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Policy for Environmental Water Return Flow

Purpose

The *Basin Plan 2012* requires implementation of policy measures to protect environmental water (held and planned environmental water), through the 'unimplemented' or 'Pre-requisite' Policy Measures (PPMs). This *Return Flow* policy is one of four policies that, together with accompanying procedures, constitute a significant proportion of South Australia's (SA) PPM environmental water protections. In addition to protection of held and planned environmental water, other water resources used for environmental watering purposes may also be afforded PPM protections within Basin-states in accordance with local requirements.

The specific purpose of this policy is to:

- outline requirements for the management and use of environmental return flow, and
- support accounting for use and re-use of environmental water at multiple sites.

Scope

This policy applies to the use and accounting of return flows from environmental watering actions undertaken within the River Murray in South Australia (SA).

The accounting of return flows from environmental watering actions ensures this water is available to be re-used for environmental outcomes at other downstream sites along the River Murray and the Coorong, Lower Lakes and Murray Mouth (CLLMM). Preservation of environmental water for environmental outcomes in these areas is covered by the *Water Allocation Plan (WAP) for the River Murray Prescribed Watercourse*, the *SA River Murray Water Resource Plan (WRP)* and the *SA Murray Region WRP*. This protection applies to environmental water delivered as part of South Australia's Entitlement and from third parties, such as the Commonwealth Environmental Water Holder (CEWH) and The Living Murray (TLM). This may include environmental water that is directly allocated to actions in SA or arrives as return flows from upstream environmental watering actions, which may be delivered through trade or under Bulk Entitlement Delivery (BED) arrangements.

Return flow from environmental watering actions cannot be used or allocated for purposes other than environmental outcomes in SA.

Upstream environmental water delivered to the South Australian border is recorded in the monthly bulk environmental water accounts maintained by the Murray-Darling Basin Authority (MDBA). However, the mechanisms for protection and delivery of environmental water from upstream states' return flows to the South Australian border are beyond the scope of this policy as NSW and Victoria have their state-specific PPMs implemented in their

tributaries. At a River Murray System scale, operational PPM implementation arrangements for the Joint Venture and MDBA-managed assets are documented in the *Objectives and Outcomes for River Operations in the River Murray System* (approved by the Basin Officials Committee (BOC)).

Policy

1. South Australia undertakes environmental watering in a transparent and accountable manner that includes the determination of return flows under circumstances as described in this policy and the *Procedure for Environmental Water Return Flows*.

2. Return flow in SA from environmental watering actions is protected in line with the WAP and WRP provisions and is not available for consumptive extraction purposes.

3. Return flow from environmental watering actions retains its environmental water characteristics and may only be re-used for ecological benefit of the River Murray Prescribed Watercourse (as defined in the WAP) and for the Coorong.

4. Any environmental water use associated with environmental watering actions is determined using the 'net environmental water use' method, and the return flow volumes are equal to the total volume required to implement the actions (i.e. the fill volume(s) delivered) minus losses. The approach to determine losses will also vary, depending on the actions, and is described in the *Procedure for the Application of Losses to Environmental Water*.

5. Pre-event modelling of site-based losses and return flows may be arranged by Environmental Water Unit (EWU) or, if available, loss data from look-up tables or data from past events of a similar nature will be used in the first instance, as agreed with water holders, for planning and decision making.

6. Post-event assessment of controlled environmental watering actions (monitored and/or modelled) will be undertaken to determine 'net environmental water use' from site-based losses and return flows from the actual event and observed climate.

7. The return flow volume may be used for environmental outcomes and accounted against a subsequent environmental watering action at a downstream site. In the absence of a downstream site requiring the water the CLLMM will be the default site.

8. To simplify the tracking and accounting of return flow volumes from small-scale watering actions, such as pumping, these will be accounted as delivered to the CLLMM.

9. Peer-reviewed hydrological models, such as the *River Murray Source Model in South Australia* (DEW, 2020), are used for a range of investigative and assessment purposes to understand complex river, floodplain and catchment behaviours. In the context of this policy and other environmental water protection policies, the use of any particular model

or calculation method used in the water balance of environmental actions will be agreed by the Department for Environment and Water (DEW), the MDBA and relevant Environmental Water Holders (EWHs), and documented, as necessary, in water delivery schedules. The use of the River Murray Source Model, in particular, to support water use accounting (losses and return flows) is accepted as a fit-for-purpose method.

10. Accounting for environmental watering return flow is recorded in:
    - the *SA River Murray Environmental Water Accounting Spreadsheet* in accordance with the *Procedure for Environmental Water Accounting in the South Australian River Murray* (maintained by Water Delivery Unit (WDU)), and
    - the *Non Class 9* (non pool-connected) *Environmental Water Accounting Spreadsheet* (maintained by EWU).

Responsibilities

Position	Responsibility
Chief Executive (CE), DEW	- Approves all DEW policies.
Executive Director (ED), Water and River Murray (WaRM) Division	- Approves DEW Water and River Murray Division procedures. - Endorses the Annual Water for the Environment Plan for the South Australian River Murray and the Annual Water for the Environment Priorities for the South Australian River Murray.
Director, Water Infrastructure and Operations (WIO) Branch	- Approves watering schedules with the Commonwealth Environmental Water Holder (CEWH).
Environmental Water Unit (EWU)	- Coordinates the development of Annual Environmental Watering Priorities and the Annual Water for the Environment Plan for the South Australian River Murray. - Coordinates the determination of modelled losses and return flows associated with environmental watering actions. - Collaborates with environmental water holders on planning for environmental watering actions, accounting arrangements and water schedules. - Undertakes monthly and event-based reporting to environmental water holders. - Maintains the environmental watering accounts.

Water Delivery Unit (WDU)	- Receives and provides advice on River Murray Action Request Forms. - Maintains the SA River Murray Environmental Water Accounting Spreadsheet.
Water Science and Monitoring Branch	- Maintains the surface water monitoring network that provides input for water use assessments. - Develops and maintains hydrological models. - Undertakes modelling to determine environmental water use for various watering actions. - Undertakes flow gauging to verify calculated flows at key structures.
Murray-Darling Basin Authority (MDBA)	- Maintains the monthly environmental water accounts which record upstream return flows delivered to the SA border. - Undertakes hydrological modelling to determine losses and return flows at The Living Murray (TLM) sites including the Chowilla floodplain site and the use of the environmental regulator. - Conducts a peer review of the models used.
Environmental Water Managers (EWMs)	- Develop and prepare environmental watering proposals and event plans. - Complete River Murray Action Request Forms. - Help to coordinate delivery of environmental water to agreed sites. - Pre-event estimation of losses.

Definitions

Controlled environmental watering action	An environmental watering action where a decision is made to use infrastructure such as a regulator or weir to increase the area of inundation or retain water.
Delivery schedule	Watering schedule (VEWH) and/or jointly managed water delivery instruction (TLM Initiative).
Environmental Outcomes	As defined in Section 4 of the *Water Act 2007;* *"environmental outcomes* includes:

	(a) ecosystem function; and (b) biodiversity; and (c) water quality; and (d) water resource health. Note 1: Paragraph (a) would cover, for example, maintaining ecosystem function by the periodic flooding of floodplain wetlands. Note 2: Paragraph (d) would cover, for example, mitigating pollution and limiting noxious algal blooms."
Environmental regulator	Built infrastructure that has the capacity to retain or release water on the floodplain to achieve environmental outcomes.
Environmental water	As defined in Section 4 of the *Water Act 2007;* "*environmental water* means: (a) held environmental water; or (b) planned environmental water" and, for the purposes of this Policy, environmental water also includes other water resources that are neither held or planned environmental water but are water entitlements and/or allocations used for environmental watering.
Environmental watering	As defined in Section 4 of the *Water Act 2007;* "The delivery or use of environmental water to achieve environmental outcomes".
Held environmental water (HEW)	As defined in Section 4 of the *Water Act 2007;* "*held environmental water* means water available under: (a) a water access right; or (b) a water delivery right; or (c) an irrigation right; for the purposes of achieving environmental outcomes (including water that is specified in a water access right to be for environmental use)".

Hydrological model	A hydrological model is a simplification of a real-world water system at a chosen geographical scale, that may have varying components representing surface water, groundwater, soil moisture, wetlands, floodplains, storages, runoff, land uses, etc. and aims to replicate important functions and behaviours of the system. The purpose of developing such models supports the capacity to explore scenarios for water availability, water planning and forecasting activities. In the context of the South Australian component of the Southern Connected Basin of the Murray-Darling Basin, the *River Murray Source Model* (DEW 2020) is used to determine water balance information and assess water delivery scenarios in SA.
Incremental transmission losses	The losses (evaporation and seepage) which occur during an enhanced flow event due to an increase in River Murray channel inundated area, in comparison to what would have occurred in the absence of the flow enhancement.
Losses	A term used when accounting for water; occurs when water evaporates, is used by plants and/or seeps into the ground. Refer https://www.mdba.gov.au/water-management/mdba-river-operations/why-water-losses-happen
Net environmental water use	The volume of water used by environmental watering action(s) based on the total volume delivered as part of the action, less any volumes that return to the River *i.e. net environmental water use = total volume delivered – return flows*.
Planned Environmental Water (PEW)	As defined in Part 1 Section 6 of the *Water Act 2007;* *"planned environmental water* is water that: (a) is committed by: (i) the Basin Plan or a water resource plan for a water resource plan area; or (ii) a plan made under a State water management law; or (iii) any other instrument made under a law of a State; to either or both of the following purposes: (iv) achieving environmental outcomes; (v) other environmental purposes that are specified in the plan or the instrument; and

	(b) cannot, to the extent to which it is committed by that instrument to that purpose or those purposes, be taken or used for any other purpose."
Regulated flow	The flow resulting from the release of stored water at the direction of the MDBA or state water resource managers, other than during or in anticipation of floods.
Return Flows	Water that returns back to the river after it is used. Refer https://www.mdba.gov.au/water-management/river-operations/return-flows
Site-based losses	Losses associated with a controlled environmental watering action where a decision is made to use infrastructure such as a regulator or weir to increase the area of inundation through the delivery of environmental water to a particular location, resulting in increased evaporation and seepage.
Unregulated flow	Unregulated flow to SA is declared by the MDBA without an associated volume for a period of time, and extended as appropriate, after NSW and Victoria exercise their rights to access unregulated flows for consumptive use, and the water is unable to be captured in Lake Victoria.

Acronyms

BED	Bulk Entitlement Delivery
BOC	Basin Officials Committee
CE	Chief Executive
CEWH	Commonwealth Environmental Water Holder
CLLMM	Coorong, Lower Lakes and Murray Mouth
Cth	Commonwealth
DEW	Department for Environment and Water

ED	Executive Director
EWHs	Environmental Water Holders
EWMs	Environmental Water Managers
EWU	Environmental Water Unit
HEW	Held Environmental Water
MDBA	Murray-Darling Basin Authority
NSW	New South Wales
PEW	Planned Environmental Water
PPM	Pre-requisite Policy Measures
SA	South Australia
TLM	The Living Murray
WAP	Water Allocation Plan
WRP	Water Resource Plan
WaRM	Water and River Murray
WDU	Water Delivery Unit
WIO	Water Infrastructure and Operations

Associated Documents and References

- *Basin Plan 2012* https://www.legislation.gov.au/Details/F2018C00451
- Department for Environment and Water (DEW), 2022-23, *Annual environmental watering priorities for the South Australian River Murray (the Annual Priorities)* https://www.environment.sa.gov.au/topics/river-murray/improving-river-health/environmental-water/environmental-water-planning
- Department for Environment and Water (DEW), 2022-23, *Water for the Environment Annual Plan for the South Australian River Murray*

https://www.environment.sa.gov.au/topics/river-murray/improving-river-health/environmental-water/environmental-water-planning

- Department for Environment and Water (DEW), 2020, *Refinements to the River Murray Source Model in South Australia, DEW Technical report 2020/06* https://www.waterconnect.sa.gov.au/Content/Publications/DEW/TechnicalReport_RefinementsToTheRiverMurraySourceModelInSA_2020_final.pdf

- Department for Environment and Water (DEW), 2023, *Policy for the Application of Losses to Environmental Water* https://www.environment.sa.gov.au/topics/river-murray/basin-plan/sustainable-limits-on-water-use/prerequisite-policy-measures

- Department for Environment and Water (DEW), 2023, *Policy for the Use of Unregulated Flow in the River Murray in South Australia* https://www.environment.sa.gov.au/topics/river-murray/basin-plan/sustainable-limits-on-water-use/prerequisite-policy-measures

- Department for Environment and Water (DEW), 2023, *Procedure for Application of Losses to Environmental Water Entitlements* *(Not available online)*

- Department for Environment and Water (DEW), 2023, *Procedure for Environmental Water Accounting in the South Australian River Murray* *(Not available online)*

- Department for Environment and Water (DEW), 2023, *Procedure for Environmental Water Return Flow* *(Not available online)*

- Department for Environment and Water (DEW), 2022, *Procedure for Quarterly Reporting on Environmental Water Accounts* *(Not available online)*

- Department for Environment and Water (DEW), 2023, *Procedure for the Use of Unregulated Flow in the River Murray in South Australia* *(Not available online)*

- *Landscape South Australia Act 2019* https://www.legislation.sa.gov.au/LZ/C/A/LANDSCAPE SOUTH AUSTRALIA ACT 2019.aspx

- Murray-Darling Basin Agreement 2008 (Cth) (see Schedule 1 of the *Water Act 2007*) https://www.mdba.gov.au/water-management/allocations-states-mdba/murray-darling-basin-agreement

- Murray-Darling Basin Authority (MDBA), *2019, South Australian Murray Region Water Resource Plan* https://www.mdba.gov.au/publications/mdba-reports/south-australian-murray-region-water-resource-plan

- Murraylands and Riverland Landscape Board (MRLB), 2023, *Water Allocation Plan for the River Murray Prescribed Watercourse* https://www.landscape.sa.gov.au/mr/water/water-allocation-plans/river-murray-wap

- *Water Act 2007* (Cth) https://www.legislation.gov.au/Details/C2017C00151

Contact

Tony Herbert
Manager, Environmental Water
Water Infrastructure and Operations
Email: tony.herbert@sa.gov.au

Chrissie Bloss
Manager, Water Delivery
Water Infrastructure and Operations
Email: chrissie.bloss@sa.gov.au

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