

# Victorian Submission to Annual Transitional Period Water Take Report 2017/18

Draft

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# 1 Victorian water resource management overview

## 1.1 Introduction

This submission constitutes Victoria's 2017/18 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 area (both surface water and groundwater), insofar as those matters are applicable in 2017/18.

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 narrative highlights the key information for 2017/18 and provides context and analysis. The detailed data are provided in Appendix 1.

## 1.2 Achievements and Outcomes in Water Resource Management

Victoria is working towards the development of Water Resource Plans (WRPs) under the Basin Plan 2012 as part of the transition from Cap reporting to reporting under the Sustainable Diversion Limit (SDL). Significant achievements for 2017/18 towards this goal are:

- Development of revised concept paper to set out Victoria's proposed method for assessing Basin Plan compliance in Northern Victoria water resource plan area using hydrologic models.
- Completion of Baseline Diversion Limit (BDL), Sustainable Diversion Limit (SDL) and Water Resource Plan (WRP) models for the Wimmera-Mallee water resource plan area as part of submission of Wimmera-Mallee Water Resource Plan to MDBA in mid-2018 for accreditation.
- Finalisation of updated documentation of all baseline entitlements for the Northern Victoria water resource plan area at 30 June 2009 to inform the BDL model of Northern Victoria water resource plan area.
- Further works on documenting operating and water management rules in the Northern Victoria water resource plan area at 30 June 2009 to inform the BDL model of Northern Victoria water resource plan area.
- Development and submission of the Annual Environmental Watering Priorities to the MDBA consistent with the Basin Plan.
- Submission of our Basin Salinity Management Strategy Annual Report for 2015-17 to the MDBA and Independent Audit Group for Salinity and continuing compliance with salinity and water quality trigger points.
- Progression in the development of Water Resources Plans (WRPs) for Victoria's north.

Current administration and assessment tools under the Cap will underpin 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 reduce the Cap for environmental flows.

### 1.3 Available Water Resources

Following an average autumn rainfall, 2017/18 started with below average winter rainfall, with records set for the lowest June rainfalls on record. Spring in 2017 was warmer than average and slightly drier than average. There was a record breaking rain event at the start of December, with many locations, including Lake Eildon (149 mm) breaking their daily rainfall records by over 50 mm. This rainfall resulted in inflow to Lake Eildon being 290% of the December average. Despite the magnitude of rainfall, river levels in the regulated river reaches of Northern Victoria remained below minor flood levels. Following the December rainfall event, the remainder of the summer and autumn was dry and warm, resulting in high water resource utilisation.

In 2017/18, seasonal determinations in northern Victoria were high, although not quite as high as those of 2016/17. The final seasonal determinations are shown in Table 1.

**Table 1. Final 2017/18 seasonal determinations**

Regulated system	Final Seasonal Determination (HRWS)	Final Seasonal Determination (LRWS)
Murray	100%	0%
Goulburn	100%	0%
Campaspe	100%	59%
Loddon	100%	0%
Broken	100%	100%
Bullarook	100%	100%
Wimmera- Mallee	81%	0%

The Commonwealth Environmental Water Holdings in the Wimmera-Mallee system did not receive an allocation in 2017/18. Other holders of different types of entitlements in the system also received allocations less than 100% of their entitlements, maximum being 81% for the Wimmera Mallee pipeline product.

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. Carryover in other northern Victorian regulated systems is not subject to any spill accounting. There were deductions in 2017/18 from spillable water accounts in the Murray system, with a portion of the water transferred to spillable water accounts deducted from those accounts.

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.

#### 1.4 Water Resource Use and Trade

Victorian systems diverted a total of 2,514 GL for consumptive water use from the Murray-Darling Basin during the 2017/18, higher than the total volume diverted in 2016/17. Demand in 2017/18 increased on the previous year due to the dry conditions and the increasing demand from the River Murray between Nyah and the SA border.

The volume diverted in the designated Murray/Kiewa/Ovens valley was 1,415 GL. A volume of 1,067 GL was diverted in the Goulburn/Broken/Loddon river valleys. The Campaspe River and Wimmera-Mallee valley diversions were 15.1 GL and 16.6 GL respectively.

The total volume delivered to northern Victorian regulated systems for consumptive water use during 2017/18 was 2,142 GL. This is 565 GL more than the volume delivered in 2016/17. The total Victorian usage in 2017/18 was 80 per cent of the total volume allocated.

Deliveries in the Murray/Kiewa/Ovens designated valley were 1,254 GL in 2017/18, 261 GL more than the delivery of 992 GL in the previous year. Deliveries in the Goulburn/Broken/Loddon valley were higher this year delivering 693 GL in 2017/18, 246 GL more than the 447 GL delivered in 2016/17. Campaspe valley deliveries were 180 GL in 2017/18, compared to 126 GL delivered in 2016/17.

Total Wimmera-Mallee deliveries, including water diverted from other valleys, were 15.3 GL in 2017/18, 3.2 GL more than the 12.1 GL delivered in 2016/17.

There was a net temporary allocation trade of consumptive water out of Victoria of 149 GL in 2017/18. This was a significant turnaround from the net 207 GL of consumptive water traded into Victoria in 2016/17.

Interstate temporary allocation trading of consumptive water between Victoria and New South Wales resulted in an overall net transfer out of Victoria of 142 GL. This volume included net allocation trade of 88.1 GL from Victoria to NSW Murray and 53.8 GL from Victoria to the Murrumbidgee River basin. There was 0.3 GL trade from the Darling River to Victoria. Trade with South Australia resulted in a total net temporary allocation trade of consumptive water of 7.1 GL to South Australia from Victoria, compared to 125 GL traded from South Australia to Victoria in 2016/17.

The net consumptive use of environmental water in 2017/18 was less than in 2016/17, with 163 GL used in comparison to 295 GL the year before, but higher than the use in 2015/16 of 56.8 GL. Of the volume delivered for environmental purposes in 2017/18, the greatest usage was in the Goulburn and Murray systems, with 372 GL and 375 GL respectively. In 2017/18, 660 GL was recredited to environmental accounts. This volume made up the majority of the 691 GL of environmental water delivered to South Australia via trade.

There was 10.3 GL traded from environmental entitlement holders to consumptive users, and 3.0 GL was traded from consumptive users to the environment through 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 being taken for commercial plantations is based on the SoilFlux 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.

A hydrological model for estimating take by stock & 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.

Victoria intends to continue to undertake further work to reduce the uncertainty associated with the estimates of runoff dam impact.

### 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 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 2017/18.

### 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 2017/18 for the Goulburn/Broken/Loddon and Campaspe Cap valleys, there were differences in May and June streamflow data from those used in the 2016/17 update. There were also changes in inflow inputs due to retrospective corrections in streamflow ratings. These led to changes in cumulative Cap credits from 1997/98 to 2016/17, which are net increase of 143.7 GL (~ 7% of long-term average Cap) and net decrease of 7.6 GL (~ 6% 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 a number of updates and an updated model has been used for the 2017/18 assessment. These updates and input data extension to 2017/18 for the Victorian Murray/Kiewa/Ovens models have led to a net decrease of 0.6 GL to the 1997/98 to 2016/17 cumulative Cap credit – less than 0.1 per cent 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 2017/18 for the Wimmera-Mallee Cap valley, there were minor differences in May and June streamflow data from those used in the 2016/17 update, which led to change of 0.5 GL in cumulative Cap credits from 1997/98 to 2016/17.

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 2017/18 Cap targets to account for water recovered for the environment through initiatives such as Snowy environmental flows, The Living Murray 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 remains committed to the ongoing development of hydrological models of regulated systems for calculating baseline and sustainable diversion limits.

#### **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 20/11/2018. It should be noted that the numbers provided are subject to minor changes or amendments following the validation process. Additional information for trade and carry over was provided by Rural Water Corporations.

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 the majority of 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 2ML/year per bore.

For both forms of take, information in the Victorian Water Register is assigned by Victorian groundwater management area and not spatially by coordinates. To enable reporting by SDL Resource Unit this year, location and depth information was used to assign licenced and private rights bores within the boundaries of the SDL resource unit.

This is the first year that Victoria has provided data for “take under basic rights” by SDL resource units.

## 2 Cap Compliance

### 2.1 Cap Models: Status of Cap models

Status of Cap models and associated historical changes are covered in Section 1.5.3 of this document. In summary, for 2017/18, there was no new model accredited for any regulated system in the Victoria.

### 2.2 Annual Cap Compliance

Annual Cap compliance for each Cap valley is presented in this section. In summary, for 2017/18, there was no breach in cumulative Cap credit 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 (when the Cap will be superseded by Basin Plan Sustainable Diversion Limits).

#### 2.2.1 Victorian Murray, Kiewa and Ovens

Diversion from the Murray/Kiewa/Ovens valley was 1,415 GL, which is 289 GL less than the Cap target of 1,704 GL (with adjustment for trade and environmental releases). The diversion was 17 per cent below the long-term Cap average of 1,702 GL/year. The cumulative Cap credit since July 1997 is 3,441 GL.

#### 2.2.2 Goulburn, Broken and Loddon

Diversion from the Goulburn/Broken/Loddon Cap Valley was 1,067 GL, which is 240 GL more than the Cap target of 827 GL (with adjustment for trade, environmental releases, decommissioning of Lake Mokoan and inter-valley transfers). Diversions were 48 per cent below the long-term average Cap of 2,034 GL/year. The cumulative Cap credit for the period from July 1997 to June 2018 is 3,149 GL.

#### 2.2.3 Campaspe

Diversion from the Campaspe valley was 15.1 GL, which is 71.3 GL below the Cap target of 86.4 GL (with adjustment for environmental releases). Diversions were 88 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 2018 is 590 GL.

#### 2.2.4 Wimmera-Mallee

Diversion from the Wimmera-Mallee valley was 16.6 GL, which is 25.8 GL less than the Cap target of 42.4 GL. Diversions were 63 per cent below the long-term average Cap of 45 GL/year. The cumulative Cap credit for the Wimmera-Mallee valley since July 1997 is 185 GL.

## 2.3 Victorian Murray

### 2.3.1 Resource Availability

There was a 66 per cent high-reliability water shares seasonal determination at the start of July 2017 for Murray system entitlement holders. The seasonal determination gradually increased to 100 per cent high-reliability water shares by the start of October 2018 (Table 1). There was 40.8 GL debited from consumptive users' spillable water accounts in the Murray system. On 10 November 2017, 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 passed from MDBA control to the Office of Water NSW control during 2017/18 as the storage volume fell below 640 GL in October 2017.

At 1 July 2017, Lake Dartmouth was 78 per cent of capacity and Lake Hume was 70 per cent of capacity. Lake Hume filled to 91 per cent in September 2017 before being drawn down to 31 per cent by the end of April 2018. By 30 June 2018 Lake Dartmouth was at 89 per cent, and Hume was at 43 per cent. Inflows for Dartmouth and Hume in 2017/18 were 65 per cent and 47 per cent of the annual average respectively.

During 2017/18 there were suspensions to access for Murray System unregulated entitlement holders on 2 unregulated waterways in the Upper Murray and none on the Mitta Mitta waterways. These suspensions were carried over from 2016/17 and remained in place until September 2017. However, they were reintroduced in November and December 2017 and remained in place for the remainder of the season.

### 2.3.2 Annual Diversion

The total diversion, excluding all environmental diversions, was 1,394 GL for the Victorian component of the River Murray valley. The allocated volume available for consumptive use was 1,269 GL, of which 1,241 GL or 97.8 per cent was used by private diverters and irrigators. There was 3.3 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 2.1 GL.

### 2.3.3 Trade

There was a net allocation trade by consumptive users out of the Victorian Murray in 2017/18 of 17.7 GL. Within this volume there was a net temporary allocation trade of 1.9 GL from the Victorian Murray to South Australia, and 111 GL to New South Wales.

There was 64 GL of permanent high-reliability water share trade within the Victorian Murray. The net permanent trade out of the Victorian Murray was 82 GL, including trade out to non-water users.

## 2.4 Kiewa

### 2.4.1 Resource Availability

During 2017/18 there were 12 suspensions to access and one restriction to access for Kiewa valley unregulated entitlement holders of the 23 unregulated waterways. These suspensions were in place during 2017/18 for between 97 and 219 days, with all of the suspensions and the restriction carrying through into 2018/19.

### **2.4.2 Annual Diversion**

Kiewa valley use of urban entitlements was 1.0 GL or 46 per cent of the entitlement volume. A further 4.6 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 2017/18 with 57 per cent and 65 per cent of average annual inflows received at Lake Buffalo and Lake William Hovell respectively. Lake Buffalo was filled from sill level between the end of September to mid-November. The storage was drawn down to 52 per cent of capacity by mid-April and ended the season at 57 per cent. Lake William Hovell began 2017/18 at 91 per cent capacity. Lake William Hovell was drawn down to 48 per cent of capacity by mid-May, however refilled to 98 per cent by the end of June 2018.

Access to spill water entitlements on the Buffalo, Ovens and King Rivers ceased in mid-January 2018 and mid-December 2017 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 2017/18.

During 2017/18 there were suspensions to access for Ovens System unregulated entitlement holders on seven of the total 30 unregulated waterways. These suspensions to access went for between 103 and 172 days, with all suspensions continuing into 2018/19.

### **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 12.0 GL or 28 per cent of the volume available for use in 2017/18. A further 4.1 GL was estimated to be taken in the unregulated system.

### **2.5.3 Trade**

There was 1.2 GL of temporary allocation trade within the Ovens valley. Current rules on trading restrict allocation trade to remain within the Ovens valley.

There was 2.5 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 1 per cent on 1 July 2017. By 1 November 2017, the seasonal determination had increased to 100 per cent of high-reliability water shares. Seasonal determinations improved to reach 100 per cent of high-reliability water shares and low-reliability water shares by mid-December 2017 (Table 1).

Lake Nillahcootie was 78 per cent full on 1 July and increased to above 100%, filling and spilling, as a result of the December rainfall event. Lake Nillahcootie ended 2017/18 at 56 per cent of capacity. Inflows to Lake Nillahcootie for 2017/18 were 29 per cent of the annual average, compared to 145 per cent of the average annual in 2016/17.

During 2017/18 there were suspensions to access for Broken valley unregulated entitlement holders on two of the four unregulated waterways. These restrictions lasted for between 163 and 365 days, with both waterways carrying the restriction into 2018/19.

### **2.6.2 Annual Diversion**

Diversion from the Broken system by consumptive users was 11.7 GL, and usage of the total allocated volume was 7.0 GL or 43.5 per cent utilisation. A further 0.7 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 6.5 GL. A total of 6.5 GL was traded out of the consumptive pool.

There was 1.4 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 2017 of 36 per cent. The seasonal determination reached a maximum of 100 per cent of high-reliability water shares by mid-October 2017 (Table 1). There has been no seasonal determination of low-reliability water shares since 1997/98.

Lake Eildon was 63 per cent full at the start of July 2017 and reached 76 per cent in mid-December. At the end of June, Lake Eildon was 55 per cent of capacity. Inflows into Lake Eildon were 68 per cent of average, and unregulated inflows into Goulburn Weir were 39 per cent of average. A low risk of spill declaration was made on 10 August 2017 allowing customers access to water in spillable water accounts. There were no deductions from spillable water accounts in Goulburn system in 2017/18.

During 2017/18 there were suspensions to access for Goulburn valley unregulated entitlement holders on 4 unregulated waterways, and restriction to access on one other unregulated waterway. These suspensions to access went for between 10 and 241 days, with one suspension continuing into 2018/19.

### **2.7.2 Annual Diversion**

The total volume allocated for use to consumptive users in the Goulburn system was 738.6 GL. Usage in the Goulburn system was 487.6 GL, or 66 per cent of the total allocated volume. A further 6.8 GL was estimated to be taken in the unregulated system.

The total diversion by consumptive users during 2017/18 to the Goulburn valley was 1,022 GL. Of this diversion, the net volume of 449 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 0.8 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 76.9 GL. A total of 168 GL was traded in, while 245 GL was traded out. There was a net allocation trade of 1.5 GL out of the Goulburn system to South Australia.

There was 17.5 GL of permanent high-reliability water share traded within the Goulburn valley, excluding Loddon Valley Irrigation Area and Rochester Irrigation Area. The net permanent trade out of this same area was 64.1 GL, including trade out to non-water users.

## **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 until the start of September when they increased to include 7 per cent of low-reliability water shares. By the start of April the low reliability water share seasonal determination had increased to 59 per cent (Table 1). A low risk of spill declaration was made on 10 January 2018, with no deductions made from spillable water accounts in 2017/18.

Lake Eppalock was at 89 per cent on 1 July 2017 and increased to 92 per cent by the end of September. Over the course of the water year it was drawn down to 61 per cent capacity. In 2017/18 the annual inflow into Lake Eppalock was only 29 per cent of average annual compared to 217 per cent during 2016/17.

The Coliban storages started 2017/18 on 1 July at 73 per cent capacity, and significantly improved over spring. The combined volume in Coliban storages ended the year at 72 per cent capacity.

There were suspensions to access for 19 of the Campaspe valley unregulated waterways during the 2017/18 season, 16 of which were carried over from 2016/17. Nearly all the suspensions were lifted in July or August and implemented later in the season. Suspensions to access were in place for 17 of the 21 unregulated waterways over the summer, all of which were carried into 2018/19.

### **2.8.2 Annual Diversion**

In 2017/18 there was no use of the Goldfields Superpipe and there was no water transferred from the Goulburn system to Lake Eppalock in 2017/18. There was 0.9 GL was pumped from Lake Eppalock to Bendigo.

The 2017/18 Campaspe valley allocated volume was 219.2 GL of which 82 per cent or 180 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 into the Campaspe trading zones plus the Rochester Irrigation Area was 6.7 GL.

There was 21.2 GL of permanent high-reliability water share traded within the Campaspe valley, including the Rochester Irrigation Area, and 1.4 GL of permanent trade out of the same area.

## **2.9 Loddon**

Although physically located within the Loddon catchment, the Loddon Valley Irrigation Area, also known as Pyramid Hill-Boort, receives 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 36 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 start of December 2017 (Table 1). While there was not allocation of low-reliability water shares, there was supplementary resource available to the Goulburn system. Entitlement holders in the Bullarook system received a seasonal determination of 100 per cent high-reliability water shares and low-reliability water shares by the start of September 2017 (Table 1).

The 2017/18 inflows into the Loddon storages were low with Tullaroop and Cairn Curran Reservoirs receiving 20 and 19 per cent of average inflows respectively, compared to 195 per cent and 197 per cent in 2016/17. On 1 July 2017 Tullaroop Reservoir was at 73 per cent of capacity and Cairn Curran Reservoir was at 75 per cent of capacity. Over 2017/18 Cairn Curran and Tullaroop Reservoirs were drawn down to meet entitlement holder requirements, ending the year at 56 per cent and 53 per cent of capacity respectively.

Newlyn Reservoir and Hepburn Lagoon began the year at 69 and 66 per cent of capacity and increased to 100 per cent in late August. Newlyn was drawn down to 50 per cent capacity at the start of June 2018, and Hepburns Lagoon was drawn down to 42 per cent to the start of May 2018.

There were suspensions to access on 23 unregulated waterways carried over from 2017/18, and 17 of these suspensions were lifted by late-August. The remaining 6 suspensions to access were in place for the whole year and continued into 2017/18.

### **2.9.2 Annual Diversion**

Diversion from the Loddon valley by consumptive users was 33.1 GL. An additional 5.5 GL was estimated to be taken in the unregulated system. An additional 216 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 198 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 47 GL.

There was 7.7 GL of permanent high-reliability water share traded within the Loddon catchment, and a net trade of 1.7 GL out of the same area.

## **2.10 Wimmera-Mallee**

### **2.10.1 Resource Availability**

Water allocations for Wimmera-Mallee Pipeline Product for the 2017/18 water year reached 81 per cent. There was a 25 per cent allocation against the 1 GL wetland product component of the Wimmera and Glenelg Rivers Environmental Entitlement, and no allocation against the 28 GL former irrigation entitlement held by the Commonwealth Environmental Water Holder.

The Wimmera-Mallee storages started 2017/18 on 1 July at a combined 52 per cent capacity. All storages were drawn down over the course of the year, resulting in a combined 46 per cent capacity on 30 June 2018.

### **2.10.2 Annual Diversion**

For 2017/18, the total diversion of water sourced within the Wimmera-Mallee valley was 16.6 GL or 7.6 per cent of the allocated volume.

Total use by regulated entitlement holders was 15.3 GL and additional 0.6 GL from unregulated waterways.

### **2.10.3 Trade**

There was 0.5 GL of temporary allocation trade within the Wimmera-Mallee in 2017/18.

## 3 Transition period Section 71 reporting

### 3.1 Surface water overview

The Water Resource Plans being developed under the Basin Plan set out water management arrangements from 2019 onwards. These plans must set out methods for determining the maximum quantity of water permitted to be taken for consumptive use during a water accounting period. Victoria's preferred method for determining Baseline Diversion Limits (BDLs), Sustainable Diversion Limits (SDLs) and for the assessment of compliance with the SDLs for take from regulated rivers is the use of hydrologic models.

There are, however, some present difficulties associated with the development of hydrologic models for SDL and water resource plan (WRP) conditions. These include uncertainties around projects that are still in progress, such as Goulburn Constraints, as well as the unknown behaviour of environmental water holders with regard to their use of the recovered water. These uncertainties have been acknowledged by the MDBA, who are proposing to not explicitly represent the water recovery in SDL and WRP versions of the hydrologic model of Murray system, but instead use a scaling method to post-process environmental water use in the model.

DELWP is working on BDL, SDL and WRP models for Victorian water resource plan areas. These models are to be submitted to the Murray-Darling Basin Authority (MDBA) as part of Water Resource Plan submission for accreditation by early 2019. Tasks undertaken in 2017/18 to achieve this timeline include:

- Completion of BDL, SDL and WRP models for the Wimmera-Mallee water resource plan area as part of submission of Wimmera-Mallee Water Resource Plan to MDBA in mid-2018 for accreditation.
- Concept paper prepared during 2015/16 and updated in 2016/17 to set out Victoria's proposed method for assessing Basin Plan compliance in Northern Victoria water resource plan areas using hydrologic models has been further updated to address various feedback received and recent discussions with MDBA on concepts for SDL and WRP versions of the models.
- Further works on finalisation of documentation on entitlements in the Goulburn, Broken, Campaspe and Loddon systems at 30 June 2009 to inform the BDL model of Northern Victoria water resource plan area.
- Further works on documenting operating and water management rules in the Goulburn, Broken, Campaspe and Loddon systems at 30 June 2009 to inform the BDL model of Northern Victoria water resource plan area.
- Worked closely with MDBA on BDL, SDL and WRP versions of Source Murray Model (SMM) for the purpose of development of Victorian Murray Water Resource Plan, which included reviewing and providing updated entitlements in the Victorian Murray system at 30 June 2009 to inform the BDL version of SMM and developing concepts for SDL and WRP versions of SMM based on best available information.

Although the REALM modelling platform is to be used initially for models of Northern Victoria water resource plan area, Victoria is currently working on the development and testing of the new National Hydrological Modelling Platform, "Source", with the aim of replacing the REALM SDL and WRP models with daily Source SDL 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 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 43.39 GL. The permitted take in the Goulburn-Murray: Highlands SDL Resource Unit was 68.7 GL and the metered actual take was 22.37 GL. The permitted take in the Goulburn-Murray: Sedimentary Plain SDL Resource Unit was 223.0 GL and the metered actual take was 120.88 GL. There was 11.4 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 actual take was 1.4 GL.

There was 6.82 GL of temporary allocation trade and 2.38 GL of permanent trade within the Goulburn-Murray: Sedimentary Plain SDL Resource Unit in 2017/18. There was 0.02 GL of temporary allocation trade and 0.01 GL of permanent trade within the Highlands in 2017/18.

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 SDL Resource Unit, 100 percent in the Goulburn-Murray: Highlands, 100% in the Goulburn-Murray: Deep and 90.5 per cent in the Goulburn-Murray: Sedimentary Plain SDL Resource Unit.

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 resource plan area the permitted take in the Wimmera-Mallee: Highlands SDL Resource Unit was 2.75 GL and the metered actual take was 1.34 GL. The permitted take in the Wimmera-Mallee: Sedimentary Plain SDL Resource Unit was 190.1 GL and the metered actual take was 4.98 GL. The permitted take in the Wimmera-Mallee: Deep SDL Resource Unit was 20.0 GL and the metered actual take was 0.13 GL.

There was 1.35 GL of temporary allocation trade within the Wimmera-Mallee: Sedimentary Plain SDL Resource Unit in 2017-18 and no permanent trade.

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 2016/17.

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 375 GL, which included use of recredited water from the Goulburn, Campaspe and Victorian Murray systems. The net usage in the Victorian Murray in 2017/18 was 96.0 GL. There was 52 GL spilled from Murray spillable water accounts held by environmental water holders.

There was a net trade of 665 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 691 GL traded out to South Australia to facilitate the delivery of water from the Goulburn and Campaspe river systems, as well as held water in the Murray system across the South Australian border. There was also trade of 220 GL within the Victorian Murray system for the movement of water between environmental water holders.

There was 381 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 279 GL recredited from the Victorian Murray.

### 4.2 Kiewa and Ovens

The Ovens system received 123 ML of environmental water which was used to contribute toward a pulse in the Buffalo and King Rivers. This water was provided from Commonwealth entitlements. There is no held environmental water in the Kiewa valley.

### 4.3 Broken

There was 1.5 GL of environmental water delivered in the Broken system to Moodies Swamp and Broken River in 2017/18. This water was traded into the Broken system for delivery from the Goulburn system.

### 4.4 Goulburn

In the Goulburn system a total of 372 GL from The Living Murray (TLM), and Commonwealth and Victorian Environmental Water Holders entitlements was 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 2017/18, 350 GL was recredited to be available for use downstream and trade to South Australia.

There was a net 2 GL of environmental allocation traded out of the Goulburn system to environmental water holders in other systems, and trade of 362 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 29.6 GL from Commonwealth, Victorian Environmental Water Holder and The Living Murray entitlements was used in 2017/18. There was 31.2 GL re-credited to the Murray system, resulting in a net use of -1.6 GL. There were recredits posted in 2017/18 from usage in June 2017 which resulted in the negative net use.

There was a 3.0 GL of environmental allocation traded out of the Campaspe to environmental water holders in other systems, and 6.6 GL of net trade within the Campaspe between environmental water holders.

#### 4.6 Loddon

The Loddon system received delivery of a total of 16.9 GL for environmental purposes. The Loddon River and Serpentine Creek received delivery of 16.4 GL of environmental water which was used to deliver environmental freshes downstream of Loddon Weir and to maintain higher passing flows. There was 499 ML of environmental water delivery to Little Lake Meran, part of the Loddon Valley wetlands, in 2017/18. These environmental deliveries exclude the use of 0.8 GL of the River Freshening Flows volume credited to the Victorian Environmental Water Holder.

There was 0.1 GL environmental entitlement allocated from Newlyn Reservoir, which was carried over into 2018/19. Carryover of the same entitlement from 2017/18 was written-off.

There was a net 4.1 GL of environmental allocation traded into the Loddon system to environmental water holders from other systems, and 3.7 GL of trade within the Loddon system between environmental water holders.

#### 4.7 Wimmera-Mallee

In the Wimmera-Mallee system, 27.6 GL was delivered to the environment, including 279 ML from the Victorian Environmental Water Holder wetland entitlement.

#### 4.8 Planned Environmental Water Reporting

The submission of Victoria's reporting on the use of planned environmental water (PEW) in 2017/18 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), or as explained in the MDBA position statement 'Determining Planned Environmental Water' "the water cannot, to the extent to which it is committed or preserved, be taken or used for any other purpose".

Victoria has identified three forms of PEW in the Northern Victoria water resource plan 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) water resource plan 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 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 2017/18 and none are currently proposed for 2018/19 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 2017/18 the Victorian Government has continued to undertake a number of 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. Victoria also prepared and submitted a revised new Goulburn Constraints Measure business case. Victoria is an active member on the multijurisdictional Constraints Measures Working Group which met six times during 2017-18 to develop an integrated Constraints Measures Workplan.
- 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.
- Continuing to work towards Victoria's water recovery targets through water savings projects and SDL offsets.
- Continuing to develop a foundation version of SOURCE model representing baseline conditions for Northern Victoria water resource plan area, to replace the REALM version of the BDL model once deemed fit for purpose.
- 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.
- Submission of our Basin Salinity Management (BSM) 2030 Comprehensive Report for 2015-17 to the MDBA and Independent Audit Group for Salinity, and continuing compliance with salinity and water quality trigger points. In line with new biennial reporting and auditing processes, Victoria is preparing a status report on compliance with BSM 2030 over 2017/18.

## 5.2 Water Resource Plan Development

Victoria's progress with Water Resource Plans in 2017/18 was focused on formally submitting the Wimmera-Mallee Water Resource Plan and preparing the water resource plan for Victoria's north.

### 5.2.1 Draft Wimmera-Mallee Water Resource Plan

Victoria submitted its Wimmera-Mallee Water Resource Plan to the MDBA on 29 June 2018 for formal assessment for accreditation. The Plan was developed to provide a response to Basin Plan requirements for the Wimmera-Mallee (surface water) water resource plan area and the Wimmera-Mallee (groundwater) water resource plan area.

The Plan was submitted following extensive consultation with the MDBA regarding accredited text and the supplementary material required to support a recommendation for accreditation.

Victoria continues to work with the MDBA on the assessment of the Wimmera-Mallee Water Resource Plan.

### 5.2.2 Draft Water Resource Plan for Victoria's North

Work on Victoria's north and Murray water resource plan was progressed in 2017-18. This plan covers the Victorian Murray water resource plan area, Northern Victoria water resource plan area and the Goulburn-Murray water resource plan area. Victoria is on track to deliver within the agreed timeframe. Victoria's north and Murray water resource plan will be released for public consultation and formal submission to MDBA in early 2019.

Development of Victoria's north and Murray water resource plan includes reviewing the measures, commitments and strategies already in place under Victorian legislation. Public consultation and stakeholder engagement is central to the development of this water resource plan, which covers:

- river systems connected to the Murray, the Mitta Mitta, Kiewa, Ovens, Goulburn, Broken, Campaspe and Loddon rivers;
- floodplain wetlands, such as Hattah Lakes, Lindsay Island and Barmah National Park, and the connected wetlands in the Loddon, Goulburn and Ovens catchments;
- all groundwater in the Northern Victoria area; and
- the Sunraysia and Goulburn Murray irrigation districts.

The Victorian Government is seeking community input and feedback to inform Victoria's North and Murray Water Resource Plan. Public consultation will occur in January and February 2019.

A technical advisory group was established which includes representatives of local water corporations, catchment management authorities, MLDRIN, traditional owners, the Victorian Farmers Federation, the Victorian Environmental Water Holder and local environmental groups. The Technical Advisory Group is being consulted on the draft content of the water resource plan for Victoria's north.

### 5.2.3 Aboriginal Water

In addition to the broad public consultation process from May-August 2017, the Wimmera-Mallee Water Resource Plan held (and is continuing to hold) discussions with Traditional Owner Groups as it works to identify Aboriginal water objectives, and desired outcomes.



Engagement occurs with a broad range of interested parties, including through established Environmental Water Advisory Groups (EWAGs), Traditional Owner groups, community groups, Committees of Management, and through direct engagement with interested individuals and private landholders. Information obtained through this engagement, such as observations, monitoring results and risk identification and management, is used to shape the implementation of environmental watering.

Victoria's catchment management authorities (CMAs) have an established network of stakeholders from local communities and peak bodies that are engaged on a range of issues, including the development and implementation of regional waterway strategies, environmental water management plans and annual seasonal watering proposals. These networks have been established for many years and have been an effective mechanism to engage with local communities. In more recent years, as the environmental water portfolio has expanded, some CMAs have established specific environmental watering advisory groups (EWAGs) through public advertisements, nominations and/or recommendations. In some instances, additional stakeholders have also been identified as opportunities require.

Engagement has been both through direct on Country meetings and providing funding to better support Traditional Owner aspirations for the lower Wimmera River system in relation to culture and traditional practices, Country, economic development opportunities, and to build relationships and community capacity.

Support has included co-funding an Aboriginal Water Officer with the Wimmera CMA and Barengi Gadjin Land Council, and through the Victorian Government Aboriginal Water Unit, employing an Aboriginal Water Policy officer at the Dja Dja Wurrung Clans Aboriginal Corporation.

Engagement with Traditional Owners has been framed by the Aboriginal Water Policy announced in the Victorian Government's 'Water for Victoria' October 2016 water plan. The policy is the foundation of Victoria's response to the Aboriginal Water requirements under the Murray-Darling Basin Plan, committing Victoria to:

- Recognise Aboriginal values and objectives of water,
- Include Aboriginal values and traditional ecological knowledge in water planning,
- Support Aboriginal access to water for economic development, and
- Build capacity to increase Aboriginal participation in water management.

The \$9.7 million funding commitment from the Victorian Government includes \$5 million to support Aboriginal access to water for economic development, and \$4.7 million over four years to incorporate Aboriginal values and expertise into water management.

To assist Aboriginal communities in Victoria's share of the Basin to measure and prioritise river and wetland health, Victoria agreed to fund six Aboriginal Waterway Assessments received as part of an EOI process conducted by MLDRIN. Four of these AWAs have been conducted to date – the Wimmera River with Barengi Gadjin, the Upper Coliban with Dja Dja Wurrung, a series of wetlands and waterways with Tati Tati Wadi Wadi Traditional Owners, and several sites with the Barapa Barapa Water for Country Steering Committee.

Victoria has met with Martang Pty Ltd regarding management of culturally significant sites at the headworks storage of Lake Lonsdale. Martang's Registered Aboriginal Party area includes a portion of the Wimmera-Mallee Water Resource Plan area.

In addition to surface water, Victoria has facilitated discussions and information sharing between the First People of the Millewa-Mallee Aboriginal and the Murrayville Groundwater Advisory Committee to understand aspirations for groundwater in the region. The First People of Millewa-Mallee have a strong connection with surface water that is being included in the Northern Victoria Water Resource Plan, and conversations have commenced in that regard, along with other Traditional Owner groups.

Finally, consulting with a wide range of stakeholders to research Aboriginal engagement and inclusion in the Victorian environmental watering program has revealed a 'snapshot' of 20 local projects or partnerships across Victoria being delivered by Traditional Owners with waterway managers or other organisations. This information will help VEWH and our local partners to better include Traditional Owner knowledge, values, practices and rights in management of water for the environment.

## Appendix 1: Key Information from 2017/18 Water Resource Reporting Spreadsheet

**Table 2. Murray-Darling Basin Diversions**

Valley	Irrigation Diversion (GL)	Other Diversion (GL)	Total Diversion (GL)
Victoria			
Goulburn	1,001.29	20.74	1,022.03
Broken	9.92	1.77	11.69
Loddon	29.71	3.35	33.05
<i>Goulburn Broken Loddon Cap Valley</i>	<i>1,040.92</i>	<i>25.86</i>	<i>1,066.78</i>
Campaspe	10.23	4.87	15.10
Wimmera-Mallee	0.58	15.98	16.56
Kiewa	4.64	1.03	5.66
Ovens	11.16	4.91	16.07
Murray	1,333.48	60.15	1,393.63
<i>Kiewa Ovens Murray Cap Valley</i>	<i>1,349.27</i>	<i>66.09</i>	<i>1,415.36</i>
<i>Total Victoria</i>	<i>2,401.00</i>	<i>112.79</i>	<i>2,513.80</i>

**Table 3. Accuracy of Diversion Estimates**

Valley	Diversion (GL)	Accuracy +/- GL	Accuracy +/- %
Victoria			
Goulburn	1,022	54	5%
Broken	12	1	6%
Loddon	33	2	7%
Campaspe	15	1	6%
Wimmera-Mallee	17	1	5%
Kiewa	6	1	13%
Ovens	16	2	11%
Murray	1,394	101	7%
<i>Total Victoria</i>	<i>2,514</i>	<i>163</i>	<i>6%</i>

**Table 4. Comparison of Diversions with Cap Levels**

Valley	Cap Target from Cap Model (GL)	Adjustment to Cap Target for Trade <sup>1</sup> (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 ]	1,575	-359	-389	826.7	1,066.778	-240	3,149	-407	-1,966
Loddon ]									
Campaspe	119	0	-33	86	15	71	590	-24	-218
Wimmera-Mallee <sup>2</sup>	42	0	0	42	17	26	185	-20	-140
Kiewa ]									
Ovens ]	1,913	176	-384	1,704	1,415.4	288.9	3,441	-340	-41
Murray ]									
<i>Total Victoria</i>	<i>3,649</i>	<i>-184</i>	<i>-805</i>	<i>2,660</i>	<i>2,514</i>	<i>146</i>	<i>7,365</i>	<i>-792</i>	<i>-2,366</i>

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**

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 <sup>4</sup>								
Goulburn	891166	474922	n/a	0	38480	n/a	n/a	37649
Broken	17344	3345	n/a	0	10215	n/a	n/a	2324
Loddon	144717	77105	n/a	0	32995	n/a	n/a	7319
Goulburn Broken Loddon Cap Valley	1053227	555372	0	0	81690	0	0	47292
Campaspe	160291	92966	n/a	0	7188	n/a	n/a	50862
Wimmera-Mallee	45309	0	n/a	0	466	n/a	n/a	2420
Kiewa	0	0	n/a	0	18233	n/a	n/a	2207
Ovens	32951	0	n/a	0	24805	n/a	n/a	10284
Murray	1034376	354468	n/a	40,000	29084	n/a	n/a	59662
Kiewa Ovens Murray Cap Valley	1067326	354468	0	40000	72122	0	0	72153
<b>Total Victoria</b>	<b>2326153</b>	<b>1002806</b>	<b>0</b>	<b>40000</b>	<b>161466</b>	<b>0</b>	<b>0</b>	<b>172727</b>

**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 <sup>4</sup>						
Goulburn	17	1,081	-73	-78		
Broken	1	8	0	-7		
Loddon	8	136	-24	-47		
Goulburn Broken Loddon Cap Valley	27	1,225	-96	-131	-109	-359
Campaspe	21	106	-23	0		0
Wimmera-Mallee	0	0	0	0		0
Kiewa	0	0	0	0		
Ovens	3	1	0	0		
Murray	64	1,866	119	-18		
Kiewa Ovens Murray Cap Valley	66	1,867	119	-18	74	176
<b>Total Victoria</b>	<b>114</b>	<b>3,198</b>	<b>0</b>	<b>-149</b>	<b>-35</b>	<b>-184</b>

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 2016/17 (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	814	516	411	-	-150	-473	777
Broken	33	23	0	-	-7	-2	16
Loddon	252	145	86	-	-71	-21	160
Campaspe	275	145	97	-	-23	-39	219
Wimmera-Mallee	48	75	128	-	0	-79	202
Kiewa	20	2	0	-	0	0	2
Ovens	68	43	0	-	0	0	43
Murray	1,272	951	217	-	101	-28	1,269
<b>Total Victoria</b>	<b>2,783</b>	<b>1,898</b>	<b>939</b>		<b>-149</b>	<b>-642</b>	<b>2,689</b>

1. No data is to be entered in shaded area.

**Table 9. Carryovers and Overdraws**

Valley	Carryover from Last Year (GL)	Less Carryover Cancelled this Year (GL)	Less Overdraw used Last Year (GL)	Plus Overdraw cancelled this year (GL)	Plus Overdraw from Next Year (GL)	Net Carryover (GL)
Victoria						
Goulburn	411	0				411
Broken	7	7				0
Loddon	89	3				86
Campaspe	97	0				97
Wimmera-Mallee	128	0				128
Kiewa	0	0				0
Ovens	0	0				0
Murray	258	41				217
<b>Total Victoria</b>	<b>990</b>	<b>51</b>				<b>939</b>

1. No data is to be entered in shaded area.

**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	1,022	-449		6.8	78	488
Broken	12	0		0.7	4	7
Loddon	33	216		5.5	46	198
Campaspe	15	185		0.7	20	180
Wimmera-Mallee	17	0		0.6	1	15
Kiewa	6	0		4.6	0	1
Ovens	16	0		4.1	0	12
Murray	1,394	47		3.3	196	1,241
<b>Total Victoria</b>	<b>2,514</b>	<b>-1</b>		<b>26</b>	<b>345</b>	<b>2,142</b>

1. No data is to be entered in shaded area.

**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	777	487.6	63%
Broken	16	7.0	44%
Loddon	160	198.0	124%
Campaspe	219	180.0	82%
Wimmera-Mallee	202	15.3	8%
Kiewa	2.2	1.0	46%
Ovens	43.1	12.0	28%
Murray	1,269	1,240.6	98%
<i>Total Victoria</i>	2,689	2,141.5	80%

**Table 12. Environmental Water Entitlements (GL)**

Valley	Total Environmental Entitlements			Entitlements created from Savings made outside the Cap		
	High Reliability Entitlement (GL)	Low Reliability Entitlement (GL)	Supplementary Access Entitlements (GL)	High Reliability Entitlements (GL)	Low Reliability Entitlements (GL)	Supplementary Access Entitlements (GL)
Victoria						
Goulburn	413	216	0	0	0	0
Broken	0	0	0	0	0	0
Loddon	7	3	0	0	0	0
Campaspe	27	8	0	0	0	0
Wimmera-Mallee	0	0	0	0	0	0
Kiewa	0	0	0	0	0	0
Ovens	0	0	0	0	0	0
Murray	143	62	40	50	0	34
<i>Total Victoria</i>	592	288	40	50	0	34

**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	350	124	0	0	1	-2	473	0
Broken	0	0	0	0	0	1	2	0
Loddon	14	3	0	0	0	4	21	0
Campaspe	32	10	0	0	0	-3	39	0
Wimmera-Mallee	33	46	0	0	0	0	79	0
Kiewa	0	0	0	0	0	0	0	0
Ovens	0	0	0	0	0	0	0	0
Murray	569	132	0	0	-8	-665	28	36
<i>Total Victoria</i>	999	316	0	0	-7	-665	642	36

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	372	22	0	22	79%
Broken	2	2	0	2	95%
Loddon	17	17	0	17	82%
Campaspe	30	-2	0	-2	76%
Wimmera-Mallee	28	28	0	28	35%
Kiewa	0	0	0	0	0%
Ovens	0	0	0	0	100%
Murray	375	96	0	96	1324%
<b>Total Victoria</b>	<b>823.100</b>	<b>162.816</b>	<b>0.696</b>	<b>163.512</b>	<b>128%</b>

1. No data is to be entered in shaded area.

**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 from Upstream 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	38	-350	1	0	0	389
Campaspe	0	1	-31	0	0	0	33
Wimmera-Mallee	0	0	0	0	0	0	0
Kiewa Ovens Murray Cap Valley	12	773	381	2	10	-12	384
<b>Total Victoria</b>	<b>12</b>	<b>812</b>	<b>0</b>	<b>3</b>	<b>10</b>	<b>-12</b>	<b>805</b>

**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	1	N/A	N/A
Ovens River at Wangaratta	897	N/A	N/A
Goulburn River at McCoys Bridge	913	N/A	N/A
Campaspe River at Rochester	94	N/A	N/A
Loddon River at Appin South	30	N/A	N/A
Wimmera River at Horsham	18	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										
	<i>Goulburn/Broken/Loddon</i>									
	Eildon Reservoir	0	3334	2104	1824	55%	-279	2.0	-277	0.1%
	Lake Nillahcootie	0	40	31	22	56%	-9	0.3	-9	0.8%
	Cairn Curran Reservoir	0	147	110	78	53%	-32	12.7	-20	8.6%
	Tullaroop Reservoir	0	73	53	41	56%	-12	4.8	-8	6.5%
	<i>Campaspe</i>									
	Lake Eppalock	0	305	271	185	61%	-86	23.3	-63	7.6%
	Lauriston Reservoir	0	20	2	2	8%	0	2.0	2	10.2%
	Malsbury Reservoir	0	18	17	3	15%	-14	1.7	-13	9.7%
	Upper Coliban Reservoir	0	37	35	28	77%	-7	4.0	-3	10.8%
	<i>Wimmera-Mallee</i>									
	Lake Bellfield	0	79	64	62	79%	-2	0.0	-2	0.0%
	Lake Fyans	0	18	14	13	69%	-1	2.5	1	13.8%
	Lake Lonsdale	0	65	33	18	27%	-15	9.3	-6	14.2%
	Lake Taylor	0	34	21	17	52%	-3	3.6	1	10.7%
	Pine Lake	0	62	0	0	0%	0	0.0	0	0.0%
	Toolondo Reservoir	0	92	13	16	17%	2	6.4	9	6.9%
	Wartook Reservoir	0	29	21	15	51%	-6	0.8	-6	2.9%
	<i>Murray/Kiewa/Ovens</i>									
	Rocky Valley Reservoir	0	28	13	14	50%	1	0.0	1	0.0%
	Lake Buffalo	0	24	13	14	57%	1	0.4	1	1.7%
	Lake William Hovell	0	14	12	13	98%	1	-0.4	1	-2.6%
<b>Total Victoria</b>			<b>4420</b>	<b>2829</b>	<b>2366</b>	<b>54%</b>	<b>-463</b>	<b>74</b>	<b>-390</b>	<b>1.7%</b>

1. Evaporation data for GWMW 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, Malsbury & 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