

# Water Outlook

2023 - 2024



LOWER MURRAY  
WATER

# ACKNOWLEDGEMENT OF COUNTRY

Lower Murray Water (LMW) acknowledges the Traditional Owners of the land on which we work and reside. We recognise their continuing connection to land, waterways, and community. We pay our respects to Elders past, present, and future.

The Traditional Owner groups within Lower Murray Water's service region lie within the traditional lands of First Nations Peoples, from upstream at Koondrook moving downstream along the Murray River (Mil) through to the western edge of our region at the South Australian border. They are the Barapa Barapa Peoples, Wamba Wemba Peoples, Wadi Wadi Peoples, Tatti Tatti Peoples, Latji Latji Peoples, Nyeri Nyeri Peoples, Ngintait Peoples, and the Wergaia Peoples.

The First Nation Peoples' connection to land and water is the living cultural knowledge that is passed down from generation to generation. The stories that connected the ancestors to their culture still live through the First Nations Peoples of today.

- Acknowledgement of Country written by Stephanie Sloane.

Stephanie works at Lower Murray Water in the People Team. She is a proud Ngiyampaa woman and has a strong connection to her culture, history, and the land. Stephanie has brought not only her experience and passion for people to this role but also a commitment to inspire and mentor others wishing to pursue a career at LMW.

This artwork has been provided by local artist Bella Sloane from the Ngiyampaa tribe. Her painting represents family and is titled 'The Connection to Family.'



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# WATER OUTLOOK 2023-24

## At a glance

### ▶ 100% seasonal determinations

All Northern Victorian water systems as of 16 October 2023

### ▶ Dam storage

#### Dartmouth Dam

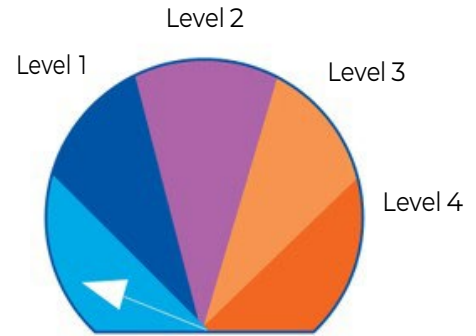
- ♦ Oct 23 capacity: 99%
- ♦ 2022-23 capacity: 100%

#### Hume Dam

- ♦ Oct 23 capacity: 96%
- ♦ 2022-23 capacity: 99%

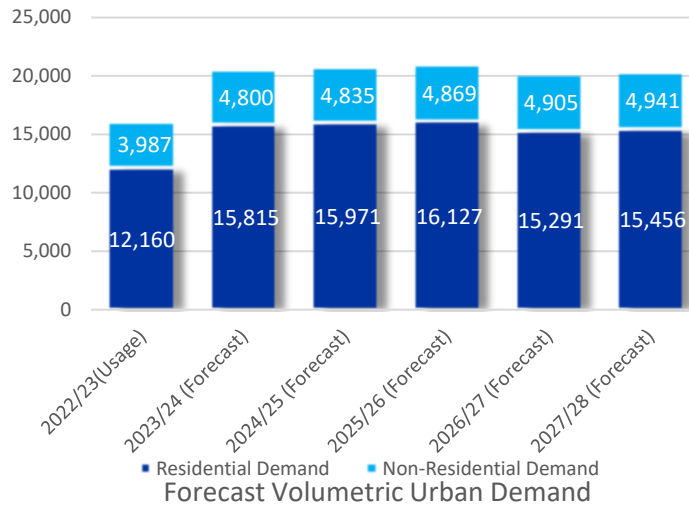
### Likelihood of water restrictions

Permanent Water Saving Rules (PWSR)



Permanent Water Saving Rules are in place

Urban demand is expected to increase steadily, and Rural demand will remain relatively constant



| Strategy                            | LMW actions to balance Supply and Demand  |
|-------------------------------------|---|
| Increase Supply Availability        | Purchase additional water shares or allocation to secure supply levels  |
| Reduce demand for water             | Deliver the Community Housing Retrofit Program<br>Enforce Permanent Water Saving Rules<br>Explore the feasibility of provision of recycled water in public spaces   |
| Heightened awareness and compliance | Deliver School Education Programs<br>Community interaction - Public information and water-wise events.<br>Water use compliance and enforcement, along with awareness and advertising to remind water saving rules and limit the usage |
| Water Efficiency                    | Sunraysia Water Efficiency Project (SWEP) funded by State and Commonwealth governments is in progress to reduce water losses in the Mildura, Merbein and Red Cliffs irrigation districts.   |

# SUMMARY

LMW's service area extends from Kerang to the South Australian Border, spanning the municipalities of Mildura, Swan Hill and Gannawarra. The Annual Water Outlook for 2023-24 provides an eight to twelve-month outlook on security of water supply to LMW's urban and rural customers, which is almost entirely delivered from the Murray River Regulated System.

Table 1 below summarises the details of the urban & rural water supply systems and the level of security of supply for 2023-24.

**Table 1 – Water supply systems and levels of security**

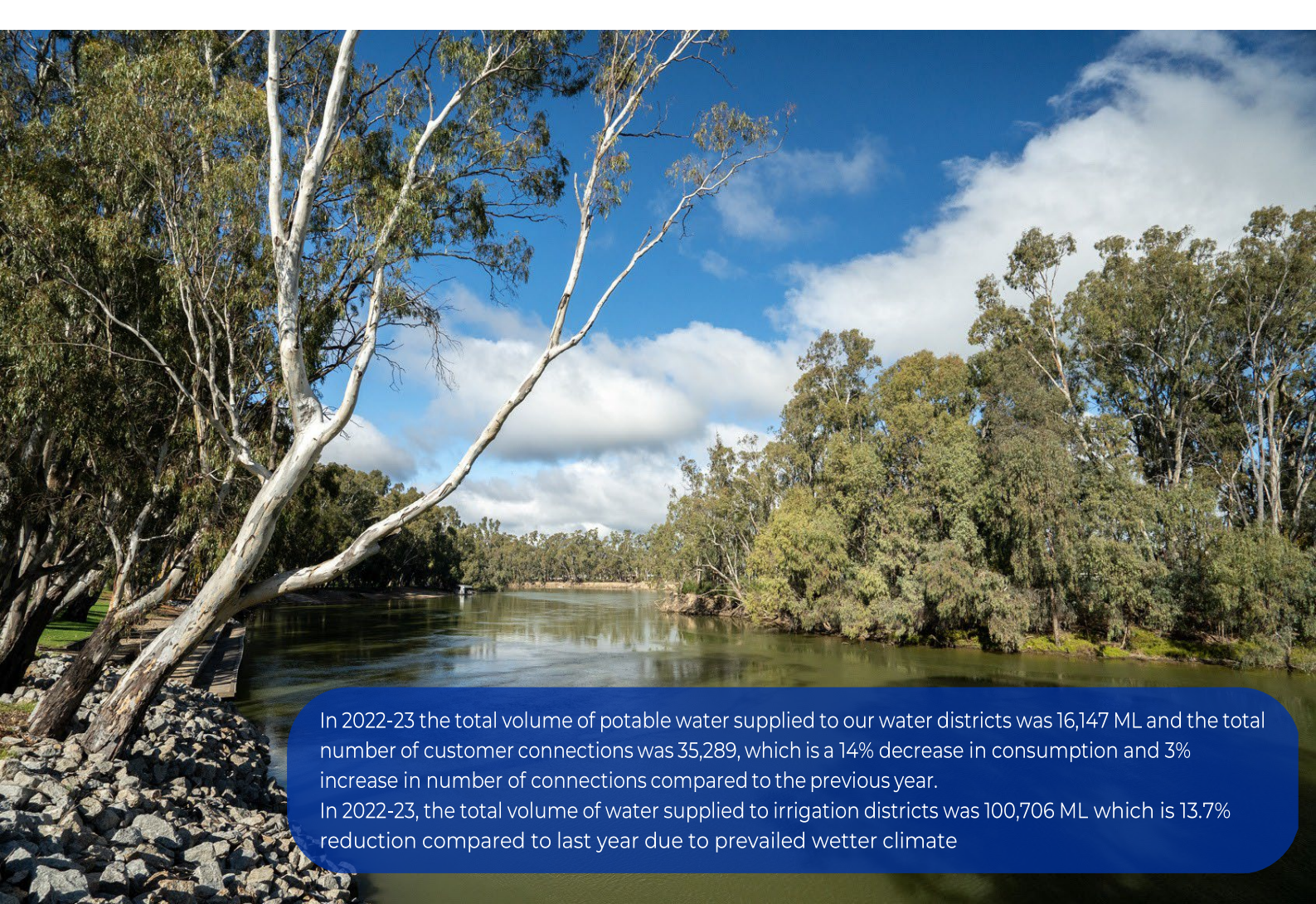
| System     | Urban / Rural | Towns Supplied  | Supply Sources  | Level of Restrictions                  | Likelihood of Restrictions* |
|------------|---------------|---|---|--|-----------------------------|
| Mildura    | Urban         | Mildura and Merbein                                     | River Murray (97%)<br><br>Loddon River, Goulburn Murray Water (GMW) Channels (3%) | PWSR has been in place since June 2020 | Very Rare <1%               |
| Red Cliffs |               | Red Cliffs  |   |  |                             |
| Robinvale  |               | Robinvale   |   |  |                             |
| Piangil    |               | Piangil   |   |  |                             |
| Swan Hill  |               | Swan Hill, Nyah, Nyah West, LakeBoga and Woorinen South |   |  |                             |
| Kerang     |               | Kerang  |   |  |                             |
| Koondrook  |               | Koondrook   |   |  |                             |
| Murrabit   |               | Murrabit  |   |  |                             |
| Millewa    | Rural         | Millewa   | River Murray (100%)   | None                                   | None                        |
| Merbein    |               | Merbein, Yelta  |   |  |                             |
| Mildura    |               | Mildura   |   |  |                             |
| Red Cliffs |               | Red Cliffs  |   |  |                             |
| Robinvale  |               | Robinvale   |   |  |                             |

\* Likelihood of water restrictions range: very rare <1%; rare 1-4%; unlikely 5-19%; possible 20-49%; likely 50-79%; almost certain 80-100%.

As shown in Table 1, LMW has a very rare likelihood of enforcing water restrictions on our customer base. Higher than average rainfall in 2022-23 has supported the water resources in the Murray-Darling catchment and the Murray River system completing its yearly 100% determination of High-Reliability Water Shares (HRWS). The Murray system experienced good inflows due to the above average winter rainfall received from mid-July to the end of August. The Murray Darling Basin Authority Outlook indicates that there is a low risk of a delivery shortfall for this water year. In addition, the urban water shares purchased in compliance with the Urban Water Strategy 2022 will ensure the security of supply of water to urban and rural customers in 2023-24. Given the current strong resource position and forecasts, the probability of restrictions in our water supply systems is Very Rare (Table 1).

In our systems, we have a 100% allocation for 2023-24. LMW will continue to apply PWSR in urban water supply systems. LMW is aware that there are still risks such as higher demand due to the warmer climatic conditions (Bureau of Meteorology forecasting a drier climatic outlook until February 2024), raw water quality issues, emergency situations, asset failure, which could result in the need for further management.





In 2022-23 the total volume of potable water supplied to our water districts was 16,147 ML and the total number of customer connections was 35,289, which is a 14% decrease in consumption and 3% increase in number of connections compared to the previous year.

In 2022-23, the total volume of water supplied to irrigation districts was 100,706 ML which is 13.7% reduction compared to last year due to prevailed wetter climate

To ensure continuity of service delivery, LMW has several initiatives which include 'Operational Summer Readiness Program' to ensure that all critical assets are capable of delivering their function during peak summer demand periods. Our emergency management plan includes contingency and response plans for Blue Green Algae, and Drought, LMW also undergoes proactive capital renewal programs to rehabilitate or replace critical assets. During recent floods, we monitored the river flows and levels near our assets to avoid the risk of inundation. We have also completed bathymetric surveying of the riverbed near the pump station suctions to identify if any silt may have accumulated around the suctions after floods preventing the siphoning of water from the river.

LMW will also continue with programs to reduce usage including Compliance and Enforcement activities with rural customers, Community Housing Retrofit Program and place information on our website which will help customers to conserve water and encourage the efficient use of water.

# OUR SERVICE REGION

Lower Murray Water is one of the few hybrid water utilities in Victoria and is the most remote water corporation from Melbourne, combining an urban water business with an irrigation water business, plus other support functions delivered for private diverters and the Mallee Catchment Management Authority. We have around 200 staff to provide services to approximately 76,000 urban customers, 6,040 irrigation, stock, and domestic water customers, and 985 private diverters.

## LMW's services

LMW provides several services across the north-west of Victoria, but our core business is centered on providing:

- Potable drinking water in the urban and regional centres.
- Wastewater collection and treatment services to the urban and regional centres.
- Irrigation water supply and irrigation drainage services.
- Management of private diversion licenses.
- Domestic and stock water supply to rural areas; and
- Reclaimed water re-use.

Figure 1 below shows the service area of LMW, which includes regional centres and towns within three local government areas. They are Mildura Rural City Council, Swan Hill Rural City Council, and Gannawarra Shire Council.

**Figure 1 - LMW's service region**



Table 2 below shows the connection numbers and volume of potable water supplied to each water supply system in 2022-23.



**Table 2 - Total number of customer connections across LMW districts - Urban**

| <b>Town</b>    | <b>Number of Urban customer Connections</b> | <b>Volume of potable water supplied (ML)</b> |
|----------------|---|--|
| Kerang         | 2,189                                       | 769  |
| Koondrook      | 542   | 171  |
| Lake Boga      | 508   | 216  |
| Mildura        | 22,276                                      | 10,660                                       |
| Murrabit       | 57  | 19   |
| Mystic Park    | 15  | 6  |
| Nyah           | 352   | 177  |
| Nyah West      | 296   | 118  |
| Piangil        | 122   | 98   |
| Red Cliffs     | 1,810                                       | 1,089  |
| Robinvale      | 1,017                                       | 459  |
| Swan Hill      | 5,930                                       | 2,278  |
| Woorinen South | 175   | 86   |
| <b>Total</b>   | <b>35289</b>                                | <b>16147</b>                                 |

Table 3 shows the volume of water delivered to our rural customer in 2022-23

**Table 3 - Volumes of water delivered to Rural districts in 2022-23**

| <b>District</b> | <b>Primary Entitlement holders (ML)</b> | <b>Private Diverters (ML)</b> |
|-----------------|---|-------------------------------|
| Mildura         | 27,136                                  | 335,557                       |
| Merbein         | 14,624                                  |                               |
| Red Cliffs      | 25,881                                  |                               |
| Robinvale       | 14,850                                  |                               |
| Millewa         | 18,215                                  |                               |
| <b>Total</b>    | <b>100,706</b>                          | <b>335,557</b>                |

No water use was recorded by the Victorian Environmental Water Holder entitlements associated with LMW. LMW manages a variety of short-and long-term risks to its urban and rural water supplies. There is a shift in some of the risks this year compared to the previous year reflecting the wet climatic conditions observed since the start of 2022-23, higher inflows to supply storages, and the consequent flood impacts.



Table 4 summarises the risk ranking and a comparison of risks with the previous year.

**Table 4 - Risks (perceived) to the urban and rural supply over the next 12 months**

| <b>Risk</b>   | <b>Rank (22-23)</b> | <b>Rank (23-24)</b> |
|---|---------------------|---------------------|
| Water Availability  | 1                   | 1                   |
| Water Quality - Blue Green Algae (BGA) & Plumatella   | 4                   | 2                   |
| Emergencies like floods, bushfires, resulting damages, service interruptions and higher demands | 4                   | 3                   |
| Urban growth and Supply demand  | 1                   | 4                   |
| Infrastructure resilience   | 4                   | 5                   |

Note that Rank 1 and 5 correspond to highest and lowest risk, respectively. These risks represent a 'point in time' and highlight some immediate areas for attention within LMW's operational planning and development of longer-term strategies.

Water availability is the key risk to rural water supply, which is highly dependent on climate. LMW and the customers are taking actions to adapt to climate change and reduce water use such as implementing efficient irrigation systems and reducing losses in water transfer systems. Given the storage levels at Dartmouth and Hume dams and current flows in the Murray Darling catchment, this risk is reduced in the short term.

With the predicted hot climatic conditions during next summer, Blue Green Algae (BGA) outbreaks in the Murray River system could be initiated. This is still one of the key issues to ensuring water supply to our communities. Significant operational interventions are required to produce compliant drinking water during BGA bloom events. During BGA bloom periods, the rural stock and domestic customers are advised not to use the water as a precautionary measure to minimise the risk. Short-term emergency restrictions may be required to manage demand.

At the start of this water year, Northern Victoria was experiencing high flows in the Murray catchments enabling an increase in organic carbon and other physiochemical parameters such as turbidity, colour, iron, and manganese occurs in the raw water. Therefore, the treatment processes to treat the water to a potable standard have been difficult during those periods. Consequently, an increase in chemical consumption and a reduction in the quantity of treated water are being experienced across all the water treatment plants managed by LMW.

Infrastructure resilience remains one of the focus areas for both urban and rural water supply. LMW is undertaking several actions such as improvements in asset maintenance, asset renewals and augmentations to improve infrastructure resilience and cater to the future demands and urban growth. Our Water Plan 5 has been approved by the Essential Services Commission (ESC) in 2023 and we are working towards delivering the projects to improve our infrastructure and streamline our service delivery.

# CURRENT WATER RESOURCE POSITION

## Urban Water Supply Systems

### Mildura

Water is pumped from the River Murray at Mildura through two conventional water treatment plants (WTP). The treated water is supplied to around 22,300 connections in the City of Mildura and surrounding rural-residential areas including the townships of Merbein, Cabarita, Birdwoodton, Irymple, Nichols Point, Koorlong and Cardross. The Seventh Street treatment plant has a capacity of 74 ML/d and the Mildura West plant has a capacity of 18 ML/d.

The current average daily consumption is approximately 44.5 ML/d, with a current estimated peak day consumption of 76.1 ML/d. Treated water pumping stations at Seventh Street and Mildura West distribute water to two water towers with a combined storage capacity of 3.0 ML. Additional booster pump stations at Ginquam and Benetook and ground-level storages with a combined storage capacity of 37.2 ML allow the system to maintain pressures in the outlying areas on high-demand days.

Merbein is supplied with treated water from Mildura (both MDA Seventh Street and MDA West WTP) via a 450 mm diameter transfer pipeline 7.14 km long. The pipeline transfers water directly to the Merbein reticulation, including ground-level storage of 7.5 ML capacity. During high demand, booster pumps of 150 L/s (13 ML/d) capacity can be operated to maintain optimum pressures and flows in the reticulation network.

### Red Cliffs

The town of Red Cliffs (14 km south of Mildura) is an independent system and services around 1,800 connections. A raw water pumping station extracts water from the river Murray and supplies it to a dissolved air flotation and filtration treatment plant. The treated water is stored in a 6 ML ground-level storage tank (GLS). From the GLS the treated water is delivered to a water tower near the town centre via two rising mains of 300 mm and 375 mm in diameter and supplied to the town. The plant capacity is 11 ML/d, and the average day demand is approximately 3.6 ML/d with a current estimated peak day consumption of 9.2 ML/d.

### Robinvale

At Robinvale, raw water is pumped from the River Murray via a 300 mm pipeline to a conventional water treatment plant, which services around 1,000 connections. Treated water is pumped to a 0.9ML standpipe from a 3.6 ML ground storage tank. The reticulation network is supplied by the 0.3 ML standpipe and a set of booster pumps. The maximum plant design capacity is 6 ML/d, with an average peak daily consumption during the summer months of approximately 5.0ML/d.

### Kerang

Kerang is situated at the southern end of the LMW region. Raw water is pumped either from the river Murray (at Koondrook) or the Goulburn Murray Water 14/2 Channel and treated in a conventional treatment plant, which services around 2,200 connections. LMW can extract water from the Loddon River in the event of an emergency with a temporary pipework arrangement, however it is not preferred due to poor water quality.

The treated water is pumped via dual rising mains of 400mm diameter to Nolan Street which supplies the reticulation network with a 0.68 ML water tower and a 2.5 ML ground storage tank. During high demand, water can be supplied from the ground storage tank via a booster pump station to maintain optimum pressures and flows in the reticulation network. The maximum plant design capacity is 11 ML/d and the average peak daily consumption reached 7.2 ML/d during summer periods.

## Piangil

At Piangil, raw water is pumped from the river Murray to a “Package” conventional water treatment plant which services around 120 connections. The plant has a capacity of 1.0 ML/d. Treated water is then pumped to a 1.14 ML ground storage tank, situated on a high ridge east of the town. The system is re-pressurised by pressure booster pumps for distribution into the town’s reticulation network from this storage tank.

In 2021-22, a new water main was constructed (225 mm PE, 1.2 km long) as the old AC (Asbestos Cement) main was approaching the end of asset life and had multiple leaks/ failures. This enabled LMW to provide an increased volume of water supply with increased pressure (from 180 – 240 kPa).

## Koondrook

Raw water is pumped from the Murray River to a conventional water treatment plant with a capacity of 3 ML/d, which services around 500 connections. Treated water is pumped to a 0.9 ML standpipe from a 2 ML ground storage tank. The Koondrook reticulation network is supplied by a standpipe.

## Murrabit

The Murrabit system can pump raw water from the Raw Water Storage, which is fed from the Goulburn-Murray Water channel or directly from the Murray River to a “Package” conventional water treatment plant with 0.4 ML/d capacity, which services around 50 connections. Treated water is pumped into a 50 kL high-level storage tank from 2x 50 kL ground storage tanks. The Murrabit reticulation network is supplied from the tower.

## Swan Hill

Raw water is pumped from the River Murray at Swan Hill to a conventional water treatment plant with a capacity of 32 ML/d. The Swan Hill system also supplies Woorinen South, Nyah & Nyah West, and Lake Boga, which together service around 7,000 connections. The average daily consumption is 9.8 ML/d for this system. Treated water pumps deliver treated water to a 2.3 ML ground-level storage and a 0.68ML water tower near the city centre. Two ground-level storages, each of 4.0 ML capacity, and a 0.15 ML water tower are situated west of the city. A new 5 ML storage facility has also been recently constructed at this storage site and is operational as of March 2022.

Woorinen South is supplied from the Swan Hill system via a 10 km long pipeline with 300 mm and 250 mm diameter sections with a 2.0 ML ground level storage tank and associated re-lift pumps and chlorination facilities.

The townships of Nyah and Nyah West are supplied via a 27 km long, 250mm diameter pipeline from the Swan Hill Water Treatment Plant. A 6.5 ML ground-level storage tank, chlorination facility, and re-lift pumps are situated at Nyah. Properties adjacent to this pipeline can access water for domestic or commercial supply.

Lake Boga is supplied via a 250 mm diameter pipeline from the Swan Hill Water Treatment Plant. A 0.9 ML ground level storage, chlorination facilities, relift pumps, and a 0.08 ML water tower.



**Figure 2 New 5 ML storage tank in Swan Hill**

## Rural Water Supply Systems

LMW services 3,206 irrigation and 2,834 stock and domestic customers in the four pumped irrigation districts of Mildura, Merbein, Red Cliffs and Robinvale, and to 300 Millewa waterworks district customers and 12 Yelta waterworks district customers. Raw water is drawn from the Murray River via several offtake pump stations and distributed to the customers via combination of channels and piped transfer networks except for Robinvale Irrigation District, which is supplied through a pressurised piped system.

### Sources of supply

LMW draws 97% of raw water from the Murray River with the remaining from Goulburn Murray Water's irrigation channel systems. A bulk water entitlement of 30,971ML is currently specified under the Bulk Entitlement (River Murray - Lower Murray Urban and Rural Water - Urban) Conversion Order 1999 as of June 2011. LMW supplements the bulk entitlement with purchases of additional water share and holds 2,222.6ML of High-Reliability Water Shares (1672.6ML Murray and 550ML Goulburn), and 216ML of Low-Reliability Goulburn Water Shares as of 14th September 2023.

In 23-24, the opening allocation for High-Reliability Water Shares (HRWS) was 80% in the Murray system and 100% in the Goulburn system. The total available water volume was 27,707ML, with a carryover volume of 1,042ML (as of July 1, 2023). With the prevailing rainfall, floods, and streamflow conditions during 2022-23, the water resource level in the Murray system was at a high level. In the latter part of July, there were high inflows in the Murray system after the Torrumbarry weir. As a result, the HRWS of the Murray system was increased to 100% from 88% in August 2023. Releases in Hume and Dartmouth dams were continued throughout resulting in allocation being written off in spillable accounts. This has caused a reduction of 1042ML in carryover to 285ML as of 16 October 2023. The total available water volume as per allocations at present is 33,520 ML. Table 5 summarises the availability of water as per the seasonal determinations on 1 July 2023 and 16 Oct 2023.

**Table 5 - Availability of water to LMW in 2023-24**

| Source of water | Entitlement/ Share (ML) | Seasonal Determination on 1 July 2023 | Seasonal Allocation issued | Seasonal determination on 15 October 2023 | Available balance as of 16 October 2023 |
|-----------------|-------------------------|---------------------------------------|----------------------------|---|---|
| Goulburn HRWS   | 550                     | 100%                                  | 550                        | 100%                                      | 550                                     |
| Goulburn LRWS   | 216                     | 0%                                    | -                          | 19%                                       | 41                                      |
| Murray HRWS     | 1,673                   | 80%                                   | 1,338                      | 100%                                      | 1,673                                   |
| BE (Urban)      | 30,971                  | 80%                                   | 24,777                     | 100%                                      | 30,971                                  |
| Carryover       | -                       | -                                     | 1,042                      | -   | 85                                      |
| Total (ML)      | 33,410                  | -                                     | 27,707                     | -   | 33,520                                  |

The available balance on 16 October is explained in Table 6 below:

**Table 6 - Availability of water to LMW in October 2023**

| Source of water | Carryover (ML) <sup>1</sup> - A | Seasonal Allocation as of 16 October 2023 (ML) - B | Net Trade <sup>2</sup> (ML) - C | Write off due to spill <sup>3</sup> (ML) - D | Available balance as of 16 October 2023 (ML) A+B+C-D |
|-----------------|---------------------------------|--|---------------------------------|--|--|
| Goulburn HRWS   | -                               | 550  | -                               | -  | 550  |
| Goulburn LRWS   | -                               | 41   | -                               | -  | 41   |
| Murray HRWS     | 0                               | 1,673  | -                               | 0  | 1,673  |
| BE (Urban)      | 1,042                           | 30,971   | -                               | 757  | 31,256   |
| Total (ML)      | 1,042                           | 33,235   | -                               | 757  | 33,520   |

1 Carryover as of the start of the season (1 July 2023)

2 Net trade Vol = trade in - trade out. Negative volume indicates trade out.

3 The volume of water write-off was from the spillable water account, which does not impact the water available.

4 The volume includes permanent water shares purchased by LMW since 30th September 2023.



## Current Demand and Forecast (Urban)

Table 7 below shows historical volumetric urban water usage from 2019/20 to 2022-23 and water use forecast up to 2026-27. The forecast is based on average climatic conditions in the last 3 years with an average annual demand of 528kL per residential connection expected. This assumption is consistent with the LMW 2022 Urban Water Strategy (UWS).

**Table 7 - Urban Water Volumetric Usage and Demand Forecast – ML pa 2019-20 – 2026-27**

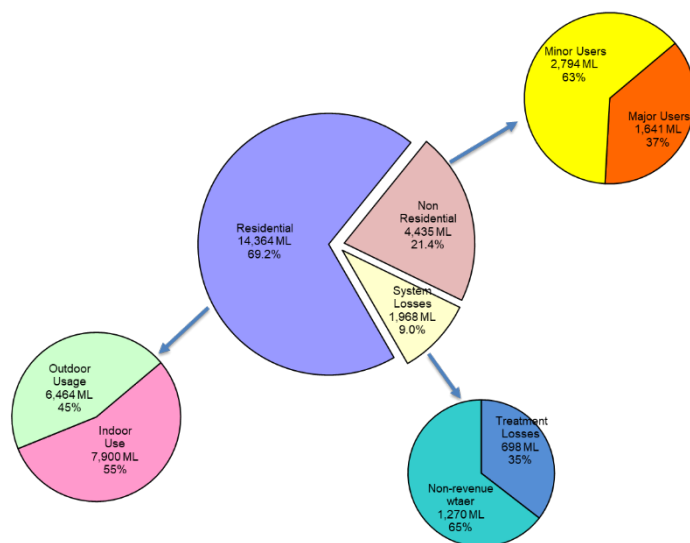
|                             | Actual Usage |         |         |         | Forecast |         |         |         |
|-----------------------------|--------------|---------|---------|---------|----------|---------|---------|---------|
|                             | 2019-20      | 2020-21 | 2021-22 | 2022-23 | 2023-24  | 2024-25 | 2025-26 | 2026-27 |
| Residential Demand (ML)     | 14,874       | 14,732  | 14,398  | 12,160  | 15,815   | 15,971  | 16,127  | 16,291  |
| Non-residential Demand (ML) | 4,569        | 4,396   | 4,396   | 3,987   | 4,800    | 4,835   | 4,869   | 4,905   |
| Total potable water demand  | 19,443       | 19,128  | 18,758  | 16,147  | 20,614   | 20,807  | 20,996  | 21,196  |

Usage during 2020-21 shows a reduction of water consumption which could be attributed to Permanent Water Saving. However, with the continuance of permanent water saving rules, it would have achieved the trend of reduction in usage. There was a small reduction in water consumption from 2020-21 to 2021-22, which could be attributed to higher than average rainfall occurring during this period, particularly in November 2021 and January 2022. But during the last year the region experienced high rainfall and floods which reduced demand significantly. There was a decrease of 14% compared to last year while residential demand has decreased by 16%.

During 19-20, Stage 1 water restrictions were in effect from November 2019 to June 2020. Over this time, temperatures exceeded 35°C for almost half of the restriction period. Furthermore, temperatures were above 40°C for seven days in December 2019 and 4 days in January 2020. Rainfall in these months was well below the mean. Extreme hot weather conditions with close to zero rainfall over the 19-20 summer period contributed to a higher water usage compared to what was anticipated. The forward climatic outlook by BoM (Bureau of Meteorology) also predicts warmer climatic conditions with rainfall below the mean rainfall levels in the coming summer. Therefore, the demand for water use can go up and the community should comply to the PWSR to manage the demands.

It is difficult to accurately predict water savings achieved through restrictions during a single season and across a large population base such as Mildura. Further, demand due to the growth in population and activities in the region will result in higher demand in the future. The level of water usage depends on several factors such as temperature, rainfall, and customer behaviour. Water restrictions offer public guidelines on water use but do not necessarily have a direct impact, particularly when the restriction is at a low level such as Stage 1. The typical urban water demand distribution between customer types is described in Figure 3, based on average annual raw water consumption of 20,766 ML (annual average from 18-19 to 22-23).

**Figure 3 - Typical raw water demand distribution assuming annual water demand of 20,766ML**



### Current Demand and Forecast (Rural)

Table 8 shows the volume of water supplied to irrigation districts. As can be seen from the historical water usage data, rural demand is relatively constant. Moreover, no new irrigation district off-take points were agreed to or used in the last 3 years. However, spare capacity created due to the Sunraysia Modernisation Project is expected to be utilised by the rural customers in Red Cliffs and Merbein irrigation districts in the coming years, which might increase the irrigation demand.

On the other hand, there would be an increase in demand due to a drier climatic outlook with less rainfall below mean levels for the rest of the 2023-24 season than last season. The estimated delivery to the Primary Entitlement Holders is 100,000-120,000 ML) which is approximately 0%-20% more than what delivered in 2022-23

**Table 8 - Volume of water supplied to rural customers**

| Year    | Volume of water supplied to primary entitlement holders (ML) | Volume of water supplied to VEHW(ML) |
|---------|--|--------------------------------------|
| 2022-23 | 100,706  | -                                    |
| 2021-22 | 116,564  | 118                                  |
| 2020-21 | 117,809  | 922                                  |
| 2019-20 | 117,511  | 1,608                                |
| 2018-19 | 129,348  | 1,561                                |

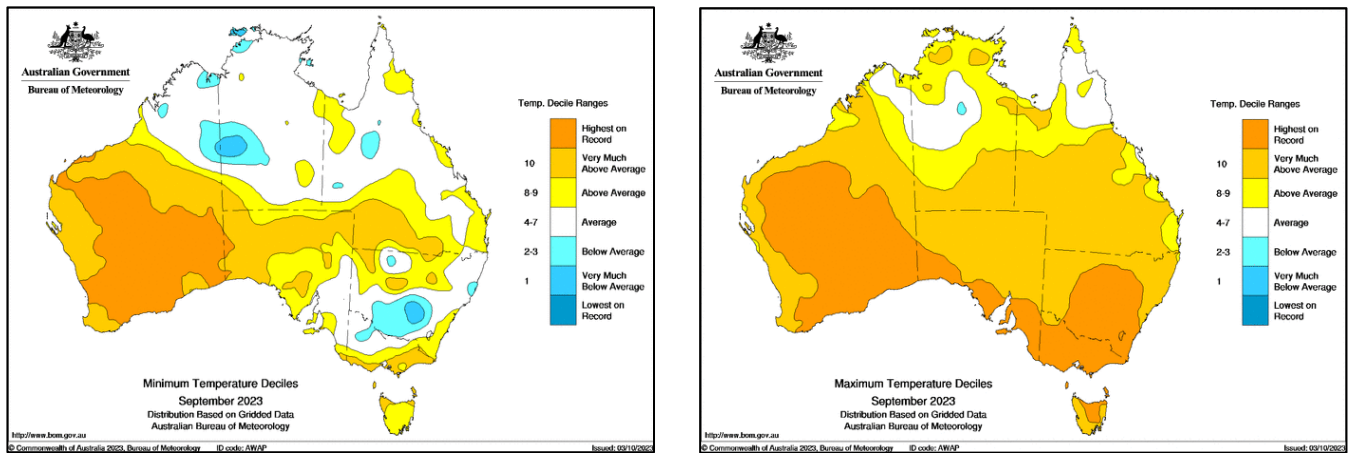
# CLIMATE CONDITIONS AND OUTLOOK

## Recent conditions

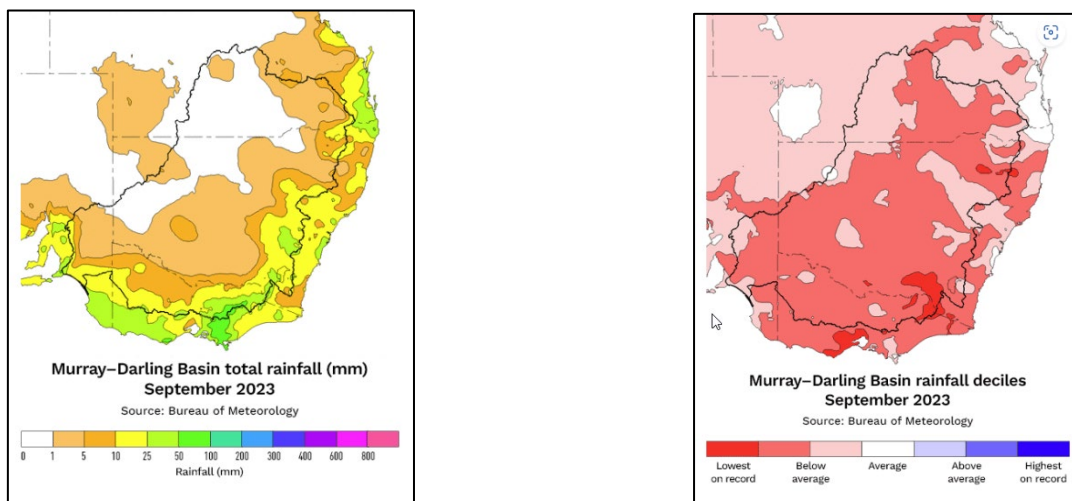
Temperatures reported by BoM this September has been the second warmest on record in September for Victoria. The mean temperature for Victoria is above 2.20°C than the average mean temperature while the mean maximum temperature was above 3.77°C than the average maximum which is the highest since 1900 and the mean minimum temperature was above 0.63°C than the average minimum. Across the Murray-Darling Basin, minimum temperature deciles varied from below average to average (Figure 4), while maximum temperature deciles varied from very much above average to the highest on record (Figure 5).

Rainfall during this September was in the lowest 10% of historical observations for September (Compared to the data from 1900) in Victoria and New South Wales. It was the driest September in Victoria with rainfall 67.1% below average rainfall for Victoria. Southern Basin showed below to very much below average rainfall over September. Most areas that were experiencing deficiencies have already expanded, becoming more severe (Figures 6 & 7).

**Figures 4 & 5 - Murray-Darling Basin minimum temperature deciles for September 2023 (left) and maximum temperature deciles (right) for September 2023. Source: Bureau of Meteorology**



**Figures 6 & 7 - Murray-Darling Basin rainfall for September 2023 (left) and September 2023 rainfall deciles. Source: Bureau of Meteorology**



Inflows into the river Murray system (excluding water for the Environment, Inter-valley trade (IVT), and Darling and Snowy scheme contributions) in September were around 706 GL which is well below the long-term average of 1547 GL for September. Storages at the end of September Murray Darling Basin storages were at 93%.

Even though the whole Murray River system has not been regulated since July 2021, some sections in the system were regulated to secure water. Seasonal determinations for High-reliability water shares for the Murray system were declared as 100% from 15th August 2023 and seasonal determinations in the Goulburn system were declared as 100% from 1st July 2023.

**Figure 8 - Murray system monthly inflows (excluding Snowy, Darling, IVT and environment inflows).**

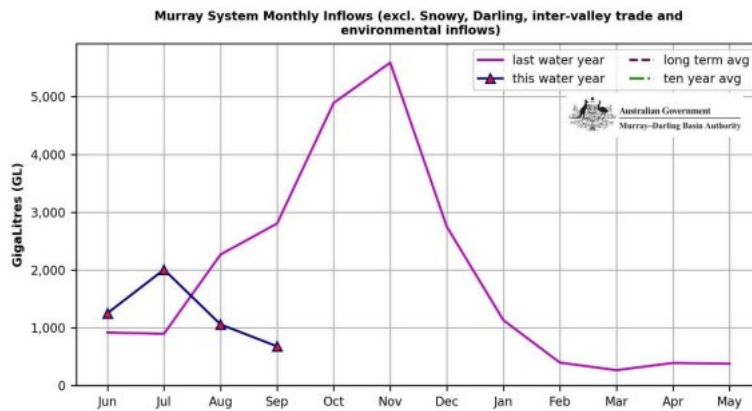


Table 9 compares the equivalent seasonal determination in the Murray system for 15 October between 22-23 and 23-24. This secures a positive outlook for this water year regarding water resource position.

**Table 9 - Seasonal determination in the Murray system – 23-24 and 22-23**

| Date of Announcement | High / Low Reliability Water Share |             |
|----------------------|------------------------------------|-------------|
|                      | 2023-24                            | 2022-23     |
| 15 October 2023      | 100%, 0%                           | 100% / 100% |

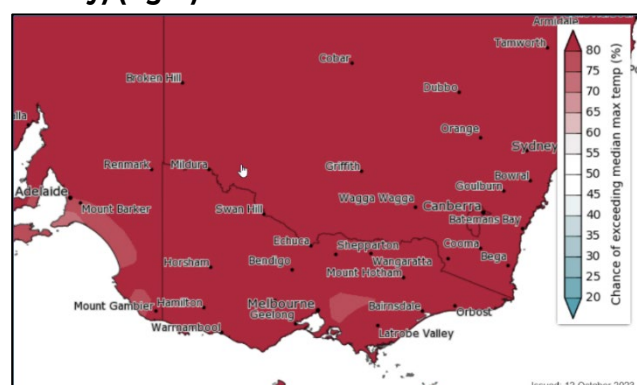
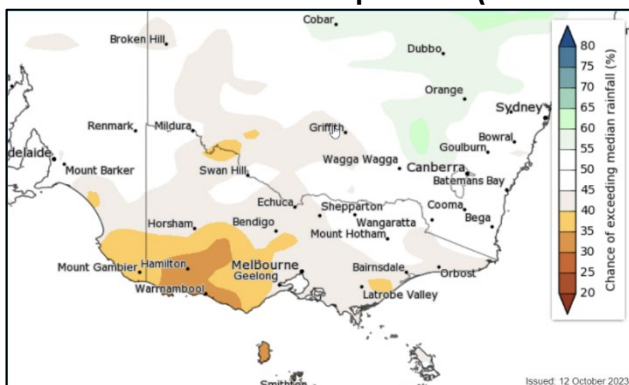
## Climate Outlook

The climate trends are summarised in the following section based on the BoM's latest climate outlook and seasonal stream flow forecast report.

Rainfall for December to January in Australia will be below the median (60% to 80% chance). However, BoM predicts Riverina Districts of New South Wales where most of them are catchments of the Murray system will have above median rainfall (60% to 80% chance). From December to February, above median rainfall is likely (greater than 40% chance) for most of Victoria (Refer to Figure 9).

On the other hand, maximum temperatures are at least twice as likely to be unusually warm for all of Australia from December to February. Southwestern Victoria region will expect above median minimum temperatures with a 60% to 80% chance while other areas of Victoria will expect above median minimum temperatures greater than 80%. (Refer to Figure 10).

**Figure 9 & 10 - Chance of exceeding the median rainfall (December to February) (left) and chance of exceeding the median maximum temperature (December to February) (right).**

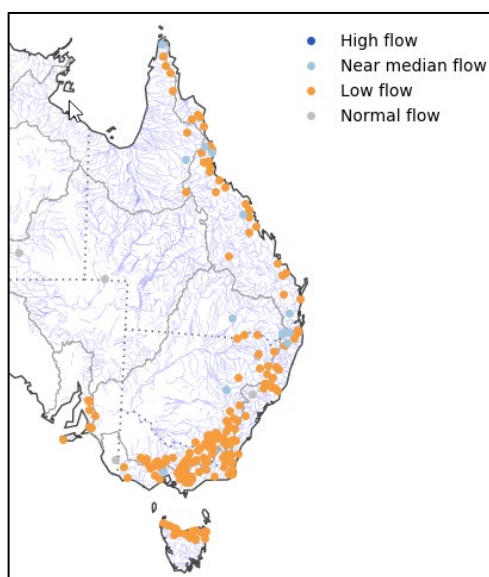




BoM forecasts that the El-Nino will be underway. This will enable further warming to the Central to Eastern Pacific areas of Australia during the Summer and will reduce the rainfall in Spring as well. Further, due to the prevailing Indian Ocean Dipole (IOD) condition spring rainfall is predicted to become reduced and this condition will last till the end of Spring. However, with both drivers, BoM is predicting a stronger drying effect all over Australia.

## Water storages and Streamflow

- Current active water storage across the Murray–Darling Basin is at 93% capacity. The active storage volume remains around maximum with Dartmouth Dam, Hume Dam, and Lake Victoria all effectively full. But Southern basin storages were reduced by 1% compared to storages at the end of August.
- Flows were fully regulated from Hume Dam to the South Australian Border for a short period of time during late September. During August it was within the stretch of Hume Dam to Barmah.
- With the lower than forecast rainfall in the Upper Murray catchment, releases from Hume dam continued to be reduced.
- BoM forecasts low streamflow for almost all areas from October to December (Refer to Figure 11).
- Flows were near median at 25% of locations across Southeast Australia.



**Figure 11 – Streamflow forecast from Oct to Dec 2023**

## The current planning process for the River Murray Operations 2023-24

- Prevailed cold conditions and low demands in the Spring continued to keep the storage levels in the basin at static levels.
- Dartmouth and Hume Dams are operating with capacities of 99% and 97% which has been static for a longer period.
- Air Space Management releases were operating considering the forecasted rainfalls in both dams until mid-October. As per the Annual Operating Outlook of MDBA (Murray Darling Basin Authority) flows at Euston Weir will be affected with continued Air Space management releases from Hume Dam and Unregulated tributary inflows.
- Flows from Menindee lakes are called to the Murray system in order to cater the demand in downstream of river. The availability of the option to release water from Menindee Lakes reduces the system shortfall risk significantly.
- The River Murray system is regulated at different sections considering the flows and the rainfall events after the floods lasted until December 2022. During the floods, the entire system was unregulated. However, the entire system has not been regulated since July 2021.
- As per the MDBA Annual Operating Outlook, the risk of delivery shortfall for the 2023-24 period is low in the section of Euston weir to Lake Victoria. However, during an indication of delivery shortfall due to high demand and drier periods flows at Euston will be regulated to 5000ML/day or above in order to minimise the risk of a delivery shortfall.



LMW will be monitoring the climatic conditions and the water resource levels of the Murray system. If extreme climatic changes are observed, we will implement our drought and emergency response plans. We will take steps to create awareness about the changes and actions amongst our customers and community through regular communications via our website and social media pages (Facebook, LinkedIn).

## Long-term impact of climate change in Victoria

Victoria's climate has shown a warming and drying trend over recent decades, and this trend is expected to continue with climate change and drivers like El Nino and Indian Ocean Dipole which occur from time to time. In comparison to historical conditions, we are already experiencing:

- Higher temperatures and more numbers of hot days
- Higher fire danger days
- Reductions in rainfall during the cooler months
- In some locations, increases in rainfall during the warmer months and during extreme, short-duration rainfall events
- In many catchments, a shift in the streamflow response to rainfall is being observed, where fewer stream flows are generated for the same amount of rainfall.

Over the longer term, we can expect:

- The rainfall reductions in winter persist
- Increases in summer rainfall
- Increases in potential evapotranspiration due to the higher temperature and lower relative humidity
- Reductions in streamflow because of less rainfall and higher potential evapotranspiration; and
- The streamflow response to rainfall no longer remains the same and declines.

Because of the projected decline in cool season rainfall, higher warmer periods, and potential evapotranspiration future runoff in Victoria will be lowered. The intensity of shorter duration rainfall occurrences in some places increased. But that will not offset the water availability impact of overall declines in rainfall. (Source: Victoria's water in a changing climate). This outlook points to the need for strategic planning to manage the long-term impacts of climate change and reduced streamflow on water availability.

# FORWARD OUTLOOK 2023-24

Allocation for HWRS on the Murray system was increased to 100% on 15th August 2023 from 80% (as of 1 July 2023) with increase of determinations by 8% on 15th July, 2% on 1st August, and 10% on 15th August. The HWRS on the Goulburn system is 100% starting from 1 July 2023. The BoM forecasts drier than average conditions for the next three months.

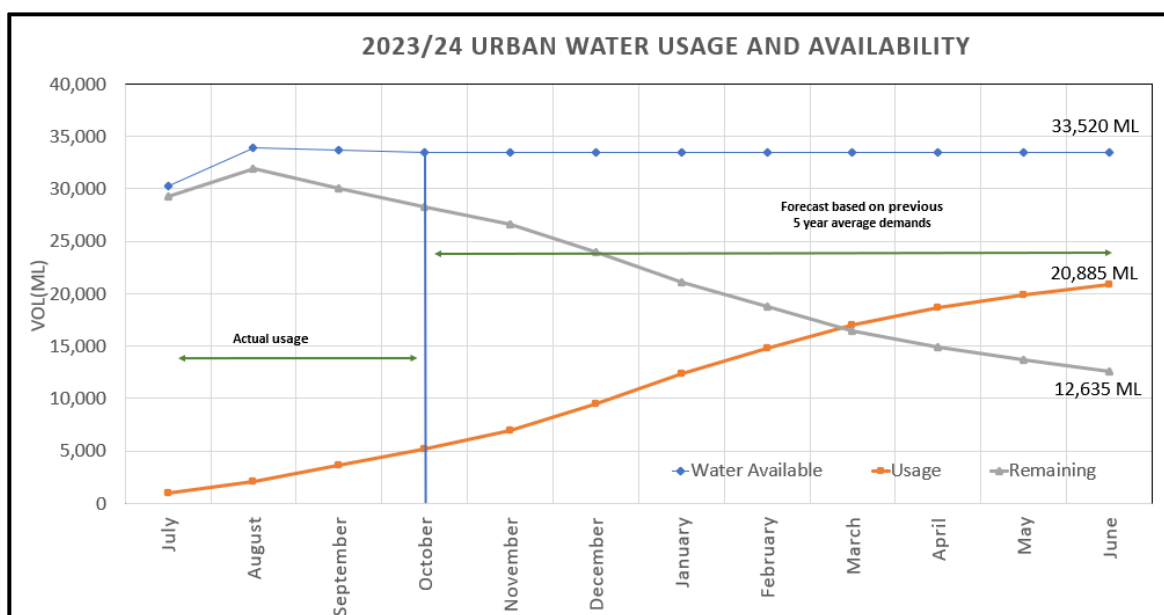
Factors to consider in this forward outlook:

- Typical annual potable water usage is generally between 19,000 and 21,000 ML
- The volume of water supplied to urban customers to the end of September 2023 was approximately 3617 ML (Source: LMW operational data)
- A deduction of 757 ML (72 percent of spillable account volume) occurred from the spillable water accounts in current year up to 16th October. With the reduction of rainfall, the releases from the dams are getting lower and will keep the capacity levels at maximum levels only letting airspace releases considering rainfall events. This may impact the ability of 100% allocation to be securely stored for use or trade.
- A positive seasonal outlook for 2023-24 suggests LMW will have enough allocation to meet its Urban customers' demand with a surplus volume at the end of the season.
- Similarly, rural customers are likely to have enough allocation to meet their irrigation and stock and domestic demand. Despite the rare likelihood of restrictions, extreme weather events or emergencies such as bushfires in our catchments, major loss of power supply or water contamination might require implementation of restrictions to manage water demands.

Figure 12 summarises the urban water availability based on the supply-demand balance. The volume of available water is plotted in a cumulative monthly pattern considering seasonal allocation and trade (No trade volume assumed from November 2023 to June 2024).

The demand is plotted as a cumulative monthly volume (raw water) based on the actual usage till September 2023 and forecast for October 2023 - June 2024 based on usage pattern observed in the last five years. The data indicates there is no likely shortfall for the 2023-24 season.

**Figure 12 - Forecast Water Supply Demand (ML) for 2023-24 season**





# KEY ACHIEVEMENTS

|  |   |
|--|---|
| <p><b>Service Delivery</b></p>                   | <p>During the 22/23 year, our region witnessed the highest River Murray level in 50 years, resulting in flooding. Our personnel and partner organisations have worked tirelessly to provide the region with water, sewer, and drainage services. During the flooding, many employees were embedded in state emergency management teams to guarantee that services could be delivered, and public health was safeguarded. This event shows our commitment to offering essential services that are required for our region every day of the year.</p>   |
| <p><b>Customer Engagement and Compliance</b></p> | <p>Our customer services survey of our customer base continues to show we have a good relationship with our customers, and we continue to seek to improve this year on year.</p> <p>Several advisory notices and formal warnings were issued to rural customers in relation to S.33E (Unauthorised Take of Water) and S.289 (Wrongful Take of Water) of the Water Act 1989. We acknowledge the positive behaviour change made by most of our rural customers with an approximately 90% reduction in water theft. This is due to an increased focus and more efficient implementation of our compliance and enforcement processes and the consistent reinforcement of the Minister's Zero Tolerance of Water Theft messaging.</p>  |
| <p><b>Operational</b></p>                        | <p>The 2022/23 floods posed a number of challenges in water treatment due to poor river water quality. However, our Operations and Water quality personnel were well informed and prepared to take necessary actions to optimise the treatment processes. The Operational and logistics planning team regularly monitored levels of chemicals and stocking sufficient quantities required for treatment.</p>  |
| <p><b>Infrastructure</b></p>                     | <p>LMW ensured our assets and infrastructure meets current and future needs by optimising our infrastructure through improved life cycle management and delivering our Water Plan capital expenditure (Capex).</p> <ul style="list-style-type: none"> <li>- UV treatment unit installations were completed at Kerang, Robinvale and Mildura WTPs (Water Treatment Plants) (Water Treatment Plant)</li> <li>- UV treatment unit installations at Swan Hill and Mildura treatment plants were delayed due to floods but now are being finalised</li> <li>- Upgrades to SCADA (Supervisory Control and Data Acquisition) system at Mildura WTP during 2022/23 are in progress and will ensure reliability of the operations at WTPs.</li> <li>- Main pipeline from Piangil WTP to Piangil town was replaced in the last year.</li> <li>- Fluoride dosing system upgrades were done in Red Cliffs, Kerang and Swan Hill treatment plants.</li> <li>- At Kerang, we are undertaking the refurbishment of filter media in WTP.</li> <li>- A brand-new pump station has been built and is in operation for our rural customers in Millewa.</li> </ul> <p>The \$37M Sunraysia Water Efficiency Project (SWEP) commenced in early 2023 with support from the Australian Government. These works will increase the efficiency of water delivery for LMW customers, remove redundant assets, minimise channel leakage and seepage, and more accurately measure water usage. The project will save up to 2.5 GL in water savings that can be shared between the environment, Traditional Owners and improving urban water security in the Sunraysia region.</p> |

# HIGH LEVEL ACTIONS

## Actions

Various aspects of 2022 UWS projected to 2071 are being implemented. Some of the completed and on-going actions are discussed below.

1. Purchase of water share to ensure the urban water demand and water security is maintained. LMW will assess the water resource position periodically and purchase adequate additional shares. 191ML of additional water shares were purchased during the 2022/23 period. This will be an additional entitlement to supplement dry years.
2. LMW is continuing with the following activities to reduce demand for potable water
  - Permanent Water Savings Rules (PWSR) campaigns.
  - Deliver Schools and Community Education Programs.
  - Deliver Community Housing Retrofit and rebate programs.
3. Improved use of existing supplies  
LMW manages carryover of water to maximise system reliability. Due to the risk of carryover being written off with spillable accounts LMW traded out 10,925ML in FY 2022/23. A similar approach will be taken this season depending on the climate outlook and resource position.
4. Alternative water sources  
LMW will continue to explore opportunities for alternative water supplies and alternative sources to supplement potable water. A feasibility study is ongoing to investigate the provision of fit-for-purpose recycled water to public open spaces in Mildura for irrigation to offset potable water use for this kind of application.
5. BGA blooms also impact rural customers particularly the stock and domestic customers. Given the potential for the presence of algal toxins in the water during the BGA bloom periods, the stock and domestic customers are advised not to use the water as a precautionary measure to minimise the risk. With the drier climatic outlook, the likelihood of extreme events like bushfires and droughts is possible. We will follow our emergency and response plans as required.



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