



Australian Government



# Basin Plan Adaptive Management Framework

## 2017 Basin Plan Evaluation

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### **Acknowledgement of the Traditional Owners of the Murray–Darling Basin**

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

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

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

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# Introduction

## What is the 2017 Evaluation?

In 2015 the Government committed to undertake an evaluation after the first five years of Basin Plan implementation to provide an update on the progress with implementation, early outcomes, and guidance for future implementation. A fuller evaluation is scheduled for 2020.

The 2017 Evaluation expands on work undertaken as part of annual Basin Plan reporting, and looks at trends over the five year implementation period. It draws on some new research in key areas of interest as well as a range of monitoring data. The results of the evaluation will help refine and improve ongoing implementation of the Basin Plan and lay a platform for building towards the comprehensive Basin Plan evaluation in 2020.

## Purpose of the 2017 Evaluation

The overarching purpose of the 2017 evaluation is to:

- a. take stock of whether Basin Plan implementation was on track
- b. evaluate the impacts and benefits of the implementation of the Basin Plan so far
- c. identify any areas where the implementation of the Basin Plan could be improved, including through better monitoring and evaluation.

The evaluation findings should be:

- a. useful for decision-making by communities, industries and governments
- b. valuable for informing ongoing implementation of the Basin Plan
- c. valuable for informing the process to deliver the full evaluation of the Basin Plan in 2020.

## Scope of the 2017 Evaluation

The 2017 Evaluation assesses implementation to date, and outcomes with respect to what was expected at this stage. It also notes any early indicators of success in achieving the anticipated long-term outcomes.

The following components of the Basin Plan are included in the 2017 evaluation:

- water recovery to bridge the gap to the new sustainable diversion limits
- environmental water management and responses
- implementation of the water trade rules
- implementation of the water quality and salinity management plan
- progress in developing water resource plans

- progress with scheduled reviews and adjustments to the Basin Plan (the Northern Basin Review and Groundwater reviews, and the associated amendments, and progress towards the Sustainable Diversion Limit (SDL) Adjustment Mechanism)
- environmental, social and economic effects of all these activities.

# An evaluation of the Basin Plan as an Adaptive Management Framework

## Purpose

The purpose of the evaluation of the Basin Plan as an Adaptive Management Framework is to determine how well the Basin Plan is operating in terms of enabling and achieving adaptive management of the Basin's water resources. In the simplest terms, the key evaluation questions for this Evaluation can be summarised as:

- What has been the progress with Basin Plan implementation and how effective has it been in enabling adaptive management?
- What have been the outcomes from Basin Plan implementation in relation to adaptive management?
- How might future implementation be improved to ensure water is adaptively managed?

## Scope

The Basin Plan is major public policy reform that is underpinned by several years of research and analysis, as well as consultation with water users and water managers at all levels of community, industry and government. The Plan is dynamic, and was designed so it could be refined and updated in response to new knowledge and information, and new approaches for managing water. As such, the Basin Plan is an adaptive management framework for the Basin water resources.

## The Basin Plan's definition of Adaptive Management

Adaptive Management is enabled through a cycle of planning, management and evaluation resulting in adaptation (Figure 1). In the Basin Plan Adaptive Management is taken to include the following steps:

- a. setting clear objectives;
- b. linking knowledge (including local knowledge), management, evaluation and feedback over a period of time;
- c. identifying and testing uncertainties;
- d. using management as a tool to learn about the relevant system and change its management;
- e. improving knowledge;
- f. having regard to the social, economic and technical aspects of management.

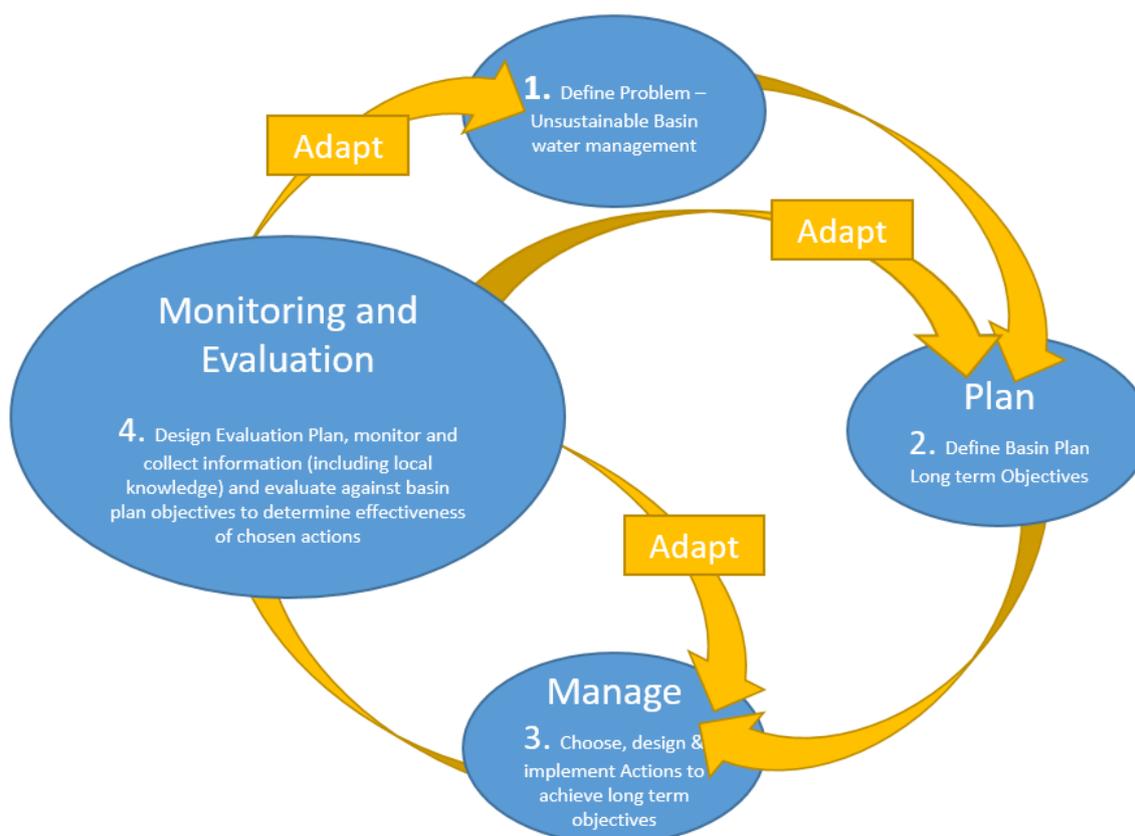


Figure 1. The adaptive management cycle. Planning consists of defining the problem, objectives, the link between objectives and proposed actions and selecting actions; management consists of design and implementation of the actions and evaluation plan; and evaluation involves analysis and synthesis of monitoring to inform adaptation. Adaptation can happen at any of the steps.

## Basin Plan adaptive management framework mechanisms

One of the Basin Plan's objectives is to provide a sustainable and long-term adaptive management framework for the Basin water resources that takes into account the broader management of natural resources in the Murray-Darling Basin (Figure 2). The Basin Plan does this through several mechanisms. These include:

- the environmental watering plan, which enables adaptive management to be applied to the planning, prioritisation and use of environmental water;
- the monitoring, evaluation and reporting (MER) program,
- statutory reviews of elements of the Basin Plan; and
- the SDL Adjustment Mechanism.

In order to determine if the Basin Plan is operating effectively as an adaptive management framework, this evaluation looks specifically at these mechanisms. This includes an assessment of their progress after five years of Basin Plan implementation and whether they're achieving their

expected outcomes. This evaluation will focus on how to improve the Basin Plan as an adaptive management framework and is not a review of the base settings for the framework.



Figure 2. The Basin Plan, as an Adaptive Management Framework, facilitates adaptive management for all elements of the Basin Plan. Specific Basin Plan adaptive management mechanisms include the Monitoring, evaluation and reporting (MER) program, which applies to all Basin Plan mechanisms, statutory reviews, the adaptive management principle for environmental water management, and the SDL Adjustment Mechanism.

## Expectations after five years of implementation

### *Environmental watering plan (Chapter 8)*

Chapter 8 of the Basin Plan - the Environmental Watering Plan - contains overall environmental objectives and targets for water-dependent ecosystems and sets out an environmental management framework designed to better coordinate planning and management of environmental water. The environmental watering framework (EMF) includes processes for co-ordinating planning and management of environmental water, as well as principles to be applied in environmental watering. The latter includes applying the principle of adaptive management to the planning, prioritisation and use of environmental water.

It is expected, after five years of Basin Plan implementation, there will be evidence that governments are applying the principle of adaptive management in managing environmental water.

Outcome: If adaptive management is being applied it is expected that deliberate learning and improvement in environmental water management would be occurring.

Question: Are water managers adaptively managing environmental water?

### *Monitoring, Evaluation and Reporting Program (Chapter 13)*

Chapter 13 of the Basin Plan sets out the program for monitoring, evaluating and reporting on the effectiveness of the Basin Plan. It includes monitoring, evaluation and reporting principles and the Monitoring and Evaluation Framework. The Framework includes processes for reviewing and evaluating the Basin Plan, conducting audits, and assessing the condition of the Murray-Darling Basin, all of which contribute to adaptive management.

It is expected that after five years of Basin Plan implementation, the monitoring, evaluation and reporting program will have contributed to adaptive management through:

- The Authority publishing guidelines to help Basin States, the Department and the Commonwealth Environmental Water Holder fulfil their Basin Plan schedule 12 reporting requirements.
- The Authority, Basin State, CEWH and Department meeting their schedule 12 reporting requirements.
- The Authority producing the Basin Plan annual report (BPAR), which includes evaluating the effectiveness of the Basin Plan against the objectives and outcomes set out in Chapters 5, 8 and 9, and by reference to the matters listed in Schedule 12, for the purposes of annual reports on the effectiveness of the Basin Plan, as required by paragraph 214(2)(a) of the Act.
- Having regard to relevant reports produced under Part 4 (Authority, Basin State, CEWH and Department schedule 12 reporting), and the key evaluation questions in section 13.06, and any other relevant information it holds when producing the BPAR.
- The Authority, in consultation with Basin States, the Department and the Commonwealth Environmental Water Holder (as relevant), and any other relevant person or body, taking all reasonable steps to publish on its website information (including data) obtained in monitoring the effectiveness of the Basin Plan.
- The Authority taking all reasonable steps to publish on its website the findings and recommendations arising from its evaluations of the effectiveness of the Basin Plan (under Division 1 of Part 3). The Authority providing the Basin States, the Department, the Commonwealth Environmental Water Holder and any other relevant person or body with an opportunity to comment on the proposed findings and recommendations before the findings and recommendations are published.
- The Authority publishing data, reports, findings and recommendations after consultation with the Basin States, the Department, the Commonwealth Environmental Water Holder and any other relevant person or body.
- The Authority ensuring that monitoring and evaluation findings, including in respect of progress towards meeting targets and trends in the condition and availability of the Basin water resources, can enable decision-makers to use adaptive management.
- The Basin States, the Commonwealth Environmental Water Holder and the Department, when meeting their schedule 12 reporting requirements, ensuring their findings enable decision-makers to use adaptive management.

Outcome: If the monitoring, evaluation and reporting program is contributing to adaptive management it is expected there will be evidence of deliberate learning and improvement in the implementation of all Basin Plan mechanisms.

Question: Is knowledge gained through the monitoring, evaluation and reporting program informing and improving Basin Plan implementation and/or outcomes?

#### *Reviews of the Basin Plan (Chapter 6.06)*

After five years of Basin Plan implementation, it is expected that the findings from the Northern Basin review and Groundwater reviews will have provided new information that has enabled decision-makers to review Basin Plan settings.

#### Northern Basin Review:

It is expected that the Authority will have conducted research and investigations by 2015 into aspects of the Basin Plan in the northern Basin. This research would focus on the basis for the long-term average sustainable diversion limits for surface water SDL resource units, and in doing so will have drawn on local community input sought from relevant local bodies.

#### Groundwater Reviews

It is also expected that the authority will have arranged, within 2 years after the commencement of the Basin Plan, a review of the long-term average sustainable diversion limit and the baseline diversion limit for three groundwater SDL areas; the Western Porous Rock SDL resource unit, the SDL resource units in the Eastern Porous Rock water resource plan area, and the Goulburn-Murray: Sedimentary Plain SDL resource unit.

The Authority will have ensured that each review considered all relevant information about the SDL resource units to which the review relates, including modelling, State planning and policy arrangements, and an evaluation of the appropriateness of any precautionary factors associated with setting the long-term average sustainable diversion limits for the units.

Outcome: if the reviews have enabled decision makers to adaptively manage it is expected that there will be evidence that decision makers have made decisions based on the findings from these reviews.

Question: Are reviews specified in the Basin Plan informing and improving Basin Plan implementation and/or outcomes?

#### *SDL Adjustment Mechanism (Chapter 7)*

The SDL Adjustment Mechanism was included in the Basin Plan to provide the opportunity to adjust the water recovery target if projects were identified that enabled equivalent environmental outcomes to be achieved using less water. The projects, referred to as Supply Measures, were to be nominated by state governments. It would then be the responsibility of the MDBA to determine the amount by which the SDLs could be adjusted (increased) while still delivering equivalent environmental outcomes. By investing in these projects, less water would need to be recovered from irrigators. At the time of finalising the Basin Plan, some thought that supply measures had the potential to increase the SDL by 650GL.

The SDL Adjustment Mechanism also provides for investment in projects known as Efficiency Measures (for example, making water use on farms more efficient), to provide more water for the environment (with the effect of reducing SDLs) provided those projects have no adverse socio-economic outcomes. Efficiency measures have the potential to decrease the SDL by 450GL.

The net change in the SDLs allowed under the SDL Adjustment Mechanism is 5% of the SDL, or 543 GL. Therefore, if the adjustment to the SDLs from supply measure projects exceeds 543GL, efficiency measure projects must at a minimum result in an efficiency decrease in the SDL that brings it back to a net change of no more than 543GL.

Finally the SDL Adjustment mechanism provides for investment in projects called Constraints Measures that remove or ease physical or other constraints on the capacity of water holders to deliver environmental water in the Murray-Darling Basin.

All projects must be completed by 2024. If projects are not completed as planned, then a reconciliation will be done to assess whether any change to the SDLs is necessary.

There are a number of other measures (known as 'pre-requisite policy measures') that are relevant to the operation of the SDL Adjustment Mechanism. These measures were agreed when the Basin Plan was finalised and involve new rules to improve the efficiency and effectiveness of delivering environmental water. If these measures are not in place by 2019, the SDL adjustment amount would need to be recalculated and could be reduced. By 2017 it was expected there would be enough progress to indicate whether these measures would be in place by 2019.

The Basin Plan initially required Basin states nominate a package of SDL adjustment projects for MDBA consideration by June 2016. By 2017 it was expected the MDBA would have determined the SDL offset from these projects and the community consultation and more detailed project design would have commenced (noting additional Efficiency Measures can be nominated up until December 2023). However, the June 2016 deadline was extended to June 2017 to allow states to put together a better package of measures.

Outcome: If the SDL Adjustment Mechanism is enabling adaptive management it is expected that there will be evidence that improved knowledge will be informing decisions about adjusting the SDL.

Question: Has the operation of the SDL adjustment mechanism specified in the Basin Plan drawn on improved knowledge that has and/or will inform and improve Basin Plan implementation and/or outcomes?

*Overall outcome for the Basin Plan as an Adaptive Management Framework:* if the above mechanisms are being implemented and we are seeing evidence of adaptation; this would signal that the Basin Plan adaptive management framework is operating to improve social, economic and environmental outcomes.

## Method

The evaluation was undertaken via a desktop analysis of multiple information sources and interviews with MDBA and CEWO staff.

More detail about the information used can be found in each of the sections below.

# Basin Plan adaptive management framework Implementation and outcomes

## Environmental watering plan

### Analysis

This section drew directly from the evaluation findings of the environmental management framework (EMF) and Hydrology technical reports and the interviews conducted as part of the monitoring, evaluation and reporting (MER) evaluation (results are listed in the MER section below).

### Findings

#### *Water Planning and Prioritisation*

In the first five years of Basin Plan implementation, the adaptive management principle has been applied in the planning, prioritisation and use of environmental water. As a result, the method for determining the priorities that guide the planning and use of water for the environment across the Basin each year have been refined. Water managers purposefully improved the knowledge that informed 2017-18 watering priorities with a shift towards multi-year components, and recommended watering actions for a range of seasonal conditions. The improved knowledge to inform these priorities was made possible by collaborative research with Universities, other research organisations and the MDBA. Priorities for waterbirds, for instance, were based on research undertaken by the Centre for Ecosystem Science (CES), University of NSW. The MDBA commissioned the CES to identify which of the Basin's major wetlands were important during drought, flood, and moderate conditions. The MDBA then applied this research to identify waterbird priorities for each seasonal condition the Basin may experience. In drought conditions, for example, it is possible to anticipate which wetlands are likely to act as a refuges, and so be prioritised for environmental watering.

#### *Learning by Doing*

Water holders have also applied the adaptive management principle. Monitoring together with experiences from environmental watering have provided valuable learnings which have fed back into water delivery. Coordination committees have allowed insights to be shared between water holders. Examples of successful adaptive management include the refinement of golden perch spawning hydrographs in the Goulburn, the ability to maintain an environmental pulse from Menindee Lakes to the Murray Mouth and refining watering practices to improve river red gum forests at The Living Murray sites. The following case study provides an example of how adaptive management contributed to outcomes for Golden Perch in the Goulburn.

### **Case study: Learning and adapting watering strategies for native fish**

Monitoring the outcomes of watering events, improving knowledge over many years, and engaging with local communities is helping water managers to adapt watering strategies and improve outcomes.

For example, the delivery of environmental water in the Goulburn River in northern Victoria has evolved significantly since 2012-13. In 2012-13 small environmental flows (designed to mimic spring freshes) were released to stimulate Golden perch spawning and support the recovery of vegetation along the river bank. However, spawning of Golden perch was not detected, possibly due to the peak height of the flow being too low. The community raised concerns about the risk of bank slumping and notching, disruption of fishing events, and irrigators' access to pumps.

In response, the following year environmental water was delivered with a higher flow peak, and a second environmental flow was delivered to encourage semi-aquatic vegetation to grow along the banks. Water holders worked with river operators to vary water levels between the flows and also time the flows either side of the opening for the Murray cod fishing season. The first freshes triggered migration of native fish and a golden perch spawning event. New growth of bank vegetation was observed following the second environmental flow. However there were still reports of bank slumping and irrigators having restricted access to pumps.

In planning for the 2014-15 year, advice sought from scientists suggested that a sequence of flows would increase the likelihood of a positive fish response. In 2014-15, a longer flow with a gradual recession was aimed at improving vegetation growth and fish condition with a second fresh aimed at spawning, while also avoiding the Murray cod fishing season. The largest golden perch spawning event since floods in 2010 was observed following the second environmental flow. No significant community concerns were raised and anglers reported that the fishing was 'the best in years'.

The redesign of watering strategies demonstrates that the Goulburn–Broken Catchment Management Authority, environmental water holders (CEWH, VEWH and TLM), and the river operator, Goulburn–Murray Water, have worked collaboratively and used new knowledge to improve outcomes for the environment and the community.

### **End of case study**

This is a summary of a case study which can be found in **Water for the Environment: 1<sup>st</sup> edition**. This publication can be purchased at <https://www.elsevier.com/books/water-for-the-environment/horne/978-0-12-803907-6>

*Improving knowledge to inform environmental water use*

Whilst monitoring has been critical in the adaptive management cycle, water holders and independent environmental watering reviews have highlighted that monitoring could be improved to reduce duplication and provide more targeted outcomes. The EMF evaluation and MER evaluation interviews (listed in the MER section below) found that there may be opportunities to improve the formal integration of monitoring and reporting into future planning. At site scales monitoring is informing water use, but at regional and Basin-scales multiple datasets are not being as well integrated to provide broader basin scale insights.

As outlined above, the adaptive management principle is already being applied to the annual priorities process and there will be opportunities to do so for the Basin environmental Watering Strategy and Long Term Watering Plans through their review cycles. In addition, the Hydrology evaluation also found there are opportunities to improve our understanding of how water moves across the landscape, which would better inform the planning, prioritisation and use of environmental water and water management more broadly.

## Recommendations

**There is evidence that environmental water managers are using adaptive management principles to improve the identification and delivery of Basin-wide watering priorities.** The Basin Plan's environmental watering framework is supporting adaptive management to improve the planning, prioritisation and use of environmental water.

**Nonetheless, Basin governments and the MDBA should review Basin Plan reporting to make it more useful for environmental water planning and management.** Refinements could be made to monitoring and reporting to help better inform the planning, coordination and use of environmental water. Furthermore, a documented process for collating and integrating monitoring data at broader spatial scales over time to inform environmental water management would aid the coordinated and adaptive management of environmental water across the Basin.

# Basin Plan Monitoring, Evaluation and Reporting Program

## Analysis

A desktop analysis was used to evaluate the Basin Plan monitoring, evaluation and reporting program drawing on Basin Plan Schedule 12 reporting, Basin Plan Annual Reports (BPARs), and meeting papers and minutes from the interjurisdictional monitoring and evaluation working group (MEWG) and Joint Venture Steering Committee (JVSC). In addition MDBA and CEWH staff, who have participated in schedule 12 reporting and the production of the BPAR, were interviewed about their experiences with the monitoring, evaluation and reporting program and asked three questions:

1. Do you think the process of schedule 12 reporting and preparing the BPAR (this includes reviewing relevant Basin state, CEWH and MDBA schedule 12 reporting) helps you to monitor, evaluate and improve your work program?
2. Do you have other processes (formal or informal) to improve (adaptively manage) your work program? If so what are they?
3. What are the current issues or shortcomings that reduce the usefulness of schedule 12 annual reporting (MDBA's, CEWH's and Basin States') and the BPAR and how would you address those?

The use of reporting, papers, minutes and interview responses has been used to answer the three evaluation questions in relation to the Basin Plan adaptive management framework, namely:

- What has been the progress with Basin Plan implementation and how effective has it been?
- What have been the outcomes from Basin Plan implementation?
- How might future implementation be improved?

It should be noted that while Basin States and the Department have had the opportunity to review and provide comment on this evaluation, due to time and resourcing limitations they were not interviewed about their involvement in the monitoring, evaluation and reporting program, specifically schedule 12 reporting and the production of the BPAR. Basin States and the Department will have the opportunity to provide their perspectives and input on the MER program in 2018.

## Findings

In the first five years of Basin Plan implementation, the focus of the Basin Plan Monitoring, Evaluation and Reporting Program has been on annual reporting. The MDBA in consultation with the Department, CEWH, and Basin States produced Basin Plan schedule 12 reporting guidelines. These guidelines, first published in 2013 with minor updates in 2015, were designed to clarify reporting requirements and assist governments in preparing their reports. The MDBA, Department, CEWH and Basin States have subsequently met their schedule 12 annual reporting requirements throughout the first five years of Basin Plan implementation, including publishing them on the MDBA website. The MDBA, in consultation with the Department, CEWH and Basin states, has prepared the BPAR, provided it to the minister for tabling and subsequently published the BPAR on MDBA's website.

The evaluation and reporting required by the Basin Plan's monitoring, evaluation reporting program is intended to meet several purposes. In addition to providing open and transparent information on the full range of Basin Plan implementation activities and progress towards outcomes, it should be able to inform adaptive management and reviews of any elements of the Basin Plan or Basin Plan implementation.

The timely reporting and publishing is helping to ensure there is accurate information available publicly on all governments' Basin Plan activities, with information published annually through the MDBA's website. However, website analytics show that across the Basin few people are accessing this information.

When asked about their schedule 12 reporting and contributions to BPAR, key themes that came through from MDBA and CEWH staff included:

- Schedule 12 reporting and the BPAR are viewed as reporting obligations for transparency and compliance purposes.
- The schedule 12 reporting does not generally feed through to future management decisions and refinements of Basin Plan implementation.
- Improvements to program implementation has been facilitated through other avenues, this was especially true in the use of environmental water
- The timing of schedule 12 reporting and publication does not always align with opportunities to inform Basin Plan implementation decisions
- Schedule 12 reporting guidance material is designed to produce reports rather than guide evaluation.
- Schedule 12 reports are useful to produce the BPAR, however to date this is still treated largely as a reporting obligation, rather than an evaluation of Basin Plan implementation.
- The five yearly asset scale reporting by Basin states due to commence in 2020 (schedule 12 matter 8) should be more useful for informing the setting of environmental watering priorities
- Matter 9.3 reporting (on the location, purpose, and volume on environmental watering) needs refinement to make the reports more useful. Improvements include but are not limited to refining the Planned Environmental Water and Held Environmental Water reporting, improving reporting protocols for environmental watering events conducted or contributed to by multiple jurisdictions, and collection of information that enables environmental water use to be geographically mapped.
- There could be a more structured approach to adaptive management within the MDBA and across Basin Jurisdictions

In summary, feedback indicated that current Basin Plan annual reports were not generally useful for informing decision making for several reasons including that the annual reporting:

- focuses on implementation rather than evaluation
- is not well timed to align with opportunities to inform activities,
- does not contain the most relevant data or data is not fit for purpose
- Is not supported by governance and/or processes to close the adaptive management loop and enable it to inform planning and management actions.

It is therefore clear that, while the MDBA, the Department, the CEWH and Basin States are meeting their reporting requirements under chapter 13, the production of schedule 12 reports and the BPAR, reporting could have further regard to chapter 13's key evaluation questions in order to better evaluate the effectiveness of Basin Plan implementation and thereby inform and improve future Basin Plan implementation.

This does not mean that monitoring, evaluation and reporting is not supporting adaptive management across the Basin more broadly. Existing state and CEWH monitoring, evaluation and reporting programs are regularly used to inform environmental watering activities at the operational level, particularly at the site scale where monitoring of individual events is used to learn about responses and evaluate outcomes. Over time, this monitoring has proven useful in building knowledge and has been used directly to inform future watering and improving outcomes. (See Case

study: Learning and adapting water strategies for native fish in the environmental watering plan section).

While current Basin Plan annual reporting processes have been somewhat streamlined making reporting more efficient, there remain some areas for improvement regarding the fit for purpose nature of current reporting requirements (Schedule 12 Reporting Guidelines). This has been discussed by jurisdictions via the MEWG. There would be value in reviewing and/or developing guidelines for all annual and five yearly reporting requirements (as the current guidelines are incomplete). As is highlighted in the interview outcomes, the guidance for schedule 12 reporting could be improved to improve the evaluative outcome, and the timing of reporting on different schedule 12 matters should also be considered to see if there is opportunities to better align reporting timeframes with decision making windows. Over the last two years, most Basin states have made the effort to provide their schedule 12 reporting early (by the end of August rather than October), to provide more time for the BPAR to be based on their content. Moving forward the timing and content of schedule 12 reporting could be further refined so that, as far as is possible, it helps to inform Basin Plan management decisions. It should also be further considered how annual schedule 12 reporting and BPAR accumulate to feed into longer term evaluations such as the next evaluation in 2020.

It is important for Basin jurisdictions and the MDBA to clearly define their MER objectives and outcomes, and ensure reporting and monitoring programs are directly linked to these objectives and outcomes. This is already being considered by the Joint Venture Steering Committee (JVSC) funded by Basin governments to address duplication, coordination and consistency issues, the MDBA's research and knowledge strategy (produced in 2014/15 and currently being reviewed) and the development of the Science Strategy, led by NSW under the Basin Officials Committee (BOC). There will also need to be special effort to ensure the outcomes from these separate efforts are tied together in an integrated action plan.

Development of the MDBA knowledge acquisition framework should also help to target and prioritise data and information collection, especially in those areas where it has been identified that some information and data collection is not fit for purpose (found in the Hydrology, Cap to SDL, Vegetation, Fish, Birds, Trade, WQSM, social and economic outcomes evaluations). Well targeted and prioritised information and data collection should result in the purposeful acquisition of knowledge to feed into the continual improvement of Basin water resource planning and management.

## Recommendations

**Basin governments should continue to support the shift to more evaluative Basin Plan reporting, and ensure Basin Plan monitoring, evaluation and reporting is actively used to improve Basin Plan implementation.** Going forward it will be important to ensure that reporting under the Basin Plan monitoring, evaluation and reporting program is providing useful information for decision makers to adaptively manage Basin Plan implementation; and that different government monitoring programs are well aligned and coordinated to reduce duplication, improve efficiency and increase the effectiveness of reporting.

**Basin governments and the MDBA need to review the Basin Plan reporting requirements to make them more relevant to adaptive management.** Reviewing and updating the guidelines for annual and five yearly Basin Plan reporting, in the light of knowledge gained from the first five years of implementation would be a significant step in helping to ensure Basin plan reporting is providing useful information in terms of adaptive management. As part of the review, consideration should be given to how reporting can meet annual requirements, as well as accumulate over time to meet longer term evaluation requirements. Guidelines should also consider the relationship between different reporting requirements by providing greater clarity on the links between data and reporting at the local or regional scale, and that for Basin scale reporting.

Once updated, the reporting guidelines should be regularly reviewed as knowledge builds, to ensure they remain current, and are guiding collection of the best available and relevant information to inform ongoing implementation and outcome improvement.

**Basin governments, the MDBA and the CEWO should continue to work together to better plan, coordinate and align their monitoring programs to support better evaluation of outcomes and clearer reporting.** This includes through the Joint Venture Monitoring and Evaluation Program, the MDBA's 2015 research and knowledge strategy (currently under reviewed) and the Basin Officials Committee Science Strategy led by NSW. Review of the Basin Plan MER guidelines (above) should be linked to these processes and programs. This work would usefully be accompanied by a review of governance processes if they are not supporting the closing of the adaptive management loop.

The above improvements would enable a shift to more evaluative reporting, allowing the monitoring, evaluation and reporting cycle to become more useful from an adaptive management perspective.

Lastly, while this evaluation has drawn on information from the MEWG, interviews regarding the usefulness of current Basin Plan reporting were held only with MDBA and CEWO program managers. As noted in the analysis section above, Basin States and the Department will have the opportunity to provide their perspectives and input on the MER program when the schedule 12 reporting guidelines are reviewed in 2018.

## Northern Basin Review and Groundwater Reviews

### Analysis

A desktop analysis was used to evaluate the Northern Basin review and Groundwater reviews, drawing on Northern Basin review technical and summary reports and the 2014 Groundwater SDL review reports.

### Findings

On the basis of the northern Basin and groundwater reviews, the Authority recommended several amendments to the Basin Plan. In November 2017 the amendments were adopted by the Minister and became law, though they have since been disallowed. The Government is considering the next

steps to take. Even so, the northern Basin and Groundwater reviews demonstrate that the Basin Plan framework does provide the avenues for improved knowledge and information to lead to recommended changes and adjustments to Basin Plan settings and outcomes.

### *Northern Basin Review*

MDBA and partner governments improved their understanding of what drives changes in communities and ecosystems in the northern Basin. Working with communities and experts, a more thorough information base was established that considered long-term drivers of change, including some factors beyond the delivery of water.

Social and economic studies were undertaken to learn more about the impacts of water recovery on communities across the northern Basin, while new scientific work was undertaken to better understand the potential improvements under various water recovery scenarios in the health and resilience of river ecosystems and the environment. The MDBA also set up a community advisory committee to provide advice on regional community views and consulted with Aboriginal communities on cultural values relating to water. This new research improved knowledge around what a healthy river system needs, and improved understanding of the effects of water recovery on northern Basin stakeholders and river health.

The Authority undertook this work collaboratively, with guidance from northern basin communities, governments, industries and researchers. This allowed the thinking to be tested and re-tested. The improved information base allowed the Authority to review water recovery requirements in the north. This resulted in a proposed amendment to reduce the northern Basin SDL by 70GL, from 390GL to 320GL. Governments agreed to couple the reduced water recovery with a “toolkit” of measures to enhance environmental outcomes, including through mechanisms such as better protection of environmental flows. This would maximise or enhance environmental water outcomes while minimising economic impacts.

### *Groundwater Reviews*

The reviews of groundwater SDLs and Baseline Diversion Limits for the Eastern Porous Rock (NSW), Western Porous Rock (NSW) and the Goulburn-Murray Sedimentary Plain (Victoria) SDL resource units were completed by 2014, and met all requirements as outlined in the Basin Plan s6.06. Expert panel deliberations were supported by a synthesis of best-available knowledge. The information gathered by the Authority and the relevant states was in a format that informed decision-making and adaptive management. Expert panel membership promoted a collaborative working relationship between the MDBA and Basin States, which enabled data sharing. The review reports and associated synthesis reports were made publicly available via MDBA website. The review process established a transparent and repeatable process that could be followed if future amendments are required.

The approach resulted in additional management benefits that were subsequently included in recommended amendments to the Basin Plan. Additional outcomes include:

- a revised groundwater compliance method to avoid the significant accumulation of credits once the limits on take commence.

- changes to groundwater water resource plan areas and SDL resource units to better reflect state management boundaries.

On the basis of these reviews, the Authority recommended several amendments to the Basin Plan, including an increase in the groundwater SDL from 3334 GL per year to 3494 GL. The 160 GL increase saw increases of 14.9 GL in the Eastern Porous Rocks area, 109.4 GL in the Western Porous Rocks area and 37.7 GL in the Goulburn-Murray area and other minor adjustments due to things such as boundary changes for groundwater water resource plan areas.

In November 2017 the revised SDLs for the northern Basin and the three groundwater areas were adopted by the Minister and became law. The amendments have since been disallowed. MDBA stands by the original recommendations, and the government is now considering the next steps to take. Notwithstanding the outcome of the disallowance motion the Northern Basin review and Groundwater reviews demonstrate that the Basin Plan framework does provide the avenues needed for adaptive management in response to new and improved knowledge.

## SDL Adjustment Mechanism

### Analysis

A desktop evaluation was undertaken drawing on a range of material including SDL Adjustment Advisory Committee minutes, Ministerial Council outcomes, recent stakeholder feedback from SDL Adjustment public consultation, the Register of SDL adjustment proposals, the constraints management strategy (CMS), CMS annual reporting, and Basin Plan Implementation Agreement annual reporting.

### Findings

In June 2017 Basin governments brought forward a package of 36 Supply Measure proposals for consideration by the MDBA. Finalising the package of supply measures projects was a complex task that took one year longer than initially planned. The one year extension allowed state governments to put together the best possible package of projects, although this has reduced the time remaining for project planning, consultation and delivery of the projects. In preparing the final package of measures, it was agreed that some key constraints projects could also be considered as supply measures and they were included in the package.

The MDBA's role was to determine the size of an adjustment to the SDLs based on the nominated measures, which would still enable equivalent environmental outcomes to be achieved. The process has resulted in a proposal to increase the surface water SDLs in the southern Basin by 605 GL.

Given that the 5% limit to adjustment of the SDLs is 543GL, efficiency measures will also be needed if the full 605 GL adjustment is to be realised. Stakeholders and some governments have also expressed concern about whether efficiency measures can be implemented with neutral or improved socio-economic outcomes. Basin governments have sought independent advice on approaches for implementing efficiency measures in a way which meets this requirement. The independent

consultants EY, tasked with analysing how to design, target and resource efficiency measure programs, presented their findings to Basin Ministers in December 2017. The government has accompanied the SDL Adjustment Mechanism amendment with a range of commitments for strengthening the SDL Adjustment Mechanism, including the implementation of efficiency measures. This has provided a clear path forward for water recovery of an additional 450GL of water for the environment through efficiency measures with positive or neutral socio-economic outcomes.

Public consultation on the proposed SDL amendment confirmed that some of the supply measures are controversial in parts of the community. Among the range of issues raised by stakeholders, was a perceived lack of transparency due to the lack of information available on many of the supply measure projects. There is particular concern around measures that involve the relaxation of constraints. However, there is scope to address these concerns during the design and implementation phase of these projects.

The Supply Measures could vastly improve the flexibility with which environmental water might be used and enhance the social and economic outcomes from the Basin Plan. These projects also need to be completed by mid-2024 in order to lock in the benefits to agricultural industries and communities from the lower water recovery target.

On the basis of the SDL Adjustment Mechanism analysis, the Authority recommended amendments to the Basin Plan. On 13 January 2018 the amendments commenced in law. The operation of the SDL Adjustment Mechanism demonstrates that the Basin Plan framework does provide the avenues for adaptive management in response to new and improved knowledge.

## Recommendations

**Basin governments should more closely involve Basin communities in the design, implementation and delivery of the nominated projects to build community understanding and acceptance of the projects.**

Considerable work lies ahead for the state governments to progress the design, refinement and implementation of the nominated Supply Measures in the period to 2024. More open and transparent community engagement will be crucial to the successfully implementing the projects on time. It will be important to review progress at regular points, including as part of the 2020 Basin Plan Evaluation, to give confidence implementation is on track for completion by 2024.

Now the independent advice on arrangements for implementing a program of Efficiency Measures has been received, governments need to work together to progress implementation given the important role they will play in improving the environmental outcomes from the Basin Plan.

# Conclusion

## **Are Basin Governments and the MDBA on track with implementing the Basin Plan as a sustainable and long-term adaptive management framework?**

The Basin Plan is operating effectively as an adaptive management framework. In the first five years of operation, mechanisms written into the Basin Plan have provided the avenues for improved knowledge and information to lead to recommended changes and adjustments to Basin Plan outcomes.

There is clear evidence that the adaptive management principle is being applied to the planning, prioritisation and use of environmental water to improve environmental outcomes. The northern Basin and Groundwater reviews demonstrate that the Basin Plan framework does provide the avenues needed for adaptive management, allowing MDBA to use new and improved information to make recommendations for changes that deliver better social, economic and/or environmental outcomes.

The SDL adjustment mechanism has also been used to develop new, more efficient approaches to water use, which can be implemented to minimise social and economic impacts and in doing so further improve Basin Plan outcomes. This demonstrates that the Basin Plan framework does provide the opportunities for adaptive management, based on new and improved knowledge. Substantial work does remain to deliver the agreed SDL adjustment mechanism projects by 2024, including finalising the design and implementation of supply measures by the Basin states. Given the diversity of community views regarding some projects, this will require strong leadership and commitment, better communication and engagement with stakeholders and good program management.

There are further opportunities to improve the use of adaptive management mechanisms to further improve Basin Plan outcomes. Most notably, improvements to MER guidance and processes could strengthen the evaluation component of some reporting and make it more relevant to ongoing implementation. This would enable MER to more effectively inform improvements to water planning and management. In addition, improved knowledge about how water moves across the landscape and insights gained from scaling up site-scale monitoring information to broader regional and basin scales would better inform environmental water management.