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GPO Box 1801, Canberra ACT 2601



engagement@mdba.gov.au



1800 230 067



mdba.gov.au

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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

The 2017 interim Basin Plan evaluation is the first evaluation of the Plan by the Murray-Darling Basin Authority (MDBA). It examines the social, economic and environmental outcomes associated with the first five years of Basin Plan implementation (2012-2017), and assesses whether the Plan is on track to deliver a healthy working basin. The 2017 interim evaluation (the evaluation) also identifies opportunities for governments to improve Basin Plan implementation in the coming years.

The environment is one of 11 themes the evaluation examines. This theme covers the implementation of the Environmental Management Framework, and assesses outcomes for river flows and connectivity, native vegetation, waterbirds and native fish at the basin scale.

This report discusses the environmental assets and functions of the Murray-Darling Basin. It was not possible to review Basin Plan environmental assets and function outcomes in the 2017 evaluation as:

- the State's Long Term Watering Plans which set objectives for assets and functions will not all be completed until 2019, and
- reporting on the achievement of asset scale outcomes by the Basin States does not commence until 2020.

This report instead focuses briefly on what information is currently being collected in order to inform the 2020 evaluation, and makes recommendations on actions that should be undertaken or continued in order to effectively report on environmental assets and functions in 2020.

Environmental assets and functions of the Murray-Darling Basin

The Murray–Darling Basin supports a vast array of river systems, wetlands and flora and fauna communities. These water-dependent ecosystems are commonly classified as environmental assets. These environmental assets support complex physical, chemical and biological functions and processes, at a variety of geographic scales. These functions include moving sediment hundreds of kilometres down rivers; spreading nutrients onto floodplains and into wetlands; and cycling carbon through the entire system, which drives the food web that supports the basin's plants and animals.

These environmental assets and functions also support the basin communities. For example, healthy ecological assets are relied on by the ecotourism and fishing industry; and are often culturally significant for Aboriginal people; and deliver an aesthetic appeal enjoyed by residents and visitors to the Basin.

The Basin contains approximately 400,000 water-dependent ecosystems, including approximately 8,000 lakes, 360,000 floodplain wetlands and 22,000 rivers (Brookes, 2017).

Many are specifically identified as being significant sites for waterbirds and native fish. A quarter of Australia's 64 Ramsar wetland sites are located within the Basin. These represent internationally

significant wetlands that are managed in line with the requirements of the Ramsar convention and are the responsibility of the Australian Government, and supported where appropriate with the environmental water.

Priority Environmental Assets

The Basin Plan defines a subset of water-dependent ecosystems as ‘priority environmental assets’. This classification describes water-dependent ecosystems that fulfil five criteria outlined in Schedule 8 of the Basin Plan:

Criterion 1: The water-dependent ecosystem is formally recognised in International agreements or, with environmental watering is capable of supporting species listed in those agreements.

Criterion 2: The water-dependent ecosystem is natural or –near natural, rare or unique.

Criterion 3: The water-dependent ecosystem provides vital habitat.

Criterion 4: Water-dependent ecosystems that support Commonwealth, State or Territory listed threatened species or communities.

Criterion 5: The water-dependent ecosystem supports, or with environmental watering is capable of supporting, significant biodiversity.

Priority ecosystem functions

Each priority environmental asset is comprised of multiple ‘priority ecosystem functions’ (Schedule 9, Basin Plan) that enable ecosystems to support native fish, waterbirds and native vegetation communities.

These key ecosystem functions include:

- creating and maintaining habitats for plants and animals
- transporting and diluting nutrients, organic matter and sediment
- connecting rivers so plants and animals can migrate and recolonise
- providing connections across floodplains, wetlands and billabongs that enable plants and animals to forage, migrate and recolonise.

Environmental objectives for assets and functions

The Basin Plan was legislated in 2012 with the aim of returning the basin to a healthy working system. The focus of the plan is to improve the Basin's environment, while balancing social and economic needs, in a sustainable way. The plan sets an environmentally sustainable level of water take for consumptive use (sustainable diversion limit) and secures a share of available water for the environment. This ‘environmental water’ allows managers to restore some of the critical elements of

the flow regime so that plant and animal species can complete their lifecycles and help build population resilience in healthy habitats.

The Basin Plan sets out three overall environmental objectives for water-dependent ecosystems. These are to:

- a. protect and restore water-dependent ecosystems of the Murray-Darling Basin
- b. protect and restore the ecosystem functions of water-dependent ecosystems
- c. ensure that water-dependent ecosystems are resilient to climate change and other risks and threats.

These are long-term objectives. In the five years since Basin Plan implementation commenced significant steps have been taken towards recovering water for the environment and ensuring it is used effectively. But implementation is still ongoing, and many ecological processes run over a time frame far longer than five years.

For this reason, the Basin Plan (Schedule 7) identifies targets to measure progress towards the three environmental objectives for water-dependent ecosystems (as above). Targets for priority assets and functions are identified explicitly:

- *Intermediate target up to 30 June 2019* there is no loss of, or degradation in:
 - river, floodplain and wetland types including the condition of priority environmental assets and priority ecosystem functions; condition of the Coorong and Lower Lakes ecosystems
- *Longer term target from 1 July 2019* there are improvements in:
 - river, floodplain and wetland types including the condition of priority environmental assets and priority ecosystem functions;
 - condition of the Coorong and Lower Lakes ecosystems
 - the community structure of water-dependent ecosystems.

Basin-wide Environmental Watering Strategy

The Basin-wide environmental watering strategy (BWS) builds on the Basin Plan and its environmental objectives and targets. It guides the work of governments, water holders and environmental managers. It sets out the expected outcomes at a whole-of-basin scale that should be achievable with the environmental water available, and efficient and effective strategies to achieve them.

The strategy assesses how waterbirds, fish, vegetation and flows (as components of healthy ecosystems) are expected to respond to environmental water delivery over the next few decades, given expectations of full implementation of the Basin Plan. It includes strategies for the planning, management and use of water to maximise outcomes and outlines how various partners will work together to plan and manage environmental water. It also details the approach to determining the Basin annual environmental watering priorities so as to achieve the long-term outcomes.

Although the BWS doesn't focus on describing specific outcomes at the priority assets and functions scale, it does identify some critical habitats, such as key foraging and breeding habitats for waterbirds, which would be relevant in any Basin-wide environmental asset assessments.

Long-term Watering Plans

Long-term watering plans (LTWPs) are developed by Basin States and guide the management of environmental water at regional scales over the longer term. LTWPs set objectives, targets and watering requirements for *priority environmental assets and functions* using methods set out in Part 5 Chapter 8 of the Basin Plan. Long-term watering plans are to be developed for each of the twenty surface water resource plan areas in the Basin. Plans were due for publication in November 2015, or as agreed by the Authority and the relevant Basin State. It is each state's responsibility to monitor against the objectives and targets established in the LTWPs, but it is important to recognise that reporting obligations do not commence until 2020.

To date, LTWPs have been published for the Victorian Murray, Northern Victoria, Wimmera-Mallee, Warrego-Paroo-Nebine, South Australian River Murray and Eastern Mount Lofty Ranges water resource plan areas (only one of the states' associated monitoring and evaluation plans have been shared with the MDBA so far). For the remaining 14 plans, their timelines are aligned to coincide with the development of state water resource plans in 2019.

Monitoring and evaluation

Basin Plan monitoring and reporting responsibilities

MDBA is responsible for evaluating the effectiveness of the Basin Plan consistent with Chapter 13 of the Basin Plan. Schedule 12 of the Basin Plan sets the responsibilities for reporting (and hence monitoring) which informs the MDBA's overall evaluation. In particular, Schedule 12 identifies that Basin States are responsible for reporting against the achievement of environmental outcomes at an asset scale starting in 2020. It is anticipated that this reporting will ultimately be against the objectives and targets established in the LTWPs.

It is important to note that MDBA and Commonwealth Environmental Water Holder (CEWH) are responsible for reporting on the achievement of environmental outcomes at a Basin Scale (by reference to the targets in schedule 7). While predominantly this will be against the basin scale outcomes as specified in the BWS there will be by necessity some linkage or intersection with asset scale reporting.

Existing data and information

There has been significant and valuable investments in ecological monitoring across the Basin by the MDBA, the Commonwealth, Basin states and community organisations. Much of this monitoring has been used to inform the 2017 Basin Plan Evaluation. With regard to monitoring and evaluating environmental responses at the asset-scale, key datasets that may be used for future asset-scale evaluations include:

- **Long-term Intervention Monitoring (LTIM) program** – LTIM is the CEWH's main monitoring and evaluation program. The focus of LTIM is to evaluate the contribution of Commonwealth environmental water (and other sources of environmental water delivered in conjunction) at

both the asset and Basin-scale while assisting the CEWH to demonstrate outcomes and adaptively manage its water holdings (Gawne, B et al. 2013). Monitoring is undertaken by consortium teams at seven river systems across the Basin to determine whether water delivery is achieving expected outcomes. These river systems were chosen to provide maximum possible coverage of areas where Commonwealth environmental watering occurs and to complement, rather than duplicate, monitoring activities being undertaken by others including Basin states and the MDBA.

- **State monitoring programs** - State monitoring at the asset scale is expected to be enhanced through the delivery of Long-term Watering Plans in 2019 (or earlier). State run monitoring programs are designed to assess the effectiveness of environmental water. Due to the geographic scale of watering activities, it is not practical or cost-effective to measure the outcomes of these management activities at all locations. Therefore, programs of targeted monitoring are undertaken to focus on priority areas of investment across states (NSW OEH, 2015). The LTWPs will identify these priority ecological assets and functions and their water requirements.
- **The Living Murray program** – The Living Murray Icon Sites (Barmah-Millewa Forest, Koondrook-Perricoota Forest, Gunbower Forest, Hattah Lakes, Lindsay-Mulcra Wallpolla Islands, Chowilla Floodplain, and Coorong, Lower Lakes and Murray Mouth) are monitored by states annually. This monitoring assesses key indicators of health such as native vegetation, native fish and waterbirds, and is used to track progress against asset-scale ecological objectives and targets (and to inform environmental water prioritisation). These objectives are based on the icon sites' environmental water requirements that are expected to be achieved with a combination of water and environmental infrastructure works. In mid-2018, the MDBA will release a set of report cards for each Icon Site, showing the trajectory of objective-achievement over time.

The MDBA also undertakes theme-specific basin-scale monitoring programs which may have some relevance at the asset scale. These include annual waterbird surveys, vegetation assessments based on satellite imagery, and native fish monitoring.

Steps to the 2020 Evaluation

Please note that the recommendations outlined in this section are a set of more specific actions under the overarching recommendation 11.2 from the Basin Plan Evaluation 2017 (MDBA, 2017) namely:

- *IR11.2: Basin governments, the MDBA and the CEWH should continue to work together to better plan, coordinate and align their monitoring programs to support better evaluation outcomes and clearer reporting.*

The 2017 Basin Plan evaluation found that the environmental monitoring and evaluation currently undertaken across the Basin (at multiple scales and by variety of Basin partners) is generally scientifically robust; and appropriate for the sites at which the individual monitoring programs apply.

The monitoring programs to date rely heavily (but not exclusively) on hydrology, birds, fish and vegetation as indicators of environmental health and function. The data and information collected

from these monitoring programs has yielded valuable knowledge on ecology-flow relationships that has been instrumental in informing management, planning, environmental water delivery and scientific understanding.

However, many of the current monitoring programs at the asset scale (above) were established for a range of purposes and predominantly established prior to the Basin Plan. Therefore, there are not yet explicit linkages to the BWS, nor necessarily the priority assets and functions (to be) described in LTWPs. Developing stronger linkages between these programs, and LTWPs, and the BWS, would further increase the value of these existing programs.

Review alignment of existing asset scale monitoring programs with the Basin-wide Watering Strategy and the Long-term Watering Plans' objectives and targets (as they are finalised).

Many of the current monitoring programs are also not yet closely aligned with each other in terms of their consistency of method and application across the basin; nor in terms of their integrative capacity (both from a technical and geographic-scale perspective). This is not surprising, as the sites (or assets) are located in very different geographical areas; under different state and regional governance structures; and have different histories of environmental water application and implementation.

Five years into the Basin Plan implementation, the individual site or asset approaches is not of major concern. Individual sites have demonstrably benefited from environmental water where it has been able to be applied, and there are strong planning, prioritisation and coordination processes in place (see Environmental Management Framework Evaluation Report for more information). It is clear that the monitoring programs are enabling effective adaptive management at the site scale.

As environmental water management moves forward, looking for opportunities and mechanisms to increase the level of integration between the various site/asset scale monitoring programs will increase the capacity to better understand change in condition at greater and greater scales (i.e. catchment; Basin-wide). The classification of aquatic ecosystems in the Murray Darling Basin (Brooks, 2017) maybe a useful base layer on which to build an agreed monitoring network to ensure a range of aquatic ecosystems are represented.

Coordinate monitoring efforts across Governments to establish an agreed Basin-wide asset scale monitoring program using consistent approaches, where appropriate.

Currently, there is no suitable framework outlining how asset-scale information will be consistently reported by States; nor how the MDBA will aggregate and evaluate asset-scale information to inform future Basin Plan Evaluations. This work should be developed as a matter of urgency in order to optimise consistency of reporting from states; and will ensure that the information can effectively contribute to a Basin-wide assessment of progress towards asset scale outcomes, prior to the 2020 Basin Plan evaluation.

This framework will need to accommodate a range of differently specified objectives and targets across a number of themes and (subject to implementation of the above recommendation) a range of data collected using different methods. Some approaches that could be considered when developing this framework include the reporting against icon site objectives adopted by the Living Murray program and assessment techniques like the Index of stream condition as developed by Victoria.

The MDBA must work with states and the Commonwealth to develop an agreed framework that supports a consistent approach to asset scale reporting and evaluation and their effective aggregation to inform Basin Plan evaluations.

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