

Victoria's 2017/18 Status Report

Basin Salinity Management 2030

Report submitted to the Murray-Darling Basin Authority

1. Introduction

Victoria's 2017/18 Status Report presents Victoria's key achievements in implementing the *Basin Salinity Management 2030 (BSM2030)* Strategy over the 2017/18 period. Victoria remains compliant with its obligation under Schedule 1 of the Murray-Darling Basin Agreement, through maintaining the State's salinity register in a net credit position and progressing reviews of Victorian accountable actions.

Victoria delivers on its obligations under the BSM2030 through a collaborative approach between the Department of Environment, Land, Water and Planning (DELWP), Goulburn-Murray Water (GMW) the Department of Economic Development, Jobs, Transport and Resources (DEDJTR), and Victoria's five northern Catchment Management Authorities (CMAs) who are active partners in the implementation of activities to support the BSM2030.

2. Key Achievements

2.1 State-Wide Achievements

The Victorian Salt Disposal Working Group (VSDWG) advises the DELWP Deputy Secretary of the Water and Catchments Group on the management of Victoria's salinity debits and credits and provides advice on Victoria's compliance with obligations under BSM2030 (DSE, 2011a). The Group continues to meet on a quarterly basis and provides input to the implementation of BSM2030.

In 2018 the Salt Technical Advisory Committee was dissolved. The Committee was convened in 2010 to address salinity accountability issues arising from GMW's Connections Project (GCP). In future, salinity accountability arrangements for GCP will be managed through VSDWG. Key STAC achievements over the last eight years include establishing cost sharing principles related to ongoing maintenance and reporting of salt impacts, determining the indicative River Murray salinity impacts from the GCP, and guiding the development of a proposal for managing groundwater pumps discharging to channels.

DELWP worked with Mallee CMA to progress several projects covered under Action 4.8 of *Water for Victoria* (DELWP, 2016). This action aims to improve salinity accountability and management within the Mallee region. It includes a review of the models used to estimate the salinity impacts of new irrigation development (Nyah to the South Australian Border Salinity Management Plan accountable action) and the salinity offset charges.

DELWP initiated a review of the metric used for accountable water use and irrigated area change in the Goulburn Murray Irrigation District. Under the *Manual for Victoria's Salinity Accountability in the Murray-Darling Basin* (DSE, 2011b), regions currently use the Annual Use Limit (AUL) held in the area. However, recent reviews have found that the volume of AUL held in the Victorian Riverine Plains is not reflective of actual water use in the region. The review is expected to conclude in late 2018 and recommend an improved metric for use in the region.



Figure 1: Mildura-Merbein Salt Interception Scheme



Figure 2: Lambert Swamp

2.2 Regional Achievements

2.2.1 Mallee CMA

As part of the communication and knowledge transfer program a draft Salinity and Irrigation Engagement Strategy, *The Salt Beneath Our Feet*, was prepared in 2017-18. The draft strategy will guide how the Mallee CMA will engage with stakeholders and the community to elevate salinity awareness and build knowledge. It outlines the engagement objectives, the proposed approach and key messages. It analyses stakeholders across the irrigation community, identifies priorities, the level of engagement and proposed engagement approach. It details an action plan with goals, actions, responsibility and timelines.

The Mallee CMA reviewed and updated the Victorian Mallee Salt Procedures Manual in 2017, which is used by Mallee CMA as an internal reference document for assessing salinity impacts of accountable actions to meet their salinity reporting obligations.

The Mallee CMA invested significant time and resources into their groundwater monitoring network, which is used to assess salinity impact. Improvement and maintenance activities undertaken included the installation of data loggers at eight high priority bores, replacement of ageing data loggers at 13 sites and bore condition assessments.

The 2017/18 was the final year of the Mallee Root Zone Drainage (RZD) project, where research was focused on the soil-water balance and RZD for citrus and table grapes. This research will be used to inform future reviews on the rate of groundwater recharge from irrigation in the Mallee region.

The Mallee Dryland Sustainable Agricultural Strategy 2017-23 was approved by regional partners and the Mallee CMA Board in October 2017, following public consultation in August 2017. The Strategy aims to strengthen the future of dryland agriculture by optimising productivity through improving on-farm resilience and enhancing collaboration between stakeholders to address key threatening processes, including dryland salinity.

2.2.2 North Central CMA

In 2017/18, North Central CMA developed a comprehensive five-year project plan to meet salinity accountability requirements in their region. The plan was developed following a workshop lead by technical experts and included members from North Central CMA, DELWP and Murray-Darling Basin Authority (MDBA).

The plan focused on the upcoming Barr Creek Catchment Strategy accountable action, due for review in 2018. The 2017 workshop process confirmed a low risk context for the Barr Creek Catchment Strategy and found that it is likely that the existing credit is being underestimated. North Central CMA is now focused on completing strategic work to be able to comprehensively review this item in five years, following on from a risk-based review due in late-2018.

North Central CMA completed the review of the Campaspe West Salinity Management Plan accountable action and three of the Legacy of History catchment reviews, for the Ovens, Kiewa and Campaspe valleys. The Legacy of History reviews have been led by North Central CMA on behalf of Goulburn Broken CMA and North East CMA. The four reviews have been submitted to MDBA for endorsement.

2.2.3 Goulburn Broken CMA

During 2017/18, the Goulburn Broken CMA finalised the review of the Shepparton Irrigation Region (SIR) Salinity Management Plan accountable action based on 2015 levels of development. The review took into consideration increased irrigation efficiencies across the SIR, and in doing this, the review increased the impact from 1.4 EC debit to a proposed 5.2 EC debit. The review is now named the Shepparton Irrigation Region Land & Water Management Plan (SIR L&WMP), as the review is influenced by actions under this plan.

Goulburn Broken CMA is using an adaptive and versatile management approach for the operation and management of public groundwater pumps in their region. This project will reduce the volume of salt being exported to the Murray River and include revision of the methodology, procedures and policies for triggering

the operation of the pumps and rationalisation of the pump network by “mothballing” pumps that won’t be required in the medium to longer term.

2.2.4 Wimmera CMA

Over the period from July 2017 to June 2018, Wimmera CMA implemented the Wimmera Waterway Strategy 2014-22, in addition to the Rural Landholder Survey conducted by Charles Sturt University. Wimmera CMA also joined the Cooperative Research Centre for high performing soils as a delivery partner.

2.2.5 North East CMA

Waterwatch in the North East continued to increase community awareness and understanding of water quality issues, including salinity, by providing education and training. Salinity education throughout North East Victoria was delivered through the Schools Environment Education Directory project, educating 570 children from schools in the North East region (pictured on the right).



2.3 Dryland Salinity

Victoria has a number of programs within the Murray-Darling Basin dryland areas that monitor and analyse groundwater and salinity trends, provide extension and training to landholders and support on-ground works. Specific areas of dryland salinity research and development activities undertaken by DEDJTR’s Agriculture Victoria Research branch to support the BSM2030 included providing advice to Landcare and similar community groups, rural water authorities and local government on how to deal with dryland salinity and rising groundwater levels in their region.

3. Salt Interception Schemes

In 2017/18, the three Salt Interception Schemes (SIS) in Victoria, Barr Creek Drainage Diversion Scheme, Mildura-Merbein SIS and Pyramid Creek Groundwater Interception Scheme, operated in accordance with the operating rules and a summary about each of the schemes and their achievements are included below.

The Pyramid Creek Groundwater Interception Scheme intercepts saline groundwater that would have otherwise discharged to the Pyramid Creek. Previously this salt caused significant negative impacts upon the region’s agricultural production, the environmental attributes of the Ramsar listed Kerang Lakes, and downstream River Murray. The flows from this scheme are diverted to constructed drainage basins where salt is harvested by a private operator.

The Barr Creek Drainage Diversion Scheme reduces baseflow salt loads reaching the River Murray by diverting drainage flows and intercepted saline groundwater from the Barr Creek catchment to the Tutchewop Disposal Basins.

The refurbished Mildura-Merbein Scheme was commissioned and commenced operation in 2014/15, with 2017/18 reflecting the third full year of operations. Salt diversions were lower than expected due to some of the pumps being turned off due to cracks in the headworks. New headworks for pumps 8 and 9 have been designed and ordered in salt resistant stainless steel.

Table 3-1 Summary of Victorian Salt Interception Schemes

Salt Interception Scheme	Volume Pumped (ML)	Salt Load Diverted (Tonnes)	Average Salinity (EC) $\mu\text{S/cm}$
Pyramid Creek	870	21,369	40,714
Barr Creek	4,116	29,641	11,160
Mildura-Merbein	1,085	45,118	79,322

4. Register Entry and Model Reviews

In 2017/18, two Register A reviews, and three Register B reviews were submitted to the MDBA for independent peer review. Only the Shepparton Irrigation Region LWMP was signed off and endorsed by BSMAP and MDBA prior to 30 June 2018. The review resulted in an increase in the estimation of the accountable action debit to 5.2EC, due to reduced drain dilution flows from irrigation efficiencies reducing the dilution of salt in the drains.

Each year Mallee CMA estimate the increased salinity impact from new irrigation development against the Nyah to the South Australian Border SMP. For 2017/18, there was an increase of 0.3 EC, with a progressive total salinity impact of 17.2 EC. Calculations were undertaken using the agreed and accredited model (SKM, 2001). A summary of the changes is included in Table 3-2 below.

A summary of all of Victoria's accountable action and Legacy of History reviews are in Table 3-3

Table 3-2 Summary of expected changes to Victoria's salinity assessments to 30-June-2018

MDBA Register A Accountable Actions	Salinity Debits (EC)		
	Balance (19/9/2017)	Estimated change 2017/18	Estimated balance (30/6/2018)
SIR LWMP	1.4	3.8	5.2
Nyah to SA Border SMP	16.9	0.3	17.2

Note: Discrepancies between these estimates and the MDBA salinity register are a result of misalignment between MSM-BigMOD which is used for MDBA biannual register calculations and the accredited and agreed model (SKM, 2001) which is used in regional calculations.

Figure 3: Dryland Salinity Monitoring Bores



Figure 4: New Drain in Goulburn Broken CMA



Table 3-3 Status of BSM2030 Register A and Register B Victorian State Accountable Action Reviews in 2017/18

Victorian State works and measures	Last Review	Review Due	Status
Register A entries			
Barr Creek Catchment Strategy	2013	2018	Review commenced and expected to be completed early 2019
Tragowel Plains Drains at 2002 level	2013	2017	Review commenced and scheduled for completion in late 2018
Shepparton LWMP	2008	2017	Review completed and endorsed in 2018
Nangiloc-Colignan SMP	2013	2023	Review not scheduled until 2023
Nyah to SA Border SMP - Irrigation Development	2014	2018	Review of model commenced, and the accountable action review expected to be completed in 2019
Kerang Lakes/Swan Hill SMP	2010	2017	Review will be completed in line with the Victorian Mid-Murray Storages initial assessment
Campaspe West SMP	2010	2017	Review completed and expected to be endorsed mid-2018
Psyche Bend	2011	2017	Review completed and endorsed in 2017
Woorinen Irrigation District Excision	2010	2017	Review will be completed in line with the Victorian Mid-Murray Storages initial assessment
Sunraysia Drains Drying up	2011	2017	Review completed and endorsed in 2017
Lamberts Swamp	2011	2017	Review completed and endorsed in 2017
Church's Cut Decommissioning	2016	2021	Review not scheduled until 2021
Mallee Drainage Bore Decommissioning	2013	2018	Review commenced and scheduled for completion in late 2018
RISI Stage 1	2016	2019	Review not scheduled until 2019
RISI Stage 2	2014	2019	Review not scheduled until 2019
Register B entries			
Campaspe Catchment Legacy of History	2011	2018	Review completed in 2018
Goulburn Catchment Legacy of History	2013	2018	Review commenced and scheduled for completion in early 2019
Loddon Catchment Legacy of History	2013	2018	Review commenced and scheduled for completion in early 2019
Kiewa Catchment Legacy of History	2011	2018	Review completed in 2018
Ovens Catchment Legacy of History	2011	2018	Review completed in 2018
Victorian Mallee – Dryland	2010	2019	Victoria is working with MDBA and NSW to progress work on Mallee Legacy of History actions with consideration of the recent BSM 2030 knowledge priority learnings
Victorian Mallee – Pre-88 Irrigation	2010	2019	

5. New Accountable Actions

In 2017/18, Victoria progressed work on potential new actions, as follows:

- Victorian Mid-Murray Storages: which includes consideration of the Woorinen Irrigation District Excision and Kerang Lakes/Swan Hill Salinity Management Plan accountable action reviews. Work so far includes consideration of the key issues for the proposed register item and engagement with key stakeholders. A provisional entry is expected for inclusion on the 2019 register.
- Connections Project: further work has progressed to calculate an initial estimate of the salinity impacts from the Goulburn-Murray Water Connections Project in Northern Victoria.
- Benwell Surface Water Management System: a preliminary assessment of this item indicated that the construction of the drain will cause a significant salinity effect at Morgan. However, drainage works are currently on hold and Victoria will progress this item once construction has been confirmed.

6. End-of-Valley Targets Summary Result

In 2017/18, each Victorian catchment valley for which an End of Valley Target (EoVT) has been adopted, was monitored and the results included in Appendix A below. Results indicate that the median salinity in the Ovens, Kiewa, Goulburn, Broken, Loddon and Wimmera were below the end-of-valley median target during the 2017/18 reporting year. Median salinities in the Campaspe River for 2017/18, similar to observations in 2016/17, exceeded EoVT values. The implication of this exceedance for Murray River salinities are minor because the tributary flow would be diluted by the higher flows of the Murray.

The streamflow and salinity data for some of these catchments were incomplete due to conditions outside of the instrumentation threshold, interference to monitoring infrastructure and/or faulty instrumentation. These periods of interrupted data were predominately of short duration and were infilled using appropriate interpolation methods.

7. Core Salinity Monitoring Network

Monitoring is essential for successful salinity management, as it helps to build understanding of conditions in the Basin. The Basin-Wide Core Salinity Monitoring Network is being collated by MDBA as part of BSM2030 to provide a sound basis for salinity assessment information. In 2017/18, Victoria nominated sites to the core salinity monitoring network.

8. References

- DELWP (2016), *Water for Victoria*. Victorian Government, Department of Environment, Land, Water and Planning, Melbourne.
- DSE (2011a), *Victorian Salt Disposal Working Group Terms of Reference*. April 2011
- DSE (2011b), *Manual for Victoria's Salinity Accountability in the Murray-Darling Basin*. Victorian Government, Department of Sustainability and Environment, Melbourne.
- SKM (2001), *Mallee Region Salt Impact of Water Trade. A Proposed Method for Accounting for the EC Impacts of Water Trade in the Victorian Mallee*. Final report by Sinclair Knight Merz for Department of Natural Resources and Environment.
- WMIS (2018), *Water Measurement Information System* <http://data.water.vic.gov.au/monitoring.htm>, Accessed: 05/08/2018

Appendix A End of Valley Target Monitoring Results

Region	Valley	Reporting site	AWRC Site Number	End-of-Valley Targets			2017/18 monitoring results			Comparison of monitoring results to End-of-Valley Target value		
				Salinity (EC µS/cm)		Salt Load (t/yr.)	Salinity (EC µS/cm)		Salt Load (t/yr.)	Salinity (EC µS/cm)		Salt Load ¹ (t/yr.)
				Median (50%ile)	Peak (80%ile)	Mean	Median (50%ile)	Peak (80%ile)	Total	Median (50%ile)	Peak (80%ile)	Total
North East	Ovens	Ovens River @ Peechelba-East	403241	72	100	54,000	59	65	29,500	Below target	Below target	Below target
	Kiewa	Kiewa River @ Bandiana	402205	47	55	19,000	36 [^]	42 [^]	11,600 [^]	Below target	Below target	Below target
Goulburn Broken	Goulburn	Goulburn River @ Goulburn Weir	405259	99	-	-	63 [^]	81 [^]	34,200 ^{^#}	Below target		
	Broken	Broken Creek @ Casey's Weir	404217	141	-	-	140 ^{##}	153 ^{##}	400 ^{^##}	Below target		
North Central	Avoca	Avoca River @ Quambatook	408203	2,096	-	-	No flow [^]	No flow [^]	0 [^]			
	Loddon	Loddon River @ Laanecoorie	407203	711	-	-	505 [^]	613 [^]	18,600 [^]	Below Target		
	Campaspe	Campaspe River @ Campaspe Weir	406218	412	-	-	446 [*]	457	29,900 ^{^#}	Above target		
Wimmera	Wimmera	Wimmera River @ Horsham Weir	415200	1,380	1,720	31,000	1,235	1,475	14,200	Below target	Below target	Below target
Mallee	Vic Mallee Zone	River Murray @ Lock 6	426200	+15EEC ^{2^}	-	-						

Guide to table:

[^] Missing data due to instrument damage or conditions outside of instrumentation threshold- where feasible, data is interpolated using available data for salt load calculations; [#] Salt load calculated using flow and salinity (EC) from downstream gauging station; ^{##} Salinity data from downstream gauging station; ^{*} Salinity exceeded target, but should not be deemed a threat to the River Murray, ^{^^} The target relates to Victoria's contribution to river salinity throughout the entire Mallee zone. This contribution is assessed using the EM2 model, rather than modelled surface water salinity.

1. Where flow and/or EC data is missing, salt load calculations for EoVTs has required interpolation of available data.
2. Equivalent Electrical Conductivity – refer to Basin Salinity Management Strategy Operational Protocols Version 2.0, Murray-Darling Basin Commission, Figure 4, pg. 100.