Drought Preparedness Plan

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1. Introduction

1.1 Introduction to Grampians Wimmera Mallee Water Corporation

Grampians Wimmera Mallee Water Corporation (trading as GWMWater) is a government-owned Statutory Corporation established on 1 July 2004 under the *Water Act 1989*. GWMWater was formed through the amalgamation the former Grampians Water (urban supply) and Wimmera Mallee Water (rural supply and headworks operation).

GWMWater has one of the largest geographic footprints of all Victorian water corporations, covering some 62,000 square kilometres or 25 percent of regional Victoria. Our service area includes thirteen municipalities in full or in part. We provide water supply services to approximately 33,000 urban properties in 71 towns, with waste water services provided to 27 of these towns. Services provided to our 11,000 rural customers include pipeline domestic and stock supplies to approximately 12,700 properties, groundwater diversions and Supply-by-agreement supplies.

Our large service area presents considerable challenges, as we must transfer and distribute water over long distances to supply many of our customers. To deliver water services we manage an extraordinary number of assets including bulk water supply reservoirs, hundreds of smaller water storages, tanks, water towers and approximately 16,400km of pipes.

1.2 Introduction to GWMWater's Supply Systems

GWMWater owns and operates a number of water supply systems, each with different water sources. By virtue of this, each of these supply systems behave differently, have a different degree of water security, and require different management approaches.

GWMWater manages five distinct supply systems, or supply regions, being:

a) Murray supplied systems (Northern Mallee Pipeline, Supply System 5 of the Wimmera-Mallee Pipeline);

b) Goulburn supplied systems (Quambatook township, South-West Loddon Pipeline (in part));

c) East Grampians & Pyrenees urban systems (townships of Willaura, Lake Bolac, Moyston, Wickliffe, Elmhurst, Buangor and rural users);

d) Grampians supplied systems (towns and rural users supplied from Wimmera-Mallee Pipeline Supply System 1,2,3,4,6,7, direct from headworks reservoirs, South-West Loddon Pipeline (in part), and when constructed, the East Grampians Rural Pipeline); and

e) Groundwater towns.

Figure 1: GWMWater Supply Areas and Sources

1.3 Policy Context

Victorian Water Corporation Statement of Obligations requires GWMWater to develop and implement an effective Drought Preparedness Plan for the urban component of each water supply system, as per the following extract from the Statement of Obligations, 2015:

The Corporation must:

a) *develop a Drought Preparedness Plan that governs the management of the supply of water by the Corporation in any period of drought or when the supply of water is limited;*
b) *not rely on the Minister declaring a water shortage and qualifying rights to water as an option for maintaining supplies as part of a Drought Preparedness Plan;*
c) *comply with any guidelines issued by the Minister for the purpose of Drought Preparedness Planning; and*
d) *make its Drought Preparedness Plan available to the public, unless the Minister consents in writing to not making available a Plan or part of a Plan.*

The Corporation must review, and if necessary amend, its Drought Preparedness Plan:

a) *at intervals of no more than five years; and*
b) *within twelve months of either:*
   i. *the lifting of any period of restriction imposed under the Corporation's Drought Preparedness Plan; or*
   ii. *any major change occurring to works or arrangements for conserving water for, or supplying water to, any water supply system that is relied upon for the supply of water by the Corporation.*

The Corporations that share water supply systems must cooperate and coordinate with each other when developing, reviewing or operating their DPPs.

The plan is prepared in accordance with State Government Guidelines for Drought Preparedness Plans contained within the Guidelines for the Development of Urban Water Strategies (DELWP, 2021)

1.4 History – Lessons from Recent Drought Periods

The lessons learnt from drought periods such as the millennium drought and even more recent dry years have informed the development of this Drought Preparedness Plan (DPP). These events have increased understanding (through experience) of climate risks to water supply in the GWMWater region.

The 1997 – 2010 'Millennium Drought' in Western Victoria is well documented as one of the worst droughts since instrumental records began. During this period, a range of drought response actions were implemented in the GWMWater region including:

- Implementation of severe water restrictions, in most cases Stage 4;
- Revising balancing storage operating levels;
- Supplementation or substitution of surface water supplies with groundwater where this was possible;
- Review system operating procedures to minimise losses and maximise efficiency;
- Enactment of a Qualification of Rights by the Minister for Water.

The former Wimmera-Mallee stock & domestic channel supply system was greatly inefficient and saw transmission losses of up to 85%. The annual supply regime from the Grampians headworks saw large volumes of water directed through thousands of kilometres of open channels to towns and farms across the region. Major system augmentation beginning with construction of the Northern Mallee Pipeline and later followed by the Wimmera-Mallee Pipeline network, has vastly improved water security for the region.

The transition from an open channel distribution system to a fully pipelined distribution system was supported by a water entitlement framework which provided greater security of supply, and also improved water resource management in the region.

All but two years between 2011-12 and 2021-22 recorded inflows less than 50% of the historic average. Only 2016-17 saw above average inflows, which were equivalent to 122% of the historic average. While the Wimmera Mallee Pipeline was able to comfortably meet demand during through this 10-year period, it is acknowledged that there is a limit to the number of successive low inflow years the pipeline systems can sustain, until response actions are required, particularly as demand for water increases into the future.

Lessons learnt by other Water Corporations in Victoria may have relevance to future water restrictions imposed by GWMWater. Anecdotal information suggests that customer demand has been observed to increase from Permanent Water Saving Rules (PWSR) levels when Stage 1 and Stage 2 water restrictions have been imposed. This is something GWMWater will consider within its urban restriction policy.

1.5 Scope of this Drought Preparedness Plan

This Drought Preparedness Plan (DPP) only considers the water available to GWMWater as an entitlement holder, under its consumptive urban and rural entitlements for supply to its customers. The demands of GWMWater's other entitlements (such as Recreation) are not considered within this plan.

GWMWater provides both urban and rural pipeline water supply services, which are supported by common bulk water entitlements and licences. In recognition that GWMWater manages the security of supply for these urban and rural pipeline users within its water entitlements, this DPP covers both user groups. The DPP does not apply to surface water and groundwater licence holders / users who have an authorisation to take and use water under Section 8 (stock and domestic use) or Section 51 (take and use) of the *Water Act 1989*.

Within the Grampians reservoir system, other entitlement holders' requirements are within the domain of the Storage Manager, and so are not directly considered within this strategy. Further information on the Storage Manager and its responsibilities can be found at www.storagemanager.com.au.

It is noted that bulk water entitlement holders (including GWMWater) receive water allocations based on water sharing arrangements published in the respective Bulk Entitlements. Bulk Entitlement holders manage their own water security risks and can utilise tools such as carryover and water trading to meet their requirements.

The DPPs of Wannon Water and Coliban Water consider these corporations' respective circumstances. It is noted that both share some common water sources and associated challenges with GWMWater. The Victorian Environmental Water Holder (VEWH) also considers drought response strategies in its planning activities.

This DPP will be used as a tool to provide warning of an emerging water security risk, and respond to potential and realised water shortages, not just drought. The term 'drought' is often linked to rainfall deficits that result in a significant decline in primary production. Water shortage may result from other causes and natural events, such as bushfire or soil erosion in reservoir catchments which result in poor water quality, and blue green algae in source waters affecting its usability for water supply.

Planning and operational response actions resulting from significant water quality incidents are managed according to GWMWater's water quality management systems and incident response plans.

2. Drought Preparedness Planning

2.1 Water Resource Drought Definition

The Bureau of Meteorology (BoM) definition of drought is *'a prolonged, abnormally dry period when there is not enough water for users' normal needs'.*

GWMWater considers 'normal needs' to be the volume of water required to meet customer demand under Permanent Water Saving Rules (PWSR).

2.2 Drought Preparedness Plan Guiding Principles

The Department of Environment, Land, Water and Planning (DELWP) has provided water corporations with guidelines for the development of Drought Preparedness Plans (DPPs).

By virtue of the geographic spread of GWMWater's supply regions, they each have different reliability characteristics, and different responses to seasonal conditions. This makes a consistent region-wide approach to preparedness planning difficult, and may mean that response actions need to occur differently or sequentially as each system responds to dry conditions and/or water shortages.

To help with these complexities, the following DPP guiding principles have been developed:

1. In determining any level of water restriction, GWMWater will consider the level of restriction in neighbouring water corporation towns, where they share the same water source.

2. Restriction by-laws only apply to urban customers. Other users are governed by water allowances, supply agreements, licence conditions or entitlement and allocation frameworks.

3. Within the bulk water available to GWMWater, priority is given to providing water for the following purposes:
   a) critical needs for domestic use and watering of livestock;
   b) critical needs for industry (primary, secondary & tertiary) for employment and the regional economy; and subsequently
   c) critical social needs for liveability (public parks, gardens and recreational facilities).

4. Priorities for the environment and other bulk entitlement holders (e.g. Wannon Water and Coliban Water) are the responsibility of the respective entitlement holders and agencies. GWMWater acknowledges a duty of care to these users and will always work to assist wherever possible.

5. Drought Preparedness Plans and any associated restriction policy can be used to respond to more than just water shortages caused by drought. These water shortages may occur for reasons such as hydraulic capacity constraints, system failures and accidents.

6. The GWMWater aspirational level of service is that Permanent Water Saving Rules level of demand can be met in 93 years out of 100. While GWMWater aspires to provide the highest possible level of service, this target means that 7% of years could have some level of water restriction, while still meeting the aspirational target (i.e. water restrictions in less than 1 year in 10).

2.3 Drought Preparedness Plan links to Urban & Rural Water Strategy and Annual Water Outlook

GWMWater uses three key strategies to manage its short, medium and long term water security in order to meet its customers' needs:

1. ***Urban & Rural Water Strategy (Urban Water Strategy, SoO 2015).***
   Used to understand short and long term water availability and security under various climate and demand scenarios. Includes identification of any need for new infrastructure, supply sources or system augmentation to meet current and projected future demands.

2. ***Annual Water Outlook***
   Documents short term (annual) water availability, water security and capacity to meet demands. It describes the likelihood of short term response actions such as introducing water restrictions, or accessing supplementary water sources. It is tool for communicating with internal stakeholders, customers and government.

3. ***Drought Preparedness Plan***
   Supports the Annual Water Outlook and Urban & Rural Water Strategy. It provides a reference point for water security response planning and response action by way of clear trigger points which correspond to the Drought Response Plan actions. The DPP also summaries supply system specific response actions and mitigation options.

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Strong integration of long-term planning with short-term planning helps to support continued and reliable urban water supplies now and into the future. As such, the inter-relationship between water strategies, Annual Water Outlooks and Drought Preparedness Plans is critically important for water corporations in their management of water security. These are the key planning tools which guide actions taken in both the short-term and longer-term to manage and improve water security, and maintain current and future water supply.

The distinction between these tools is that:

- Urban Water Strategies – set out what actions might be needed and when, over a 50 year planning period, under a certain set of planning assumptions; whereas

- Drought Preparedness Plans – set out the short-term actions that will be needed to respond to water shortages if they arise.
- Annual Water Outlooks – present an annual assessment of water security and identify the potential for water security risks to emerge, and subsequent response actions.

A key consideration for GWMWater, if faced with the prospect of water shortages, will be deciding whether to implement short-term drought response initiatives in accordance with actions set out the DPP, or embark on long-term augmentation investments in accordance with those identified in the Urban & Rural Water Strategy.

It is noted that actions in a DPP are likely to be those things that can be "switched on and off", whereas actions in the Urban & Rural Water Strategy are likely to reflect longer-term and permanent/strategic system changes. For example, purchase of a temporary water allocation is a possible response action for the DPP, however the action of developing alternate water sources is a strategic response action, and hence captured within the Urban & Rural Water Strategy.

Water corporations are obliged to review and update their DPPs within 12 months of either the lifting of any period of water restrictions or the major augmentation of any water supply system.

2.4 Purpose and objectives of GWMWater's Drought Preparedness Plan

The purpose of this Drought Preparedness Plan (DPP) is to document the way in which GWMWater proactively identifies and responds to water security risks and water shortage situations. The strategies and response options in this plan aim to minimise, to the greatest extent possible, the impacts of water shortage, while ensuring security of supply for critical needs.

The objectives of this DPP are to:

- To be applicable to each of GWMWater's urban and rural pipeline supply systems;
- Have clearly defined water security triggers for each of the GWMWater supply systems;
- Have clear triggers for implementing drought response planning and drought response actions; and
- To provide flexibility, be adaptable, and be easily updated as supply systems are augmented, developed, or significant new information becomes available.

3. Water Resource System Monitoring

Essential to this Drought Preparedness Plan (DPP) is an ongoing commitment by GWMWater to monitor its water resource availability and implement the actions identified to:

- Review water availability and demand compared to Urban & Rural Water Strategy forecasts;
- Review the list of priority actions for the next five years to determine relevance, appropriateness and any need to bring actions forward or postpone them;
- Produce an Annual Water Outlook (AWO) and publish by 1 December each year.

3.1 Annual Water Outlook

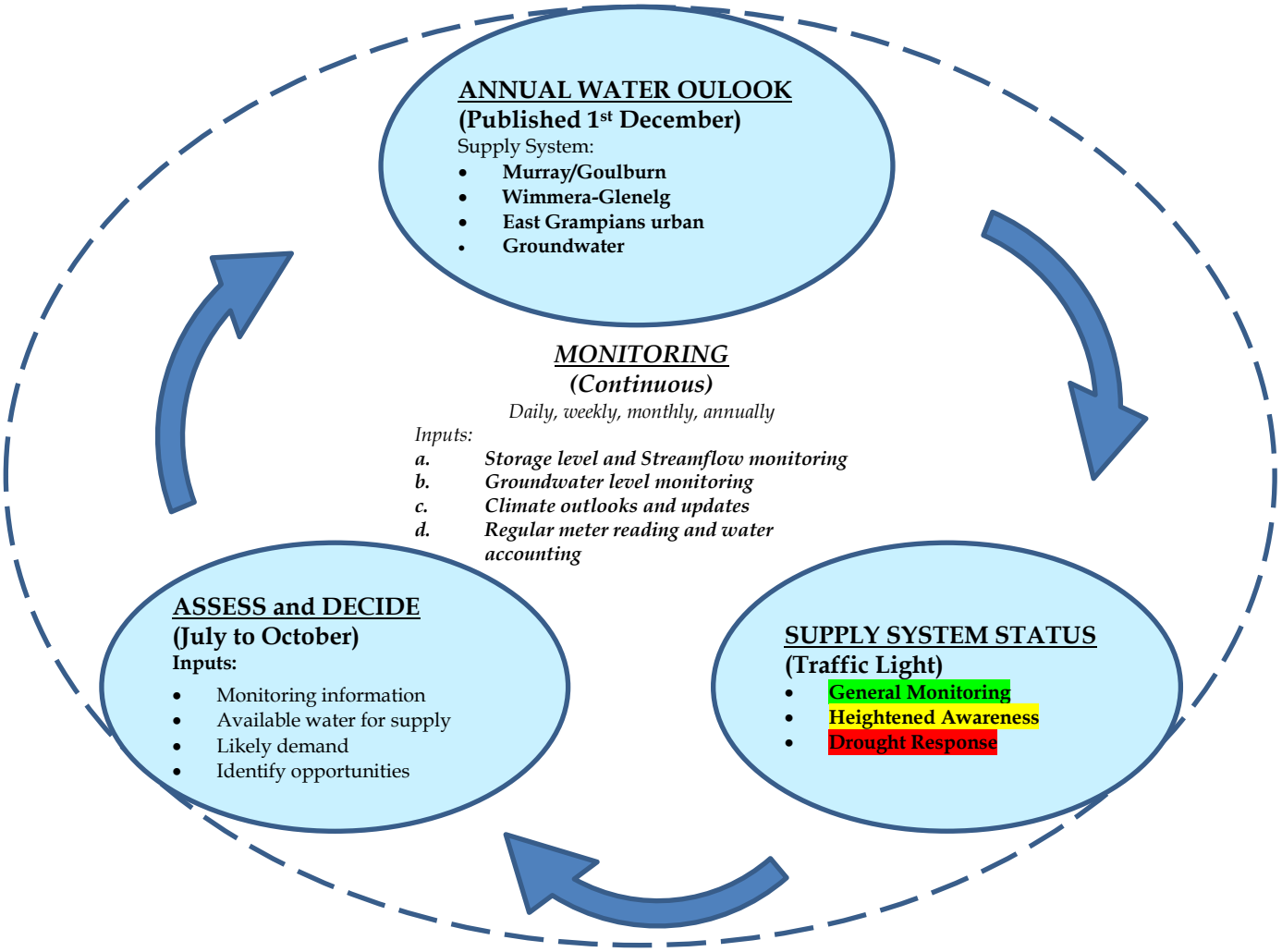
GWMWater must produce an Annual Water Outlook and make it publicly available by 1 December each year. The outlook must also be submitted to the Department of Environment, Land, Water and Planning, and is used to inform the State-wide Water Outlook.

In its Annual Water Outlook, GWMWater must report on:

- The current water resource position;
- A forward 12 month outlook under a range of plausible climate scenarios;
- Whether agreed levels of service will be able to be met under these scenarios;
- If not, what action(s) will be undertaken to improve system performance so that these agreed levels of service can be met.

Figure 2 describes the annual water planning cycle which feeds into the Annual Water Outlook.

Figure 2: Process diagram for Annual Water Outlooks



3.2 GWMWater's Traffic Light Approach to Water Security

This Drought Preparedness Plan (DPP) and GWMWater's is underpinned by a 'traffic light approach' to water security. This approach is intended to be a simple and easily communicated summary of water security status for each of GWMWater's supply systems (GWMWater, 2016).

The traffic light approach assigns a water security status based on a system specific assessment methodology. The result of the water security assessment is represented by a 'traffic light' status of either General Monitoring, Heightened Awareness, or Drought Response.

Table 1 provides a summary of each water security trigger under the traffic light system. This is a generic description which has been developed for application to each of GWMWater's supply systems. It indicates the relative water security risk and suggested actions, which may be internal planning, or active response. The traffic light approach can also be used to identify the need for longer term supply enhancement, if for example, a supply system was to remain in 'heightened awareness' for many years under average climatic conditions.

Table 1: Traffic light system and descriptions for all water supply systems

Supply System Status	Description
General Monitoring	• The water system reserve *exceeds* the *General Monitoring* trigger volume. • Business as usual, but continue to monitor. • No water restrictions due to availability.
Heightened awareness	• The water system reserve *exceeds* the *Drought Response* trigger volume, but *cannot satisfy* the *General Monitoring* trigger volume. • There may be an emerging water security risk. • Increase frequency of water system monitoring. • Commence planning to ready the business for contingencies. • Some form of action or restrictions *may be considered* in the current year.
Drought Response	• The water system reserve *cannot* satisfy the *Drought Response* trigger volume. • Immediate water security risk. • Drought Preparedness Plan enacted. • Actions *will be* implemented to reduce demand and/or improve supply. • Restrictions *are expected*.

While water security status for all supply systems is reviewed on a monthly basis, a comprehensive water security assessment is undertaken annually to inform the Annual Water Outlook. This presents an opportune time to re-assess water security status, as it falls towards the end of the traditional inflow period. At this time, GWMWater will generally have a good understanding of its water availability situation for the year ahead. The water security status can then be incorporated into the Annual Water Outlook report and be communicated through the traffic light approach.

When used as part of the broader Drought Preparedness Plan, water security triggers and the traffic light approach will assist GWMWater in proactively planning for and responding to future low water availability situations.

4. Drought Response Options

Drought response options include both demand management and supply enhancement. Addressing the supply-demand gap can involve a combination of demand reduction measures, supply system efficiency measures and supply improvement measures. Major supply system augmentation is generally a longer term option, primarily dealt with through the Urban & Rural Water Strategy. However, in some instances, minor augmentation may be identified as a viable a short-term response action.

4.1 Demand reduction options

Table 2 summarises a range of general demand reduction options which could be applied within any of GWMWater's supply systems. System specific options are highlighted in the response actions for the respective systems, within this document.

Table 2: General demand reduction options

Demand Reduction Options	Demand	Description
Increase system efficiency	Urban/rural	Can be achieved through changes in supply system operations such as leak detection and repair and changes in supply system operations such as pressure reduction.
Increase end use efficiency	Urban/rural	Community education, promotion of water efficiency programs, tips and messaging. Implementing government water efficiency programs such as installation of water efficient household fittings and appliances.
Implement restrictions	Urban	Staged water restrictions as described under GWMWater's Urban Water Restriction Bylaw.
Promote alternative sources of supply	Urban/rural	Promote installation/ use of household rainwater tanks, grey water systems, use of grey water on gardens.

4.2 Supply Enhancement Options

*Table 3*Table 2 summarises at a high level, a range of potential supply enhancement options which could be applied across various parts of GWMWater's supply systems.

Table 3: Potential supply enhancement options

Supply System Enhancement options (*Applicable system)*	**Description**	**Approximate Time period required to implement**
Purchase of temporary/permanent water entitlement ***Murray & Goulburn Systems***	Purchase of allocation or entitlement.	3 months (temporary) 1-2 years (permanent)
Pumping Dead Storage ***Grampians Reservoir System***	Temporary pumping set up to access dead storage volumes from critical headworks reservoirs.	6-12 months
Groundwater supplementary supply ***Horsham Urban***	Mt Zero bores are activated to supplement Horsham and Natimuk supply.	1 month
Groundwater supplementary supplies to Wimmera-Mallee Pipeline ***Supply Systems 1, 2, 3 & 4***	Identification, testing and subsequent development of suitable groundwater resource in reasonable proximity to key pipeline distribution points.	2-4 years
Supplementary water carting	Water carting to supplement supply for small and/or isolated supply systems. Temporary measure only.	1-2 weeks.
Activate existing cross connections ***Various locations***	Supplement supply from system cross connections.	1 - 4 weeks
Construction of new cross connections	Construct and supplement supply from new system cross connection.	Dependant on scale of connection.

5. Restrictions

GWMWater urban by-laws permit the restriction of water use by urban customers under a staged restriction approach. The traffic light approach to water security provides clear triggers for when GWMWater would consider the introduction of restrictions for each supply system. The water security triggers and reserve policies contained within this Drought Preparedness Plan (DPP) provide clear information as to the water security status of each respective supply system. This information is used to guide decisions on the timing and level of any restrictions to implemented.

A broader restriction mechanism policy gap assessment has been reviewed as part of this plan. A summary of GWMWater's customer types, the existing restriction mechanisms in place, triggers that exist to implement restrictions, and any policy or technical gaps that exist are documented in Appendix 2 - Summary of Customer Types and Restriction Arrangements. This also includes customer types that are not subject to this DPP, but are included for completeness of the policy gap assessment.

5.1 Implementing restrictions

For restrictions to be effective and ensure a fair distribution of available water during water shortage, they must be adequately enforced. The enforcement of restrictions involves:

- A legal basis which validates the implementation of restrictions and sets out the mechanisms for their enforcement, i.e. the making of a By-Law.
- The commitment of management to ensuring the rigorous application of the restrictions and appropriate legal support when breaches of restrictions occur.
- Enhanced on-ground monitoring of water distribution to detect and correct breaches of restrictions.

The importance of public green spaces and social and economic impact of empty recreation lakes in the region was a key learning from the millennium drought. GWMWater is a leading water corporation in Victoria in the recognition and provision of water supply for recreation purposes. This includes discounted water supplied to recreation clubs and sporting grounds in the region.

During times of water shortage, there may be water restrictions and lack of water available for recreation lakes and to maintain green space for recreation. GWMWater has a prioritisation framework for supplying recreation lakes when water availability is limited, however it is noted that recreation lake supply from the Grampians reservoirs occurs under a separate entitlement to GWMWater's urban and rural supply.

A strategic and equitable approach to the ovals and public open spaces across the GWMWater region which are watered during various stages of water restriction and water shortage is important. However, the priority and need for particular community assets to be watered from urban and rural pipeline networks is anticipated to change over time (particularly where sites

are connected to or augmented with alternate water sources). As a result of this, and the fact that resource related water restrictions have not been required over the past decade, GWMWater intends to engage with local government and communities on priority assets to be watered ahead of any potential period of water restrictions.

6. Drought Preparedness Plan for GWMWater Supply Systems

6.1 Murray & Goulburn supplied systems

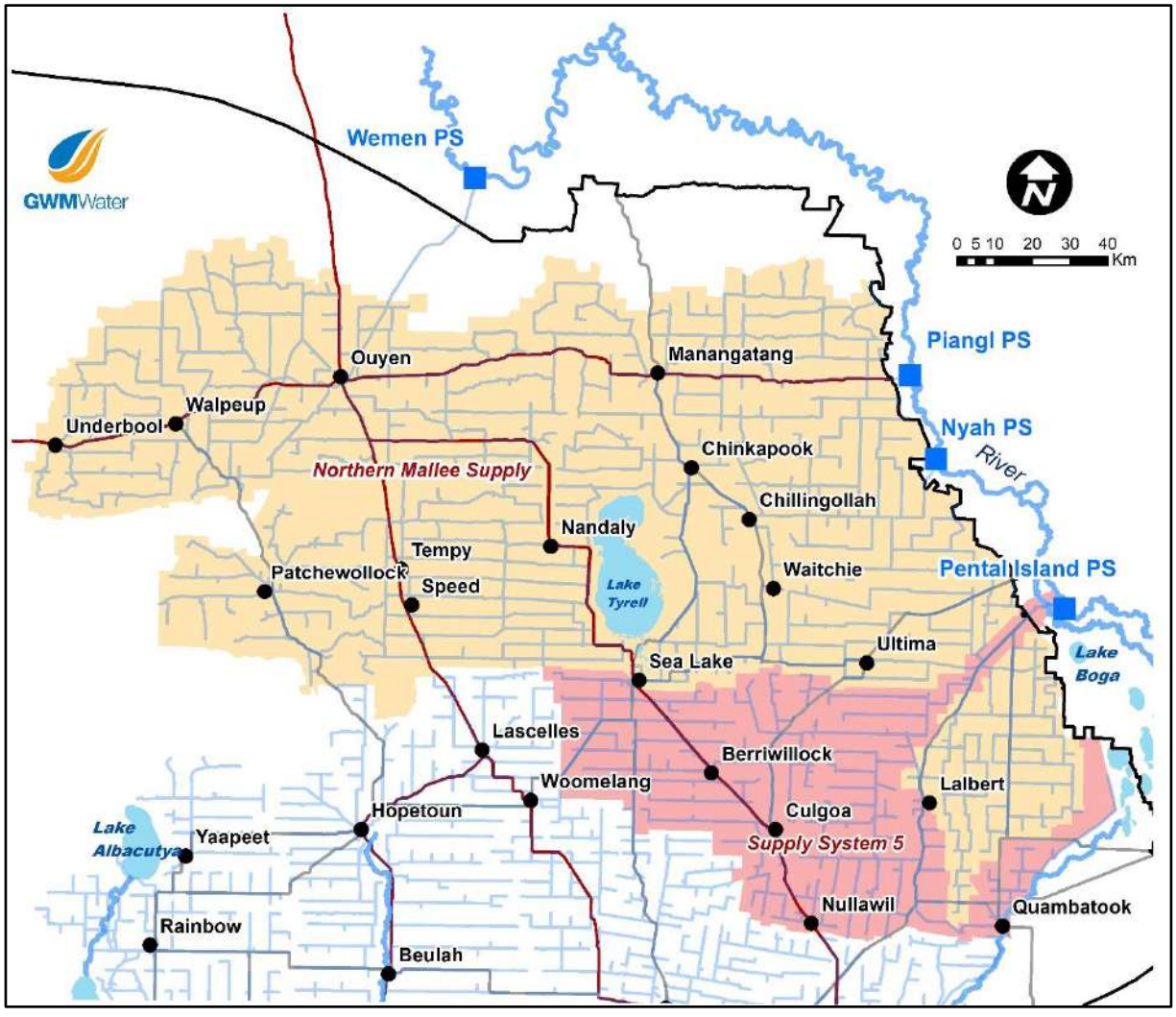
6.1.1. *System Description*

GWMWater operates four pump stations on the River Murray located at Swan Hill, Piangil, Nyah and Liparoo. These pump stations supply bulk water to urban storages and rural customers through the Northern Mallee Pipeline (NMP) and Supply System 5 of the Wimmera Mallee Pipeline (WMP) (refer to

Figure 3).

Following the completion of the Wimmera Mallee Pipeline, only the Quambatook township was supplied from the Goulburn System, via the Normanville pipeline. However, the South West Loddon Pipeline network (completed in 2020), sources part of its supply from the Goulburn System via the Waranga Western Channel.

Figure 3: Northern Mallee Pipeline and Supply System 5 supply areas



6.1.2. *Water Source, Demands and Consumption*

Water availability to GWMWater from the River Murray and Goulburn River systems is dependent on the seasonal allocations that are made to entitlement holders in the respective systems. These systems have historically experienced an average high-reliability allocation of around 98%, and have delivered average allocations of better than 90% since the mid-1990s.

GWMWater holds 6,509 ML of high reliability entitlements within the Victorian Murray and Goulburn systems, which are used to service all demands from these systems, inclusive of recreation lakes supplies and pipeline water losses. GWMWater's entitlement holdings in the Goulburn system can be accessed from its River Murray pumps through water trading mechanisms.

Demand from Murray and Goulburn supplied pipeline systems and Quambatook township has continued to remain below the water allocations available under GWMWater's entitlements. By virtue of this, a good level of water security has persisted, even in years with reduced bulk water allocations. However, security of supply in the Murray & Goulburn supplied systems is still dependent on the level of carryover maintained to balance supply and demand in dry years with reduced water allocations.

The average volume of water allocation required to meet Permanent Water Saving Rules (PWSR) demand for the Murray and Goulburn supplied systems is 4,650 ML/year, inclusive of recreation lake supply volumes, and South West Loddon Pipeline.

6.1.3. *Water Security Triggers*

GWMWater uses a multi criteria water security assessment tool[1] for Murray and Goulburn supplied systems. This tool informs the water security status of the supply system. The water security status also doubles as a trigger for response planning or direct response action, for example, were water security assessments return a 'Heightened Awareness' or 'Drought Response' status. The water security assessment tool was reviewed and updated in 2022.

There are three main components to the water security assessment, which feed directly into the multi-criteria assessment tool:

- Current season water allocation available;
- Projected demand for the season; and
- The volume of existing reserve (i.e. carryover) which can be accessed.

[1] Background information and further details relating to the water availability rating matrix and water security rating matrix tools can be found in: *Drought Preparedness Plan – Development of Water Security Triggers for Murray & Goulburn Supplied Systems* (GWMWater, 2018b).

The multi-criteria assessment tool combines these three key components to assess overall water security in a two-step process, as described in the following sections.

The Water Availability Rating Matrix (*Figure 4*) classifies the currently available water, or projected available water, with a rating from 'A' to 'E'. The matrix is able to consider the volume of carryover which is available, alongside the current seasonal allocation or projected maximum seasonal allocation. The combination of these two variables means that a holistic assessment is made of the total volume either currently available, or projected to become available to GWMWater with high confidence.

The ratings in the matrix are structured so that a rating of:

- 'E' indicates that there is insufficient water allocation available to meet Permanent Water Saving Rules (PWSR) level of demand.
- 'D' indicates that there is sufficient water allocation available to meet PWSR level of demand, and a carryover reserve of up to 25% of PWSR level of demand is projected.
- 'C' indicates that there is sufficient water allocation available to meet PWSR level of demand, and a carryover reserve of between 25% and 50% of PWSR level of demand is projected.
- 'B' indicates that there is sufficient water allocation available to meet PWSR level of demand, and a carryover reserve of between 50% and 75% of PWSR level of demand is projected (equivalent to Stage 4 restriction demand volume).
- 'A' indicates that there is sufficient water allocation available to meet PWSR level of demand, and a carryover reserve of greater than PWSR level of demand.

For example, if seasonal allocations were 100%, and the volume of available carryover from the previous season was 2,500 ML, water availability would be given a rating of 'A'. This would be equivalent to a total available allocation holding of around 8,900 ML.

Figure 4: Multi-criteria Assessment Tool - Water Availability Rating

	Estimate of Available Carryover						
Seasonal Allocation as % HRWS	>5000 ML	4001-5000 ML	3001-4000 ML	2001-3000 ML	1501-2000 ML	1001-1500 ML	< 1000 ML
150-159	A	A	A	A	A	A	A
140-149	A	A	A	A	A	A	A
130-139	A	A	A	A	A	A	B
120-129	A	A	A	A	A	A	B
110-119	A	A	A	A	A	B	B
101-109	A	A	A	A	B	B	C
90-100	A	A	A	A	B	B	C
80-89	A	A	A	B	B	B	D
70-79	A	A	B	B	B	C	D
60-69	A	A	B	B	C	C	E
50-59	A	B	B	C	D	D	E
40-49	B	B	B	C	D	E	E
30-39	B	B	C	D	E	E	E
20-29	B	C	C	D	E	E	E
<20	C	C	D	E	E	E	E

Annual demand is significantly influenced by seasonal factors including rainfall and summer temperatures. This can mean that demand may fall below the average PWSR level of demand in cooler, wetter years (such as 2016-17) or be above the average PWSR level of demand in hotter drier years (such as 2015-16 and 2018-19). To accommodate this within the assessment framework, a second stage of assessment combines the Water Availability Rating with the projected demand in any season.

The Water Security Status matrix allows a more dynamic assessment, where water security status can be assessed based on the expected conditions and likely demand relative to the volume of water allocation available in a particular year.

The three water security statuses were structured so that:

- 'Drought Response' reflects a scenario where there is either a deficit in available water allocation to meeting the current season's demand, or the likely carryover reserve would be less than 1,000 ML.

  It is considered that carrying over less than 1,000 ML presents a supply risk where early season allocations are low, and dry conditions result in lower water allocations. GWMWater is reliant on year-round supply, and so maintaining some level of carryover reserve is essential.

- 'Heightened Awareness' reflects a scenario where PWSR level of demand can be met, but the projected carryover reserve volume is less than 50% of PWSR demand (although a carryover reserve of greater than 1,000 ML is anticipated).

- 'General Monitoring' reflects a scenario where PWSR level of demand can be met, and a carryover reserve or unused volume equivalent to, or greater 50% of PWSR demand is projected.

For example, if projected demand for the season was 4,000 ML to 4,500 ML, with 'B' rating for water availability, the water security status assigned would be 'General Monitoring'.

Figure 5: Multi-criteria Assessment Tool - Water Security Rating

	Projected Bulk Offtake Demand						
Water Availablity Rating	3000-3500 ML	3500-4000 ML	4000-4500 ML	4500-5000 ML	5000-5500 ML	5500-6000 ML	6000-6500 ML
A	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Awareness
B	Monitor	Monitor	Monitor	Monitor	Awareness	Awareness	Awareness
C	Monitor	Monitor	Awareness	Awareness	Response	Response	Response
D	Awareness	Awareness	Response	Response	Response	Response	Response
E	Response	Response	Response	Response	Response	Response	Response

This water security assessment methodology is designed to only indicate 'Heightened Awareness' or 'Drought Response' when there is a potential or real water security risk.

The Annual Water Outlook uses the water security assessment method contained in this Drought Preparedness Plan to determine the water security status of the supply system.

6.1.4. *Drought Response Plan*

The water security assessment described in section 6.1.3 determines the water security status of the supply system, and guides the actions which are required. Not all actions will be required under all circumstances, with the most appropriate action(s) to be determined when trigger points are reached.

Water Security Status	Water Security Summary & Potential Action Responses
General Monitoring	• The water system reserve *exceeds* the *General Monitoring* trigger volume. • Business as usual, but continue to monitor. • Management and Board receive routine monthly status reporting. • No water restrictions due to availability.
Heightened awareness	• The water system reserve *exceeds* the *Drought Response* trigger volume, but *cannot satisfy* the *General Monitoring* trigger volume. • A water security risk may emerge if conditions remain dry. • Inform management and Board via routine monthly status reporting. • Commence planning to implement contingencies if the situation is likely to escalate. • Implement community education programs, increase frequency of water efficiency messaging (as required). • Customer communications to advise of some concern, and what GWMWater is doing to manage/secure supplies (if appropriate). • External communications to flag possible need for restrictions in the future (if this response is likely to be required). • Increase frequency of water system monitoring. • Some form of response action (e.g. water allocation purchase) *may be considered* in the current year. • Restrictions *may be considered* in the current year.
Drought Response	• The water system reserve *cannot* satisfy the *Drought Response* trigger volume. • Immediate water security risk (critical within 12 months). • Drought Preparedness Plan enacted, management and Board briefed. • Senior Leadership Team to review/authorise response actions. • Increase frequency of water efficiency / water restriction messaging. **Where supply cannot be sufficiently improved:** • Regular briefings to Senior Leadership Team, Board, Government. • Media and external communications to advise of situation (as required). • Actions *will be* implemented to reduce demand. • Restrictions *are expected*.

6.2 Grampians supplied systems

6.2.1. *System Description*

GWMWater owns and operates nine bulk water supply reservoirs and a number of other headworks assets as part of the Grampians reservoir system, under direction of the Storage Manager for the Wimmera-Mallee System Headworks (also referred to as Wimmera-Glenelg System). The reservoirs are Lake Bellfield, Lake Fyans, Mt Cole Reservoir, Lake Lonsdale, Lake Wartook, Moora Reservoir, Rocklands Reservoir, Toolondo Reservoir and Taylors Lake.

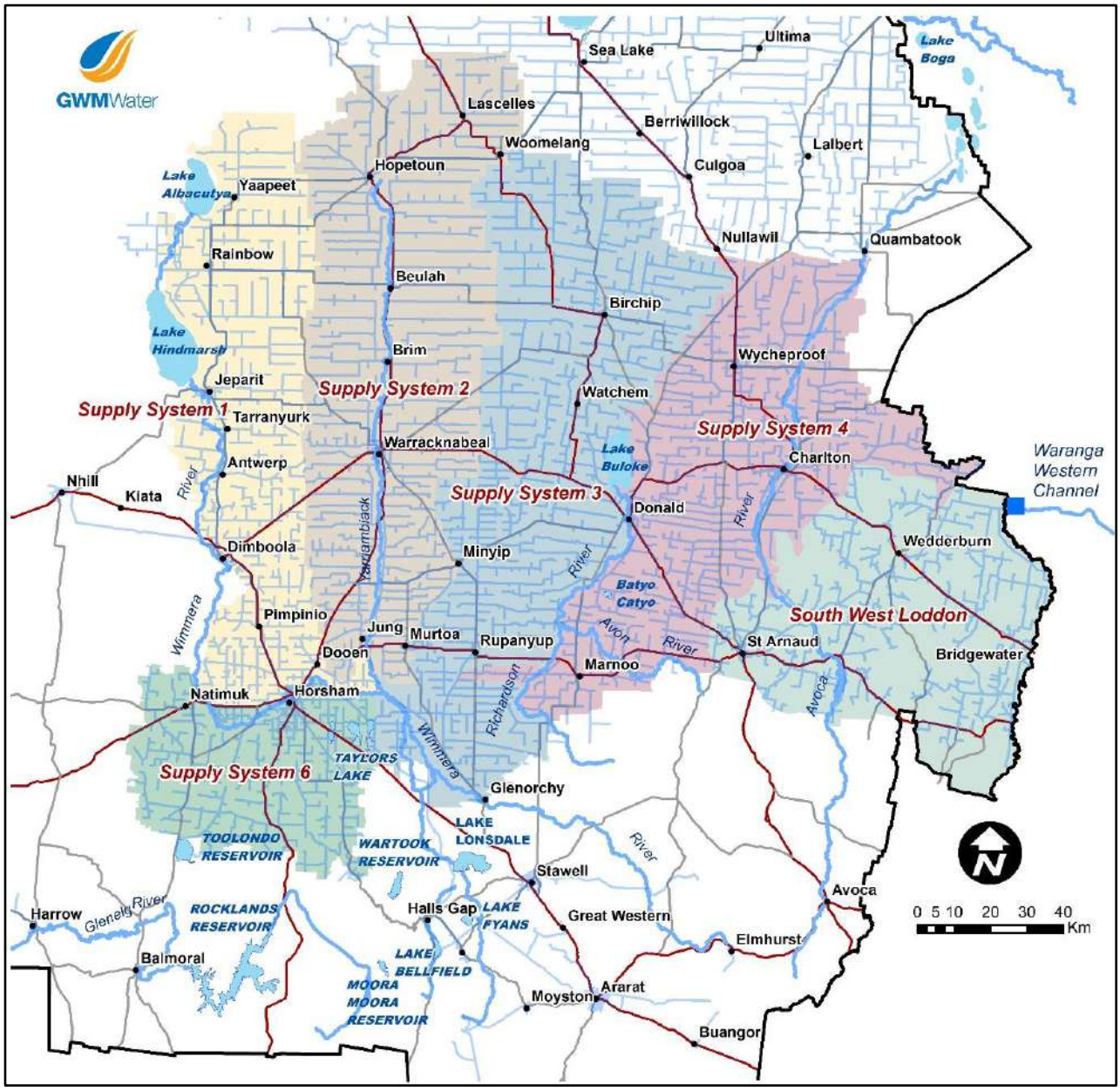
Green Lake near Horsham is no longer used for water supply, but provides valued recreation opportunities. Pine Lake and Dock Lake are no longer used for water storage or supply, and are considered to be offline.

The Grampians reservoirs support Wimmera-Mallee Pipeline Supply Systems 1,2,3,4,6,7 (refer to *Figure 6*), and the South-West Loddon Pipeline (in part). The South-West Loddon Pipeline network can take supply from both the Grampians reservoirs (via the Wimmera-Mallee Pipeline) and the Goulburn system via the Waranga Western Channel.

The East Grampians Rural Pipeline Project moves from the planning phase into construction phase in 2022. The rural pipeline network will service rural farming enterprises and lifestyle properties in areas south of Ararat. With this project:

- Moyston will switch from the Eastern Grampians Urban Supply System to receive water from Ararat Water Treatment Plant.
- Streatham and Westmere are anticipated to switch from groundwater supply to receive water via the East Grampians Rural Pipeline.
- Elmhurst, Willaura, Lake Bolac and Wickliffe may receive supplementary supply from the East Grampians Rural Pipeline.

Figure 6: Areas supplied from Grampians Reservoir System



6.2.2. *Water Source, Demands & Consumption*

GWMWater has a 44,720 ML entitlement (36% of total entitlements) from the Grampians Reservoir system for supplying its urban, rural and large 'supply by agreement' commercial customers. Coliban Water, Wannon Water and the Victorian Environmental Water Holder also hold bulk entitlements in this system. Only the urban and rural component of GWMWater's entitlement (32,720 ML) used in supplying urban and rural pipeline customers is within the scope of this Drought Preparedness Plan. Supply by agreement users (12,000 ML) receive a bulk water allocation and have the ability to manage their own water security through carryover. Bulk water allocations are determined by the Storage Manager (Wimmera Glenelg System).

The Mt Zero area near Horsham was identified during the 1990's as a suitable groundwater source in close proximity to existing water supply infrastructure. Three production bores were developed to supplement the Horsham urban system, and during the 1996-2010 drought, met up to 30% of Horsham's supply requirements in some years. This Mt Zero bore field provides an ongoing contingency during periods of critically low surface water availability.

Summary of Grampians supplied systems demand (GWMWater, 2021)):

- Average annual urban demand is 9,770 ML and the average annual rural demand is 3,930 ML.
- Upon completion of the East Grampians Rural Pipeline, average annual rural pipeline demand is estimated to increase to 4,620 ML/yr.

6.2.3. *Water Security Triggers & Reserve Volume*

Water security triggers for the Grampians supplied systems were developed as part of the 2018 Drought Preparedness Plan. Supported by REALM hydrologic modelling, a broad range of scenarios were assessed, including variations to demands, carryover and inflow data[2].
These water security triggers were reviewed as part of the 2022 Drought Preparedness Plan. While no changes were necessary to the methodology of these water security triggers, they were updated to reflect changes in demands since 2018.

The 'Drought Response' water security trigger volume for the Grampians Supply System is equivalent to a reserve of Stage 4 restricted demand. This means that if at the time of assessment GWMWater did not hold sufficient allocation in reserve to meet Stage 4 demand in the following water year, the water security status would immediately be 'Drought Response'. A drought response trigger and reserve volume less than Stage 4 level of restricted demand was not assessed, as it would mean that under very dry conditions, GWMWater may not have enough water to meet demands in the following year, even with severe water restrictions

[2] Full details are available in the report *Development of a Reserve Policy and Water Security Triggers for Grampians Supplied Systems* (GWMWater, 2018a). The different demands and climates used during the investigation are summarised in the report *Technical note for Drought Preparedness Plan Modelling Scenarios* (GWMWater, 2018e)

imposed. Such a situation would suggest some sort of drought response action should already be in progress.

The volume of Stage 4 restricted demand was estimated based on the assumption that Stage 4 water restrictions would reduce the residential demand for all towns by 45%.

The water security triggers for Grampians supplied systems can be summarised as a reserve volume of:

- Less than the volume required to meet demands under Stage 4 water restrictions (11,490 ML), the system will be in Drought Response (i.e. less than 1 year essential needs in reserve).
- More than the volume required to meet demands under Stage 4 water restrictions but less than the volume of Stage 4 plus PWSR demand (i.e. at least 1 year essential needs in reserve), the system will be in Heightened Awareness.
- More than the volume required to meet Stage 4 demands plus PWSR demands, the system will be in general monitoring (i.e. more than 1 year full demand in reserve, plus essential needs for a further year).

The reserve described is a volume in addition to that already held to service the current year's demand.

Table 4: Water Security Triggers and Corresponding Reserve Volumes

General Monitorin	Heightened awareness	Drought Response
PWSR + Stage 4 (>25,820 ML)	PWSR + Stage 4 > Reserve > Stage 4 (25,820 ML >Reserve>11,490 ML)	Can't meet Stage 4 (≤11,490 ML)

This suite of water security triggers are considered to offer the best balance between water security and providing early-warning of diminishing water security via the traffic light assessment.

A reserve volume equivalent to Stage 4 level of demand, which indicates drought response, also provides alignment with the Victorian definition of critical human water needs. This definition is *"the amount of water required to supply Stage 4 restricted demand in urban areas, supply domestic and stock needs and operate the distribution system to deliver that water" (DELWP, 2017a)*.+

6.2.4. *Grampians Sub System Supply Status*

Due to the large size and geographical distribution of the Grampians reservoir system, there is potential for some parts of the system to be at higher risk of shortage in supply than the overall system.

The analysis for the 2018 DPP found that the allocation available to GWMWater was likely to become a limiting factor in terms of water availability, before the physical volume held in Lake Bellfield and Lake Fyans became a limitation (GWMWater, 2018d). In a situation where these reservoirs both approach critical volumes, it is anticipated that the overall system's water security status would already reflect *Drought Response* (GWMWater, 2018a).

The Lake Wartook sub-system, supporting Horsham and Supply System 6, was found to be at risk of entering *Heightened Awareness* and *Drought Response* status well ahead of the overall system (GWMWater, 2018a). Modelling for the 2022 Urban and Rural Water Strategy confirmed this is still the case, and predominantly the result of high demand from the reservoir, relative to its volume (GWMWater, 2022a). This ultimately results in competition for supply between entitlement holders.

Results from the sub-system analysis suggested that the water security trigger points established for the overall system could be reasonably applied to assess the security of the Wartook sub-system (GWMWater, 2018a).

GWMWater believes it is reasonable to maintain a reserve of its allocation in particular reservoirs, such as Wartook Reservoir, but will require the support of the Storage Manager to secure this from year to year. GWMWater believes the development of a framework specifically for the sharing of the water resource in Lake Wartook is required to provide certainty to all entitlement holders. It is anticipated such a framework will be developed in the near future (GWMWater, 2022b). However, until such a framework exists, GWMWater will request the Storage Manager consider its reserve requirements alongside the supply requests from other entitlement holders.

Table 5: Water Security Triggers specific to the Lake Wartook sub-system (high demand scenario)

Scenario	General Monitoring	Heightened awareness	Drought Response
Scenario 1 PWSR demands and Stage 4 level demand	PWSR + Stage 4 (>6,600 ML)	PWSR + Stage 4 > Reserve > Stage 4 (6,600 ML >Reserve>2,530 ML)	Can't meet Stage 4 (≤2,530 ML)

The water security triggers PWSR demand volume for the Wartook system was based on the highest annual urban usage from the 2017 to 2021 period, to reflect a 'high demand' year. This is in contrast to the water security triggers for the overall system (Table 4) which are based on the average annual volume from 2017 to 2021. The 2018-19 water year had the highest combined demand for Horsham and Natimuk (based on bulk offtake volumes), reported as 3,486 ML.

6.2.5. *Drought Response Plan*

The water security triggers described in section 6.2.3 determine the water security status of the system, and guides the actions which are required. Not all actions will be required under all circumstances.

Supply System Status	Water Security Summary & Potential Action Responses
General Monitoring	• The water system reserve *exceeds* the *General Monitoring* trigger volume. • Business as usual, but continue to monitor. • Management and Board receive routine monthly status reporting. • No water restrictions due to availability.
Heightened awareness	• The water system reserve *exceeds* the *Drought Response* trigger volume, but *cannot satisfy* the *General Monitoring* trigger volume. • A high water security risk is anticipated if conditions remain dry. • Inform management and Board via routine monthly status reporting. • Commence planning to ready the business for contingencies if the situation is likely to escalate. • Initiate contingency discussions with the Storage Manager. • Explore opportunities to purchase water allocation. • Implement Community education programs, increase frequency of water efficiency messaging (as required). • Customer communication to advise of some concern, and what GWMWater is doing to manage/secure supplies (if appropriate). • External communications to flag possible need for restrictions in the future (if this response is likely to be required) • Increase frequency of water system monitoring. • Some form of response action *may be considered* in the current year. • Restrictions *may be considered* in the current year.
Drought Response	• The water system reserve *cannot* satisfy the *Drought Response* trigger volume. • Immediate water security risk (critical within 12 months). • Drought Preparedness Plan enacted, management and Board briefed. • Regular interface with the Storage Manager on contingency actions. • Senior Leadership Team to review/authorise response actions. • Contingency water allocation purchases (if opportunity exists). • Activate contingency groundwater supply (Horsham). • Increase frequency of water efficiency / water restriction messaging. • Media and communications to advise of situation. **Where supply cannot be sufficiently improved:** • Regular briefings to Senior Leadership Team, Board, Government. • Media and external communications to advise of situation (as required). • Actions *will be* implemented to reduce demand. • Restrictions *are expected*. • Emergency measures to meet critical needs (e.g. pumping dead storage)

6.3 Pyrenees and Eastern Grampians Urban Supply Systems

6.3.1. *System Description*

The Pyrenees and Eastern Grampians Urban Supply Systems comprises of the Willaura, Moyston, Elmhurst and Buangor supply systems.

The East Grampians Urban System (Willaura system) is supplied by six weirs on small streams, with two each located on Stoney Creek, Mt. William Creek and Masons Creek. Between December and May, the supply is supplemented by groundwater sourced from four bores near Mt William. The system services the towns of Willaura, Moyston, Lake Bolac and Wickliffe and provides bulk water to the Wannon Water township of Glenthompson under its Willaura system bulk entitlement. The system also supplies a number of rural connections who draw water from pipelines between the towns. The system services approximately 1,000 connections.

The Elmhurst water supply system comprises of one weir which diverts water from Hickman's Creek to the Elmhurst Service Basin (via a small sedimentation and strainer tank).

The Buangor water supply system comprises of one weir which diverts water from McLeod's Creek to the Buangor Service Basin (via a small sedimentation and strainer tank). There are a small number of rural customers between the weir and the storage basin.

Many of these supply systems will be augmented as part of, or within the construction window, for the East Grampians Rural Pipeline (EGRP). This augmentation will enable supplementary supply to these systems from the Grampians reservoir system, further enhancing their water security. However, the final layout and connections between the different systems will not be confirmed until the construction of the EGRP is completed. As a result, the DPP will continue to apply the existing water security triggers for these systems, which are linked to volumes held in local supply storages. The operation of water security triggers for these systems will be reviewed following completion of the EGRP.

6.3.2. *Water Source, Demands and Consumption*

GWMWater holds a bulk entitlement permitting the take of 28 ML/year for Buangor, 48 ML/year for Elmhurst and 390 ML/year for the Willaura system. GWMWater also hold a 220 ML/year groundwater extraction licence for the Mt William bore field to supplement the Willaura system.

The 2017-2021 average bulk water demand for the respective systems was:

- Willaura System towns and rural connections: 381 ML/year
  Of this demand, on average, 209 ML/year was sourced from the diversion weirs and 172 ML/year from the groundwater bores. Groundwater supplementation is generally higher in dry years.
- Wannon Water for Glenthompson: 39 ML/year, although this volume can vary from year to year.

- Elmhurst: 25 ML/year.
- Buangor: 18 ML/year.

Pyrenees (Elmhurst, Buangor) & East Grampians (Willaura system) supply system reliability is not able to be quantified due to the absence of long-term streamflow data. Experience through 1997 to 2009 (millennium drought) demonstrated that GWMWater could maintain supply to customers dependant on these systems, however restrictions were implemented during very dry years. More recent anecdotal evidence suggests that McLeod's Creek (Buangor supply) is a very reliable stream and generally experiences streamflow for at least 8 months per year, with Hickman's Creek (Elmhurst supply) generally having a lesser duration of streamflow.

Groundwater remains a critical part of the supply arrangements for the Willaura system, and is utilised to some extent in all years.

6.3.3. *Water Security Triggers & Reserve Volume*

The East Grampians and Pyrenees systems are reliable systems in most years, but do not have the storage capacity for a multi-year reserve. The methodology adopted for water security triggers in these systems is dependent on the volume in storage, and designed to provide adequate lead time for implementing contingency planning and response actions.
The water security trigger curves indicate the minimum volume required in storage to maintain supply under permanent water savings rules for the defined period with no inflow to storage. Each of the water security trigger curves were reviewed as part of the 2022 DPP.

The most effective short-term response option for the Elmhurst and Buangor systems is supplementary water carting, due to the relatively small peak daily summer demand. As a result, requiring a large reserve volume to be held in storage was deemed unnecessary and would only serve to bring forward any water carting response action (GWMWater, 2018d). This also extends to the Willaura system towns, as groundwater bores are used to continuously supply storages through the summer months. Operational practice in this system has also been to conduct supplementary water carting to maintain a minimum reserve in the respective storages where necessary.

With the above considerations, it was assessed that a 90 day reserve in storage should reflect an informal reference point. A reserve below 60 days' supply in storage would reflect a 'Heightened Awareness' status, where response options should be coordinated to be available on standby and ready to activate when required. 'Drought Response' actions would be enacted if the reserve was less than 30 days' supply. It is noted that the reserve triggers reflect a highly conservative 'upper range' possible demand, which will not be observed in all years (GWMWater, 2018c).

The water security triggers for Elmhurst, Buangor and the Willaura system are presented in *Table 6*.

Table 6: Water Security Status & Triggers for Elmhurst, Buangor and Willaura System

Water Security Trigger Scenario	General Monitoring	Heightened awareness	Drought Response
Preferred Scenario	Reserve greater than 60 days' supply	Reserve less than 60 days' supply, but greater than 30 days' supply.	Reserve less than 30 days' supply

The reservoir trigger curves for Elmhurst are presented in ***Error! Reference source not found.***, and Buangor in *Figure 8*.

Figure 7: Water Security Trigger Curves for Elmhurst

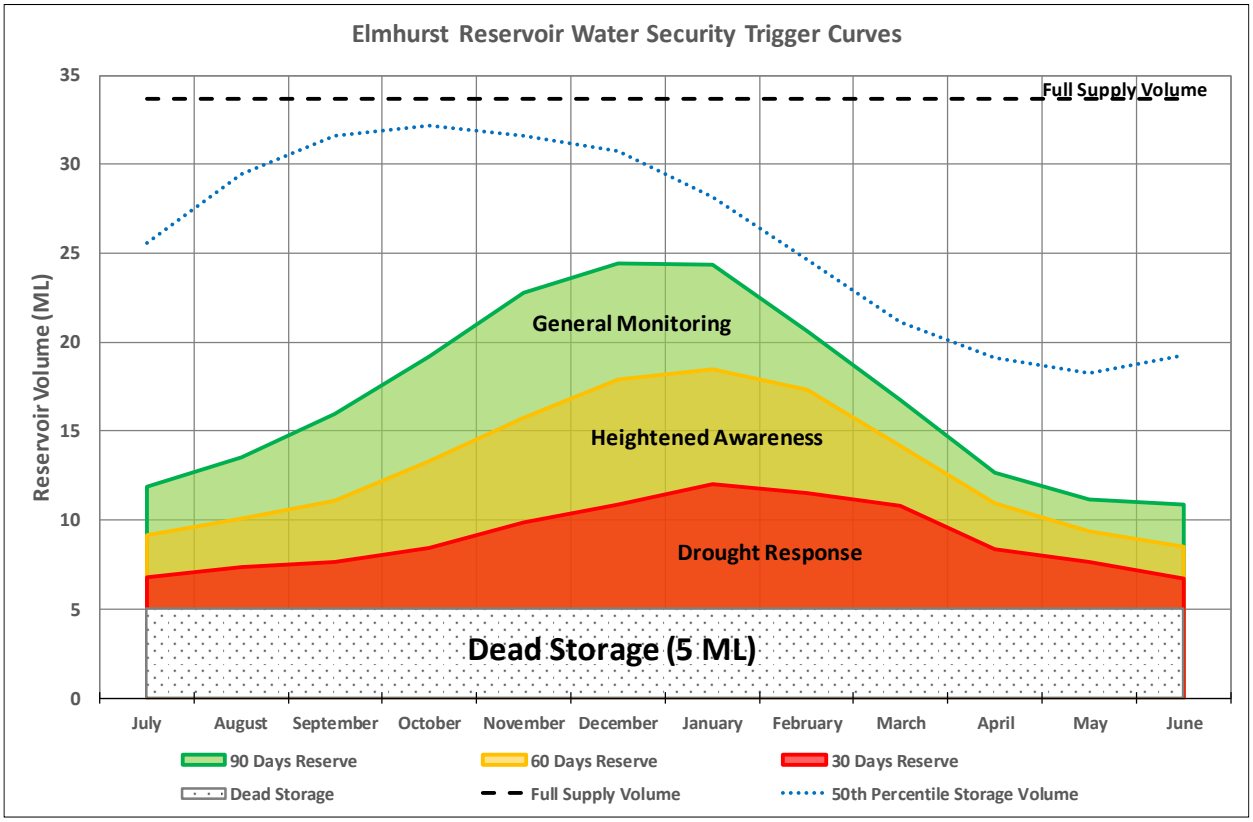
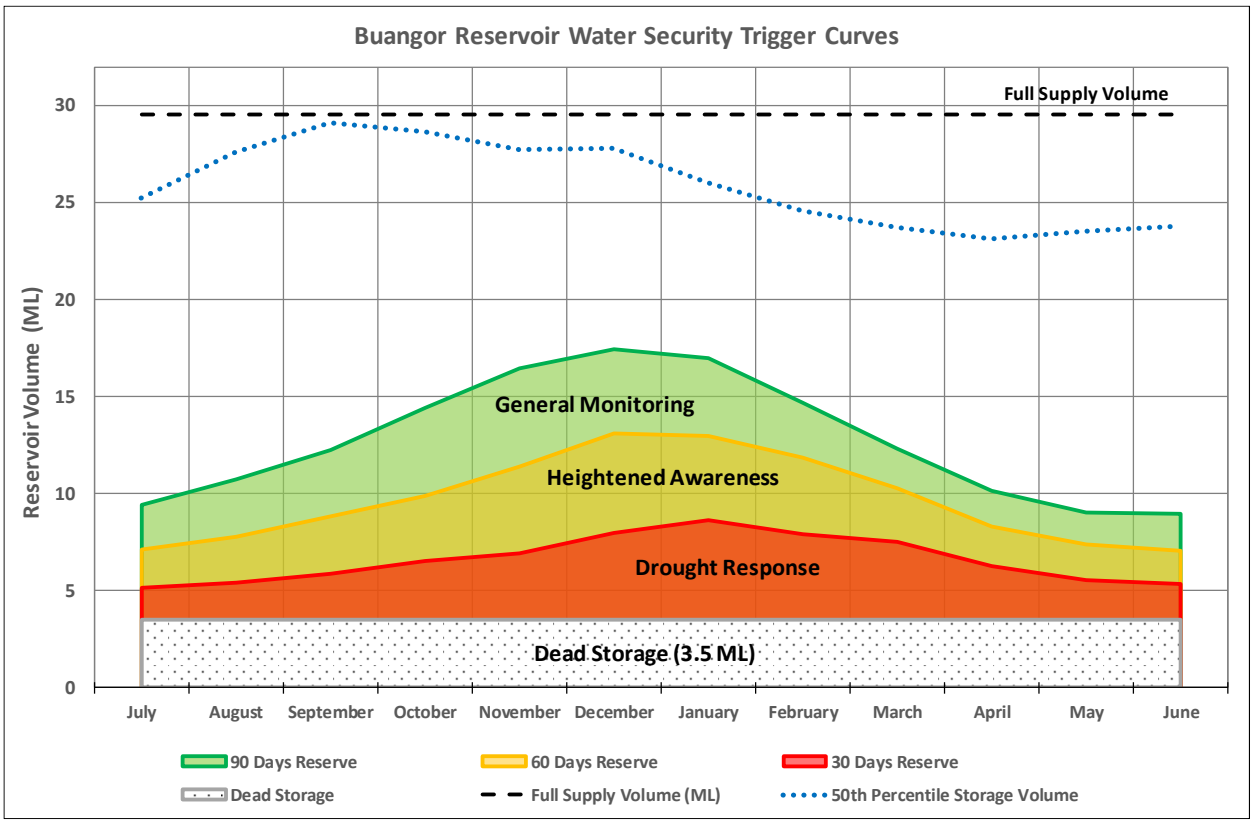
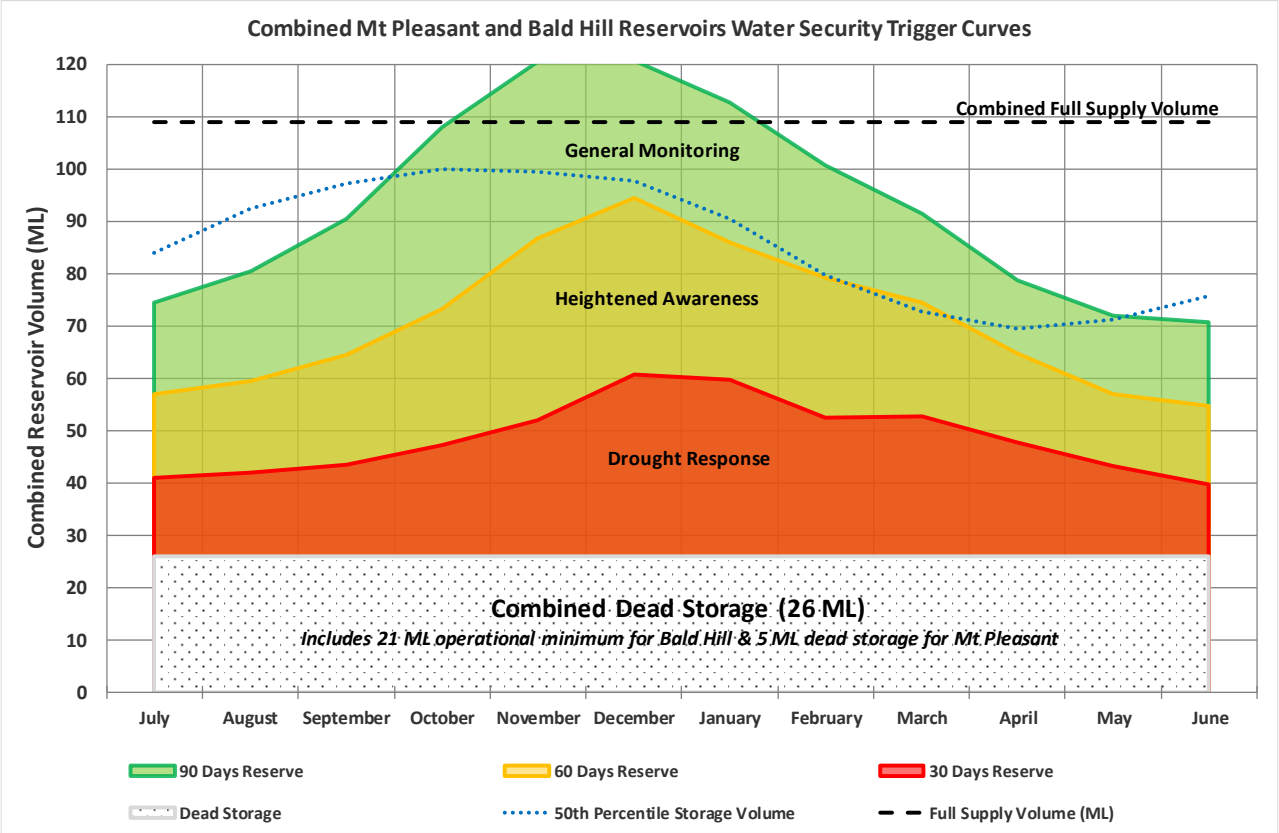


Figure 8: Water Security Trigger Curves for Buangor



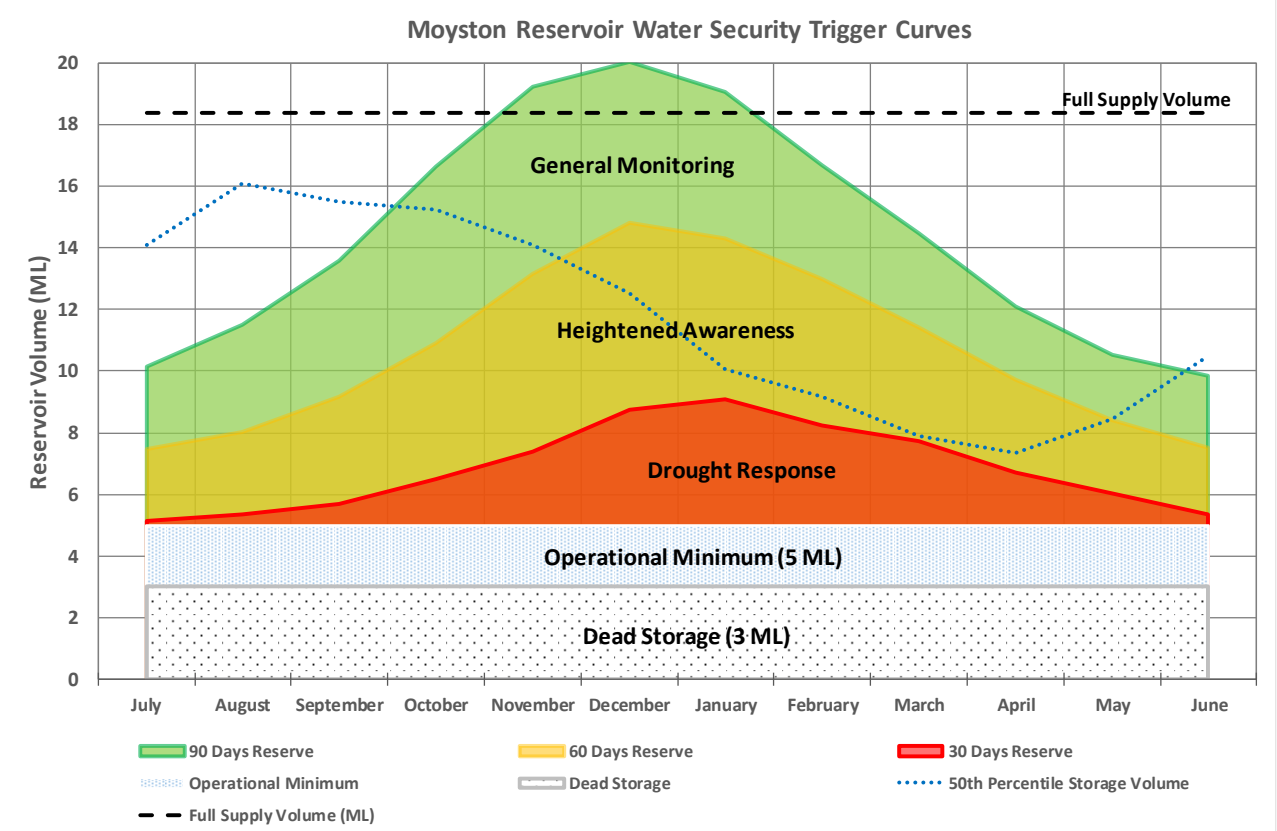
For the Willaura system, a combined trigger curve is presented, incorporating both Mt Pleasant and Bald Hill reservoirs (*Figure 9*). Together, these storages support supply to Willaura, Lake Bolac and Wickliffe townships. As such, the combined volume held in these reservoirs is the primary factor determining water security.

Figure 9: Water Security Trigger Curves for combined Mt Pleasant and Bald Hill Reservoirs (Willaura System)



Moyston township is supplied from a separate reservoir, and so has a separate water security trigger curve (*Figure 10*). At the time of preparing this DPP, Moyston was scheduled to receive a drinking water quality upgrade. It is anticipated that upon completion of the upgrade, Moyston will be supplied with potable water piped directly from Ararat, and the Moyston Reservoir will no longer be used for urban water supply. At that time, the water security trigger curves for Moyston shown in Figure 10 will cease to be used.

Figure 10: Water Security Trigger Curves for Moyston Reservoir (Willaura System)



6.3.4. *Drought Response Plan– Elmhurst, Buangor and Willaura System towns*

The water security triggers described in section 6.3.3 determine the water security status of the respective systems, and guide the actions which are required. Not all actions will be required under all circumstances.

Supply System Status	Water Security Summary & Potential Action Responses
General Monitoring	• The water system reserve *exceeds* the *General Monitoring* trigger volume. • Business as usual, but continue to monitor. • Management and Board receive routine monthly status reporting. • No water restrictions due to availability.
Heightened awareness	• The water system reserve *exceeds* the *Drought Response* trigger volume, but *cannot satisfy* the *General Monitoring* trigger volume. • A high water security risk is anticipated if conditions remain dry • Commence planning to ready the business for contingencies if the situation escalates. • Increase frequency of water system monitoring. • Limit water carting from standpipes to essential use only. • Supplementary water carting to urban storages may be initiated. • External communications to flag possible need for restrictions (if this response is likely to be required). • Restrictions *may be considered*.
Drought Response	• The water system reserve *cannot* satisfy the *Drought Response* trigger volume. • Immediate water security risk (critical within 30 days). • Drought Preparedness Plan enacted. • Water carting activities commenced/ increased. • Regular briefings to Senior Leadership Team. • Targeted communication to large users requesting temporary reduction in consumption, where possible. **Where supply cannot be improved or stabilised** • Communications to general customers requesting temporary reduction in consumption (prior to implementation of any restrictions). • Media and external communications to advise of situation (as required). • Actions *will be* implemented to reduce demand. • Restrictions *are expected*.

6.4 Groundwater supplied towns

6.4.1. *System Description*

GWMWater operates a number of groundwater bores which are the primary supply or supplementary/ contingency supply for a number of towns in the south-east and western parts of GWMWater's operational area (refer *Table 7*). Where groundwater is provided as a supplementary source to surface water supplies, such as the Eastern Grampians (Willaura system), or as a drought contingency such as for Horsham, then these supplies are also considered in the respective surface water sections.

Table 7: Groundwater supplied systems, customer user groups and licensed entitlement volumes

Groundwater area	User Group	Towns Supplied	Licence Volume (ML)
West Wimmera: Northern	Urban	Kaniva Kiata Lillimur Miram Serviceton	600 40 32 7 25
West Wimmera: Southern	Urban	Apsley Edenhope Harrow	40 250 60
West Wimmera: Gymbowen	Urban	Goroke	86
Murrayville	Urban	Cowangie Murrayville	40 475
Eastern Grampians	Urban (supplementary)	Willaura Wickliffe Lake Bolac Moyston	220 (all towns)
Eastern Grampians	Urban (primary)	Streatham Westmere	30 30
Western Grampians	Urban (contingency)	Horsham/Natimuk	1200
			Total: 3,135

6.4.2. *Water Source, Demands and Consumption*

GWMWater's groundwater supplied towns span a range of groundwater areas with differing levels of security. In most cases, the existing groundwater resource provides a long term supply option which is influenced very little by climatic factors. The primary groundwater resources accessed by GWMWater are summarised below.

Horsham
GWMWater has a 1,200 ML groundwater entitlement from the Mt Zero bore field to supplement Horsham urban system during periods of critically low surface water availability. This licence permits GWMWater to extract up to 1,200 ML a year from the wellfield, on the condition that a volume no greater than 2,400 ML is extracted in any consecutive 5-year period. The average groundwater extraction over the 5 years (2016-2021) was 23 ML/year, with the bores only operated for testing, water quality sampling and water for firefighting.

Willaura System (East Grampians area)
Groundwater is a supplementary supply annually for the Willaura System. The average annual extraction volume is around 172 ML/year.

West Wimmera & Murrayville area
Bulk water demand for urban use over the five years (2016-2021) was approximately 570 ML for GWMWater towns located in the West Wimmera Groundwater Management Area. For GWMWater towns located in the Murrayville Groundwater Management Area, average urban water extraction has been about 123 ML/yr. In general, urban allocations are considered to be comfortably in excess of current demand, with West Wimmera groundwater towns using around 50% of licensed entitlement and Murrayville area towns using around 24% of licensed entitlement.

Southern Grampians area
The groundwater supply to the townships of Streatham and Westmere is currently sourced from two production bores located north of Streatham. These towns are currently using around 55% of the 60 ML urban groundwater licence entitlement, partly due to the quality of supply only being suitable for some outdoor use (4,000 EC). Streatham and Westmere are anticipated to switch from groundwater supply to a surface water supply sourced from the East Grampians Rural Pipeline.

6.4.3. *Water Security Triggers*

Urban and rural groundwater users are generally less affected by drought than those reliant on surface water. This is because the groundwater resource is less susceptible to annual variations on rainfall, and the size of aquifers in GWMWater's area of operation are large in comparison to annual extraction rates and recharge.

The current utilisation of GWMWater's groundwater licences suggests that available allocation is unlikely to become a constraining factor in the foreseeable future. It is more likely that any drought response action will arise from a localised groundwater impacts.

During times of severe water shortages, some locations could potentially experience localised drawdown of the groundwater level which may reduce or limit pumping rates. The degree to which this could occur varies considerably and it is important to closely monitor this where it is identified as a risk in GWMWater's production bores.

Water security triggers for groundwater towns will primarily be based on the drawdown within the bore hole under pumping stress. This provides a measure of water security based on the physical capacity of the bore(s) to meet the required demand. GWMWater is continuing to collect data to build detailed knowledge of urban bore performance. As such, work is ongoing to understand and monitor the effect of drawdown relative to the pump depth and screened depth of all urban production bores, along with the local groundwater levels. GWMWater will continue to progress the development of water security triggers for groundwater towns based on the drawdown within the bore hole under pumping.

For consistency, the traffic light approach will be used to communicate the security of groundwater towns, based on their respective water security triggers.

6.4.4. *Drought Response Plan*

Drought response actions for groundwater towns include the lowering of the bore hole pumps where possible (short term), extending the depth of existing bore holes (short to medium term), expansion or enhancement of existing bore fields (longer term).

Supply System Status	Water Security Summary & Potential Action Responses
General Monitoring	• The water system reserve *exceeds* the *General Monitoring* trigger. • Business as usual, but continue to monitor. • Management and Board receive routine monthly status reporting. • No water restrictions due to availability.
Heightened awareness	• The water system reserve *exceeds* the *Drought Response* trigger, but *cannot satisfy* the *General Monitoring* trigger. • There is an emerging water security risk. • Increase frequency of water system monitoring. • Initiate supply enhancement discussions with Infrastructure Group. • Commence planning for contingencies & bore augmentation. • Implement Community education programs, increase frequency of water efficiency messaging • Customer communication to advise of situation and what GWMWater is doing to manage/secure supply (if appropriate). • External communication to flag possible need for restrictions in future (if this is likely to be required). • Some form of response action *may be considered* in the current year. • Restrictions *may be considered* in the current year.
Drought Response	• The water system reserve *cannot* satisfy the *Drought Response* trigger. • Immediate water security risk (requires action within 12 months). • Drought Preparedness Plan enacted. • Senior Leadership Team to review/authorise response actions. • Bore and/or supply augmentation works in progress **Where supply cannot be sufficiently improved in the short term:** • Supplementary water carting from alternate source (where feasible) • Regular briefings to Senior Leadership Team, Board, Government. • Media and external communications to advise of situation (as required). • Actions *will be* implemented to reduce demand. • Restrictions *are expected*.

7. Communications

Effective communication is an essential component of drought preparedness and response, and needs to be timely, informative and wide-reaching.

Wherever possible, customer consultative committees and stakeholder forums will be leveraged to both consult and inform customers and stakeholders about emerging water availability issues and drought response actions. Existing customer newsletters continue to provide a prime opportunity to disseminate information across our customer base. The engagement of customers and stakeholders in drought response action will assist in the overall success of the response effort.

Strong engagement with communities and local government will also assist water efficiency and demand reduction initiatives, along with the compliance of any water restrictions in place. This engagement will enable an effective and collaborative approach to identifying and prioritising strategic community assets to be watered during periods of restriction, and also identifying any special needs of individual communities.

Use of electronic, radio and print media allows information to be quickly and broadly communicated to customers. Upon the commencement of major drought response actions in particular, communication via media releases, infotorials and social media should be considered in addition to any direct communication, to keep customers and communities informed. This may also extend to any water restrictions implemented, and changes in the level of restriction.

While the focus of our communication should be our customers, communities and stakeholders, it is also essential for the Water Minister, relevant politicians, government agencies and local authorities to be briefed via established processes on the water security status, response options and actions, as well as the anticipated outcome of proposed response actions. Advice to the Department, and Minister where appropriate, will generally precede the issuing of media releases.

A high level external communications strategy outline can be found in Appendix 3.

8. Post drought evaluation and incorporating learnings into future planning.

Following the return of Permanent Water Saving Rules for urban customers after a period of drought response or water security driven restrictions, an evaluation of the Drought Preparedness Plan and its implementation will occur.

This should include the following key evaluation factors:

- Effectiveness – did we do and achieve what we planned? Were objectives met?
- Efficiency – was it cost and resource efficient?
- Appropriateness – were there better and more appropriate responses?
- Learnings – what did we learn that can be used to improve our preparedness plan.

9. Appendices

Appendix 1 - GWMWater Entitlements

Murray System: Northern Mallee Pipeline Wimmera-Mallee Pipeline SS5, Private Pipelines Goulburn System: South-West Loddon Pipeline (in part)

Entitlement Type	Volume (ML)	Reliability
Murray Bulk Entitlement	3,485.8	High
Murray Water Share	1,874	High
Goulburn Water Share	1,049	High
Quambatook	100	Very High
Total	***6,508.8***	

Grampians System: Wimmera-Mallee Pipeline (SS 1,2,3,4,6,7), urban towns direct from headworks.

Entitlement Type	Volume (ML)	Reliability
Wimmera-Glenelg Bulk Entitlement (Urban & Rural)	32,720	High
Wimmera-Glenelg Bulk Entitlement (SBA – not considered in this Strategy)	12,000	High
Total	***44,720***	

Eastern Grampians and Pyrenees Urban Systems

Entitlement Type	Volume (ML)	Reliability
Bulk Entitlement (Willaura System)	390	Not defined
Bulk Entitlement (Elmhurst)	48	Not defined
Bulk Entitlement (Buangor)	28	Not defined
Total	***466***	

Groundwater Towns

Entitlement Type	Volume (ML)	Reliability
S51 Licence (Goroke)	86	Not defined
S51 Licence (Kiata)	40	Not defined
S51 Licence (Nhill)	1,000	Not defined
S51 Licence (Mt William - Willaura)	220	Not defined
S51 Licence (Kaniva)	600	Not defined
S51 Licence (Serviceton)	25	Not defined
S51 Licence (Edenhope)	250	Not defined
S51 Licence (Harrow)	60	Not defined
S51 Licence (Murrayville)	475	Not defined
S51 Licence (Lillimur)	32	Not defined
S51 Licence (Cowangie)	40	Not defined
S51 Licence (Mt Zero - Horsham)	1,200	Not defined
S51 Licence (Apsley)	40	Not defined
S51 Licence (Miram)	7	Not defined
Total	***4,075***	

Appendix 2 - Summary of Customer Types and Restriction Arrangements

A broader restriction mechanism and policy gap assessment has been developed as part of this plan and is included in *Table 8*, below. This also makes note of customer types that are not subject to this Drought Preparedness Plan.

Table 8: Summary of GWMWater Customer Types and Restriction Arrangements.

Customer Type	Restriction Mechanism	Triggers to Implement Restriction	Policy Gaps
Urban	Urban water restriction by-law	Yes	Nil identified.
Rural Pipeline (Domestic and Stock)	Rural Customer Charter (10.11 (g))	Yes	Basis to impose restriction or rural pipeline "water allowance" customers.
Supply by Agreement (excludes headworks SBA)	As per Agreement.	Triggers are not always clear, or may be open to interpretation. May be different depending on system water is sourced from.	No documented policy on how SBA users are to be restricted. Sometimes differing arrangements between SBAs.
Commercial water carting	Permit conditions for access to urban and rural standpipes.	Yes	Can take the form of an emergency supply, so may not always be eligible for restriction. Method for monitoring compliance with permits.
Recreation – watering of green spaces.	Restriction by-law (eligible for exemption).	As per urban restrictions.	Approach for restricting / exempting watering from rural pipeline systems.
Recreation lakes	Not applicable under DPP.	Entitlement allocation.	
Take & Use Licence (Domestic and Stock)	Not applicable under DPP.	Nil.	
Take & Use Licence Holders (Irrigation & Commercial)	Not applicable under DPP.	Licence conditions & allocations.	

Customer Type	Restriction Mechanism	Triggers to Implement Restriction	Policy Gaps
Other Water Corporations	Not applicable under DPP.	Entitlement allocation.	
Environmental Water Holders	Not applicable under DPP.	Entitlement allocation.	

Appendix 3 – External Communications Strategy Outline

Target Audience	Motivational Factors	Key Messages	Method
Customer Committees/ Stakeholder forums	Desire to provide input to proposed drought response actions.	Clear overview of the proposed response and where they can find more information.	Presentations Briefings
DELWP, Minister for Water, relevant local politicians	Has proper planning and consultation has been undertaken. Assurance that impacts to customers and communities is being appropriately managed.	Planning and consultation that has informed the drought response action(s). How any impacts to customers and communities is being managed.	Written advice Briefings as required
Local Authorities – Local Government	Has proper planning and consultation has been undertaken? Desire to understand potential impact on community facilities, local businesses and rate payers.	Planning and consultation that has informed the drought response action(s). GWMWater will continue to engage.	Written advice Briefings & direct engagement Fact Sheets
Customers & general community	Will be directly affected by response actions. Desire to know if/how response actions will impact cost to customers.	Strategic approach is being taken. Importance of the response action(s) to secure/maintain supply. Promote water saving tips, reinforce water efficiency messaging and programs.	Customer newsletter Fact sheets & info on GWMWater website Infotorials Media releases Radio/print/ social media comms.

10. Key Water Industry Terms used in this Plan

Many of the definitions here are courtesy of the Victorian Water Register - Water Dictionary (https://waterregister.vic.gov.au)

Allocation (water allocation, temporary allocation)

Water that is actually available to use or trade in any given year, including new allocations and carryover.

Allocation Trade (temporary trade)

The transfer of a volume of allocation water between a seller and buyer.

Water is traded within a current irrigation season / water year.

Previously this was known as temporary trade and some people still use this term.

Carryover (carryover entitlement)

An arrangement that allows a water entitlement holder to take unused water allocations from one season into the next season to use and/or trade.

Carryover rules depend on the declared system in which allocations are held.

Critical Human Water Needs

Under the Commonwealth Water Act, the minimum amount of water required to meet core requirements of communities dependent on Basin water resources. The definition also includes non-human requirements that, if not met, would cause prohibitively high social, economic or national security costs.

In Victoria, as a matter of practise, this means the amount of water required to supply stage 4 restricted demand in urban areas, supply domestic and stock needs and operate the distribution system to deliver that water.

Licence (permanent licence)

Generally, a shorthand way of referring to a take and use licence.

There are also other types of licences – for example, works licences and water-use licences.

Permanent Water Saving Rules (PWSR) and Water Restrictions

The Victorian Government's permanent water saving (or use) rules are a set of common-sense rules to reduce demand and make sure we use water efficiently.

These rules are in place at all times. Whenever water restrictions are also in place, the more severe rule or restriction applies. There are penalties for not following the rules.

These rules took effect from November, 2011, and are uniform across Victoria.

More information on PWSR and water restrictions is available from the Department of Environment, Water and Planning.

Spillable Water

Water that is above entitlement volume and is quarantined in a spillable water account until the resource manager for northern Victoria or Storage Manager for the Wimmera-Glenelg System declares a low risk of spill.

Spillable Water Account

A feature of an allocation account where spillable water is recorded before the resource manager for northern Victoria declares a low risk of spill.

It keeps track of casual access to storage space, and the water that could spill as the storages in northern Victoria fill.

Supply By Agreement

An agreement between a water corporation and a person giving an entitlement to water for defined period.

Supplies by agreement usually cover less reliable water sources, like drainage water, or areas where supply is not guaranteed.

Water Entitlement (permanent entitlement, bulk entitlement, water share)

A right to receive water allocations, depending on resource availability.

An unbundled water entitlement is a water share.

A bundled water entitlement may be one of several types; most commonly take and use licences, water allowances, and supply by agreements.

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