Gippsland Water

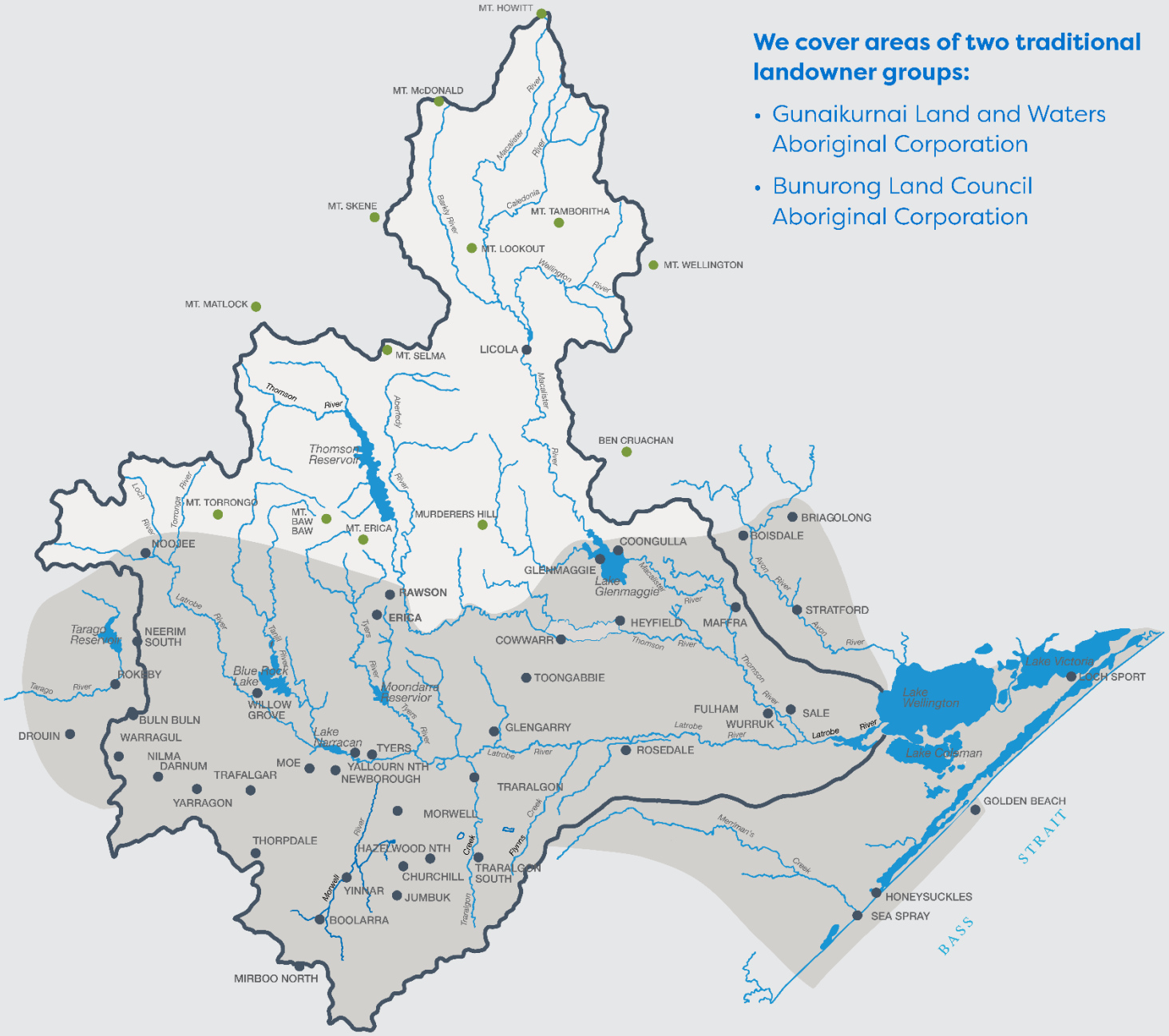
Annual report on drinking water quality 2021-22

Our Service Area

We acknowledge Traditional Custodians of the land on which we live and work. We pay respect to Elders past and present. We are committed to working respectfully to honour their ongoing cultural and spiritual connections to this country. We recognise the role and value of culture in our work and community.

We cover areas of two traditional landowner groups:

- Gunaikurnai Land and Waters Aboriginal Corporation
- Bunurong Land Council Aboriginal Corporation



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Latrobe River catchment boundary

Gippsland Water operating area

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Document Control

Description	Version number	Date
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1 Introduction

1.1 CHARACTERISATION OF THE SYSTEM

We are the Central Gippsland Region Water Corporation, and trade as Gippsland Water. We are a regional water corporation in Victoria established under the *Water Act 1989* and constituted on 21 December 1994.

This Annual Report on Drinking Water Quality 2021-22 is prepared for compliance with section 26 of the Safe Drinking Water Act 2003 (SDWA).

With over 300 operational, engineering, financial, environmental and administrative employees, we are a major local employer for the region serving a population base of approximately 157,000 people.

We deliver water to 74,794 customers and wastewater services to 67,261 customers in 43 towns. Our customers include major industries, some of which are of state and national significance.

These towns are grouped into 35 localities for the purposes of monitoring and reporting in accordance with the *Safe Drinking Water Regulations 2015 (SDWR)*.

Our service area spans from Drouin in the west, to Loch Sport in the east, from Briagolong in the north, to Mirboo North in the south. This covers approximately 5,000 square kilometres in the municipalities of the Baw Baw Shire, Latrobe City, South Gippsland Shire, and Wellington Shire.

The way we treat water depends on where it is sourced. We take water from 13 different sources including aquifers, rivers, creeks and reservoirs. Our largest storage is Moondarra Reservoir, south of Erica, with a capacity of 30,458ML. We also take water from storages managed by Southern Rural Water (Blue Rock Dam and Lake Glenmaggie) and Melbourne Water (Tarago Reservoir).

We are the second largest regional water corporation in Victoria in terms of revenue earned and is the largest in terms of the total volume of water supplied and wastewater collected. We own and maintain a $1 billion infrastructure network which includes:

- More than 2,000 kilometres of water mains, 65 treated water storages, and 48 pump stations.
- More than 1,700 kilometres of sewer mains and 199 sewer pump stations.
- 15 water treatment plants.
- 14 wastewater treatment plants including the Gippsland Water Factory.
- Two ocean outfalls (McGaurans Beach and Delray Beach).
- Soil and organic recycling facility; and
- Agribusiness

We are committed to providing responsible asset management, quality management, incident management and operational audit of the reticulated urban water supply system to ensure that customer service levels are achieved according to its Customer Charter targets and the *Safe Drinking Water Act 2003 (SDWA).*

A major objective for the corporation is to achieve and maintain community confidence in the safety, reliability and quality of their water supply.

To ensure customers are provided with safe drinking water, we maintain a '*risk based*' drinking water quality management system, which covers the entire water supply system from the catchment to customers' taps. The system entails:

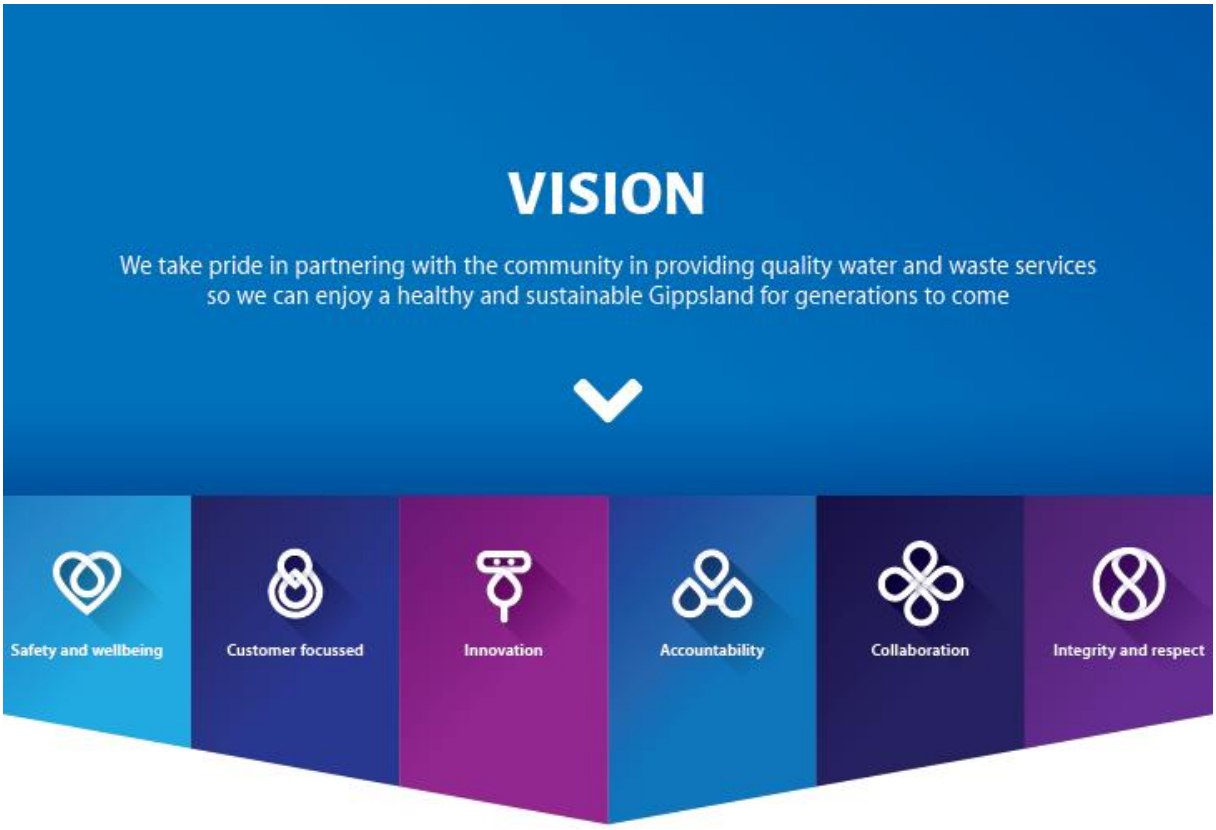
- Detailed water quality risk identification processes;
- Audited control measures to manage risks;
- Continuous improvement project to increase system capability, manage risk and improve customer experiences; and
- Verification systems, including an independent water quality monitoring program.

1.2 WATER QUALITY ACTIVITIES

In 2021-22, we made many improvements to ensure our customers' water quality was maintained, including:

- Continued the implementation of Integrated Catchment Land Use Options Strategy outcomes for the Moondarra catchment to protect water quality;
- Continued upgrading a number of our secondary disinfection systems to maintain water quality safety as part of our rolling upgrade program (Warragul South, Rosedale and Newborough townships);
- Completed filter rebuild and media replacement as part of a rolling filter maintenance program at Tyers.
- Returned a major drinking water service basin floating cover and liner to service after replacements were completed at Northways basin in the Churchill Township.
- Commenced two additional drinking water basin relining and recovering projects in the Churchill (Sanders basin) and Warragul (Warragul North basin) systems
- Continued with water quality inspections of drinking water tanks and storage basins and as part of regular inspection programs
- Completed a major upgrade of the Moe Water Treatment Plant chemical storage and dosing system
- Commenced construction of a new drinking water storage basin at Moe Water Treatment Plant
- Maintaining and refreshing the 'Five Cs for Protecting Water Quality' initiative for unplanned water main breaks. Our teams refer to the five Cs to ensure: Clean pipes – check before installing; Clearance – stop contaminated water running into pipes; Chlorination – flush after repair; Cleanliness – clean tools and separate from contamination; and Clothing – wear appropriate clothing;
- Continued delivering air scouring works to maintain water quality in our reticulation networks by cleaning pipes in Mirboo North, Heyfield and Rawson townships
- Installation of new sludge management storage at Heyfield Water Treatment Plant
- Completion of maintenance and modifications to the Warragul Chlorine Contact Tank at Warragul Water Treatment Plant
- Continued to optimise the Moe-Warragul treated interconnect system as part of the drinking water network, transferring treated water from Moe to the Warragul drinking water supply system
- Completed the Heyfield - Coongulla interconnect to supply treated drinking water from Heyfield to the Coongulla township and decommissioning the Coongulla water treatment plant.
- Undertook chemical trials during the Alum supply chain issue to identify alternative treatment chemicals as part of our business continuity and risk management process
- Responding to multiple significant storm and flood events to continue to supply safe drinking water to our customer across the region

Our Vision and Values



Our Strategic Priorities

OUR STRATEGIC PRIORITIES FOCUS ON THE FOLLOWING SIX THEMES:

Each of these strategic themes has a five year destination statement, strategic objectives to focus our attention and resources, and a set of strategic actions to deliver on those objectives.

Healthy people, healthy environment
We are a leader in safety, public health and the environment to support a healthier community.

Enabling our people
Through a constructive culture, we are an engaged and empowered workforce capable of delivering on our priorities.

Strengthening relationships
On behalf of our community we help shape the health and prosperity of the Gippsland region.

Customer focussed
We learn from our customers and deliver on our promises.

Business sustainability
We invest strategically and make evidence-based decisions that deliver value for money to secure our future.

Clever thinking
We foster innovation and empower people to find and deliver efficiencies that transform our business.

2. Drinking water quality management framework

The regulatory environment in which we operate is to provide safe drinking water at **all** times. Safe drinking water is water that does not cause illness in those who consume it. To achieve this, the water must be free of pathogens and harmful chemicals.

Guidance regarding the structure of this report has been provided by the Department of Health (DH) in accordance with the *Safe Drinking Water Act 2003* (section 26) and the current Water Quality Annual Report Guidance, June 2017.

Drinking water supplied by us must meet the obligations under the *Safe Drinking Water Act 2003* and the Safe Drinking Water Regulations 2015. The Australian Drinking Water Guidelines 2011 (ADWG) are used as a benchmark for safe drinking water. The guidelines provide a framework for good management of drinking water supplies that if implemented, will ensure safety at the point of use.

The ADWG include two types of guideline values:

- A health related guideline value, which is the concentration or measure of a water quality characteristic that, based on present knowledge, does not result in any significant risk to health of the consumer over a lifetime of consumption; and
- An aesthetic guideline value, which is the concentration or measure of a water quality characteristic that is associated with acceptability of water to the consumer, such as appearance, taste and odour.

The regulatory environment that provides guidance in the production of safe drinking water consists of:

- ***Victorian Safe Drinking Water Act 2003 (SDWA)***

The Victorian State Government passed the *Safe Drinking Water Act* 2003 in June 2003. This Act provides details of further requirements for Victorian water corporations.

The purpose of the *Safe Drinking Water Act (2003)* is to make provision for the supply of safe drinking water. In outline this Act:

- Requires water suppliers and water storage managers to prepare and implement plans to manage risks in relation to drinking water and some types of non-potable water;
- Provides for the auditing of those plans by approved auditors;
- Requires water suppliers to ensure that the drinking water they supply meets quality standards specified by the regulations;
- Requires water suppliers to disclose to the public information concerning the quality of drinking water;
- Provides for the variation, after community consultation, of water quality standards that relate only to aesthetic factors;
- Requires the reporting of known or suspected contamination of drinking water to the Secretary to the Department of Health; and
- Empowers the Secretary to enforce this Act.

- ***Victorian Safe Drinking Water Regulations 2015 (SDWR 2015)***

The Victorian State Government passed the Safe Drinking Water Regulations 2005 in July 2005. These Regulations provides details of further requirements for Victorian water corporations. The Safe Drinking Water Regulations 2015 came into operation on 18 July 2015 with the Safe Drinking Water Regulations 2005 being revoked.

The purpose of the Safe Drinking Water Regulations 2015 is to make further provision for the supply of safe drinking water. In outline, the regulations include:

- Setting out further matters to be addressed in risk management plans and the risks to be addressed in those plans; and
- Specifying the documents to be made available for inspection in a risk management plan audit; and
- Specifying the issues relating to the quality of drinking water and regulated water that are to be dealt with by a water supplier and water storage manager in an annual report; and
- Providing for other matters required to be prescribed under the Safe Drinking Water Act 2003.

- ***Australian Drinking Water Guidelines 2011 (ADWG)***

The purpose of the *Australian Drinking Water Guidelines 2011* is to provide the authoritative reference for use within Australia's administrative and legislative framework to ensure the accountability of drinking water suppliers. The ADWG are not mandatory legally enforceable standards.

The guidelines set the framework for the management of drinking water quality known as the 12 elements. We have adopted the 12 elements of the ADWG 2011 that comprise:

- ***Health (Fluoridation) Act 1973***

The *Health (Fluoridation) Act 1973* ('the Fluoridation Act') regulates the safe and effective addition of fluoride into drinking water supplies in Victoria.

Under the Fluoridation Act*,* the Secretary to the Department of Health has the power to direct water supply authorities to commence water fluoridation.

- **Code of Practice for Fluoridation of Drinking Water Supplies; Second Edition (2018) – *Health (Fluoridation) Act 1973*.**

This code provides details of further requirements for Victorian water corporations.

The objective of the code is to provide for the safe and effective addition of fluoride into the drinking water supply. This will be achieved by specifying:

(a) The optimum fluoride levels for drinking water supplies and the design control limits for fluoridation plants;
(b) The minimum requirements for the safe and effective addition of fluoride chemicals to drinking water supplies, covering the design and operation of a fluoridation plant; and
(c) Monitoring and reporting requirements for the proposed fluoridation scheme.

The code also includes works undertaken on fluoridation plants and integrates the practices with the SDWA through:

(a) The inclusion of water fluoridation into the corporations' risk management plan under the SDWA; and
(b) Integration and compliance with the auditing, notification and reporting requirements of the SDWA.

The code also describes the gap analysis and subsequent works program associated with water fluoridation plant through:

a) The regulatory frame work including the procedure to fluoridate;
b) Safety in design;
c) Requirements for the design and control of fluoridation facilities; and
d) Requirements for plant operation including monitoring, training or personnel, occupational health and safety, security and environmental protection.

- **Health Based Targets (HBT)**

The National Health and Medical Research Council (NHMRC) released a discussion paper in 2009 on introducing a health-based target (HBT) for microbial water quality in the *Australian Drinking Water Guidelines* (ADWG). In December 2011, Water Services Association of Australia's (WSAA) Water Quality Network considered the HBT proposition at their annual meeting. Outcomes from that meeting formed the basis of a subsequent WSAA submission to the National Health and Medical Research Council (NHMRC).

The WSAA *Drinking Water Source Assessment and Treatment Requirements Manual for the Application of Health-Based Treatment Targets Release No. 2 September 2015* was adopted by Gippsland Water for assessing the microbiological risk associated with its catchments and treatment processes in place (log removal requirements) to manage these risks.

The HBT comprises four parts:

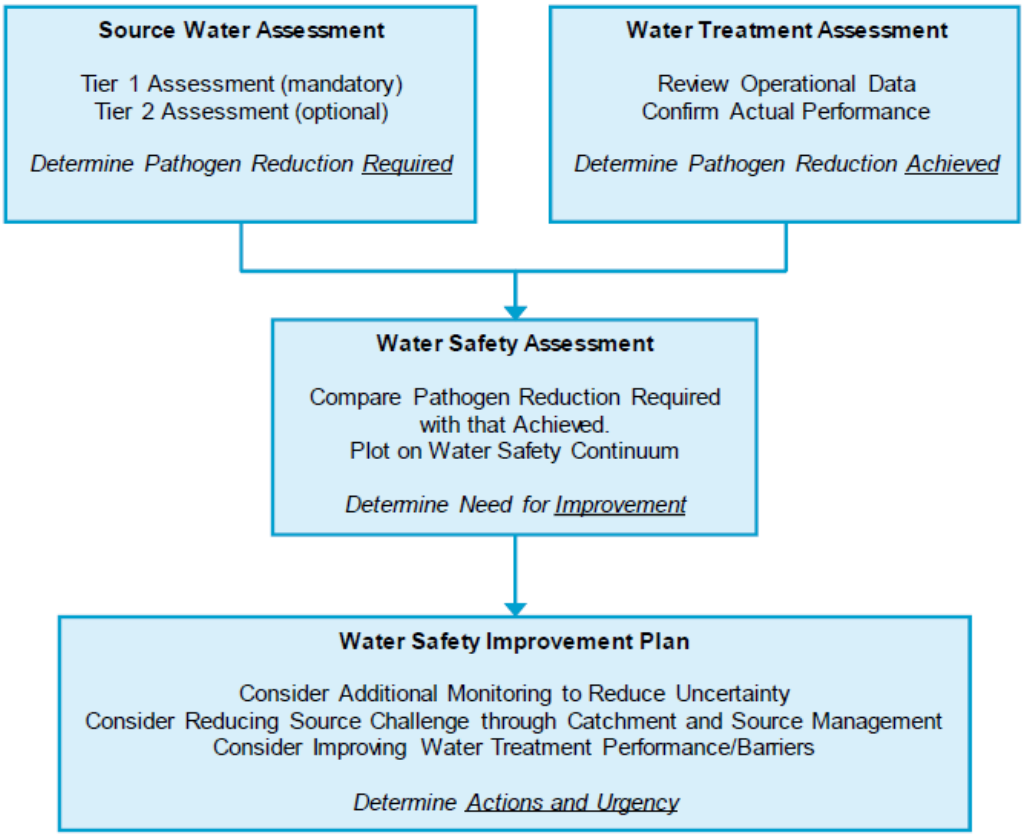
(a) ***Source water assessment*** (microbial risk). Pathogen risk assessment is conducted in accordance with the Water Service Association of Australia's (WSAA) *Manual for the Application of Health-Based Treatment Targets Release No 2* and is consistent with the ADWG 2011 Framework. Figure 1 below sets out WSAA's approach to quantitative risk assessment that has been adopted by the Corporation

(b) ***Water treatment plant process assessment.*** The water treatment assessment involves assigning estimates of pathogen reduction to the treatment processes deployed at a source.

(c) ***Water safety assessment.*** Comparing the log reduction required from the source assessment with the log reduction values claimable from the water treatment assessment.

(d) ***Water Safety Improvement Plan*** The water safety improvement plan involves planning improvements to improve water safety. Where the HBT is not achieved, the water supplier should undertake improvements.

Figure 1: WSAA Water Safety Assessment Process



3 Drinking Water Quality Policy

1. Policy statement and purpose

Gippsland Water is committed to managing its water supply systems to provide safe drinking water for customers at all times. This is achieved by managing catchments, treatment and water supply assets and systems in an efficient and sustainable manner reflecting the current and future commitments.

Drinking water is managed in accordance with our Drinking Water Quality Manual that outlines the strategic and operational processes which reflect our attitude to our customers, our product, our service delivery and each other, in a matter which demonstrates that we:-.

- Understand our obligations to public health
- Are committed to high quality products and services
- Behave openly, ethically and fairly
- Focus on customer satisfaction
- Promote innovative solutions
- Strive to get the best out of our systems all of the time

2. Our commitments

To continually improve our drinking water quality performance by:

- Meeting all of our legislated drinking water quality requirements, and moving our practices beyond compliance with relevant legislation only, where sustainable and economic opportunities are identified;
- Managing the water quality aspects of all our activities by training our people, incorporating water quality objectives and targets into our business planning activities, and implementing appropriate risk based approaches to ensure we provide safe drinking water at all times;
- Working with our customers and suppliers to jointly understand and be more effective in the management of water quality products and services supplied to us; and
- Undertaking whole-of-water supply catchment to tap assessments as part of an integrated approach to the sustainable management of our water resources and treatment activities.

To communicate with our community by:

- Openly sharing and publishing information on our drinking water quality activities and performance;
- Utilising our water industry partners, advisory committees and other consultative mechanisms, to seek community involvement in policy development and planning processes and by contributing to initiatives and activities that educate and enhance community awareness of water resources, catchments, water treatment and water quality issues; and
- Co-operating with all stakeholders within the community to identify, influence and participate in sustainable solutions to global and regional drinking water quality priorities.

4 Drinking water supply systems

4.1 SOURCE OF WATER

We operate 15 water treatment systems supplying 35 water sampling localities and 42 towns in 2021-22. The water for these systems is sourced from a variety of water supplies including stream off-takes, reservoirs, and groundwater (bore water). The table below provides information on where the raw water is sourced for each water sampling locality, identifies the raw water storage (if one exists prior to each water treatment plant) and details the water treatment processes used to produce safe drinking water.

We interact with many stakeholders regarding catchment management. For details regarding catchment management activities refer to section 9.6.

Table 1: Gippsland Water - water sampling locality source water and water treatment processes

Water sampling Locality	Estimated Population Serviced[1]	Source water	Raw Water Storage	Water Treatment Plant	Treatment process										Sludge Thickening Dewatering	Added substances						
						Clarification		Filtration		Disinfection				Other								
					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[4]		Lime / Soda Ash	Alum Based Coagulants	Iron Based Coagulants	Potassium Permanganate	Polymers	Sodium Fluoride / Hydrofluorosilicic Acid	Calgon sodium hexametaphosphate
Maffra	5,530	Macalister River	N/A	Maffra	X	X		X		X		Stratford and Boisdale		X		Soda Ash	Alum/PACl-23* (High Turbidity)			LT22	Sodium Fluoride	X
Stratford	2,720																					
Boisdale	80																					
Briagolong	770	Bore - Wa De Lock Aquifer	N/A	Briagolong	X			X				X				Soda Ash		Polymerised Ferric Sulphate		1115 & 1160		

1 = The listed populations are for the water sampling localities calculated using Gippsland Water's number of residential water connections, the 2016 ABS census data of number of persons per dwelling, and adjusted for estimates of permanent occupation rates. Figures have been rounded to the nearest 10 people.
3 = The water supplied to Darnum changed from the Warragul system to the Moe system in March 2012.
4 = PAC/GAC used as required to treat for taste and odour compounds.
* = PACl-23 used as required to treat high turbidity raw water.
X_1 = Plant capability for activated carbon dosing (not currently in use).

Table 1 (cont.): Gippsland Water - water sampling locality source water and water treatment processes

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						Clarification		Filtration		Disinfection				Other							
					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[4]		Lime / Soda Ash	Alum Based Coagulants	Iron Based Coagulants	Potassium Permanganate	Polymers	Sodium Fluoride / Hydrofluorosilicic Acid
Morwell	15,780	Tyers River	Moondarra	Morwell	X	X		X		X		Morwell, Churchill, Jumbuk, Hazelwood Nth, Boolarra	Traralgon South			Soda Ash	Alum			LT20	Sodium Fluoride
Boolarra	680																				
Churchill	5,390																				
Yinnar	1,430																				
Jumbuk	390																				
Traralgon South/ Hazelwood North	1,920																				
Tyers/Glengarry	2,250	Tyers River	Moondarra	Tyers (Plant 1)	X			X				Tyers, Rosedale & Toongabbie			X	Soda Ash	Alum			1115 & 1160	
Rosedale	1,750																				
Toongabbie	990			Tyers (Plant 2)	X		X	X													
Cowwarr	300																				
Traralgon	30,020	Tyers River	Moondarra	Traralgon	X		X	X		X						Soda Ash	Alum			LT20	Sodium Fluoride

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						Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[4]								
Warragul[3] (including Nilma, Drouin East)	21,480	Pederson Weir (Tarago River) Tarago Reservoir - (supplementary supply)	Tarago Reservoir (supplementary supply)	Warragul	X		X	X		X		Warragul South & Drouin		X_1	X	Lime	Alum			LT20	Sodium Fluoride	
Warragul South	670																					
Drouin	16,940																					
Rokeby/Buln Buln	560																					
Coongulla/ Glenmaggie	820	Macalister River	Lake Glenmaggie	Coongulla	X			X				X		X	X	Soda Ash	Alum 90			1160, 1115		
Rawson	360	Trigger Creek	Amours Basins	Rawson	X		X	X				Rawson WTP, Parkers Corner			X	Soda Ash		PFS (Polymerised Ferric Sulphate)		1160		
Erica	250																					
Heyfield	2,060	Thomson River	Heyfield raw water storage	Heyfield	X			X		X				X	X	Soda Ash		PFS (Polymerised Ferric Sulphate)		1115, 1160		X

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3 = The water supplied to Darnum changed from the Warragul system to the Moe system in March 2012.
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Water Sampling Locality	Estimated Population Serviced[1]	Source water	Storage	Water Treatment Plant	Treatment process										Sludge Thickening Dewatering	Added Substances						
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						Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[4]								
Mirboo North	1,800	Little Morwell River	N/A	Mirboo North	X	X	X	X				X			X	Soda Ash	PASS			LT20		
Moe (inc Darnum[3])	10,240	Tanjil River and Narracan Creek	N/A	Moe	X	X		X		X		Newborough, Yallourn North, Trafalgar, Yarragon & Darnum			X	Soda Ash	Alum			LT20	Sodium Fluoride	X
Newborough	7,060																					
Yallourn North	1,600																					
Trafalgar	4,290																					
Yarragon	2,200																					
Neerim South	1,570	Tarago River	Tarago Reservoir	Neerim South	X		X	X			X (Noojee System)	X (Neerim South)			X	Soda Ash		PFS (Polymerised Ferric Sulphate)		1115, 1160		X
Noojee	240																					
Sale/Wurruk	17,190	Bore (Boisdale Aquifer)	N/A	Sale				X		X						Lime			X		Sodium Fluoride	

1 = The listed populations are for the water sampling localities calculated using Gippsland Water's number of residential water connections, the 2016 ABS census data of number of persons per dwelling, and adjusted for estimates of permanent occupation rates. Figures have been rounded to the nearest 10 people.
3 = The water supplied to Darnum changed from the Warragul system to the Moe system in March 2012. Darnum is not a designated water sampling locality under the SDWR.
4 = PAC/GAC used as required to treat for taste and odour compounds.
* = PACl-23 used as required to treat high turbidity raw water.
X_1 = Plant capability for activated carbon dosing (not currently in use).

Table 1 (cont.): Gippsland Water - water sampling locality source water and water treatment processes

Water Sampling Locality	Estimated Population Serviced [1]	Source water	Storage	Water Treatment Plant	Treatment process										Sludge Thickening Dewatering	Added Substances						
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						Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[4]								
Seaspray	770	Merrimans Creek	Seaspray raw water storage	Seaspray	X			X				X		X	X	Soda Ash	Alum 90			1115, 1160		
Thorpdale (water carting from Moe water sampling locality)	180	Tanjil River and Narracan Creek (September 2015 - ongoing)	N/A	Moe	X	X		X		X		Newborough, Yallourn North, Trafalgar, Yarragon & Darnum			X	Soda Ash	Alum			LT20	Sodium Fluoride	X
Willow Grove	460	Tanjil River	Blue Rock Lake	Willow Grove	X			X			X				X	Soda Ash	Alum			1115, 1160		

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X_1 = Plant capability for activated carbon dosing (not currently in use).

4.2 WATER QUALITY MANAGEMENT SYSTEM

The *Safe Drinking Water Act 2003* (SDWA) provides a regulatory framework for drinking water quality including a risk management framework and water quality standards. The SDWA requires all Victorian Water Corporations to prepare, implement and review a risk management plan. To assist with this requirement, we have made a commitment to establish and maintain a Drinking Water Quality Management System (DWQMS) that considers the principles of the Framework for the Management of Drinking Water Quality within the *Australian Drinking Water Guidelines 2011* (ADWG). This quality management framework is specific for the water industry and incorporates a preventive risk management approach from catchment to consumer.

We utilise the ADWG Framework principles in its Water Quality Management System for the supply of safe drinking water. The ADWG Framework is based on 12 elements outlined in Chapter 2.

The 12 elements of the Water Quality Management System must be met, and the key processes undertaken to meet these requirements include:

4.2.1 Hazard and risk identification

To determine the key risk to a water supply to enable control measures to be implemented, we undertake an extensive hazard assessment process from the catchment to the end user involving management, operational staff, system operators and key stakeholders.

The risks identified during this process are reviewed regularly to identify changes to risks, new risks, or when processes and system changes occur.

4.2.2 Control measures

Control measures are established to reduce the key risk or likelihood of the risk occurring. The intent is to manage or reduce the risk to an acceptable level. Within our Water Quality Management System, this consists of:

- Critical Control Points (CCPs) that are alarmed and have the ability to stop processes before a water quality failure occurs. The CCPs are documented and apply to critical process steps in the treatment process;
- Maintenance programs that include preventive maintenance of critical assets used in the treatment process and control systems such as dosing systems, monitoring instrumentation for key assets and system-based maintenance such as mains flushing, air scouring, tank and basin cleaning as well as asset maintenance and replacement programs; and
- Trained and competent water treatment technicians manage the operation and maintenance of water treatment plants and water supply systems. All technicians undertake industry based training to ensure a high level of knowledge of treatment processes and associated risks. Our technicians are trained in accordance with the Water Industry Operator Certification Framework 2018: Drinking Water, Wastewater, Recycled Water effective 1 July 2019 requirements to Certificate 3 and Certificate 4 level in water industry operations.

4.2.3 Verification and monitoring

Verification and monitoring is used to confirm and authenticate the performance of water treatment processes and water supply systems to ensure compliance with SDWR 2015 standards and ADWG health related and aesthetic guideline values. Our verification and monitoring includes:

- Supervisory control and data acquisition systems (SCADA) at:
    - Individual water treatment plants;
    - Secondary disinfection systems; and
    - Water supply treated water tanks, storages and pump stations.
- System-wide telemetry and alarms 24 hours a day, 7 days a week;
    - Critical Control Point (CCP) alert and critical process alarms;
- Water treatment and water quality Technicians on-call 24 hours a day, 7 days a week for system monitoring and alarm verification and response;

- A drinking water quality monitoring program covering the catchment, water treatment plant process and water supply system testing and undertaken by an independent National Association of Testing Authorities (NATA) accredited laboratory that include:
    - Pathogenic microorganisms;
    - Inorganic chemicals, including inorganic disinfection by-products;
    - Organic chemicals, including pesticides, pesticide residues and organic disinfection by-products;
    - Radiological parameters; and
    - Algal toxins (as required when algal events occur).
- A water treatment chemical quality assurance program undertaken by an independent laboratory that includes certificates of analysis prior to receipt of chemicals for use;
- Calibration programs of on-line and benchtop critical instruments used for process control and alert and critical alarm processes by independent service providers; and
- Customer feedback captured through our water quality complaint resolution procedure.

4.2.4 System auditing

Internal and external auditing programs have been established to assess compliance of the Water Quality Management System. This includes auditing:

- Water treatment plant records, systems and processes;
- Water supply system infrastructure (water mains repairs, treated water storage tanks and basins);
- Challenging testing CCP alert and critical alarms; and
- Behavioural audits to verify compliance with control, verification and monitoring requirements.

4.3 WATER TREATMENT PROCESSES

The source waters for our 16 water supply systems are treated prior to distribution with the objective of providing safe drinking water at all times. The treatment varies for each water supply system with the specific treatment process dependent on the quality and risks of the source water.

Table 1 identifies the regular treatment process for each of the water localities and lists the added substances and any periodic treatment activities. The treatment process used depends on the source and quality of the water to be treated. The corporation uses the following treatment processes to produce safe drinking water:

4.3.1 Coagulation/flocculation

Coagulation is a process to remove very fine suspended particles often associated with turbidity, colour or colloidal matter in water. These particles have a negative charge that causes them to repel each other and stay suspended in water. The addition of a suitable 'coagulant' of iron and/or aluminium salt with a positive charge neutralises or destabilises the negative charge enabling the fine particles to join together to form larger particles. The flocculation (floc) process involves stirring the water gently after the coagulant has been added. This allows the particles to come into contact, and eventually causes it to stick together and form floc. This process removes the fine particles, dirt and colour present in the water.

Chemicals used for coagulation/flocculation at the water treatment plants include aluminium sulphate, ferric sulphate and poly-aluminium silicate sulphate solution (PASS).

4.3.2 Clarification/sedimentation

The clarification or sedimentation of the floc particles formed during the coagulation/flocculation process is usually carried out under still conditions (e.g. in the sedimentation tank or clarifier). A sedimentation tank relies on gravity to separate the floc from the water, which is heavy and falls to the bottom of the tank – leaving the 'cleaner' water on top. A clarifier uses a mechanical process to separate the floc, and the water is collected in troughs at the surface. Once the floc has been removed the clean water is sent to filters.

4.3.3 Membrane filtration

Membrane filtration is used to remove suspended solids and some colloidal matter from the source water. The water is pumped through the filter membrane trapping suspended solids in the process. The concentrate (material that does not pass through the membrane) is periodically removed to waste to prevent the blocking of the membrane filters.

4.3.4 Filtration

The clarified water is passed through a filter consisting of several types of graded filter media (sand, gravel and coal) to remove any remaining particles, floc or dissolved chemicals that may have passed through the clarification/sedimentation process.

Another method used utilises Dissolved Air Flotation and Filtration (DAFF) which relies on the injection of microscopic air particles into the water stream, causing the flocculated particles to float to the surface. These particles are then drawn off the surface and off the filtration tank and removed to waste. The clear water then is filtered, as above, through graded filter media.

Over time, the filters gradually become clogged with trapped particles. A filter backwash is carried out to clean the filters, returning it to optimum condition. Air and water is forced up through the filter nozzles to agitate the filter bed and remove any trapped particles. The final turbidity of water leaving the filters, during normal plant operation, is less than 0.1 NTU (Nephelometric Turbidity Units - unit of measure for turbidity).

The backwash water produced during the filter cleaning process is discharged to the sludge thickening system to separate solids from process water. To maximise water use, the separated process water is then returned to the treatment plant and mixed with new raw water to recommence the treatment process.

4.3.5 Sequestration

Sequestration involves the addition of sequestering agents followed by chlorination which keeps dissolved iron and manganese from oxidising and precipitating.

4.3.6 Disinfection

Drinking water is disinfected to prevent the spread of waterborne pathogens that cause diseases such as dysentery, cholera, typhoid and gastroenteritis.

A low residual level of disinfection also ensures that the water remains disinfected once it leaves the water treatment plant until it arrives at the customer’s tap.

In our service area, chlorination is the most commonly used disinfectant because of its reliability and cost effectiveness. Chlorine is the most widely used disinfectant for drinking water supplies in the world. The other disinfection treatment process used in our region is chloramination.

Chlorination

Chlorine is widely used throughout the world to disinfect drinking water and control disease causing organisms. The type of chlorine used at our plants is either chlorine gas or sodium hypochlorite.

Chloramination

Chloramination is also used throughout the world as a means of disinfecting drinking water to control disease causing organisms. Small amounts of chlorine and ammonia are added to the water to form chloramines, providing a relatively long lasting process to safely disinfect water.

Secondary disinfection

Disinfectant residuals decrease with time as water passes throughout the distribution system and within storage tanks. Secondary water disinfection plants are used to maintain adequate disinfection levels within the distribution system.

We operate a number of secondary water disinfection sites that are in place to ensure disinfection residuals are maintained throughout the distribution system by topping up chlorine levels to maintain a balance between adequate disinfection residuals and aesthetic water quality. Sodium hypochlorite is used in these secondary disinfection plants.

4.3.7 Added substances

Lime/Soda ash

To assist with the treatment process and to ensure the pH level in the raw water (before treatment chemicals are added) and filtered water (after treatment) is within the required ranges, lime or soda ash is added. Lime or soda ash is added to the raw water to adjust the pH to ensure the optimum level for chemical reactions to occur in the coagulation/flocculation process.

Lime or soda ash is also added to the water before it leaves the water treatment plant to maintain the pH in the desired range to optimise the effectiveness of disinfection chlorinated systems and to minimise the risk of corrosion and improve water taste.

Potassium permanganate

Potassium permanganate can be added to the water supply as required to reduce iron and manganese levels. When present in higher concentrations, these metals can cause staining of laundry and plumbing fixtures and contribute to ‘dirty water’ events.

Powdered activated carbon

Powdered activated carbon can be added to the water supply as required to remove compounds that contribute to taste and odour issues, usually associated with higher levels of certain algae in raw water.

Fluoridation

In accordance with DH requirements, we fluoridate the drinking water supplies at 6 of our 15 water treatment plants (Moe, Morwell, Maffra, Traralgon, Sale, and Warragul). Any fluoride present in those systems that do not have fluoride dosing systems is due to naturally occurring sources. For information about the health issues associated with the water fluoridation program, contact the Department of Health (DH) on 1800 651 723.

Sodium hexametaphosphate

Sodium hexametaphosphate can be added to the water supply as required as a sequestration agent to prevent the oxidation of trace levels of manganese in the water supply that can contribute to dirty water issues.

4.3.8 Distribution

After water is filtered and disinfected, it is relayed to customers through a vast network of tanks, basins, pumps and pipes. We use positive pressure, gravity and backflow prevention to ensure safe drinking water. Positive pressure pushes contaminants away from the water supply system if leaks occur. The corporation requires high risk properties install and maintain a testable backflow prevention device before connecting to the water supply network.

Where works are required on water mains, the safety of drinking water is maintained through pro-actively managing any risks. Programs such as our 5Cs (clean pipes, clearance, chlorination, cleanliness, clothing) is specifically designed to address any contamination risk. See Figure 2.

The water distribution system is also strategically flushed to remove build-up of naturally occurring sediments from pipes that can cause customers to experience dirty water.

Figure 2: Gippsland Water's 5Cs program

5 System issues for 2021-22

During the 2021-22 reporting period, there was one event reportable under section 22 of the SDWA, and the event is detailed in section 6.4 of this report. There were also two events reportable under section 18 of the SDWA, and the events are detailed in section 6.5 of this report.

Our area continued to feel the effects of the significant storm event which occurred in June 2021.

Apart from the widespread power outages, inundation at key sites and raw water quality changes which were the immediate after effects of the rainfall event, the catchment areas continued to be impacted for many months. The most notable change is catchment raw water quality was observed in Moondarra Reservoir.

Any other non-reportable systems issues were dealt with through the customer water quality complaints process outlined in section 6.

6 Quality of drinking water 2021-22

The SDWR require a water quality monitoring program to be undertaken to verify compliance or non-compliance of specified water quality parameters as listed in the regulations. The quality of water is measured across each of the 35 localities to determine that the water meets the specified quality standard. Over the reporting period, more than 2,500 samples were collected for quality testing and over 28,000 tests performed. The following section provides a summary of the results against the water quality parameters monitored through the year at the required sampling frequency.

A brief explanation of the required water quality parameters is provided below. A more detailed explanation can be obtained from the ADWG prepared by the National Health and Medical Research Council (NHMRC).

6.1 Water quality standards (SDWR 2015)

***Escherichia coli* (*E. coli*) –** *E. coli* is the most common thermo-tolerant coliform present in faeces and is regarded as the most specific indicator of recent faecal contamination from warm blooded animals. The presence of *E. coli* in the water supply can therefore indicate the potential for other pathogenic bacteria to be present. Results from samples taken within the water sampling locality that exceed the maximum level of this parameter are reported to DH, as required under section 22 of the SDWA.

Trihalomethanes (THM) – Trihalomethanes are a category of by-products produced in drinking water, principally as a result of disinfection chemicals (chlorine) reacting with naturally occurring organic matter derived from the decay of aquatic and terrestrial vegetative matter present in water supplies. Results from samples taken within the water sampling locality that exceed the maximum level of this parameter are reported to DH, as required under section 18 of the SDWA.

Turbidity – Turbidity is caused by the presence of fine suspended matter such as clay, silt, colloidal particles, algae and other microscopic organisms in the water. In high levels, this matter gives the water the appearance of being dirty, muddy or milky. Turbidity is best removed by coagulation and filtration treatment processes. Results from samples taken within the water sampling locality that exceed the maximum level of this parameter are reported to DH, as required under section 18 of the SDWA.

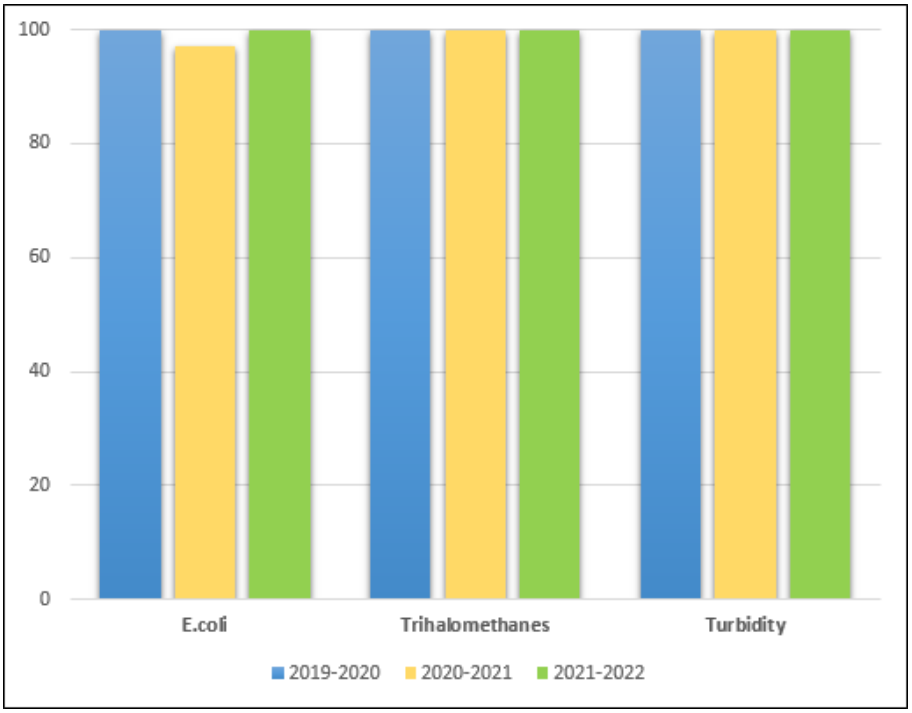
The Safe Drinking Water Regulations (2015) monitoring requirements are summarised in Table 2:

Table 2: Summary of the Safe Drinking Water Regulations 2015 (Schedule 2):

Parameter	**SDWR (2015)** **Drinking Water Quality Standard**
Escherichia coli	All samples of drinking water collected are found to contain no Escherichia coli per 100 millilitres, with the exception of any false positive sample.
Trihalomethanes	Less than or equal to 0.25 mg/L.
Turbidity	The 95th percentile of results for samples in any 12 month period must be less than or equal to 5·0 Nephelometric Turbidity Units.

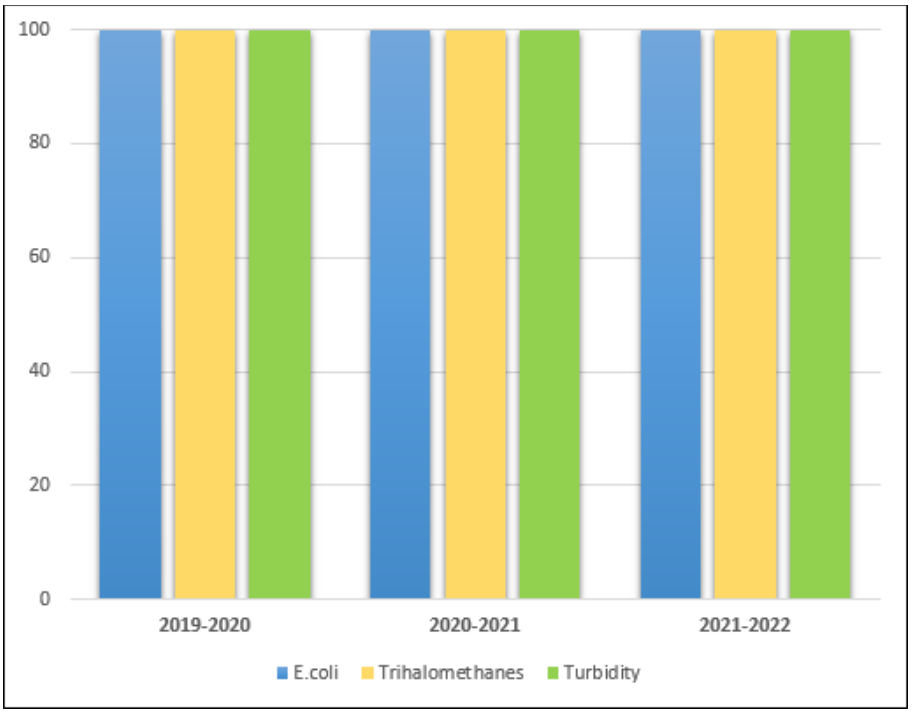
Figures 3 and 4 below show the performance and achievement of compliance with the water quality standards detailed in Schedule 2 of the SDWR (2015). Further detailed comparisons of water quality parameters with the previous two financial years are provided in the following sections.

Figure 3: Percentage Compliance by Water Sampling Locality with Water Quality Standards – Schedule 2 (SDWR) 2015



For the 2021-2022 reporting period, 100% compliance was achieved with the Schedule 2 parameters, which was equivalent to the 2019-2020 result. This is an improvement over the 2020-2021 result for *E. coli* where 97% compliance was achieved.

Figure 4: Percentage Compliance by Population with Water Quality Standards – Schedule 2 (SDWR) 2015



For the 2021-2022 reporting period, 100% compliance was achieved with the Schedule 2 parameters, which was equivalent to the 2019-2020 result. This is an improvement over the 2020-2021 result for *E. coli* where 97% compliance was achieved.

6.2 Water quality standards

We must ensure that all drinking water supplied to our localities complies with the quality standards specified under Part 3 of the SDWA (2003). As well as the above parameters that are required under Schedule 2 of the SDWR (2015), many other tests are conducted to ensure that the water supplied is safe to drink. These parameters are determined by assessing the risks to each system and monitoring to verify that these risks are being controlled effectively.

The quality standards applied for the additional parameters in most instances are derived from the ADWG.

6.3 Emergency/incident management

We have aligned our incident/emergency management approach to the Australasian Inter-service Incident Management Systems (AIIMS) as part of its SDWA and SDWR emergency and incident management processes.

We are currently reviewing our All Hazards Incident Management Plan to ensure ongoing compliance with the requirements of Part 7a of the *Emergency Management Act (2013).*

6.4 Incidents and potential water quality events

Section 18 of the SDWA states:

'A water supplier must notify the Secretary in writing if it becomes aware that the drinking water it is supplying to another person does not comply, or is not likely to comply, with any relevant water quality standard and must do so within 10 days after it becomes aware of the fact.'

In 2021-22, the water quality events reported to the DH pursuant to section 18 of the SDWA are summarised below.

Table 3: Summary of notifications under section 18

Water Sampling Locality Affected	Date and duration of incident	Location of incident	Nature of the incident	Drinking water supplies affected	Safe Drinking Water Regulations (Schedule 2) – Standard Not Met
Mirboo North	21 September 2021	Mirboo North sampling point	Level of Manganese detected above the ADWG Guideline limit	Mirboo North	Manganese

Refer to section 6.5 for more information on these events and actions taken to manage and return the drinking water supply to specification, and preventative actions.

6.5 Emergencies and water quality events

Section 22 of the SDWA states:

'(1) This section applies if an officer of a water supplier believes or suspects on reasonable grounds that the water supplied, or to be supplied for drinking purposes –
(a) may be the cause of illness; or
(b) may be the means by which an illness is being, has been or will be transmitted; or
(c) may contain any pathogens, substance, chemical or blue-green algae toxin, whether alone or in combination, at levels that may pose a risk to human health; or
(d) may cause widespread public complaint.

‘(2) On forming that belief or suspicion, the officer must immediately report his or her belief or suspicion to the Secretary, and must make the report in the form required by the Secretary.’

During the 2021-22 reporting year, there were two reportable events that required notification to the Drinking Water Regulatory Unit of DH, under section 22 of the SDWA. These notifications are summarised below:

Table 4: Summary of incidents and actions taken under section 22

Water Sampling Locality Affected	Date and duration of incident	Location of incident	Nature of the incident	Drinking water supplies affected	Actions taken in response to the incident	Was the community notified
Seaspray	31 October 2021	Seaspray reticulation	Overdosing of chlorine (sodium hypochlorite) due to equipment fault	Seaspray	Flushing of the distribution network. Due to the length of main from the treatment plant to the first customers, most of the effected water was able to be flushed out of the system. Flushing of the extent of the distribution system was undertaken to ensure minimal impact to customers	No. Corrective actions implemented as the issue was quickly resolved. Level of chlorine dosed only slightly exceeded the guideline limit.
Briagolong	19 April 2022	Briagolong Reticulation	*E. coli* exceedance	Briagolong	*E. coli*	No. Corrective actions implemented quickly as the issue was resolved. No further detections occurred.
Coongulla & Maffra	14 October 2021	Lake Glenmaggie	*Vehicle into water storage*		*Coongulla Water Treatment turned off – sufficient volumes in storage.* *Maffra – testing of storage discharge and river downstream for hydrocarbons.*	No. Corrective actions implemented quickly as the issue was resolved. Testing undertaken - No hydrocarbons detected.

6.5.1 Mirboo North Manganese Detection (September 2021)

Gippsland Water were notified on 5 October 2021 by the independent analytical laboratory of a Manganese result which was above the ADWG limit. The result was for a sample collected on 28 September 2021 and returned a result of 0.77 mg/L (Limit = 0.5 mg/L)
Other water quality parameters reported for this sample included:

- Free Chlorine = 1.35 mg/L
- Total Chlorine = 1.38 mg/L
- pH = 7.2 units
- Turbidity = 0.2 NTU
- Coliforms = 0 orgs/100mL
- Plate Count 22^{o}C = 0 cfu/mL.
- *E. coli* = 0 orgs/100mL

We notified the DH immediately, submitted the required notification forms, undertook a rapid risk assessment and immediately commenced a response to ensure customers were not put at risk.

The laboratory was requested to retest the sample, which confirmed the Manganese result.
On 5 October 2021 we collected water samples from the effected site, and also from the Mirboo North water storage basin. The test results for these samples indicated Manganese levels well below the ADWG limit.
The likely cause of the Manganese exceedance is due to a build-up of material in the sample collection tapping. The sample point effected is located at the end of a long tapping off the major water main. It is likely that a build-up of sediment was dislodged during the sampling process. The sample point has since been relocated to provide a more representative sample of water being supplied.
To improve water quality across Mirboo North, the mains across the whole system were cleaned by air scouring during April 2022.

6.5.2 Seaspray Chlorine exceedance (September 2021)

Due to passing storms and wind in the region, power was cut to the Seaspray Water Treatment Plant approximately 9:00am on 29 October 2021. Power was not restored to site until approximately 10:30pm on 31 October 2021. On receiving notification that the power had been restored, the Water Treatment Technician logged onto the plant control system remotely to check the plant status. To prevent the plant from restarting whilst unattended, and given that there was sufficient volume in storage, the plant was locked out and the sodium hypochlorite trim dosing pumps were isolated electronically.

On attending the site on 1 November 2021 at 1:30pm, the Water Treatment Technician observed that the sodium hypochlorite trim dosing pumps were operating, even though the control system indicated that the pumps were inhibited.

The pumps were immediately shut down manually and the chlorine level checked. A reading of 5.9 mg/L was obtained on the water leaving the plant to town.

The DH were notified of the issue. Corrective actions to address the high chlorine levels were implemented, which included flushing the main from the treatment plant to town. Due to the length of this main, most of the higher chlorine dosed water was able to be flushed from the system prior to reaching any customers. A system wide flushing program was also undertaken to ensure all traces of elevated chlorine water were removed. This activity was completed by 11pm on 1 November 2021.

Investigation found a wiring issue with the dosing pump and a lack of electronic feedback from the pumps to the control system were identified as issues. These have since been corrected.

6.5.3 Briagolong *E. coli* exceedance (June 2022)

A routine water quality compliance sample was collected on Tuesday 19 April 2022 at 10:10am in the Briagolong distribution system. A preliminary, unconfirmed sample result for *E. coli* of 1 org/100mL was phoned through to Gippsland Water (GW) on Wednesday 20 April 2022 at 3:00pm. A confirmed sample result for *E. coli* of 1 org/100mL was received for the site on 20 April 2022 at 3:06pm.

This investigation was initiated immediately upon receiving notice of an *E. coli* detection within the Briagolong drinking water reticulation network. The investigation covers the period of one week before the positive detection on 19 April 2022, when 1 org/100mL *E. coli* result was reported for a sample taken on the 20 April 2022.

Remedial/precautionary actions undertaken immediately were:

- The Briagolong system was resampled prior to any works
- The sodium hypochlorite dosing set-point at the Water Treatment Plant was increased
- The Briagolong reticulation network was flushed to draw fresh water through the system
- A repeat set of samples were collected for microbiological analysis on 21 April 2022
- An addition sample set was collected on 22 April 2022.

All pre and post flushing reticulation samples collected on 20 April 2022 returned no *E. coli* detections per 100mL.

All samples collected on 21 April 2022 from the Briagolong reticulation also returned no *E. coli* detections per 100mL.

No significant degradation of plant or infrastructure was identified during the investigation period, including no recorded or identified WTP system or process failures at the Briagolong WTP.

Based on the performance of the Treatment Plant, and the sampling results for the Water Storage, it is considered very unlikely that any contaminated water originated from the Briagolong Water Treatment Plant and flowed through to the reticulated water network.

No significant degradation of plant or infrastructure was identified during the investigation period, including no recorded or identified WTP system or process failures at the Briagolong WTP.

Routine testing of the raw, untreated water entering the Water Treatment Plant (WTP) at Briagolong showed no signs of abnormal *E. coli* contamination or no unusual turbidity readings.

The 1.2 ML clear water storage tank was inspected on 4 April 2022, two weeks prior to the exceedance notification. No floating debris was evident which suggests that there is no structural issues or vermin access that could have contributed to the positive *E. coli* reported for the sample collected from 8 Forbes Street. The tank was also inspected on 20 April 2022 with no evidence of ingress or debris inside the tank.

The sample point at 8 Forbes Street Briagolong was inspected and found to be in good condition and not affected by vegetation or other contaminants.

The investigation concluded that the sample collected on 19 April 2022 which returned the positive *E. coli* result was not representative of the water supplied to customers in the Briagolong reticulated water network, and that the detection is a False Positive in accordance with the Safe Drinking Water Regulation 2015, Schedule 2 definition. This conclusion was supported by DH.

Table 5: Water quality results during investigation

Water Sampling Locality	Number of samples	E Coli	Free chlorine reticulation and tanks	Turbidity
		Maximum detected (orgs/100mL)	Range (mg/L)	Range (NTU)
Briagolong	22	1	0.49 to 0.72	<0.1 to 0.3

The incident based water quality sampling data has not been included in the data presented in section 9. As required by DH, only samples scheduled as part of the risk management plan monitoring programs are included for data analysis and statistics.

6.5.4 Vehicle into Lake Glenmaggie (October 2022)

On Thursday 14 October 2021, Southern Rural Water (SRW) were notified by Victoria Police of a vehicle accident at Lake Glenmaggie. The accident involved a diesel 4WD that rolled into the water, at a steep section of the lake shoreline, immediately south of Ryans Road, Coongulla – in the vicinity of Ryan Cove. The vehicle had been completely submerged.

As Water Storage Mangers, under the Safe Drinking Water Act (2003), SRW notified Gippsland Water (GW) of the incident due to its potential to impact nearby Coongulla and Maffra Water Treatment Plants.

On Wednesday 13 October 2021, GW were advised by SRW Operations Staff that releases from Lake Glenmaggie to the Macalister River were increased from 1,800ML/d to 4,400 ML/d in preparation for predicted high rainfall forecast over the coming days.

A SRW staff member attended the approximate location of the incident at 11:15am on Friday 15 October 2021. The vehicle was not sighted and there was no substantial evidence of the incident. Also on this day, whist on-site collecting water samples for analysis, a GW Water Treatment Technician came across representatives of the salvage company that were planning the recovery of the vehicle, as well as the owner of the property where the accident occurred. They showed our Operator the site where the vehicle, which may have contained up to 80 litres of diesel onboard, was located.

At the site, there is no visible sign or smell of any oils or diesel leaking from the vehicle.

On Saturday 16 October 2021, Gippsland Water were advised by SRW that the vehicle had been removed from Lake Glenmaggie without issue, or leakage of diesel/oil.

After being notified by Victoria Police of a vehicle accident, SRW and Gippsland Water worked collaboratively to assess and manage the potential risk posed from diesel and oil from the vehicle.

In summary, no contamination was observed or measured as a result of the vehicle accident. There was no impact to customers.

6.6 Other events not reportable

In 2021-22, there were no other water quality events that occurred however we did respond to a significant storm event in June 2021 that carried into the 2021-22 reporting period.

A significant storm event occurred overnight on Wednesday 9 June 2021 which saw rainfall totals of >200mm fall in the north (Mt Baw Baw) and the south (Mt Tassie), with extremely high winds impact our region causing power outages and localised flooding. The rainfall and flooding was the highest experienced in the area since 1993.

The turbidity levels immediately after the storm event resulted in the turbidity of our raw water supply from Moondarra increasing from ~ 7 NTU to over 100 NTU within 24 hours. The higher turbidity values required significant manual intervention at our Water Treatment Plants to ensure we could treat water, maintain storage levels and ensure our water remained safe for drinking.

While the Moondarra reservoir supplies raw water to the Morwell, Traralgon and Tyers Water Treatment Plants, only Tyers was impacted by the increased turbidity in raw water quality due to its design and inability to treat highly raw turbid water.

The Tyers Water Treatment Plant consist of 2 separate plants on a single site. Under normal water quality conditions, Plant 1's treatment capacity is 3.4 ML/day and Plant 2 is 2.5 ML/day for a combined output of 6 ML/day.

Plant 1 was designed to treat low turbidity water (5-10NTU), however the June 2021 storm resulted in Plant 1 being unable to operate due to the elevated turbidity. At the same time Plant 2 was operating at reduced capacity due to filter infrastructure issues, however given the winter demand, the Tyers system was able to be maintained with supply supplemented though water carting, community consultation to reduce usage, and maintenance activities.

In the immediate aftermath of the storm and resultant turbidity increase, modifications were undertaken to the Tyers Water Treatment Plant flow path. Since Plant 1 could not effectively produce water at the

elevated turbidity levels without additional solids removal being installed, the flow path of the plant was modified to place the plants 2 and 1 units in series, rather than parallel. This resulted in plant 2 acting as a solids removal process, prior to the water flowing to plant 1 for final filtration. The process of converting the water treatment process occurred over a 48 hour period and was able to maintain sufficient supply of fully compliant, safe drinking water to the Tyers system.

In addition, filter repair works were undertaken to Plant 2 during August and September 2021 which saw Plant 2 returned to full operational capacity (2.5ML/D). These upgrades were enough to meet the current demand and as Moondarra raw water improved Plant 1 capacity would increase to meet summer demands, supplemented by water carting if required.

Between July and October 2021, a number of plant upgrades were undertaken to improve the Tyers Water Treatment Plant production capacity. These works were undertaken to ensure the Tyers plant could supply enough water to meet the summer demand period even if at slightly reduced capacity if required.

The Moondarra reservoir raw water turbidity levels returned to approximately 10 NTU by late October 2021, however a second intense regional storm event occurred on 16 November 2021 that resulted in the Moondarra raw water turbidity levels unexpectedly increasing from 10 to 30 NTU. This event resulted in Tyers Plant 1's treatment capacity again being reduced while Tyers Plant 2 remained at full capacity. Water carting to supplement the system was re-introduced to the Tyers and Rosedale drinking water storages.

The Moondarra raw water turbidity returned to normal levels in mid-December 2021 when the Tyers Water Treatment Plant returned to full treatment capacity.

Additional works undertaken at the site during this time included the installation of Siltbuster solid removal system at the front of Plant 1. The goal of the Siltbusters was to reduce the turbidity to a range where Plant 1 could operate effectively (<20NTU). The system was trialled in preparation for use, but was not implemented long term due to the turbidity of Moondarra decreasing to levels which allowed effective treatment.

Throughout the entire event, supply of safe drinking water was maintained to the Tyers system.

7 Complaints

7.1 Water quality complaints

We are committed to providing safe drinking water to our customers at all times. We record all complaints relating to drinking water quality. The types of water quality complaints logged by us are classified as follows:

- Discoloured/dirty water;
- Taste/odour;
- Blue water;
- Air in water;
- Alleged illness.

The complaints are compared to the number of customers (per 100 customers) to enable comparisons with other water supplies and localities. A summary of customer complaints we received relating to the quality of drinking water supplied is reported below.

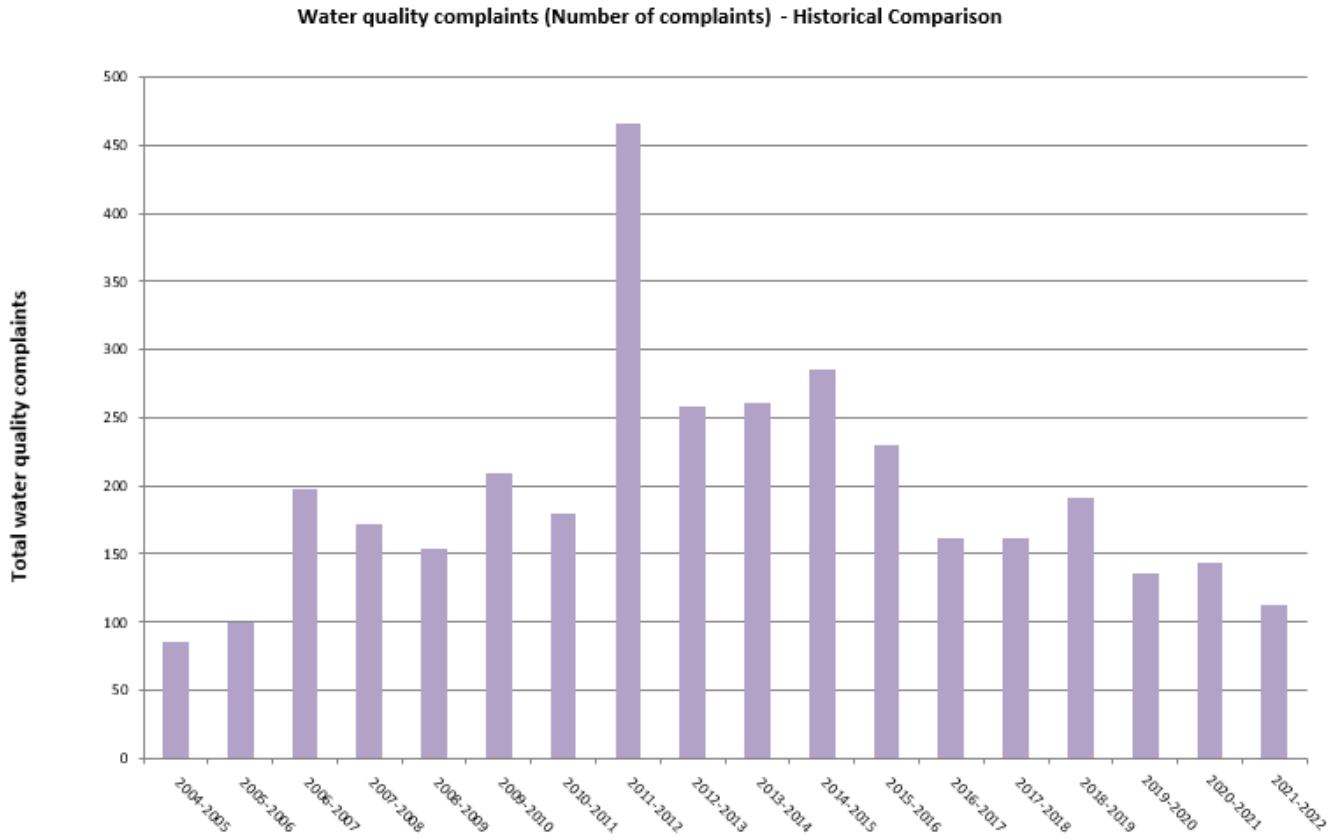
Each water quality complaint received is responded to as per Figure 6 whereby the customer complaint is logged by our Customer Service or after-hours staff, and a Gippsland Water representative responds to the complaint and initiates any corrective actions as required.

Table 6: Water quality complaints per 100 customers supplied

Type of Complaint	2021-22		2020-21		2019-20	
	No. of Complaints	Complaints per 100 customers	No. of Complaints	Complaints per 100 customers	No. of complaints	Complaints per 100 customers
Discoloured water	58	0.089	71	0.105	47	0.072
Taste / Odour	32	0.049	48	0.071	64	0.098
Blue water	0	0.000	0	0.000	4	0.006
Air in water	13	0.020	20	0.030	11	0.017
Alleged illness	9	0.014	5	0.007	10	0.015
Total	112	0.172	144	0.213	136	0.209

The total number of complaints we received during the 2021-22 reporting period decreased when compared to the same time period in 2020-21 and 2019-20. This could be attributed to the on-going water quality improvement works such as the water main replacement program and the water mains cleaning program (air scouring).

Figure 5: Total customer complaints for 2004-05 to 2021-22



When calculating the number of complaints per 100 customers, there were no localities within our supply district which exceeded four complaints per 100 customers, as represented in the figure below.

Figure 6: Customer complaints per 100 customers for 2021-22

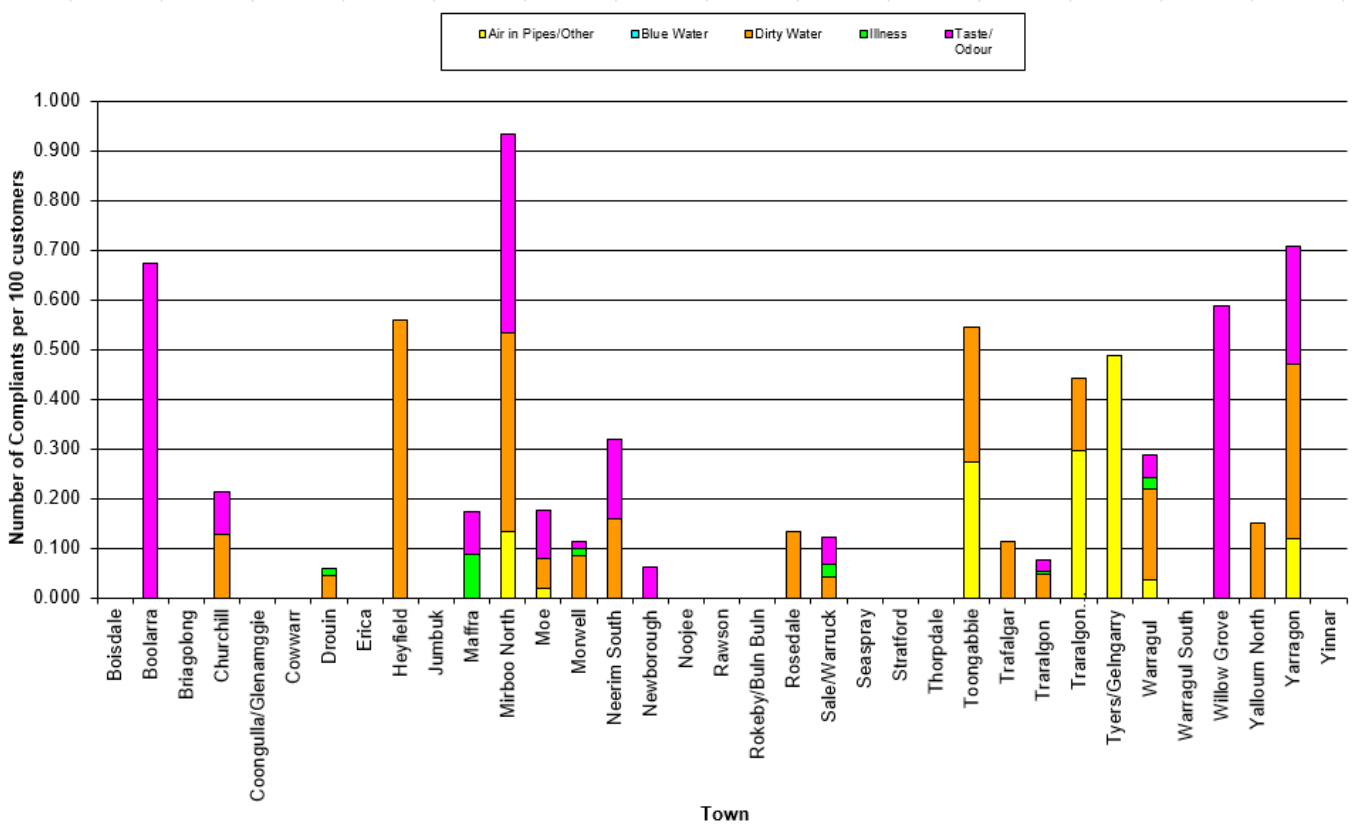
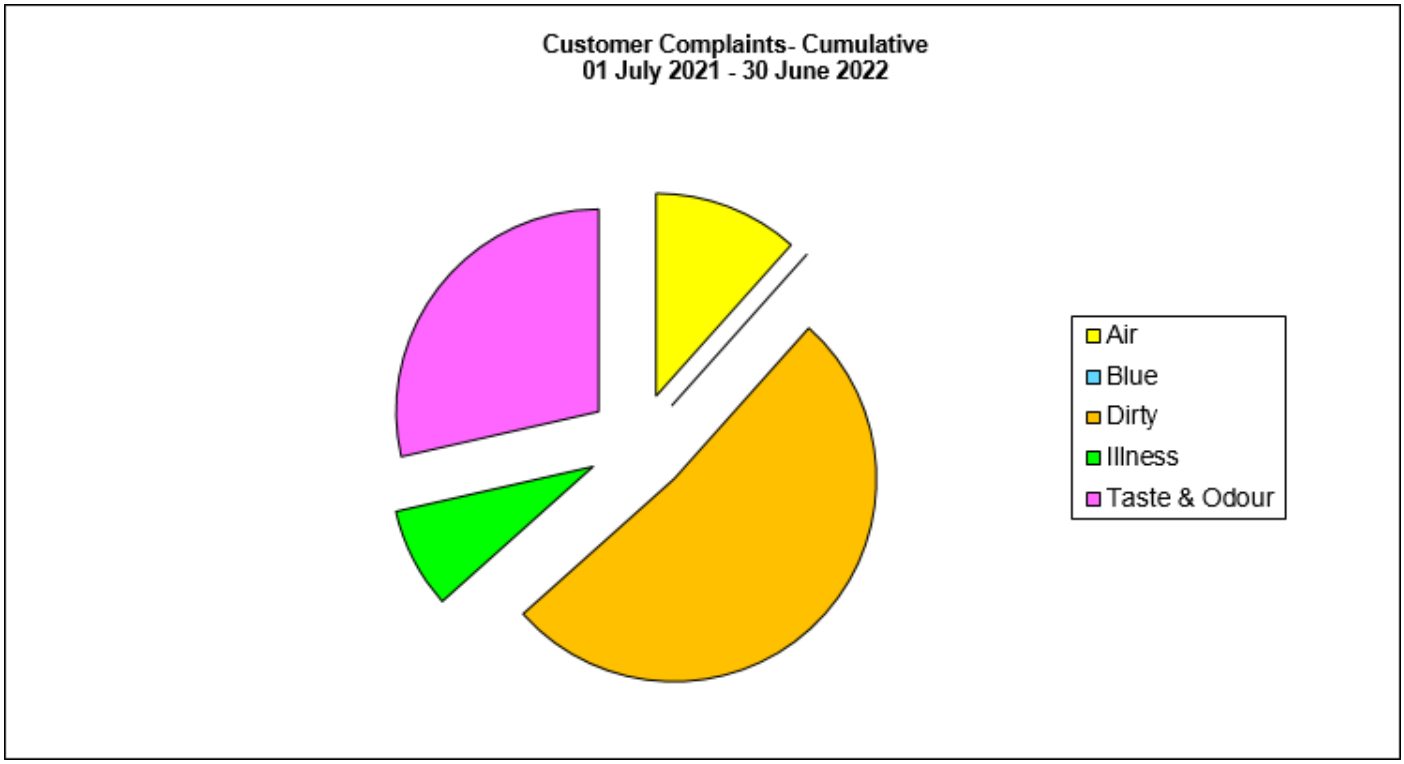


Figure 7: Customer water quality complaints by type 2021-22



The majority of customer complaints for the 2021-22 period related to discoloured/dirty water followed by taste and odour (Figure 7).

Table 7: Customer complaints summary for each water sampling locality 2021-22

Water Sampling Locality	Population (Customers = Number of Connections)	Total Complaints Received 2021-22	No. Complaints per 100 customers 2021-22
Boisdale	31	0	0.000
Boolarra	297	2	0.673
Briagolong	322	0	0.000
Churchill	2344	5	0.213
Coongulla/Glenmaggie	410	0	0.000
Cowwarr	110	0	0.000
Drouin	6775	4	0.059
Erica	129	0	0.000
Heyfield	896	5	0.558
Jumbuk	154	0	0.000
Maffra	2305	4	0.174
Mirboo North	751	7	0.932
Moe	5118	9	0.176
Morwell	7174	8	0.112
Neerim South	629	2	0.318
Newborough	3207	2	0.062
Noojee	124	0	0.000
Rawson	173	0	0.000
Rokeby / Buln Buln	198	0	0.000
Rosedale	759	1	0.132
Sale / Wurruk	7391	9	0.122
Seaspray	349	0	0.000
Stratford	1087	0	0.000
Thorpdale	76	0	0.000
Toongabbie	368	2	0.543
Trafalgar	1786	2	0.112
Traralgon	13052	10	0.077
Traralgon South / Hazelwood Nth	678	3	0.442
Tyers / Glengarry	822	4	0.487
Warragul	8692	25	0.288
Warragul South	224	0	0.000
Willow Grove	170	1	0.588
Yallourn North	665	1	0.150
Yarragon	849	6	0.707
Yinnar	597	0	0.000

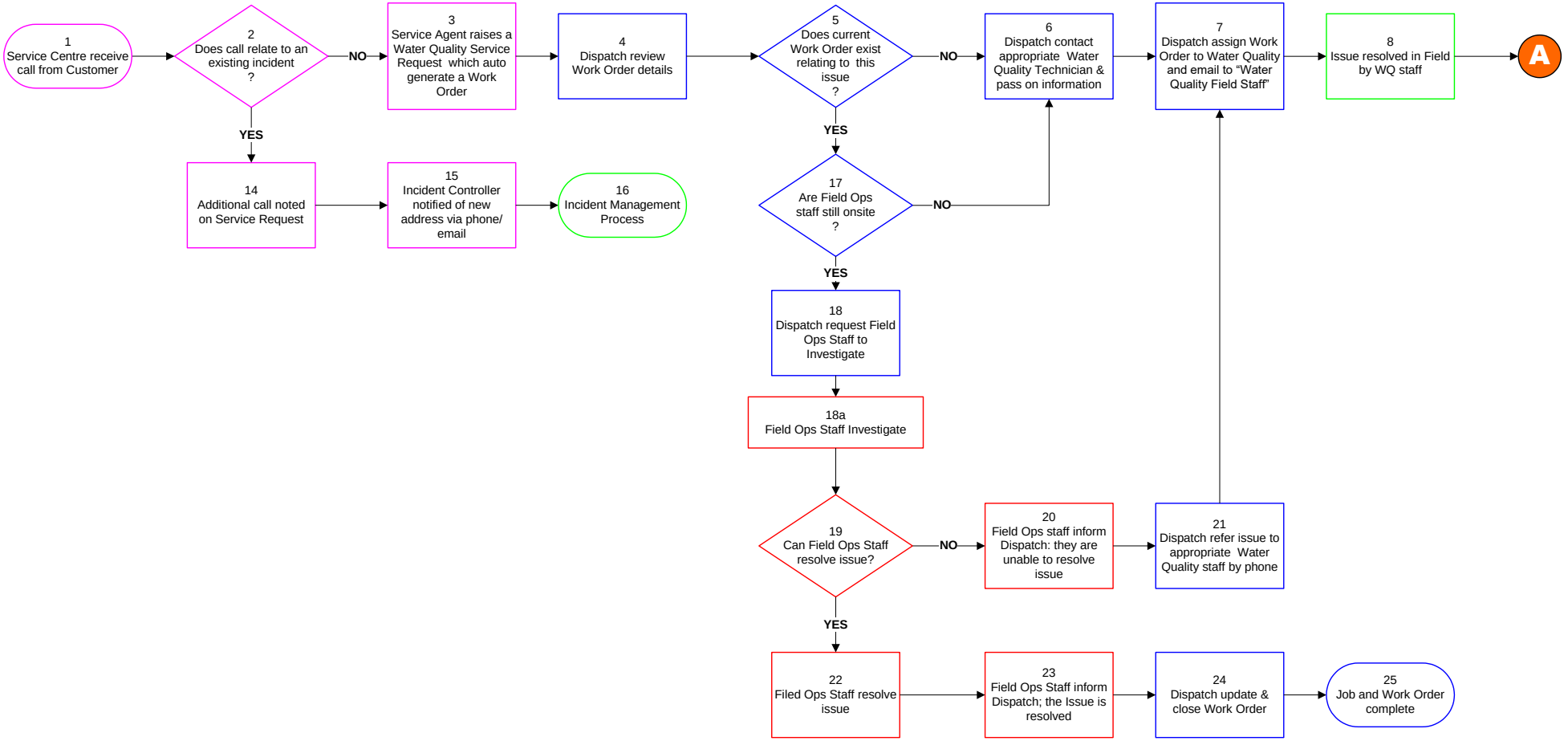
7.2 A summary of the customer complaint process

Customer complaints are managed according to the following summary procedure:

- Customer complaints received by our Customer Contact Centre are recorded in a corporate database. Details include information of who, where, time and nature of complaint.
- The Water Quality Group investigates by contacting the customer and visiting the site if necessary to determine details of the water quality problem.
- For complaints associated with taste and odour, dirty water, and air in pipes, field measurements are performed, the reticulation system is typically flushed then field measurements are taken again to verify the problem has been corrected.
- Follow up contact may be made with the customer to determine if they are satisfied with the quality of service, or alternatively our standard contact card is left with the customer. This also encourages customers to keep us informed of any reoccurrence of water quality problems.
- Details of actions undertaken are entered into a database to provide a record/history of the site, to document issues for maintenance programs, and to inform capital upgrade requirements where a history of system failures occurs.

This procedure is presented in more detail in the figure on the following page.

Figure 8: Water quality complaints resolution procedure



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8 Risk management plan audit

Our Water Quality Risk Management Plan has been operational since 2005 and adopts the 12 elements outlined in the ADWG and preventative risk management strategies outlined in the SDWA.

There was no audit undertaken during this reporting period, however GW continued to progress the OFI and observation identified during the previous audit conducted in 2020.

The last audit was undertaken in August 2020 by DH approved (Exemplar Global) auditors for compliance with section 7(1) of the SDWA 2003.

We were found to be compliant with the requirements of the SDWA and Regulations. One opportunity for improvement (OFI) was identified during the audit and one observation recorded. The audit findings are summarised in the following table, Table 8.

A copy of the compliant risk management plan audit certificate, 26 August 2020, is attached in Appendix 2.

Table 8: Risk Management Plan outcomes

Outcomes	GW Action Identified and Status
2020 Audit outcome	
Opportunity for Improvement (OFI) OFI-2020-001 Consider raising work orders for reactive mains flushing in response to network monitoring results	We identified the following actions which have been implemented, or are currently in the process of being developed. • Interim response includes continuing to record reactive mains flushing activities on existing paper forms and storing in corporate records management system – **In place (completed in 2020-21)** • Scoping of work order requirements and assessment of existing system capability – **Complete in 2021-2022** • Software development – **In development in 2021-2022.** • Testing and deployment of solution **(In development) Expected completion in during 2022-23 financial year**
Observation One source water microbial assessment indicated that the sanitary survey results were anomalous, and that reassessment was required.	We identified the following actions • Collect further information and when sufficient data/results is available GW will reassess source water risks and treatment capability. **– Continuous and Ongoing during 2022-2023** • Review assessment where source water conditions or treatment plant capability change (i.e. treatment needs for installation of UV disinfection **– Continuous and Ongoing 2022-2023.**

9 Water quality results for 2021-22

9.1 Escherichia coli (*E. Coli*)

9.1.1 *E. coli* results

Compliance under the SDWR (2015) requires all samples of drinking water collected within a water sampling locality to contain no *E. coli* organism/100mL of drinking water, with the exception of any false positive sample. All our localities achieved compliance with this standard for the 2021-22 reporting period, except the Briagolong locality.

For further details of the detection and confirmation of false positive water quality result at Briagolong, refer to section 6.5.

Tables 9 and 10 below details all *E. coli* notifications for the reporting period 1 July 2021 to 30 June 2022 under the SDWR.

Table 9: *E. coli* detections for water sampling localities 2021-22

Water Sampling Locality	No. of investigations conducted (s.22)	No. of confirmed false positives	No. of investigations where standard not met (s.18)
Briagolong	1	1	0

Table 10: *E. coli* results for all water sampling localities for 2021-22

Water Sampling Locality	Frequency of Sampling	Number of samples*	Maximum Detected (orgs/100mL)	No. of detections and investigations conducted (s.22)	No. of samples where standard was not met (s.18)
Boisdale	Weekly	104	0	0	0
Boolarra	Weekly	104	0	0	0
Briagolong	Weekly	104	1	1	0#
Churchill	Weekly	167	0	0	0
Coongulla-Glenmaggie	Weekly	104	0	0	0
Cowwarr	Weekly	52	0	0	0
Drouin	Weekly	158	0	0	0
Erica	Weekly	52	0	0	0
Heyfield	Weekly	104	0	0	0
Jumbuk	Weekly	95	0	0	0
Maffra	Weekly	115	0	0	0
Mirboo North	Weekly	116	0	0	0
Moe#	Weekly	156	0	0	0
Morwell	Weekly	275	0	0	0
Neerim South	Weekly	104	0	0	0
Newborough#	Weekly	115	0	0	0
Noojee	Weekly	156	0	0	0
Rawson	Weekly	104	0	0	0
Rokeby-Buln Buln	Weekly	52	0	0	0
Rosedale	Weekly	104	0	0	0
Sale-Wurruk	Weekly	194	0	0	0
Seaspray	Weekly	104	0	0	0

Table 10: *E. coli* results for all localities for 2021-22 (cont.)

Water Sampling Locality	Frequency of Sampling	Number of samples*	Maximum Detected (orgs/100mL)	No. of detections and investigations conducted (s.22)	No. of samples where standard was not met (s.18)
Stratford	Weekly	52	0	0	0
Thorpdale	Weekly	104	0	0	0
Toongabbie	Weekly	104	0	0	0
Trafalgar	Weekly	113	0	0	0
Traralgon	Weekly	161	0	0	0
Traralgon South-Hazelwood North	Weekly	54	0	0	0
Tyers-Glengarry	Weekly	104	0	0	0
Warragul	Weekly	201	0	0	0
Warragul South	Weekly	104	0	0	0
Willow Grove	Weekly	104	0	0	0
Yallourn North#	Weekly	104	0	0	0
Yarragon	Weekly	104	0	0	0
Yinnar	Weekly	52	0	0	0

*= The number of samples collected is based on the population of the water sampling locality and is calculated based on the guidance provided in ADWG (2014) - Table 9.4 Recommended minimum frequency of *E. coli* monitoring.
= Refer to section 6.5 for details of the *E..coli* detection in the Briagolong locality

Table 11: Comparison of *E. coli* results for previous years (2019-2022)

Water Sampling Locality	2021 - 2022		2020 - 2021		2019 - 2020	
	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)
Boisdale	0	0	1	1	0	0
Boolarra	0	0	0	0	0	0
Briagolong	1	0	0	0	0	0
Churchill	0	0	0	0	0	0
Coongulla/Glenmaggie	0	0	0	0	0	0
Cowwarr	0	0	0	0	0	0
Drouin	0	0	0	0	0	0
Erica	0	0	0	0	0	0
Heyfield	0	0	0	0	0	0
Jumbuk	0	0	0	0	0	0
Maffra	0	0	0	0	0	0
Mirboo North	0	0	0	0	0	0
Moe	0	0	0	0	0	0
Morwell	0	0	0	0	0	0
Neerim South	0	0	0	0	0	0
Newborough	0	0	0	0	0	0
Noojee	0	0	0	0	0	0

Table 11: Comparison of *E.* coli results for previous years (2019-2022) (cont.)

Water Sampling Locality	2021 - 2022		2020 - 2021		2019 - 2020	
	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)
Rawson	0	0	0	0	0	0
Rokeby/Buln Buln	0	0	0	0	0	0
Rosedale	0	0	0	0	0	0
Sale/Wurruk	0	0	0	0	0	0
Seaspray	0	0	0	0	0	0
Stratford	0	0	0	0	0	0
Thorpdale	0	0	0	0	0	0
Toongabbie	0	0	0	0	0	0
Trafalgar	0	0	0	0	0	0
Traralgon	0	0	0	0	0	0
Traralgon South/ Hazelwood North	0	0	0	0	0	0
Tyers/Glengarry	0	0	0	0	0	0
Warragul	0	0	0	0	0	0
Warragul South	0	0	0	0	0	0
Willow Grove	0	0	0	0	0	0
Yallourn North	0	0	0	0	0	0
Yarragon	0	0	0	0	0	0
Yinnar	0	0	0	0	0	0

Results obtained for the 2021-22 reporting period for each of the localities, with the exception of Briagolong, were similar to that of previous years.

E. coli has not been previously detected in Briagolong system, and this result is not consistent with historic *E. coli* test results. After reviewing the investigation report, the DH supported Gippsland Water's conclusion that the result was a false positive and not representative of the water quality in the Briagolong System.

9.1.2 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

9.2 Chlorine based disinfection by-product chemicals

9.2.1 Trihalomethanes (THM) results

For compliance with the SDWR (2015), a sample result must not exceed 0.25 mg/L trihalomethanes. All our sites achieved 100% compliance with this standard for the 2021-22 reporting period.

Table 12: Trihalomethanes results for all localities for 2021-22

Water Sampling Locality	Frequency of sampling	No. of samples	No. of non-complying samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	0	0.092	0.039	Yes
Boolarra	Monthly	12	0	0.130	0.065	Yes
Briagolong	Monthly	12	0	0.024	0.007	Yes
Churchill	Monthly	12	0	0.140	0.048	Yes
Coongulla-Glenmaggie	Monthly	12	0	0.029	0.011	Yes
Cowwarr	Monthly	12	0	0.100	0.069	Yes
Drouin	Monthly	12	0	0.082	0.030	Yes
Erica	Monthly	12	0	0.043	0.014	Yes
Heyfield	Monthly	12	0	0.039	0.014	Yes
Jumbuk	Monthly	12	0	0.160	0.055	Yes
Maffra	Monthly	12	0	0.080	0.015	Yes
Mirboo North	Monthly	12	0	0.039	0.023	Yes
Moe	Monthly	12	0	0.053	0.024	Yes
Morwell	Monthly	12	0	0.063	0.032	Yes
Neerim South	Monthly	12	0	0.080	0.035	Yes
Newborough	Monthly	12	0	0.034	0.024	Yes
Noojee	Monthly	12	0	0.049	0.025	Yes
Rawson	Monthly	12	0	0.029	0.010	Yes
Rokeby-Buln Buln	Monthly	12	0	0.071	0.028	Yes
Rosedale	Monthly	12	0	0.210	0.064	Yes
Sale-Wurruk	Monthly	12	0	0.027	0.015	Yes
Seaspray	Monthly	12	0	0.160	0.098	Yes
Stratford	Monthly	12	0	0.077	0.030	Yes
Thorpdale	Monthly	12	0	0.086	0.043	Yes
Toongabbie	Monthly	12	0	0.090	0.061	Yes
Trafalgar	Monthly	12	0	0.045	0.023	Yes
Traralgon	Monthly	12	0	0.086	0.013	Yes
Traralgon South-Hazelwood North	Monthly	12	0	0.083	0.048	Yes
Tyers-Glengarry	Monthly	12	0	0.230	0.050	Yes
Warragul	Monthly	12	0	0.076	0.024	Yes
Warragul South	Monthly	12	0	0.066	0.044	Yes
Willow Grove	Monthly	12	0	0.001	<0.001	Yes
Yallourn North	Monthly	12	0	0.067	0.035	Yes
Yarragon	Monthly	12	0	0.049	0.026	Yes
Yinnar	Monthly	12	0	0.110	0.060	Yes

Table 13: Comparison of Trihalomethane (THM) results for previous years (2019-2022)

Water Sampling Locality	2021 - 2022		2020 - 2021		2019 - 2020	
	Maximum THM in a sample (mg/L)	Complying (Yes/No)	Maximum THM in a sample (mg/L)	Complying (Yes/No)	Maximum THM in a sample (mg/L)	Complying (Yes/No)
Boisdale	0.092	Yes	0.052	Yes	0.100	Yes
Boolarra	0.130	Yes	0.100	Yes	0.086	Yes
Briagolong	0.024	Yes	0.014	Yes	0.028	Yes
Churchill	0.140	Yes	0.094	Yes	0.093	Yes
Coongulla/Glenmaggie	0.029	Yes	0.018	Yes	0.019	Yes
Cowwarr	0.100	Yes	0.091	Yes	0.086	Yes
Drouin	0.082	Yes	0.076	Yes	0.075	Yes
Erica	0.043	Yes	0.035	Yes	0.032	Yes
Heyfield	0.039	Yes	0.031	Yes	0.033	Yes
Jumbuk	0.160	Yes	0.087	Yes	0.093	Yes
Maffra	0.080	Yes	0.037	Yes	0.031	Yes
Mirboo North	0.039	Yes	0.036	Yes	0.053	Yes
Moe	0.053	Yes	0.059	Yes	0.069	Yes
Morwell	0.063	Yes	0.052	Yes	0.049	Yes
Neerim South	0.080	Yes	0.049	Yes	0.055	Yes
Newborough	0.034	Yes	0.060	Yes	0.070	Yes
Noojee	0.049	Yes	0.044	Yes	0.039	Yes
Rawson	0.029	Yes	0.022	Yes	0.022	Yes
Rokeby/Buln Buln	0.071	Yes	0.073	Yes	0.076	Yes
Rosedale	0.210	Yes	0.092	Yes	0.120	Yes
Sale/Wurruk	0.027	Yes	0.022	Yes	0.023	Yes
Seaspray	0.160	Yes	0.170	Yes	0.160	Yes
Stratford	0.077	Yes	0.051	Yes	0.042	Yes
Thorpdale	0.086	Yes	0.070	Yes	0.095	Yes
Toongabbie	0.090	Yes	0.069	Yes	0.071	Yes
Trafalgar	0.045	Yes	0.045	Yes	0.072	Yes
Traralgon	0.086	Yes	0.038	Yes	0.060	Yes
Traralgon South/ Hazelwood North	0.083	Yes	0.048	Yes	0.052	Yes
Tyers/Glengarry	0.230	Yes	0.060	Yes	0.059	Yes
Warragul	0.076	Yes	0.078	Yes	0.087	Yes
Warragul South	0.066	Yes	0.078	Yes	0.092	Yes
Willow Grove	0.001	Yes	0.001	Yes	0.001	Yes
Yallourn North	0.067	Yes	0.056	Yes	0.064	Yes
Yarragon	0.049	Yes	0.052	Yes	0.093	Yes
Yinnar	0.110	Yes	0.085	Yes	0.070	Yes

Results obtained for each of the localities was similar to the previous two reporting periods.

9.2.2 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

9.3 Turbidity

9.3.1 Turbidity results

For compliance with the SDWR (2015), the 95th percentile of results for samples of drinking water collected in any 12-month period, must be less than or equal to 5.0 NTU (Nephelometric Turbidity Unit). All of our water sampling localities achieved 100% compliance with this standard for the 2021-22 reporting period for the scheduled sampling results.

Table 14: Turbidity results for all water sampling localities in 2021-22

Water Sampling Locality	Frequency of Sampling	Number of Samples	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	No. of 95th Percentile of results in any 12 months above standard (s.18)	Complying (Yes/No)
Boisdale	Weekly	52	0.1	0.1	0	Yes
Boolarra	Weekly	52	0.3	0.2	0	Yes
Briagolong	Weekly	52	0.1	0.1	0	Yes
Churchill	Weekly	55	0.4	0.3	0	Yes
Coongulla/Glenmaggie	Weekly	52	0.9	0.3	0	Yes
Cowwarr	Weekly	52	0.3	0.2	0	Yes
Drouin	Weekly	52	0.2	0.2	0	Yes
Erica	Weekly	52	0.4	0.4	0	Yes
Heyfield	Weekly	52	0.6	0.3	0	Yes
Jumbuk	Weekly	52	0.7	0.2	0	Yes
Maffra	Weekly	52	0.1	0.1	0	Yes
Mirboo North	Weekly	52	0.2	0.1	0	Yes
Moe	Weekly	52	0.5	0.3	0	Yes
Morwell	Weekly	53	0.5	0.2	0	Yes
Neerim South	Weekly	52	0.7	0.6	0	Yes
Newborough	Weekly	52	0.9	0.2	0	Yes
Noojee	Weekly	52	0.6	0.5	0	Yes
Rawson	Weekly	52	0.6	0.3	0	Yes
Rokeby/Buln Buln	Weekly	52	0.4	0.2	0	Yes
Rosedale	Weekly	52	0.3	0.3	0	Yes
Sale/Wurruk	Weekly	52	0.1	0.1	0	Yes
Seaspray	Weekly	52	0.4	0.2	0	Yes
Stratford	Weekly	52	0.1	0.1	0	Yes
Thorpdale	Weekly	52	2.2	0.8	0	Yes
Toongabbie	Weekly	52	0.2	0.2	0	Yes
Trafalgar	Weekly	52	0.2	0.1	0	Yes
Traralgon	Weekly	53	0.8	0.3	0	Yes
Traralgon South/ Hazelwood North	Weekly	54	0.2	0.2	0	Yes
Tyers/Glengarry	Weekly	52	0.3	0.2	0	Yes
Warragul	Weekly	104	0.4	0.2	0	Yes
Warragul South	Weekly	52	0.2	0.1	0	Yes
Willow Grove	Weekly	52	0.2	0.1	0	Yes
Yallourn North	Weekly	52	0.2	0.1	0	Yes
Yarragon	Weekly	52	0.2	0.1	0	Yes
Yinnar	Weekly	52	0.4	0.3	0	Yes

* = For calculation purposes, all results reported as <0.1 NTU were rounded to 0.1 NTU for calculating the maximum 95th percentile.

Table 15: Comparison of Turbidity results for previous years (2019-2022)

Water Sampling Locality	2021 - 2022		2020 - 2021		2019 - 2020	
	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*
Boisdale	0.1	0.1	0.1	0.1	0.1	0.1
Boolarra	0.3	0.2	0.2	0.2	0.5	0.3
Briagolong	0.1	0.1	0.1	0.1	0.2	0.1
Churchill	0.4	0.3	0.6	0.4	0.1	0.1
Coongulla/Glenmaggie	0.9	0.3	0.3	0.3	0.2	0.2
Cowwarr	0.3	0.2	0.6	0.2	5.0	0.2
Drouin	0.2	0.2	0.1	0.1	0.2	0.1
Erica	0.4	0.4	0.8	0.4	2.2	0.5
Heyfield	0.6	0.3	0.3	0.2	0.8	0.2
Jumbuk	0.7	0.2	1.3	0.2	0.2	0.1
Maffra	0.1	0.1	0.1	0.1	0.2	0.1
Mirboo North	0.2	0.1	0.3	0.2	0.5	0.2
Moe#	0.5	0.3	0.9	0.4	1.6	0.3
Morwell	0.5	0.2	1.4	0.5	0.2	0.1
Neerim South	0.7	0.6	0.8	0.7	0.4	0.4
Newborough#	0.9	0.2	0.9	0.4	1.7	0.7
Noojee	0.6	0.5	0.8	0.4	0.7	0.3
Rawson	0.6	0.3	1.0	0.3	0.3	0.3
Rokeby/Buln Buln	0.4	0.2	0.2	0.1	0.1	0.1
Rosedale	0.3	0.3	1.4	0.4	0.2	0.2
Sale/Wurruk	0.1	0.1	0.2	0.1	0.1	0.1
Seaspray	0.4	0.2	0.3	0.3	0.8	0.6
Stratford	0.1	0.1	0.7	0.1	0.2	0.1
Thorpdale	2.2	0.8	2.4	0.4	0.3	0.2
Toongabbie	0.2	0.2	0.2	0.1	0.2	0.1
Trafalgar	0.2	0.1	0.1	0.1	0.2	0.1
Traralgon	0.8	0.3	0.2	0.1	0.3	0.2
Traralgon South/ Hazelwood North	0.2	0.2	0.3	0.1	0.2	0.1
Tyers/Glengarry	0.3	0.2	0.2	0.2	3.2	1.2
Warragul	0.4	0.2	0.3	0.1	0.4	0.1
Warragul South	0.2	0.1	0.2	0.1	1.0	0.3
Willow Grove	0.2	0.1	0.1	0.1	0.2	0.1
Yallourn North#	0.2	0.1	0.2	0.1	1.0	0.7
Yarragon	0.2	0.1	0.2	0.1	1.0	0.2
Yinnar	0.4	0.3	0.3	0.2	0.4	0.3

*For calculation purposes, all results reported as <0.1 NTU were rounded to 0.1 NTU for calculating the maximum 95th percentile.

Results obtained for each of the localities was similar to the previous two reporting periods.

9.3.2 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

9.4 Fluoride

Fluoride testing has been performed in the water supply systems where fluoride is added to the water. This includes the Maffra, Warragul, Sale, Traralgon, Morwell and Moe systems reaching over 90% of our population.

We have sampled localities on a weekly basis even though some of the localities listed in Table 17 require monthly samples according to section 5.1.3 of the *Code of Practice for Fluoridation of Drinking Water Supplies (second edition) 2018* (i.e. if a fluoride plant supplies five or more water sampling localities then the corporation must take a sample each month from a water sampling point in each water sampling locality supplied from those plants such that a sample is collected from the distribution system at least once per week).

9.4.1 Fluoride results

Based on health considerations and the *Health (Fluoridation) Act 1973*, no single sample concentration of fluoride in drinking water should exceed 1.5 mg/L, and the average optimum concentration of fluoride should not exceed 1.0 mg/L. All our sites achieved 100% compliance with this standard for the 2021-22 reporting period.

The *Code of Practice for Fluoridation of Drinking Water Supplies (second edition) 2018*, section 4.2.2, defines the operating range of annual average concentration of fluoride being the operating target set by the DH (0.9mg/L for our plants) plus/minus 0.1 mg/L of fluoride. The drinking water fluoridation system in Morwell and Sale achieved operating averages which met the target for the reporting period. The fluoridation systems for Maffra, Warragul, Moe and Traralgon achieved an operating average ranging from 0.11 to 0.17 mg/L below the operating target.

Table 16: Fluoride results for all fluoridated localities in 2021-22

Treatment Plant	Water Sampling Locality	Frequency of Sampling	Number of Samples	Operating Target	Max (mg/L)	Min (mg/L)	Overall Average[1] (mg/L)	Operating Average[2] (mg/L)	Comply[3] (Yes /No)	Meeting Obligations[4] (Yes/No)
Maffra	Boisdale	Weekly	52	0.9	0.78	0.54	0.70	0.72	No	Yes
	Maffra	Weekly	104	0.9	0.87	0.36	0.70	0.74	No	Yes
	Stratford	Weekly	52	0.9	0.85	0.43	0.70	0.73	No	Yes
Morwell	Churchill	Monthly	53	0.9	0.88	0.67	0.81	0.81	Yes	Yes
	Boolarra	Monthly	52	0.9	0.86	0.72	0.80	0.80	Yes	Yes
	Jumbuk	Monthly	52	0.9	0.86	0.75	0.81	0.81	Yes	Yes
	Morwell	Weekly	105	0.9	0.94	0.06	0.80	0.82	Yes	Yes
	Traralgon South/ Hazelwood North	Monthly	54	0.9	0.88	0.70	0.81	0.81	Yes	Yes
	Yinnar	Monthly	52	0.9	0.88	0.71	0.81	0.81	Yes	Yes
Moe	Moe	Weekly	104	0.9	0.97	0.13	0.75	0.78	No	Yes
	Newborough	Monthly	52	0.9	0.93	0.45	0.76	0.77	No	Yes
	Trafalgar	Monthly	52	0.9	0.94	0.23	0.76	0.79	No	Yes
	Yallourn North	Monthly	52	0.9	0.85	0.64	0.77	0.77	No	Yes
	Thorpdale[5]	Monthly	52	0.9	0.88	0.70	0.79	0.79	No	Yes
	Yarragon	Monthly	52	0.9	0.93	0.22	0.76	0.79	No	Yes
Sale	Sale/Wurruk	Weekly	104	0.9	0.89	0.44	0.82	0.82	Yes	Yes
Traralgon	Traralgon	Weekly	106	0.9	0.93	0.07	0.72	0.76	No	Yes

1 = The overall average value calculated based on all monitoring conducted over the 2021-22 reporting period, including when dosing did not occur.
2 = The operating average is calculated excluding the times where dosing did not occur (concentration decreased below 0.2mg/L).
3 = Complying is defined as any sample not exceeding 1.5 mg/L, or the 12-month rolling average not exceeding 1.0 mg/L.
4 = Meeting obligation is defined as the annual average concentration of fluoride was within the operating target plus/minus 0.1mg/L excluding when dosing did not occur.
5 = Water carting to Thorpdale from the Moe system (Trafalgar) commenced in September 2015.

Table 16 (cont.): Fluoride results for all fluoridated localities in 2021-22

Treatment Plant	Water Sampling Locality	Frequency of Sampling	Number of Samples	Operating Target	Max (mg/L)	Min (mg/L)	Overall Average[1] (mg/L)	Operating Average[2] (mg/L)	Comply[3] (Yes /No)	Meeting Obligations[4] (Yes/No)
Warragul	Drouin	Weekly	52	0.9	0.85	0.47	0.79	0.79	No	Yes
	Rokeby/Buln Buln	Weekly	52	0.9	0.88	0.42	0.79	0.79	No	Yes
	Warragul	Weekly	104	0.9	0.89	0.52	0.79	0.80	Yes	Yes
	Warragul South	Weekly	52	0.9	0.83	0.59	0.77	0.78	No	Yes

1 = The overall average value calculated based on all monitoring conducted over the 2021-22 reporting period, including when dosing did not occur.
2 = The operating average is calculated excluding the times where dosing did not occur (concentration decreased below 0.2mg/L).
3 = Complying is defined as any sample not exceeding 1.5 mg/L, or the 12-month rolling average not exceeding 1.0 mg/L.
4 = Meeting obligation is defined as the annual average concentration of fluoride was within the operating target plus/minus 0.1mg/L excluding when dosing did not occur.
5 = Water carting to Thorpdale from the Moe system (Trafalgar) commenced in September 2015.

Table 17: Comparison of Fluoride results for previous years (2019-2022)

Treatment Plant	Water Sampling Locality	2021 - 2022			2020 - 2021			2019 - 2020		
		Max (mg/L)	Min (mg/L)	Overall Average[1] (mg/L)	Max (mg/L)	Min (mg/L)	Overall Average[1] (mg/L)	Max (mg/L)	Min (mg/L)	Overall Average[1] (mg/L)
Maffra	Boisdale	0.78	0.54	0.70	0.88	0.67	0.79	0.91	0.64	0.81
	Maffra	0.87	0.36	0.70	0.96	0.30	0.78	0.92	<0.05	0.81
	Stratford	0.85	0.43	0.70	0.88	0.65	0.79	0.90	0.74	0.81
Morwell	Churchill	0.88	0.67	0.81	0.85	0.72	0.80	0.92	0.74	0.83
	Boolarra	0.86	0.72	0.80	0.84	0.74	0.79	0.89	0.76	0.83
	Jumbuk	0.86	0.75	0.81	0.86	0.72	0.80	0.91	0.74	0.84
	Morwell	0.94	0.06	0.80	0.91	0.32	0.79	1.00	0.54	0.84
	Traralgon South/ Hazelwood North	0.88	0.70	0.81	0.89	0.37	0.79	0.93	0.71	0.85
	Yinnar	0.88	0.71	0.81	0.84	0.70	0.79	0.90	0.74	0.83
Moe	Moe	0.97	0.13	0.75	0.87	<0.05	0.77	0.93	0.17	0.79
	Newborough	0.93	0.45	0.76	0.86	0.20	0.77	0.90	0.28	0.79
	Trafalgar	0.94	0.23	0.76	0.89	0.34	0.79	0.96	0.31	0.80
	Yallourn North	0.85	0.64	0.77	0.87	0.32	0.77	0.87	0.69	0.80
	Thorpdale[5]	0.88	0.70	0.79	0.86	0.51	0.78	0.88	0.62	0.80
	Yarragon	0.93	0.22	0.76	0.91	0.34	0.80	0.97	0.46	0.79
Sale	Sale/Wurruk	0.89	0.44	0.82	0.90	0.72	0.82	0.99	0.59	0.81
Traralgon*	Traralgon	0.93	0.07	0.72	0.91	<0.05	0.75	0.94	0.42	0.82
Warragul	Drouin	0.85	0.47	0.79	0.87	0.64	0.82	0.90	0.65	0.80
	Rokeby/Buln Buln	0.88	0.42	0.79	0.91	0.71	0.83	0.92	0.65	0.81
	Warragul	0.89	0.52	0.79	0.89	0.63	0.82	0.90	0.56	0.80
	Warragul South	0.83	0.59	0.77	0.85	0.76	0.81	0.87	0.68	0.80

1 = The average value calculated based on all monitoring conducted over the 2021-22 reporting period, including when dosing did not occur.

The fluoride dosing systems of Sale and Morwell performed within requirements for the 2021-22 reporting period. The systems for Maffra, Morwell and Moe were operating slightly below the operating target. Overall system performance was slightly low in terms of overall average achieved when compared to the 2019-20 and 2020-21 reporting periods.

9.4.2 Actions taken in relation to non-compliance

All systems achieved compliance against the standard (no single sample concentration of fluoride in drinking water should exceed 1.5 mg/L, and the average level of fluoride should not exceed 1.0 mg/L).

9.4.3 Fluoride dosing systems performance and maintenance 2020-21

Under the *Code of Practice for Fluoridation of Drinking Water Supplies (second edition) 2018*, we are required to notify the DH if the fluoride concentration in drinking water, measured at the fluoridation plant, is less than 0.6 mg/L for a continuous period of greater than 72 hours. Notifications are included under each fluoride plant.

A number of maintenance activities were undertaken during the reporting period which necessitated that the fluoridation systems be shut down for a period of time to allow the works to proceed.

- Traralgon
  The fluoride dosing system at the Traralgon Water Treatment Plant was operational for the duration of the reporting period. During February/March 2022, the system was turned off for a period of 33 days to allow for saturator media replacement and minor system maintenance.

- Maffra
  The fluoride dosing system at the Maffra Water Treatment Plant was operational for the duration of the reporting period. During May 2022, the system was turned off for a period of 3 days to allow for saturator media replacement.

- Warragul
  The fluoride dosing system at the Warragul Water Treatment Plant was operational for the duration of the reporting period. During January/February 2022, the system was turned off for a period of 4 days to allow for saturator media replacement.

- Sale
  The fluoride dosing system at the Sale Water Treatment Plant was operational for the duration of the reporting period. During April 2022, the system was turned off for a period of 5 days to allow for saturator media replacement.

- Morwell
  The fluoride dosing system at the Morwell Water Treatment Plant was operational during the reporting period.

- Moe
  The fluoride dosing system at the Moe Water Treatment Plant was operational during the reporting period. During January 2022, the system was turned off for a period of 4 days to allow for saturator media replacement.

9.5 WATER TREATMENT, QUALITY AND CATCHMENT PROJECTS AND PROGRAMS UNDERTAKEN

During the 2021-22 reporting period, we undertook a number of works, programs and projects to ensure that continual improvements were made for the provision of safe drinking water to our customers. These included:

- Major projects for asset replacements
  - Completion of Northways Basin liner and cover replacement
- Treated water storage basins and tank condition assessments as part of the ongoing inspection, maintenance and cleaning program;

- Ongoing water treatment plant filter upgrades and refurbishment program
    - Tyers WTP
    - Morwell WTP
    - Mirboo North WTP
    - Warragul WTP
    - Moe WTP
- Installation and upgrades of remote secondary disinfection sites and monitoring installations
    - Newborough Basin
    - Warragul South Basin
    - Rosedale basin
- Ongoing implementation of water reticulation mains air scouring program, flushing and cleaning;
    - Rawson and Erica
    - Mirboo North
    - Heyfield
- Ongoing replacement and upgrade of water quality on-line and field instrumentation;
- Willow Grove (DELWP IWM project) stormwater quality improvement project maintenance;
- Catchment bushfire preparedness inspections with CFA and Forest Fire Management Vic
- Planned fuel reduction burns in catchment areas
- Weed and pest control in catchment areas in conjunction with DELWP and plantation operators
- Catchment and waterway improvement projects through the implementation of the Integrated Catchment Land Use Options Strategy

The following figures depict some of our projects and programs:

Figure 9: Revegetation at Willow Grove stormwater for water quality improvement

Figures 10: Tyers WTP Filter rebuild for improved treatment performance

Figure 11: installation of a new secondary disinfection site at Newborough

Figure 12: Assessing repairs required in the aftermath of the June 2021 Storm event in the Moondarra Catchment

Figure 13: Installation of new sludge silos at Heyfield WTP

Figure 14: Installation of a new secondary disinfection site at Rosedale

Figure 15: Installation of new pipework into the Contact Tank at Warragul WTP

Figures 16: Cleaning the inside of the contact tank and Warragul WTP

Figure 17: Replacement of non-return valves on pumps at Moe WTP

Figure 18: Undertaking maintenance on the Merriman Creek weir at Seaspray

Figure 19: Warragul WTP Basin cover and liner replacement project

9.6 Catchment projects and programs undertaken

We work in partnership with West Gippsland Catchment Management Authority (WGCMA), Landcare groups and local councils to improve and preserve our waterway ecosystems.

We are a stakeholder in the review of the West Gippsland Regional Catchment Strategy and West Gippsland Waterway Strategy. These strategies are due to be reviewed in the coming year. We are working with WGCMA to ensure water quality considerations include potable water supply catchments. The recently reviewed Environment Protection Act 2017 (Vic) and environmental regulations will sharpen the focus on the public health implications of potable water supply protection in these regional strategies.

Our biodiversity management programs and extensive carbon sequestration plantings at Dutson Downs also contribute to key objectives in the Regional Catchment Strategy and to improving the overall health of the Ramsar-listed Gippsland Lakes through revegetation and threatened species preservation.

We maintained a project from the Gippsland Integrated Water Management Plan, which involved planting native shrubs and grasses at Willow Grove to protect Blue Rock Lake from pollutants. We partnered with Southern Rural Water, WGCMA, Tanjil Landcare, the grazier who leases the land and Baw Baw Shire Council to revegetate a section of land by the lake to capture pollutants in stormwater coming from nearby homes. We will monitor the impacts of this project on water quality at this site for five years.

Table 18: Gippsland Water - water supply locality water source and activities undertaken

Source water	Raw Water Storage	Water Treatment Plant	Water Sampling Locality	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Macalister River	Lake Glenmaggie	Maffra WTP	Maffra Stratford Boisdale	Southern Rural Water	West Gippsland Catchment Management Authority	• Ongoing participation in Victorian Environmental Water Holder's, Macalister River Environmental Water Advisory Group • Water Licence applications referrals – water quality assessments • Planning application assessments: including coordination with Southern Rural Water, as co-referral authority. • Participation as a stakeholder in DELWP Gippsland Strategic Fuel Breaks Project • Discussion with DELWP regarding future catchment declaration • Participation in DELWP-funded Integrated Water Management Planning for Wellington Shire Council • Liaison with SRW on Newry Pipeline (irrigation upgrade) project • Sharing of water quality data with WGCMA and SRW for environmental & recreational water monitoring • Sharing of water quality data with horticultural producers • Participation in pre-bushfire season briefing with Forest Fire Management Victoria Heyfield
Bore - Wa De Lock Aquifer	N/A	Briagolong WTP	Briagolong	Southern Rural Water	West Gippsland Catchment Management Authority	• PFAS/PFOA monitoring • Water Licence applications referrals – water quality assessments • Participation as a stakeholder in DELWP Gippsland Strategic Fuel Breaks Project • Engagement with Friends of Blue Pools, Landcare group • Test bore to investigate future water security options • Participation in pre-bushfire season briefing with Forest Fire Management Victoria Heyfield

Table 18 (cont.): Gippsland Water - water sampling locality water source

Source water	Raw Water Storage	Water treatment Plant	Water Sampling Locality	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Tyers River (including Trigger Creek)	Moondarra Reservoir	Morwell WTP	Morwell Boolarra Churchill Yinnar Jumbuk Traralgon South/Hazelwood North	Gippsland Water	West Gippsland Catchment Management Authority	• Moondarra Land Use Options Plan • Hosted pre-bushfire season meeting and field inspection of Moondarra catchment with CFA & DELWP fire crews • Road Maintenance, including at Trigger Creek weir • Participation as a stakeholder in DELWP Gippsland Strategic Fuel Breaks Project • Pre-bushfire season orientation with fire agencies. • Planning application assessments: for water quality risks • Ongoing participation in the Regional Water Monitoring Partnership. • Timber production from GW-owned pine plantation: including harvest & site preparation for re-establishment. • Ongoing liaison with Friends of Tyers State Park • Liaison with Baw Baw shire as major road maintenance manager. • Participation in DELWP-funded Integrated Water Management Planning for Baw Baw Shire Council • Gathering of intelligence data for trespass into closed catchment area • Participation in DELWP Sustainable Water Strategy Review, specific to recreation • Review of forest plantation pesticide application operational plans • Weir maintenance and inspection at Trigger Creek • Reporting of rubbish dumping on Crown land to DELWP & Parks Victoria • Bulk Water shoreline assessments of Moondarra Reservoir
		Tyers WTP	Tyers/Glengarry Rosedale Toongabbie Cowwarr			
		Traralgon WTP	Traralgon			
	Amours Basins	Rawson WTP	Rawson Erica			

Table 18 (cont.): Gippsland Water - water sampling locality water source

Source water	Raw Water Storage	Water Treatment Plant	Water Sampling Locality	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Pederson Weir (Tarago River) Tarago Reservoir - (supplementary supply)	Tarago Reservoir (supplementary supply)	Warragul WTP	Warragul (including Nilma, Drouin East) Warragul South Drouin Rokeby/Buln Buln	Melbourne Water	West Gippsland Catchment Management Authority	• Planning application assessments, including liaison with Melbourne Water • Ongoing liaison with Melbourne Water, specific to Tarago Reservoir water quality. • Engagement with VicForests for timber production coupe over GW pipeline in Tarago state forest • Participation in DELWP Sustainable Water Strategy Review, specific to recreation
		Neerim South WTP	Neerim South Noojee			
Macalister River	Lake Glenmaggie	Coongulla WTP	Coongulla/ Glenmaggie	Southern Rural Water	West Gippsland Catchment Management Authority	• Ongoing participation in Victorian Environmental Water Holder's, Macalister River Environmental Water Advisory Group • Water Licence applications referrals – water quality assessments • Planning application assessments: including coordination with Southern Rural Water, as co-referral authority. • Participation as a stakeholder in DELWP Gippsland Strategic Fuel Breaks Project • Discussion with DELWP regarding future catchment declaration • Participation in DELWP-funded Integrated Water Management Planning for Wellington Shire Council • Liaison with SRW on Newry Pipeline (irrigation upgrade) project • Sharing of water quality data with WGCMA and SRW for environmental & recreational water monitoring • Sharing of water quality data with horticultural producers • Participation in pre-bushfire season briefing with Forest Fire Management Victoria Heyfield
Bore (Boisdale Aquifer)	N/A	Sale WTP	Sale / Wurruk	Southern Rural Water	West Gippsland Catchment Management Authority	• PFAS/PFOA monitoring • Water Licence applications referrals – water quality assessments

Table 18 (cont.): Gippsland Water - water sampling locality water source

Source water	Raw Water Storage	Water Treatment Plant	Water Sampling Locality	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Merriman Creek	Seaspray raw water storage	Seaspray WTP	Seaspray	Gippsland Water	West Gippsland Catchment Management Authority	• PFAS/PFOA monitoring • Ongoing monitoring of the trial of algae control measures in raw water basin • Forestry Spray application program review • Forestry pesticide application, on ground observance and infield monitoring data gathering with HVP Plantations • Ongoing working relationship with Merriman Creek Landcare • Water Licence applications referrals – water quality assessments
Tanjil River	Blue Rock Lake	Willow Grove WTP	Willow Grove	Southern Rural Water	West Gippsland Catchment Management Authority	• Engagement with SRW and WGCMA regarding water quality protection • Stormwater Gully revegetation works
Thomson River	Heyfield raw water storage	Heyfield WTP	Heyfield	Gippsland Water	West Gippsland Catchment Management Authority	• Planning application assessments, including coordination with Melbourne Water • Participate in Gippsland Strategic Bushfire Fuel Management Planning Project • Discussion with DELWP regarding future catchment declaration • Liaise with Melbourne Water, including Thomson dam visit by Bulk Water staff • Ongoing participation in Victorian Environmental Water Holder's, Thomson River Environmental Water Advisory Group • Participation in WGCMA's Rainbow Creek / Thomson River avulsion working group • Coordination of planning of major project to connect Heyfield WTP to Coongulla supply system • Water Licence applications referrals – water quality assessments

Table 18 (cont.): Gippsland Water - water sampling locality water source

Source water	Raw Water Storage	Water treatment plant	Water Sampling Locality	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Little Morwell River	N/A	Mirboo North WTP	Mirboo North	N/A	West Gippsland Catchment Management Authority	• Engagement with upstream landholders and assessment of sediment runoff mitigation potentials • Reporting of rubbish dumping in State forest to DELWP • Water Licence applications referrals – water quality assessments
Tanjil River and Narracan Creek	N/A	Moe WTP	Moe Newborough Yallourn North Trafalgar Yarragon Darnum Thorpdale (water carting from Moe water sampling locality)	N/A	West Gippsland Catchment Management Authority	• Planning application assessments, including liaison with SRW • Ongoing participation in the Regional Water Monitoring Partnership. • Planning and delivery of a DELWP-funded Integrated Water Management Project at Willow Grove to intercept stormwater, prior to discharge into Blue Rock Lake. • Participation in planting days with Tanjil Landcare • Participation in DELWP-funded Integrated Water Management Planning for Baw Baw Shire Council • Water Licence applications referrals – water quality assessments • Water Act, irrigation dam work permit referrals.

9.7 Other algae, pathogen, chemical or substance not specified that may pose a risk to human health

9.7.1 Overall results

During the reporting period, the corporation monitored for the following health-related aspects of the drinking water supplied to customer taps. The following table lists the parameters and the frequency of samples taken across all localities, comparing the results to the ADWG and the health-based guideline value.

Table 19: Other sampled parameter results for all localities in 2021-22 (Health Based Parameters)

Parameter	Frequency of sampling	2021-22 No. of Samples	2021-22 Maximum Value Recorded for All Localities (mg/L)	2020-21 Maximum Value Recorded for All Localities (mg/L)	2019-20 Maximum Value Recorded for All Localities (mg/L)	Health Based Guideline value (mg/L)	Result
Nitrite	Weekly*/6 Monthly	401	0.013	0.031	0.031	< 3	All results below ADWG health guideline values
Mercury	Quarterly	363	0.0002	0.0009	0.0001	< 0.001	
Chromium	Quarterly	158	<0.001	<0.001	<0.001	< 0.05	
Cadmium	Quarterly	158	<0.0002	<0.0002	<0.0002	< 0.002	
Nitrate	Weekly*/Quarterly	297	1.3	1.8	1.5	< 50	
Nickel	Annually	41	0.003	0.010	0.004	< 0.02	
Arsenic	Annually/Quarterly	127	<0.001	<0.001	<0.001	< 0.01	
Cyanide	Annually	35	<0.005	<0.005	<0.005	< 0.08	
Selenium	Annually/Quarterly	127	<0.001	<0.001	<0.001	< 0.01	
Beryllium	Annually/6 Monthly	50	<0.01	<0.01	<0.001	< 0.06	
Chloryl Hydrate	Monthly	106	0.024	0.012	0.014	< 0.1	
2, 4-Dichlorophenoxy acetic acid	Monthly	106	<0.01	<0.01	<0.01	< 0.03	
Nitrosodimethylamine	Monthly**	23	0.000008	0.000016	0.000023	< 0.0001	
2,4,6-Trichlorophenol	Monthly***	108	<0.001	<0.001	<0.001	< 0.02	
2,4-Dichlorophenol	Monthly***	108	<0.001	<0.01	<0.001	< 0.2	
2- Chlorophenol	Monthly***	108	<0.001	<0.001	<0.001	< 0.3	
Pentachlorophenol	Monthly	115	<0.001	<0.001	<0.001	< 0.01	
Chloride	Annually/Quarterly	244	120	220	220	<250	
Zinc	Annually	44	0.012	0.023	0.046	<3	
Hardness ($CaCO_3$)	Annually/Quarterly	187	87	78	170	<200	
Total dissolved solids	Annually/Quarterly	142	340	320	370	<600	
Silica	Annually/Quarterly	203	15	15	15	<80	
Sulphate	Annually/Quarterly	178	61	130	130	<250	

*- Weekly monitoring undertaken on chloraminated systems
**- Monthly monitoring undertaken on chloraminated systems
***- Frequency Increased from quarterly to monthly during reporting period

Monitoring for other parameters such as radiological, pesticides, protozoan organisms is conducted routinely. A complete list of raw water parameters monitored is included in Appendix 1. Additional monitoring is performed on a risk basis and as the need arises.

Blue Green Algae (BGA) monitoring is undertaken across our storages based on visual and water quality triggers. Major raw water supply/storages are routinely monitored for BGA as part of the routine catchment monitoring program. The frequency of sampling is determined by the assessed risk and historical bloom occurrences.

For water storages not managed by us, the Water Storage Manager (Melbourne Water – Tarago, Southern Rural Water – Blue Rock and Lake Glenmaggie) undertakes monitoring and advise us of the results in accordance with their respective algae management plans.

Table 20: Routine BGA monitoring for raw water supplies in 2021-22 (samples per month collected)

Location	Jul '21	Aug '21	Sept '21	Oct '21	Nov '21	Dec '21	Jan '22	Feb '22	Mar '22	Apr '22	May '22	Jun '22
Maffra Weir	2	3	3	2	3	5	4	4	5	4	2	5
Heyfield Raw Water Storage	4	3	5	3	5	4	4	4	5	4	5	2
Neerim South Tarago Reservoir	1		1	1	1	1	1	1	1	1	1	1
Rawson Amours Basin	1	1	1	1	1	1	1	1	1	1	1	1
Seaspray Raw Water Storage	2	3	3	2	4	5	4	4	5	4	2	4
Seaspray – Merriman Creek	1	2	1	1	2	3	2	2	1	2	1	2
Blue Rock Lake (Southern Rural Water BGA Program)	Southern Rural Water (SRW) BGA Monitoring Program											
Lake Glenmaggie (Southern Rural Water BGA Program)	Southern Rural Water (SRW) BGA Monitoring Program											
Coongulla WTP Inlet – Lake Glenmaggie	2	2	2	2	3	4	3	4	5	4	2	1
Tarago Reservoir (Melbourne Water BGA Program)	Melbourne Water BGA Monitoring Program											
Moondarra Surface	1	1	1	1	1	1	1		1	1	1	1
Moondarra pipeline		1	1	1	1			1			1	

During the reporting period, although there were algae and blue green algae blooms, none of these impacted the water treatment process or the production of safe drinking water.

9.7.2 Manganese

Manganese can be naturally present in raw water supplies as either a soluble or insoluble form. When concentrations exceed the aesthetic guideline of 0.1 mg/L, manganese can create unacceptable tastes in water, as well as stain fixtures and laundry. The ADWG guideline value is measured against the health guideline value of 0.5 mg/L in ADWG.

Table 21: Manganese results for all water sampling localities in 2021-22

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Boisdale	Monthly	12	0.001	0.002	<0.001	Yes
Boolarra	Weekly	55	0.001	0.002	<0.001	Yes
Briagolong	Weekly	64	<0.001	<0.001	<0.001	Yes
Churchill	Monthly	16	0.001	0.003	<0.001	Yes
Coongulla/Glenmaggie	Weekly	64	0.002	0.003	<0.001	Yes
Cowwarr	Monthly	12	<0.001	<0.001	<0.001	Yes
Drouin	Monthly	12	0.002	0.007	<0.001	Yes
Erica	Monthly	12	0.011	0.024	0.007	Yes
Heyfield	Weekly	64	0.010	0.027	0.003	Yes
Jumbuk	Monthly	12	0.001	0.001	<0.001	Yes
Maffra	Weekly	64	0.016	0.150	<0.001	Yes
Mirboo North	Weekly	75	0.014	0.770	0.001	No
Moe	Weekly	73	0.015	0.076	<0.001	Yes
Morwell	Weekly	168	0.005	0.140	<0.001	Yes
Neerim South	Weekly	64	0.013	0.023	0.006	Yes
Newborough	Monthly	12	0.002	0.006	<0.001	Yes
Noojee	Monthly	18	0.010	0.021	0.006	Yes
Rawson	Weekly	63	0.007	0.047	<0.001	Yes
Rokeby/Buln Buln	Monthly	12	0.002	0.007	<0.001	Yes
Rosedale	Monthly	12	<0.001	<0.001	<0.001	Yes
Sale/Wurruk	Weekly	64	0.001	0.002	<0.001	Yes
Seaspray	Weekly	64	0.007	0.010	0.004	Yes
Stratford	Monthly	12	0.001	0.002	<0.001	Yes
Thorpdale	Weekly	64	0.002	0.020	<0.001	Yes
Toongabbie	Monthly	12	<0.001	<0.001	<0.001	Yes
Trafalgar	Weekly	64	0.003	0.038	<0.001	Yes
Traralgon	Weekly	64	0.002	0.007	<0.001	Yes
Traralgon South/Hazelwood North	Monthly	12	0.001	0.001	<0.001	Yes
Tyers/Glengarry	Weekly	64	0.002	0.009	<0.001	Yes
Warragul	Weekly	115	0.011	0.280	<0.001	Yes
Warragul South	Monthly	12	0.001	0.001	<0.001	Yes
Willow Grove	Weekly	64	0.002	0.005	<0.001	Yes
Yallourn North	Monthly	12	0.001	0.002	<0.001	Yes
Yarragon	Weekly	64	0.002	0.005	<0.001	Yes
Yinnar	Monthly	12	0.001	0.001	<0.001	Yes

*= average unable to be calculated as all results for reporting period were below detection level
#= average values calculated using the detection limit value for sample results showing less than detection limit.
^= Based on the maximum value being below the ADWG guideline health limit of 0.5 mg/L.

9.7.3 Actions taken in relation to non-compliance

All localities with the exception of Mirboo North complied with this water quality parameter. Refer to section 6.5 regarding the Manganese levels in Mirboo North.

9.7.4 Lead

Lead can be present in drinking water as a result of dissolution from natural sources or from household plumbing. Based on health considerations in the ADWG guidelines, concentrations of lead in drinking water should not exceed 0.01 mg/L. Our sites achieved 100% ADWG guideline value against lead guideline values for all customer tap sites.

Table 22: Lead results for all water sampling localities in 2021-22

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Boisdale	Quarterly	4	<0.001	<0.001	<0.001	Yes
Boolarra	Quarterly	4	<0.001	<0.001	<0.001	Yes
Briagolong	Quarterly	4	<0.001	<0.001	<0.001	Yes
Churchill	Quarterly	4	<0.001	<0.001	<0.001	Yes
Coongulla/Glenmaggie	Quarterly	4	<0.001	0.001	<0.001	Yes
Cowwarr	Quarterly	4	<0.001	<0.001	<0.001	Yes
Drouin	Quarterly	4	<0.001	<0.001	<0.001	Yes
Erica	Quarterly	4	<0.001	<0.001	<0.001	Yes
Heyfield	Quarterly	4	<0.001	0.001	<0.001	Yes
Jumbuk	Quarterly	4	<0.001	<0.001	<0.001	Yes
Maffra	Quarterly	4	<0.001	<0.001	<0.001	Yes
Mirboo North	Quarterly	4	<0.001	<0.001	<0.001	Yes
Moe	Quarterly	4	<0.001	<0.001	<0.001	Yes
Morwell	Quarterly	4	<0.001	<0.001	<0.001	Yes
Neerim South	Quarterly	4	<0.001	<0.001	<0.001	Yes
Newborough	Quarterly	4	<0.001	<0.001	<0.001	Yes
Noojee	Quarterly	4	<0.001	<0.001	<0.001	Yes
Rawson	Quarterly	4	<0.001	<0.001	<0.001	Yes
Rokeby/Buln Buln	Quarterly	4	<0.001	<0.001	<0.001	Yes
Rosedale	Quarterly	4	<0.001	<0.001	<0.001	Yes
Sale/Wurruk	Quarterly	4	<0.001	<0.001	<0.001	Yes
Seaspray	Quarterly	4	<0.001	<0.001	<0.001	Yes
Stratford	Quarterly	4	<0.001	<0.001	<0.001	Yes
Thorpdale	Quarterly	4	<0.001	<0.001	<0.001	Yes
Toongabbie	Quarterly	4	<0.001	<0.001	<0.001	Yes
Trafalgar	Quarterly	4	<0.001	<0.001	<0.001	Yes
Traralgon	Quarterly	4	<0.001	<0.001	<0.001	Yes
Traralgon South/Hazelwood North	Quarterly	4	<0.001	<0.001	<0.001	Yes
Tyers/Glengarry	Quarterly	4	<0.001	<0.001	<0.001	Yes
Warragul	Monthly	16	<0.001	<0.001	<0.001	Yes
Warragul South	Quarterly	4	<0.001	<0.001	<0.001	Yes
Willow Grove	Quarterly	4	<0.001	<0.001	<0.001	Yes
Yallourn North	Quarterly	4	<0.001	<0.001	<0.001	Yes
Yarragon	Quarterly	4	<0.001	<0.001	<0.001	Yes
Yinnar	Quarterly	4	<0.001	<0.001	<0.001	Yes

*= average unable to be calculated as all results for reporting period were below detection level
#= average values calculated using the detection limit value for sample results showing less than detection limit.
^= Based on the maximum value being below the ADWG guideline health limit of 0.01 mg/L.

9.7.5 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

9.7.6 Copper

Copper is present in raw water supplies at very low concentrations. Copper can be found in higher concentrations in drinking water as a result of corrosion of copper pipes and fittings. Based on health considerations in the ADWG guideline, concentrations of copper in drinking water should not exceed 2 mg/L. The aesthetic guideline value is 1 mg/L. Our sites achieved 100% ADWG guideline value against both copper guideline values.

Table 23: Copper results for all water sampling localities in 2021-22

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Boisdale	Quarterly	4	0.005	0.009	0.002	Yes
Boolarra	Quarterly	4	0.004	0.005	0.003	Yes
Briagolong	Quarterly	4	0.022	0.071	0.003	Yes
Churchill	Quarterly	4	0.010	0.022	0.001	Yes
Coongulla/Glenmaggie	Quarterly	4	0.020	0.055	0.005	Yes
Cowwarr	Quarterly	4	0.005	0.008	0.001	Yes
Drouin	Quarterly	4	0.009	0.015	0.004	Yes
Erica	Quarterly	4	0.006	0.013	0.003	Yes
Heyfield	Quarterly	4	0.021	0.046	0.010	Yes
Jumbuk	Quarterly	4	0.009	0.020	0.005	Yes
Maffra	Quarterly	4	0.007	0.020	0.003	Yes
Mirboo North	Quarterly	4	0.010	0.013	0.006	Yes
Moe	Quarterly	4	0.002	0.004	<0.001	Yes
Morwell	Quarterly	4	0.017	0.057	0.003	Yes
Neerim South	Quarterly	4	0.013	0.013	0.012	Yes
Newborough	Quarterly	4	0.015	0.053	<0.001	Yes
Noojee	Quarterly	4	0.005	0.007	0.004	Yes
Rawson	Quarterly	4	0.009	0.017	0.006	Yes
Rokeby/Buln Buln	Quarterly	4	0.005	0.008	0.003	Yes
Rosedale	Quarterly	4	0.008	0.023	<0.001	Yes
Sale/Wurruk	Quarterly	4	0.007	0.008	0.006	Yes
Seaspray	Quarterly	4	0.029	0.031	0.023	Yes
Stratford	Quarterly	4	0.010	0.018	0.005	Yes
Thorpdale	Quarterly	4	0.005	0.013	0.001	Yes
Toongabbie	Quarterly	4	0.010	0.012	0.006	Yes
Trafalgar	Quarterly	4	0.006	0.007	0.005	Yes
Traralgon	Quarterly	4	0.019	0.052	<0.001	Yes
Traralgon South/Hazelwood North	Quarterly	4	0.003	0.007	0.001	Yes
Tyers/Glengarry	Quarterly	4	0.003	0.005	0.002	Yes
Warragul	Monthly/Qrty	16	0.002	0.015	0.001	Yes
Warragul South	Quarterly	4	0.002	0.004	0.001	Yes
Willow Grove	Quarterly	4	0.006	0.007	0.003	Yes
Yallourn North	Quarterly	4	0.002	0.002	0.001	Yes
Yarragon	Quarterly	4	0.006	0.008	0.005	Yes
Yinnar	Quarterly	4	0.005	0.009	0.002	Yes

*= average unable to be calculated as all results for reporting period were below detection level
#= average values calculated using the detection limit value for sample results showing less than detection limit.
^= Based on the maximum value being below the ADWG guideline health limit of 2 mg/L.

9.7.7 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

9.8 Aesthetics

9.8.1 pH results

In addition to the monitoring of parameters to determine compliance against the SDWA regulations, pH is routinely monitored in the reticulation system. The ADWG guidelines suggest that the drinking water be between pH 6.5 and pH 8.5. The pH results for all towns are provided below.

Table 24: pH results for all water sampling localities in 2021-22

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average (units)	Max (units)	Min (units)	Drinking Water Aesthetic Operating Range Met (ADWG) (Yes/No)^
Boisdale	Weekly	52	7.7	7.8	7.3	Yes
Boolarra	Weekly	52	7.5	7.9	7.2	Yes
Briagolong	Weekly	52	7.2	8.2	7.0	Yes
Churchill	Weekly	55	7.4	7.7	7.2	Yes
Coongulla/Glenmaggie	Weekly	52	7.5	8.2	7.2	Yes
Cowwarr	Weekly	52	7.4	7.9	7.2	Yes
Drouin	Weekly	52	7.1	7.6	6.9	Yes
Erica	Weekly	52	7.8	8.7	6.8	No
Heyfield	Weekly	52	7.2	7.5	7.0	Yes
Jumbuk	Weekly	52	7.3	7.7	7.2	Yes
Maffra	Weekly	52	7.3	7.7	7.1	Yes
Mirboo North	Weekly	52	7.3	7.6	7.1	Yes
Moe	Weekly	52	7.3	7.8	6.8	Yes
Morwell	Weekly	53	7.2	7.8	7.0	Yes
Neerim South	Weekly	52	7.7	7.9	7.2	Yes
Newborough	Weekly	52	7.3	7.8	6.8	Yes
Noojee	Weekly	52	7.9	8.1	7.2	Yes
Rawson	Weekly	52	7.3	8.3	7.1	Yes
Rokeby/Buln Buln	Weekly	52	7.1	7.3	6.8	Yes
Rosedale	Weekly	52	7.7	8.2	7.1	Yes
Sale/Wurruk	Weekly	52	7.4	7.8	7.0	Yes
Seaspray	Weekly	52	7.2	7.8	6.8	Yes
Stratford	Weekly	52	7.4	7.7	7.1	Yes
Thorpdale	Weekly	52	7.9	8.4	7.3	Yes
Toongabbie	Weekly	52	7.2	7.4	7.0	Yes
Trafalgar	Weekly	52	7.2	7.6	6.9	Yes
Traralgon	Weekly	54	7.2	7.6	7.0	Yes
Traralgon South/Hazelwood North	Weekly	54	7.4	7.8	7.1	Yes
Tyers/Glengarry	Weekly	52	7.3	8.2	6.9	Yes
Warragul	Weekly	104	7.3	8.3	6.9	Yes
Warragul South	Weekly	52	7.5	8.1	7.1	Yes
Willow Grove	Weekly	52	7.8	8.0	7.6	Yes
Yallourn North	Weekly	52	7.4	7.7	7.1	Yes
Yarragon	Weekly	52	7.3	7.5	7.2	Yes
Yinnar	Weekly	52	7.4	7.9	7.2	Yes

^= Based on the minimum and maximum values being within the ADWG guideline aesthetic operating range of 6.5 – 8.5.

9.8.2 Actions taken in relation to non-compliance

Some experienced elevated pH results (Erica) as a result of long residence times of water in the reticulation, cement-lined pipes in parts of the reticulation, and reduced flushing programs due to permanent water saving rules in place. All average pH results were within the range of 6.5 to 8.5.

We continue to monitor pH variations and modify system operation where possible to reduce variability. Automatic flushing devices have been installed in some locations to manage pH changes from excessive “water age”. These also have the benefit of improving chlorine residual in the extremities of the systems.

Reactive flushing of mains based on routine water sampling results is assessed on a case by case basis to manage pH, chlorine residuals and customer water supply pressures.

ADWG states that cement mortar lined pipes can significantly increase the pH and a value up to 9.2 may be tolerated provided monitoring indicates no deterioration in the microbiological quality. No deterioration in the microbiological quality of the water was observed.

9.8.3 Iron results

Iron can become apparent in taste in water at about 0.3 mg/L and above. High concentrations can give water a rust-brown appearance and cause staining of laundry and plumbing fittings. Based on aesthetic considerations the concentration in the ADWG guidelines of iron in drinking water should not exceed 0.3 mg/L, however no health-based guideline value has been set for iron.

Table 25: Iron results for all water sampling localities in 2021-22

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average[#] (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)
Boisdale	Monthly	12	0.01	0.01	<0.01	Yes
Boolarra	Weekly	55	0.04	0.07	0.01	Yes
Briagolong	Weekly	64	0.01	0.01	<0.01	Yes
Churchill	Monthly	16	0.03	0.14	<0.01	Yes
Coongulla/Glenmaggie	Weekly	64	0.02	0.06	<0.01	Yes
Cowwarr	Monthly	12	0.02	0.05	<0.01	Yes
Drouin	Monthly	12	0.01	0.01	<0.01	Yes
Erica	Monthly	12	0.09	0.14	<0.01	Yes
Heyfield	Weekly	64	0.01	0.03	<0.01	Yes
Jumbuk	Monthly	12	0.02	0.06	<0.01	Yes
Maffra	Weekly	64	0.01	0.01	<0.01	Yes
Mirboo North	Weekly	75	0.01	0.12	<0.01	Yes
Moe	Weekly	73	0.01	0.18	<0.01	Yes
Morwell	Weekly	168	0.02	0.19	<0.01	Yes
Neerim South	Weekly	64	0.02	0.05	<0.01	Yes
Newborough	Monthly	12	0.01	0.01	<0.01	Yes
Noojee	Monthly	18	0.02	0.04	<0.01	Yes
Rawson	Weekly	63	0.02	0.12	<0.01	Yes
Rokeby/Buln Buln	Monthly	12	0.01	0.03	<0.01	Yes
Rosedale	Monthly	12	0.02	0.03	<0.01	Yes
Sale/Wurruk	Weekly	64	0.01	0.02	<0.01	Yes
Seaspray	Weekly	64	0.04	0.12	<0.01	Yes
Stratford	Monthly	12	0.01	0.01	<0.01	Yes
Thorpdale	Weekly	64	0.03	0.20	0.01	Yes
Toongabbie	Monthly	13	0.01	0.04	<0.01	Yes
Trafalgar	Weekly	64	0.01	0.01	<0.01	Yes
Traralgon	Weekly	65	0.01	0.02	<0.01	Yes
Traralgon South/Hazelwood North	Monthly	12	0.01	0.04	<0.01	Yes
Tyers/Glengarry	Weekly	64	0.03	0.10	<0.01	Yes
Warragul	Weekly	115	0.02	0.51	<0.01	No
Warragul South	Monthly	12	0.01	0.01	<0.01	Yes
Willow Grove	Weekly	64	0.01	0.01	<0.01	Yes
Yallourn North	Monthly	12	0.01	0.01	<0.01	Yes
Yarragon	Weekly	64	0.01	0.01	<0.01	Yes
Yinnar	Monthly	12	0.02	0.04	<0.01	Yes

*= average unable to be calculated as all results for reporting period were below detection level
#= average values calculated using the detection limit value for sample results showing less than detection limit.
^= Based on the maximum value being below the ADWG guideline aesthetic limit of 0.3 mg/L.

9.8.4 Actions taken in relation to non-compliance

All localities complied with this water quality parameter with the exception of Warragul. A result above the aesthetic guideline was recorded at the water treatment plant sample site in January 2021, most likely the result of sample contamination due to maintenance activities and project works. An additional sample was collected which returned a result of <0.01 mg/L.

9.9 Analysis of results

Comparison to previous years

For the 2021-22 reporting period, all samples analysed complied with the relevant health based water quality standards, with the exception of Chlorine (Seaspray) and Manganese (Mirboo North). Refer to section 6.5 for discussion of these exceedances. The water quality standards required under the SDWR have been represented as trend data over three financial years. This information allows for a comparison of data for the major towns.

An analysis by the percentage of water sampling localities where the drinking water complied with each of the health based parameters, over three reporting periods, is shown below. The table also shows an analysis of the percentage of customers supplied with drinking water that complied with the standards.

Table 26: Compliance by water sampling locality and population

	Percentage by water sampling Locality			Percentage by Population		
Parameter	**2021-22**	**2020-21**	**2019-20**	**2021-22**	**2020-21**	**2019-20**
Aluminum	100%	100%	100%	100%	100%	100%
Chloroacetic Acid	100%	100%	100%	100%	100%	100%
Dichloroacetic Acid	100%	100%	100%	100%	100%	100%
E. coli	100%	97%	100%	100%	99.96%	100%
Trichloroacetic Acid	100%	100%	100%	100%	100%	100%
Trihalomethanes	100%	100%	100%	100%	100%	100%
Turbidity	100%	100%	100%	100%	100%	100%
Chlorine (Total)	97.1%	100%	100%	99.5%	100%	100%
Nitrite	100%	100%	100%	100%	100%	100%
Nitrate	100%	100%	100%	100%	100%	100%
Fluoride	100%	100%	100%	100%	100%	100%
Mercury	100%	100%	100%	100%	100%	100%
Chromium	100%	100%	100%	100%	100%	100%
Cadmium	100%	100%	100%	100%	100%	100%
Nickel	100%	100%	100%	100%	100%	100%
Arsenic	100%	100%	100%	100%	100%	100%
Selenium	100%	100%	100%	100%	100%	100%
Beryllium	100%	100%	100%	100%	100%	100%
Copper	100%	100%	100%	100%	100%	100%
Barium	100%	100%	100%	100%	100%	100%
Lead	100%	100%	100%	100%	100%	100%
Manganese	97.1%	100%	100%	98.9%	100%	100%
Cyanide	100%	100%	100%	100%	100%	100%
Selenium	100%	100%	100%	100%	100%	100%
Molybdenum	100%	100%	100%	100%	100%	100%
Acrylamide	100%	100%	100%	100%	100%	100%
Boron	100%	100%	100%	100%	100%	100%
Chloryl Hydrate	100%	100%	100%	100%	100%	100%
2, 4-Dichlorophenoxy acetic acid	100%	100%	100%	100%	100%	100%
Nitrosodimethylamine	100%	100%	100%	100%	100%	100%
2,4,6-Trichlorophenol	100%	100%	100%	100%	100%	100%
2,4-Dichlorophenol	100%	100%	100%	100%	100%	100%
2- Chlorophenol	100%	100%	100%	100%	100%	100%
Pentachlorophenol	100%	100%	100%	100%	100%	100%

10 Undertakings under section 30 of the SDWA

We have no undertakings relevant to the 2021-22 reporting year.

11 Exemptions under section 20 of the SDWA

We have no exemptions relevant to the 2021-22 reporting year.

12 Variation in aesthetic standards

We have no variations in aesthetic standards sought under section 19 of the SDWA.

13 Regulated water

Regulated water is water that is not intended for drinking but could reasonably be mistaken as drinking water and declared under section 6 of the Safe Drinking Water Act 2003

We do not manage any regulated water supplies.

14 Glossary of terms

Table 27: Glossary of terms

ADWG	*Australian Drinking Water Guidelines 2011* prepared by National Health and Medical Research Council that details a framework for the management of drinking water.
DH	Department of Health.
CCP	A physical point in treatment processes that can be controlled either by SCADA, or manually, and has a significant impact on water quality.
Detection limit	The lowest concentration of analytical parameter in the sample that can be detected by the process laboratory.
Drinking Water Supply systems	Towns supplied with water from a common water source (WTP, supply mains and reticulation pipe-work).
E. coli	*Escherichia coli*.
Water Sampling Locality	Under the SDWR, a specified area that is supplied with drinking water by a water supplier.
mg/L	Milligram per litre.
NHMRC	National Health and Medical Research Council.
NTU	Nephelometric Turbidity Units.
Properties	A registered customer connection to the drinking water supply.
RMP	Risk Management Plan.
SCADA system	A Supervisory Control And Data Acquisition (SCADA) system consists of human-machine interface, computerised logics, telemetry communication system, electronically actuated instruments and sensors. SCADA allows remote control and monitor of all key processes
SDWA	*Safe Drinking Water Act 2003* Act No.46/2003.
SDWR	Safe Drinking Water Regulations 2015 S.R No.88/2015.
Source Water	Raw water supply for town, prior to treatment.
THM	Trihalomethane.
WSAA	Water Services Association Australia.
WTP	A facility where raw water is directed through various treatment processes and produces treated water fit for human consumption
100mL	100 millilitres.
<	Less than.
>	Greater than.
≤	Less than or equal to.
≥	Greater than or equal to.

15 Further information

The *Safe Drinking Water Act (2003)* No.46/2003, section 23, requires us to disclose water quality monitoring information publically. We publish this Annual Drinking Water Report on the following website : www.gippswater.com.au/residential/about-us/corporate-documents/drinking-water-reports

Customers and members of the public may request further drinking water quality information by phoning 1800 050 500, or visiting our websites:

www.gippswater.com.au or,
www.gippswater.com.au/residential/what-we-do/water-quality

16 References

National Health and Medical Research Council. *Australian Drinking Water Guidelines 2011.*
Web address: www.nhmrc.gov.au

Department of Health and Human Services - Guidance: Water quality annual report section 26 of the Safe Drinking Water Act 2003 Regulations 16 and 17 of the Safe Drinking Water Regulations 2015 – June 2017

Safe Drinking Water Act (2003) No.46/2003

Safe Drinking Water Regulations (2015) S.R No.88/2015

Health (Fluoridation) Act (1973)

Code of Practice for Fluoridation of Drinking Water Supplies; *Second Edition (2018)*

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Appendix 1: Raw water monitoring

Source water	Water Sampling Locality	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
Moondarra Reservoir via Tyers River	Morwell Churchill Yinnar Jumbuk Boolarra Traralgon South/ Hazelwood North	**Physicals** • Absorbance (254nm) • Colour True (465nm) • Dissolved Oxygen • SUVA (245nm) • Turbidity • Electrical Conductivity @25^{o}C • pH **Microbiological** • *Escherichia coli* • Total Coliforms • Heterotrophic Plate Count **Metals*** • Iron Total • Manganese Total • Mercury	**Physicals** • Alkalinity Bicarbonate as $CaCO_3$ • Alkalinity Total as $CaCO_3$ • Dissolved Organic Carbon (DOC) • Total Organic Carbon (TOC) • Total Dissolved Solids (TDS) • SUVA (245nm) • Chlorophyll a **Chemical inorganic** • Ammonia as N • Bromide • Chloride • Fluoride • Nitrate as N • Nitrite as N • Organic Nitrogen as N • Phosphorous, Reactive as P • Phosphorous Total as N • Sulphate • Total Kjeldahl Nitrogen as N • Total Nitrogen as N **Biological** • Algae • Blue Green Algae (sampling frequency may vary depending on the season and results received)	**Physicals*** • Total Dissolved Solids (TDS) • Suspended Solids **Chemical inorganic** • Cyanide • Dissolved Organic Carbon (DOC) • Total Organic Carbon (TOC) • Bromide • Fluoride **Metals*** • Aluminium Total • Arsenic Total • Selenium • Cadmium Total • Copper Total • Lead Total • Mercury • Zinc Total **Radiological** • Gross Alpha Activity • Gross Beta Activity **Microbiological** • *Cryptosporidium spp* • *Giardia spp*
	Traralgon			
	Tyers/Glengarry Rosedale Cowwarr Toongabbie			
Macalister River	Maffra			
	Stratford			
	Boisdale			
Bore – Wa De Lock Aquifer	Briagolong			
Pederson Weir (Tarago River) Tarago Reservoir - (supplementary supply)	Warragul (including Nilma, Darnum, Drouin East)			
	Warragul South			
	Drouin			
	Rokeby/Buln Buln			
Macalister River	Coongulla/ Glenmaggie			
Trigger Creek	Rawson			
	Erica			

Source water	Water Sampling Locality	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
Thomson River	Heyfield		**Metals** • Aluminium Total • Arsenic Total • Calcium Total • Cadmium Total • Copper Total • Iron Total • Iron Soluble • Lead Total • Mercury • Potassium • Magnesium • Manganese Total • Manganese Soluble • Selenium • Zinc Total **Chlorophenols (Sale Bores Only)** • 2,3,4,5 Tetrechlorophenol • 2,6-Dichlorphenol • 2-Chlorophenol • 4-Chloro-3-Methylphenol • Total Phenols (Halogenated) • Pentachlorophenol • 2,4,5-Trichlorophenol **PFOS/PFOA suite** (Seaspray, Sale Bores, Briagolong Bores and reticulation)	**Pesticides, Herbicides and Chemical Organics**** • 2,4,5-T (Herbicide) • 2,4,5-Tp (Silvex) • 2,4,6-T • 2,4-D • 2,4-Db • 2,4-Dp • 2,6-D • 3-Hydroxy Carbofuran • 4-Cpa • 4 Chlorophenoxy Acetic Acid • 4,4-Ddd • 4,4-Dde • 4,4-Ddt • Abamectin • Acephate • Alachlor • Aldicarb • Aldrin • Ametryn • Aminopyralid • Amitraz • Ampa • Asulam • Atrazine • Atrazine-Desethyl • Atrazine-Desisopropyl • Azinphos-Ethyl • Azinphos-Methyl • Azoxystrobin • Bendiocarb • Benomyl • Bensulfuron Methyl • Bensulide • Bentazon • BHC (Alpha) • BHC (Beta)
Little Morwell River	Mirboo North			
Tanjil River and Narracan Creek	Moe			
	Newborough			
	Yallourn North			
	Trafalgar			
	Yarragon			
Tarago River	Neerim South			
	Noojee			
Bore (Boisdale Aquifer)	Sale/Wurruk			
Merrimans Creek	Seaspray			
Tanjil River and Narracan Creek	Thorpdale			
Tanjil River	Willow Grove			

Source water	Water Sampling Locality	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• BHC (Delta) • Bifenthrin • Boscalid • Brodifacoum • Bromacil • Bromophos-Ethyl • Bromoxynil • Butachlor • Carbaryl • Carbendazim • Carbofenothion • Carbofuran • Carboxin • Carfentrazone-Ethyl • Chlorantraniliprole • Chlordane (Cis) • Chlordane (Trans) • Chlorfenvinphos • Chlorothalonil • Chloroxuron • Chloropyrifos • Chloropyrifos - Methyl • Chlorsulfuron • Clopyralid • Coumaphos • Cyanazine • Cyfluthrin • Cypermethrin • Cyproconazole • Cyprodinil • Cypromazine • Cyromazine • Deltamethrin • Demeton-O • Demeton-S • Demeton-S-Methyl • Diazinon • Dicamba

Source water	Water Sampling Locality	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• Dichlobenil • Dichlorprop • Dichlorprop-P • Dichlorvos • Diclofop-Methyl • Dicofol • Dieldrin • Difenoconazole • Diflubenzuron • Diflufenican • Dimethoate • Dinoseb • Diphenamid • Diquat • Disulfoton • Diuron • ENDOSULFAN (Alpha) • ENDOSULFAN (Beta) • Endosulfan Sulphate • Endothal • Endrin • Endrin Aldehyde • Endrin Ketone • Epn • Eptc • Ethion • Ethoprophos • Etridiazole • Fenamiphos • Fenarimol • Fenchlorphos (Ronnel) • Fenitrothion • Fenoxycarb • Fensulfothion • Fenthion • Fenvalerate • Fipronil • Flamprop Methyl

Source water	Water Sampling Locality	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• Fluometuron • Flupropanate • Fluroxypyr • Flusilazole • Formothion • Fosetyl Aluminium • Glyphosate • Haloxyfop • Heptachlor • Heptachlor Epoxide • Hexachlorobenzene • Hexaconazole • Hexaflurate • Hexazinone • Imazapyr • Indoxacarb • Iodosulfuron Methyl • Iprodione • Irgarol • Isoproturon • Lindane • Malathion • Mcpa • Mcpb • Mecoprop • Metalaxyl • Metalaxyl-M • Metaldehyde • Methidathion • Methiocarb • Methomyl • Methoxychlor • Metolachlor • Metribuzin • Mevinphos • Molinate • Monocrotophos • Myclobutanil

Source water	Water Sampling Locality	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• Naftalofos • Napropamide • Nicarbazin • Nitralin • Norfluazon • Novaluron • Omethoate • Oryzalin • Oxamyl • Oxychlordane • Oxyfluorfen • Paclobutrazole • Paraquat • Parathion • Parathion-Methyl • Pebulate • Penconazole • Pendimethalin • Permethrin • PFAS • Phorate • Picloram • Pirimicarb • Pirimiphos-Ethyl • Pirimiphos-Methyl • Prochloraz • Profenofos • Promecarb • Prometon • Prometryn • Propachlor • Propamocarb • Propanil • Propargite • Propazine • Propiconazole • Propyzamide • Prothiofos

Source water	Water Sampling Locality	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• Pyraclostrobin • Pyrasulfatole • Pyrazophos • Pyrimethanil • Pyriproxyfen • Pyroxsulam • Quinclorac • Rimsulfuron • Siduron • Silvex • Simazine • Simetryn • Spirotetramat • Sulfotep • Sulprofos • Tebuconazole • Tebuthiuron • Temephos • Terbacil • Terbufos • Terbuthylazine • Terbutryn • Tertbutryn • Tetrachlorvinphos • Tetraconazole • Thiamethoxam • Thiobencarb • Thiodicarb • Thiometon • Toltrazuril • Trans Chlordane • Triadimefon • Triadimenol • Triazophos • Trichlorfon • Trichloronate • Triclopyr • Trifloxystrobin

Source water	Water Sampling Locality	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• Trifloxysulfuron-Sodium • Trifluralin • Trinexapac Ethyl • Vernolate

*Reduced frequency of monitoring in some catchments based on risk profile.
** Note all pesticides, herbicides and chemical organics results were within ADWG guideline values.
Not all parameters were measured at all localities or source waters.
Purpose of monitoring - risk management within catchments and raw water supply systems.
Comprehensiveness (frequency) – weekly, fortnightly, monthly, quarterly and annual monitoring or as risks identified.

Appendix 2: Safe Drinking Water Act Audit Certificate of Compliance

Risk Management Plan Audit Certificate
Safe Drinking Water Regulations 2015

Certificate Number: REC-20-222
Audit period: 31 May 2018 to 26 August 2020

To:
Mr David Toohey
Manager Water Treatment Quality and Catchment
Gippsland Water
55 Hazelwood Road
Traralgon VIC 3844

Australian Business Number (ABN): 75 830 750 413

I, Karen Pither, after conducting a risk management plan audit of the water supplied by Gippsland Water, am of the opinion that—

> Gippsland Water *has* complied with the obligations imposed by section 7(1) of the *Safe Drinking Water Act 2003* during the audit period.

26 August 2020

PO BOX 348
55 Hazelwood Road
Traralgon VIC 3844

Enquiries 1800 050 500
Faults and emergencies 1800 057 057

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ABN 75 830 750 413

Gippsland Water