Report on environmental watering coordination and principles – MDBA

The Murray-Darling Basin Authority's 2014- 15 annual report on implementing the Basin Plan environmental management framework (Schedule 12, Item 10)

Reporting context

The Basin Plan aims to protect and restore water-dependent ecosystems to support a healthy working Basin. To help achieve this, the Plan makes more water available for the environment and also guides how environmental watering is planned, coordinated and used at a Basin-scale.

The processes for planning and delivering environmental water including principles to be applied when watering occurs are set out in the environmental management framework in Chapter 8 of the Basin Plan. It includes:

- processes to co-ordinate the planning, prioritisation and use of planned environmental water and held environmental water, under which:
    - the Authority is obliged to prepare a Basin-wide environmental watering strategy
    - each Basin State is obliged to prepare long-term watering plans for water resource plan areas
    - each Basin State is obliged to identify annual environmental watering priorities for water resource plan areas; and
    - the Authority is obliged to identify Basin annual environmental watering priorities (Division 5)
- the principles to be applied in environmental watering
- a mechanism to enable the Authority to co-ordinate the recovery of additional environmental water.

The purpose of this report is to monitor how Basin governments are implementing the environmental management framework. The report is a requirement of Chapter 13 of the Basin Plan and relates to Item 10 of Schedule 12.

Indicators for measuring success

Implementation of the environmental management framework is evaluated using the following indicators:

- Basin-wide environmental watering strategy, long-term watering plans and annual priorities were prepared with the required content and are published, reviewed and updated, **(10.1)**
- Watering strategies, plans and priorities are prepared in consultation with other parties and having regard to matters as required (**10.2**)
- How environmental watering principles are applied (**10.3**)

10.1: Basin-wide environmental watering strategy, long-term watering plans and annual priorities were prepared with the required content, published, reviewed and updated as obligated under Part 4 of Chapter 8, Divisions 2-5

The Basin-wide environmental watering strategy (strategy) was published in November 2014. The strategy includes an explanation as to how the Authority will identify the Basin annual environmental watering priorities, as per s.8.14 (1). The strategy also sets out, in alignment with s.8.14 (2):

- expected environmental outcomes for river flows and connectivity, native vegetation, waterbirds and native fish;
- water management strategies for maximising these environmental outcomes;
- roles and responsibilities in managing environmental water; and
- approaches to measuring success and topics for future work.

Eleven Basin annual environmental watering priorities were prepared for the 2015/16 water accounting period and published prior to 30 June 2015, as per s.8.27 (1). Four of these priorities supported the recently released Basin-wide environmental watering strategy and its expected environmental outcomes, as per 8.27 (2). The remaining seven priorities focused on priority environmental assets of Basin-significance, as per s.8.28.

10.2: Watering strategies, plans and priorities were prepared consistently with Part 4 of Chapter 8, in relation to coordinating, consulting and cooperating with other Reporters and the matters to which regard must be had (Chapter 8, Part 4)

10.2.1. Describe how coordination, consultation and cooperation occurred including with other governments

Response

The Basin-wide environmental watering strategy was prepared in consultation with Basin states and the Commonwealth Environmental Water Holder (s. 8.15 (1)) through the Basin Plan Implementation Committee (an inter-jurisdictional committee with representation from all Basin governments) and its Environmental Watering Working Group. A series of workshops were also held with environmental water holders and managers.

In preparing the strategy, the consultation process ensured that regard was had to the views of interested parties listed in s. 8.15 (4). This consultation process included a public comment period from 21 August to 26 September 2014, with submissions accepted via the MDBA website, by email, post and in person; briefings to peak organisations; and public meetings. Feedback was received from 41 respondents, and this feedback was used to improve the strategy. More information can found in the on-line report; ‘Summary of feedback on the Basin-wide environmental watering strategy.’

The Basin-wide environmental watering priories were prepared in consultation with Basin states and the Commonwealth Environmental Water Holder through the Basin Plan Implementation Committee (an inter-jurisdictional committee with representation from all Basin governments) and its Environmental Watering Working Group. A Basin watering outlook was published in March seeking public comments from interested parties. MDBA staff preparing the priories attended a number of forums across the Basin to engage with environmental water holders and managers, river operators, and persons materially affected by environmental watering. MDBA also organised forums with expert scientists and managers to discuss the priorities.

Consultation with Aboriginal nations and local communities was not as strong as it has been in previous years, nor was there consideration of how priorities optimised social, economic and environmental outcomes. These two areas will be strengthened in years to come.

The Southern Connected Basin Environmental Water Committee (SCBEWC) was established in late 2014 by the Murray-Darling Basin Ministerial Council. Consisting of River Operators and holders/managers of environmental water, SCBEWC has two key roles to:

- coordinate the planning and delivery of all environmental water in the southern connected basin to maximise environmental outcomes. Decisions in relation to the allocation of water from the respective portfolios are retained by the environmental water holders
- make decisions on the planning and use of water available under The Living Murray portfolio, River Murray Increased Flows and River Murray Unregulated Flows.

SCBEWC's first major activity was the coordination of the planning for the 2015-16 environmental water delivery season.

10.2.2. Describe what difference coordination, consultation and cooperation made

Response

Click here to enter text.

The differences made by coordination, consultation and cooperation through the environmental management framework are threefold: better long-term planning, streamlined decision-making, and improved delivery of environmental water. These are elaborated on below.

Better long-term planning - The Basin-wide environmental watering strategy

The Basin-wide environmental watering strategy was improved as a result of public consultation.

Firstly, submissions received firstly confirmed that the Authority had been successful in producing a framework for Basin-scale, long-term thinking. Most feedback supported the approach to quantifying expected environmental outcomes and thought that it would assist the community to understand what the Basin Plan will achieve with environmental water.

Secondly, submissions provided useful suggestions about how to improve the readability and content of the document. Some of the changes the Authority made in response to submissions were describing the basis for expected outcomes, describing the relationship between the strategy and water resource plans, and providing more information on how annual priorities will be set, especially in very dry periods.

Streamlined decision making - SCBEWC

The establishment of the SCBEWC has effectively streamlined a set of pre-existing parallel planning processes into a single coordinated approach that retains sovereign decision making of the members.

This new approach enables better harmonisation of environmental watering and river operations practices so that the ecological health of rivers and of floodplains in the southern connected Basin is supported in the most effective and efficient way.

Improved delivery of environmental water - Operational Advisory Groups (OAGs)

Operational Advisory Groups (OAGs) include representatives from regional, state and commonwealth water management authorities and agencies, and include people with expertise in areas such as river operations, environmental water management and riverine ecology. The principal role of OAG's is to support the Authority in making operational decisions on the management and delivery of environmental water in the river (the River Murray system). OAG's provide advice 'in real time', which means shortly before or as the environmental watering event is actually happening.

OAG's are formed on an 'as needs' basis within a given water year, usually aligned with the timing of environmental watering. They meet as often as is required (as frequently as weekly) in the lead-up and during the watering events. OAGs discuss a range of operational matters including flow management, inundation extents, risk management, ecological responses, engineering issues, fishway operations and water accounting.

The Authority plays a vital role in the coordination / functioning of OAG's. OAG meetings are held via teleconference, as this is the most pragmatic and cost effective way to get everyone together. Typically, the Authority chairs OAG teleconferences (there are some exceptions where a regional agency performs this role instead of the Authority). The Authority's River Murray Operations (RMO) unit were active participants in each of around 13 OAGs that operated throughout 2014-15, and a total of about 230 OAG teleconferences.

The Authority provides an overarching 'whole of river' perspective, which no other single agency can on its own. In chairing OAG meetings, the Authority leads the group(s) through a standard agenda which allows participants to share updates on the latest news and information from their part of the river. OAG members report back to the group verbally at OAG teleconferences, in turn, on any observations or monitoring data on ecological response to the flows in their part of the river. With their diverse perspectives and links to local people, the OAG's guide event implementation to help achieve the best possible environmental outcomes whilst managing risks such as poor water quality outcomes.

The Authority keeps a written record of the key points of discussion at OAG meetings and distributes them to the group. These notes provide a very useful record of the watering events, how flows were managed, and how any issues arising were dealt with. This helps us with ongoing improvement in the way the river is operated, too.

One area of water delivery OAGs are helping refine is 'pulsing', which is releasing water from dams so that the pattern of flow in the river downstream of the dam mimics the variability of natural flow pulses (before the dam was built). The aim in doing this is to maximise the environmental benefit of the release. For instance, variable releases from dams, timed appropriately, can provide the necessary flow cues to stimulate fish breeding. This has been successfully demonstrated in the Goulburn River and in the lower Darling River.

10.3: How environmental watering principles were applied, consistently with Division 6 of Chapter 8, Part 4

10.3.1. Provide at least one case study that demonstrates how environmental watering principles were applied and identify the relevant principles.

Response

Click here to enter text.

Principle 1: Environmental watering to be undertaken having regard to the Basin annual environmental watering priorities

TLM's delivery of environmental water (in coordination with the other environmental water holders) provided flows to three Basin Plan priorities at the TLM Icon Sites–

- Flows to support and improve native fish populations.
- Improvement of aquatic, littoral and riparian vegetation.
- Inundation of wetlands and lakes which supported water bird breeding events.

TLM water has to be delivered for the benefit of TLM icon sites and therefore did not provide flows to all Basin Plan priorities.

Principle 2: Consistency with the objectives for water-dependent ecosystems

TLM water was delivered consistent with the objectives for water-dependent ecosystems. For example, TLM contributed to a large watering action that inundated over 6,100 hectares of lakes, wetlands and floodplains in the Hattah Lakes complex.

The watering was able to extend to outer floodplain black box communities; some of these communities had not been inundated in over 20 years. The watering stimulated a waterbird response as well as observations of juvenile native fish including Murray Cod, Silver Perch and Golden Perch.

Principle 3: Maximising environmental benefits

TLM watering proposals that maximise outcomes at a system level are scored higher when assessing where to provide water and how much to deliver.

In 2014–15, environmental water was used to supplement natural flows in the river, providing water to the six icon sites. A total of 294 gigalitres (inclusive of return flows) of TLM environmental water was delivered to icon sites. These deliveries were made in coordination with deliveries from other environmental water holders.

The environmental watering actions undertaken in 2014–15 had considerable ecological benefits, improving the health of many parts of the river system. They also provided water to allow the operational testing of recently completed water management structures at Gunbower-Koondrook-Perricoota Forest, Hattah Lakes and at the Chowilla Floodplains-Lindsay-Wallpolla Islands icon sites. Testing confirmed the design and operation of the structures, ensuring the efficient delivery of water to these icon sites in the longer term.

TLM watering activities were coordinated with actions by other environmental water holders and river operators to maximise the outcomes achieved. For example, TLM coordinated with the CEWO and river operators to deliver water from the Goulburn River for the Chowilla testing event downstream. This coordination enabled the achievement of flow pulses targeting vegetation and fish outcomes and river operators to maintain consumptive water deliveries in the Goulburn.

During the 2014-15 water year, the Authority's River Murray Operations unit (RMO) again assisted with the delivery of significant volumes of environmental water held by the Basin States, The Living Murray and the Commonwealth Environmental Water Holder, to target a range of environmental outcomes in the following locations, which are TLM icon sites:

- Gunbower Forest;
- Koondrook Forest;
- Hattah Lakes;
- Mulcra Island;
- Chowilla; and
- the lower River Murray channel, the Lower Lakes and to help maintain barrage releases to the Coorong.

Additionally, the Authority, acting with GMW, assisted the co-ordinated delivery of environmental water with bulk water inter-valley transfers ('IVT's') in the Goulburn River. Environmentally beneficial flow variation was targeted with these deliveries, thereby achieving multiple benefits from the releases.

RMO played an important role in coordinating environmental watering between holders of held environmental water and managers of planned environmental water, thereby maximising its benefits and effectiveness. The RMO was an active participant in, and in most cases co-ordinated, each of the thirteen Operations Advisory Groups (OAG's) (or similar) which focused on environmental operations in different parts of the system, and across the River Murray System as a whole. RMO provided advice to these groups throughout the year, as well as supplying observed hydrological data and flow forecasts.

In some cases, environmental water was coordinated with flows regulated for consumptive use to maximise its benefits and effectiveness, for instance:

- Pulsing (mimicking natural flow variation, as explained in the response to 10.2.2), using inter valley transfer (IVT) water, supplemented with environmental water. IVT volumes delivered at McCoys on the Goulburn were shaped to mimic natural flow pulses, in October – November, and January to March, up to a total of 3,000 ML/day. These flows were supplemented to higher peaks (within current operational limits) with CEWH water. The MDBA, acting with Goulburn Murray Water and the Goulburn-Broken Catchment Management Authority, played an important role in coordination of water delivery.
- Weir pool variability at Locks 8 and 9. A trial to vary these weir pool levels began in August 2014, in co-operation with NSW Office of Water and the Mallee Catchment Management Authority. The trial raised the weir pools in spring and then reduced them below full supply level over summer and autumn before raising them back to full supply level in May. CEWH water was used where required (e.g. for weir pool raising).

Principle 4: Risks

Risks associated with delivering TLM environmental water were managed throughout the year. Measures included:

- Water proposals submitted by jurisdictions identified potential risks associated with water actions and mitigation measures. These were considered in the prioritisation of proposals (Environmental Risks associated with the watering) and the development of the TLM annual environmental watering priorities (AEWP).
- Local and system-scale risks and mitigation measures were considered as part of the Risk Management framework in the TLM AEWP.
- Where available, modelling was used to help identify potential risks such as poor water quality and third-party impacts for TLM watering actions. Modelling was then used to help develop mitigation strategies.

- At times changes were made to delivery flow patterns, timing and volume to avoid potential risks. For example, when scouring of one of the main creeks in Hattah Lakes was detected, the flows were immediately stopped and remedial works undertaken.
- Real time data was provided to TLM during environmental water delivery through OAG's or directly through River Operations. This data was used to monitor risk and inform the response.

Principle 5: Cost of environmental watering

The cost of environmental watering was considered in the process of prioritising TLM watering as the 'Amount of benefit for volume of water'.

TLM watering actions were undertaken in a manner which generally saw return flows re-credited or re-used at downstream sites. For example, Hattah Lakes received environmental water from three different environmental water holders including TLM. The return flows from this event at Hattah were then re-diverted onto the Chowilla Floodplain downstream. The return flow from Chowilla Floodplain was then used to assist watering at Lower Lakes, Coorong and Murray Mouth. This approach minimised the costs involved and achieved multiple benefits.

Principle 6: Apply the precautionary principle

TLM activities sought to maximise environmental outcomes while having regard to the Basin Plan.

Watering proposals were informed by substantiated data, including scientific, expert opinion and best available on-ground information.

At times TLM may undertake watering actions that may not have full scientific certainty. Under these circumstances the positive ecological benefits derived from environmental water delivery are considered against the potential risks associated with the watering action and the risks of not watering. Mitigation strategies are used where possible to lower any associated risks with watering and risks are carefully monitored during water delivery.

Principle 7: Working effectively with local communities

Icon site managers enable local community involvement on behalf of TLM. This includes consultation before, during and after watering events. Icon site managers also coordinate community reference groups that provide advice and help to disseminate information.

For example, the local community was consulted during the preparation of plans to deliver water for the Gunbower Forest watering event. Specifically, the community was consulted about the planned timing and extent of the inundation and feedback was then used to refine the timing of flows in order to reduce impacts on activities such as firewood collection and commercial timber harvesting. Community consultation has been a vital component in ensuring the success of the infrastructure works and environmental watering at Gunbower Forest.

Principle 8: Adaptive management

Adaptive management principles were applied throughout the planning and delivery of TLM environmental water in 2014-15:

- Monitoring results were used to develop watering proposals

- An annual review identified areas for improvement in planning and delivering environmental water and changes were implemented as part of the 2014-15 program
- Real-time decision making allowed TLM to respond to changing river and climatic conditions. These were informed through the Operational Advisory Groups (OAGs).
- Modelling supported planning and real-time decision making during the delivery of environmental water at a number of icon sites. This was through the provision of information concerning flow management, inundation extents, water quality risks and water accounting.
- Validation and recalibration of a number of models occurred with the input of measured data from the 2014-15 watering events. These processes help to ensure and maintain model accuracy and usefulness.

Principle 9: Relevant international agreements

TLM environmental watering actions are undertaken principally at the six icon sites. Many of these sites are listed under the international Ramsar Convention on Wetlands. Environmental watering supports many aspects of the Ramsar ecological description for these sites.

Principle 10: Other management and operational practices

The Authority continued to review and improve its river management and operational practices to improve its capacity to manage the river to meet multiple objectives. The ongoing development of environmental guidelines, and revisions to the Objectives and Outcomes document including the approval of new and amended Specific Objectives and Outcomes, are all examples of steady improvement. These instruments codify better ways of running the river as we strive toward improving the environmental outcomes of river operations while meeting existing requirements (for irrigation etc).

An example of environmental watering practices and procedures improving is the implementation of an agreed schedule between SA Department of Environment, Water and Natural resources (DEWNR) and the Commonwealth Environmental Water Office (CEWO). The schedule pertains to the delivery and management of commonwealth environmental water to the River Murray in South Australia to achieve environmental outcomes in the Lower Lakes, Coorong and Murray Mouth area.

Significant progress has been made by the Authority in the development of a River Operations Workflows System - ROWS and the next generation operations tool (in the eWater Source platform). These are key pieces of work that will facilitate future operations and in particular environmental operations. They are also critical to the Authority's response to changing climate as they will provide a platform to make better use of BoM dynamic streamflow forecasts.

Principle 11: Management of water for consumptive use, consistent with achieving environmental objectives where possible

TLM's regular consultation with MDBA and state-based river operators ensured that the management of water for consumptive use was considered in the delivery of TLM environmental water.

In 2014-15, the River Murray System was operated at channel capacity in the mid reaches of the system for large periods of time to meet system demands, which included the delivery of large volumes of environmental water to South Australia. In this context it was a challenging

year to improve environmental attributes and ecosystem functions and processes throughout much of the river, and particularly at locations like the Barmah Choke.

Despite the challenging circumstances in 2014-15, the Authority continued to manage water for consumptive use, where possible, in ways that contributed to the environmental objectives of the Basin Plan.

For example, variable releases of consumptive water (or bulk water transfers from Dartmouth to Hume Dams) were made in accordance with environmental guidelines for flow variability in the Mitta Mitta River. Essentially, these guidelines set out 'tried and tested' ways (based on knowledge gained from previous monitored trials) that variable river flow patterns and levels, implemented within the context of achieving a 'healthy working river', can be utilised to contribute to the protection and, where possible, restoration of environmental assets and ecosystem functions. For the highly regulated Mitta Mitta River, pulsing releases of consumptive water is currently the only opportunity to improve the environmental outcomes of river operations in this reach. Past monitoring (to develop the guidelines) shows that flow pulsing in the Mitta Mitta River, irrespective of the ecological impacts of cold water releases from Dartmouth Dam, does improve the quality of "biofilm" in the river, thereby indicating a positive shift in river health.

Lake Mulwala (the lake formed by Yarrawonga Weir on the Murray) was drawn down below its normal operating level in winter 2015 (outside the irrigation season so not interrupting consumptive use) to allow vital maintenance. This also aided ongoing efforts to manage the aquatic waterweed *Egeria densa*[1] *('Brazilian Waterweed,* commonly found in household aquariums).This waterweed spread across much of the lake in the mid-1990s, compromising biodiversity and, at times, restricting recreational activities including fishing, boating and water skiing. Since 2008 there have been four "drawdowns" (or lowering of the lake below its normal water level) in winter that expose the weed to air and frost, drying it out. A monitoring survey technique was developed to track the effectiveness of each drawdown in managing the weed Egeria in the lake. The observed information and lessons about Egeria and the four drawdowns were synthesised in 2014-15, alongside stakeholder perspectives. MDBA and Goulburn-Murray Water will be drawing on the report to develop guidelines for managing submersed aquatic vegetation (including Egeria) in the lake. The guidelines will be implemented as part of normal operations and adapted over time as knowledge and information improves.

[1] Egeria densa is an aquatic waterweed that reached problematic levels of abundance and distribution in Lake Mulwala around 2008