

Annual Water Outlook

December 2021

Final

EGW TRIM Ref: DOC/21/67068



Photo: Old Coach Road Bridge over the Tambo River 15/9/2021.

Typical of minor flooding occurring periodically across the region during 2021.

Page intentionally left blank

TABLE OF CONTENTS

Executive Summary.....	5
1 INTRODUCTION.....	7
1.1 Water Systems	7
1.2 Recent Water Supply Improvements.....	8
1.3 Rainfall Trends	8
1.4 Demand Trends.....	11
2 CURRENT WATER RESOURCE POSITION.....	13
2.1 Mitchell System	13
2.2 Orbost Water Supply.....	16
2.3 Mallacoota Water Supply	18
2.4 Dinner Plain Water Supply	20
2.5 Omeo Water Supply.....	22
2.6 Swifts Creek Water Supply.....	24
2.7 Buchan Water Supply	26
2.8 Bemm River Water Supply.....	28
2.9 Cann River Water Supply.....	30
3 CLIMATE OUTLOOK.....	32
3.1 East Gippsland Outlook	32
4 FORWARD OUTLOOK.....	34
4.1 Mitchell System Forward Outlook.....	34
4.2 Orbost System Forward Outlook.....	39
4.3 Mallacoota Forward Outlook	40
4.4 Dinner Plain Forward Outlook	40
4.5 Omeo Forward Outlook.....	41
4.6 Swifts Creek Forward Outlook.....	41
4.7 Buchan Forward Outlook	42
4.8 Bemm River Forward Outlook.....	42
4.9 Cann River Forward Outlook.....	43
5 Short Term Actions	44
5.1 Mitchell System Actions	44
5.2 All other System Actions	44
6 References	45

Document Status

Rev No	Comments	Issue Date	Prepared By	Approved By
Draft	Draft for internal comment	27/10/2021	Stuart Stagg	Mark McNeil
Final 1	Addressing internal review comments. Release to DELWP for review	1/11/2021	Stuart Stagg	Mark McNeil
Final 2	Addressing DELWP comments, updating storage volumes, and with latest BoM seasonal outlook	1/12/2021	Stuart Stagg	Mark McNeil

Executive Summary

The table below provides a summary of each of the nine urban water supply systems for East Gippsland Water (EGW) including the likelihood of imposing water restrictions for the upcoming 2021/22 summer period. Average to above average rainfall has occurred across East Gippsland for most of 2021 with all stream flows currently above historical averages. The Bureau of Meteorology's forecast is positive and for above average rainfall for the December to February period.

EGW remains vigilant to climatic conditions and potential reductions to stream flows. EGW has initiated a number of mitigation strategies and continues to ensure water storages are maintained at near capacity as the warmer months approach.

Water Supply System	Townships supplied	No. of water connections (2020/21)	Water source	2020/21 annual extraction (ML)	Likelihood of water restrictions over 2021/22 summer ¹
Mitchell River	Bairnsdale (including Wy Yung and Lucknow), Lindenow, Paynesville, Raymond Island, Metung, Tambo Bluff, Lakes Entrance (including Lake Tyers, Lake Tyers Beach and Kalimna), Nowa Nowa, Nicholson, Johnsonville, Swan Reach, Bruthen and Sarsfield	20,622	Mitchell River + 5 groundwater bores (take and use plus Aquifer Storage and Recovery)	4370	"Unlikely"
Bemm River	Bemm River	101	Bemm River	13.7	"Very Rare"
Buchan	Buchan	109	Buchan River	16.5	"Unlikely"
Cann River	Cann River	194	Cann River	27.9	"Very Rare"

Water Supply System	Townships supplied	No. of water connections (2020/21)	Water source	2020/21 annual extraction (ML)	Likelihood of water restrictions over 2021/22 summer ¹
Dinner Plain	Dinner Plain	395	Groundwater bores (2)	46.9	"Very Rare"
Orbost	Orbost, Marlo, Newmerella	2,039	Brodribb Rivers.	629	"Rare"
Mallacoota	Mallacoota	1008	Betka River and 4 groundwater bores	156.7	"Rare"
Omeo	Omeo	262	Butchers Creek	47.9	"Rare"
Swifts Creek	Swifts Creek	128	Tambo River	21.6	"Rare"

1. Likelihood of water restrictions rated according to DELWP (2017) guidance.

1 INTRODUCTION

1.1 Water Systems

East Gippsland Water operates nine separate potable water supply systems. The systems are a combination of:

- Surface water (rivers, streams and creeks) supplied with off-stream storages (Bemm River, Buchan, Cann River, Orbost, Omeo and Swifts Creek supply systems);
- Mixture of surface water and groundwater supplied with off-stream storages (Mitchell River and Mallacoota systems); and,
- Groundwater supplied with storage (Dinner Plain).

The townships provided with water services are shown in Figure 1-1. The Mitchell River Water Supply System is the largest within the East Gippsland Water region providing potable water to approximately 22,000 customers within major towns such as Bairnsdale, Lakes Entrance, Metung and Paynesville. All of the systems are independent of each other and none of the systems are connected to the Victoria Water grid.



Figure 1-1: Towns supplied with reticulated sewer and water services

1.2 Recent Water Supply Improvements

East Gippsland Water is continuously improving its water supply systems including renewing aged assets and creating new assets to cater for growth. The key improvements relating to water supply in 2021/22 included:

- Completion and commissioning of a new concrete 36ML clear water storage at Bairnsdale.
- Refurbishment of tanks at Metung, Nowa Nowa, and Eagle point.
- Replacement of shade cloth covers at Mallacoota.
- Replacement of an critical aged section of Main supplying water to Eagle point and Paynesville.

1.3 Rainfall Trends

Figure 1-2 to Figure 1-5 illustrate the deviation from the mean monthly rainfall (Bureau meteorology all years) over the past 12 months for Bairnsdale, Orbost, Mallacoota and Omeo respectively. The graphs show that good rainfall over the previous 12 months has been punctuated by some months of little rainfall. As a whole the period is above average and shows a remission of the severe drought that occurred 2017-2020. For the twelve months up till up till September 2021, rainfall totals across the region have exceeded averages by, 169.2mm at Bairnsdale, 191.7mm at Omeo, 214.5mm at Mallacoota, and 307.8mm in Orbost. This has provided sufficient river flows and/or groundwater recharge to ensure that water storage levels are approaching full supply leading into the coming summer (as demonstrated in the storage volumes outlined in Section 2).

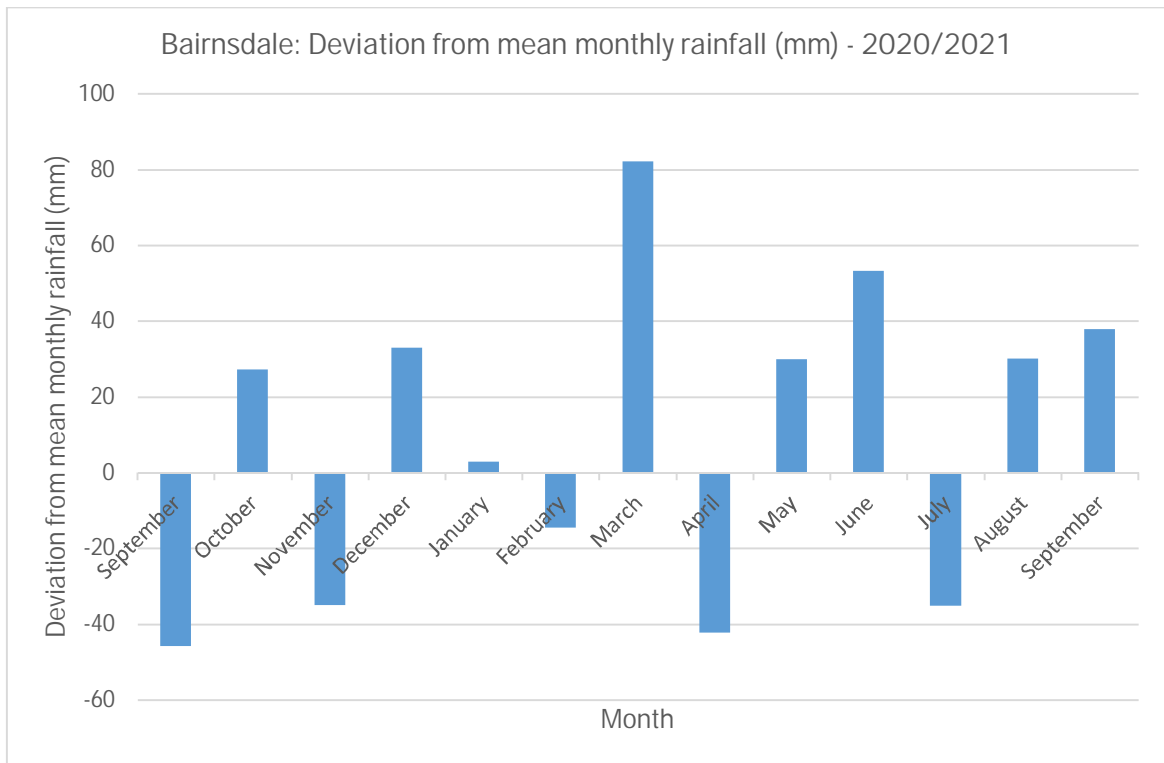


Figure 1-2: Bairnsdale: Deviation from mean monthly rainfall for 12 month period to Sept 2021

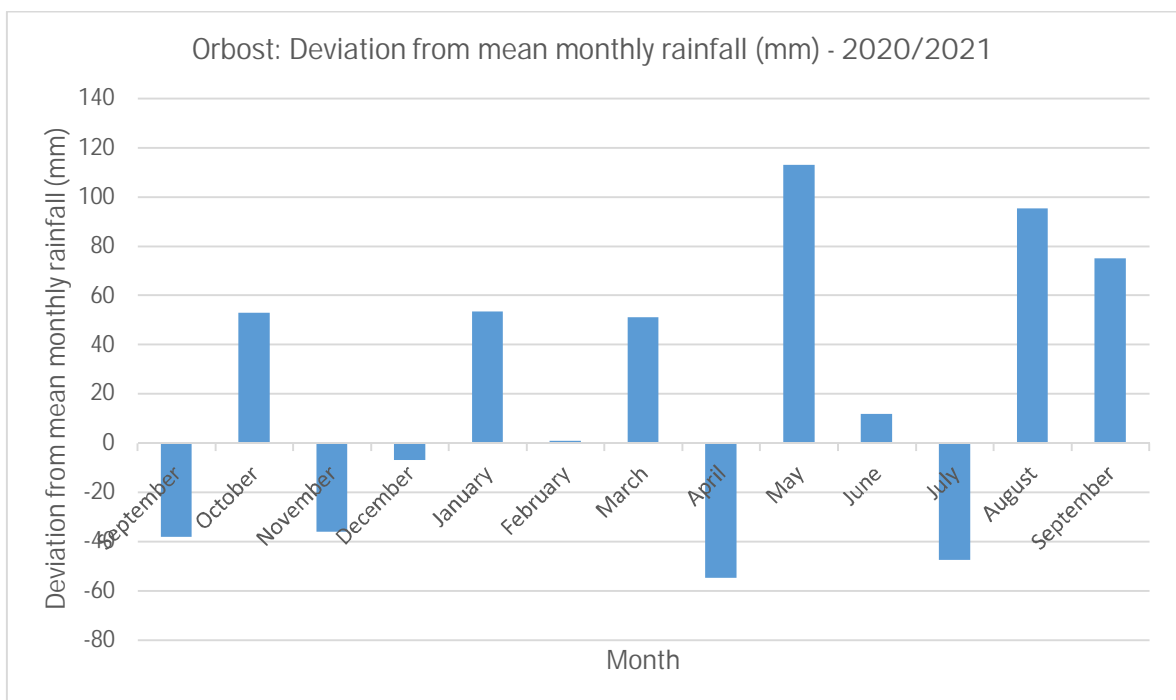


Figure 1-3: Orbost: Deviation from mean monthly rainfall for 12 month period to Sept 2021

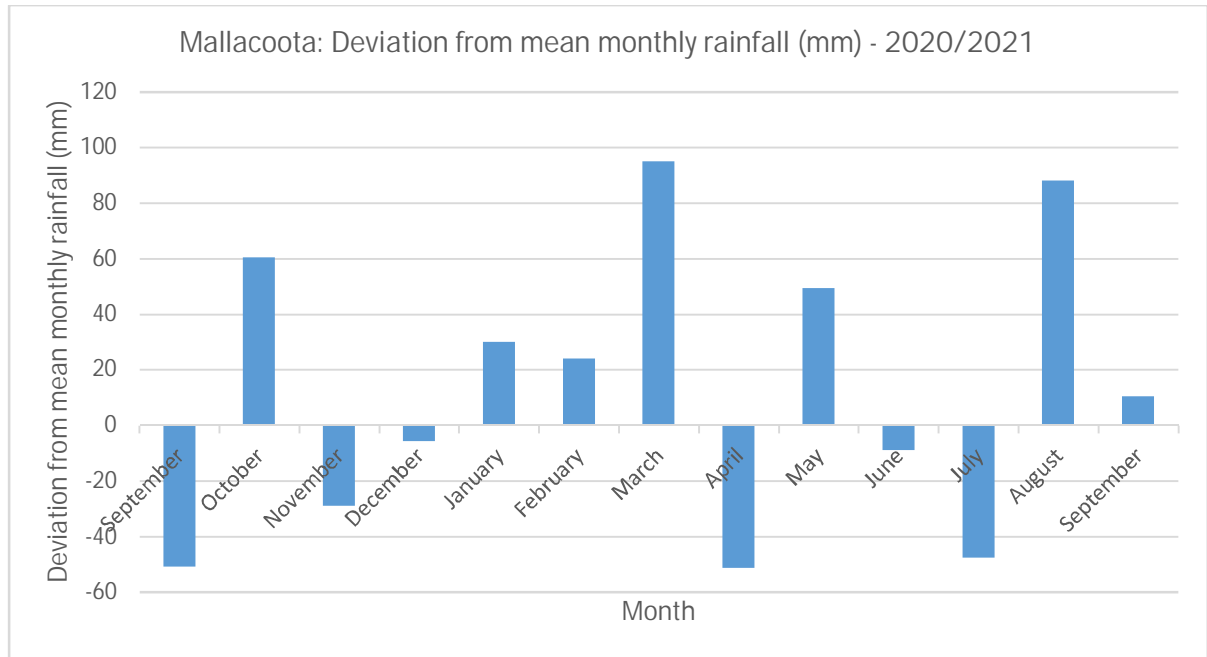


Figure 1-4: Mallacoota: Deviation from mean monthly rainfall for 12 month period to Sept 2021

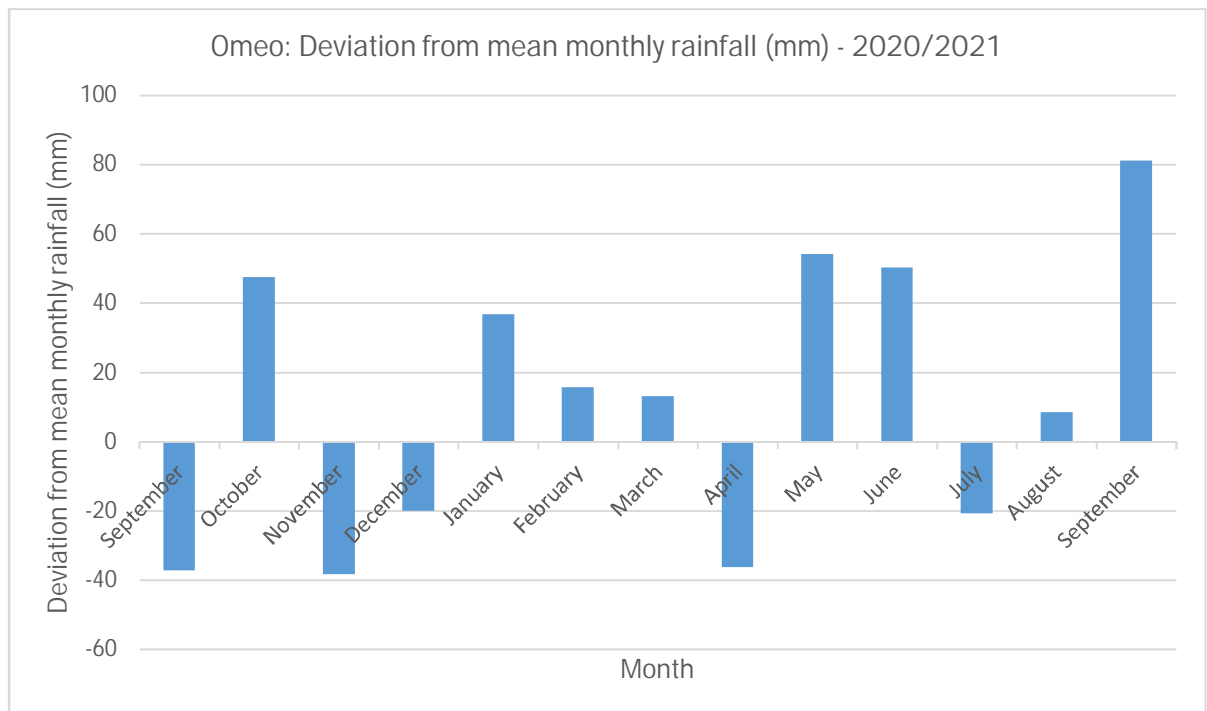


Figure 1-5: Omeo: Deviation from mean monthly rainfall for 12 month period to Sept 2021

1.4 Demand Trends

The demand for all nine of East Gippsland Waters supply systems over time is shown in Table 1-1. The water use per connection for residential and non-residential use is shown in Figure 1-6 while the residential demand per person is shown in Figure 1-7 (assuming an average 2.27 people per household (.ID, 2017)). The data illustrates an overall decrease in domestic use per connection for the period 2008-2021, with the majority of the decrease occurring in the period 2008 to 2012. The last 12 months have shown a slight decrease in the residential water use per connection which was not expected given people have spent more time at home during the Pandemic, however wet conditions have removed the need for residents to water gardens. The non-residential consumption has seen a greater decrease as a result of Low tourist numbers, poor venue attendance, and people working at home all resulting from Covid-19.

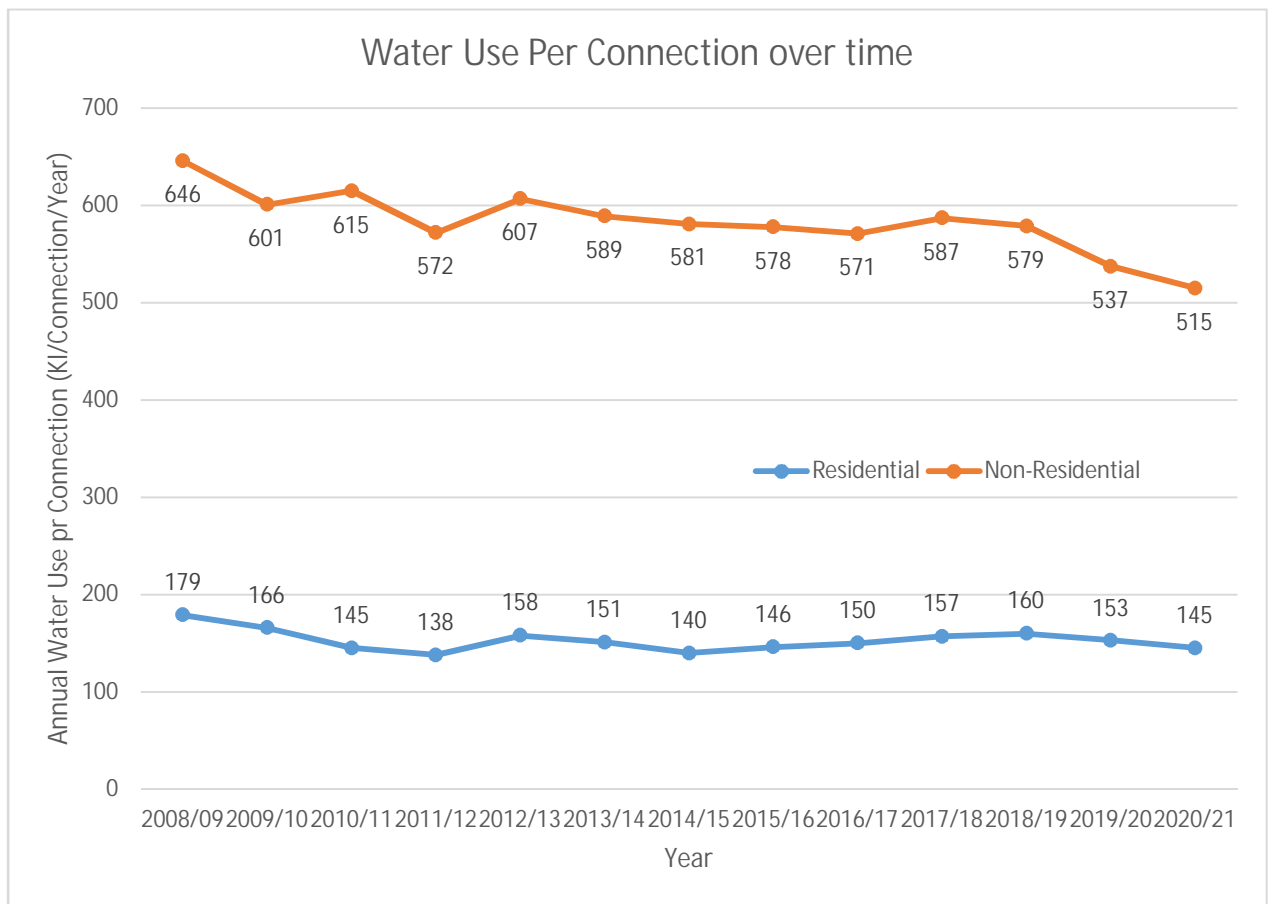


Table 1-1: Water demand over time for all nine water systems

Year	Residential					Non-Residential				Non-Revenue Water			Total Use (ML)
	No of Assessm.	No. of Connect.	Use (ML)	Use per Connection (KL/Yr)	Use per Person per day (l/day)	No of Assessm.	No. of Connect.	Use (ML)	Use per Connection (KL/Yr)	Unaccounted for water (ML)	Accounted for Non-Revenue Water	Non Revenue as a % of total water	
2006/07	19084	N/A	3097	N/A	N/A	2877	N/A	1755	N/A	801	193	17%	5846
2007/08	19860	N/A	2648	N/A	N/A	2956	N/A	1639	N/A	686	161	17%	5133
2008/09	20222	18001	3224	179	216	3005	2737	1767	646	393	70	8%	5454
2009/10	20655	18329	3049	166	201	3036	2782	1671	601	617	331	17%	5668
2010/11	20928	19048	2700	145	175	3077	2832	1741	615	853	84	17%	5378
2011/12	21671	19389	2620	138	166	3121	2859	1634	572	698	183	17%	5135
2012/13	22030	19697	3058	158	190	3105	2865	1738	607	651	189	15%	5636
2013/14	22309	19984	2966	151	182	3128	2872	1692	589	490	152	12%	5298
2014/15	22543	20266	2797	140	169	3141	2871	1669	581	529	19	11%	5013
2015/16	22822	20266	2961	146	176	3171	2944	1702	578	652	26	13%	5341
2016/17	23051	20266	3036	150	181	3206	2862	1635	571	510	34	10%	5215
2017/18	23194	20823	3278	157	189	3256	2937	1724	587	730	140	13%	5732
2018/19	23396	21179	3386	160	193	3386	2949	1707	579	441	41	8%	5534
2019/20	23691	21485	3286	153	185	3219	2962	1592	537	481	49	9%	5415
2020/21	24050	21915	3177	145	175	3205	2944	1515	515	605	76	11%	5373

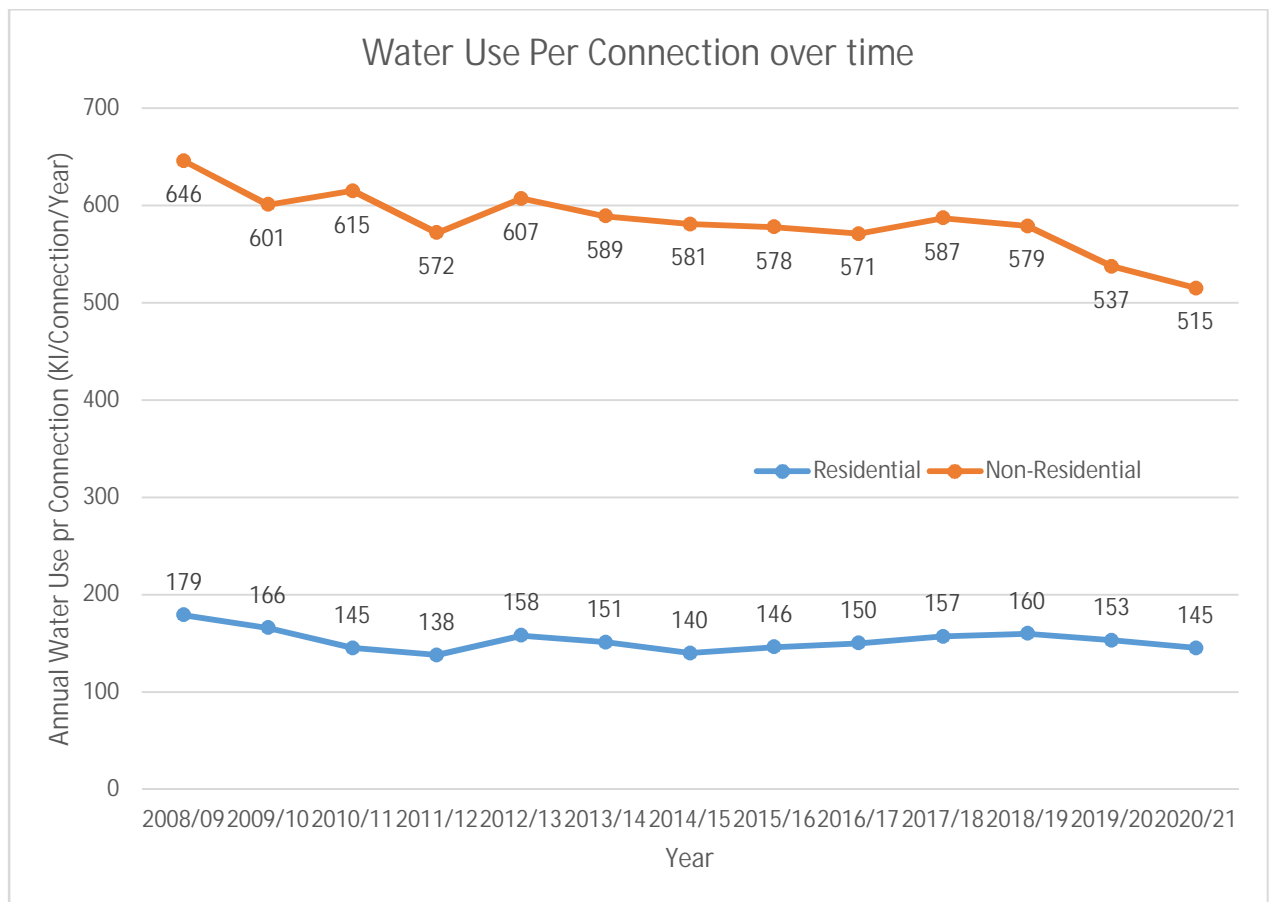


Figure 1-6: Annual residential and non-residential water use per connection over time

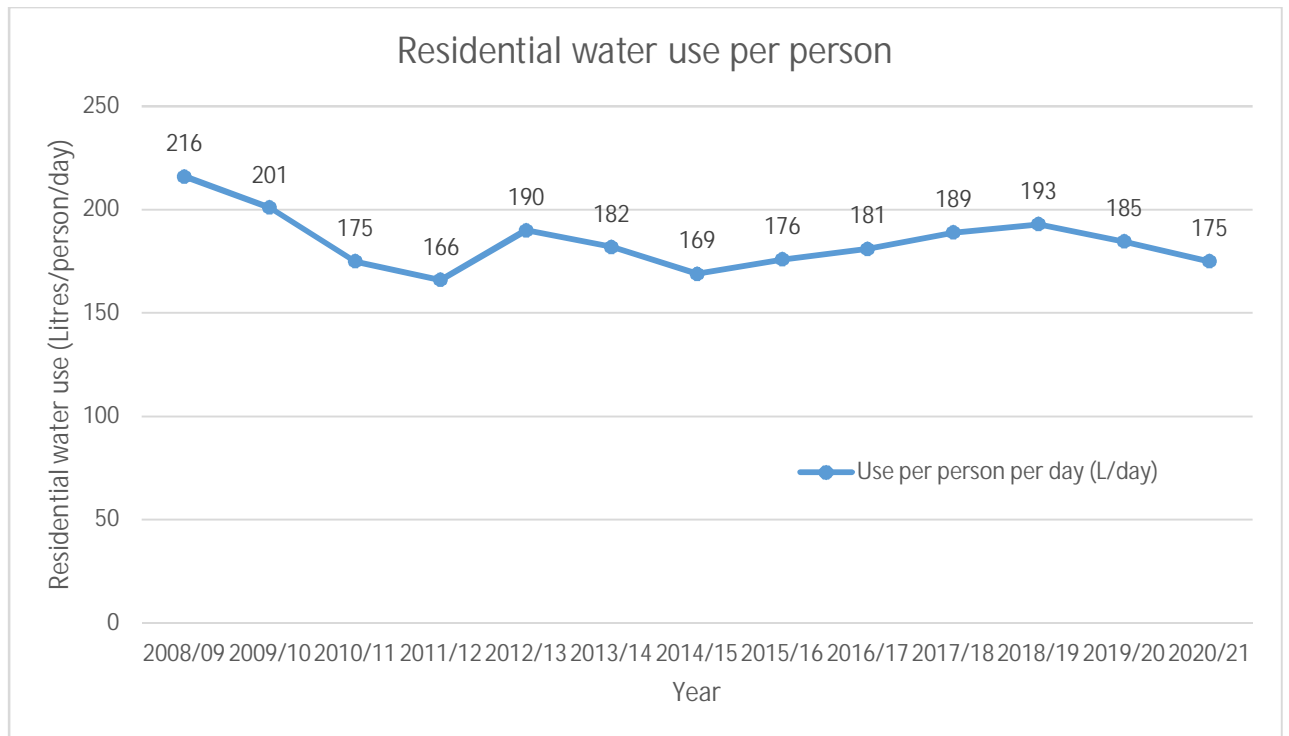


Figure 1-7: Annual residential water use per person

2 CURRENT WATER RESOURCE POSITION

2.1 Mitchell System

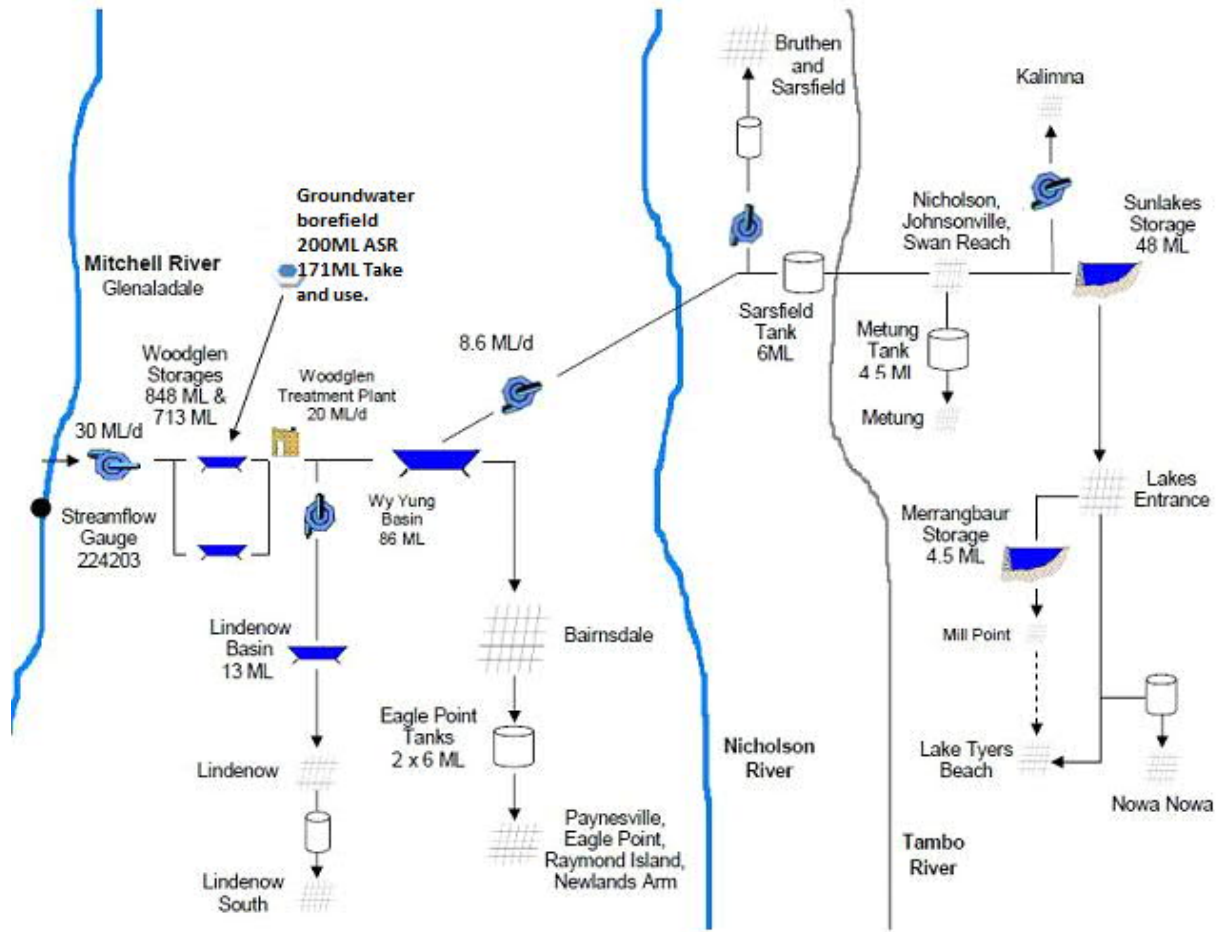
2.1.1 Mitchell System Configuration

Townships supplied: Bairnsdale, Wy Yung, Lucknow, Paynesville, Metung, Lakes Entrance, Nowa Nowa, Nicholson, Johnsonville, Swan Reach, Bruthen and Sarsfield

The Mitchell system's primary source of water is the Mitchell River which is supplemented by 5 groundwater bores. There are 20,622 connections in the Mitchell system and major customers include Vegco (One Harvest), Patties, Bairnsdale Hospital and Dennison Foods.

System operation

Water from the Mitchell River supplemented by 5 groundwater bores is treated at the Woodglan Water Treatment Plant at a rate of up to 20ML/d using the Dissolved Air Flotation and Filtration (DAFF) process. Treated water is supplied to a number of balancing storages before being distributed to various supply networks.



2.1.2 Mitchell System Water Supply information

Water Source	Volume Available (ML)	Volume Used 2020/21 (ML)
Mitchell River (bulk entitlement)	9208.0	4370.1
Groundwater (Take and Use)	171.0	0
Groundwater (Aquifer Storage)	200.0	0
Total:	9579.0	4370.1

Storage	Size (ML)	Volume Instore (ML Nov 2021)	Percentage Instore
Raw water	1526.0	1432.5	93.9%
Aquifer (groundwater recharge)	200.0	181.3	90.1%
Treated Water	173.5	162.3	93.5%
Total:	1899.5	1776.1	93.5%

2.1.3 Mitchell System Water Demand Information.

Figure 2-1 shows the annual demand for water in the Mitchell system over the past 7 years. Demand has decreased over the previous 4 years, the result for 2019/20 was slightly lower than 2020/21 in part due to water saving measures and restrictions during 2019/20. It is assumed that the demand in the Mitchell system for 2021-2022 will be around 4400ML.

No water restrictions were imposed during 2020/21.

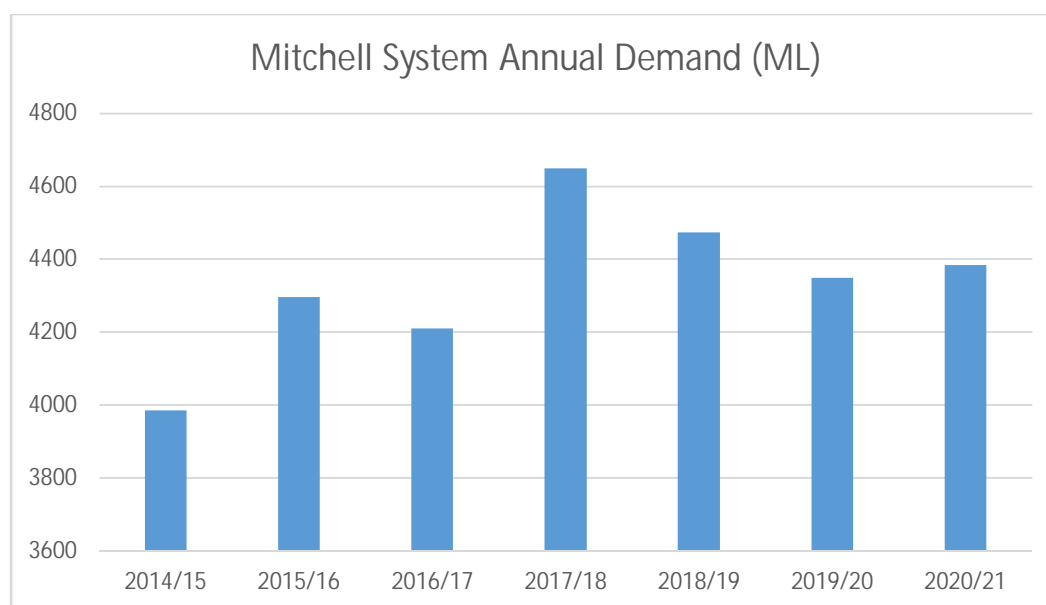


Figure 2-1: Annual water demand in Mitchell System (ML)

2.2 Orbost Water Supply

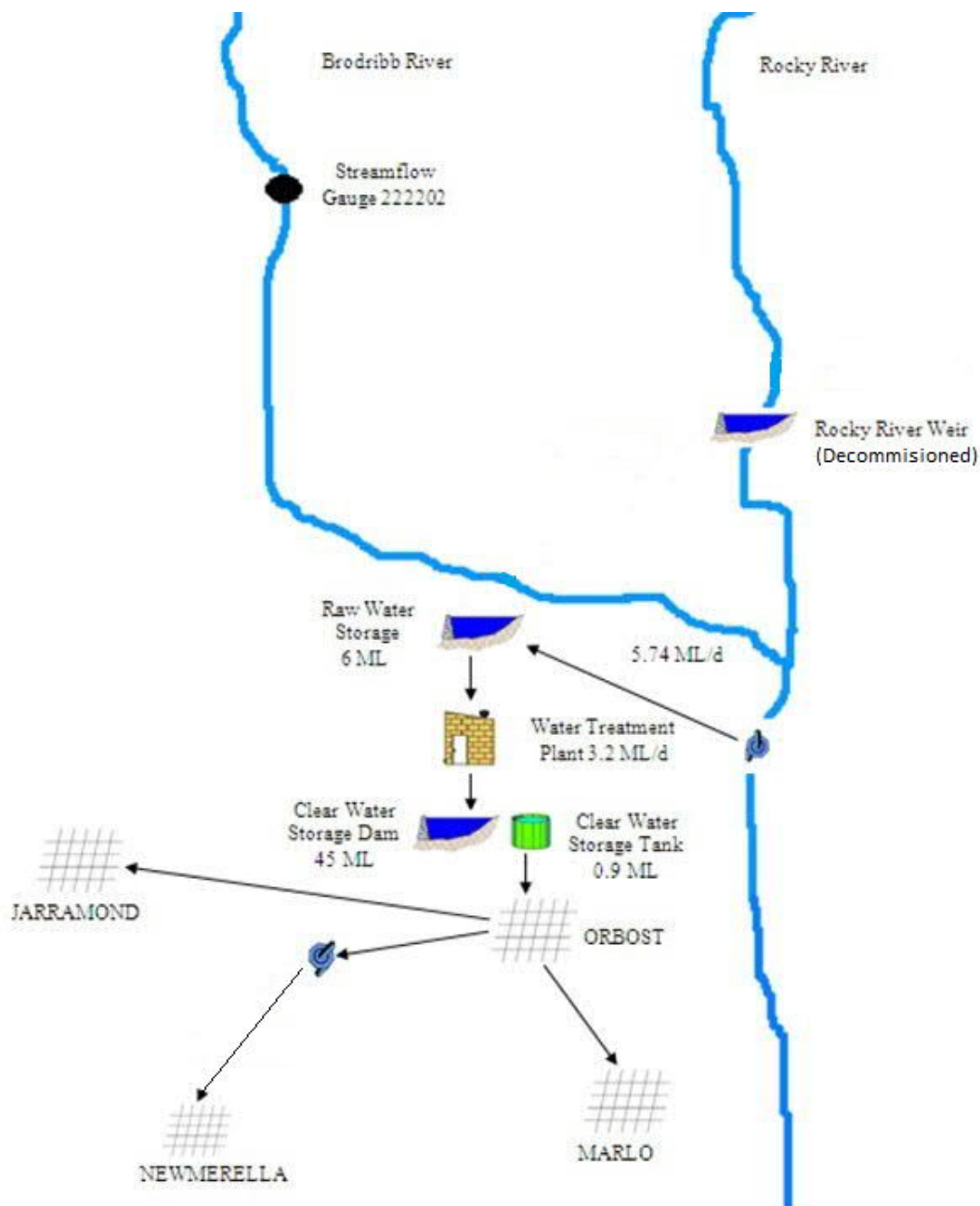
2.2.1 Orbost System Configuration

Townships Supplied: Orbost, Marlo, Newmerella

The Orbost system's source of water is the Brodribb River. There are 2039 connections in the Orbost system and major customers include the Corringal gas plant, Orbost abattoir, Orbost Hospital and a number of large dairy farms.

System operation

Water is pumped from the Brodribb River and stored in a 6ML raw water storage; it is then fully treated before being stored in a 45ML clear water storage or 0.9ML clear water tank and is then distributed to customers.



2.2.2 Orbost system Water Supply Information

Water Source	Volume Available (ML)	Volume Used 2020/21 (ML)
Brodribb River (Bulk Entitlement)	2031.0	629.0

Storage	Size (ML)	Volume Instore (ML Nov 2021)	Percentage Instore
Raw water	6.0	6.0	100%
Treated Water	50.6	42.7	84%
Total:	56.6	48.6	86%

2.2.3 Orbost System Demand Information

Figure 2-2 shows the annual demand for water in the Orbost system over the past 7 years. From this it can be seen that demand was high during the drought years and has reduced following a return to wetter weather. The reduction in the number of tourists at Marlo due to Covid-19 will have contributed to reduced demand in 2020/21. EGW is predicting that 2021-2022 annual demand for the Orbost System will be around 650ML.

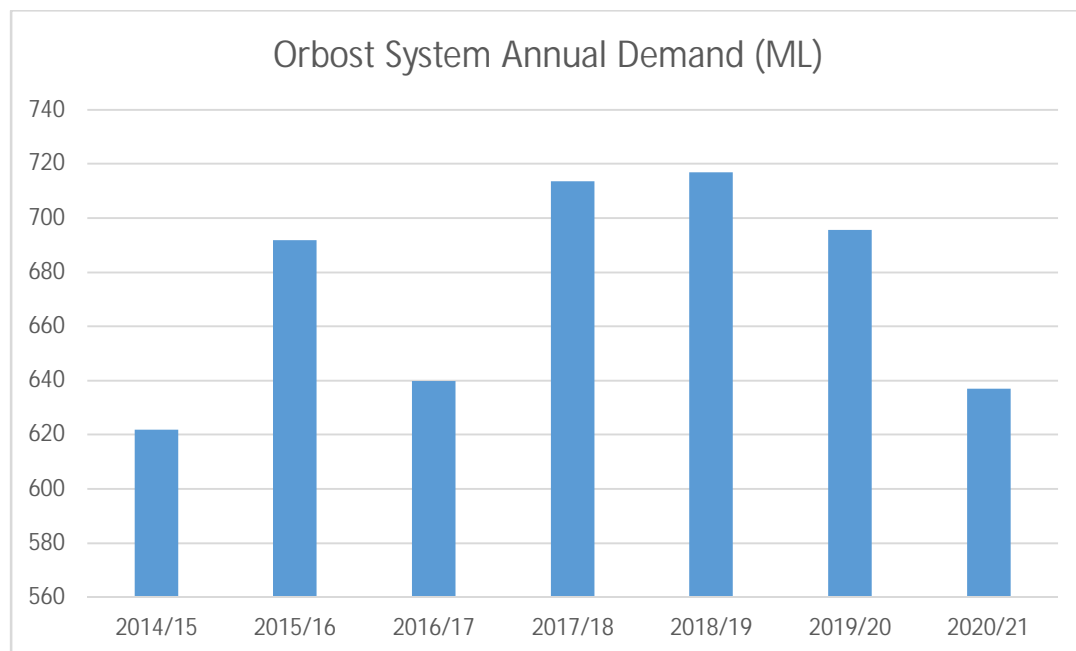


Figure 2-2: Annual Water Demand Orbost System (ML)

2.3 Mallacoota Water Supply

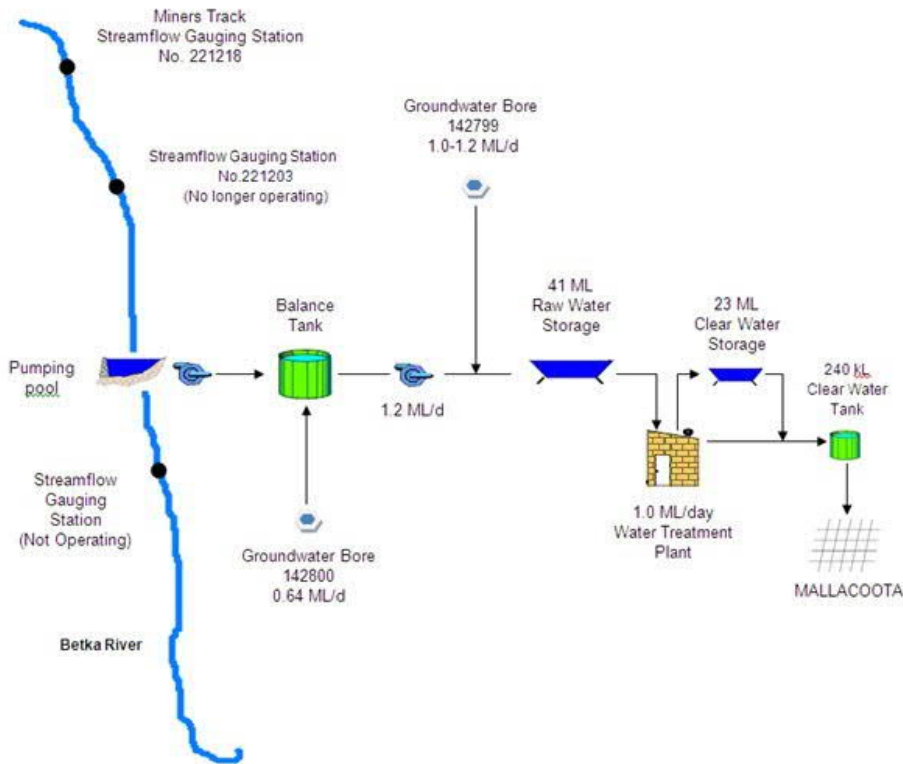
2.3.1 Mallacoota System Configuration

Township Supplied: Mallacoota

The Mallacoota System is supplied with water from the Betka River and from 3 Ground water Bores. There are 1008 Connections in Mallacoota.

System Operation

Water is pumped from either the Betka River or one of three operational groundwater bores and stored in a 41ML raw water storage before being treated. It is then transferred to a 23ML clear water storage basin or 0.24ML clear water tank before being delivered to customers.



2.3.2 Mallacoota Water Supply Information

Water Source	Volume Available (ML)	Volume Used 2020/21 (ML)
Betka River (Bulk Entitlement)	330.0	69.7
Groundwater	220.0	87.1
Total:	550.0	156.7

Storage	Size (ML)	Volume Instore (ML Nov 2021)	Percentage Instore
Raw water	41.0	35.3	86%
Treated Water	23.0	16.2	70%
Total:	64.0	51.5	80%

2.3.3 Mallacoota Demand Information

Figure 2-3 shows the annual demand for water at Mallacoota over the past 7 years. This is showing a gradually increasing trend. In normal years consumption in Mallacoota can be greatly affected by the number of tourists in the town. The continued covid 19 situation has seen people move from the city to the country, in Mallacoota this has meant that houses which were occasionally occupied now have full time residents, consequently demand for water has not reduced. EGW is predicting that 2021-2022 annual demand for the Mallacoota will be around 175ML.

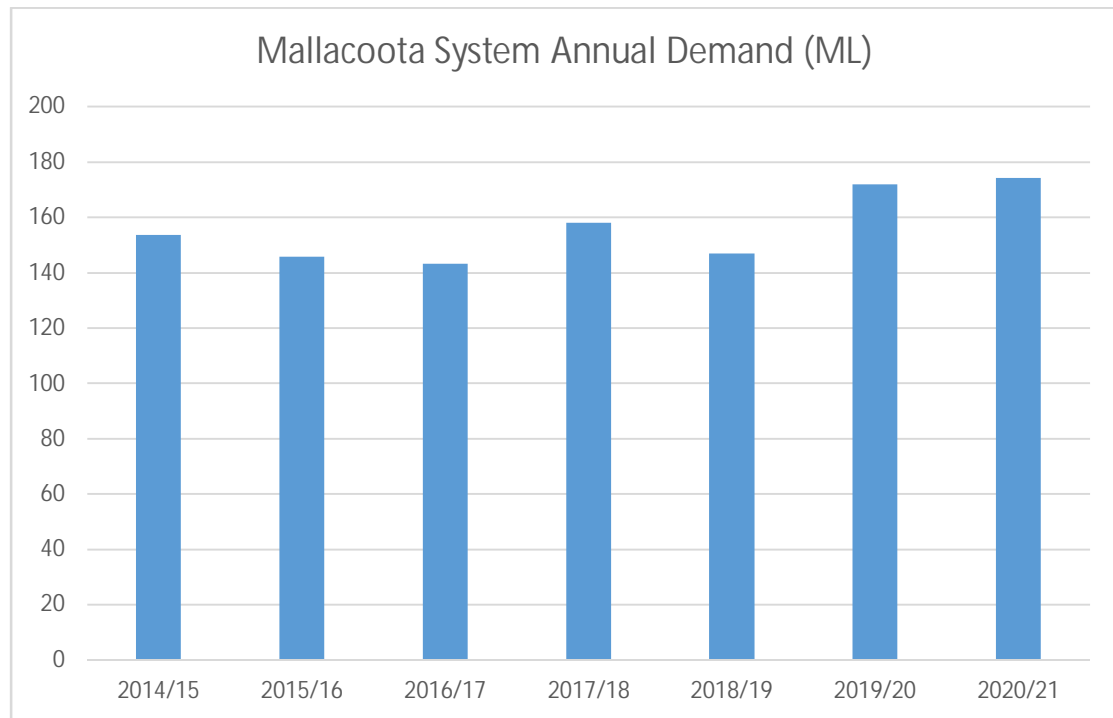


Figure 2-3: Annual Demand Mallacoota (ML)

2.4 Dinner Plain Water Supply

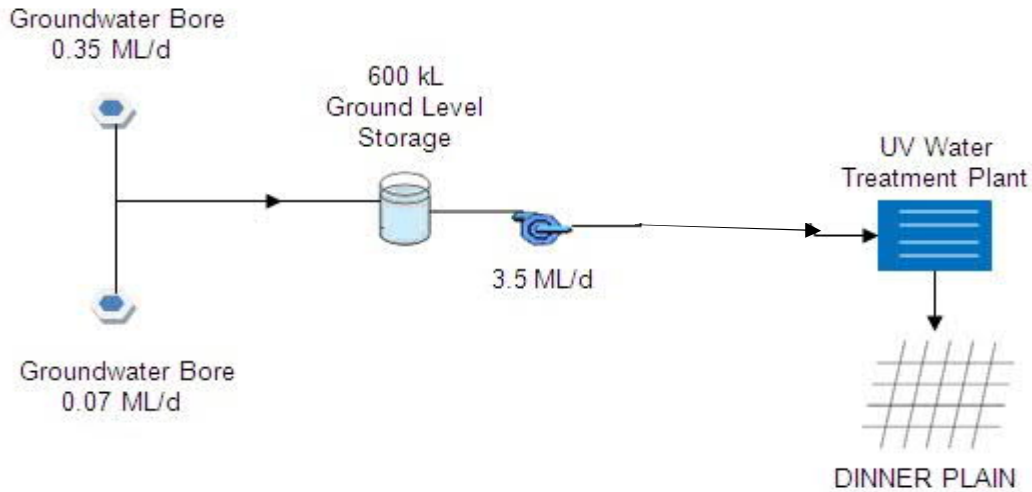
2.4.1 Dinner Plain System Configuration

Township Supplied: Dinner Plain

The Dinner Plain system is supplied with water from two groundwater bores. There are 395 connections in Dinner Plain.

System Operation

Water is pumped from two groundwater bores into a 600kL storage, from here it is pressurized and passed through an Ultraviolet disinfection plant before being delivered to customers via the reticulation network.



2.4.2 Dinner Plain Water supply Information

Water Source	Volume Available (ML)	Volume Used 2020/21 (ML)
Ground Water Bores	120.0	46.9

Storage	Size (ML)	Volume Instore (ML Nov 2021)	Percentage Instore
Raw water	0.6	0.6	100%

2.4.3 Dinner Plain Demand Information

Figure 2-4 shows the annual demand for water at Dinner Plain over the past 7 years. It can be seen that demand has varied over time and with a minority of permanent residents, demand is directly affected by the number of tourists in the town. It is anticipated that visitor numbers will increase in Dinner Plain during the coming twelve months. EGW is predicting annual demand for 2021-2022 will be around 50ML.

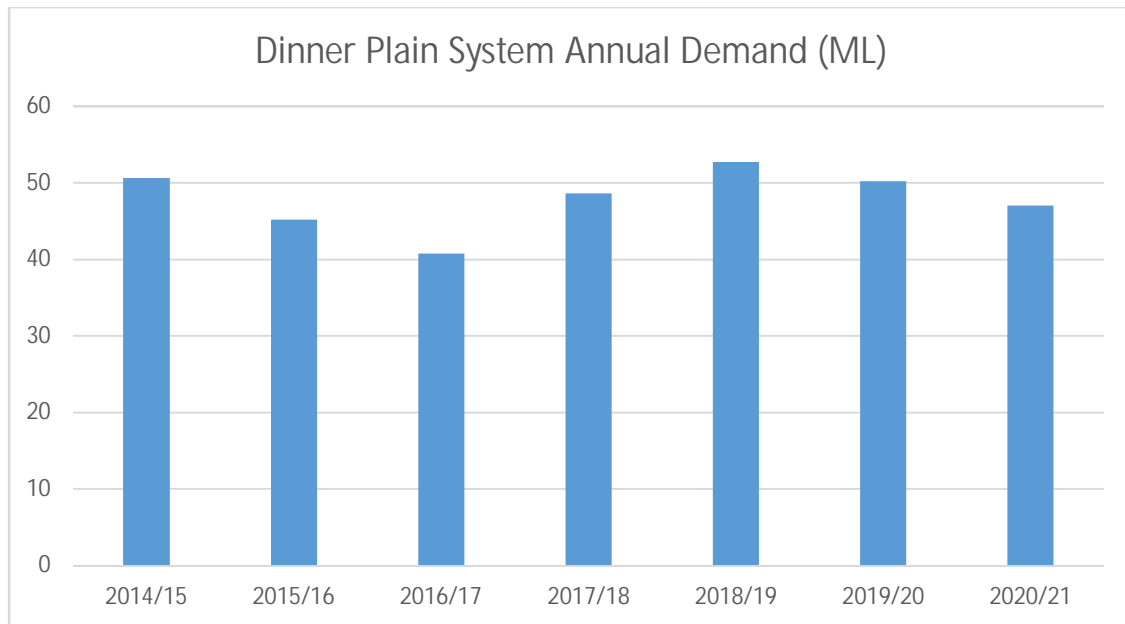


Figure 2-4: Annual Demand Dinner Plain (ML)

2.5 Omeo Water Supply

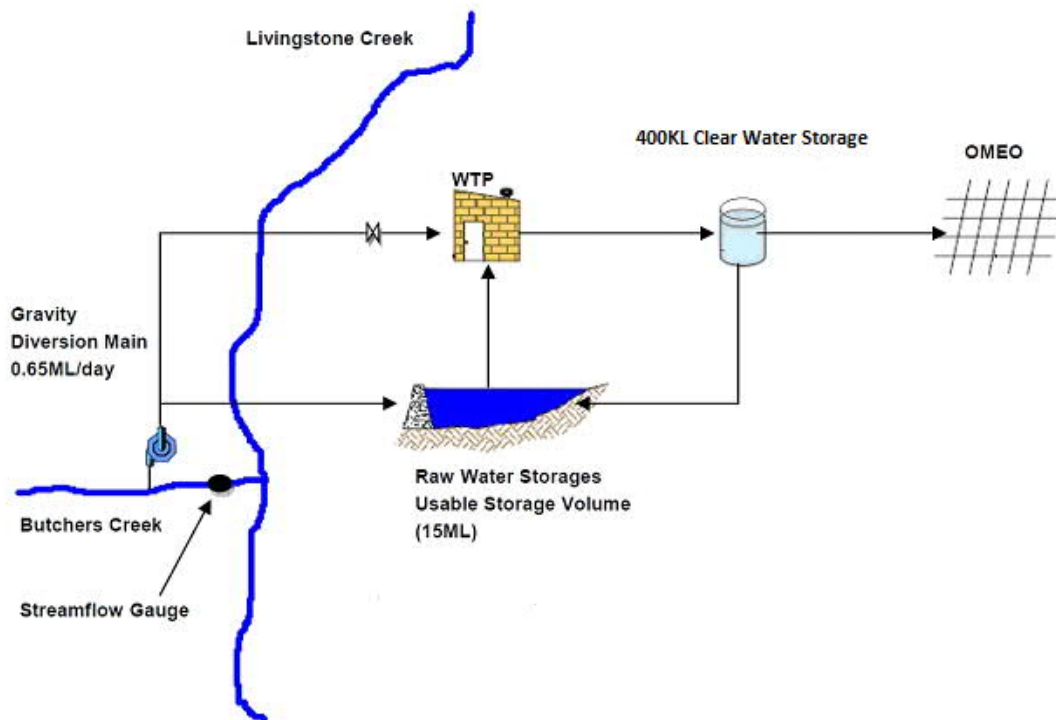
2.5.1 Omeo System Configuration

Township Supplied: Omeo

The Omeo system is supplied with water from Butchers Creek. There are 262 connections in Omeo.

System Operation

Water is transferred via gravity to one of two raw water storages. It is then treated before being stored in one of two 200kL clear water storages and delivered to customers via the reticulation network.



2.5.2 Omeo Water Supply Information

Water Source	Volume Available (ML)	Volume Used 2020/21 (ML)
Butchers Creek (Bulk Entitlement)	77.0	47.9

Storage	Size (ML)	Volume Instore (ML Nov 2021)	Percentage Instore
Raw water	15.2	12.9	85%
Treated Water	0.4	0.4	100%
Total:	15.6	13.3	85%

2.5.3 Omeo Demand Information

Figure 2-5 shows the annual demand for water in Omeo over the past 7 years. The recent downward trend is likely to be a result of declining permanent population in the town. Many houses in Omeo have been bought by investors hoping to capitalize on the construction of a new mountain bike track, and are mostly empty. EGW is predicting annual demand for 2020-2021 will be around 50ML.

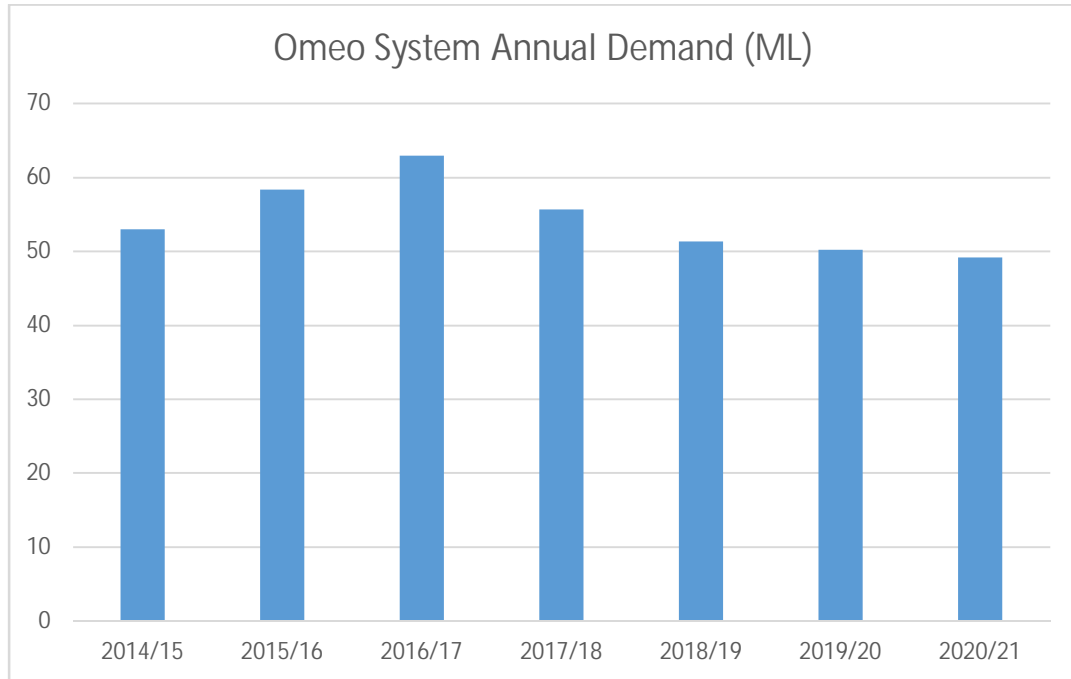


Figure 2-5: Annual Demand Omeo (ML)

2.6 Swifts Creek Water Supply

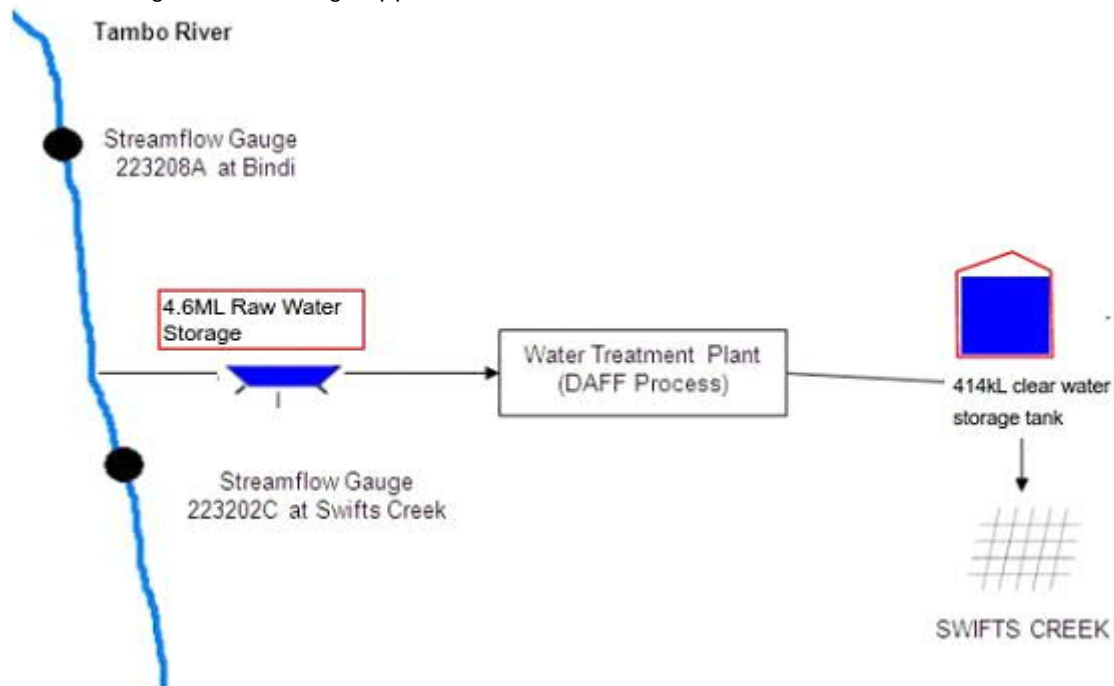
2.6.1 Swifts Creek Configuration

Township Supplied: Swifts Creek

Swifts Creek is supplied with water from the Tambo River. There are 128 connections in Swifts Creek.

System Operation

Water is pumped from the Tambo River and stored in a 4.6ML raw water storage. It is treated in a Dissolved Air Flocculation (DAFF) plant and then stored in a 414kL Clear water storage before being supplied to customers via the reticulation network.



2.6.2 Swifts Creek Supply Information

Water Source	Volume Available (ML)	Volume Used 2020/21 (ML)
Tambo River (Bulk Entitlement)	224.0	21.6

Storage	Size (ML)	Volume Instore (ML Nov 2021)	Percentage Instore
Raw water	4.6	3.6	78%
Treated Water	0.4	0.4	100%
Total:	5.0	4.0	80%

2.6.3 Swifts Creek Demand Information

Figure 2-6 shows the annual demand for water in Swifts Creek over the past 7 years. It shows a steady decrease in consumption caused by both a return to wetter conditions and a declining permanent population in the town. EGW is predicting annual demand for 2021-2022 will be around 22ML.

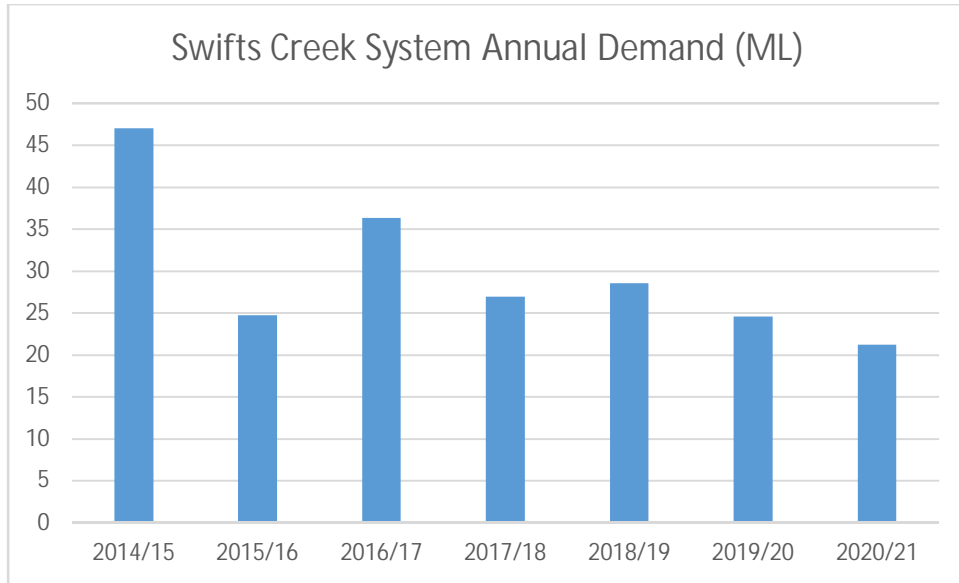


Figure 2-6: Swifts Creek Annual Demand (ML)

2.7 Buchan Water Supply

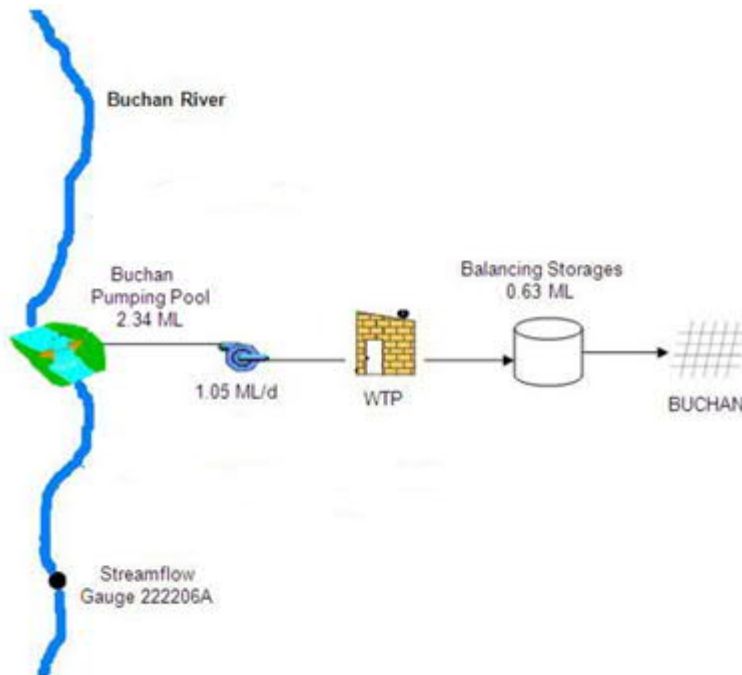
2.7.1 Buchan System Configuration

Township Supplied: Buchan

Buchan Is supplied with water from the Buchan River. There are 109 connections in Buchan.

System Operation

Water in Buchan is pumped directly from the Buchan River into a water treatment plant. From here it is transferred to a 640kL storage and reticulated to customers.



2.7.2 Buchan Water Supply Information

Water Source	Volume Available (ML)	Volume Used 2020/21 (ML)
Buchan River (Bulk Entitlement)	170.0	16.5

Storage	Size (ML)	Volume Instore (ML Nov 2021)	Percentage Instore
Treated Water	0.6	0.6	100%

2.7.3 Buchan Demand Information

Figure 2-7 shows the annual demand for water in Buchan over the past 7 years. The recent downward trend is likely to be a result of declining population, as well as a reduction in tourists due to Covid-19. EGW is predicting the annual demand for 2021-2022 to be around 17ML.

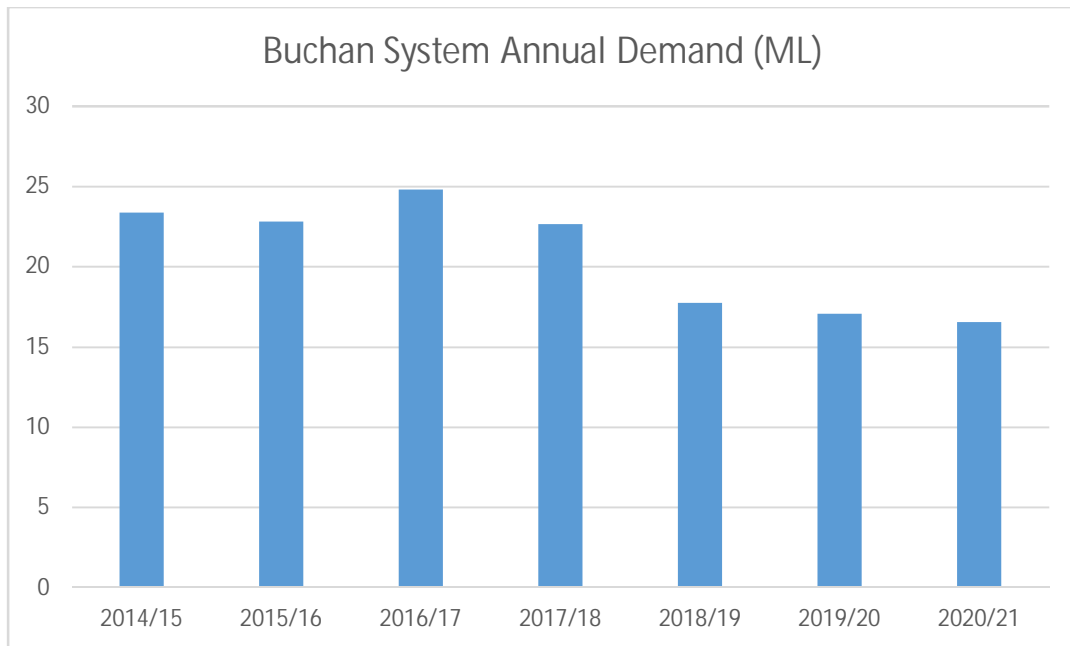


Figure 2-7: Buchan Annual Demand (ML)

2.8 Bemm River Water Supply

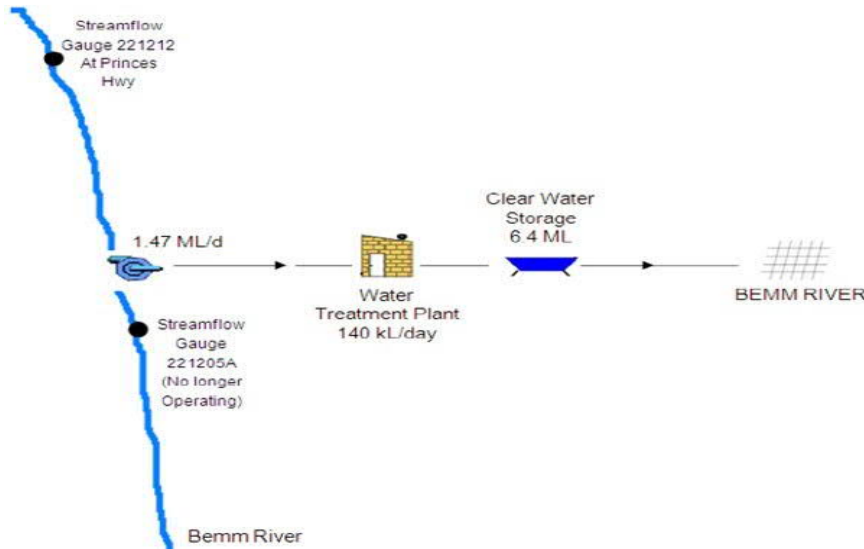
2.8.1 Bemm River System Configuration

Township Supplied: Bemm River

The town of Bemm River is supplied with water from the Bemm River. There are 101 Connections.

System Configuration

Water is pumped from the Bemm River and stored in a 6.4ML raw water storage. It is then treated, stored in a 500kL clear water storage and delivered to customers.



2.8.2 Bemm River Supply Information

Water Source	Volume Available (ML)	Volume Used 2020/21 (ML)
Bemm River (Bulk Entitlement)	100.0	13.7

Storage	Size (ML)	Volume Instore (ML Nov 2021)	Percentage Instore
Raw water	6.4	4.9	77%
Treated Water	0.5	0.5	100%
Total:	6.9	5.4	78%

2.8.3 Bemm River Demand Information

Figure 2-8 shows the annual demand in Bemm River over the past 7 years. Demand fluctuates depending on the number of tourists visiting the town. EGW is predicting annual demand for 2021-2022 will be around 16ML.

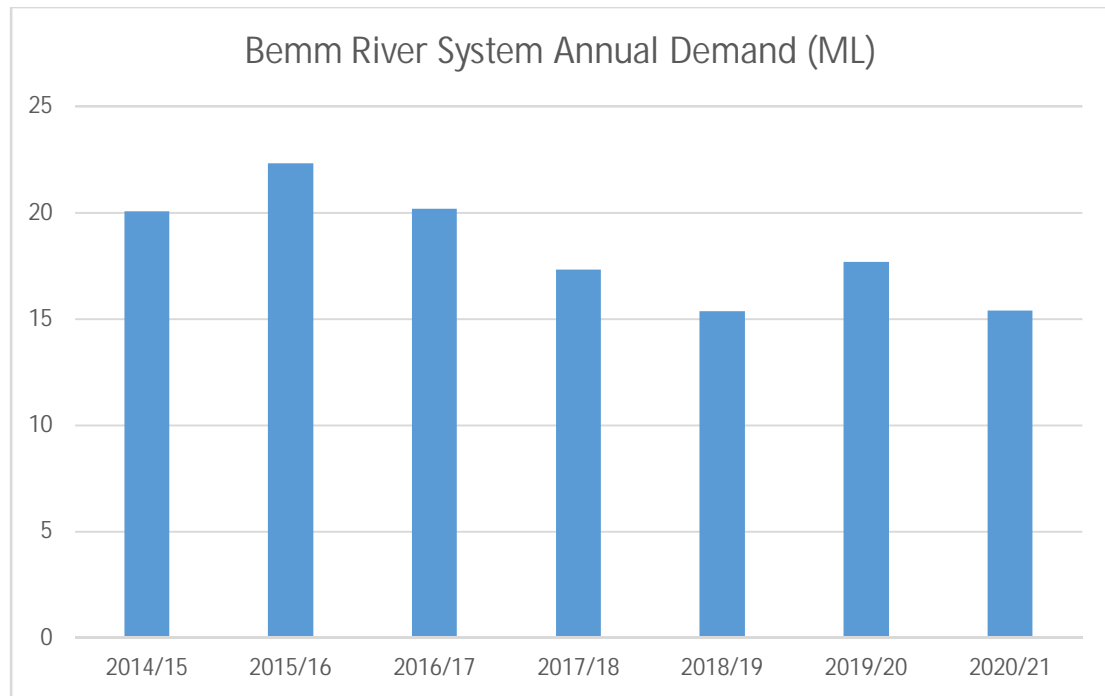


Figure 2-8: Bemm River Annual Demand (ML)

2.9 Cann River Water Supply

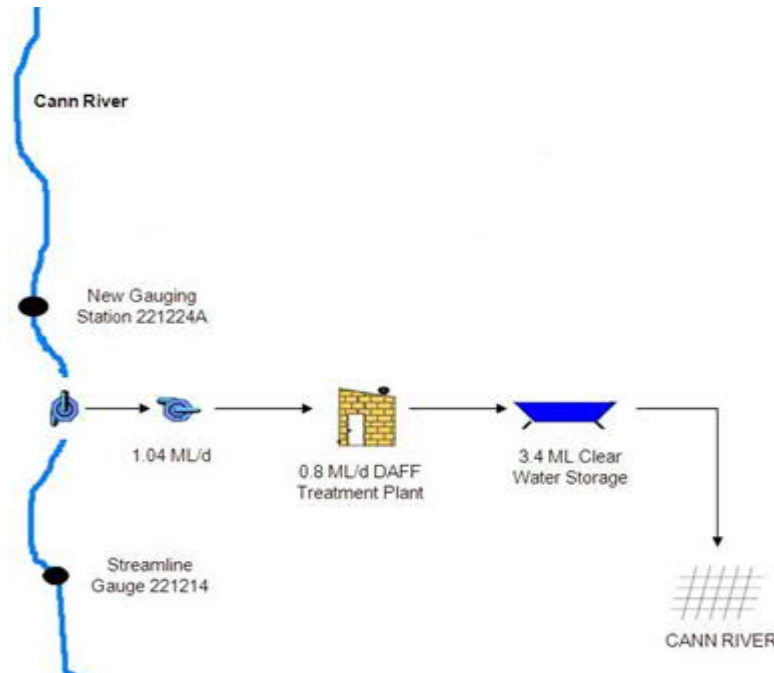
2.9.1 Cann River Configuration

Township Supplied: Cann River

The township of Cann River is supplied with water from the Cann River. There are 194 connections.

System Configuration

Water is pumped from the Cann River and stored in a 3.4ML raw water storage. It is then treated, stored in a 350kL clear water storage and delivered to customers via the reticulation.



2.9.2 Cann River Supply Information

Water Source	Volume Available (ML)	Volume Used 2020/21 (ML)
Cann River (Bulk Entitlement)	192.0	27.9

Storage	Size (ML)	Volume Instore (ML Nov 2021)	Percentage Instore
Raw water	3.4	3.4	100%
Treated Water	0.4	0.4	100%
Total:	3.8	3.6	100%

2.9.3 Cann River Demand Information

Figure 2-9 shows the annual demand for water in Cann River over the past 7 years. EGW is predicting annual demand for 2021-2022 will be around 35ML.

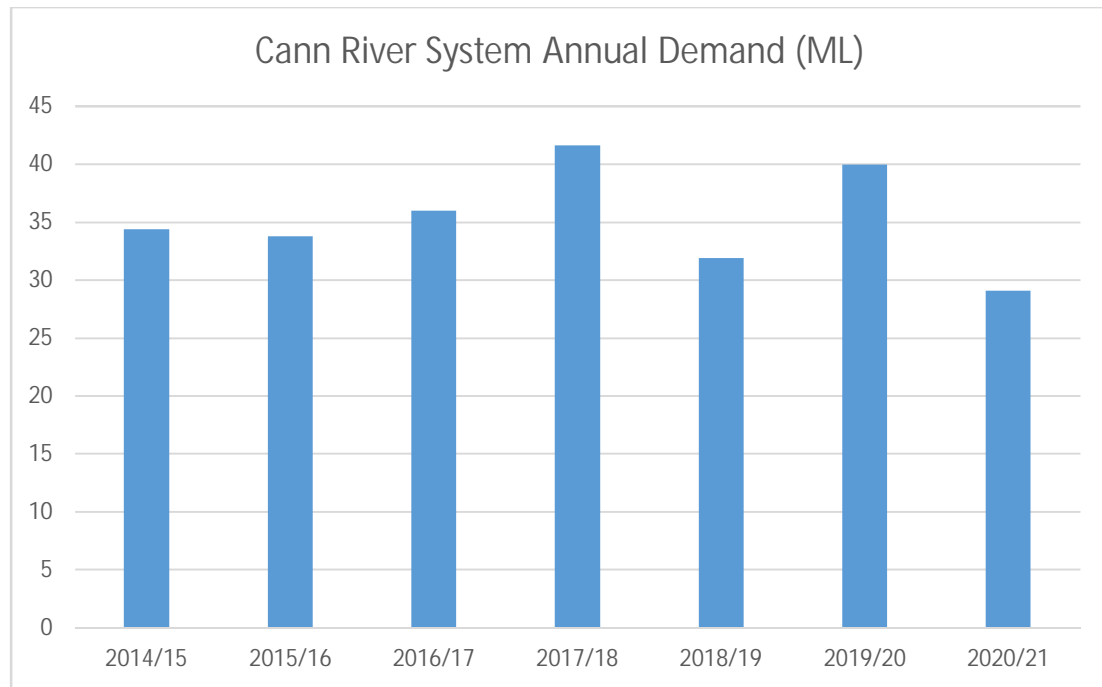


Figure 2-9: Cann River Annual Demand Information (ML)

3 CLIMATE OUTLOOK

3.1 East Gippsland Outlook

The Bureau of Meteorology's climate outlook provides the following summary for the period December 2021 to February 2022:

- December to February rainfall is likely to be above median for parts of eastern Australia, with highest chances for eastern Queensland.
- December to February maximum temperatures are likely to be above median for much of WA, the NT, much of Queensland, northern and eastern SA, western NSW, western and central Victoria, and Tasmania (greater than 60% chance). Below median daytime temperatures are likely for eastern NSW extending into eastern Victoria (chance of exceeding the median is less than 40%).

Figure 3-1 and Figure 3-2 show the Bureau of Meteorology's predicted likelihood of above average rainfall and below average maximum temperatures for the period December 2021 to February 2022. Figure 3-1 suggests that there is a 55-60% chance of above average rainfall across all of EGW's catchments. Figure 3-2 predicts a greater chance of below average maximum temperatures across East Gippsland.

The regional climate outlook suggests that higher stream flows are most likely for December to February across Eastern Australia coupled with reduced demand resulting from predicted lower temperatures.

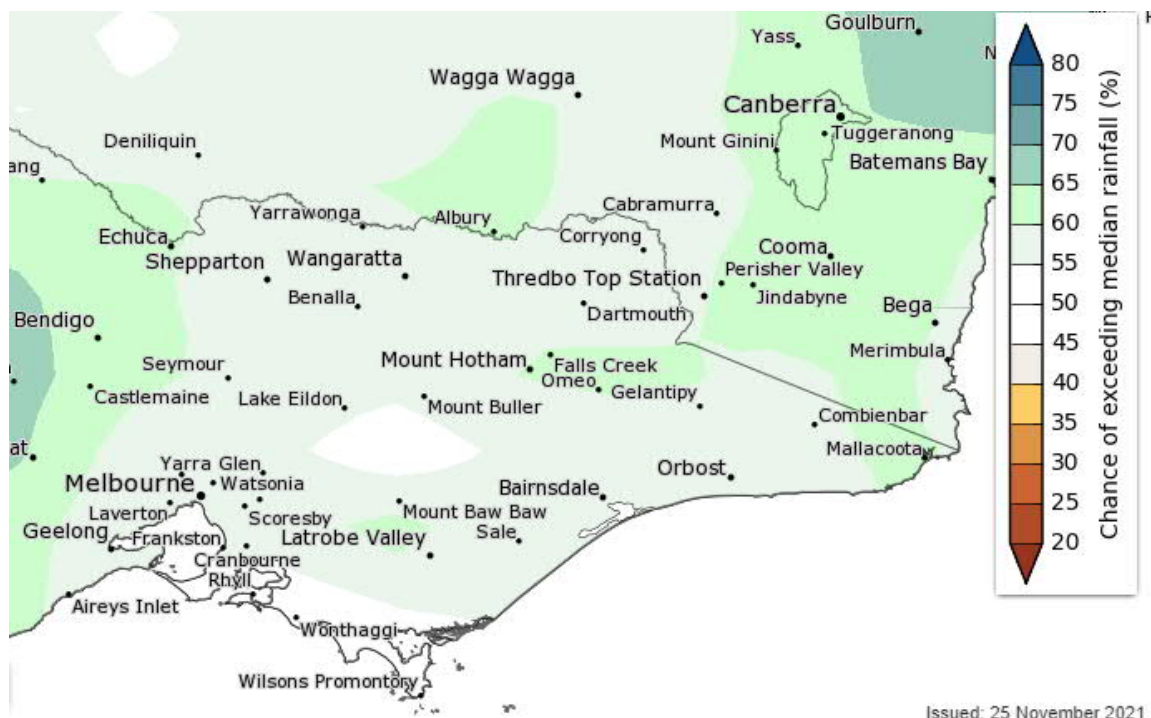


Figure 3-1: Predicted probability of above median rainfall for period December 2021 to February 2022 (Bureau of Meteorology prediction issued 25th Nov, 2021).

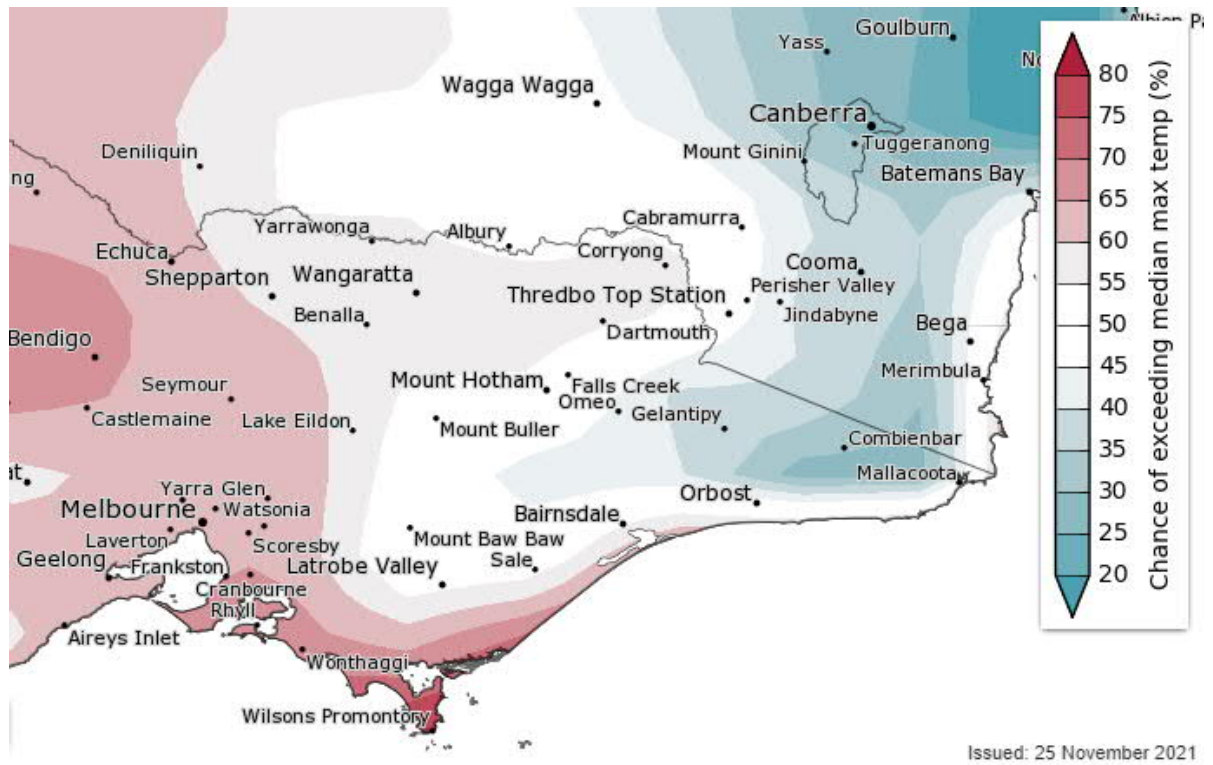


Figure 3-2: Predicted probability of exceeding median maximum temperature for period December 2021 to February 2022 (Bureau of Meteorology prediction issued 25th Nov, 2021).

4 FORWARD OUTLOOK

4.1 Mitchell System Forward Outlook

4.1.1 Short term strategy

Following some good falls of rain over the past twelve months the Mitchell River catchment has somewhat recovered from three years of drought. However, there still remains a longer term deficit in rainfall and given the unreliable climate in East Gippsland in any year it remains possible that in late summer the Mitchell streamflow could drop below levels at which EGW is allowed to extract water under its bulk entitlement. The Woodglen storages were drawn down over winter to allow water to be turned over and chemically dosed to reduce algal levels, and have been refilled.

Water from the Mitchell River is currently being injected into five groundwater bores in the Woodglen area as additional raw water storage. The Aquifer Storage and Recovery (ASR) groundwater license allows up to 200ML to be stored in the aquifer for later use when needed. Currently 178ML of injected bore water is available for use under East Gippsland Water's ASR licence; however, it is anticipated that this will be closer to 200ML by the time that streamflows drop and spare water to inject becomes unavailable. The ASR volume of water is in addition to 171ML of a separate "take and use" licence, giving a current total of 349ML of groundwater available.

The planning stage is underway for an additional raw water storage at Woodglen. This proposed Woodglen Basin 3 will provide additional buffer during periods of low flow in the Mitchell River and if constructed would lessen the likelihood of future restrictions to customers in the Mitchell system. This project does not impact the outlook for this summer period.

4.1.2 Outlook

Figure 4-1 illustrates the daily Mitchell River flow over the last three years plotted against the average daily flow since 2010. The data shows the current flows are trending close to average and much higher than in the drought year of 2019.

Figure 4-2 shows the cumulative monthly rainfall at Dargo (representative of the Mitchell River catchment) over the past five years as well as the long term average (1939 to present). This shows that the rainfall totals for 2017 to 2019 were significantly below average; however, the 2020 and 2021 rainfall totals are much greater. Despite the deficit of previous drought years this is a good indication that streamflow's in the coming summer are likely to be close to average.

Over the 2017 to 2020 the Mitchell flows dropped below 265ML/day (which is the trigger for restricted pumping by EGW) progressively earlier in each successive year. Refer table below.

Summer	Date of restricted pumping
2017	5 th February
2018	23 rd January
2019	5 th January
2020	11 th December (2019)
2021	19 th March

However in 2021 the Mitchell river did not drop below 265ML per day until the 19th of March and then for less than a week. It is difficult to forecast when the trigger for restricted pumping will occur in 2022; however, given current stream flows, and the positive outlook from the BoM, it is considered unlikely to occur before late February or early March 2022. With the river highly unlikely to drop to the level at which there is a total ban on pumping this summer.

Figure 4-3, Figure 4-4 and Figure 4-5 illustrate the actual raw water storage volumes since the beginning of 2021 and the predicted raw water storage volumes for the following rainfall and streamflow scenarios:

- Average
- Dry (stream flows equivalent to summer 2018/19)
- Very dry (stream flows equivalent to the summer of 2006/07)

The graphs also show the amended Stage 4 water restrictions trigger with stage 2 restrictions (not shown) introduced when extraction from the Mitchell River stops.

The information in Figure 4-3 (considered the most probable scenario) shows that:

- For an average rainfall scenario with average Mitchell River flows the supply and demand over the up-coming summer period is approximately balanced with raw water storage remaining at close to capacity.

The information in Figure 4-4 (considered possible but unlikely) shows that:

- For a dry scenario similar to the summer of 2018/19, extraction from the river stops in late February for around a month.
- Stage two water restrictions are triggered once extraction from the Mitchell ceases.
- Stage 4 water restriction triggers are not reached
- Storages recover quickly during April and May.

The information in Figure 4-5 (considered highly unlikely) shows that:

- For a very dry scenario similar to the summer of 2006/07 where extraction from the river stops around the start of December until mid-February and again for much of March.
- Stage two water restrictions are triggered once extraction from the Mitchell ceases.
- Stage 4 water restriction triggers are likely to be reached by early February at which point EGW would have 60 days water supply remaining.

4.1.3 Overall outlook and probability of water restrictions

Above average Rainfall in the Mitchell Catchment for most of 2021 has meant an end to the drought conditions seen between 2017-2020. BoM outlooks are predicting above average rain and below average temperatures. Given the current position it is probable that streamflows over the coming summer in the Mitchell will be greater than in the previous few years. The most likely scenario is that streamflows follow the normal average and may drop below 265ML/day (the level for restricted pumping) briefly in late March, and remain well above the trigger level for stage two water restrictions. Given this the likelihood of water restrictions is rated at "Unlikely" using the DELWP (2017) grading system.

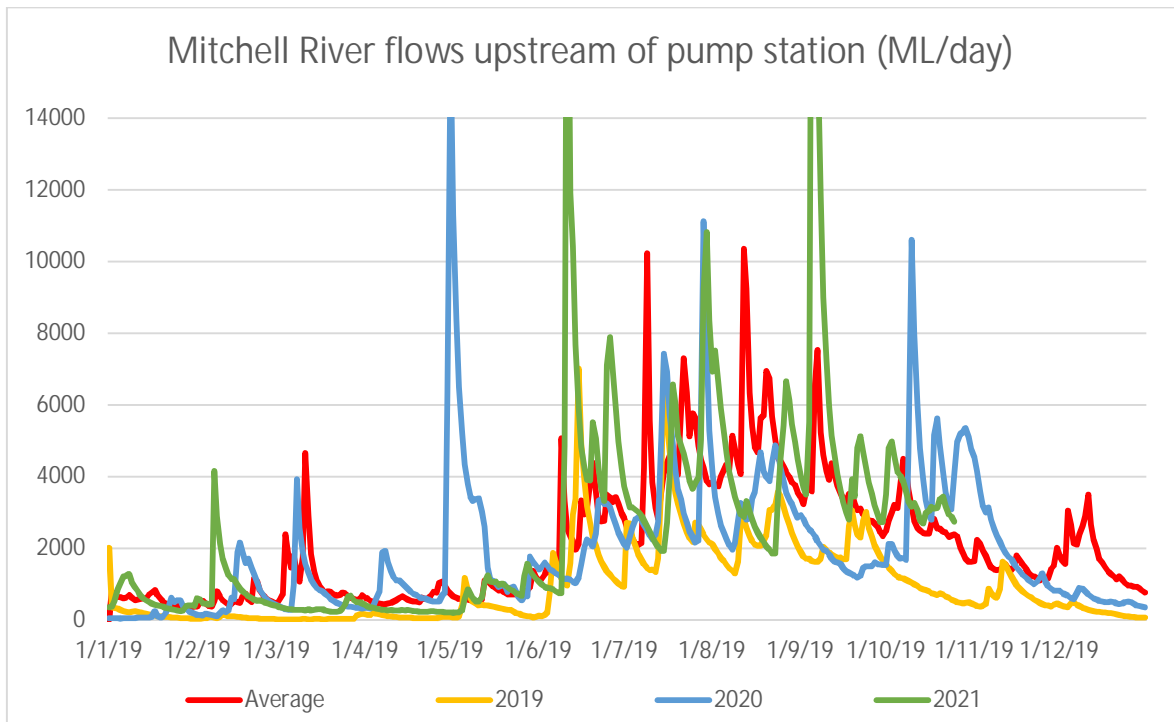


Figure 4-1: Mitchell River at Glenaladale daily flow over last 4 years compared to average flow (2010-2020)

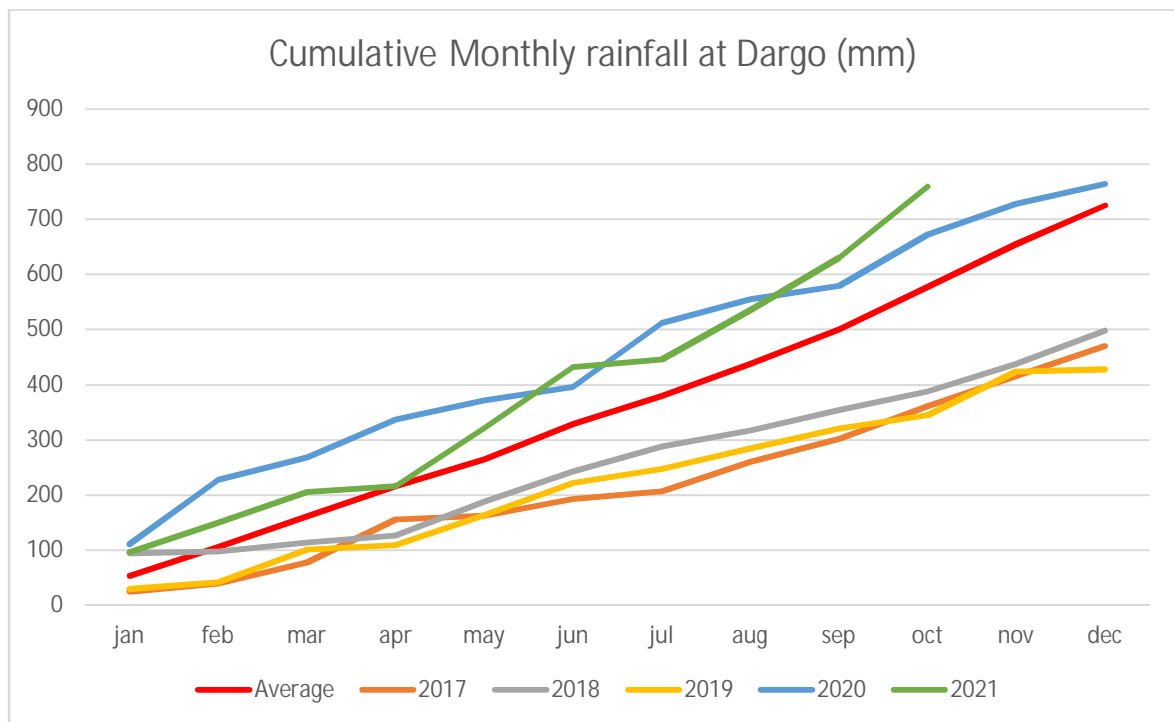


Figure 4-2: Cumulative Monthly Rainfall at Dargo (Long term average rainfall 1939 to present)

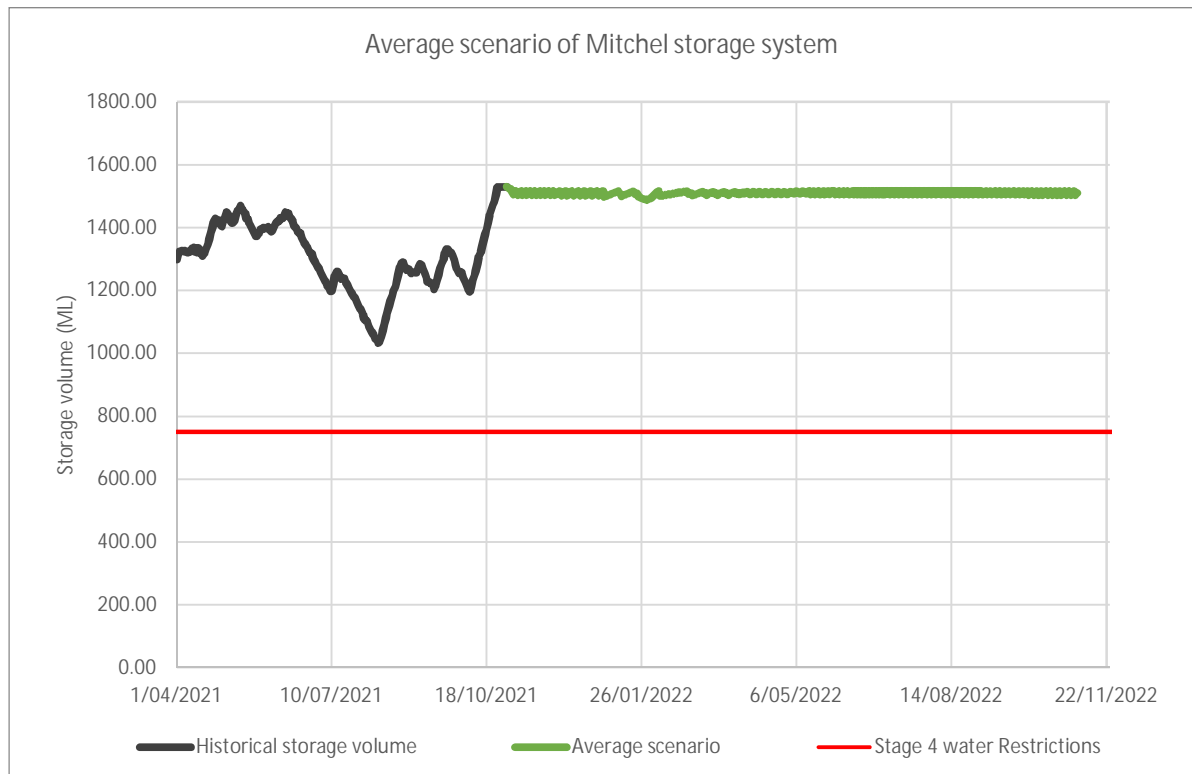


Figure 4-3: Woodglen Storages Average Scenario (probable)

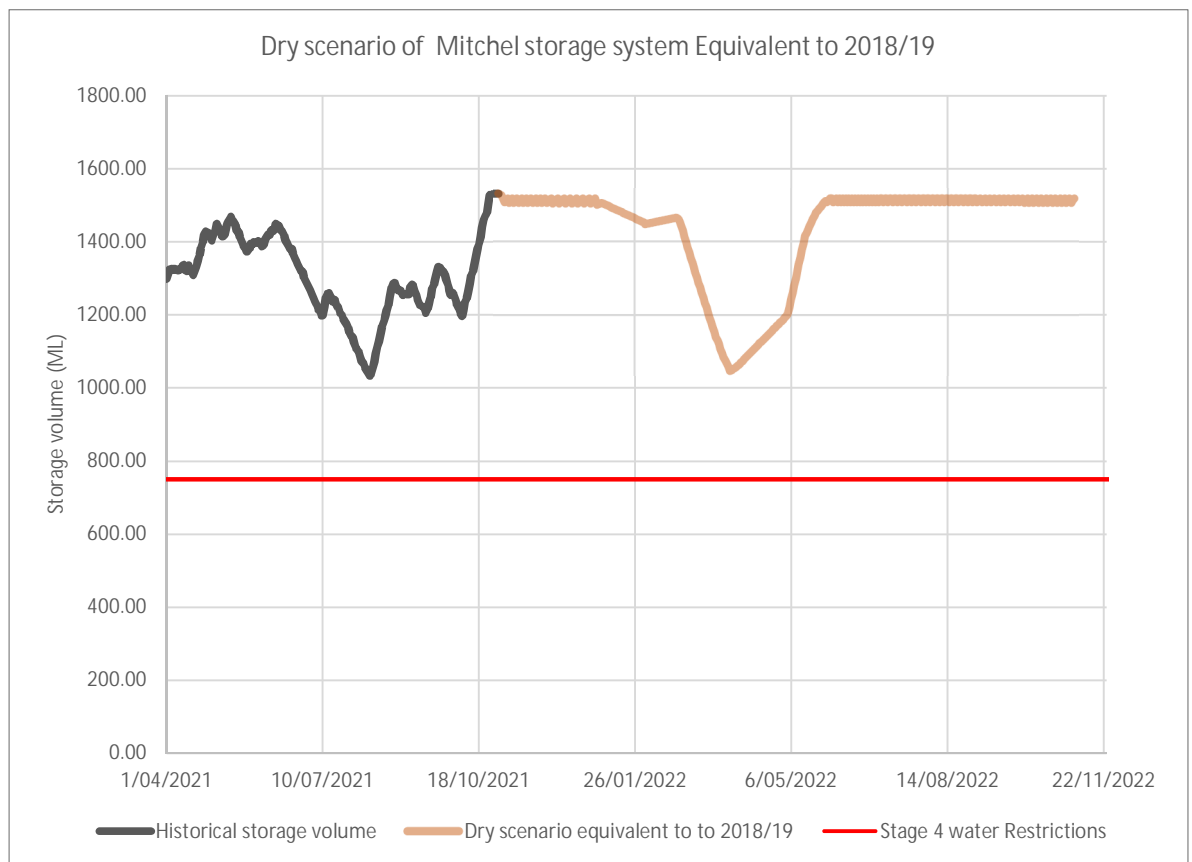


Figure 4-4: Woodglen Storages Dry Scenario (possible but unlikely)

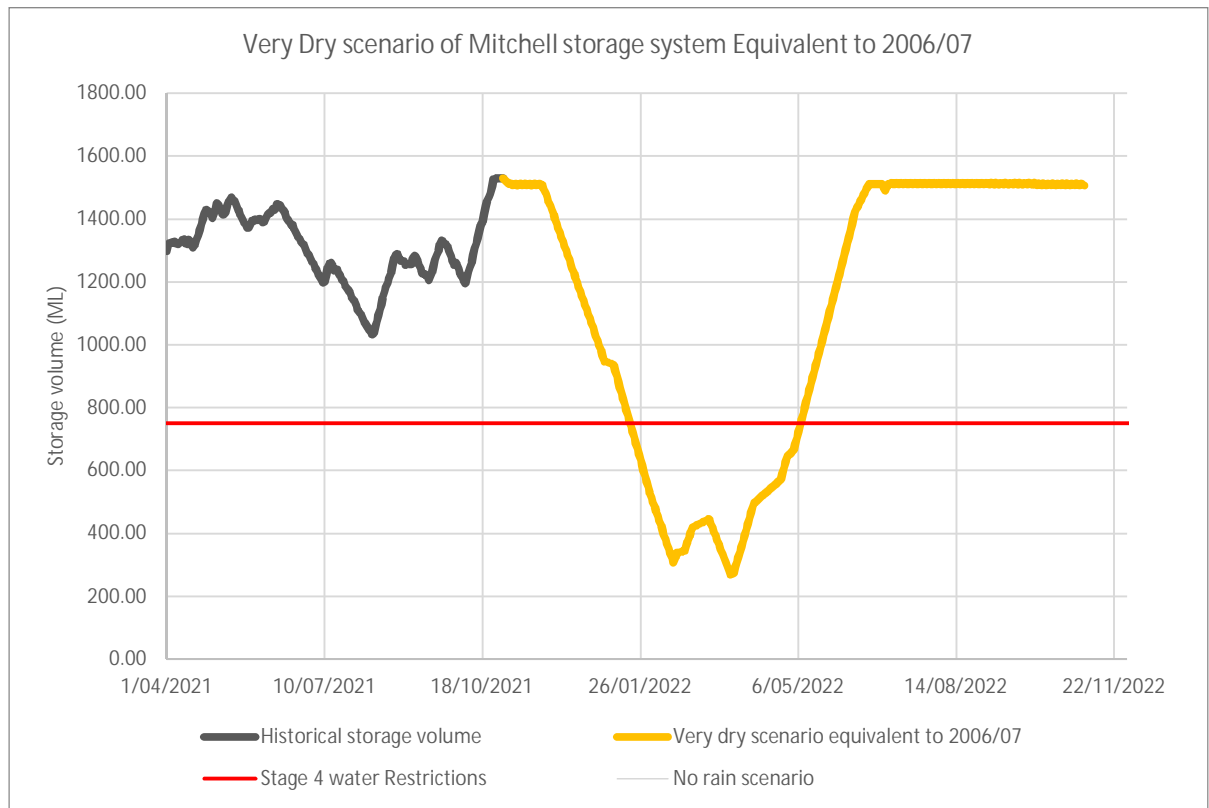


Figure 4-5: Woodglen Storages Very Dry Scenario (highly unlikely)

4.2 Orbost System Forward Outlook

4.2.1 Short term strategy and 5 year plan

The strategy to ensure demand can be met over the up-coming summer is to ensure that all storages are as full as possible. Experience over the past summer post bushfire (when much of the Brodribb River catchment was burnt) has shown the importance of pre-treatment of highly turbid water. Infrastructure has been permanently installed so that this can be quickly implemented whenever a dirty water event occurs.

In the longer term, new clear water storages at both Orbost and Marlo are proposed to ensure peak demands can continue to be met.

4.2.2 Outlook

Flow in the Brodribb River is considered reliable and the requirement of water restrictions has been rare (2 instances since 1973). Figure 4-6 shows that over the period 1975 to June 2015, flows in the Brodribb River have never exceeded the limit for a reduction in pumping under the Bulk Entitlement rules. The minimum flow recorded over the entire period of record dating back to 1922 is 16.4 ML/day in Feb 2010 followed by 17.0 ML/day in Feb 2007, which is well in excess of the 5.74ML/d trigger for a reduction in pumping. Annual extraction volumes are significantly below the maximum allowable in the Bulk Entitlement and are likely to remain so for the foreseeable future.

Historical flow records, and the conditions of the bulk entitlement, and current climatic conditions estimate the likelihood of water restrictions over the up-coming summer period to be at a rating of "rare" using the DELWP (2017) grading system.

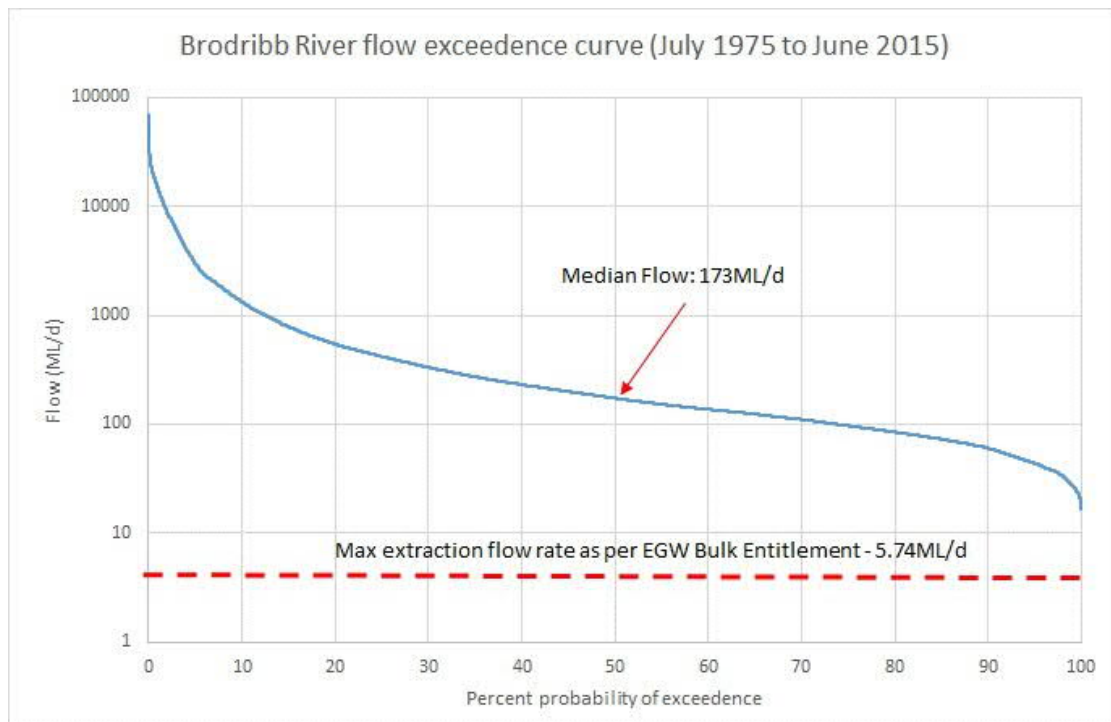


Figure 4-6: Brodribb River flow exceedance – 1975 to 2015

4.3 Mallacoota Forward Outlook

4.3.1 Short term strategy and 5 year plan

The strategy to ensure demand can be met over the up-coming summer is to ensure that all storages are as full as possible.

Over the past year a fourth bore (drilled some years ago) has been commissioned. This bore has been equipped with a dedicated solar pump to reduce emissions and provide uninterrupted service during power outages. Preliminary tests have shown that it is capable of supplying enough water to supply approximately 100 houses per day or 10% of Mallacoota. This will increase as the days get longer and solar radiation increases.

Over the longer term, a replacement treated water storage has been planned.

4.3.2 Outlook

During drought years the Betka River has become increasingly unreliable as a source of water for Mallacoota, with 2019/20 seeing 26ML just being harvested. However, in 2020/21 flows improved due to good rainfall and some 70ML was able to be harvested. Groundwater has proven a more reliable source with bores being pumped at a rate of approximately 12l/s intermittently without any long term impact on groundwater levels (EGW, 2018).

A water balance developed as part of the Urban Water Strategy showed that groundwater supply alone is sufficient to cater for current summer demands. This has been proven over the three summers of drought.

Given the flexibility of having a climate “independent” groundwater supply and a storage capacity representing 40% of annual demand, the likelihood of water restrictions in the coming summer period is rated as “rare” using the DELWP (2017) grading system.

4.4 Dinner Plain Forward Outlook

4.4.1 Short term strategy and 5 year plan

Peak demand at Dinner Plain occurs in the winter snow season. During the winter of 2021 visitation and water usage was again low due to Covid-19. During the previous winter and summer supply was maintained to meet demand of the village.

No further capital works are planned over the coming 5 year period.

4.4.2 Outlook

Given the two groundwater bores at Dinner Plain are a relatively climate independent source, predictions on supply meeting demand have greater certainty than for a surface water source. A water balance model developed for the Urban Water Strategy suggests that the current groundwater bores and 600kL storage can meet predicted demand to at least 2040. Post the 2021 snow season Dinner Plain has experienced good falls of rain and with the ground water levels just below surface it is likely that the aquifer has been well recharged.

Given the relative climate independence of the two groundwater bores, the likelihood of water restrictions in the next 12 months is rated as “Very Rare” using the DELWP (2017) grading system.

4.5 Omeo Forward Outlook

4.5.1 Short term strategy and 5 year plan

The key short-term strategy to ensure up-coming peak summer demands can be met is to keep the storages as full as possible.

Hexagonal floating discs were installed on the lined 10ML raw water storage to protect against algae outbreaks and reduce evaporation. An additional 200kL treated water storage was installed to increase Omeo's security of supply.

No further capital works on the Omeo system are planned for the next 5 years.

4.5.2 Outlook

A water balance developed for the Urban Water Strategy suggests that with the lowest Butchers Creek flow on record (2009/10), there is sufficient raw water storage to ensure that current demand is able to be met without water restrictions.

There is a small chance that in extreme circumstances it may be necessary to cart some water from Omeo to Swifts Creek to cover a water shortage there. This was necessary in 2006/07, however given improvements at Swifts Creek and the fact that it has not been required in the most recent three drought years it is considered unlikely.

The Butchers Creek catchment is situated north of the Great Dividing Range and receives the tail end of rainfall events from the north east that other parts of East Gippsland do not receive. Throughout winter and in early spring it has received more rainfall than other catchments across East Gippsland. The extra rainfall and positive seasonal outlook means it is unlikely that Butchers Creek will cease to flow for an extended period if at all this summer. Storage volumes in Omeo are sufficient to withstand a cease flow event in Butchers Creek for a couple of months without the need for water restrictions.

Therefore, the likelihood of water restrictions in the next 12 months is rated as "Rare" using the DELWP (2017) grading system.

4.6 Swifts Creek Forward Outlook

4.6.1 Short term strategy and 5 year plan

The key strategy to ensure up-coming peak summer demands can be met is to keep the storages at or close to capacity and ensure the off-take pool in the Tambo River is as deep and clear of obstacles as possible.

A submersible pump was installed at the Swifts Creek off take during the 2019 summer which allowed water harvesting to be undertaken at very low river levels. This proved successful and allowed supply to be maintained throughout the 2017-2020 drought being a very dry period.

No further capital works are planned over the coming 5 year period.

4.6.2 Outlook

The Urban Water Strategy concludes that although calculations show that current demand can be mostly met based on historical flows and current storage volumes, the biggest risk

to meeting demand is the occasional cease to flow event in the Tambo River. Since 1947, the flow in the Tambo River has dropped below 1 ML/d approximately 8 times with one cease to flow event in 2007. In such low flow events, water restrictions are likely. For instance, since 1998, there have been 3 instances of water restrictions imposed in Swifts Creek due to low flow events. In the event of an extended no flow event in the Tambo River water can be trucked in to supply the town. This was carried out successfully in 2003 and again in 2006 when potable water was carted from Omeo. Following the installation of the raw water basin the opportunity exists to cart raw water from other sources.

For the past 2017-2020 drought years EGW has been able to maintain water supply to Swifts Creek without the need to cart water. Given the current seasonal outlook and recent rains in East Gippsland it is unlikely the Tambo River will cease to flow this summer. Consequently the probability of water restrictions in the next 12 months is "rare" (using the DELWP (2017) grading system).

4.7 Buchan Forward Outlook

4.7.1 Short term strategy and 5 year plan

The short-term strategy to ensure up-coming peak summer demands can be met is to keep the storage at Buchan as full as possible, however this represents less than a week's supply in summer.

A new raw water storage for the Buchan is currently being tendered. This is likely to be constructed prior to summer 2023 and will improve EGW's resilience against low flows and times of high turbidity.

4.7.2 Outlook

During the summer of 2019/20 large bushfires burnt the remainder of the Buchan river catchment which had not been burnt in previous years. That summer due to drought water was already being carted from both Nowa Nowa (Mitchell system) and Orbost, and was sufficient to meet supply. Following rain the river started to flow again, however was heavily affected by ash and silt from the fire. The lamella plate clarifier which had been used the previous year was recommissioned (much of the pipework had been destroyed by fire) and water was successfully treated. This unit has now been permanently installed and can be used if required after any heavy rain event to treat highly turbid water.

The risk to water supply from bush fire run off is now manageable. If the Buchan River were to cease to flow, the town can be supplied by carting water, however with the current seasonal outlook it is unlikely that the Buchan River will cease to flow in the coming summer. For these reasons the probability of water restrictions in the next 12 months has been classed as "Unlikely" (using the DELWP (2017) grading system).

4.8 Bemm River Forward Outlook

4.8.1 Short term strategy and 5 year plan

The key short-term strategy to ensure up-coming peak summer demands can be met is to keep the storages as full as possible.

No major augmentations are planned for the up-coming 5 year period.

4.8.2 Outlook

The Urban Water Strategy concluded that the current storage volumes, Bulk Entitlement and likely future river flow were sufficient to cater for current and future demands. The strategy concluded that the biggest risk to supply of potable water is the risk of an event such as a bushfire which may temporarily render the quality of the water in Bemm River as unusable. A newly constructed 500kL treated water storage and the conversion of the existing 6.4ML treated water storage to a raw water storage provides approximately 3 months of supply which will provide sufficient time to implement actions to address water quality risks such as high turbidity.

Since the Bemm River water supply system was commissioned in 1984, there has been only one instance of voluntary water restrictions imposed (in 2003) and only then due to the threat of bushfire which didn't eventuate. The system was able to cope with significantly lower flows in 1997/98 without restrictions.

With good spring rainfall and a positive seasonal outlook the Bemm River is considered very reliable. Given the large storage capacity of 3 months, and the infrequent previous water restrictions, the likelihood of water restrictions in the next 12 months is rated as "Very Rare" using the DELWP (2017) grading system.

4.9 Cann River Forward Outlook

4.9.1 Short term strategy and 5 year plan

The key short-term strategy to ensure up-coming peak summer demands can be met is to keep the storages as full as possible.

No major augmentations are planned for the up-coming 5 year period.

4.9.2 Outlook

The Urban Water Strategy concluded that that the river flow has dropped below 1.04 ML/day Bulk Entitlement trigger for reduced pumping only 2% of the time and ceased to flow once (briefly) over the last 10 years. The risk of not be able to meet restricted demand is relatively low and in the unlikely event of an extreme short term water shortage, carting from Bemm River is a viable option.

Over the last 40 years, there have been no periods of water restrictions imposed at Cann River other than two brief periods of voluntary restrictions in 1998 and 2003.

The Cann River is considered reliable, and has received good spring rains. The likelihood of water restrictions in the next 12 months is rated as "Very Rare" using the DELWP (2017) grading system.

5 Short Term Actions

5.1 Mitchell System Actions

Action	Timing	Status	Comments
Maximize volume in Woodglen storages	October 2021 until pumping stops	On track	Storages currently full will be maintained at Top Water Level (TWL) throughout summer
Maximize volume in Groundwater storage	October 2021 until demand exceeds pumping	On track	Will achieve 200ML of ASR water.
Erect permanent water saving signs in key locations.	All year round	Completed	Permanent reminder of the message to save water.

5.2 All other System Actions

Action	Timing	Status	Comments
Maximize volume in storages	Ongoing	On track	Most will be at capacity by December.
Orbost: Extend suction pipework, and sandbag pump hole.	If stream flows drop and pumping becomes difficult	Not Started	Pipework purchased and permission from EGCMA for riparian works granted.
Erect permanent water saving signs in key locations.	All year round	Completed	Permanent reminder of the message to save water.

6 References

Bureau of Meteorology (2021)
[Climate Data Online - Map search \(bom.gov.au\)](#)

Bureau of Meteorology (2021)
<http://www.bom.gov.au/climate/outlooks/#/rainfall/median/seasonal/0> Viewed Nov 2021

Bureau of Meteorology (2021)
<http://www.bom.gov.au/climate/outlooks/#/temperature/summary> Viewed Nov 2021

EGW (2017), Urban Water Strategy. March 2017. EGW Doc No.: DOC/16/18427