

# Water Outlook

## 2020-2021



LOWER MURRAY  
WATER

# WATER OUTLOOK 2020-21 AT A GLANCE



## SEASONAL ALLOCATION 81%

AS AT 16<sup>TH</sup> NOVEMBER 2020

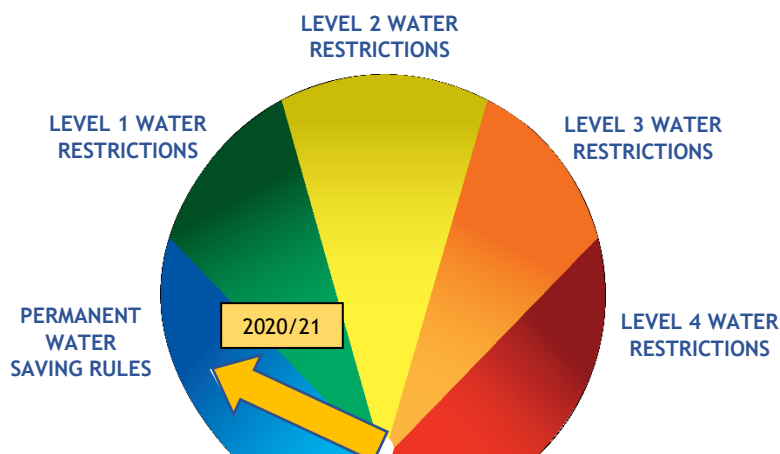
### DARTMOUTH DAM STORAGE

- 61% capacity current
- 55% 2019/20

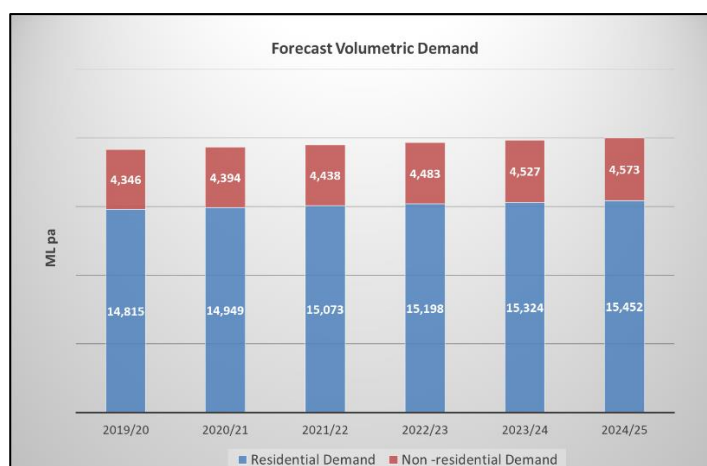
### HUME DAM STORAGE

- 79% capacity current
- 36% 2019/20

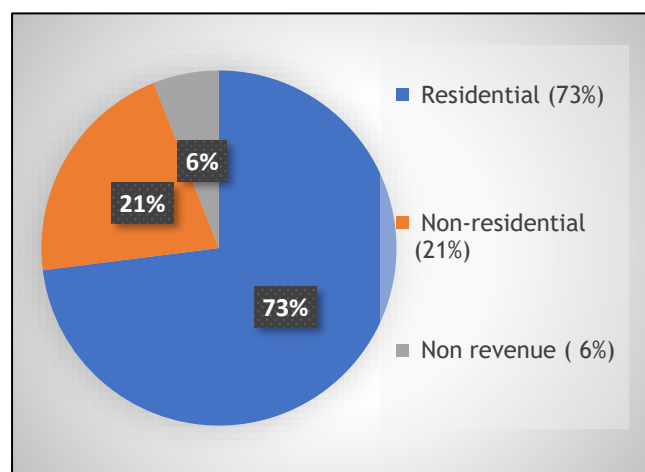
## LIKELIHOOD OF WATER RESTRICTIONS



## DEMAND IS SET TO INCREASE STEADILY OVER TIME



## USAGE IS MOSTLY RESIDENTIAL



Strategy	LMW actions to balance Supply and Demand
Heightened awareness	<ul style="list-style-type: none"> <li>Community interaction - Public information and water-wise events</li> </ul>
Reduce demand for potable water	<ul style="list-style-type: none"> <li>"Target Your Water Use" campaign</li> <li>Pursue integrated water management strategies</li> <li>Deliver Schools Education Program</li> <li>Deliver the Community Housing Retrofit Program</li> </ul>
Improved use of existing supplies	<ul style="list-style-type: none"> <li>Invest in metering and analytics to better understand water usage</li> <li>Manage carryover of water to maximise system reliability</li> </ul>
Alternative water sources	<ul style="list-style-type: none"> <li>Continue to identify opportunities and deliver projects such as 'Sunraysia Regional Water Balance Model'</li> </ul>
Water Efficiency	<ul style="list-style-type: none"> <li>Collaborate with the Department of Environment, Land, Water and Planning (DELWP) and other water corporations on the Victorian Water Efficiency Strategy (in progress)</li> </ul>

# Executive Summary

This Annual Water Outlook for 2020/21 has been prepared by Lower Murray Water (LMW) to support the needs of its customers' and the Department of Environment, Land, Water and Planning (DELWP). The report provides an eight to twelve-month outlook for security in LMW's water supply systems, which are almost entirely delivered from the Murray Regulated System. LMW's operational area extends from Kerang to the South Australian Border, spanning the municipalities of Mildura, Swan Hill and Gannawarra.

## LMW Water Supply System:

System	Towns supplied	Primary source of supply	Permanent water savings	Comments
<b>Murray Regulated system</b>	<ul style="list-style-type: none"> <li>•Mildura System, including Merbein</li> <li>•Kerang System</li> <li>•Red Cliffs System</li> <li>•Piangil System</li> <li>•Robinvale System</li> <li>•Koondrook System</li> <li>•Murrabit System</li> <li>•Swan Hill System, including Nyah/Nyah West, Lake Boga and Woorinen</li> </ul>	<p>River Murray (97%)</p> <p>Loddon River, GMW Channels (3%)</p>	<p>Stage 1 water restrictions were lifted from June 6, 2020 and the permanent water savings rule is now in place.</p>	<p>Due to higher than expected rainfall and inflows into storages, there is now a more positive outlook for the 2020/21 season than 2019/20. LMW has seen a generally positive response from our customers to Stage 1 water restrictions with examples of efficient water use by the public despite one of the hottest summers on record over 2019/20.</p> <p>LMW returned to the Permanent Water Savings Rule on June 6, 2020. The rules will remain effective for the 2020/21 season.</p> <p>Strong regional growth continues as the demand for customer services and reliable water and waste wastewater infrastructure underpin the 2020/21 outlook.</p>

# Table of Contents

- Introduction
- Areas of Operation & Supply
- Water Performance Reporting
- Committing to Environment and Region
- Climate conditions and outlook
- Water supply systems
- Current Demand and Forecast
- Forward outlook 2020/21
- Water Restrictions - Actions & Learnings

# Introduction

Lower Murray Water is involved in several initiatives to promote sustainable water use and support catchment and river management practices to improve water quality. Ours 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 74,000 urban customers, 3,200 irrigation, stock and domestic water customers and 1,300 private diverters. We are a resilient essential services provider maintaining reliable delivery services for safe drinking water and wastewater treatment, as well as irrigation water to support our urban customers and over \$600 million of agricultural production annually from our irrigation districts.

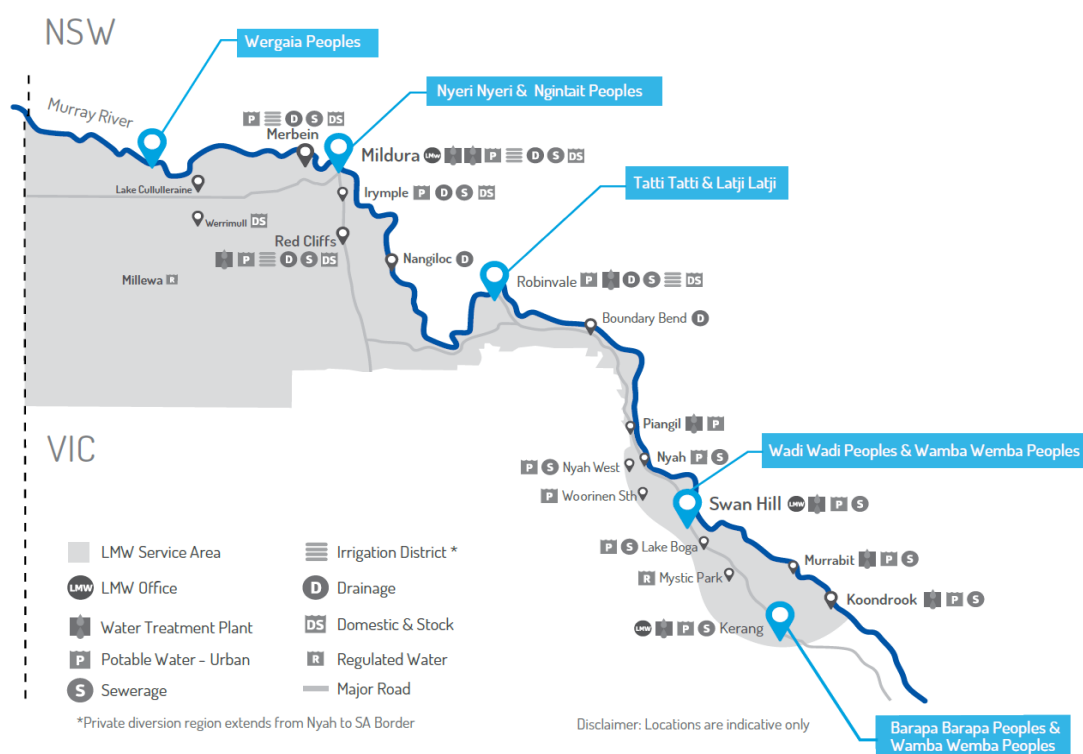
## LMW's water systems:

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

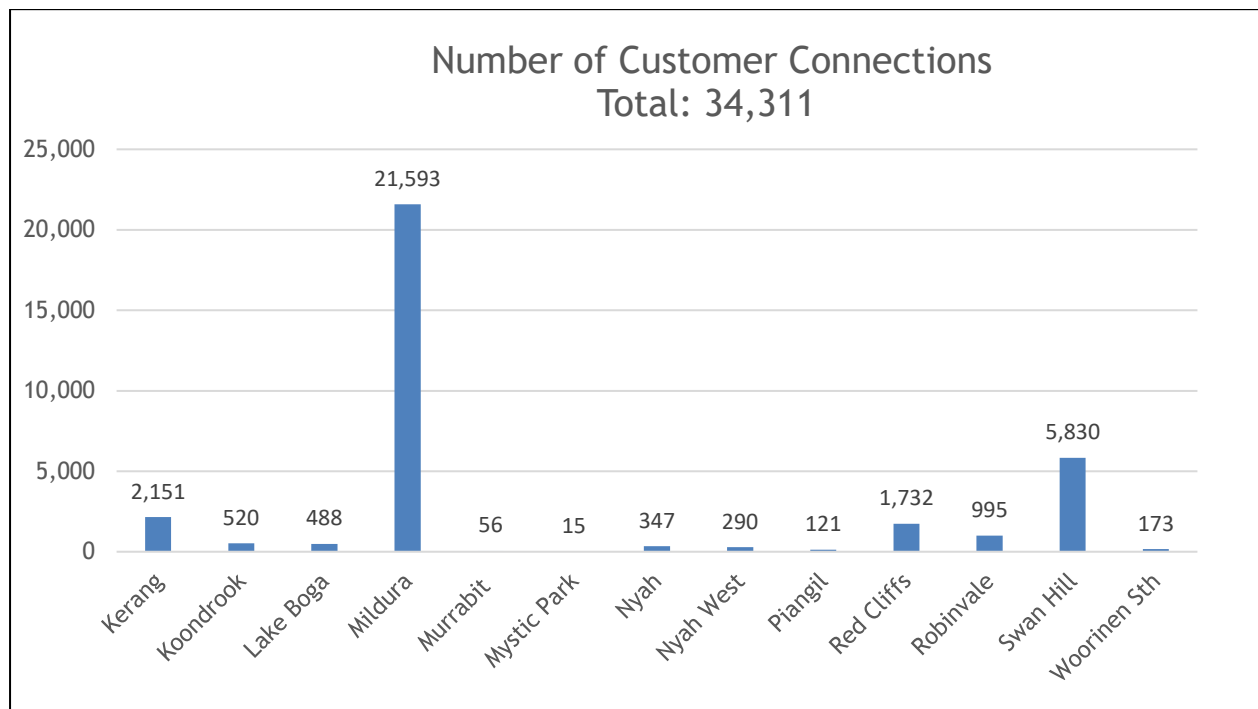
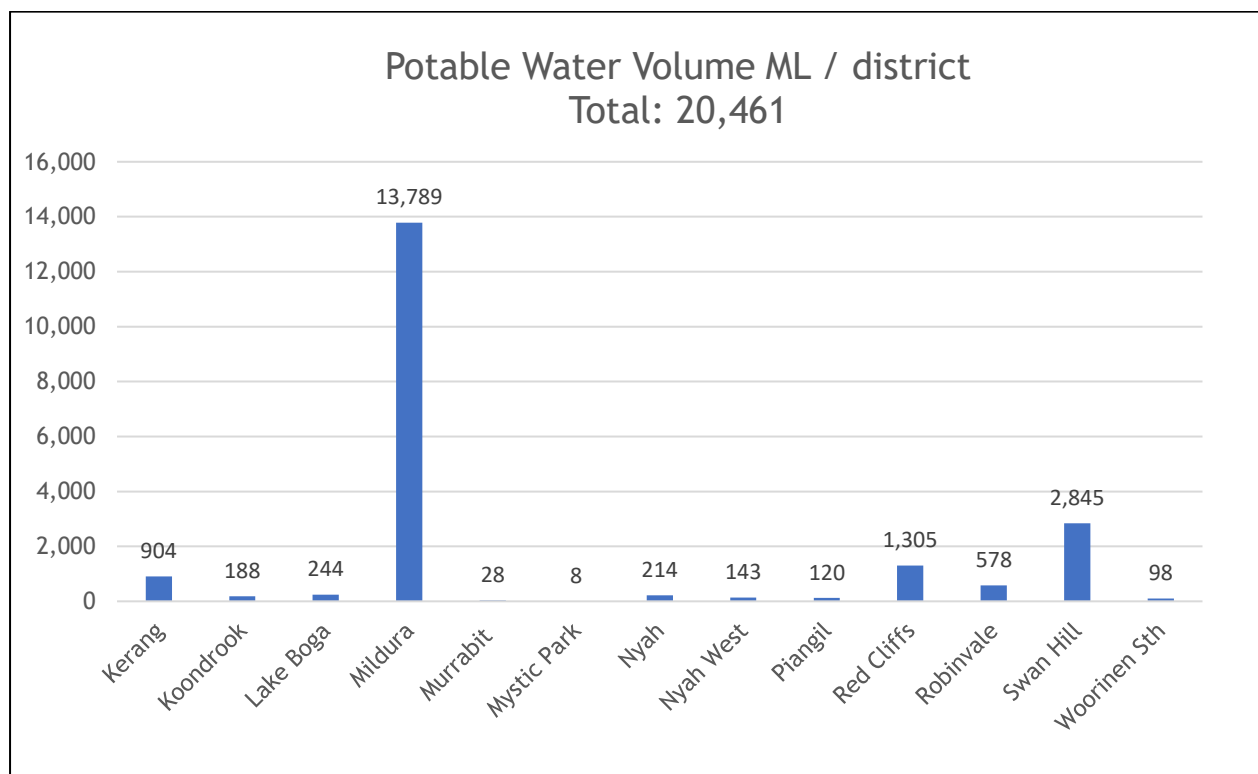
- Potable drinking water to the urban and regional centres
- Urban wastewater treatment services
- Irrigation water and irrigation drainage services
- Untreated domestic and stock water supply to rural areas
- Reuse water

# Areas of Operation & Supply

## 2019/20 network distribution





**Figure 1. Total Number of Customer Connections across LMW districts 2019/20****Figure 2. Total potable water volume supplied across LMW districts 2019/20**

The total urban water supplied across districts was 20,461 ML (source-LMW Annual Report) across 34,311 customer connections for 2019/20, per Figure 2.

LMW manages a variety of short-and long-term risks to its urban supply. There is a perceived shift in the high-level risk areas for this year compared to 19/20 reflecting the more favourable climatic conditions at the start of 20/21 and higher supply storage inflows.

**Table 1. Risks (perceived) to the urban supply over the next 12 months and comparison with the previous year, 1 highest, 4 lowest.**

Risk	Rank (19/20)	Rank (20/21)
Infrastructure resilience	1	1
Water Availability	2	3
Urban growth & Supply demand	3	4
Water quality- Blue Green Algae (BGA) & Plumatella	4	2

These risks represent a ‘point in time’ and highlight some immediate areas for attention within LMW’s operational planning and longer-term strategy.

BGA represents one of our largest summer threats from the Murray supply and requires significant operational intervention to remove and produce potable supply. During 19/20 the problem increased with extended periods of Red Alert where contact with water was not recommended and chemical treatment was required to eradicate the blooms.

## Water Performance Reporting

Table 2 summarises the key customer service results achieved for LMW in 19/20 (amongst various performance criteria) and comparison with equivalent 18/19 data<sup>1</sup>

**Table 2. Urban Customer Responsiveness Performance Indicators**

Key Performance Indicator	2018/19 Result	2019/20 Result	2019/20 Target	Variance to Prior Year
<b>Unplanned Water Supply Interruptions</b> <i>No. of customers receiving 5 unplanned interruptions in the year/ total number of water (domestic and non-domestic) customers x100</i>	22%	0%	0%	100% (improvement)
<b>Interruption Time</b> <i>The average duration of unplanned water supply interruptions (minutes)</i>	62.04	66.65	60.00	7.40%
<b>Restoration of Unplanned Water Supply</b> <i>Unplanned water supply interruptions restored within 5 hours/ total unplanned water supply interruptions x100</i>	100%	95.92	99.40%	-4.10%

<sup>1</sup> LMW Annual Report 2019/20

Key Performance Indicator	2018/19 Result	2019/20 Result	2019/20 Target	Variance to Prior Year
<b>Sewer Spills- Containment</b> <i>Sewer spills from reticulation and branch sewers contained within 5 hours/total sewer spills from reticulation and branch sewers</i>	100%	100%	97.0%	0.0%
<b>Sewer Spills- Interruptions</b> <i>No. of residential sewerage customers affected by sewerage interruptions restored within 5 hours</i>	100%	100%	97.0%	0.0%

#### Key points

1. **Unplanned water supply interruptions-** *Results have improved from the previous year 18/19. LMW's targeted urban water main replacement program over 18/19 and recent years likely contributed to this improvement in performance.*
2. **Water supply interruption time-** *Performance has been slightly below target compared to previous year 18/19. LMW experienced a significant decrease in total number of water supply interruptions compared to last year.*

Table 3. Urban Customer Responsiveness Performance Indicators

Key Performance Indicator	2018/19 Result	2019/20 Result	2019/20 Target	Variance / Year Prior
<b>Water Quality Complaints</b> <i>No. complaints per 1000 customers</i>	1.674	1.020	1.380	-39.1%

Table 4. Urban Residential Customer Water Bill Indicators

Key Performance Indicator	2018/19 Result	2019/20 Result
<b>Customer Water Bill</b> <i>Total urban residential billed based on average consumption (518kl for 18/19 - 19/20)</i>	\$1005.62	\$1009.93

#### Key points

1. **Customer Responsiveness-** *The number of water quality complaints for urban customers decreased for 19/20 - a highly positive result.*
2. **Water Bill-** *Average urban residential bill for customers in 19/20 increased by 0.4% primarily due to increase in LMW annual price path and CPI.*



### Compliance Reporting<sup>2</sup>:

LMW issued 392 advisory letters and 3 formal warnings to Urban customers over 2019/20. Advisory notices were issued due to customers watering outside of the nominated hours during water restrictions. Formal Warnings were issued only to those customers found in breach of water restrictions on multiple occasions.

### Comparison with other water corporates in Victoria:

LMW is proud to report having been placed among the highest performing Victorian Water Corporations against several key performance indicators over 2018/19<sup>3</sup>. Urban KPI's contributing to this included:

- Household water use
  - LMW reported a 5% increase in water usage in line with the trend in increase in usage across regional Victoria
- Typical household bills- for the usage of 500 KL<sup>4</sup> (regional owner-occupiers)
  - Sixth lowest - in our category at \$1,006 for a typical annual bill.
- Typical household bills (tenants)
  - Seventh lowest - in our category at \$313 for a typical annual bill.
- Number of complaints to Energy and Water Ombudsman (Victoria) relative to sector share
  - Second lowest - While LMW recorded an increase in the complaint rates; it remained second lowest of all utilities per 100 customers.
- Average minutes with off-water supply in the event of an interruption
  - Fourth lowest - Average minutes off-supply for our customers 11.8 min
- Spills per 100 kilometres of sewer main
  - Third lowest - Spills per 100 kilometres of sewer main
- Spills to customer properties
  - Third lowest. LMW recorded the third-best result in the State
- Benchmarking call centre performance
  - There is a slight increase in performance (based on three pillars: Ease, Sentiment and Success) compared to last year for LMW. The overall performance score for LMW was 62, which is higher than the median score of 55 across the Victorian Regional Water Sector.
- Water supply restrictions for non-payment of bills
  - LMW recorded the second lowest water supply restrictions on customers for bills' non-payment, representing a 50 percent decrease in the

---

<sup>2</sup> LMW Annual Report 2019/20

<sup>3</sup> ESC Water Performance Report 2018/19 (as 18/19 is the latest report, performance could not be compared for 19/20)

<sup>4</sup> Based on the average annual water use for LMW - ESC Water Performance Report 2018/19

previous year. LMW more than doubled customers' rate on instalment plans, returning to its earlier levels, following a sharp drop in 2017/18.

## Committing to Environment and Region

LMW recognises that changes in climatic conditions pose one of our biggest threats. We are working across several areas to build resilience and reduce the risk to the environment through operations and our urban supply.

### Emission Pledge:

In 2018 LMW pledged to the Victorian Government to reduce emissions from its operations to 24,708 tCO<sub>2</sub> by July 1st, 2025, reducing 39% from the baseline of 40,243 tCO<sub>2</sub> (2016/17). LMW's total carbon footprint in 2019/20 increased to 46,772 tCO<sub>2</sub> against the 2025 target of 24,708 tCO<sub>2</sub>. This rise was mainly due to our scope 2 emissions from increased pumping demand in the irrigation districts which made up 67% of LMW's total emissions.

To meet LMW's pledge a reduction of 3,677 tCO<sub>2</sub> per annum (from 2020/21) is required. Achieving this target will involve a creative mix of operational efficiencies, modified customer behaviours and utilising renewable energy either through direct capital investment in solar generation or other commercial arrangements, identified as savings initiatives (G1-G4) below in LMW's Demand Management Plan.

G1. Network pressure optimisation, including dynamic district pressure control that reduces wasted energy (pressure head) through the irrigation networks with no anticipated service impact. Robinvale high-pressure pump station is the initial target of this work. Other initiatives within the G1 tasks focus on the high energy irrigation pump stations that have recently seen changes to the control philosophy at Robinvale and Merbein facilities which smooth pressure and flow, resulting in more efficient power usage.

G2. Flow rate management (modified pumping regimes) which optimise (smooth) the power-flow relationships for each pump reducing peaks and lows in the pumping profile, with no service impact.

G3. Time of use tariffs and additional measures to regulate the watering duration and reduce unscheduled water use. This may include measures (e.g. incentives) for growers to smooth demand and work toward ordered flow-only, incorporating customer education and compliance measures.

G4. Introduction of additional renewable energy potentially including a mix of behind and front of meter solar and remote renewable offtakes via commercial arrangements.

Energy reduction initiatives working for LMW currently include our 1,200kW solar power installations across 16 sites. This project was completed successfully in 2019 and will deliver 1,603 tCO<sub>2</sub> (~7%) toward the pledge. Solar sites are consistently yielding 5-10% higher power output than forecast initially.

Relieving excessive pressure across the Robinvale irrigation network is our next target over summer 2020/21, aiming to reduce 'system head' and energy consumption without impacting

agreed service levels to customers. This change will contribute a further 1,800 tCO<sub>2</sub> (8.3%) savings toward the pledge.

### Climate Change:

Climate change will also have an increasing impact on water availability from the Murray River and remains a significant theme for environmental and regional water management. LMW recognises the importance of adapting to the potential effects of changing climate and has been committed to the following actions:

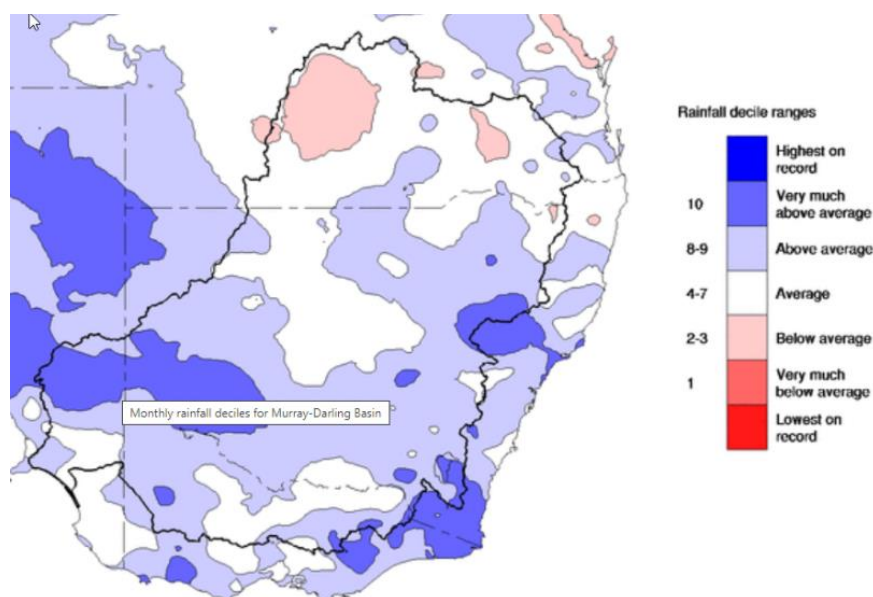
- Water savings with investigation and replacement of Non-Revenue Water supply sources 'leaky pipes'
- Energy audits on its major irrigation pump pumping sites which are responsible for >70% of power use
- Sunraysia Modernisation Project (2) modernisation of irrigation channels and replacement with underground pipe to reduce evapotranspiration
- Investigation of alternate water sources, specifically groundwater through association with a local grower consortium
- Preliminary investigations to implement a demand management strategy to optimise power usage and reduce carbon emissions at large pumping stations.

## Climate conditions & Outlook

Recent data - The national mean temperature for October was above average for Australia as a whole, at 1.05 °C warmer than average. For Victoria, the mean minimum temperature for the month was the third highest on record for October.

October rainfall was 35% above average for Australia as a whole. Figure 3 shows rainfall deciles for October, highlighting that while southern catchments are experiencing above-average rainfall, a significant portion of the northern Basin is receiving average to very much below average falls. In the Mildura region, mean rainfall over this period was 30 mm, whereas observed rainfall was 60 mm -Bureau of Meteorology (BOM).

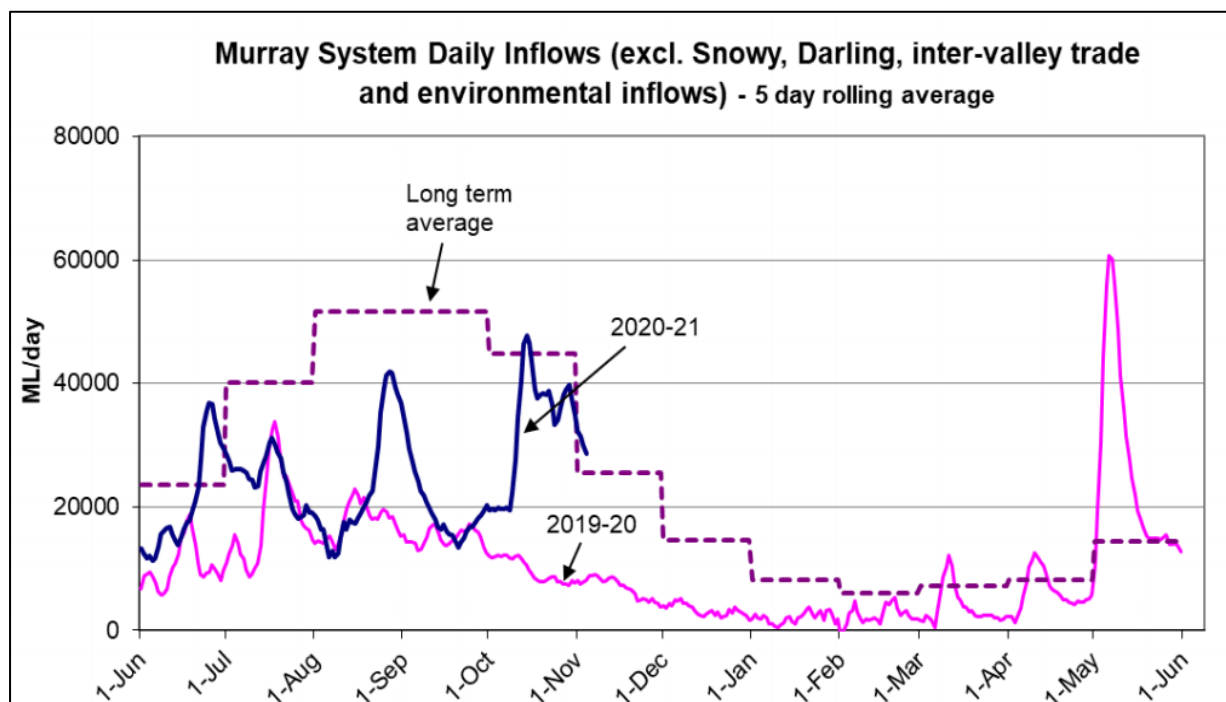
**Figure 3 - Murray-Darling Basin rainfall deciles for base period October 2020 (Source: BoM)**



The improved rainfall in October wetted up the catchment, which supported the October River Murray System inflows totalling around 1,050 GL (calculated excluding Water for the Environment, IVT, Darling and Snowy scheme contributions). This volume is above the 10-year October mean of 920 GL but below the long-term mean of 1,340 GL.

During 2020/21, flows into the River Murray's major storages were in steady decline across July - September, then followed an overall upward trend for October. The constant rainfall in late September and October contributed to a resource improvement (Figure 4).

**Figure 4 - Murray System Daily inflows (excl. Snowy, Darling, IVT and env. inflows)**



The October inflows resulted in water resource improvements and increased seasonal determinations, as advised by the Northern Victoria Resource Manager. Table 5 compares the equivalent seasonal determination in the Murray system for November between 19/20 and 20/21.

**Table 5. Seasonal determination in the Murray system-19/20 and 20/21**

Date of announcement	High-Reliability Water Share (20/21)	High-Reliability Water Share (19/20)
15/16-Nov	81%	48%
1/2-Nov	77%	42%

The Bureau of Meteorology (BOM) is forecasting conditions in summer are likely to be wetter than average. La Niña is predicted to be continued at least through February 2021. La Niña events typically bring above-average spring rainfall in eastern Australia. The outlook also suggests that temperatures are likely to be warmer than average over this period.

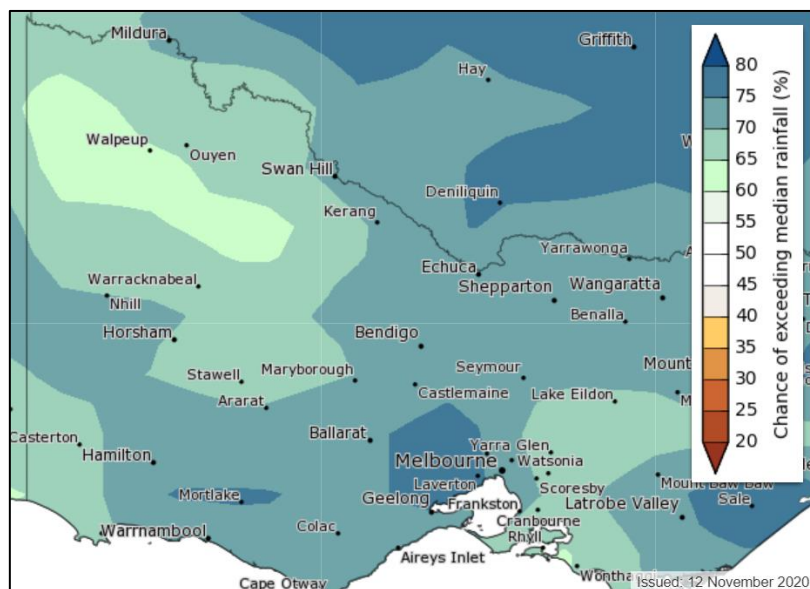
## Climate Outlook

Based on the latest climate outlook and seasonal streamflow forecast report from the BOM, December 2020 to February 2021 climate trends for Mallee/NSW South West are summarised in the following section.

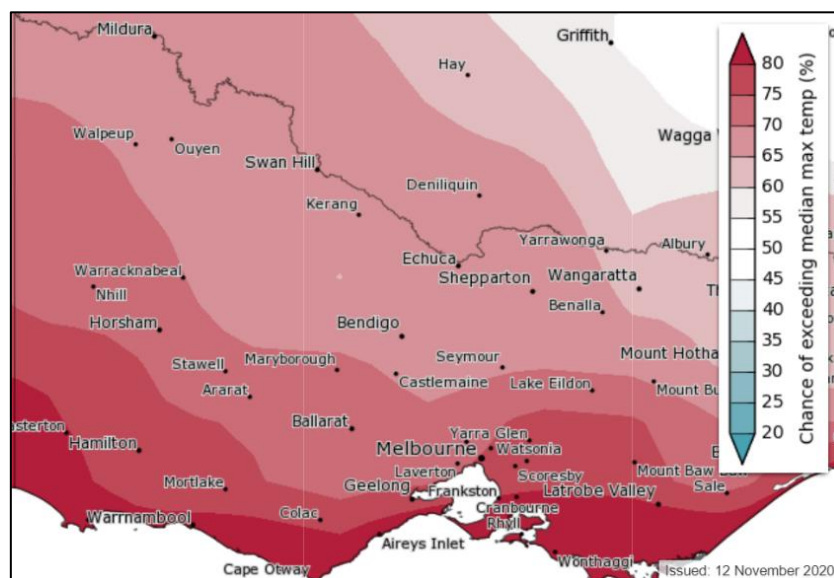
### Rainfall and temperature:

- December to February is likely to be wetter than average for nearly all of Australia (greater than 70% chance in most areas), including the Wimmera Mallee region.
- The average maximum temperature for December to February is likely to be higher than the long-term average for nearly all of Australia, including the Wimmera Mallee region.

**Figure 5. Chance of exceeding the median rainfall**



**Figure 6. Chance of exceeding the median temperature**

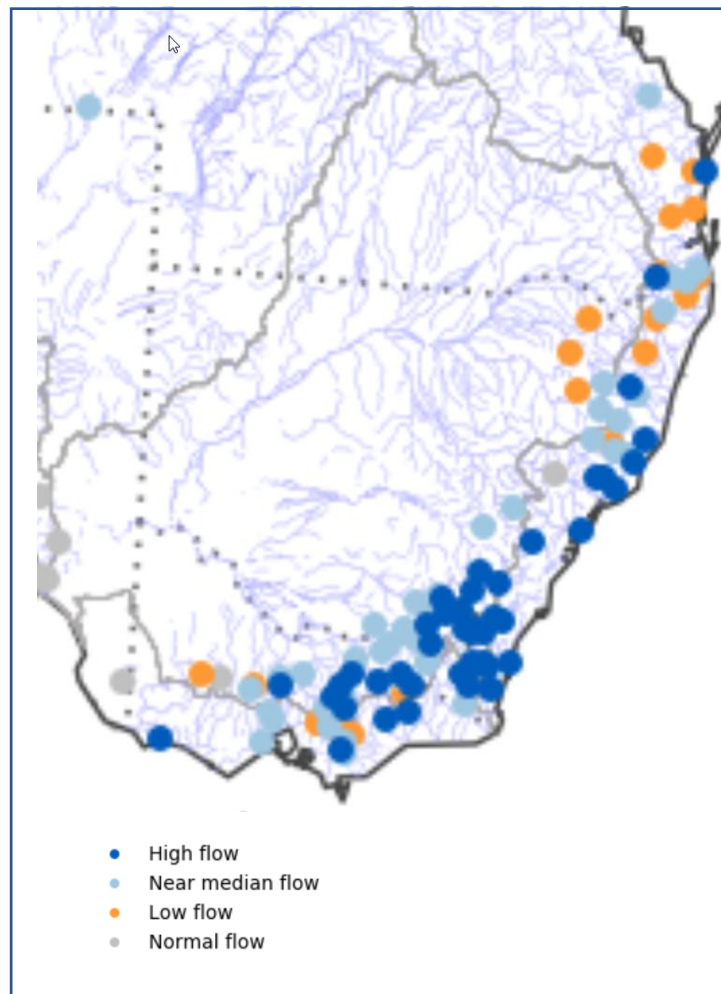




### Seasonal streamflow outlook:

- High and near-median streamflow most likely for November 2020-January 2021.
- Low and near-median flows were observed at 38% and 33% of locations across Australia in October.
- High flows occurred at 29% of locations, mostly in far eastern regions.

**Figure 7. Seasonal Streamflow Forecast for November 2020 to January 2021 (Murray Darling Basin)**



### Overall climate and streamflow in the longer-term context for Victoria:

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 we are already experiencing:

- Higher temperatures
- Reductions in rainfall in late autumn and winter and, in some locations, some increases in rainfall during the warmer months
- In many catchments, a shift in the streamflow response to rainfall, with less streamflow generated for the same amount of rain. The impact of a reduction in streamflow response to rainfall is not yet fully known and is the subject of investigation.



Over the longer term, we can expect:

- the rainfall reductions in winter to persist
- possible increases in summer rainfall, reductions in streamflow because of less rainfall and higher potential evapotranspiration.

Although there will still be significant variability in Victoria's climate and streamflow, the chances of experiencing warmer conditions and less streamflow is now higher than in past decades. (Source: DELWP Hydrology and Climate Science). This outlook points to the need for strategic planning to manage the longer-term impacts of climate change and reduced streamflow on water availability.

## Water supply systems

Lower Murray Water provides services through 8 water supply systems. A high-level description of these is provided:

### Mildura

Water is pumped from the River Murray at Mildura through two conventional water treatment plants. The treated water is supplied to around 21,000 connections in the City of Mildura and surrounding rural-residential areas including the townships of Irymple, Merbein and Cardross. The Seventh Street treatment plant is designed for 85 ML/d and the Mildura West plant has a capacity of 20 ML/d.

The summer months' average daily consumption is normally below 70ML/d with occasional consumption above this. Treated water pumping stations at Seventh Street and Mildura West distribute water to two water towers with a combined storage capacity of 3.03 ML. Additional booster pump stations and ground-level storages with a combined storage capacity of 37.6 ML allow the system to maintain pressures to the outlying areas on higher demand days.

Merbein is supplied with treated water from the Mildura treatment plant via the reticulation from the north-west end of Merbein and the Mildura West water treatment plant via a 450 mm diameter transfer pipeline 7.14 km long from the South. 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 pump from the storage directly into the reticulation system to maintain optimum pressures.

### Red Cliffs

The town of Red Cliffs (14 km south of Mildura) is an independent system and services around 1,700 connections. A pumping station extracts water from the River Murray through a dissolved air flotation treatment plant to a 6 ML ground level storage. The treated water is delivered to a water tower near the town centre. Two rising mains of 300 mm and 375 mm in diameter. The plant design capacity is now 12 ML/d after an upgrade in 2018, and the average daily consumption during the summer months is usually below 9 ML/d.

### Robinvale

The town of Robinvale pumps water from the River Murray via a 300 mm pipeline to a conventional water treatment plant, which services around 1,000 connections. The maximum plant design capacity is 6 ML/d, with an average peak daily consumption during

the summer months of approximately 5.0 ML/d, from a 3.6 ML ground storage and 0.3 ML water tower.

### Kerang

Kerang is situated at the southern end of the Lower Murray Water region. Water is pumped either from the Loddon River, the River Murray (at Koondrook) or the Goulburn Murray Water 14/2 Channel and treated in a conventional treatment plant, which services around 2,100 connections. The maximum plant design capacity is 11 ML/d and average peak daily consumption has reached 7.2 ML/d during some summer periods.

### Piangil

At Piangil, water is pumped from the River Murray to a "Package" conventional water treatment plant which services around 100 connections. The plant has a capacity of 0.7 ML/d. Treated water is then pumped to the existing 1.14 ML ground storage, 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.

### Koondrook

Water is pumped from the Murray River to a conventional water treatment plant with a capacity of 3 ML/d. Above groundwater storage of 2 ML and a standpipe of 0.9 ML services around 500 connections.

### Murrabit

The Murrabit system can pump water from a Goulburn-Murray Water channel and the Murray River to a conventional water treatment plant of 0.2 ML/d. Treated water pumps supply a 50kL high-level storage which services over 50 connections.

### Swan Hill

The Rural City of Swan Hill is situated in the centre of the southern region of LMW. Raw water is pumped from the River Murray at Swan Hill to a conventional filtration and disinfection system with a capacity of 30 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 normally below 23 ML/d for this system. Treated water pumps deliver treated water to a 2.27 ML ground level storage and 0.68 ML water tower near the city centre. Two extra ground level storages, each of 4.0 ML capacity, and a 0.15 ML water tower are situated west of the city.

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

The townships of Nyah and Nyah West are supplied via a 27 km long, 300 mm diameter pipeline from the Swan Hill Water Treatment Plant. A 6 ML ground level storage, 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 Plant. A 0.9 ML ground level storage, chlorination facilities, and a 0.1 ML water tower and associated re-lift pumps have been installed to maintain pressure on days of high demand.

### Sources of Supply and current resource position:

LMW sources 97% of its water from the Murray River with the remaining from Goulburn Murray Water irrigation channel systems. A bulk water entitlement of 30,971 ML 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 allocation volumes and currently holds 1,244 ML of High-Reliability and 216 ML of Low-Reliability water shares.

The opening allocation in 20/21 was 8% High-Reliability water shares (HRWS) in the Murray system. The total available water volume was 9,098 ML, with a carryover volume of 6,372 ML (as of July 1, 2020). With a resource improvement in the 20/21 season, the allocation was increased to 81% HRWS in the Murray system. This resulted in the total available water volume to be 32,571 ML (as of November 16, 2020).

## Current Demand and Forecast

Table 6 below shows historical and projected volumetric water usage from 17/18 to 18/19 and water use forecast for the remainder of WP4 (Water Plan 4) out to 24/25. The forward data is based on average climatic conditions in the last 5 years with an average annual demand of 477 kL per residential connection expected.

**Table 6 Water Volumetric Usage and Demand Forecast - ML pa 2017/18 - 2024/25**  
(Source: LMW Corporate Plan19-20)

Actual usage/Demand forecast	2017/18	2018/19	2019/20 (forecast)	2020/21 (forecast)	2021/22 (forecast)	2022/23 (forecast)	2023/24 (forecast)	2024/25 (forecast)
Residential Demand	14,698	15,647	14,815	14,949	15,073	15,198	15,324	15,452
Non-residential Demand	4,527	4,861	4,346	4,394	4,438	4,483	4,527	4,573
Total water demand	19,225	20,509	19,161	19,343	19,511	19,681	19,852	20,024

There was a small decrease in forecast demand volume for 19/20 compared to 18/19 usage expecting Stage 1 water restriction would change customer behaviour in decreasing water usage. However, in 19/20, the actual water supply volume recorded was 20,461 ML (Source: LMW annual report), approximately 7% higher than the forecasted volume of 19,161 ML (Table 6).

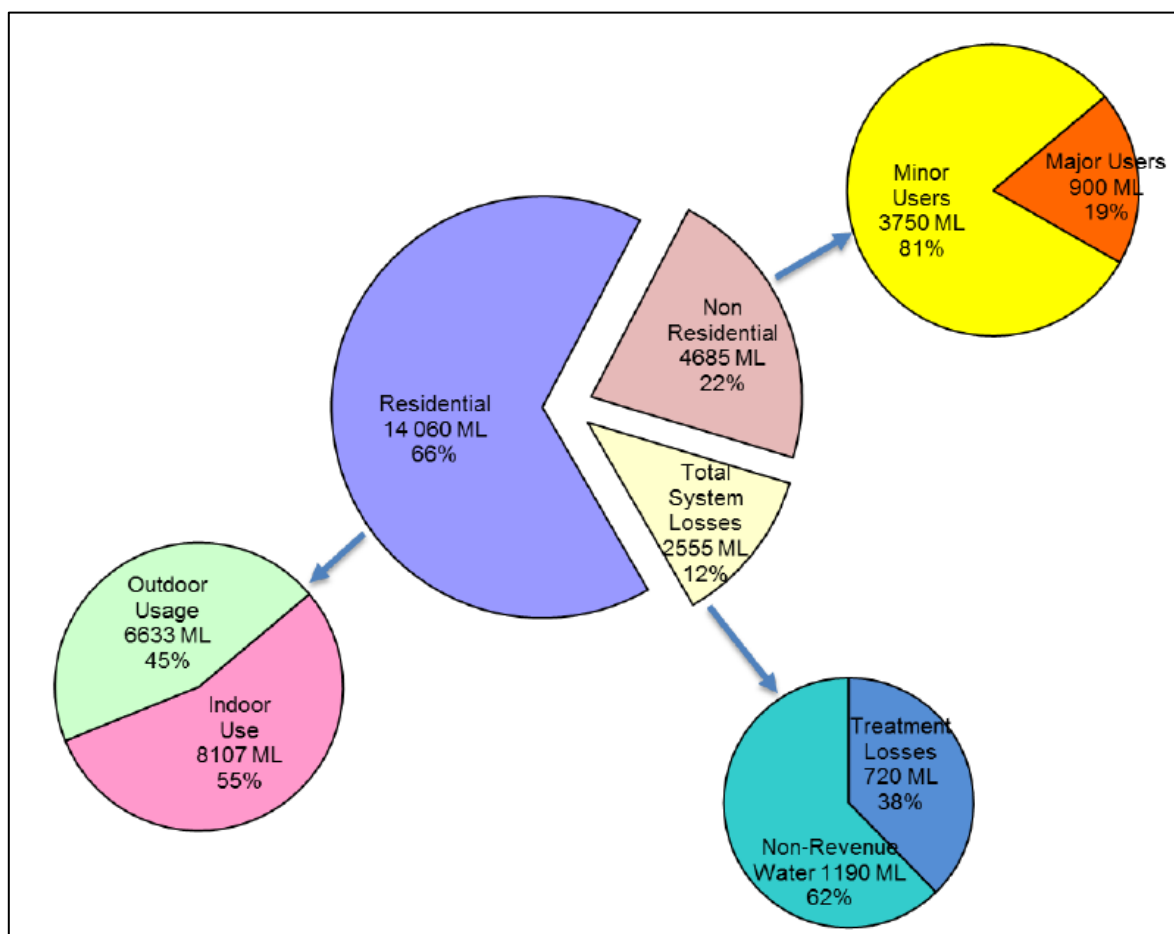
Based on historical raw water use, the average annual water consumption for Mildura is generally between 19,000-21,000 ML (2012-2016) (source: LMW Water Supply Demand Strategy 2017-2066).

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 condition with close to zero rainfall over the 19/20 summer period most likely contributed to a higher water usage compared to that forecasted for 19/20, even with the Stage 1 restrictions in place.

It is difficult to accurately predict water savings achieved through restrictions during a single season and across a large population base such as Mildura. The level of water usage is multifactorial, impacted by temperature, rainfall and customer behaviour. Water restrictions offer the public guidelines on water use but do not necessarily have direct impact, particularly when only at low Stage 1.

The typical water usage distribution between customer types is described below, based on annual water consumption of 21,000 ML.

**Figure 8: Typical water use distribution (based on LMW Water Supply Demand Strategy 2017-2066) assuming a year's water consumption of 21,000ML.**



## Forward outlook 2020/21

The opening seasonal determination in 20/21 commenced with only 8% HRWS in the Murray. As of July 1, 2020, the total allocation held by LMW including carryover of 6,373 ML from the 2019/20 season was 9,098 ML. With resource improvements 'rainfall' during the season, this determination increased to 81% HRWS in the Murray on 16 November 2020. This significant improvement in determination provided an additional water allocation of 23,473 ML for LMW, with available water allocation totalling 32,572 ML.

Table 7 summarises the source of water for LMW and compares the seasonal determination and water availability between 1 July 2020 and 16 November 2020.

**Table 7. Total source and availability of water for LMW (2020/21)**

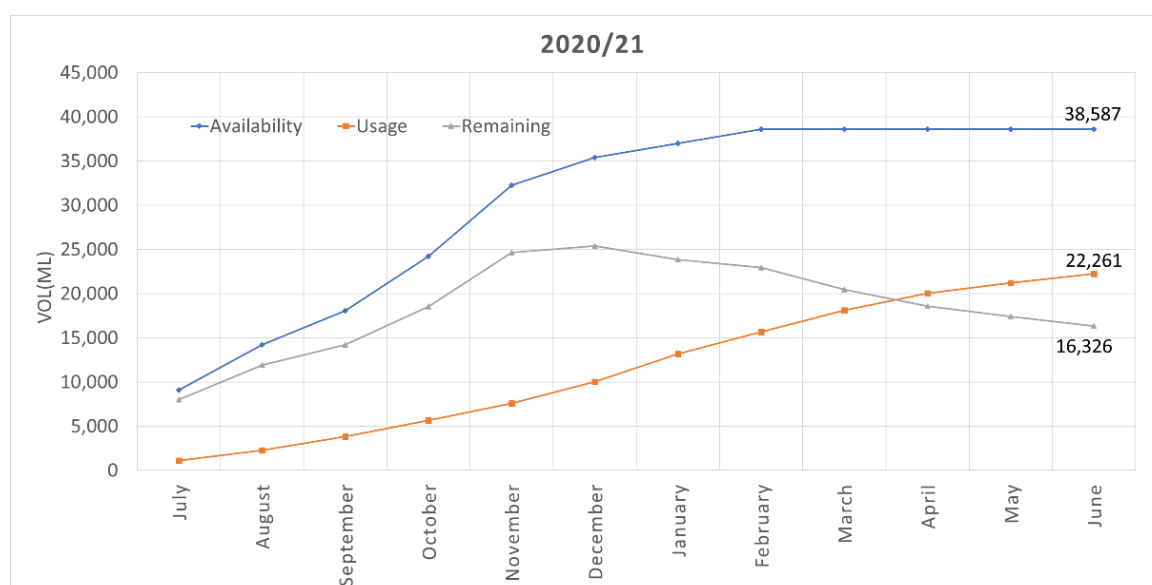
Source of water	Vol (ML)	Seasonal Determination 1 July	Total available as 1 July 2020 (ML)	Seasonal Determination 16 November 2020	Total available as 16 November 2020 (ML)
Goulburn HRWS	550	35%	193	100%	550
Murray HRWS	694	8%	56	81%	562
Murray BE (Urban)	30,971	8%	2,478	81%	25,087
Carryover	6,373		6,373		6,373
<b>Total</b>	<b>38,588</b>		<b>9,098</b>		<b>32,572</b>

As per the most recent outlook (16 November 2020), the HRWS is expected to be 99% by 15 December 2020 under average rainfall conditions. The BOM forecasts higher than average rainfall for the next three months. Therefore 100% HRWS may well be achieved even by the next outlook determination on 1 December 2020. This would be a very favourable position for LMW to meet its supply commitments to customers.

Factors to consider in the forward outlook:

- LMW's typical annual water consumption is generally between 19,000 and 21,000 ML
- The volume of water supplied to customers to the end of October 2020 was 1,353 ML (Source: LMW operational data)
- It is anticipated that with average conditions, the seasonal determination is expected to be 100% HRWS by December 15, 2021
- It is also anticipated that under dry condition, the seasonal determination is expected to be 94% HRWS by February 15, 2021
- Under both average and dry circumstances, LMW would have additional water available to meet its commitment to customers
- The Northern Victoria Resource Manager (NVRM) has declared there is a low risk of spill for 2020/21
- This positive outlook suggests LMW will have enough allocation to meet its Urban customers' demand for 2020/21 with a surplus volume at the end of season.

The following graph (Figure 10) summarises forward water availability based on the current seasonal determination and outlook. The data indicates there is no likely shortfall for the 20/21 season.

**Figure 9. Forecast Water Supply/Demand (ML), Indicative Supply/Demand balance**

## Water Restrictions - Actions & Learnings

### Key findings from Water Restrictions 2019/20:

Water supply was limited for the 2019/20 year, with the seasonal determination for Victorian Murray HRWS reaching 66%. This resulted in the imposition of Stage 1 water use restrictions on Mildura urban users in November 2019. Table 7 summarises a few key findings and lessons from the 19/20 water restrictions.

**Table 8. Select findings from recent 19/20 water restrictions**

Category	Lessons
Customer	<p>The urban water use restrictions were generally accepted by LMW customers, leading to a 'reasonable' compliance level in water use and subsequent lifting of these restrictions late in the season as the outlook for water availability in 2020/21 improved.</p> <p>LMW continues working internally with staff and with our customers on water savings initiatives including the following actions:</p> <p>Drought preparedness planning-</p> <ul style="list-style-type: none"> <li>Developed 'Target Your Water Use' campaign self-audit tool for households, designed to help customers understand water use and where water can be saved</li> <li>Waterwise education delivered through school programs</li> <li>Community Housing Retrofit program audits (76 completed)</li> </ul>



Category	Lessons
<b>Operational</b>	<p>LMW experienced several unforeseen operating challenges throughout 2019/20 which placed upward pressure on staff and processes. A notable challenge was transient river water quality including a significant blue-green algae (BGA) outbreak across December 2019 / January 2020, requiring additional water treatment efforts to provide the community with safe drinking water.</p> <p>Operational challenges also included implementing and managing the Stage 1 urban water restrictions requiring LMW compliance officers and community support.</p> <p>Increased sewer blockages due to lower flows (possibly arising from water restrictions) were observed in some locations.</p>
<b>Infrastructure</b>	<p>Critical infrastructure was challenged under high heat conditions and required close monitoring and regular inspection.</p> <p><i>Specifically -</i></p> <p>Pumping and electrical switchboard stress under high heat conditions required additional air-cooling at some sites.</p> <p>Power restrictions and blackouts had to be managed with backup power generation available at our urban pump stations.</p>
<b>Compliance</b>	<p>Increase in advisory letters to urban customers during the restriction period was due to customers watering outside nominated hours.</p> <p>LMW recognises there is scope for improvements in developing community awareness for efficient water use behaviour. This is ongoing work within the customer and stakeholder team.</p> <p>As we move into 20/21, LMW will continue to work with its customers to build awareness around water-saving opportunities.</p>

