Victorian Submission to Murray-Darling Basin Annual Transition Period Water Take Report 2018-19

Draft

VICTORIA State Government | Environment, Land, Water and Planning

Acknowledgements

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1 Victorian water resource management overview

1.1 Introduction

This submission constitutes Victoria's 2018/19 reporting on water resources in the Murray-Darling Basin. Specifically, this submission addresses the following:

- Reporting on matters stipulated in Schedule E of the Murray-Darling Basin Agreement for each designated river valley, including on compliance against Cap targets
- Reporting on matters stipulated in section 71 of the *Water Act 2007* (Commonwealth) for each water resource plan (WRP) area (both surface water and groundwater), insofar as those matters are applicable in 2018/19.

This submission provides a "dry run" of reporting on Matters 9.1 and 9.2 in Schedule 12 of the Basin Plan, which relate to the identification of environmental water and the monitoring of its use. Information is also provided about Victoria's approach and progress towards reporting under the Basin Plan from 2019.

This report highlights the key information for 2018/19 and provides context and analysis. The detailed data are provided in Appendix 1.

1.2 Achievements and Outcomes in Water Resource Management

Compliance with Sustainable Diversion Limit (SDL) under Section 71 of the *Water Act 2007* (Commonwealth) comes into effect on 1 July 2019 and by that time, Victoria is required to get Water Resource Plans (WRPs) accredited for its WRP areas. Victoria has developed the Water Resource Plans (WRPs) and submitted these to the Murray-Darling Basin Authority (MDBA) for accreditation. The annual reporting will be transitioned from Cap compliance reporting to SDL compliance reporting starting for the periods from 1 July 2019. Significant achievements in 2018/19 for this are:

- Finalisation of documentation of all baseline entitlements in the Goulburn, Broken, Campaspe and Loddon systems at 30 June 2009 to inform the Baseline Diversion Limit (BDL) model of the Northern Victorian system.
- Finalisation of documentation of operating and water management rules in the Goulburn, Broken, Campaspe and Loddon systems at 30 June 2009 to inform the BDL model of Northern Victorian system.
- Completion of BDL and interim WRP models for Northern Victorian systems as part of submission of Victoria's North and Murray WRP to MDBA.
- Agreement with MDBA on the method for adjusting diversion limits by scaling the modelled limits for environmental water recoveries which are not explicitly represented in WRP versions of the hydrologic models of Northern Victorian and Victorian Murray systems.

- Significant progress towards Victoria's water recovery targets through water savings projects and SDL offsets.
- Update of Long-Term Diversion Limit Equivalence (LTDLE) factors based on the best available information for the baseline diversion limit conditions. MDBA has agreed to the set of updated factors and is also satisfied that the updated factors are robust, and evidence based.
- Development and submission of the Annual Environmental Watering Priorities to the MDBA consistent with the Basin Plan.
- Submission of the status report on compliance with Basin Salinity Management (BSM) 2030 in 2017/18 and preparation for the submission of the BSM 2030 Comprehensive Report for 2017-19 to the MDBA and Independent Audit Group for Salinity.
- Significant work to develop a foundational version of the Source model representing baseline diversion limit conditions for Northern Victorian systems, with aim to replace the REALM version of the BDL model once deemed fit-for-purpose.

Current administration and assessment tools under the Cap have underpinned the development of the WRPs. Existing arrangements will be improved by selection and implementation of appropriate monitoring methods for unregulated use, interception activities and groundwater use.

Victoria also continues to work with the MDBA to improve the method to adjust the Cap or annual permitted take under SDL compliance for environmental water recovery not explicitly in Cap or Water Resource Plan models.

1.3 Available Water Resources

Following a warm autumn with below average rainfall, 2018/19 started with below average winter rainfall, with a particularly dry July. Dry conditions continued into spring, which was warmer and drier than average.

Victoria received its warmest summer on record, with several heatwaves. December was wetter than average resulting from a storm in mid-December, with localised areas of north east of Victoria receiving their monthly average rainfall over a couple of days. At Lake Buffalo 120 mm was recorded over three days and 61 mm at Yarrawonga Weir. Despite the magnitude of rainfall, due to the localised nature, river levels in the regulated river reaches of the Ovens and Murray systems remained below minor flood levels. This rainfall resulted in inflow to Lake William Hovell being 94% of the December average, while Lake Buffalo inflows were only 50% of the December average.

Following the rainfall in December, north east Victoria recorded above average rainfall in autumn 2019. However, north central and north west Victoria was dry and warm for the remainder of the summer and autumn, resulting in high demand for water. There was some very welcome rain in May, with above average rainfall across much of the north of the state except in the Mallee.

In 2018/19, seasonal determinations in Northern Victoria started generally low and reached high during mid to end of the season, although not quite as high as those in 2017/18, particularly in the Broken, Campaspe and Wimmera-Mallee systems. The final seasonal determinations are shown in Table 1.

Table 1. Final 2018/19 seasonal determinations

Regulated system	Final Seasonal Determination (HRWS)	Final Seasonal Determination (LRWS)
Murray	100%	0%
Goulburn	100%	0%
Campaspe	100%	0%
Loddon	100%	0%
Broken	37%	0%
Bullarook	100%	100%
Wimmera- Mallee	55%	0%

Entitlement holders in the Wimmera-Mallee system received allocations less than 100% of their entitlements, maximum being 55% for the Wimmera-Mallee pipeline product. The Commonwealth Environmental Water Holdings in the Wimmera-Mallee system did not receive an allocation in 2018/19.

The carryover policy in the Murray, Goulburn and Campaspe systems allows unused allocations to be carried over by entitlement holders into the following year, with any water above their entitlement volumes being subject to spills or pre-releases that occur from Lake Hume, Lake Eildon or Lake Eppalock respectively. The volume carried over in excess of the entitlement volumes is held in spillable water accounts until a low risk of spill declaration is made for the relevant system. Spillable water accounting also applies in the Wimmera-Mallee system. There were no deductions in 2018/19 from spillable water accounts in any of the eligible systems. Carryover in other Northern Victorian regulated systems is limited type and not subject to any spill accounting. The carryover and allocation in those systems are limited to entitlement volume and the maximum volume that an entitlement holder can carry over is limited to 50% of entitlement.

In Victoria, diversions from unregulated waterways are estimated to be less than 2 per cent of total diversions. Restrictions to access of unregulated waterways were implemented across northern Victoria, as discussed further in Section 2.

1.4 Water Resource Use and Trade

Victorian systems diverted a total of 2,396 GL for consumptive water use from the Murray-Darling Basin during the 2018/19, less than the total volume diverted in 2017/18. Demand in 2018/19 decreased on the previous year partly due to lower water availability and trade out of Victoria.

The volume diverted in the designated Murray/Kiewa/Ovens valley was 1,355 GL. A volume of 991 GL was diverted in the Goulburn/Broken/Loddon river valleys. The Campaspe River and Wimmera-Mallee valley diversions were 32.2 GL and 18.3 GL respectively.

The total volume delivered to Northern Victorian regulated systems for consumptive water use during 2018/19 was 1,939 GL. This is 203 GL less than the volume delivered in 2017/18. The total Victorian usage in 2018/19 was 78 per cent of the total volume allocated. Deliveries in the Murray/Kiewa/Ovens designated valley were 1,159 GL in 2018/19, 95 GL less than the delivery of 1,254 GL in the previous year. Deliveries in the Goulburn/Broken/Loddon valley were lower this year delivering 601 GL in 2018/19, 92 GL less than the 693 GL delivered in 2017/18. Campaspe valley deliveries were 162 GL in 2018/19, compared to 180 GL delivered in 2017/18.

Total Wimmera-Mallee deliveries, including water diverted from other valleys, were 16.9 GL in 2018/19, 1.6 GL more than the 15.3 GL delivered in 2017/18.

There was a net temporary allocation trade of consumptive water out of Victoria of 90.0 GL in 2018/19. This is consistent with the direction of the net trade observed in 2017/18, but with a lower volume of trade.

Interstate temporary allocation trading of consumptive water between Victoria and New South Wales resulted in an overall net transfer out of Victoria of 61.2 GL. This volume included net allocation trade of 74.2 GL from Victoria to NSW Murray and 13.0 GL from Murrumbidgee River basin to Victoria. There was no trade between the Darling River and Victoria. Trade with South Australia resulted in a total net temporary allocation trade of consumptive water of 28.8 GL, which includes 500 ML of environmental water to consumptive water, to South Australia from Victoria, an increase from the 7.1 GL traded to South Australia in 2017/18.

The total environmental water available for 2018/19 was 823 GL.The net consumptive use of environmental water in 2018/19 was less than in 2017/18, with 113 GL used in comparison to 163 GL the year before. Of the volume delivered for environmental purposes in 2018/19, the greatest usage was in the Goulburn and Murray systems, with 255 GL and 163 GL respectively. In 2018/19, 373 GL was recredited[1] to environmental accounts in downstream systems. This volume made up the majority of the 498 GL of environmental water delivered to South Australia via trade.

There was 31.5 GL traded from environmental entitlement holders to consumptive users, and 67 ML was traded from consumptive users to the environment as either donations and or as part of the process of transferring water savings holdings to the environmental water holders.

1.5 Assessment Tools and Data

1.5.1 Interception Diversion

Victoria has developed appropriate methods to estimate take from interception activities for Basin Plan reporting purposes. This includes take from runoff dams and commercial plantations.

The approach for commercial plantations is based on a catchment water balance model which is considered to provide the best available information. The annual permitted net take of water by commercial plantations will be estimated based on the long-term average rate of evapotranspiration from plantations compared to the vegetation type that was present before the plantation was established.

[1] Recredit occurs when residual portion of environmental water orders from upstream system flows to downstream system

A hydrological model for estimating take by stock and domestic (basic rights) runoff dams, has been developed by Victoria based on the best available data. Annual take by stock and domestic runoff dams will be based on the best estimate of the long-term average annual take using this hydrological model.

All runoff dams used for irrigation or commercial purposes in Victoria are fully included in the capped entitlement system. While hydrological modelling could be used to estimate take by these dams, the modelling outputs have a very high degree of uncertainty. Consequently, the recorded entitlement volume of the dams is considered a more reliable estimate of their take. Therefore, estimated take for these licensed dams will be based on entitlement volume.

1.5.2 Unregulated Diversion

In Victoria, unregulated watercourse diversions are estimated to represent less than 2 per cent of total diversions. In previous years, fit-for-purpose approaches have been used to estimate both long-term average unregulated usage and annual unregulated usage. In both cases, the approach adopted estimates the unregulated use based on regulated usage. Similar to previous years, an improvement to the estimation of unregulated use has been made by using some available metered unregulated use data to extrapolate total unregulated use in 2018/19.

1.5.3 Regulated Diversion

All the models used by Victoria to calculate Cap targets for regulated systems have been approved by the MDBA. The models used for the Goulburn/Broken/Loddon, Campaspe and Wimmera-Mallee Cap valleys were developed by Victoria while the model used for the Victorian Murray/Kiewa/Ovens Cap valley was developed by the MDBA. In the case of the Wimmera-Mallee system, two new Cap models have been approved by the MDBA to calculate Cap targets, a post pipeline model to be used from July 2011 to June 2013 and a post irrigation model to be used from July 2013. These models represent the completion of all pipeline projects in the Wimmera-Mallee system and the sale of irrigation entitlements in the Wimmera-Mallee system respectively.

Data inputs for all the models used are extended annually to undertake the Cap audit. As part of the data extension process, improvements to data estimation techniques are included where possible. Any changes that impact on Cap assessment are explained in the following paragraphs.

The model used for the Goulburn/Broken/Loddon and Campaspe valleys was approved by the then Murray-Darling Basin Commission at Meeting 93 on 4 September 2007. This model was re-calibrated for improved Campaspe Irrigation District diversion data and re-approved by the MDBA on 10 May 2012. In extending model inputs to 2018/19 for the Goulburn/Broken/Loddon and Campaspe Cap valleys, there were differences in May and June streamflow data from those used in the 2017/18 update. There were also changes in inflow inputs due to retrospective corrections in streamflow ratings, and in some inflow and demand inputs due to retrospective corrections in rainfall (Lake Nillahcootie) and evaporation (Malmsbury, Lake Nillahcootie and Rochester) data. These led to changes in cumulative Cap credits from 1997/98 to 2017/18, which are net increase of 15.2 GL (~ 0.8% of long-term average Cap) and net decrease of 0.4 GL (~ 0.3% of long-term average Cap) for Goulburn/Broken/Loddon and Campaspe valleys respectively.

Regression models are used for the Kiewa and Ovens valleys. These were developed by the MDBA as part of their development of a computer simulation model for the Murray which includes the

Victorian Murray. Both the regression models and the computer simulation model, excluding the Lower Darling component, were approved by the then Murray-Darling Basin Commission at Meeting 96 on 26 August 2008. The Murray model has since undergone several updates and the updated model has been used for the 2018/19 assessment. Updates as part of input data extension to 2018/19 for the Victorian Murray/Kiewa/Ovens models have led to changes in inputs mainly due to differences in Bureau of Meteorology climate data between last year and this year. These differences have resulted in a net decrease of 55 GL to the cumulative Cap credit from 1997/98 to 2017/18, which is 3.2% of the long-term average valley Cap.

The Wimmera-Mallee Post Irrigation entitlement sale model has been used to calculate the 2017/18 Cap target for Wimmera-Mallee valley. This model was approved by MDBA on 6 November 2013. The Wimmera-Mallee Post Pipeline model operated over the 114-year period from July 1895 to June 2009 yields a long-term annual diversion of 44.2 GL/year, not including unregulated diversion outside the model area. In extending model inputs to 2018/19 for the Wimmera-Mallee Cap valley, there were minor differences in May and June streamflow data from those used in the 2017/18 update and correction in some evaporation inputs, which led to decrease of 1.4 GL in cumulative Cap credits from 1997/98 to 2017/18.

On 30 October 2010 the MDBA approved Victoria's proposed method for Cap adjustment for environmental water recovery that is required under the Murray-Darling Basin Agreement Schedule E protocol "Adjusting Caps on Diversions for Environmental Entitlements and Uses." Similar to previous years, the Environmental Use method has been applied to 2018/19 Cap targets to account for water recovered for the environment through initiatives such as Snowy environmental flows, The Living Murray (TLM) and Commonwealth purchases. A sliding scale method was used for the decommissioning of Lake Mokoan. MDBA agreed to continue using this method until the Basin Plan comes into effect. Victoria continuously worked on development of hydrological models of regulated systems for calculating baseline and sustainable diversion limits and submitted the baseline diversion limit and interim WRP models as part of Victoria's North and Murray WRP.

1.5.4 Groundwater Take

Information used to inform this work from the Victorian Water Register is subject to further validation, which is not complete as of 1 November 2019. The data provided is subject to minor changes or amendments following the validation process. Additional information for trade and carryover was provided by Rural Water Corporations. The reporting is considered to be consistent with the accredited Wimmera-Mallee WRP and the draft Victoria's North and Murray WRP.

The permitted take is based on the SDL for the respective SDL resource units. The access entitlement is based on the sum of the licensed entitlements for all groundwater bores, and the allocation is based on any annual restrictions in place by groundwater management area or sub-zone through a management plan.

Actual take for most of the licensed groundwater bores is measured through annual metering. All groundwater bores licensed for volume in excess of 20 ML/yr are metered, except in the Goulburn-Murray: Shepparton Irrigation Region SDL resource unit. Many bores greater than 10 ML/yr are also metered. Meters are read at least once annually. Annual take for licenced entitlements in the Goulburn-Murray: Shepparton Irrigation Region SDL resource unit is estimated based on a subset of metered bores. Take from basic rights bores (domestic and stock use) is estimated based on the number of bores less than 30 years old (given the likely life of a domestic and stock bore) with an average use of 2 ML/year per bore.

This year, Victoria has developed an automated process for taking bore and licence location data in the Victorian Water Information Management System (WMIS) and the Victorian Water Register to compile the allocation and actual take data for all forms of take from groundwater by SDL resource unit. Minor discrepancies exist when using the methodology for previous years data however the approach is considered more robust and repeatable.

2 Cap Compliance

2.1 Cap Models: Status of Cap models

Status of Cap models and associated historical changes are covered in Section 3 of this document. In summary, for 2018/19, there was no new model accredited for any regulated system in the Victoria for Cap compliance purposes, and Victoria has submitted as part of Victoria's North and Murray WRP the baseline diversion limit and interim WRP models.

2.2 Annual Cap Compliance

Annual Cap compliance for each Cap valley is presented in this section. In summary, for 2018/19, there was no breach in Cap compliance for any Cap valley in the Victoria.

Actual diversions are expected to exceed the modelled Cap targets in some years because significant policy changes since the introduction of Cap have altered water-use behaviour. To balance out the high variability between years, the cumulative Cap credit/debit is used for assessing Cap compliance — not each individual year's credit/debit.

The large cumulative Cap credits accrued since 1997 mean that Victoria is expected to be Cap compliant until 2019/20. The Cap will then be superseded by Basin Plan Sustainable Diversion Limit (SDL) which resets the starting position for SDL compliance as at 1 July 2019 of zero.

2.2.1 Victorian Murray, Kiewa and Ovens

Diversion from the Murray/Kiewa/Ovens valley was 1,355.0 GL, which is 53.3 GL less than the Cap target of 1,408.3 GL (with adjustment for trade and environmental releases). The diversion was 20.4 per cent below the long-term Cap average of 1,702 GL/year. The cumulative Cap credit since July 1997 is 3,402.7 GL.

2.2.2 Goulburn, Broken and Loddon

Diversion from the Goulburn/Broken/Loddon Cap Valley was 990.8 GL, which is 25.0 GL less than the Cap target of 1,015.8 GL (with adjustment for trade, environmental releases, decommissioning of Lake Mokoan and inter-valley transfers). Diversions were 51.3 per cent below the long-term average Cap of 2,033.7 GL/year. The cumulative Cap credit for the period from July 1997 to June 2019 is 3,189.3 GL.

2.2.3 Campaspe

Diversion from the Campaspe valley was 32.2 GL, which is 34.4 GL below the Cap target of 66.6 GL (with adjustment for environmental releases). Diversions were 73.6 per cent below the long-term average Cap of 121.8 GL/year. The cumulative Cap credit for the Campaspe valley from July 1997 to June 2019 is 624.1 GL.

2.2.4 Wimmera-Mallee

Diversion from the Wimmera-Mallee valley was 18.3 GL, which is 10.1 GL below the Cap target of 28.4 GL. Diversions were 59.4 per cent below the long-term average Cap of 45.1 GL/year. The cumulative Cap credit for the Wimmera-Mallee valley from July 1997 to June 2019 is 193.5 GL.

2.3 Victorian Murray

2.3.1 Resource Availability

There was a 41 per cent high-reliability water share seasonal determination at the start of July 2018 for Murray system entitlement holders. The seasonal determination gradually increased to 100 per cent high-reliability water shares by mid-December 2019 (Table 1). On 10 October 2018, a declaration was made that the risk of spill at Lake Hume was low which enabled the remaining water held in spillable water accounts to be accessed.

The Menindee Lakes remained in control of the NSW during 2018/19.

At 1 July 2018 Lake Dartmouth was 89 per cent of capacity and Lake Hume was 43 per cent of capacity. Lake Hume filled to 53 per cent in September 2018 before being drawn down to 13 per cent by the end of April 2019. By 30 June 2019 Lake Dartmouth was at 64 per cent, and Hume was at 24 per cent. Inflows for Dartmouth and Hume in 2018/19 were 63 per cent and 32 per cent of the annual average respectively.

During 2018/19 there were suspensions to access and rostered access for Murray System unregulated entitlement holders on 5 of the 8 unregulated waterways in the Upper Murray and 8 of the 10 Mitta Mitta waterways. The suspensions to access on for the Mitta Mitta waterways during 2018/19 were in place for between 2 to 8 months. Two suspensions on the Upper Murray waterways were carried over from 2017/18, one was lifted for 40 days before being reintroduced while the other remained in place for the entire year. On the Upper Murray waterways there was one other suspension and two restrictions to access during the year for a duration of three months.

2.3.2 Annual Diversion

The total diversion, excluding all environmental diversions, was 1,329 GL for the Victorian component of the River Murray valley. The allocated volume available for consumptive use was 1,300 GL, of which 1,143 GL or 87.9 per cent was used by private diverters and irrigators. There was 1.5 GL of estimated diversion in the unregulated system.

Water was returned by North East Water to the River Murray from the West Wodonga Water Treatment Plant for take by towns downstream. The total volume returned was 2.2 GL.

2.3.3 Trade

There was a net allocation trade by consumptive users into the Victorian Murray in 2018/19 of 71.1 GL. Within this volume there was a net temporary allocation trade of into the Victorian Murray from the Goulburn, Broken, Loddon and Campaspe of 156.6 GL, 25.5 GL from the Victorian Murray to South Australia, and 60 GL from the Victorian Murray to New South Wales.

There was 129 GL of permanent high-reliability water share trade within the Victorian Murray.

2.4 Kiewa

2.4.1 Resource Availability

During 2018/19 there were suspensions to access water for Kiewa valley unregulated entitlement holders on 18 of the total 23 unregulated waterways. These suspensions were in place during 2018/19 for between 5 and 11 months, with one suspension carrying through into 2019/20.

2.4.2 Annual Diversion

Kiewa valley use of urban entitlements was 1.1 GL or 49 per cent of the entitlement volume. A further 5.5 GL was used by private diverters.

2.4.3 Trade

There is currently no reporting on unregulated temporary and permanent trade.

2.5 Ovens

2.5.1 Resource Availability

Storage inflows in the Ovens system were well below average in 2018/19 with 47 per cent and 63 per cent of average annual inflows received at Lake Buffalo and Lake William Hovell respectively. Lake Buffalo was filled from sill level between mid-September to mid-November. The storage was drawn down to 48 per cent of capacity by the start of May and ended the season at 61 per cent. Lake William Hovell began 2018/19 at 98 per cent capacity. Lake William Hovell was drawn down to 36 per cent of capacity by the start of May, however, refilled to 101 per cent by the end of June 2019

Access to spill water entitlements on the Buffalo and Ovens Rivers, and King River ceased at the start of January 2019 and mid-November 2018 respectively when spill flows were forecast to fall below the minimum requirements in the regulated reaches. There were no restrictions to regulated high reliability supplies in the Ovens valley in 2018/19.

During 2018/19 there were suspensions and rostering of access for Ovens System unregulated entitlement holders on 22 of the total 30 unregulated waterways. These restrictions to access went for between 3 to 10 months, with two suspensions continuing into 2019/20.

2.5.2 Annual Diversion

Diversion in the Ovens valley and regulated tributaries for private irrigation, domestic and stock, commercial, industrial and urban purposes was 14.6 GL or 34 per cent of the volume available for use in 2018/19. A further 5.0 GL was estimated to be taken in the unregulated system.

2.5.3 Trade

Current rules on trading restrict allocation trade to remain within the Ovens valley. There was 2.3 GL of temporary allocation trade within the Ovens valley.

There was 5.2 GL of permanent high-reliability water share traded within the Ovens valley.

2.6 Broken

2.6.1 Resource Availability

The Broken River system seasonal determinations started at 0 per cent on 1 July 2018, increasing to 1 per cent by mid-August. By mid-December 2018, the seasonal determination had increased to 30 per cent of high-reliability water shares. Seasonal determinations improved to reach 37 per cent of high-reliability water shares by 1 April 2019 (Table 1).

Lake Nillahcootie was 56 per cent full on 1 July and increased to 62% by mid-September and was drawn down to 25 per cent at the start of June 2019. Lake Nillahcootie ended 2018/19 at 26 per cent of capacity. Inflows to Lake Nillahcootie for 2017/18 were 11 per cent of the annual average, compared to 29 and 145 per cent of the average annual in 2017/18 and 2016/17 respectively.

During 2018/19 there were suspensions to access for Broken valley unregulated entitlement holders on two of the four unregulated waterways. These restrictions continued from 2017/18, remained in place for the entire year, and carried into 2019/20.

2.6.2 Annual Diversion

Diversion from the Broken system by consumptive users was 11.1 GL, and usage of the total allocated volume was 5.8 GL or 51.4 per cent utilisation. A further 0.9 GL was estimated to be taken in the unregulated system.

2.6.3 Trade

There was a net volume of consumptive allocation trade out of the Broken of 2.1 GL. A total of 2.5 GL was traded out of the consumptive pool.

There was 1.5 GL of permanent high-reliability water share traded within the Broken system.

2.7 Goulburn

The Goulburn River system supplies private diverters, environmental entitlements and an extensive irrigation network. The irrigation network supplied from the Goulburn River system via the Waranga Western Channel is physically located across three Cap valleys. Although physically located within the Campaspe and Loddon catchments, the Rochester Irrigation Area and Loddon Valley Irrigation Area are supplied primarily by Goulburn sourced entitlements which are subject to the Goulburn system seasonal determinations.

2.7.1 Resource Availability

High-reliability water share entitlement holders in the Goulburn system received an initial seasonal determination on 1 July 2018 of 32 per cent. The seasonal determination reached a maximum of 100 per cent of high-reliability water shares by mid-March 2019 (Table 1). There has been no seasonal determination of low-reliability water shares since 1997/98.

Lake Eildon was 55 per cent full at the start of July 2018 and reached 65 per cent in mid-September. At the end of June, Lake Eildon was 38 per cent of capacity. Inflows into Lake Eildon were 64 per cent of average, and unregulated inflows into Goulburn Weir were 35 per cent of average. A low risk of spill declaration was made on 10 September 2018 allowing customers access to water in spillable water accounts. There were no deductions from spillable water accounts in Goulburn system in 2018/19.

During 2018/19 there were suspensions to access for Goulburn valley unregulated entitlement holders on 5 unregulated waterways and rostering of access on two unregulated waterways. These restrictions to access went for between 1 and 6 months, with one suspension in place for the entire year, continuing into 2019/20.

2.7.2 Annual Diversion

The total volume allocated for use to consumptive users in the Goulburn system was 584 GL. Usage in the Goulburn system was 438 GL, or 75 per cent of the total allocated volume. A further 7.3 GL was estimated to be taken in the unregulated system.

The total diversion by consumptive users during 2018/19 to the Goulburn valley was 956 GL. Of this diversion, the net volume of 399 GL was transferred from the Goulburn system via the Goulburn River or the Waranga Western Channel to the Murray, Campaspe, Loddon and Wimmera-Mallee systems. A total of 0.4 GL was transferred from north to south of the Great Dividing Range to Melbourne Water from the Goulburn River and Silver and Wallaby creeks which are tributaries of the Goulburn River.

2.7.3 Trade

The net volume of temporary consumptive allocation trade out of the Goulburn system, excluding the Rochester and Loddon Valley irrigation areas which sit geographically in the Campaspe and Loddon valleys, was 137 GL. A total of 129 GL was traded in, while 266 GL was traded out. There was a net allocation trade of 0.9 GL out of the Goulburn system to South Australia.

There was 55 GL of permanent high-reliability water share traded within the Goulburn valley, excluding Loddon Valley Irrigation Area and Rochester Irrigation Area.

2.8 Campaspe

The Campaspe River system supplies private diverters, environmental entitlements and the Coliban water supply system. Although physically located within the Campaspe catchment, the Rochester Irrigation Area receives its water from the Goulburn system via the Waranga Western Channel and is part of the Goulburn/Broken/Loddon designated river valley for Cap compliance. Seasonal determinations to irrigators in the Rochester Irrigation Area are the same as those in the Goulburn system.

2.8.1 Resource Availability

Seasonal determinations for high reliability entitlements in the Campaspe system were 100 per cent on 1 July and remained 100 per cent for the entire season (Table 1). A low risk of spill declaration was made on 10 September 2018, with no deductions made from spillable water accounts in 2018/19.

Lake Eppalock was at 61 per cent on 1 July 2018 and increased to 62 per cent by the end of August. Over the course of the water year it was drawn down to 36 per cent capacity. In 2018/19 the annual inflow into Lake Eppalock was only 12 per cent of average annual compared to 29 per cent in 2017/18 and 217 per cent during 2016/17.

The Coliban storages started 2017/18 on 1 July at 63 per cent capacity, and significantly improved over spring. The combined volume in Coliban storages ended the year at 60 per cent capacity.

There were suspensions to access water at the start of 2018/19 for 17 of the 21 Campaspe valley unregulated waterways, 11 of which were lifted during spring, with access allowed for between 40 and 65 days. There were 3 waterways unrestricted for the entire year. Suspensions to access were in place for 17 of the 21 unregulated waterways by mid- December, all of which were carried into 2019/20.

2.8.2 Annual Diversion

In 2018/19 there was no use of the Goldfields Superpipe and there was no water transferred from the Goulburn system to Lake Eppalock in 2018/19. There was 9.7 GL pumped from Lake Eppalock to Bendigo, and 1.4 GL pumped to White Swan Reservoir.

The 2018/19 Campaspe valley allocated volume was 176.6 GL of which 92 per cent or 162 GL was utilised, including the Rochester Irrigation area. A further 0.7 GL was estimated to be taken in the unregulated system.

2.8.3 Trade

The net temporary consumptive allocation trade out of the Campaspe trading zones plus the Rochester Irrigation Area was 1.0 GL.

There was 24 GL of permanent high-reliability water share traded within the Campaspe valley, including the Rochester Irrigation Area.

2.9 Loddon

Although physically located within the Loddon catchment, the Loddon Valley Irrigation Area, also known as Pyramid Hill-Boort, receives the majority of its water from the Goulburn system via the Waranga Western Channel. Seasonal determinations to irrigators in the Loddon Valley Irrigation Area are the same as those in the Goulburn system.

2.9.1 Resource Availability

The Loddon system opening seasonal determination was 32 per cent of high-reliability water shares (excluding the Bullarook Regulated system). The seasonal determination reached a maximum of 100 per cent of high-reliability water shares by the mid-March 2018 (Table 1). Entitlement holders in the Bullarook system received a seasonal determination of 100 per cent high-reliability water shares and low-reliability water shares by mid-July 2018 (Table 1).

The 2018/19 inflows into the Loddon storages were low with Tullaroop and Cairn Curran Reservoirs both receiving 22 per cent of average inflows, compared to 20 per cent and 19 per cent in 2017/18. On 1 July 2018 Tullaroop Reservoir was at 56 per cent of capacity and Cairn Curran Reservoir was at 53 per cent of capacity. Over 2018/19 Cairn Curran and Tullaroop Reservoirs were drawn down to meet entitlement holder requirements, ending the year at 46 per cent and 35 per cent of capacity respectively.

Newlyn Reservoir and Hepburn Lagoon began the year at 52 and 49 per cent of capacity and increased to 88 and 74 per cent respectively in late October. By the start of May, Newlyn was drawn down to 30 per cent capacity and Hepburns Lagoon was drawn down to 23 per cent.

On 1 July 2018 there were suspensions to access for water on 23 unregulated waterways carried over from the previous year, 17 of these suspensions were lifted by the end of August 2018. Including the 6 suspensions already in place there were a total of 28 suspensions to access water during the year. At the end of the year there were 12 suspension to access water that continued into 2018/19.

2.9.2 Annual Diversion

Diversion from the Loddon valley by consumptive users was 24.0 GL. An additional 6.7 GL was estimated to be taken in the unregulated system. An additional 181 GL was physically transferred into the Loddon Valley Irrigation Area, which sits within the Loddon Valley, from the Goulburn valley.

Total use by regulated consumptive entitlement holders in the Loddon valley was 157 GL, including deliveries to Loddon Valley irrigation area.

2.9.3 Trade

The net temporary allocation trade out of the combined Loddon trading zones and Loddon Valley Irrigation Area was 24 GL.

There was 21 GL of permanent high-reliability water share traded within the Loddon catchment including the Loddon Valley Irrigation Area.

2.10 Wimmera-Mallee

2.10.1 Resource Availability

Water allocations for Wimmera-Mallee Pipeline Product for the 2017/18 water year reached 55 per cent. There was no allocation against the 1 GL wetland product component of the Wimmera and Glenelg Rivers Environmental Entitlement, and the 28 GL entitlement held by the Commonwealth Environmental Water Holder.

The Wimmera-Mallee storages started 2018/19 on 1 July at a combined 41 per cent capacity. All storages were drawn down over the course of the year, resulting in a combined 31 per cent capacity on 30 June 2018.

2.10.2 Annual Diversion

For 2018/19, the total diversion of water sourced within the Wimmera-Mallee valley was 18.3 GL or 9.0 per cent of the allocated volume.

Total use by regulated entitlement holders was 16.9 GL and additional 0.7 GL from unregulated waterways.

2.10.3 Trade

There was 1.7 GL of temporary allocation trade within the Wimmera-Mallee in 2018/19.

3 Transition period Section 71 reporting

3.1 Surface water overview

The WRPs developed under the Basin Plan set out water management arrangements from 2019 onwards. These plans also set out methods for determining the maximum quantity of water permitted to be taken for consumptive use during a water accounting period. Victoria's proposed methods for determining Baseline Diversion Limits (BDLs), Sustainable Diversion Limits (SDLs) and for the assessment of compliance with the SDLs for take from regulated rivers are based on the use of hydrologic models.

There are, however, some difficulties associated with complete representations of SDL and WRP conditions in the development of hydrologic models. These include uncertainties around projects that are still in progress, such as Goulburn Constraints and finalisation of all water recovery projects and purchases, as well as the unknown behaviour of environmental water holders with regards to their use of the recovered water. These uncertainties have been acknowledged by the MDBA, who has proposed to explicitly represent in SDL and WRP versions of the hydrologic model of Murray system only the finalised water recoveries and use a scaling method to post-process environmental water use in the model for the other water recoveries not yet finalised.

DELWP has submitted BDL and WRP models for Victorian WRP areas to the Murray-Darling Basin Authority (MDBA) as part of the WRP submission for accreditation. Tasks undertaken in 2018/19 for this include:

- Finalisation of documentation on entitlements in the Goulburn, Broken, Campaspe and Loddon systems at 30 June 2009 to inform the BDL model of Northern Victorian systems.
- Finalisation of documentation of operating and water management rules in the Goulburn, Broken, Campaspe and Loddon systems at 30 June 2009 to inform the BDL model of Northern Victorian systems.
- Completion of BDL and WRP models for northern Victorian systems as part of submission of Victoria's North and Murray WRP to MDBA.
- Worked closely with MDBA for the development and finalisation of BDL and WRP versions of Source Murray Model (SMM) for Victorian Murray system as part of submission of Victoria's North and Murray Water Resource Plan to MDBA.

Although the REALM modelling platform is currently being used for models of Northern Victorian systems, Victoria has made significant progress on the development of Source model of Northern Victorian system, along with testing of the new National Hydrological Modelling Platform, "Source". The aim is to replace the REALM BDL and models with daily Source BDL and WRP models, once these are deemed fit-for-purpose.

3.2 Groundwater overview

3.2.1 GW2 Goulburn-Murray (GS8)

Annual Permitted take and Actual take

In the Goulburn-Murray groundwater water resource plan area the permitted take in the Goulburn-Murray: Shepparton Irrigation Region SDL resource unit was 244.1 GL and the estimated actual take was 96.33 GL. The permitted take in the Goulburn-Murray: Highlands SDL resource unit was 68.7 GL and the metered and estimated actual take was 15.54 GL. The permitted take in the Goulburn-Murray: Sedimentary Plain SDL resource unit was 223.0 GL and the metered and estimated actual take was 149.11 GL. There was 24.48 GL of carry over available in the Goulburn-Murray: Sedimentary Plain SDL resource unit. The permitted take in the Goulburn-Murray: deep SDL resource unit was 20.0 GL and the metered and estimated actual take was 1.74 GL.

There was 20.18 GL of temporary allocation trade and 4.25 GL of permanent trade within the Goulburn-Murray: Sedimentary Plain SDL resource unit in 2018/19. There was 0.002 GL of permanent trade within the Highlands in 2018/19.

There was no trade between SDL resource units.

Resource Availability

The groundwater allocation was 100 per cent of licenced entitlement in the Goulburn-Murray: Shepparton Irrigation Region, 100 percent in the Goulburn-Murray: Highlands, 100 per cent in the Goulburn-Murray: deep and 98.6 per cent in the Goulburn-Murray: Sedimentary Plain SDL resource units.

As described above, actual take was less than the Permitted Take in all SDL resource units.

3.2.2 GW3 Wimmera-Mallee (GS9)

Annual Permitted take and Actual take

For the Wimmera-Mallee groundwater WRP area the permitted take in the Wimmera-Mallee: Highlands SDL resource unit was 2.75 GL and the metered and estimated actual take was 0.89 GL. The permitted take in the Wimmera-Mallee: Sedimentary Plain SDL resource unit was 163.8 GL and the metered and estimated actual take was 8.63 GL. The permitted take in the Wimmera-Mallee: deep SDL resource unit was 20.0 GL and the metered and estimated actual take was 0.14 GL.

There was 1.51 GL of temporary allocation trade and 0.02 GL of permanent allocation trade within the Wimmera-Mallee: Sedimentary Plain SDL resource unit in 2018/19.

There was no trade between SDL resource units.

Resource Availability

The allocation was 100 per cent in the Wimmera-Mallee: Highlands SDL resource unit and 100 per cent in the Wimmera-Mallee: Sedimentary Plain SDL resource unit. There was no allocation in the Wimmera-Mallee: deep SDL resource unit in 2018/19.

As described above, actual take was less than the Permitted Take in all SDL resource units.

4 Environmental water – held and planned

4.1 Victorian Murray

The use of regulated environmental entitlements in the Victorian Murray was 163 GL, which included use of recredited water from the Goulburn, Campaspe and Victorian Murray systems. The net usage in the Victorian Murray in 2018/19 was 88 GL.

There was a net trade of 862 GL of environmental allocation out of the Victorian Murray system to environmental water holders in other systems. Of this volume there was a net trade of 498 GL traded out to South Australia from total Murray environmental holdings as well as facilitating the delivery of water from the Goulburn and Campaspe river systems across the South Australian border. There was also trade of 122 GL within the Victorian Murray system for the movement of water between environmental water holders.

There was 299 GL of environmental water credited to the Victorian Murray system for reuse or trade downstream, originating from the Goulburn and Campaspe systems, and an additional 75 GL recredited from the Victorian Murray.

4.2 Kiewa and Ovens

The Ovens system received 162 ML of environmental water which was used to contribute toward a pulse in the Buffalo and King Rivers. Of this delivery, 123 ML was provided from Commonwealth entitlements and 39 ML was donated to the VEWH from a consumptive water holder. There is no held environmental water in the Kiewa valley.

4.3 Broken

There was 250 ML of environmental water delivered in the Broken system to the Broken River in 2018/19. This water was traded into the Broken system for delivery from the Goulburn system.

4.4 Goulburn

In the Goulburn system, a total of 255 GL from The Living Murray (TLM), and Commonwealth and VEWH's entitlements were delivered to wetlands and utilised in-stream on the Goulburn River and lower Broken Creek to provide environmental freshes and maintain additional passing flows. In 2018/19, 276 GL was recredited to be available for use downstream and trade to South Australia. There were recredits posted in 2018/19 from usage in June 2018 which resulted in the annual negative net use of 21.6 GL.

There was a net 4.8 GL of environmental allocation traded into the Goulburn system from environmental water holders in other systems, and trade of 227 GL within the Goulburn system for movement of water between environmental water holders accounts.

4.5 Campaspe

The Campaspe River environmental entitlements were used to provide environmental freshes down the River and maintain higher passing flows in the Campaspe River. A total of 23.4 GL from

Commonwealth, VEWH and TLM entitlements was used in 2018/19. There was 22.1 GL re-credited to the Murray system, resulting in a net use of 1.3 GL.

There were no environmental allocations traded in or out of the Campaspe to environmental water holders in other systems. There was 9.8 GL of net trade within the Campaspe between environmental water holders.

4.6 Loddon

The Loddon system received delivery of a total of 15.5 GL for environmental purposes. The Loddon River and Serpentine Creek received delivery of 15.0 GL of environmental water which was used to deliver environmental freshes downstream of Loddon Weir, and to maintain higher passing flows. There was 510 ML of environmental water delivery to Little Lake Meran, part of the Loddon Valley wetlands, in 2018/19. These environmental deliveries exclude the use of 373 ML of the River Freshening Flows volume available to the VEWH.

There was 0.1 GL environmental entitlement allocated from Newlyn Reservoir, which was carried over into 2019/20. Carryover of the same entitlement from 2018/19 was written-off during the year in accordance with the carryover rules.

There was a net 4.0 GL of environmental allocation traded into the Loddon system to environmental water holders from other systems, and 3.3 GL of trade within the Loddon system between environmental water holders.

4.7 Wimmera-Mallee

In the Wimmera-Mallee system, 29.9 GL was delivered to the environment, including 147 ML from the VEWH wetland entitlement.

4.8 Planned Environmental Water Reporting

The submission of Victoria's reporting on the use of planned environmental water (PEW) in 2018/19 recognises previous discussions with the MDBA in which it was agreed that the majority of Victoria's non-held environmental water did not meet the Commonwealth definition for PEW. While much of Victoria's non-held environmental water contributes to environmental outcomes, it does not specifically meet the definition in section 6 of the *Water Act 2007* (Commonwealth). As explained in the MDBA position statement 'Determining Planned Environmental Water' to be identified as PEW; "the water cannot, to the extent to which it is committed or preserved, be taken or used for any other purpose," which is not the case under Victoria's legislative regime for the majority of the water in the system that contributes to environmental outcomes.

Victoria has identified three forms of PEW in the Northern Victoria WRP area, two in the Ovens River system (*Upper Ovens River Water Supply Protection Area Water Management Plan* and *Bulk Entitlement (Ovens System – Goulburn-Murray Water) Order 2004*) and one in the Broken River system (*Bulk Entitlement (Broken System-Goulburn-Murray Water) Conversion Order 2004*).

There are no forms identified in the Victorian Murray or Wimmera-Mallee (surface water) WRP areas.

5 Progress of water reform

5.1 Existing Administration of the Basin Plan

Between 1995 and 1997, Victoria introduced and refined the following changes to water management in response to the Murray-Darling Basin Ministerial Council's decision to Cap water use:

- restrictions on temporary and permanent water trading,
- reductions on allocations for a given resource, and
- limits on the issuing of new entitlements.

Monitoring of the effectiveness of the water management policies is undertaken on an ongoing basis. No new capping policies were introduced in 2018/19 and none are currently proposed for 2017/18 as existing measures have continued to be effective. There is no evidence of growth in diversions in any of the Victorian valleys.

Victoria currently administers the Cap through establishment and implementation of bulk entitlements, Streamflow Management Plans and licensing of irrigation farm dams.

During 2018/19 the Victorian Government has continued to undertake several transitional arrangements to ensure the progress of water reform in the Murray-Darling Basin, including:

- Continuing to work collaboratively with the MDBA and other Basin states to progress implementation of the Constraints Management Strategy through our ongoing involvement in the River Murray Constraints Steering Committee.
- Working on the progression of supply measure projects implementation through the Sustainable Diversion Limit Implementation Committee. A number of these are Victorian works-based supply measures, developed in partnership with the Mallee and North Central Catchment Management Authorities, and some are Victorian-led operating rule change proposals.
- Significant progress towards Victoria's water recovery targets through water savings projects and SDL offsets.
- As part of its commitment to meeting the Basin Plan water recovery targets, Victoria has also updated Long Term Diversion Limit Equivalence (LTDLE) factors based on the best available information for the BDL conditions. MDBA has agreed the set of updated factors and is also satisfied that the updated factors are robust and evidence based.
- Significant work undertaken to develop a foundational version of the Source model representing baseline conditions for Northern Victoria, with aim to replace the REALM version of the BDL model once deemed fit-for-purpose. A process has been initiated for independent review of the model.
- Development and submission of the Annual Environmental Watering Priorities to the MDBA consistent with the Basin Plan, while working collaboratively with the Commonwealth Environmental Water Holder and through other formal coordination forums to successfully deliver our Seasonal Water Plan.

- In line with new biennial reporting and auditing processes, Victoria submitted the status report on compliance with BSM 2030 in 2017/18. Victoria is now preparing for the submission of the BSM 2030 Comprehensive Report for 2017-19 to the MDBA and Independent Audit Group for Salinity.

5.2 Water Resource Plan Development

Victoria's progress with WRPs in 2018/19 was focused on stakeholder engagement including additional Traditional Owner (TO) engagement, formally resubmitting the Wimmera-Mallee WRP, and preparing and formally submitting Victoria's North and Murray WRP.

5.2.1 Wimmera-Mallee Water Resource Plan

Victoria resubmitted its Wimmera-Mallee WRP to the MDBA on 22 February 2019 (prior to the 28 February 2019 deadline) for formal assessment for accreditation. The plan was developed to provide a response to Basin Plan requirements for the Wimmera-Mallee (surface water) WRP area and the Wimmera-Mallee (groundwater) WRP area.

The Plan was resubmitted following extensive consultation with the MDBA regarding accredited text and the supplementary material required to support a recommendation for accreditation. The Wimmera-Mallee WRP was accredited by the Commonwealth Minister on 19 September 2019.

5.2.2 Victoria's North and Murray Water Resource Plan

Victoria's North and Murray WRP was submitted to the MDBA on 30 April 2019 for formal assessment. This plan covers the Victorian Murray WRP area, Northern Victoria WRP area and the Goulburn-Murray WRP area.

Development of Victoria's North and Murray WRP during the 2018/2019 period included:

- Targeted stakeholder engagement to support development of the draft Victoria's North and Murray WRP.
- Extensive Traditional Owner engagement across Northern Victoria to support the development of 10 Traditional Owner contributions.
- Public consultation on Victoria's North and Murray Comprehensive Report which outlined the proposed content of the WRP and an explanation of how Victoria would meet Basin Plan requirements.
- Extensive consultation with the MDBA regarding accredited text and the supplementary material required to support a recommendation for accreditation.

The Plan was resubmitted following extensive consultation with the MDBA regarding accredited text and the supplementary material required to support a recommendation for accreditation. The revised Victoria's North and Murray WRP is pending MDBA review and recommendation to the Commonwealth Minister for accreditation.

5.2.3 Aboriginal Water

Traditional Owner engagement has been a major focus during the development of Victoria's WRPs over the last three years. Across Victoria's WRP areas, 14 Traditional Owner groups were invited to collaborate to ensure that Victoria's plans reflect their aspirations for water. DELWP worked with each Traditional Owner group to create an engagement approach tailored to meet the needs of each group.

The approach to the initial submission of the Wimmera-Mallee WRP in 2018 received substantial feedback from the Murray Lower Darling River Indigenous Nations (MLDRIN) delegates. In

response, DELWP committed to undertake additional engagement with a revised Traditional Owner engagement strategy for all Traditional Owner groups, and to revise the Wimmera-Mallee WRP to reflect the outcomes of the additional engagement. To deliver the engagement strategy, DELWP dedicated additional resources to support engagement by the WRP team and provided additional resourcing for Traditional Owner groups to support their participation.

To support Traditional Owner groups to engage on WRPs and determine their objectives and outcomes for water, Victoria supported engagement activities and broader capacity-building through:

- employment of Aboriginal water officers, whose appointments have since been extended beyond the timeframe of the development of WRP;
- the development of water advisory groups within respective Aboriginal Corporations;
- Aboriginal waterways assessments undertaken by Traditional Owners with the support of MLDRIN;
- cultural, social, economic and environmental values identification and mapping projects;
- on-country meetings, gatherings, workshops and cultural events;
- revision of country plans to add a water focus to support continued involvement in water resource management; and
- training and other capacity-building activities.

Traditional Owner groups developed and signed-off their own contributions, which were included in the Comprehensive Report of both WRPs. The Traditional Owner contributions outline expectations held by Traditional Owners for water resource management, including preferred means of engagement, objectives and outcomes for water management, values and uses of water and key areas of interest for Traditional Owner groups.

Post accreditation of the WRP s, the protection of Aboriginal water values and uses will continue to be strengthened through the Victorian Aboriginal water policy in *Water for Victoria*. It directs an ongoing partnership approach between Traditional Owners and Victorian Government water managers to:

- support Aboriginal participation in Victorian water planning and management frameworks through collaborative structures that address the rights and interests of Traditional Owners;
- increase capacity for shared benefits to realise Aboriginal water outcomes through working with Water Corporations, Catchment Management Authorities and VEWH; and
- build capacity to increase Aboriginal participation in water management.

Appendix 1: Key Information from 2018/19 Water Resource Reporting Spreadsheet

Table 2. Murray-Darling Basin Diversions

Valley	Irrigation Diversion (GL)	Other Diversion (GL)	Total Diversion (GL)
Victoria			
Goulburn	934.09	21.57	955.66
Broken	9.29	1.84	11.13
Loddon	20.23	3.76	23.99
Goulburn Broken Loddon Cap Valley	*963.61*	*27.17*	*990.78*
Campaspe	10.50	21.73	32.23
Wimmera-Mallee	0.75	17.54	18.29
Kiewa	5.51	1.09	6.60
Ovens	14.10	5.52	19.61
Murray	1,267.88	60.96	1,328.83
Kiewa Ovens Murray Cap Valley	*1,287.48*	*67.57*	*1,355.04*
Total Victoria	2,262.34	134.00	2,396.34

Table 3. Accuracy of Diversion Estimates

Valley	Diversion (GL)	Accuracy +/- GL	Accuracy +/- %
Victoria			
Goulburn	956	52	5%
Broken	11	1	6%
Loddon	24	1	5%
Campaspe	32	2	5%
Wimmera-Mallee	18	1	5%
Kiewa	7	1	13%
Ovens	20	2	12%
Murray	1,329	99	7%
Total Victoria	2,396	159	7%

Table 4. Comparison of Diversions with Cap Levels

Valley	Cap Target from Cap Model (GL)	Adjustment to Cap Target for Trade[1] (GL)	Adjustment to Cap Target for Environmental Allocations (GL)	Cap Target Adjusted for Trade and Env. Allcn (GL)	Total Diversion (GL)	Cap Credit (GL)	Cumulative Cap Credit (GL)	Cap Target Exceedance Trigger (20% of Long-Term Diversion Cap) (GL)	Cumulative Difference (Modelled minus Observed) in Storage (GL)
Victoria									
Goulburn]									
Broken]	1,585	-337.560	-240.839	1,006.1	990.776	15	3,180	-407	-533
Loddon]									
Campaspe	98	-8.432	-23.356	67	32	34	624	-24	-27
Wimmera-Mallee[2]	28	0.000	0.000	28	18	10	194	-20	-100
Kiewa]									
Ovens]	1,514	219.982	-325.352	1,408	1,355.0	53	3,403	-340	-45
Murray]									
Total Victoria	3,225	-126	-590	2,509	2,396	113	7,400	-792	-705

1. Adjustment to Cap target for trade includes exchange rate adjustments to permanent interstate trade.
2. Wimmera/Mallee Cap model not completed.

Table 6: Total Water Entitlements at Start of Season (i.e. at 1 July 2018)

Valley	High Reliability	Low Reliability	Conveyance	Supplementary Access / Water Harvesting	Unregulated Stream Licences	Unsupplemented Licenced Areas	Stock and Domestic	Urban
	ML	ML	ML	ML	ML	ha	ML	ML
Victoria[4]								
Goulburn	923868	488580	n/a	0	38480	n/a	n/a	37649
Broken	17535	3327	n/a	0	10215	n/a	n/a	2324
Loddon	145464	74752	n/a	0	32995	n/a	n/a	7319
Goulburn Broken Loddon Cap Valley	1086867	566659	0	0	81690	0	0	47292
Campaspe	154824	91814	n/a	0	7188	n/a	n/a	50862
Wimmera-Mallee	114770	0	n/a	0	466	n/a	n/a	2420
Kiewa	0	0	n/a	0	18233	n/a	n/a	2207
Ovens	32995	0	n/a	0	24805	n/a	n/a	10284
Murray	1338641	417352	n/a	74,300	29084	n/a	n/a	59662
Kiewa Ovens Murray Cap Valley	1371636	417352	0	74300	72122	0	0	72153
Total Victoria	2728097	1075826	0	74300	161466	0	0	172727

Table 7. Net Water Entitlement Transfers

Valley	Trade Data Not Affecting Cap		Trade Data Affecting Cap			
	Total Intravalley Permanent Entitlement Sold (GL)	Total Temporary Allocation Sold (GL)	Net Tagged trade Usage (GL)	Net Temporary Trade Inwards (GL)	Adjustment to this Year's Cap for Previous Permanent Trade (GL)	Total Trade Adjustment to this Years Cap Target (GL)
Victoria[4]						
Goulburn	55	818	-46	-136		
Broken	1	4	0	-2		
Loddon	21	106	-15	-24		
Goulburn Broken Loddon Cap Valley	77	928	-61	-162	-109	-346
Campaspe	24	82	-14	-8		-8
Wimmera-Mallee	0	2	0	0		0
Kiewa	0	0	0	0		
Ovens	5	2	0	0		
Murray	129	1,616	74	71		
Kiewa Ovens Murray Cap Valley	134	1,619	74	71	74	220
Total Victoria	235	2,630	0	-99	-35	-134

1. No data is to be entered in shaded area.
2. The total Cap adjustment for permanent trade (including exchange rate adjustments to permanent interstate trade) is comprised of the sum of net inter-valley and net interstate trade for each designated river valley, as per the Diversion Cap Register.
3. The total Cap adjustment for temporary trade is comprised of the sum of net inter-valley and interstate trade for each designated river valley, as per the Diversion Cap Register.
4. The sign convention used is that a negative value indicates a trade out of the valley and a positive value indicates a trade into the valley.
5. Temporary entitlement transfers in Victoria, includes temporary trade in both water right and sales entitlement.
6. The Metro-Adelaide Cap component is non-tradeable, unless the Ministerial Council determines otherwise.
7. Adjustment for Campaspe equals water transferred via Goldfields Superpipe. All other trades are effected by changing the Rochester pumped diversions
8. Goulburn/Broken/Loddon Cap adjustment reduces by the total water transferred via the Goldfields Superpipe.

Table 8. Water Allocated

Valley	Base Valley Water Entitlement (GL)	Announced Allocation (GL)	Net Carryover from 2017/18 (GL)	Water available under continuous accounting	Allocation Transferred into Valley (GL)	Net Trade in from Environment (GL)	Total Allocated Water in Valley (GL)
Victoria							
Goulburn	840	542	224	-	-182	-444	584
Broken	33	9	5	-	-2	-1	11
Loddon	252	147	54	-	-39	-22	161
Campaspe	269	128	71	-	-22	-37	177
Wimmera-Mallee	48	51	138	-	0	-66	189
Kiewa	20	2	0	-	0	0	2
Ovens	68	43	0	-	0	0	43
Murray	1,261	952	203	-	146	-168	1,300
Total Victoria	2,791	1,874	693		-99	-737	2,468

Table 9. Carryovers and Overdraws

Valley	Carryover from Last Year (GL)	Less Carryover Cancelled this Year (GL)	Net Carryover (GL)
Victoria			
Goulburn	224	0	224
Broken	5	0	5
Loddon	56	2	54
Campaspe	71	0	71
Wimmera-Mallee	138	0	138
Kiewa	0	0	0
Ovens	0	0	0
Murray	203	0	203
Total Victoria	695	2	693

Table 10. Water Authorised for Use

Valley	Diversion from Valley (GL)	Diverted from other valleys (GL)	Less Supplementary Access & Water-harvesting Use (GL)	Less Unregulated Stream Use not in Allocation (GL)	Less System Diversion not in Allocation (GL)	Use of Allocated Water in Valley (GL)
Victoria						
Goulburn	956	-399		7.3	112	438
Broken	11	-1		1	4	6
Loddon	24	181		6.7	42	157
Campaspe	32	162		0.7	32	162
Wimmera-Mallee	18	0		1	1	17
Kiewa	7	0		5.5	0	1
Ovens	20	0		5.0	0	15
Murray	1,329	55		1.5	239	1,143
Total Victoria	2,396	-1		28	429	1,939

Table 11. Use of Valley Allocations

Valley	Total Allocated Water in Valley (GL)	Use of Allocated Water in Valley (GL)	Use as a % of Total Effective Allocation (%)
Victoria			
Goulburn	584	438.1	75%
Broken	11	5.8	51%
Loddon	161	157.0	97%
Campaspe	176.6	161.9	92%
Wimmera-Mallee	189	16.9	9%
Kiewa	2.2	1.1	49%
Ovens	43.2	14.6	34%
Murray	1,300	1,143.0	88%
Total Victoria	2,468	1,938.6	79%

Table 12. Environmental Water Entitlements (GL)

	Total Environmental Entitlements			Entitlements created from Savings made outside the Cap		
Valley	High Reliability Entitlement (GL)	Low Reliability Entitlement (GL)	Supplementary Access Entitlements	High Reliability Entitlements (GL)	Low Reliability Entitlements (GL)	Supplementary Access Entitlements (GL)
Victoria						
Goulburn	420	229	0	0	0	0
Broken	1	0	0	0	0	0
Loddon	6	3	0	0	0	0
Campaspe	27	8	0	0	0	0
Wimmera-Mallee	70	0	0	0	0	0
Kiewa	0	0	0	0	0	0
Ovens	0	0	0	0	0	0
Murray	446	138	74	50	0	74
Total Victoria	970	377	74	50	0	74

Table 13. Environmental Water Allocations (GL)

Valley	Environmental Allocation (GL)	Net Availability of Carryover (GL)	Environmental Allocation Borrowed by Non Environmental Users	Use of Environmental Supplementary Access Entitlements	Net Trade in from Non-Environmental Allocations (GL)	Net transfer in from Environmental Allocations in other valleys (GL)	Water Available for Environmental Use (GL)	Water made available to the environment as a result of Savings outside the Cap (GL)
Victoria								
Goulburn	364	96	0	0	-21	5	444	0
Broken	0	0	0	0	0	0	1	0
Loddon	14	4	0	0	0	4	22	0
Campaspe	27	9	0	0	0	0	37	0
Wimmera-Mallee	22	44	0	0	0	0	66	0
Kiewa	0	0	0	0	0	0	0	0
Ovens	0	0	0	0	0	0	0	0
Murray	394	282	0	0	-11	-497	168	50
Total Victoria	823	435	0	0	-31	-488	737	50

Table 14. Environmental Water Use

Valley	Total use of Environmental Allocations (GL)	Consumptive Use of Environmental Allocations (GL)	Consumptive Environmental Use not covered by Entitlement (GL)	Total Consumptive Environmental Use (GL)	Percentage Use of Environmental Allocations
Victoria					
Goulburn	255	-22	0	-22	57%
Broken	0	0	0	0	48%
Loddon	16	16	0	16	72%
Campaspe	23	1	0	1	64%
Wimmera-Mallee	30	30	0	30	45%
Kiewa	0	0	0	0	0%
Ovens	0	0	0	0	100%
Murray	163	88	0	88	97%
Total Victoria	486.875	113.497	0.573	114.070	66%

Table 15. Cap Adjustment for Environmental Water Use

Valley	Component of calculated Annual Diversion Target that was used for Environment under baseline conditions (GL)	Component of Calculated Annual Diversion Target relating to an Entitlement and water savings that has been transferred to Environmental Use (GL)	Credits fromUpstream Tributaries Not Traded	Environmental Use of an Non-Environmental Allocation (trade to Environment) (GL)	Non-Environmental Use of an Environmental Allocation (trade from Environment) (GL)	Water Within Cap transferred to Snowy Annual Allocation (GL)	Cap Adjustment for Environmental Entitlements and Use (GL)
Victoria							
Goulburn Broken Loddon Cap Valley	0	-51	-276	0	21	37	241
Campaspe	0	1	-22	0	0	0	23
Wimmera-Mallee	0	0	0	0	0	0	0
Kiewa Ovens Murray Cap Valley	27	603	289	0	11	-5	325
Total Victoria	27	553	-10	0	32	31	590

Table 16. Comparison of Actual and Natural Annual Flows (GL) for Key Sites

Valley	Actual Flow (GL)	Natural Flow (GL)	Actual/ Natural (%)
Inter Basin Transfers			
Snowy Mountain Scheme to Murrumbidgee River	N/A	N/A	N/A
Snowy Mountain Scheme to Murray River	N/A	N/A	N/A
Glenelg River Catchment to Wimmera-Mallee	N/A	N/A	N/A
Wannon River Catchment to Wimmera-Mallee	N/A	N/A	N/A
Victorian Tributaries			
Kiewa River at Bandiana	416	N/A	N/A
Ovens River at Wangaratta	617	N/A	N/A
Goulburn River at McCoys Bridge	791	N/A	N/A
Campaspe River at Rochester	49	N/A	N/A
Loddon River at Appin South	25	N/A	N/A
Wimmera River at Horsham	12	N/A	N/A

TABLE 17 IMPOUNDMENTS & LOSSES IN MAJOR ON-STREAM STORAGES (>10GL Capacity)

	Major On-Stream Storage	Completion Date	Storage Capacity (GL)	Volume of Storage at Beginning of Water Year (GL)	Volume of Storage at End of Water Year (GL)	% of Storage Full at End of Year (%)	Increase in Volume of Storage (GL)	Evaporation Losses (Net) (GL)	Net Reduction in Flow due to Storage (GL)	% Evap Loss to Storage Capacity (%)
Victoria										
Goulburn/Broken/Loddon	Eildon Reservoir	0	3334	1820	1261	38%	-559	14.7	-545	0.4%
	Lake Nillahcootie	0	40	22	10	26%	-12	1.0	-11	2.4%
	Cairn Curran Reservoir	0	147	78	52	35%	-26	7.9	-18	5.4%
	Tullaroop Reservoir	0	73	41	33	46%	-8	4.1	-4	5.6%
Campaspe	Lake Eppalock	0	305	185	110	36%	-76	16.7	-59	5.5%
	Lauriston Reservoir	0	20	16	16	80%	0	2.1	2	10.4%
	Malmsbury Reservoir	0	18	3	2	12%	-1	1.0	1	5.6%
	Upper Coliban Reservoir	0	37	28	27	72%	-2	4.0	2	10.8%
Wimmera-Mallee	Lake Bellfield	0	79	62	54	69%	-8	-0.1	-8	-0.2%
	Lake Fyans	0	18	13	13	70%	0	2.5	3	13.3%
	Lake Lonsdale	0	65	18	10	15%	-8	7.6	0	11.6%
	Lake Taylor	0	34	17	9	28%	-8	3.2	-5	9.5%
	Pine Lake	0	62	0	0	0%	0	0.0	0	0.0%
	Tooloondo Reservoir	0	92	16	14	15%	-2	6.9	5	7.5%
	Wartook Reservoir	0	29	15	12	41%	-3	0.2	-3	0.6%
Murray/Kiewa/Ovens	Rocky Valley Reservoir	0	28	14	17	61%	3	0.0	3	0.0%
	Lake Buffalo	0	24	14	14	59%	0	0.4	1	1.6%
	Lake William Hovell	0	14	14	14	101%	0	-0.1	0	-1.0%
Total Victoria			4420	2375	1668	38%	-707	72	-635	1.6%

1. Evaporation data for GWMWater storages are estimates only and rely on pan evaporation data at Rocklands Reservoir.
2. Rocky Valley reservoir data sourced from AGL Hydro. No evaporation data available.
3. Lauriston, Malmbury & Upper Coliban reservoir data sourced from Coliban Water.
4. Lake Bellfield, Lake Fyans, Lake Lonsdale, Lake Taylor, Pine Lake Toolondo Reservoir & Wartook Reservoir sourced from Grampians Wimmera Mallee Water
5. All other reservoir data sources from G-MW's data base or from BoM for rainfall/evaporation
6. Lake Mokoan has been decommissioned