implement a range of 'toolkit' measures
- » endorsing work to identify ways to achieve environmental outcomes and to reduce the impacts of floods through pre-releases and

different flow regimes that better mimic natural conditions, without impacting long and short term reliability

- » considering the socio-economic outcomes of the Basin Plan and agreeing to the terms of reference for an independent analysis of efficiency measures, to ensure neutral or improved socio-economic outcomes
- » endorsing the final package of Sustainable Diversion Limit Adjustment Mechanism projects.

Basin Officials Committee

The Murray–Darling Basin Officials Committee was established by the Murray–Darling Basin Agreement, Schedule 1 to the Water Act. The committee facilitates cooperation and coordination between the Australian Government, the MDBA and the Basin state governments in funding works and managing the Basin's water resources.

Membership of the committee comprises officials from the six Basin governments and is chaired by the Australian Government committee member. The Authority Chair and our Chief Executive are non-voting members of the Committee.

The committee is responsible for providing advice to the Murray–Darling Basin Ministerial Council and for implementing policy and decisions of the Council on matters such as state water shares and the coordination of environmental watering.

The committee has high-level decision-making responsibilities for river operations, including: setting objectives and outcomes to be achieved by the MDBA in River Murray Operations and providing advice to the Ministerial Council on the joint programs component of the corporate plan. As at 30 June 2017, committee membership comprised:

- » Deputy Chair, Mr Paul Morris (Australian Government)
- » Mr Matt Kendall (alternate member for the Australian Capital Territory)
- » Mr Gavin Hanlon (New South Wales)
- » Mr David Wiskar (Queensland)
- » Mr Ben Bruce (South Australia)
- » Ms Helen Vaughan (acting member for Victoria).

Ms Helen Vaughan replaced Ms Kate Houghton in late 2016–17 as acting member of the Basin Officials Committee for Victoria.

Mr David Wiskar replaced Ms Leanne Barbeler in late 2016–17 as member of the Basin Officials Committee for Queensland.

Meetings and outcomes

The Basin Officials Committee held eight meetings during 2016–17 and achieved the following significant outcomes:

- » approved the external consultancy for the River Operations Framework changes to continue until 30 June 2017
- » approved the establishment of the Menindee Sustainable Diversion Limit Adjustment Mechanism Project Inter-governmental Working Group to report to the Sustainable Diversion Limit Adjustment Assessment Committee and the Basin Officials Committee
- » agreed to a process for the Ministerial Council to present to the Council Of Australian Governments a credible and balanced pathway plan to implement the Basin Plan package agreed in 2012
- » endorsed the draft 2017–18 to 2020–2021 Joint Programs Annual Work Plan and Budget
- » endorsed the final package of Sustainable Diversion Limit Adjustment Mechanism projects.

Basin Plan Implementation Committee

In August 2013, the finalised Implementation Agreement established the new Basin Plan Implementation Committee (BPIC) as a high-level forum to monitor, review and make decisions around implementing the agreement. The MDBA chairs the committee which has members from the Basin state agencies responsible for water resource management and environmental watering, the Commonwealth Environmental Water Holder and the Australian Government Department of Agriculture and Water Resources.

Four Basin Plan Implementation Committee working groups were also established – water resource planning, environmental watering, trade rules, and monitoring and evaluation. These technical working groups also have Basin government representatives and have been set up to progress the tasks outlined in

the implementation agreement. The MDBA also chairs each working group and provides secretarial support.

Meetings and outcomes

The committee met three times in 2016–17. A completion plan outlining the steps for finalising state water resource plans within the June 2019 timeframe, was developed and agreed. The risks that may impede this timeframe were identified and mitigation strategies were agreed. A review of these will occur in line with BPIC meetings. The committee collaborated on amendments to the Basin Plan and discussed the work and information sharing required for the 2017 evaluation of the Basin Plan's implementation.

The working groups have met frequently to progress the many tasks under the implementation agreement. These tasks include:

- » identifying and addressing risks to meeting the June 2019 timeframe in consultation with the Water Resource Planning Working Group
- » progressing the development and implementation of the Register of Take for surface water and groundwater compliance
- » progressing the transition to SDL work program and delivery of Water Take reports
- » supporting the delivery of streamlined criteria for water resource planning and assessment
- » sharing and discussing progress, challenges and information on long-term environmental watering plans and watering priorities
- » reviewing approaches to monitoring and evaluation and providing guidance to states, particularly in relation to Schedule 12 and matter 18
- » working with states to resolve high priority trade issues

River Murray Operations Committee

The River Murray Operations Committee was established to provide support and advice to the Basin Officials Committee on responsibilities with regards to River Murray Operations. It met four times in Canberra in 2016–17.

The committee provides formal oversight of River Murray Operations which we manage on behalf of the relevant contracting governments in accordance with the provisions of the agreement, including:

- » 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:
 - » preparation of corporate plans in relation to River Murray Operations
 - » preparation of the asset management plan and any amendments to the asset management plan
 - » coordination of waterway management functions of New South Wales, Victoria and South Australia in relation to the River Murray system.

Basin Community Committee

The role of the Basin Community Committee includes providing advice to us about the performance of our functions, including:

- » engaging the community in the implementation of the Basin Plan
- » community matters relating to the Basin water resources
- » matters referred to the committee by the Authority.

The Basin Community Committee advises the Murray–Darling Basin Ministerial Council on the Murray–Darling Basin and its functions under the Murray–Darling Basin Agreement, which may include matters such as delivery of natural resource management programs.

In carrying out these functions, the committee liaises with the broader Basin community by convening meetings with regional Basin stakeholders during the implementation process for the Basin Plan. They also carry out liaison activities to help provide advice to the Authority and the Murray–Darling Basin Ministerial Council. At 30 June 2017, the 11 member committee comprised:

- » Chair, Rory Treweeke, Lightning Ridge (New South Wales)
- » Di Bowles, Cohuna (Victoria)
- » Paul Harvey, Adelaide (South Australia)
- » Karen Hutchinson, Griffith (New South Wales)
- » Howard Jones, Dareton (New South Wales)
- » Christopher Joseph, Dalby (Queensland)
- » Anthony Martin, Merbein (Victoria)
- » Russell Pell, Wyuna (Victoria)
- » Joanne Pfeiffer, Murray Bridge (South Australia)
- » Grant Rigney, Meningie (South Australia)
- » Jason Wilson, Walgett (New South Wales).

Meetings and outcomes

The Basin Community Committee held four meetings during 2016–17 including a regional meeting in Mildura and a tour to the Sunraysia district. The following significant outcomes have been achieved by the Basin Community Committee during 2016–17:

- » provided strategic advice to the MDBA on its engagement with communities during the Northern Basin Review and Basin Plan Amendments community consultation phases
- » provided strategic and timely advice to the Authority and Ministerial Council on water reform community engagement and provided assistance to us with coordinating and facilitating community meetings.

The Basin Community Committee also provided advice on the 2017 Basin Plan evaluation, the northern Basin socioeconomic analysis outcomes, monitoring and evaluation, cultural flows and Aboriginal engagement.

Northern Basin Advisory Committee

The Northern Basin Advisory Committee concluded on 31 December 2016. The committee met three times during the year – twice in

Canberra and once in Moree. The Committee had 21 formal meetings over its four-year term. Members were involved in various sub-committees which met regularly, providing important input to the discussion around the Northern Basin Review, including changes to the Sustainable Diversion Limit in the northern Basin.

Membership of the committee comprised:

- » Mal Peters (Chair), Ashford (New South Wales)
- » John Clements, Wee Waa (New South Wales)
- » Ed Fessey, Brewarrina (New South Wales)
- » Katrina Humphries, Moree (New South Wales)
- » Bruce McCollum, Goondiwindi (Queensland)
- » Sarah Moles, North Branch (Queensland)
- » Michelle Ramsay, Bonshaw (Queensland)
- » Donna Stewart, St George (Queensland)
- » Ian Todd, St George (Queensland)
- » Jason Wilson, Dubbo (New South Wales)
- » Geoff Wise, Dubbo (New South Wales).

The Committee provided a final report *Finding the balance – final report of the Northern Basin Advisory Committee*, which articulated the need for a toolkit of complementary measures to be an integral part of any changes to the sustainable diversion limit in the northern Basin.

During the Committee's final months, members participated in Basin Plan amendment engagement tours of the northern Basin, working with their communities to help explain the reasoning behind changes to the sustainable diversion limit and the results of the studies of the socioeconomic impacts in the northern Basin.

The MDBA thanks the Northern Basin Advisory Committee for all the work done by members in helping progress the work of the MDBA in the northern Basin.

Advisory Committee on Social, Economic and Environmental Sciences

The MDBA established the Advisory Committee on Social, Economic and Environmental Sciences to provide high-level, strategic advice on a range of scientific matters relevant to implementing the Basin Plan. Members of the committee bring skills and eminence in the fields of economics, hydrology, ecology and resilience, water governance and law, sociology and sustainable

systems. As at 30 June 2017, committee members comprised:

- » Professor Stuart Bunn (Chair)
- » Professor Kate Auty
- » Dr Steve Hatfield-Dodds
- » Dr David James
- » Associate Professor Mike Stewardson
- » Professor Poh-Ling Tan.

The diversity of the members' skills provides a valuable opportunity to integrate across the scientific disciplines and to help ensure that our work is based on the best possible scientific advice. Strategic advice from the committee is used in developing a coherent approach to identifying knowledge gaps, aligning collective efforts, and identifying new ways to connect and communicate the complex technical issues that underpin a healthy working Basin. An example of the committee's contribution is their strategic advice on the Basin Plan Monitoring and Evaluation framework through a workshop-style meeting in February 2017.

The committee met in Canberra three times in 2016-17.

APPENDIX C

Communication products

The MDBA produces a range of communication products each year, in printed and electronic formats.

Publications – print and online

2016–17 Basin annual environmental watering priorities (05/16)

A survey of Aboriginal water interests in the Murray–Darling Basin – A summary report (28/16)

Assessment of environmental water requirements for the Northern Basin review: Condamine–Balonne river system 2016 (23/16)

Bank erosion along the River Murray between Hume Dam and the Ovens Junction (09/17)

Basin environmental watering outlook for 2017–18 (08/17)

Basin Environmental watering priorities – overview and technical summaries (19/17)

Basin Environmental watering priorities – Gunbower Forest case study

Basin Environmental watering priorities – Macquarie Marshes case study

Basin Plan amendments – A summary of progress (15/17)

Basin Plan Amendments – Plain English Summary (26/16)

Basin Plan annual report 2015–16 (04/17)

Community consultation report – Proposed Basin Plan amendments (14/17)

Constraints Management Strategy annual progress report 2016 (13/17)

Environmental outcomes of the Northern Basin Review (22/16)

Floodplain and vegetation inundation using Landsat satellite imagery (21/16)

Hydrologic modelling for the Northern Basin Review (35/16)

Identifying locations and timing of water extractions in the Barwon–Darling using remote sensing data (17/17)

Lake Victoria Annual Compliance Report 2014–15 (02/16)

Lake Victoria annual report 2015–16 (18/17)

Lower Balonne Floodplain grazing model report (38/16)

MDBA annual report 2015–16 (25/16)

Northern Basin Review – Community consultation report (41/16)

Northern Basin Review overview report (39/16)

Northern Basin Review – Technical overview of the socioeconomic analysis – interim report (40/16)

Objectives and outcomes for river operations in the River Murray System (06/16)

Our water, our life: An aboriginal study in the northern Basin (04/16)

Proposed groundwater amendments to the Basin Plan (37/16)

Proposed groundwater amendments to the Basin Plan – additional information (06/17)

River Murray system annual operating plan 2016–17 (15/16)

River Murray system annual operating plan End October 2016 update (36/16)

Sharing the water – One hundred years of River Murray politics (43/16)

Since the millennium drought – lessons learnt and changes made along the River Murray system (42/16)

Stand condition assessment of forests and woodlands of Barmah Forest – 2015 (44/16)

Stand condition assessment of forests and woodlands of Chowilla Floodplain – 2015 (49/16)

Stand condition assessment of forests and woodlands of Gunbower Forest – 2015 (50/16)

Stand condition assessment of forests and woodlands of Hattah Lakes – 2015 (48/16)

Stand condition assessment of forests and woodlands of Koondrook-Perricoota Forest – 2015 (46/16)

Stand condition assessment of forests and woodlands of Lindsay, Mulcra and Wallpolla Islands – 2015 (47/16)

Stand condition assessment of forests and woodlands of Millewa Forest – 2015 (45/16)

The triple bottom line framework (34/16)

Water Audit Monitoring Report 2011–12: Report of the Murray–Darling Basin Authority on the Cap on Diversions (20/16)

Brochures and fact sheets

Basin Plan Amendments – snapshot of groundwater changes (32/16)

Basin Plan Amendments – snapshot of minor practical changes (33/16)

Basin Plan Amendments – snapshot of northern Basin changes (31/16)

CONASTA 2016 education flyer (03/16)

Healthy rivers Healthy communities (02/17)

Northern Basin Review community profile for each of the 21 locations across the northern Basin

Salt of the earth – salinity management in the Murray–Darling Basin (12/17)

The Murray–Darling Basin at a glance (07/16)

Weed Wipeout: augmented reality factsheet for Lake Mulwala (01/16)

Why we need the Murray–Darling Basin Plan

Website

Audio video content: [youtube.com/user/mdbamedia](https://www.youtube.com/user/mdbamedia) (nine new videos)

Corporate site: mdba.gov.au

River stories: riverstories.mdba.gov.au

APPENDIX D

Agency resource statement

These tables show the funding sources the Murray-Darling Basin Authority has drawn upon during 2016-17.

Table D.1 MDBA agency resource statement 2016-17 (excluding GST)

	Actual available appropriation for 2016-17 \$'000 (A)	Payments made 2016-17 \$'000 (B)	Balance remaining 2016-17 \$'000 (A)-(B)
Ordinary annual services¹			
Departmental appropriation			
Transfer of Special Account balance ²	80,963	(992)	81,955
Departmental appropriation ³	84,746	59,739	25,007
Own-source income ⁴	94,626	94,626	-
Total ordinary annual services	260,335	153,373	106,962
Total available annual appropriations	260,335	153,373	106,962
Total net resourcing for MDBA	260,335	153,373	106,962

1 Appropriation Bill (No.1) 2016-17

2 On 1 July 2014, the MDBA ceased to be an Agency under the FMA Act and became a corporate Commonwealth entity for the purposes of the *Public Governance, Performance and Accountability Act, 2013* as amended (PGPA Act).

One of the outcomes associated with this change was that the MDBA elected to fully draw-down the existing cash balance of \$91.427 million and transfer these monies to the MDBA's bank account. This was to facilitate the subsequent transfer of these funds on 1 July 2014 to a new operating account that functions outside of the Official Public Account. The value of the bank balance at 30 June 2017 is \$81.955 million.

3 The variance between the actual appropriation and payments made during the year primarily relates to SARFIIP funding. To better align with the revised expenditure plan for SARFIIP, \$25.0 million was phased to forward three years.

4 Own-source income comprises of mainly the jurisdictions contributions to the MDB Agreement functions.

The MDBA did not receive a Departmental Capital Budget in 2016-17.

Agency resources for outcome 1

Table D.2 Budgeted expenses for outcome 1

	Budget 2016-17 \$'000 (A)	Actual 2016-17 \$'000 (B)	Variation 2016-17 \$'000 (A)-(B)
Program 1.1 Equitable and sustainable use of the Murray-Darling Basin			
Revenue from Government			
Payment from related entities ¹ (For Basin Plan related functions)	84,746	59,739	25,007
Payment from related entities (Commonwealth share of contribution to MDB Agreement functions)	12,960	12,960	-
Revenue from other independent sources (Basin States contribution to MDB Agreement functions) ²	78,224	81,481	(3,257)
Total for Program 1.1	175,930	154,180	21,750
Outcome 1 Totals by resource type			
Revenue from Government			
Payment from related entities ¹ (For Basin Plan related functions)	84,746	59,739	25,007
Payment from related entities (Commonwealth share of contribution to MDB Agreement functions)	12,960	12,960	-
Revenue from other independent sources (Basin States contribution to MDB Agreement functions) ²	78,224	81,481	(3,257)
Total expenses for Outcome 1	175,930	154,180	21,750

- 1 The variance between the actual appropriation and payments made during the year primarily relates to SARFIIP funding. The remaining balance is redistributed to outer years subsequent to the approval obtained from the Minister of Finance.
- 2 Revenue from other independent sources include contributions from jurisdictions for MDB Agreement functions, other miscellaneous revenue and funds drawn from Murray-Darling Basin special account. Murray-Darling Basin special account is not a Special Account for the purpose of the *Public Governance, Performance and Accountability Act 2013*.

	2012-13	2013-14	2014-15	2015-16	2016-17
Average staff level (number)	305	295	289	286	291

APPENDIX E

Advertising and market research

This table of expenditure for 2016–17 is presented in accordance with the reporting requirements in s.311A of the Commonwealth Electoral Act 1918. Expenditure was in the media advertising category only.

Table E.1 MDBA media advertising for 2016–17

Agency	Purpose	Expenditure \$ (excluding GST)
Fairfax	Press advertising for consultation	16,018.50
Herald Weekly Times	Press advertising for consultation	7,400.00
Denstu Mitchell Pty Ltd	Press advertising for consultation and river operations	7,087.09
Nationwide News Pty Ltd	Press advertising for consultation	5,615.40
News Limited	Press advertising for consultation	2,838.58
Facebook	Facebook advertising for website	653.96
Suraysia Publishing Company	Press advertising for consultation	302.5
Office of Parliamentary services	Advertising of submissions period	300
International Association for Public Participation Australasia Limited	Recruitment advertising	275
Navoc Pty Ltd	Press advertising for consultation	240
Ethical jobs	Recruitment advertising	130
Warren Weekly Pty Ltd	Press advertising for consultation	109.09
Total		40,970.12

APPENDIX F

Ecologically sustainable development and environmental performance

Ecologically sustainable development is at the core of our activities and business. The *Water Act 2007* 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 – that 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 our core business activities, which include:

- » 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 which will help to maximise environmental outcomes and contribute to the conservation of biodiversity and ecological integrity within the Basin
- » using The Living Murray's environmental

water portfolio to meet the environmental objectives of the target sites, which includes 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 also follows the principles of ecologically sustainable development in internal operations and implemented a number of initiatives, including:

Recycling by:

- » operating a paper, cardboard, battery, comingled and organic waste recycling program.
- » using 100% recycled or partially recycled stock for all print publications.
- » recycling printer cartridges.
- » changing over toilet paper suppliers to 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 default 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 sensor operated taps in bathrooms; using low flow taps in all kitchen areas.

Reducing power consumption by:

- » implementing server virtualisation for IT network.
- » enabling computers monitors to turn off overnight to save power.
- » using power-efficient centralised multi-function devices instead of distributed desktop printing.

- » operating lighting 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.

Travel

- » in 2016–17, MDBA staff travelled 147,193 km by car (an average of 589 km per employee), and 2,053,603 km by plane (an average of 8,430 km per employee). Also caught the bus 10 times, the train once and worked away from home for a total of 1,924 room nights.
- » interstate travel was reduced by utilising teleconferences, Skype and videoconferencing, where possible, although in 2016–17 there continued to be extensive travel throughout the Basin due to the importance of meeting face-to-face with community members.
- » 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
- » continue to look for further opportunities in internal operations and premises to further minimise impact on the environment.

Sustainability



Continued to work towards the sustainable use of water resources in the Murray–Darling Basin by implementing the Basin Plan.



Continued to reduce energy consumption by power saving measures and buying energy efficient equipment.



Around 40% of staff regularly cycle to work.



Continued to reduce the number of printed publications.



Much of the organic waste from kitchens is recycled.

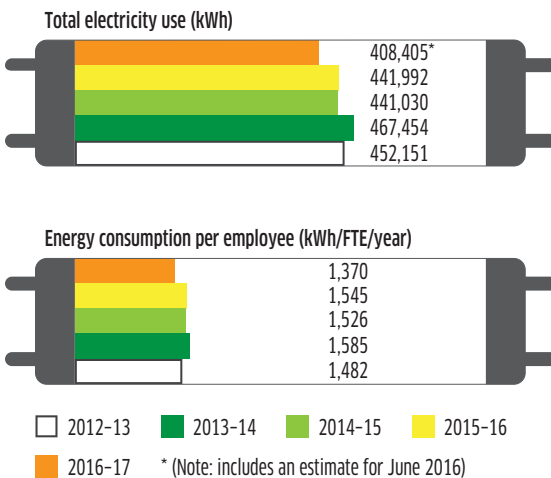


Figure F.1 MDBA energy use 2011 to 2016

ABBREVIATIONS AND ACRONYMS

ADF	Additional Dilution Flow
AHD	Australian height datum
AHIP	The Aboriginal Heritage Impact Permit
AWA	The Aboriginal Waterways Assessment initiative
BCC	Basin Community Committee
BMEC	Barkindji and Maraura Elders Council
BOAG	Barrage Operating Advisory Group
BoM	Bureau of Meteorology
BPIC	Basin Plan Implementation Committee
the CAP	Murray–Darling Basin Cap on diversions
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DO	Dissolved oxygen
DPI Water	New South Wales Department of Primary Industries
EC	electrical conductivity unit
EWN	Early Warning Network
GL	gigalitre (a billion litres)
IVT	Inter Valley Trade
LMI	Living Murray Initiative
MDBA/the Authority	Murray–Darling Basin Authority: the agency/the six member Authority
ML	megalitre (a million litres)
ML/day	megalitres per day
MLDRIN	Murray Lower Darling Rivers Indigenous Nations
Ministerial Council	Murray–Darling Basin Ministerial Council
NBAN	Northern Basin Aboriginal Nations
WRP	Water resource plan
WQM	Water Quality Management
REOs	Regional engagement officers
RMIF	River Murray Increased Flows
SARFIIP	South Australian Riverland Integrated Infrastructure Program
SA Water	South Australian Water Corporation
SDL	sustainable diversion limit
SO&O	Specific Objective and Outcome

GLOSSARY

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

Describes how wet or dry a catchment is before rain, as 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 the Australian continent. 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

The Australian National Committee on Large Dams Incorporated is 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.

Basin states

For the purposes of the Basin Plan, the Basin states are defined in the Water Act as New South Wales, Victoria, Queensland, South Australia and the Australian Capital Territory.

Basin water resources

Under the *Water Act 2007*, Basin water resources are within or beneath the Murray–Darling Basin, but do not include water resources within or beneath the Basin that are prescribed by the regulations, or 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 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

A constraint is anything that affects the delivery of environmental water. It can include physical aspects such as low lying bridges, or river channel capacity, but can also include operational aspects such as river rules or operating practices that impact on when and how much water can be delivered.

We can improve how effectively we manage and deliver environmental water by looking at how we can change some of these physical and operational constraints.

Consumptive use

Use of water for irrigation, industry, urban, stock and domestic use, or for other private consumptive purpose.

Conveyance water

Conveyance water is 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.

Setting aside water for conveyance and critical human needs aims 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.

EC

Water and soil salinity levels are measured by passing an electric current between the two electrodes of a salinity meter. Electrical current (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. Freshwater above 800 EC becomes marginal for drinking, above 1,600 EC it is brackish, and above 4,800 EC it is saline.

Efficiency measure

Provide 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; 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 event of flow in a river, sometimes required to achieve one or more 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

Held environmental water is 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, and inflow for a stream or river could be rain.

Joint governments

Includes the Australian Government, and governments of New South Wales, Victoria, South Australia, and Australian Capital Territory

Keeping place

A community museum housing Aboriginal artefacts, art and information.

Macroinvertebrate

An animal without a backbone that is large enough to be seen without magnification.

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)

MLDRIN was formed in 1998 as a confederation of Indigenous Nations from the southern part of the Basin. It comprises representatives of the Barapa Barapa, Barkindji (Paakantyi), Dhudhuroa, Dja Dja Wurrung, Latji Latji, Maraura, Mutti Mutti, Nari Nari, Ngarrindjeri, Ngintait, Nyeri Nyeri, Tatti Tatti, Taungurung, Wadi Wadi, Wamba Wamba, Waywurru, Wegi Wegi, Wergaia, Wiradjuri, Wolgalu, Wotjabaluk, Yaitmathang, Yita Yita, Yorta Yorta.

Northern Basin Aboriginal Nations (NBAN)

NBAN was formed in April 2010 and 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.

NBAN comprises Traditional Owner nominated representatives from the following Nations:

Barkindji (Paakantyi), Barunggam, Bidjara, Bigambul, Budjiti, Euahlayi, Gamilaroi, Githabul, Gunggari, Gwamu (Kooma), Jarowair, Kambuwai, Kunja, Kwiambul, Maljangapa, Mandandanji, Mardigan, Murrawarri, Ngemba, Ngiyampaa, Wailwan and Wakka Wakka.

Ramsar Convention

The Convention on Wetlands of International Importance is 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 or flow levels are controlled through the use of structures such as dams and weirs.

Salt interception scheme

Large-scale groundwater pumping and drainage projects that intercept saline groundwater inflowing to rivers, and dispose 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 after having risen to the surface naturally from underground (see s. 4 of the Water Act).

The maximum long-term annual average quantities 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

Allows the sustainable diversion limit to be adjusted under certain circumstances.

Take

Take is the removal of water from, or the 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 accounting applies Australian Water Accounting Standards

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 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 after having 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 streamflow and other hydrologic data.

CONTENT REQUIREMENTS

Mandatory requirements for the content of annual reports for corporate Commonwealth entities are prescribed by the *Public Governance, Performance and Accountability Rule 2014* (PGPA Rule).

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Any government policy orders that applied in relation to the entity during the period under section 22 of the Act	n/a
If, during the period, the entity has not complied with a direction or order referred to above – particulars of non-compliance	n/a
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RELATED ENTITY TRANSACTION

The decision-making process undertaken by the accountable authority for making a decision if:

- the decision is to approve the entity paying for a good or service from another Commonwealth entity or a company, or providing a grant to another Commonwealth entity or a company 98
- the entity, and other Commonwealth entity or the company, are related entities 98
- the value of the transaction, or if there is more than one transaction, the aggregate value of those transactions, is more than \$10,000 (inclusive of GST) 98

If there is only one transaction – the value of the transaction n/a

If there is more than one transaction – the number of transactions and the aggregate of value of the transactions 98

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Any significant activities and changes that affected the operations or structure of the entity during the period 10–11

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Particulars of judicial decisions or decisions of administrative tribunals made during the period that have had, or may have, a significant effect operations. Particulars of any report by:

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- a Committee or either House, or of both Houses, of the Parliament 85
- the Commonwealth Ombudsman 85
- the Office of the Australian Information Commissioner 85

OBTAINING INFORMATION FROM SUBSIDIARIES

If the accountable authority has been unable to obtain information from a subsidiary of the entity that is required to be included in the annual report n/a

INDEMNITIES AND INSURANCE PREMIUMS

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Published by the Murray-Darling Basin Authority

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Electronic copies of this annual report are available at mdba.gov.au

MDBA publication No. 28/17

ISSN 1003-6745

ISBN 978-1-925599-22-0 (print)

978-1-925599-37-4 (online)

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Cover image: Dawn on the Murray River as participants in the 2016 Massive Murray Paddle prepare for the day's paddling ahead (photo by Brayden Dykes).

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