Goulburn-Murray WATER

Annual Water Outlook

November 2023

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Executive Summary

Rainfall during the 2022/23 water year was much higher than average and inflows were more than twice the long-term average at most Goulburn-Murray Water (GMW) storages. Reserves established in 2022/23 following maximum seasonal determinations in all systems contributed to opening seasonal determinations in all systems on 3 July 2023. The Goulburn, Campaspe, Loddon and Bullarook systems all opened 2023/24 with 100 per cent of high-reliability water shares (HRWS).

By 15 September 2023, seasonal determinations had reached 100 per cent HRWS in all systems, with the Broken, Campaspe and Bullarook systems also receiving allocation to low-reliability water shares (LRWS).

The seasonal climate outlooks issued by the Bureau of Meteorology on 16 November 2023 indicate the chances of exceeding median rainfall across the GMW region from December 2023 to February 2024 is about 50 per cent.

Resource improvements in 2023/24 will be directed towards increasing LRWS seasonal determinations in the Murray, Goulburn, Campaspe and Loddon systems until the seasonal determination has reached the maximum in each system. With LRWS seasonal determinations available in the Murray, Goulburn, Loddon and Campaspe systems, there are already good volumes in reserve for 2024/25. The Broken, Bullarook and Ovens systems are annual systems and water availability will depend on seasonal conditions and inflows closer to the start of 2024/25.

GMW, as delegated Resource Manager for northern Victorian systems, will issue a detailed outlook for 2024/25 seasonal determinations in regulated systems on Thursday 15 February 2024.

Unregulated systems across northern Victoria started the 2023/24 season with few restrictions due to rainfall events in June and September. Under the Bureau of Meteorology's rainfall outlook for an even chance of exceeding the median rainfall, restrictions in the larger streams are likely, while the smaller tributary streams will experience restrictions and suspensions.

Groundwater aquifers across northern Victoria showed strong recovery throughout 2022/23 with lower-than-average use and above-average rainfall. Most groundwater licence holders have access to 100 per cent of their entitlement, except for licence holders in the Barnadown Zone within the Lower Campaspe Water Supply Protection Area (WSPA) and the Katunga WSPA. Lower Campaspe WSPA Barnadown Zone users have a 75 per cent allocation for 2023/24. The allocation in the Katunga WSPA is 70 per cent, but good aquifer response occurred after lower-than-average use in 2022/23. With the Bureau of Meteorology predicting an even chance of exceeding median rainfall across the region, groundwater levels are expected to drop in 2023/24 with increased extraction expected.

The most likely water quality risks to occur in the coming year are blue green algae blooms and potentially hypoxic blackwater since many floodplain billabongs are still holding water. While these events are unlikely to prevent supply to customers, they could impact aquatic life and recreational use.

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 2023/24 and what conditions are possible at the start of the 2024/25 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.

While this outlook focuses on water availability due to streamflows, storage levels and water quality, there may be other rare circumstances due to extreme events or emergencies such as bushfires in our catchments, major loss of power supply or water contamination that may require restrictions to manage water demands.

Current climate and streamflow in the longer context

Victoria's climate and streamflow is highly variable, but within this variability we have experienced a warming and drying trend over recent decades.

In comparison to historical conditions, the GMW region is already experiencing trends toward:

- higher temperatures and hotter days
- reductions in rainfall during the cooler months
- in some locations, increases in extreme, short-duration rainfall events
- in some catchments, particularly in western Victoria, a shift in the streamflow response to rainfall with typically less streamflow generated for a given amount of rain.

Some of the rainfall declines in the cooler months can be attributed to increases in greenhouse gas concentrations in the atmosphere. During the cooler months, we have been getting less rainfall from low-pressure and frontal systems.

The cause of the reduction in streamflow response to a given rainfall is not yet fully known and is the subject of continuing research.

In the future, over the longer term the GMW region can expect:

- the rainfall reductions during the cooler months to persist
- increases in extreme rainfall events
- increases in potential evapotranspiration due to higher temperature and lower relative humidity
- reductions in streamflow because of less rainfall and higher potential evapotranspiration
- the streamflow response to rainfall to no longer remain the same, and generally decline.

Victoria's climate will continue to be variable with wet years and dry years, against a background drying trend. With a warmer future and projections of declining water availability, we can expect more frequent and severe droughts in coming decades and increased numbers of extreme rainfall events.

The Victorian Government is investing in further research to better understand how Victoria's climate is changing and the water resource implications, through the Victorian Water and Climate Initiative. More information on the observed changes and longer-term future climate and water projections can be found

at: https://www.water.vic.gov.au/our-programs/climate-change-and-victorias-water-sector/hydrology-and-climate-science-research/victorian-water-and-climate-initiative.

Regulated Systems

Current seasonal conditions

Rainfall over the 2022/23 water year was very much above average across the GMW region, particularly from September to November and again during June. Annual storage inflows across GMW's catchments were in the highest 10 per cent of the historical record (averages based on climate conditions observed since 1975).

In 2022/23 inflows into Lake Eppalock were over four times the average annual volume. Over the 2022/23 water year, Lake Eildon inflows were 192 per cent of the annual average volume. Inflows to Lake Nillahcootie, Goulburn Weir, Dartmouth Reservoir, Lake Hume, Lake Buffalo and Lake William Hovell were all over twice the annual average while inflows into the Loddon storages, (i.e., Cairn Curran, Tullaroop and Laanecoorie reservoirs) received over three times the annual average inflows.

After wetter conditions in June 2023, rainfall across northern Victoria from July to September 2023 was below-average (Figure 1). These drier conditions contributed to lower-than-average storage inflows (Table 1). Despite the overall drier conditions a rain band in early October significantly increased inflows in the Goulburn, Broken and Ovens catchments, leading to minor flooding occurring. Inflows to Lake Eildon, Lake Buffalo and Lake William Hovell were almost twice the monthly average in October while Lake Nillahcootie received over three times the October average.

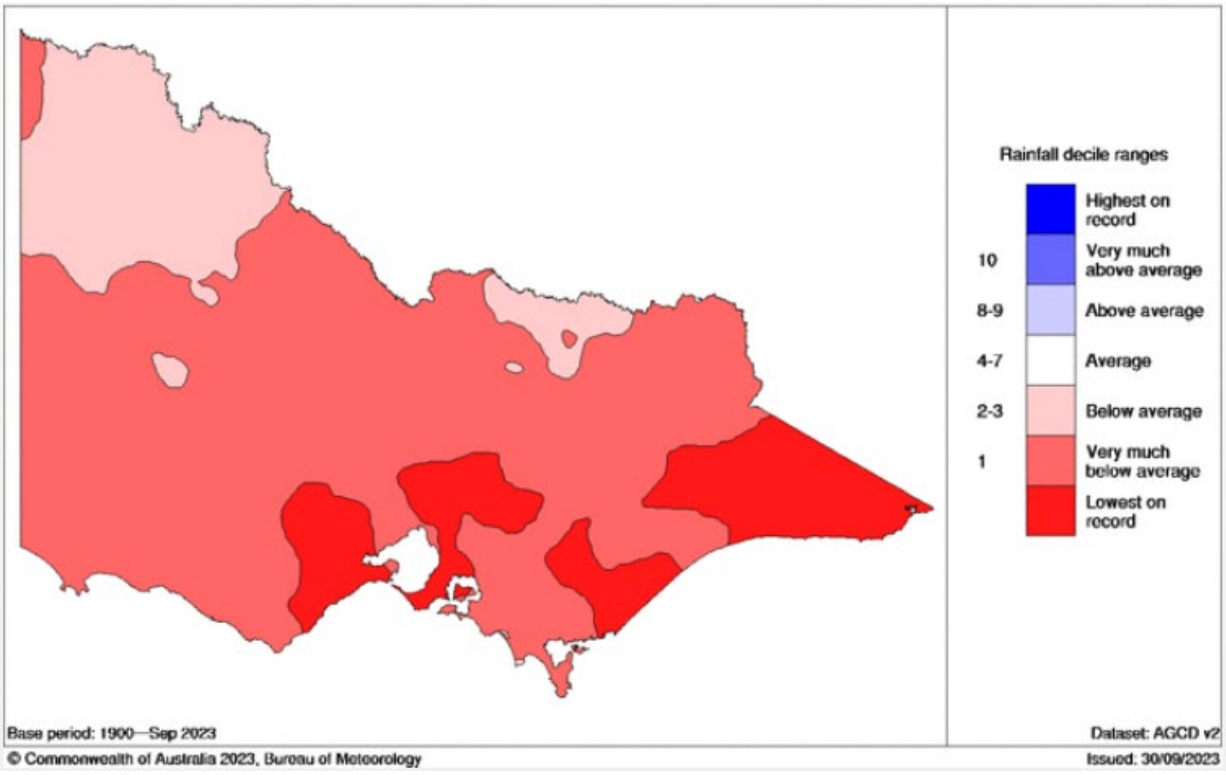

Figure 1. Rainfall deciles for 1 July to 30 September 2023

Table 1. July to September 2023 inflows to the major GMW storages

Storage	July – September inflow (GL)	Percent of average[2]	Chance of greater inflow[2]
Eildon	498.3	71%	68%
Goulburn Weir[1]	424.7	77%	57%
Hume[1]	796.7	73%	57%
Dartmouth	253.4	72%	63%
Buffalo	183.5	92%	49%
William Hovell	75.8	76%	64%
Nillahcootie	10.9	33%	78%
Eppalock	44.0	48%	62%
Cairn Curran	23.2	37%	69%
Tullaroop	17.8	64%	48%

[1] Natural inflows excluding releases from upstream storages

[2] Historical flow records that have been adjusted to match climate conditions observed since 1975

Table 2 outlines the change in storage volumes and percentages from July to mid-October. As the storage levels were high following rainfall in early June, there has been little change to the volumes in storage over the July to October months. Demand for water increased in September and storage levels started to fall. However, rainfall in early October refilled some storages and dampened demand. Lake Eildon filled on 6 November 2023 and Lake Buffalo filled in mid November 2023.

Table 2. Storage volume changes from July to mid-October

Storage	1 July 2023 Volume (GL)	1 July 2023 Percentage full	15 October 2023 Volume (GL)	15 October 2023 Percentage full	Volume change (GL)	Percentage full change
Eildon	3,253	97.6%	3,316	99.5%	63	1.9%
Hume	2,911	96.9%	2,911	96.9%	0	0.0%
Dartmouth	3,743	97.1%	3,815	98.9%	72	1.8%
Buffalo*	15.4	65.2%	14.9	63.2%	-0.5	-2.0%
William Hovell	14.0	102.5%	13.9	101.4%	-0.1	-1.1%
Nillahcootie	40.9	101.2%	40.8	101.0%	-0.1	-0.2%
Eppalock	297.9	97.8%	295.1	96.9%	-2.8	-0.9%
Cairn Curran	138.8	94.3%	139.6	94.9%	0.8	0.6%
Tullaroop	71.2	97.7%	73.2	100.3%	2.0	2.6%

*Lake Buffalo level is managed through winter and spring by passing inflows until gates lowered in late October

Water availability in northern Victoria early in 2023/24 was assisted by the reserves established in 2022/23 after seasonal determinations reached 100 per cent HRWS and 100 per cent LRWS. This allowed an opening seasonal determination to be made on 3 July 2023 in all systems including the highest opening allocations for the Goulburn and Loddon systems since 1997/98. There was also a high volume of carryover on 1 July 2023, with 1,094 GL carried over in the Goulburn system and 988 GL carried over in the Murray system.

Seasonal determinations at 15 November 2023 are shown in Table 3. All systems are 100 per cent HRWS and LRWS is available in all systems.

Resource Availability

Murray System

The Murray system started 2023/24 with a seasonal determination of 80 per cent HRWS. Continuing good inflows through winter enabled the seasonal determination to reach 100 per cent on 15 August 2023. On 15 November 2023, entitlement holders received a 16 per cent LRWS seasonal determination.

Table 3. Seasonal determinations at 15 November 2023

Water System	High-Reliability Water Share	Low-Reliability Water Share
Murray	100%	16%
Broken	100%	100%
Goulburn	100%	40%
Campaspe	100%	83%
Loddon	100%	40%
Bullarook	100%	100%

Despite below average inflows in the first months of the water year, releases to manage storage levels at Lake Hume have been required in winter and spring of 2023. These releases meant deductions from water allocated to rules-based entitlements, such as the Barmah-Millewa Forest Environmental Water Allocation, as well as water held in spillable water accounts. On 15 November 2023, 425 GL of the 540 GL transferred to spillable water accounts has been deducted.

As specified in clause 10.5 of GMW's Murray bulk entitlement, water was borrowed from the Barmah-Millewa Forest Environmental Water Allocation at the start of the 2023/24 water year to support early seasonal determinations for high-reliability water shares. After deductions for the volume spilled, the remaining volume borrowed from the Barmah-Millewa Forest Environmental Water Allocation was paid back, leaving 200 GL available for use.

On 11 November, the risk of spill in the Murray system was above 50 per cent, higher than the threshold required for a low risk to be declared.

Goulburn System

The reserves established in the Goulburn system from inflows during 2022/23, particularly in June 2023, were enough for the system to commence the 2023/24 water year with a seasonal determination of 100 per cent HRWS. This is the first time the Goulburn system has opened with a full allocation to HRWS in over 25 years.

The volume in Lake Eildon was managed under target filling arrangements through July and into early August with wet catchment conditions and ongoing inflows. Because of these wet conditions the storage was managed to a target filling curve that aimed to fill the storage by 1 November 2023. After returning to regulated conditions in early August, the storage was operated under flood management conditions in early October.

Releases from Lake Eildon under the target filling arrangements meant the Goulburn River downstream of Goulburn Weir operated under unregulated conditions until mid-August 2023 and recommenced in early October. Unregulated conditions continued until late October.

These higher flows meant there was sufficient water to fill Waranga Basin to the target level in mid-September. Irrigation demand began to lower the storage level in late September before rainfall in early October enabled more water to be diverted and stored in Waranga Basin.

Once reserves for 2024/25 HRWS seasonal determinations were established, a seasonal determination to Goulburn system LRWS was announced on 16 October 2023. Releases from Lake Eildon under target filling arrangements and flood management meant that to 16 October, 416 GL of the 635 GL transferred into spillable water accounts in the Goulburn system has been deducted.

On 11 November, the risk of spill in the Goulburn system remained above the threshold required for a low risk to be declared as releases were still required to manage storage levels.

Broken System

The Broken system opened the 2023/24 water year with a seasonal determination of 49 per cent HRWS.

Lake Nillahcootie filled to 100 per cent capacity in June and inflows ensured the storage remained full. The seasonal determinations steadily increased to reach 100 per cent HRWS and 100 per cent LRWS on 16 October 2023.

Campaspe System

The Campaspe system opened the 2023/24 water year with a seasonal determination of 100 per cent HRWS and 46 per cent LRWS. Lake Eppalock filled in mid-July and remained close to full supply level until an environmental water delivery commenced in mid-September. The volume available for allocation has gradually increased and the seasonal determination increased to 100 per cent HRWS and 83 per cent LRWS on 15 November 2023. The spills from Lake Eppalock resulted in 6.8 GL being deducted from the 21.3 GL transferred to spillable water accounts.

On 11 November, the risk of spill in the Campaspe system was about 20 per cent, above the threshold required for a low risk to be declared.

Loddon and Bullarook Systems

In accordance with the bulk entitlement rules, the Loddon system 2023/24 seasonal determination increased in line with the Goulburn system. The seasonal determination started 2023/24 at 100 per cent HRWS on 3 July and increased to 100 per cent HRWS and 40 per cent LRWS on 15 November 2023.

The Bullarook system is the smallest of the GMW systems with two relatively small annual storages. The Bullarook system opened with a 100 per cent HRWS and 100 per cent seasonal determination on 3 July 2023 as both storages filled in June.

Ovens System

Despite entitlement holders having water shares, the Ovens system does not receive incremental 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.

Entitlement holders are currently not restricted, as inflows into the system are meeting demands. The gates were lowered at Lake Buffalo in August 2023 and the storage increased to 80 per cent of capacity. Due to rainfall in early October, the gates were raised to allow inflows to pass the storage. The gates were again lowered in late October and the storage filled to 100 per cent of capacity in mid-November. Entitlement holders in the Ovens, Buffalo and King rivers currently have access to their spill-reliability entitlements. Access to the spill-reliability entitlements will cease later in the season once the storages commence regulated operations.

Outlook for remainder of 2023/24

The Bureau of Meteorology's three-month outlook for December 2023 to February 2024, issued on 16 November 2023, indicated the chances of exceeding the median rainfall over most of GMW's irrigation and catchment areas is about 50 per cent (Figure 2).

The Bureau of Meteorology's Climate Driver update issued on 8 November outlined that oceanic indicators exhibit a clear El Niño state and central and eastern Pacific Sea surface temperatures continue to exceed El Niño thresholds. A positive Indian Ocean Dipole (IOD) is also contributing to

weather conditions. When a positive IOD and El Niño occur together, their drying effect is typically stronger and more widespread across Australia.

Temperature and rainfall outlook updates are available from the Bureau of Meteorology website (www.bom.gov.au/climate/ahead/).

Entitlement holders in all systems except the Bullarook and Broken systems have yet to receive their maximum seasonal determination. Further resource improvements in the Murray, Goulburn, Campaspe and Loddon systems will contribute to LRWS seasonal determination increases.

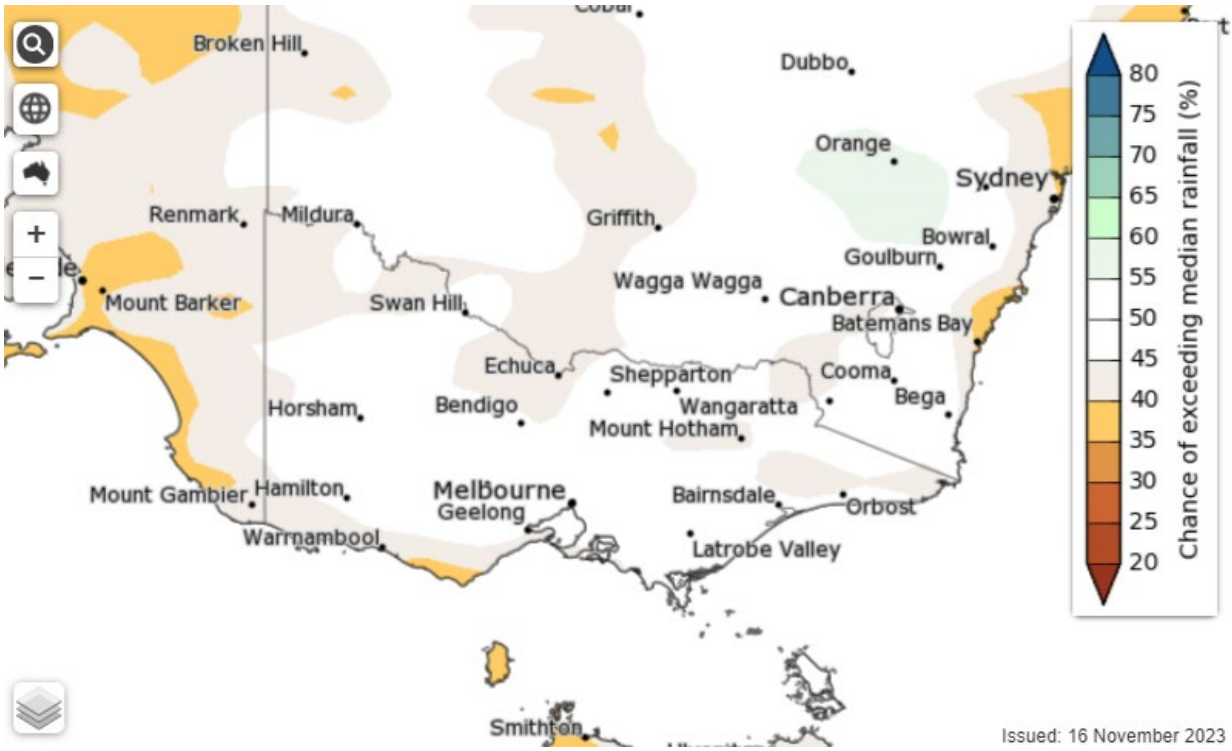

Figure 2. Chance of exceeding median rainfall for the period December 2023 to February 2024 (Source Bureau of Meteorology).

Entitlement holders in the Ovens system are unlikely to experience restricted diversion access this water year as the storages are yet to be drawn upon to meet demand and inflows into Lake Buffalo and Lake William Hovell continue.

Irrigation and environmental water demand over the remaining months of the 2023/24 water year will determine storage levels heading into the next peak inflow period and how much allocation is carried over into 2024/25. As the volume available for delivery is large and the rainfall outlook does not favour wetter conditions, demand for water may be high.

Outlook for 2024/25

Reliable long-term weather outlooks for the start of 2024/25 are not available as the Bureau of Meteorology rainfall outlooks only extend for three months. GMW, as Northern Victoria Resource Manager, will release a detailed first outlook for the 2024/25 water year on 15 February 2024 based on historical inflows (adjusted for conditions since 1975). The outlook will be updated on 15 May 2024.

Murray System

Effective with the 15 November 2023 assessment, the Murray system LRWS seasonal determination was 16 per cent. Further resource improvements will be directed to increasing the allocations to LRWS. With the large volume already reserved for 2024/25, HRWS are highly likely to receive a 100 per cent

seasonal determination by April 2025. Allocations to LRWS in the Murray system in 2024/25 will depend on reserves being established for HRWS next season. Wet conditions, deductions from spillable water accounts and high water use early in the season are factors that contribute to LRWS receiving a seasonal determination.

Goulburn System

As the Goulburn system seasonal determination is 100 per cent HRWS and 40 per cent LRWS (at 15 November 2023), there are sufficient reserves for seasonal determinations for HRWS to reach 100 per cent in 2024/25 if inflows expected in 99 years in 100 are received between now and April 2025. This does not mean that seasonal determinations open on 1 July 2023 at 100 per cent HRWS because the seasonal determination policy only includes inflows estimates for the upcoming six weeks. However, it indicates that HRWS are highly likely to receive a 100 per cent seasonal determination by April 2025. Allocations to LRWS in the Goulburn system in 2024/25 will depend on reserves being established for HRWS in the 2025/26 season. Wet conditions, deductions from spillable water accounts and high water use early in the season are factors that contribute to LRWS receiving a seasonal determination.

Campaspe System

With the seasonal determination at 100 per cent HRWS and 83 per cent LRWS (at 15 November 2023), all further resource improvements will go towards increasing LRWS seasonal determinations. There are sufficient reserves to operate the system and provide a 100 per cent HRWS opening seasonal determination on 1 July 2024.

Loddon System

If LRWS seasonal determinations in the Goulburn system increase, the Loddon seasonal determination will increase by the same percentage. There is about 40 GL available to supplement water availability in the Goulburn system. Further resource improvements will contribute to additional Goulburn supplement and further reserves for 2024/25. There are sufficient reserves to operate the system and match the Goulburn system seasonal determination on 1 July 2024.

Broken System

The Broken system is an annual system, so 2024/25 reserves will depend on how much water is used this water year and the inflows during the traditional inflow months in winter and spring 2024.

Bullarook System

Like the Broken, the Bullarook system is an annual system, so 2024/25 reserves will depend on how much water is used this water year and the inflows during the traditional inflow months in 2024.

Ovens System

Water availability in the Ovens system depends on weather and stream flows, so it is difficult to determine what water availability will be in 2024/25. 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) or Water Supply Protection Area (WSPA) management plans. Minimum streamflow requirements are

outlined in LMRs and WSPA management plans. A minimum flow requirement of 3 ML/day is applied to streams that do not have an LMR.

If minimum flow requirements are not met, restrictions are put in place (Table 4). 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 4. Current Stage 5 Suspensions on unregulated streams (as at 16 November 2023)

Catchment	Stream	Suspension start date
Broken	Boosey Creek	11 January 2023
Goulburn	Sunday Creek	10 November 2023
Campaspe	Axe Creek	30 October 2023
Campaspe	Cornella Creek	12 December 2022
Campaspe	Emu Creek	30 October 2023
Campaspe	Jones Creek	16 November 2023
Campaspe	Little Coliban River	16 November 2023
Campaspe	McIvor Creek	30 October 2023
Campaspe	Mt Ida Creek	30 October 2023
Campaspe	Sheep Wash Creek	30 October 2023
Campaspe	Smiths Creek	16 November 2023
Campaspe	Stony Creek	6 November 2023
Campaspe	Sweenies Creek	30 October 2023
Campaspe	Wanalta Creek	8 November 2016
Campaspe	Wild Duck Creek	30 October 2023
Loddon	Back Creek	13 October 2023
Loddon	Bet Bet Creek	17 January 2023
Loddon	Bullock Creek	17 January 2023
Loddon	Coghills Creek	13 October 2023
Loddon	Joyces Creek	31 October 2023
Loddon	McCallums Creek	13 October 2023
Loddon	Muckleford Creek	31 October 2023

Outlook for remainder of 2023/24

The Bureau of Meteorology is an even chance of exceeding the median rainfall across northern Victoria throughout summer, which will likely result in reduced stream flows and an increase in restrictions. Smaller tributary streams will experience restrictions.

The Bureau of Meteorology current seasonal streamflow forecast predicts low stream flows for November 2023 to January 2024 across the GMW region due to dry and unusually warm conditions. (www.bom.gov.au/water/ssf/).

Upper Murray Catchment

- The Bureau of Meteorology predicts that flows are likely to be low and there is a 45 per cent chance of exceeding median rainfall in the Upper Murray catchment between December 2023 to February 2024
- No restrictions are forecast for the main stem of the unregulated Murray River and the Mitta Mitta River above Lake Hume
- Tributaries will most likely experience restrictions during the summer of 2024

Kiewa Catchment

- The Bureau of Meteorology predicts low flows and a 50 per cent chance of exceeding median rainfall in the Kiewa catchment between December 2023 to February 2024
- No restrictions are forecast for the Kiewa main stem while some smaller tributaries will experience restrictions during the summer of 2024

Ovens Catchment

- The Bureau of Meteorology predicts low flows and a 45 per cent chance of exceeding median rainfall in the Ovens catchment between December 2023 to February 2024
- Restrictions are likely for the main stem of the Ovens River upstream of Myrtleford during the 2024 summer
- Small tributaries will experience restrictions during summer of 2023/24.

Goulburn Catchment

- The Bureau of Meteorology predicts low flows and a 50 per cent chance of exceeding median rainfall in the Goulburn catchment between December 2023 to February 2024
- Restrictions are likely for the main tributaries which flow into the Goulburn River upstream of Seymour
- Small tributaries will experience restrictions

Broken Catchment

- The Bureau of Meteorology predicts low flows and around 50 per cent chance of exceeding median rainfall in the upper parts of the Broken catchment between December 2023 to February 2024
- The Broken River tributaries will experience restrictions

Campaspe Catchment

- The Bureau of Meteorology predicts low flows and a 50 per cent chance of exceeding median rainfall in the Campaspe catchment between December 2023 to February 2024
- The Upper Campaspe, Coliban and all tributaries will experience restrictions

Loddon Catchment

- The Bureau of Meteorology predicts low flows and a 50 per cent chance of exceeding median rainfall in the Loddon catchment between December 2023 to February 2024
- The Loddon River upstream of Cairn Curran Reservoir and most tributaries will experience restrictions

Outlook for 2024/25

Access to unregulated systems in 2024/25 will depend on weather conditions (Table 5).

Table 5. Unregulated systems outlook for 2024/25

Catchment	Very Dry weather conditions (flows are less than expected in 95 out of 100 years)	Dry weather conditions (flows are less than expected in 75 out of 100 years)	Average weather conditions (flows are less than expected in 50 out of 100 years)
Broken	All streams on suspension.	All minor tributaries on suspension.	All minor tributaries on restriction or suspension.

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.
Ovens	All minor tributaries on suspension. Upper Ovens River and larger tributaries on restriction	All minor tributaries on suspension. Upper Ovens River and major tributaries on restriction	All minor tributaries on restrictions. Tributaries of the Upper Ovens to be on the same level of restriction as the Ovens main stem above Myrtleford. Several smaller tributaries on suspension.
Goulburn	All minor and major tributaries on restriction or suspension.	All minor tributaries on suspension. All major Goulburn tributaries on restriction	Most minor tributaries on restriction or suspension.
Campaspe	All streams on suspension	All streams on suspension	All tributaries and the Upper Campaspe on restriction or suspension.
Loddon	All streams on suspension	All streams on suspension	All tributaries and the Upper Loddon on restriction or suspension.

Note: worst conditions on record are defined as instream flows that are greater 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, groundwater licence holders in the Katunga WSPA are on 70 per cent allocation and in the Lower Campaspe Valley WSPA are on 75 per cent allocation in the Barnadown Zone. The remaining Groundwater Management Units have access to 100 per cent of their entitlement (Table 6).

Table 6. Groundwater allocation for 2023/24

Groundwater Management Unit (GMU)	2023/24 Allocations (% Licensed Volume)
Barnawartha GMA	100%
Broken GMA	100%
Central Victorian Mineral Springs GMA	100%
Eildon GMA	100%
Katunga WSPA	70%
Kiewa GMA	100%
Loddon Highlands WSPA	100%
Lower Campaspe Valley WSPA - Barnadown Zone - All other Zones	 75% 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 remainder of 2023/24

Groundwater use and trading activity is likely to be above average in the 2023/24 season due to the Bureau of Meteorology predicting an even chance of exceeding the median rainfall and above average temperatures across northern Victoria in late 2023 and early 2024.

Outlook for 2024/25

Groundwater recovery and drawdown levels in northern Victoria are dependent on rainfall recharge and groundwater extraction. The predicted above average groundwater use in 2023/24, coupled with below average rainfall across the region, is expected to cause a reduction in groundwater levels across all aquifers. After strong groundwater recharge in 2022/23, groundwater levels across northern Victoria are expected to see some minor water level reductions.

Groundwater levels in the Lower Campaspe Valley WSPA and Katunga WSPA will be closely monitored with the impact of allocations on the resource (Table 7).

Table 7. Groundwater outlook for 2024/25

Catchments	Groundwater Management Unit	Groundwater level outlook	Allocations outlook
Loddon/ Campaspe	Central Victorian Mineral Springs GMA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Loddon/ Campaspe	Mid Loddon GMA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Loddon/ Campaspe	Loddon Highlands WSPA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Loddon/ Campaspe	Lower Campaspe Valley WSPA	Seasonal drawdown and recovery likely to reduce water levels with expected increase in usage	75% allocation for Barnadown zone. 100% allocation all other zones.
Goulburn/ Broken/ Mid Murray	Broken GMA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Goulburn/ Broken/ Mid Murray	Eildon GMA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Goulburn/ Broken/ Mid Murray	Katunga WSPA	Seasonal drawdown and recovery likely to reduce water levels.	Potential 100% allocation Dependent on 5 year rolling average
Goulburn/ Broken/ Mid Murray	Mid Goulburn GMA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Goulburn/ Broken/ Mid Murray	Shepparton Irrigation GMA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Goulburn/ Broken/ Mid Murray	Strathbogie GMA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Goulburn/ Broken/ Mid Murray	Upper Goulburn GMA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Goulburn/ Broken/ Mid Murray	West Goulburn GMA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Kiewa/ Ovens/ Upper Murray	Barnawartha GMA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Kiewa/ Ovens/ Upper Murray	Kiewa GMA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Kiewa/ Ovens/ Upper Murray	Lower Ovens GMA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Kiewa/ Ovens/ Upper Murray	Upper Murray GMA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%
Kiewa/ Ovens/ Upper Murray	Upper Ovens WSPA	Seasonal drawdown and recovery likely to reduce water levels	Remain at 100%

Surface Water Quality

Current seasonal conditions

There have been no recreational warnings for blue green algae in GMW's region since mid-July 2023, but there have been some very wet months, which has potentially mobilised and suspended sediment and nutrients.

Some GMW storages have experienced persistently elevated nutrient levels since the floods in October 2022, in particular several storages in the Loddon catchment. This increases the likelihood of algal blooms developing over coming months. Turbidity is also elevated in these storages, as has occurred previously after floods in 2010-11 and 2016.

Outlook for 2023/24

Water quality monitoring in storages suggests there is an elevated risk of blue green algae blooms occurring in coming months that could necessitate recreational warnings.

Hypoxic blackwater events are likely to remain a possibility throughout summer. Despite the low rainfall outlook, many floodplain wetlands and billabongs are full, which means any intense summer rainfall events could readily mobilise hypoxic blackwater into creeks and rivers.

The occurrence of elevated blue green algae or hypoxic blackwater events is unlikely to affect GMW's supply to rural customers, as the phenomena are not considered harmful to irrigated agriculture. However, both events can impact aquatic life and recreational use of water bodies. All current blue green algae warnings in GMW systems can always be found on our website www.gmwater.com.au/news/bga along with links to further information.

High salinity in water systems is unlikely to occur under the current and expected water resource position, with high water availability and storage levels keeping salinity at usable levels.

Information Updates

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

The first outlook for 2023/24 seasonal determinations will be issued on 15 February 2024 and updated on 15 May 2024. The first seasonal determination announcement for 2024/25 will be on 1 July 2024.

All resource management updates can be located on the Northern Victoria Resource Manager website at www.nvrm.net.au.

Information about stream rosters and restrictions (www.gmwater.com.au/water-resources/diversions/rosters-and-restrictions) and groundwater allocations (www.gmwater.com.au/water-resources/ground-water) are available on the GMW website.