



Australian Government



MURRAY—
DARLING
BASIN AUTHORITY

Monitoring Statement

Data sets used by the MDBA for Basin monitoring and a summary of our monitoring obligations

January 2021

Published by the Murray–Darling Basin Authority
MDBA publication no: 03/21
ISBN (online): 978-1-922396-35-8



GPO Box 1801, Canberra ACT 2601



engagement@mdba.gov.au



1800 230 067



mdba.gov.au

© Murray–Darling Basin Authority 2021

Ownership of intellectual property rights



With the exception of the Commonwealth Coat of Arms, the MDBA logo, trademarks and any exempt photographs and graphics (these are identified), this publication is provided under a *Creative Commons Attribution 4.0* licence. (<https://creativecommons.org/licenses/by/4.0>)

The Australian Government acting through the Murray–Darling Basin Authority has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Murray–Darling Basin Authority, its employees and advisers disclaim all liability, including liability for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying upon any of the information or data in this publication to the maximum extent permitted by law.

The Murray–Darling Basin Authority's preference is that you attribute this publication (and any Murray–Darling Basin Authority material sourced from it) using the following wording within your work:

Cataloguing data

Title: Monitoring Statement January 2021, Murray–Darling Basin Authority Canberra, 2021. CC BY 4.0

Accessibility

The Murray–Darling Basin Authority makes its documents and information available in accessible formats. On some occasions the highly technical nature of the document means that we cannot make some sections fully accessible. If you encounter accessibility problems or the document is in a format that you cannot access, please contact us.

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.

Contents

- Introduction..... 1
- Why we monitor..... 1
 - Compliance and assurance..... 1
 - Intervention monitoring..... 2
 - Evaluating the Basin Plan 2
 - Condition monitoring 3
 - River management 3
- What monitoring activities are in place 3
- Monitoring obligations 6
 - Water Act: Non-discretionary administrative, reporting and publishing obligations..... 7
 - Water Act, Schedule 1: Murray–Darling Basin Agreement..... 8
 - Basin Plan 2012: Non-discretionary administrative, reporting and publishing obligations..... 8
 - Basin Plan, Schedule 12: Matters for evaluation and reporting 11

Introduction

The MDBA uses a variety of data sets to meet our wide-ranging monitoring and reporting obligations and responsibilities, as set out in the *Water Act 2007* (Cwlth), the Basin Plan 2012, the Murray–Darling Basin Agreement (Schedule 1 of the Water Act) and other arrangements. The data used include those collected directly and those harnessed from existing sources, including partner organisations. As part of our broader Basin monitoring and reporting initiative, this document summarises the data sets we use and our monitoring obligations. We intend to update this document periodically, so it serves as a reliable reference for the triple bottom line monitoring of the Basin.

The Monitoring Statement provides a baseline for development of a Basin Monitoring Strategy, one of the key components of an integrated monitoring and reporting program. Development of a monitoring strategy will be complemented by development of a framework and work plan for the 2025 Basin Plan Evaluation, which itself will be informed by a review of the [2020 Basin Plan Evaluation](#). We are also rolling out a Basin condition monitoring project as part of the Australian Government’s [Murray–Darling Basin Communities Investment Package](#). The monitoring being conducted by our partners in the Basin, including the Basin governments, water holders, researchers and industry bodies, also plays an important role. Taking a holistic look at these components will help identify gaps and prioritise future work, thereby maximising the value of monitoring investment across the Murray–Darling Basin.

Why we monitor

Monitoring is the means by which we obtain the data and information needed to assess the effectiveness and impact of policy initiatives designed to manage the Basin resources appropriately. As such, monitoring may reveal not only the intended effects of management activities but also potential unintended consequences. Monitoring is integral to supporting adaptive management of the Basin’s water resources.

Evaluation logically follows from monitoring and is aimed at systematically tracking implementation outcomes and assessing the overall effectiveness of a given policy setting. The next step, reporting, forms part of our commitment to openness, accountability and good governance.

The MDBA monitors for the following five overarching purposes:

- assure compliance
- adapt interventions – intervention monitoring
- evaluate the Basin Plan
- monitor the condition of the Basin
- assist river management.

Compliance and assurance

Consistent with the Water Act and the Basin Plan, compliance and assurance functions are carried out by the MDBA (currently) and partner governments under the statutory sustainable diversion limit

reporting and compliance framework and the compliance compact. The need for compliance-related data will continue regardless of the transfer in mid-2021 of a suite of compliance and assurance functions to a statutory Inspector-General of Water Compliance, based within the Department of Agriculture, Water and the Environment (DAWE). Compliance monitoring projects are developed as required by the partner governments under this program. Further information can be found on the MDBA website at:

- [Sustainable diversion limits](#)
- [Compliance priorities](#)
- [MDBA Compliance and Enforcement Policy](#)
- [Compliance monitoring using remote sensing](#)

In addition, the MDBA plays an assurance role for progress against Chapter 7–Adjustment of SDLs of the Basin Plan. The MDBA publishes [annual progress reports on adjusting sustainable diversion limits](#).

Intervention monitoring

Intervention monitoring is used when delivering water for the environment and in salinity management. These interventions depend on specific monitoring programs to inform their adaptive management. For example, as an agent of our partner governments, the MDBA has a delivery role for The Living Murray (TLM) water for the environment. The MDBA coordinates [intervention monitoring at TLM icon sites](#), while implementing this monitoring is the responsibility of the Basin state governments and most work is undertaken by them. The knowledge gained from the intervention monitoring is then used by the [Southern Connected Basin Environmental Water Committee](#) when planning subsequent deliveries.

Another example of intervention monitoring is for the operation of salt intercepting schemes, which are used to manage [salinity in the River Murray](#). The schemes can be ramped up or down depending on need, and such decisions are based on monitoring of salinity, flow and rainfall.

Evaluating the Basin Plan

The MDBA is responsible for evaluating the Basin Plan periodically. To do this, evidence is drawn from many programs to assess whether we have met the objectives and expected outcomes outlined in the Basin Plan and related documents like the [Basin-wide Environmental Watering Strategy](#). We undertake our own monitoring and draw data and information from our partners, including the Basin state governments, the Bureau of Meteorology (BoM), Australian Bureau of Statistics (ABS), Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), and Geoscience Australia (GA). Under the Basin Plan the MDBA is to lead Basin-scale monitoring. The Basin state governments are responsible for reporting within their jurisdiction and sites (assets). Environmental water holders are to monitor the contribution of environmental water to the Basin Plan objectives but also monitor for their own adaptive management purposes.

Condition monitoring

There are many drivers other than water management on the social, economic and environmental conditions of the Basin and sometimes we or our partner agencies monitor these other drivers. The climate is one of the most important drivers on Basin conditions, and we work closely with the BoM to develop products suited to our Basin-wide monitoring role and to be briefed regularly by Bureau staff on climate conditions and outlooks. Similarly, we seek to understand the long-term Basin-wide patterns of water flow, demographics, economic activity, ecosystems, the landscape and more to provide information and context to our decision making.

River management

The MDBA and other river operators require a range of critical data and information to be able to successfully deliver and manage water supply. The data and information required include:

- weather forecasts and how predicted weather scenarios might impact the amount of water available and the amount of water in the river
- demands of the many different water users and their locations along the river; how much water is needed to deliver water downstream
- how long it will take for the water to reach a specific section of the river
- whether there are any constraints that might impact the flow.

Through a well-established process, these data sets are used to calculate how much water is available and to run computer models to help understand how different conditions and water management decisions would affect the river system.

What monitoring activities are in place

There are hundreds of water management activities and other projects occurring across the Basin, but they draw on a relatively small number of raw data sets. The raw data sets that underpin the MDBA's monitoring programs are listed in Table 1. There is often considerable work done by MDBA staff to manage, analyse and model the data so it can be transformed into knowledge used in compliance, evaluation and testing policy alternatives.

At its core, the strategic value of monitoring is derived from being fit for purpose that enables the MDBA to fulfill its obligations and responsibilities set out in legislative instruments and other agreements. The strategic value should be periodically tested and enhanced in the broader context of monitoring activities by Basin jurisdictions and alignment with an overall monitoring strategy. This would help maximise benefits for the Basin as a whole and for all jurisdictions and eliminate any duplication or waste.

Table 1. Raw data sets which underpin the MDBA's monitoring programs

Core monitoring data	Who collects the data	Where/how MDBA accesses the data
Rainfall	BoM	Data received from the controlling state providers and operating agencies responsible for the sites. BoM Australian Water Resources Information System (AWRIS) online is a backup source.
River flow	States (MDBA for Murray hydrometric network)	Data received from the controlling state providers and operating agencies responsible for the sites. BoM AWRIS online is a backup source.
Flow and rainfall outlooks	BoM	BoM website and briefings
Storage levels	States (MDBA for Murray)	Data received from the controlling state providers and operating agencies responsible for the sites. BoM AWRIS online is a backup source.
Groundwater levels	States	For MDBA-funded sites, data is received direct from the controlling state providers or operating agency looking after those sites. BoM AWRIS online is a backup source.
Water trade	States (registers)	BoM water data dashboard
Held environmental water entitlements, allocations and use	States, Commonwealth Environmental Water Office (CEWO) and the MDBA (on behalf of TLM)	Schedule 12, Matter 9 reporting. Provided annually to the MDBA as part of the s71 Water Act reporting.
Water for the environment outcomes	CEWO, State water holders	Data received from the relevant water holder
TLM water for the environment outcomes	States as part of the Joint Venture Living Murray Initiative	Scientific reports available on MDBA website and associated data sets vaulted in MDBA database and stored in Content Manager. Annual site condition report cards on the MDBA website. State partner agencies.
Salinity	States	State government data portals and MDBA database (currently Hydstra)

Core monitoring data	Who collects the data	Where/how MDBA accesses the data
Phytoplankton (including blue-green algae)	States collect phytoplankton and blue-green algae data	For mapping purposes, information relating to blue-green algae alerts produced by the States. Emailed data for River Murray phytoplankton.
Fish movement	States as part of the Sea to Hume PIT tag program, the JVM&E acoustic tag program and ad hoc projects	FishNet database (PIT and acoustic tagged data – maintained by KarlTek)
Fish populations	States, through the MDBA funded fish survey	Emailed data (then compiled into the Sustainable Rivers Audit / Murray–Darling Basin Fish Survey database)
Water bird populations – survey of wetlands located in latitudinal bands	University of NSW (UNSW) Eastern Australian Aerial Waterbird Survey (State funded)	Emailed data and UNSW online water bird data portal
Water bird populations – survey targeting specific wetlands	UNSW Murray–Darling Basin aerial water bird survey (MDBA funded); University of South Australia Coorong and Lower Lakes water bird (including migratory shorebirds) surveys (co-funded with TLM and MDBA)	Emailed data and UNSW online water bird data portal
Vegetation extent and clearing	State governments, through land clearing monitoring and evaluation programs	State government vegetation data portals, National Vegetation Information System
Woody vegetation condition using Stand Condition Assessment (SCA) tool	MDBA through Landsat-based stand condition assessment tool	MDBA
Basin-wide satellite imagery	MDBA via GA, includes all 33 years of Landsat 30x30m imagery and all 4 years of Sentinel 10x10m imagery updated daily (MDBSat)	European Space Agency and US Geological Survey data held at the ANU’s National Computational Infrastructure, managed by GA. Google Earth Engine and GA Sandbox for backup access.
Catchment and landscape condition	ANU Centre for Water and Landscape Dynamics	ANU Australia’s Environment data portal

Core monitoring data	Who collects the data	Where/how MDBA accesses the data
Ecosystem valuation	DAWE Land and Ecosystem Accounting Project	Emailed data
Demographic and employment	ABS	ABS data lab
Agricultural production and value	ABARES	Data request to ABARES
Other social and economic Census data	ABS census	ABS data lab
Wellbeing	University of Canberra regional wellbeing survey	Emailed data

Monitoring obligations

The MDBA's monitoring-related obligations and responsibilities are specified in the Water Act, the Basin Plan and the Murray–Darling Basin Agreement. The monitoring obligations fall into three categories:

1. Legislated and specified (e.g. annual salinity reporting)
2. Legislated but unspecified (e.g. section 172 monitoring of water-dependent ecosystems)
3. Obligation that will require monitoring but little or no guidance is provided (e.g. evaluations of the Basin Plan indicated in the Water Act).

The MDBA has a total of 72 monitoring-related obligations and responsibilities (Table 2), of which a concise, high level, plain English summary is provided in the following sections.

Table 2. Summary count of the MDBA's monitoring-related obligations and responsibilities under the Water Act, Murray–Darling Basin Agreement and Basin Plan.

Type of obligation	Water Act	Murray–Darling Basin Agreement	Basin Plan	Total
Administrative	2	5	22	29
Annual reporting	3	5	4	12
5-yearly reporting	2	0	3	5
10-yearly reporting	1	0	1	2
One-off reporting	1	1	2	4
Publishing	2	0	18	20
Total	11	11	50	72

Water Act: Non-discretionary administrative, reporting and publishing obligations

Type of obligation	Obligation	Cross-link with Basin Plan
Part 2: Management of Basin water resources		
Administrative	<ul style="list-style-type: none"> Monitoring and evaluation program for the Basin Plan [ongoing] Annual financial year auditing and account held environmental water 	s13.01–s13.07 Schedule 12, Matter 9
Annual reporting	<ul style="list-style-type: none"> Annual (water year) analysis of Basin Plan effectiveness 	s13.05(1)(a)
5-yearly reporting	<ul style="list-style-type: none"> 5-year review of water quality and salinity management plan targets 5-year review of environmental watering plan 	s13.08 s13.09
10-yearly reporting	<ul style="list-style-type: none"> 10-year review of the Basin Plan 	s13.05(1)(c)
One-off reporting	<ul style="list-style-type: none"> 2020 advice to the Murray–Darling Basin Ministerial Council on the impacts of the Basin Plan 	s13.05(1)(b)
Publishing	<ul style="list-style-type: none"> Publish 2020 advice to the Murray–Darling Basin Ministerial Council on the impacts of the Basin Plan Publish 10-year review of Basin Plan 	S13.18
Part 9: Murray–Darling Basin Authority (administrative provisions)		
Annual reporting	<ul style="list-style-type: none"> Annual Report, which must include Ministerial directions and reporting requirements under the Murray–Darling Basin Agreement Under the Water (Indigenous Values and Uses) Direction 2018, the MDBA to: <ul style="list-style-type: none"> Report publicly each year on how, when planning for environmental watering, the holders of held environmental water have considered Indigenous values and Indigenous uses and involved Indigenous people Publish the report on its website within six months after the end of the water accounting period 	None None

Water Act, Schedule 1: Murray–Darling Basin Agreement

The significant administrative and reporting obligations for the MDBA arising out of the Murray–Darling Basin Agreement are captured in the table below. Note that it does not include the general river management operations and water accounting activities arising out of the Agreement.

Type of obligation	Obligation
Administrative	<ul style="list-style-type: none"> • Prepare annual reporting period corporate plan and submit to Basin Officials Committee and Murray–Darling Basin Ministerial Council • Prepare annual reporting period work plan and submit to Basin Officials Committee and Murray–Darling Basin Ministerial Council • Implement the current salinity strategy • Recording flow, diversions, stored water and water quality of River Murray and tributaries • Determine by May of each calendar year Critical Human Water Needs
Annual reporting	<ul style="list-style-type: none"> • Calendar year reporting to contracting States on water management • Water year reporting on contracting State compliance with Cap • Water year reporting on environmental outcomes of River Murray Increased Flows • Annual review of Asset Management Plan • Annual and forward financial estimates
One-off reporting	<ul style="list-style-type: none"> • Review of interstate transfers 2 years after water trading rules come into effect

Basin Plan 2012: Non-discretionary administrative, reporting and publishing obligations

Type of obligation	Obligation
Chapter 1: Introduction	
<i>Establishes the parameters and workings, agreements and obligations, of the Basin Plan</i>	
Publishing	<ul style="list-style-type: none"> • Jurisdictional implementation agreements with the States
Chapter 3: Water Resource Plan Areas and Water Accounting Periods	
Publishing	<ul style="list-style-type: none"> • Map which identifies water resource areas
Chapter 6: Water that can be taken	
Administrative	<ul style="list-style-type: none"> • Maintain a register of take
Publishing	<ul style="list-style-type: none"> • Map that identifies surface water SDL resource units • Register of take

Type of obligation	Obligation
Chapter 7: Adjustment of SDLs	
Administrative	<ul style="list-style-type: none"> • Invite public submissions on SDL adjustments • Notified measures and efficiency measures register
Annual reporting	<ul style="list-style-type: none"> • Report annually to Ministerial Council on Constraints Management Strategy
Publishing	<ul style="list-style-type: none"> • Draft SDL adjustments (for public submissions process) • Constraints Management Strategy • Notified measures and efficiency measures register
Chapter 8: Environmental watering plan	
Administrative	<ul style="list-style-type: none"> • Prepare Environmental Watering Strategy • Explain annual water priorities • Consult with States and CEWO about Environmental Watering Strategy • Consult with land owners, river operators and holders of environmental water • MDBA must have regard to Position Statements • Prepare annual environmental watering priorities each water year • Consult States and CEWO about annual watering priorities • Have regard to various matters preparing annual watering priorities • Be consistent with Basin Plan objectives and watering schedules • Establish an environmental assets and ecosystem functions database • Identify environmental assets that require environmental watering, and their environmental watering requirements, having regard to the information on the environmental assets and ecosystem functions database • Identify ecosystem functions that require environmental watering to sustain them, and their environmental watering requirements, having regard to the information on the environmental assets and ecosystem functions
5-yearly reporting	<ul style="list-style-type: none"> • Review and update the Environmental Watering Strategy within 5 years
Publishing	<ul style="list-style-type: none"> • Environmental Watering Strategy and any updates • Annual watering priorities and any updates every year
Chapter 9: Water quality and salinity management plan	
Sets out key causes of water quality degradation in the Murray-Darling Basin, water quality objectives for Basin water resources and water quality targets	
Administrative	<ul style="list-style-type: none"> • Assess salt export objective annually • Monitor salinity daily at 5 sites • Assess annual performance of the 5 sites against salinity targets

Type of obligation	Obligation
Annual reporting	<ul style="list-style-type: none"> • Annual salt export objective • Annual performance of the 5 sites against salinity targets
Publishing	<ul style="list-style-type: none"> • Annual salt export objective • Annual performance of the 5 sites against salinity targets • WRP water quality target application zones
Chapter 12: Water trading rules	
One-off reporting	<ul style="list-style-type: none"> • By June 2020 report on the operation of clauses allowing trade restrictions on held environmental water
Publishing	<ul style="list-style-type: none"> • Declaration if a State notifies of a water trade restriction
Chapter 13: Program for monitoring and evaluating the effectiveness of the Basin Plan	
Administrative	<ul style="list-style-type: none"> • Evaluation of the effectiveness of the Basin Plan against Chapters 5, 8 and 9, and by reference to the matters listed in Schedule 12, for the purposes of the annual, 5-yearly and 10-yearly reports/reviews • 5-yearly review of targets in the water quality and salinity management plan, including consultation with Basin States, CEWO and other relevant agencies • Review environmental watering plan every 5 years, including Schedule 7 targets, including consultation with Basin States, CEWO and other relevant agencies • MDBA must seek comment from stakeholders before publishing Basin Plan Evaluations
Annual reporting	<ul style="list-style-type: none"> • Annual reports on Basin Plan impacts
5-yearly reporting	<ul style="list-style-type: none"> • 5-yearly reports on Basin Plan impacts • 5-yearly assessment of monitoring, evaluation and reporting capabilities
10-yearly reporting	<ul style="list-style-type: none"> • 10-yearly review of Basin Plan
One-off reporting	<ul style="list-style-type: none"> • 5-yearly report on Basin Plan impacts, due date 31 October 2020 (extended by exchange of letters)
Publishing	<ul style="list-style-type: none"> • Annual Basin Plan Report • 5-Yearly Basin Plan Report • 10-Year Basin Plan Review • Monitoring information and data on Basin Plan effectiveness • Basin Plan evaluations

Basin Plan, Schedule 12: Matters for evaluation and reporting

Note: These requirements are already captured in the previous table on Basin Plan obligations. Some reporting requirements apply to parties other than the MDBA.

Item	Matter	Reporter	Reporting Frequency	Relevant Chapter in Basin Plan
<i>Basin Plan as a whole</i>				
1	The transparency and effectiveness of the management of the Basin water resources	MDBA	5-yearly	5
2	The protection and restoration of water-dependent ecosystems and ecosystem functions in the Murray–Darling Basin, including for the purposes of strengthening their resilience in a changing climate	MDBA	5-yearly	5
3	The extent to which the Basin Plan has affected social, economic and environmental outcomes in the Murray–Darling Basin	MDBA DAWE	5-yearly	5
4	The effectiveness of the management of risks to Basin water resources	MDBA Basin States	Annual	4, 5 and 10
5	The transition to long-term average sustainable diversion limits	DAWE	Annual	5 and 6
6	The extent to which local knowledge and solutions inform the implementation of the Basin Plan	MDBA CEWH Basin States	Annual	6, 8 and 10
<i>Environmental Watering Plan</i>				
7	The achievement of environmental outcomes at a Basin scale, by reference to the targets in Schedule 7	MDBA CEWH	5-yearly	8
8	The achievement of environmental outcomes at an asset scale	Basin States	5-yearly	8
9	The identification of environmental water and the monitoring of its use	MDBA CEWH Basin States	Annual	8

Item	Matter	Reporter	Reporting Frequency	Relevant Chapter in Basin Plan
10	The implementation of the environmental management framework (Part 4 of Chapter 8)	MDBA CEWH Basin States	Annual	8
<i>Water quality and salinity</i>				
11	The fitness for purpose of the Basin water resources	MDBA	5-yearly	5 and 9
12	Progress towards the water quality targets in Chapter 9	MDBA Basin States	5-yearly	9
13	The implementation, where necessary, of the emergency response process for critical human water needs	MDBA DAWE Basin States	Annual	11
14	The implementation of the water quality and salinity management plan, including the extent to which regard is had to the targets in Chapter 9 when making flow management decisions	MDBA CEWH Basin States	Annual	9
<i>Water trading rules</i>				
15	The facilitation, by efficient and effective water markets, of tradeable water rights reaching their most productive use	MDBA	5-yearly	5 and 12
16	The implementation of water trading rules	MDBA Basin States	Annual	12
<i>Water resource planning</i>				
17	The certainty of access to Basin water resources	MDBA	5-yearly	5 and 10
18	The efficiency and effectiveness of the operation of water resource plans, including in providing a robust framework under a changing climate	MDBA Basin States	5-yearly	10
19	Compliance with water resource plans	Basin States	Annual	10
20	The prioritisation of critical human water needs	Basin States	Annual	10 and 11
21	The accountability and transparency of arrangements for water sharing	Basin States	Annual	10

Office locations

Adelaide
Albury-Wodonga
Canberra
Goondiwindi
Griffith
Mildura
Murray Bridge
Toowoomba

 mdba.gov.au

 1800 230 067

 engagement@mdba.gov.au