Annual Water Outlook

1 December 2017

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Distribution

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2	S. Barber, M. Bailey	20 October 2017	Draft for comment
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Contents

Executive Summary

Following the wet 2016/17 water year, the first quarter of 2017/18 has been much drier, with below average inflows to all Goulburn-Murray Water (GMW) major storages. The strong resource position carried into this water year ensured opening seasonal determinations for all regulated surface water systems in northern Victoria, the Bullarook system being the exception.

At 15 November 2017, all systems had received or are approaching a seasonal determination of 100 per cent of high-reliability water shares (HRWS). Low-reliability water shares (LRWS) seasonal determinations have also been made in the Broken, Campaspe and Bullarook systems. A LRWS seasonal determination in the Campaspe system in the current water year ensures a seasonal determination of 100 per cent HRWS on 1 July 2018 for water year 2018/19 under all inflow scenarios.

The seasonal climate outlooks issued by the Bureau of Meteorology on 30 November 2017 indicate a 50 per cent to 65 per cent chance of exceeding median rainfall across the GMW region from December 2017 to February 2018. On 21 November 2017, the Bureau of Meteorology issued a 'alert' for a La Niña event meaning that there is a 70 per cent chance of a La Niña forming late in 2017 or early 2018.

Early reserves for 2018/19 have already been established in the Goulburn and Murray systems with the current water year HRWS seasonal determination exceeding 50 per cent HRWS. Reserves for 2018/19 are stored in the Loddon and Campaspe systems in line with their respective seasonal determinations policies. The Broken, Bullarook and Ovens systems are annual systems that will depend on seasonal conditions and inflows closer to the start of 2018/19.

GMW, as delegated Resource Manager for northern Victorian systems, will issue a detailed outlook for seasonal determinations in regulated systems on Thursday 15 February 2018.

With average conditions this year, the majority of unregulated systems started the water year with no restriction. Weather conditions in the coming months will determine if and where restrictions are needed again this year. The seasonal rainfall and temperature outlooks suggest unregulated stream customers should anticipate some level of restriction in the second half of 2017/18 especially in western and central areas. Availability into 2018/19 is difficult to forecast at this early stage, but will be driven by rainfall through winter and spring in 2018.

Groundwater resources have experienced minimal recovery this year especially in the western region of GMW. All groundwater licence holders have access to 100 per cent of their entitlement, except for those in the Newlyn Zone of the Loddon Highlands Water Supply Protection Area (WSPA), who have a 75 per cent allocation for 2017/18. A final allocation announcement will be made for the Newlyn Zone in late November 2017. The Katunga WSPA has received 100 per cent of its allocation for the first time in 11 years following the amendment to the Katunga WSPA Groundwater Management Plan. The current outlooks and longer-term resilience of groundwater aquifers across northern Victorian suggest customers can expect similar availability during 2018/19.

To the extent it can be predicted, the risk of water quality incidents occurring over the next 12 months that would impact on supply to customers/entitlement holders is considered low.

Introduction

Part 4-2 of the Statement of Obligations (General) 2015 requires water corporations to prepare an Annual Water Outlook by 1 December each year. This document provides information in accordance with this obligation and will assist the development of the Water Outlook for Victoria.

The purpose of the Annual Water Outlook is to provide an outlook of water availability for the remaining months of 2017/18 and what conditions are possible at the start of the 2018/19 water year.

GMW's role is to efficiently manage, store and deliver water to more than 21,000 active customers involved in a diverse range of enterprises and interests across northern Victoria. Our customers include gravity irrigation, regulated and unregulated surface water diverters, groundwater, urban water corporations and environmental water holders. More information about GMW and its services are available on the GMW website, www.gmwater.com.au/about.

This water outlook covers the status and outlook for regulated, unregulated and groundwater sources as well as water quality.

Longer term trends in climate and streamflow

Victoria's climate has shown a warming and drying trend over recent decades, and this trend is expected to continue. In comparison to historical conditions Victoria is already experiencing:

- higher temperatures, particularly during the warmer months of the year;
- reductions in rainfall in autumn and early winter, and in some locations, increases in rainfall during the warmer months; and
- in some catchments, less streamflow is generated for the same amount of rain.

The decline in rainfall during autumn and early winter is associated with a southerly shift in rain bearing weather systems. Global warming is a contributor to this southerly shift, which means that the downward trend is likely to continue.

Over the longer term, modelling indicates that Victoria can expect:

- the rainfall reductions in autumn and winter to remain, or become drier still;
- reductions in spring rainfall but possible increases in summer rainfall; and
- overall reductions in streamflow.

Even if there is an increase in summer rainfall, it is unlikely to offset the streamflow impact of rainfall reductions in the other seasons.

Although there will still be a lot of variability in Victoria's climate, the chances of experiencing cooler conditions and higher than average streamflow is lower now than it was in previous decades. Conversely, the chances of experiencing warmer conditions and less streamflow is now higher than in past decades.

The Bureau of Meteorology seasonal climate outlooks build in the influence of changes in climate that have already occurred.

More information on the observed changes and longer-term future climate projections can be found at www.water.vic.gov.au/climate-change

The Victorian Government is investing in further research to better understand how Victoria's climate is changing and the water resource implications, as part of implementing *Water for Victoria*.

Regulated Systems

Current seasonal conditions

The 2016/17 water year was wetter than average, with storage inflows across the majority of GMW's catchments recording well above average annual inflows. The exception to this was the Goulburn

catchment where inflows from the natural catchment between Lake Eildon and Goulburn Weir, excluding Lake Eildon releases, were 79 per cent of average.

Despite the annual totals, June 2017 was one of the driest June months on record for a large part of Victoria (Figure 1). With very little rainfall in June, catchments were relatively dry leading into 2017/18.

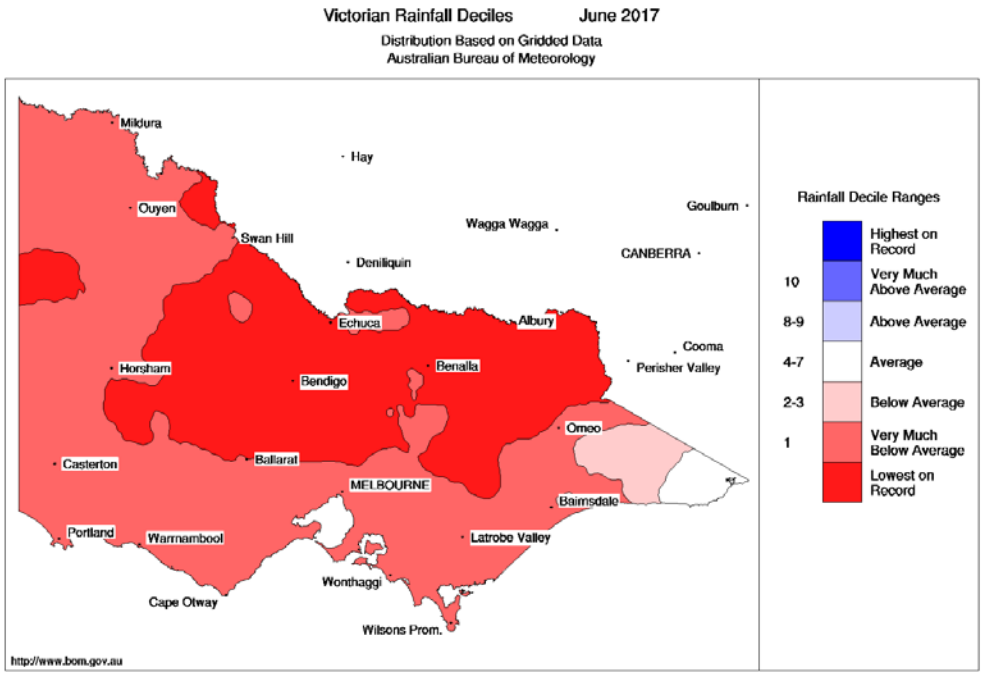

Figure 1. Rainfall deciles for June 2017

June to November 2017 rainfall was mostly below average across the GMW catchment areas (Figure 2). Following the record dry June, storage inflows were well below average for all GMW storages from the start of 2017/18 to the end of October 2017 (Table 1). Seasonal determinations were relatively slow to increase early in the water year. Inflows began to improve in August, when rainfall through northern Victoria was average to above average. These inflows enabled seasonal determinations to increase in larger increments.

Table 2 outlines the change in storage volumes and percentages from July to the end of November.

Lake William Hovell and Lake Buffalo have been the only major storages to fill to date. Newlyn Reservoir and Hepburns Lagoon are small storages in the Bullarook system and both storages also filled.

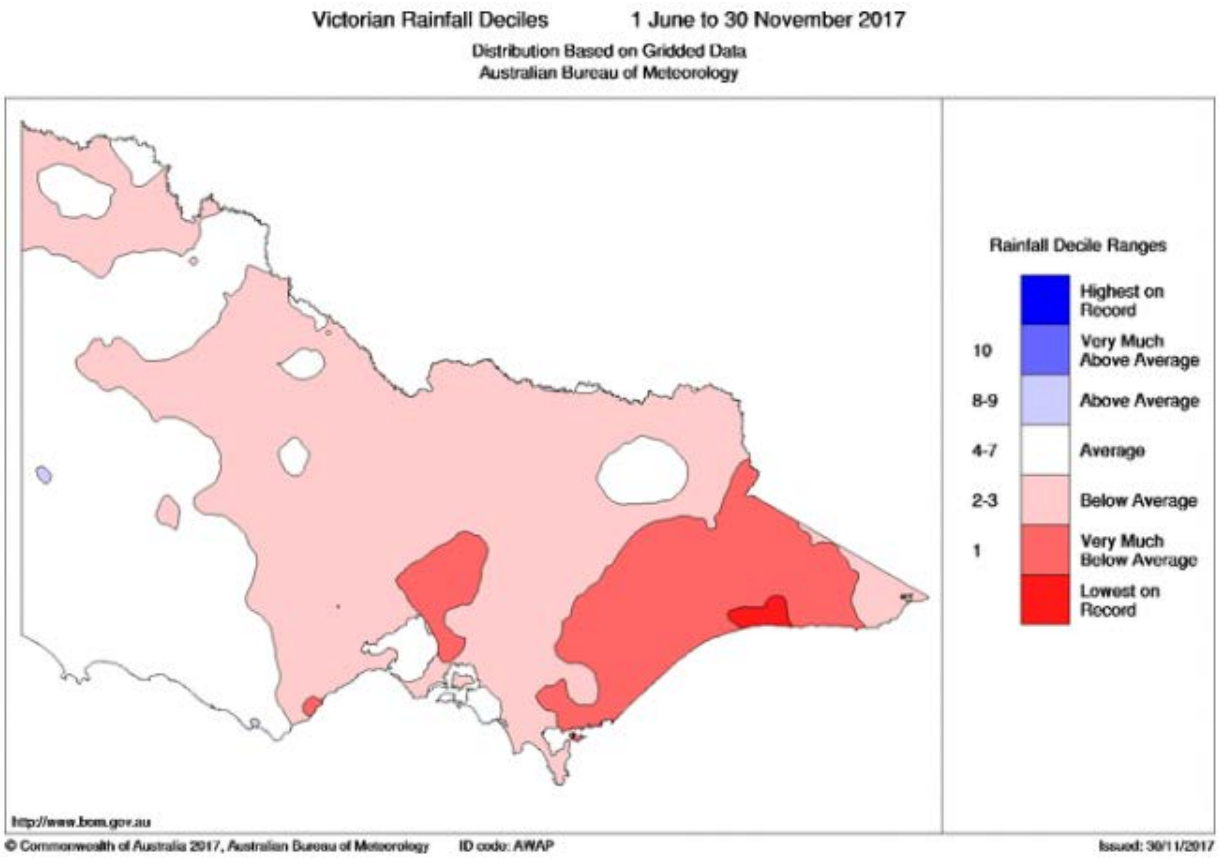

Figure 2. Rainfall deciles for 1 June to 30 November 2017

Table 1. July to October 2017 inflows to the major GMW storages

Storage	July – October inflow (GL)	Percent of average	Probability of Exceedance
Eildon	612.7	62%	77%
Goulburn Weir[1]	258.7	31%	91%
Hume[1]	786.0	50%	80%
Dartmouth	349.5	65%	72%
Buffalo	161.1	60%	74%
William Hovell	78.8	63%	77%
Nillahcootie	7.4	17%	87%
Eppalock	36.3	31%	73%
Cairn Curran	18.2	22%	84%
Tullaroop	9.5	24%	78%

[1] Natural inflows excluding releases from upstream storages

Water availability in Northern Victoria in 2017/18 is assisted by the reserves established in 2016/17. This allowed an opening seasonal determination to be made on 3 July 2017 in all systems except the Bullarook system, which has smaller annual storages compared to the other systems.

Seasonal determinations as at 15 November are shown in Table 3. Seasonal determinations are at least 100 per cent HRWS in the Murray, Broken, Campaspe and Bullarook systems. The Goulburn, and Loddon systems remain below 100 per cent HRWS, but are on track to reach 100 per cent before the end of the 2017 calendar year. The Goulburn and Murray systems' early season reserves for 2018/19 have both been established. The reserve volumes contribute to operating commitments for the following water year, ensuring that any water carried over by entitlement holders from the current water year will be deliverable, assuming previous minimum inflows are received.

Table 2. Storage volume changes from July to the end of November

Storage	1 July 2017 Volume (GL)	1 July 2017 Percentage full	30 November 2017 Volume (GL)	30 November 2017 Percentage full	Volume change (GL)	Percentage full change
Eildon	2,109	63.3%	2,379	71.4%	270	8.1%
Hume	2,115	70.4%	2,255	75.0%	140	4.6%
Dartmouth	3,015	78.2%	3,369	87.4%	354	9.2%
Buffalo	13.1	55.9%	23.5	99.9%	10.4	54.0%
William Hovell	12.5	91.0%	13.6	99.0%	1.1	8.0%
Nillahcootie	31.1	77.0%	36.1	89.3%	5.0	12.3%
Eppalock	271.5	89.1%	262.3	86.1%	-9.2	-3.0%
Cairn Curran	110.1	74.8%	112.2	76.2%	2.1	1.4%
Tullaroop	53.5	73.3%	54.5	74.7%	1.0	1.4%

Table 3. Seasonal determinations as at 15 November 2017

Water System	High-Reliability Water Share	Low-Reliability Water Share
Murray	100%	0%
Broken	100%	20%
Goulburn	94%	0%
Campaspe	100%	33%
Loddon	94%	0%
Bullarook	100%	100%

Note: Seasonal determinations will be updated on 1 December 2017

Resource Availability

Murray System

The Murray system started 2017/18 with a seasonal determination of 66 per cent HRWS. This relatively high opening was due to reserves established in 2016/17. Dry conditions early in the water year saw no increase in seasonal determinations before August 2017 when rainfall and subsequent storage inflows increased resource availability. The seasonal determination reached 100 per cent on 2 October 2017.

Internal spills from Victoria's share of Lake Hume during August and September saw volumes held in spillable water accounts reduced by 93 GL in total.

To improve early seasonal determinations for high-reliability water shares, water was borrowed from the Barmah Forest Environmental Water Account at the start of the 2017/18 water year. The water borrowed from the Barmah-Millewa Forest Environmental Water Account has been fully paid back. Resource improvements are going toward additional reserves for 2018/19.

Goulburn System

Compared with the Murray system, the reserves established in the Goulburn system during 2016/17 were not as large. Nevertheless, the system commenced the 2017/18 water year with a seasonal determination of 36 per cent HRWS.

Inflows during spring 2017 have been more favourable in the catchment above Lake Eildon compared to the mid Goulburn catchment. The Lake Eildon volume started to increase in July 2017 with improved inflows and reduced releases and increased to 73 per cent full by 19 October 2017. Waranga Basin

reached a maximum capacity of 88 per cent before beginning to be drawn down due to irrigation demand in mid-September 2017.

As the resource position improved through the spring months, the seasonal determination increased to reach 94 per cent on 15 November 2017.

Broken System

The Broken system opened the 2017/18 water year with a seasonal determination of 1 per cent HRWS. This is in contrast to 2016/17, when seasonal determinations were zero until 1 August 2016. While not large, a 1 per cent seasonal determination is significant because it indicates that system operating requirements for the water year are secured. Once this commitment is secured, further resource improvements can then be allocated to entitlement holders. In addition, with system operating requirements met, the ability to deliver any carried over water is assured.

The seasonal determination in the Broken system had increased to 100 per cent HRWS and 20 per cent of low-reliability water shares (LRWS) on 15 November 2017. The average carryover in the Broken system was equivalent to 41 per cent HRWS and this contributed to the overall volume available for use early in the water year.

Campaspe System

Seasonal determinations in the Campaspe system were 100 per cent of high and low-reliability water shares in 2016/17. Reserves established last water year allowed an opening 2017/18 seasonal determination of 100 per cent HRWS on 3 July 2017.

Once sufficient reserves were established for 2018/19, LRWS seasonal determinations commenced in September 2017. As at 15 November 2017, the LRWS seasonal determination had reached 33 per cent.

Loddon and Bullarook Systems

In accordance with the rules in the bulk entitlement, the Loddon system 2017/18 seasonal determination has increased in line with the Goulburn system from an opening seasonal determination of 36 per cent to also be at 94 per cent at 15 November 2017. The system has enough water in storage to meet 100 per cent of HRWS commitments in 2017/18 and reserves are being established for 2018/19 water requirements.

The Bullarook system is the smallest of the GMW systems with relatively small annual storages. It was the only system to not open with a seasonal determination on 3 July, but as rainfall and inflows improved in August 2017, seasonal determinations increased to 100 per cent HRWS and 100 per cent LRWS by 1 September 2017.

Ovens System

Despite entitlement holders having water shares, the Ovens system does not receive seasonal determinations like the six other regulated systems operated by GMW. The system is managed similarly to an unregulated stream because of the high volume of inflows relative to storage size. Entitlement holders are restricted if the inflows into the system and the volumes held in Lake Buffalo and Lake William Hovell are insufficient to meet all the demand in the system.

With storages effectively full and reasonable inflows into the system, entitlement holders are not restricted and have had access to their spill-reliability entitlements.

Outlook comparison

The outlook for seasonal determinations published on 3 July 2017 (Table 4) indicated that average inflows were needed for seasonal determinations to reach 100 per cent HRWS by mid-October, with the exception of the Campaspe which opened at 100 per cent HRWS. The increases in seasonal determinations have followed the patterns suggested by the outlook as inflows have been between the Dry and Average scenarios.

Table 4. Outlook for seasonal determinations for 16 October 2017 as published on 3 July 2017

Water System	Inflow Scenario[1]		
	Wet	Average	Dry
Murray	100%	100%	96%
Broken	100%	79%	47%
Goulburn	100%	100%	72%
Campaspe	100%	100%	100%
Loddon	100%	100%	72%
Bullarook	100%	100%	62%

[1] Note dry conditions are defined as inflow volumes to major storages that are greater in 90 years out of 100, average conditions are inflow volumes to major storages that are greater in 50 years out of 100 and wet conditions are inflow volumes to major storages that are greater in 10 years out of 100

Outlook for remainder of 2017/18

The Bureau of Meteorology's three month outlook for December 2017 to February 2018, issued on 30 November 2017, indicates the chances of exceeding the median rainfall over most of GMW's region range from 50 to 65 per cent. The chance of exceeding the median rainfall is highest over south eastern Australia. Above average conditions are most likely across the GMW region during December.

Daytime and night temperatures are expected to be slightly above average from December to February. From south to north across the GMW region, there is 70 per cent to 55 per cent chance of exceeding the average maximum temperature and a 75 to 80 per cent chance of exceeding the average minimum temperatures over the next three months.

Pacific Ocean temperatures are approaching La Niña thresholds. There is approximately a 70 per cent change of La Niña occurring in 2017/18. The Bureau of Meteorology's ENSO Wrap-Up issued on 21 November said that sea surface temperature patterns in the Indian Ocean and closer to Australia are not typical of La Niña, reducing the likelihood of widespread summer rainfall. Temperature and rainfall outlook updates are available from the Bureau of Meteorology website (www.bom.gov.au/climate/ahead/).

As the historical peak inflow period has passed and catchments have dried during spring, inflows are not expected to increase significantly unless passing severe weather systems bring heavy rain to the catchments.

As detailed in Table 3, the Murray, Broken, Campaspe and Bullarook systems have 100 per cent HRWS available for the 2017/18 water year. Resource improvements in the Goulburn and Loddon systems will contribute to seasonal determination increases until seasonal determinations reach 100 per cent HRWS. Both systems are expected to reach 100 per cent HRWS by mid-December 2017 under dry inflow conditions. As resources improve in the Broken and Campaspe, the LRWS seasonal determination will increase until they reach 100 per cent LRWS.

Bullarook entitlement holders have their maximum volume available and will not see any changes for the remaining months of 2017/18.

GMW's seasonal determination policy describes how available water is distributed to entitlement holders. In the Murray, Goulburn, Campaspe and Loddon systems, available water is allocated progressively to high-reliability water shares once all system operating requirements can be met. Once HRWS are fully available, reserves (in addition to the early reserve in the Murray and Goulburn systems) to support HRWS in the following water year start to be established. After HRWS in the following water year are secured, assumed inflows with a probability of exceedance of 99 per cent are received, any available water is allocated to low-reliability entitlements.

In the Broken and Bullarook systems, available water is allocated progressively to high-reliability water shares once all system operating requirements can be met. Once seasonal determinations reach 100 per cent HRWS, any available water is allocated to low-reliability entitlements.

Further inflows and reduction of supply commitments through use are needed for LRWS seasonal determinations to be announced in the Murray and Goulburn systems. The anticipated return of the Menindee Lakes system to New South Wales control during December 2017 and consequential restriction of access to Victorian resources held in the lakes decreases the chances of the Murray system receiving a LRWS seasonal determination in 2017/18. As the necessary operating reserves for 2018/19 are yet to be established in either system, it is unlikely that a LRWS seasonal determination will be announced in the Murray system or the Goulburn system in 2017/18.

Entitlement holders in the Ovens system are unlikely to experience restricted diversion access this water year as the storages are expected to remain full until late 2017 or early 2018. History indicates that restrictions are not needed to manage demand when the storages are still at capacity in January. Restrictions may be needed if inflow rates reduce and stored water is needed to meet supply obligations before the end of 2017.

Demand for water in the first three months of the irrigation season has been high compared to 2016. Weather conditions in the remaining months of the season will dictate how much water is used in 2017/18 and how much is carried over into 2018/19.

Outlook for 2018/19

Long-term weather outlooks for the start of 2018/19 are not available as the Bureau of Meteorology rainfall outlooks only extend for three months. GMW, as the delegated Northern Victoria Resource Manager, will release a detailed first outlook for the 2018/19 water year on 15 February 2018 based on historical inflows and follow up with another detailed outlook on 15 May 2018.

It is not expected that any dry inflow contingency measures will be required in 2018/19 in any regulated systems and carryover should be able to be delivered at the start of the season. If conditions are extremely dry and opening seasonal determinations will be low or zero in some systems, recent carryover trends indicate that the equivalent of 30 per cent HRWS on average across all systems will be available for use in 2018/19.

Murray System

As only a small volume of additional reserves for 2018/19 have been established, there is a possibility that seasonal determinations could be very low next water year if inflows are extremely low. Average inflow conditions should allow seasonal determinations to reach 100 per cent HRWS during the spring of 2018. Seasonal determinations will be available under dry inflow conditions, but may not reach 100 per cent HRWS.

Goulburn System

The seasonal determination in the Goulburn system is below 100 per cent HRWS and only the 2018/19 early reserve has been secured. Average inflow conditions should allow seasonal determinations to

reach 100 per cent HRWS during the spring. Seasonal determinations will be available under dry inflow conditions, but may not reach 100 per cent HRWS. Similar to the Murray system, seasonal determinations could be very low if inflows are extremely low.

Campaspe System

In accordance with the GMW seasonal determination policy, the availability of LRWS seasonal determinations in 2017/18 indicates Lake Eppalock contains enough water to make a seasonal determination of 100 per cent HRWS on 1 July 2018 under all climatic conditions.

Loddon System

There is almost sufficient resource currently available in storage to support a seasonal determination of 100% HRWS in 2018/19. At 15 November 2017, a further 1.0 GL is needed to meet all operating commitments and high-reliability entitlements next water year. Seasonal determinations in the Loddon system will be the same as the Goulburn system in 2018/19.

Broken System

The Broken system is an annual system, so 2018/19 reserves will depend on the final seasonal determination for 2017/18, how much water is utilised this water year and the inflows during the traditional inflow months in winter and spring 2018. As all resource improvements are contributing to seasonal determination improvement, operating reserves for 2018/19 will not commence until the seasonal determinations reach 100 per cent LRWS.

Bullarook System

Like the Broken, the Bullarook system is an annual systems, so 2018/19 reserves will depend on how much water is used this water year and the inflows during the traditional inflow months in 2018. With the storages filling to capacity this year, GMW expects there will be water available to operate the system at the start of 2018/19.

Ovens System

Water availability in the Ovens system depends on weather and streamflows, so it is difficult to determine what water availability will be in 2018/19. Restrictions are unlikely under wet and average inflow conditions, but remain possible under drier scenarios.

Unregulated Systems

Current seasonal conditions

Unregulated streams are monitored in accordance with relevant Local Management Rules (LMRs). Minimum streamflow requirements are outlined in LMRs. A minimum flow requirement of 3 ML/day is applied to streams that do not have a LMR.

If minimum flow requirements are not met, restrictions are put in place (Table 5). Restrictions range from Stage 1 Roster (access to 10 per cent of entitlement every 10 days) to Stage 5 suspension (only diversion for domestic and stock use is permitted). LMRs and the details of rosters and restrictions are available online at www.gmwater.com.au/water-resources/diversions.

Table 5. Current Stage 5 Suspensions on unregulated streams (as at 2 October 2017)

Catchment	Stream	Suspension start date
Broken	Boosey Creek	13 January 2017
Goulburn	Sunday Creek (Kurakurac & Kilmore)	21 December 2016
Campaspe	Cornella Creek	21 September 2017
	Wanalta Creek	08 November 2016
Loddon	Bet Bet Creek	14 December 2016
	Bullock Creek	12 December 2016
	Muckleford Creek	07 December 2016

Outlook for remainder of 2017/18

The Bureau of Meteorology current seasonal streamflow forecast predicts near median streamflows for October to December across the western and eastern areas of the GMW region, while the Goulburn-Broken (central area) has a low streamflow prediction.

As discussed earlier, the Bureau of Meteorology three month rainfall outlook from November to January slightly favours above average rainfall. If above average rainfall occurs, flows during summer will likely be maintained. If below average rainfall occurs, more streams may not meet the minimum flow requirements and be put onto restrictions. Catchment outlooks for the next three months are outlined below.

Upper Murray Catchment

- The Bureau of Meteorology predicts roughly median to high flows and a 50 per cent chance of exceeding median rainfall in the Upper Murray catchment.
- 2017/18 flows are comparable to 2012/13; no restrictions are forecast for the main stem of the unregulated Murray River and the Mitta Mitta River above Lake Hume.
- Tributaries may experience restrictions.

Kiewa Catchment

- The Bureau of Meteorology predicts slightly higher than median flow and a 50 per cent chance of exceeding median rainfall in the Kiewa catchment.
- 2017/18 flows are comparable to 2012/13; no restrictions are forecast for the Kiewa main stem.

Ovens Catchment

- The Bureau of Meteorology predicts slightly higher than median flow and a 50 per cent chance of exceeding median rainfall in the Ovens catchment.
- 2017/18 flows are comparable to 2013/14; minor restrictions are expected for the main stem of the Ovens River upstream of Myrtleford.
- Some tributaries will experience restrictions or suspension during summer.

Goulburn Catchment

- The Bureau of Meteorology predicts lower than median flow in the Goulburn catchment.
- 2017/18 flows are comparable to 2013/14; minor restrictions are forecast for the Goulburn River tributaries upstream of Seymour.
- Tributaries that enter the Goulburn River downstream of Seymour may experience restrictions and suspensions.

Broken Catchment

- The Bureau of Meteorology predicts lower than median flow and a 50 per cent chance of exceeding median rainfall in the Broken catchment.
- 2017/18 flows are comparable to 2013/14; minor restrictions are forecast for the larger tributaries of the Broken River.
- Minor tributaries may experience restrictions and suspensions.

Campaspe Catchment

- The Bureau of Meteorology predicts median flow and 55 per cent chance of exceeding median rainfall in the Campaspe catchment.
- 2016/17 flows are comparable to 2012/13; minor restrictions are forecast for the Campaspe and Coliban Rivers upstream of Lake Eppalock.
- All minor tributaries may experience restrictions and/or suspension.

Loddon Catchment

- The Bureau of Meteorology predicts lower than median flow and 55 per cent chance of exceeding median rainfall in the Loddon catchment.
- 2017/18 flows are comparable to 2013/14; restrictions are forecast for the Loddon River upstream of Cairn Curran Reservoir.
- Most tributaries are expected to experience restrictions or suspension.

Outlook for 2018/19

Access to unregulated systems in 2018/19 will depend on weather conditions (Table 6).

Table 6. Unregulated systems outlook for 2018/19

Catchment	Worst on record weather conditions (greater for 95 of 100 years)	Dry weather conditions (greater for 75 out of 100 years)	Average weather conditions (greater for 50 out of 100 years)
Loddon	All streams on suspension	All streams on suspension	Minor tributaries and the Upper Loddon on restriction or suspension.
Campaspe	All streams on suspension	All streams on suspension	Minor tributaries and the Upper Campaspe on restriction or suspension.
Goulburn	All minor and major tributaries on restriction or suspension.	All minor tributaries on suspension. All major Goulburn tributaries on restriction	All minor tributaries on restriction or suspension.
Broken	All minor tributaries on suspension.	All minor tributaries on suspension.	All minor tributaries on restriction or suspension.
Ovens	All minor tributaries on suspension. Upper Ovens River on restriction	All minor tributaries on suspension. Upper Ovens River on restriction	All minor tributaries on restrictions.
Kiewa	All minor tributaries on suspension. Kiewa River on restriction	All minor tributaries on suspension. Kiewa River on restriction	All minor tributaries on restrictions.
Upper Murray	All minor tributaries on suspension. Upper Murray River on restriction	All minor tributaries on suspension. Upper Murray River on restriction	All minor tributaries on restrictions.

Note: worst conditions on record are defined as instream flows that are in 95 years out of 100, dry conditions are greater 75 out of 100 years, average conditions are inflow volumes to major storages that are greater in 50 years out of 100 and wet conditions are inflow volumes to major storages that are greater in 10 years out of 100).

Groundwater

Current seasonal conditions

Currently, all groundwater licence holders have access to 100 per cent of their entitlement except for those in the Newlyn Zone of the Loddon Highlands Water Supply Protection Area (WSPA) who have a 75 per cent allocation for 2017/18 (Table 7). A final allocation announcement will be made for the Newlyn Zone in late November 2017. The Katunga WSPA has received 100 per cent of its allocation for the first time in 11 years following the amendment to the Katunga WSPA Groundwater Management Plan.

Table 7 Groundwater allocation for 2017/18

Groundwater Management Unit (GMU)	2017/18 Allocations (% Licensed Volume)
Barnawartha GMA	100%
Broken GMA	100%
Central Victorian Mineral Springs GMA	100%
Eildon GMA	100%
Katunga WSPA	100%
Kiewa GMA	100%
Loddon Highlands WSPA	100% (75% in Newlyn Zone)
Lower Campaspe Valley WSPA	100%
Lower Ovens GMA	100%
Mid Goulburn GMA	100%
Mid Loddon GMA	100%
Shepparton Irrigation GMA	100%
Strathbogie GMA	100%
Unincorporated GMU	100%
Upper Goulburn GMA	100%
Upper Murray GMA	100%
Upper Ovens WSPA	100%
West Goulburn GMA	100%

*WSPA = Water Supply Protection Area; GMA = Groundwater Management Area

Outlook for 2017/18

Groundwater recovery and drawdown levels in northern Victoria are dependent on rainfall recharge and groundwater extraction. In most areas, groundwater levels and recharge are likely to remain stable for 2017/18 except for the Mid Loddon GMA, Loddon Highlands WSPA Newlyn Zone and the Lower Campaspe Valley WSPA which are expected to experience continued decline due to below average rainfall in the western catchments (Table 8).

As mentioned above, the Newlyn Zone allocation will be revisited in November 2017. However, it is unlikely to increase above 75 per cent for 2017/18.

Table 8. Groundwater outlook for 2017/18

Catchments	Groundwater Management Unit	Groundwater level outlook	Allocations outlook
Loddon/ Campaspe	Central Victorian Mineral Springs GMA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%
	Mid Loddon GMA	Seasonal drawdown and recovery likely to continue to decline	Remain at 100%
	Loddon Highlands WSPA	Seasonal drawdown and recovery likely to remain stable except in Newlyn Zone where both are likely to continue to decline.	Remain at 100% except in Newlyn Zone – 75%; Newlyn Zone to be revised in November 2017 however unlikely to be increased from 75%
	Lower Campaspe Valley WSPA	Seasonal drawdown and recovery likely to continue to decline	Remain at 100%
Goulburn/ Broken/ Mid Murray	Broken GMA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%
	Eildon GMA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%
	Katunga WSPA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%
	Mid Goulburn GMA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%
	Shepparton Irrigation GMA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%
	Strathbogie GMA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%
	Upper Goulburn GMA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%
	West Goulburn GMA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%
Kiewa/ Ovens/ Upper Murray	Barnawartha GMA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%
	Kiewa GMA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%
	Lower Ovens GMA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%
	Upper Murray GMA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%
	Upper Ovens WSPA	Seasonal drawdown and recovery likely to remain stable	Remain at 100%

Surface Water Quality

Current seasonal conditions

The winter-spring period of 2017 has not caused any surface water quality problems in the GMW region. Blue green algae levels in storages are very low at the moment, but have the ability to increase in the space of a few weeks.

Outlook for 2017/18

To the extent that it can be predicted, the risk of water quality incidents occurring over the next 12 months that would impact supply to entitlement holders is considered low. Water storage levels are high and are not forecast to fall to low levels.

The possibility of future blue green algae (BGA) blooms is hard to predict. BGA blooms can occur under a range of weather, storage level and stream flow scenarios. For example, the unprecedented BGA bloom in Waranga Basin and associated channels early in 2017 (during the 2016/17 water year) happened despite very high regulated flows, which had historically been thought to reduce the risk.

The occurrence of BGA blooms or black-water events (hypoxia) is unlikely to affect GMW's supply to rural customers, as the phenomena are not considered harmful to agricultural production. However, both can impact aquatic life and recreational use of water bodies.

Urban water corporations are generally able to treat BGA affected water with powdered activated carbon to provide safe drinking water. Similarly, the urban water corporations are generally able to manage the taste and odour issues typically associated with hypoxic water.

GMW has been working with the Goulburn Broken Catchment Management Authority and Goulburn Valley Water to develop management guidelines for hypoxic events following the black-water event in early January 2017 that began in Stony Creek and Seven Creeks and affected the lower Goulburn River near Shepparton.

High salinity in water systems is unlikely to occur given the good water resource position. Salinity tends to rise as storages decline to very low levels, particularly in the Loddon and Campaspe catchments, but this is not expected to happen during 2017/18.

Information Updates

GMW will update seasonal determinations on the 1st and 15th of each month, or next business day, until all seasonal determination are 100 per cent HRWS. Seasonal determinations will then be updated on the 15th of each month, or next business day.

The first outlook for 2018/19 seasonal determinations will be issued on 15 February 2018. All resource management updates can be located on the Northern Victoria Resource Manager website at http://nvrm.net.au/.