Gippsland Water

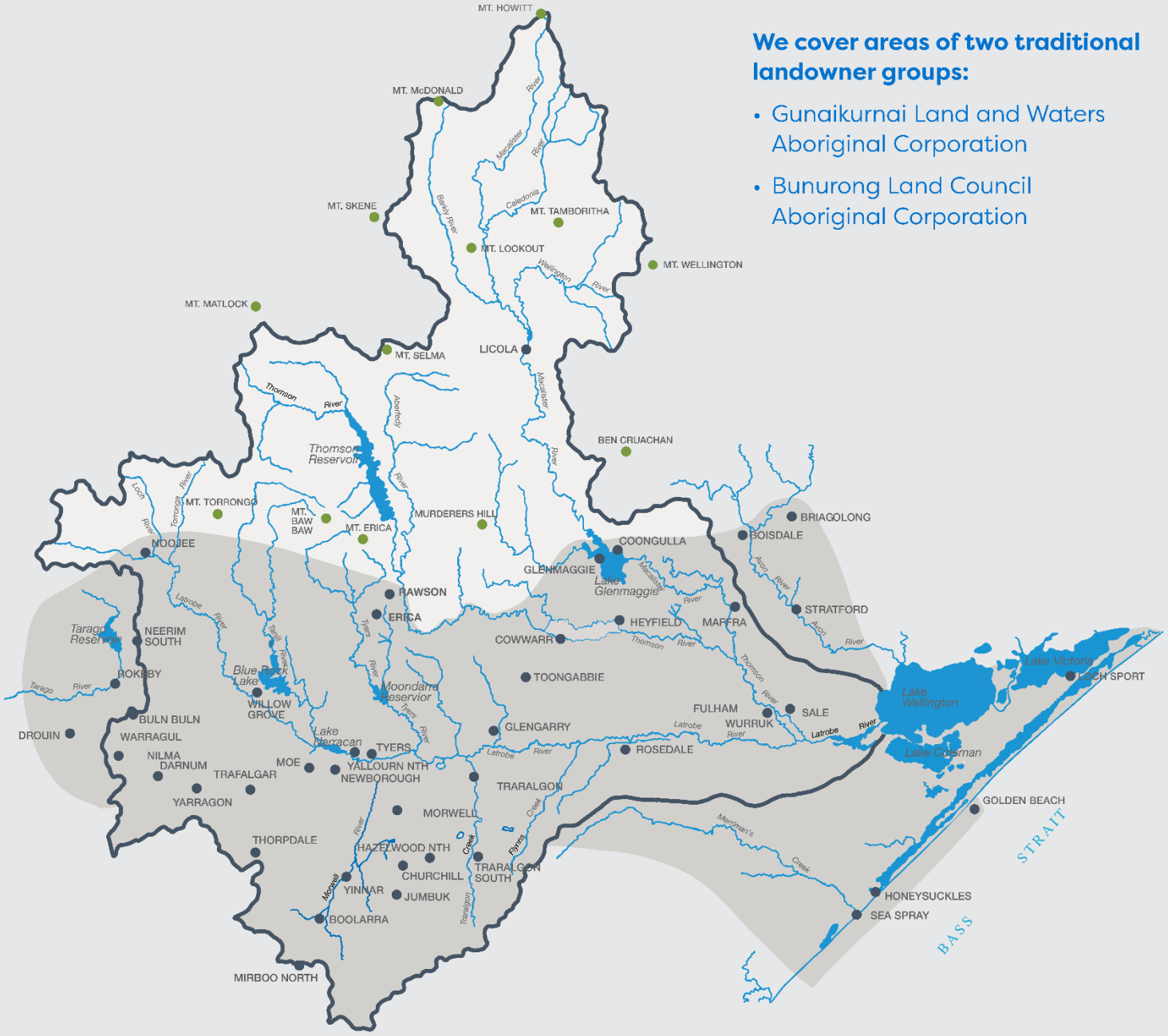
Annual report on drinking water quality 2019-2020

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



Legend

Latrobe River catchment boundary

Gippsland Water operating area

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Document Control

Description	Version number	Date
Final	1	30 October 2020
Revision to Sections 6.5, 9.1 and 9.3	2	11 December 2020

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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.

With 306 operational, engineering, financial, environmental and administrative employees, we are a major local employer for the region serving a population base of 147,000 people.

We deliver water to 70,906 customers and wastewater services to 63,600 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).

Gippsland Water is 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

Gippsland Water is 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, Gippsland Water maintains 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 2019-20, we made many improvements to ensure our customers' water quality was maintained, including:

- Finalising an Integrated Catchment Land Use Options Strategy for the Moondarra catchment to protect water quality;
- Commencing a review of Catchment Sanitary Surveys (including spatial mapping) for our catchments;
- Upgrading some of our secondary disinfection systems to maintain water quality safety as part of our rolling upgrade program;
- Upgrading process controls for improved water treatment plant operation;
- Upgrading activated carbon dosing at the Coongulla Water Treatment Plant to improve taste and odour;
- Enhancing our Water Information Management System (WIMS) enabling external data migration and transition to a digital system. This continues to improve our understanding of and access to field, water treatment plant, and process and compliance data;
- Consolidated 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;
- Delivering air scouring works to maintain water quality in our reticulation networks by cleaning pipes.

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 Gippsland Water operates 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 and Human Services (DHHS) 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 Gippsland Water 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 Human Services; 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. This 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.

Gippsland Water has adopted the 12 elements of the ADWG 2011 that comprise:

1. Commitment to Drinking Water Quality Management.
    (i) Drinking Water Quality Policy
    (ii) Regulatory and formal requirements
    (iii) Engaging stakeholder
2. Assessment of the Drinking Water Supply System.
    (i) Water supply system analysis
    (ii) Assessment of water quality data
    (iii) Hazard identification and risk assessment
3. Preventive Measures for Drinking Water Quality Management.
    (i) Preventative measures and multiple barriers
    (ii) Critical control points
4. Operational Procedures and Process Control.
    (i) Operational procedures
    (ii) Operational monitoring
    (iii) Corrective action
    (iv) Equipment capability and maintenance
    (v) Materials and chemicals
5. Verification of Drinking Water Quality.
    (i) Drinking water quality monitoring
    (ii) Consumer satisfaction

(iii) Short term evaluation of results
(iv) Corrective action

6. Management of Incidents and Emergencies.
   (i) Communications
   (ii) Incident and emergency response protocols
7. Employee Awareness and Training.
   (i) Employee awareness and involvement
   (ii) Employee training
8. Community Involvement and Awareness.
   (i) Community consultation
   (ii) Communication
9. Research and Development.
   (i) Investigative studies and research monitoring
   (ii) Validation of processes
   (iii) Design of equipment
10. Documentation and Reporting.
   (i) Management of documentation and records
   (ii) Reporting
11. Evaluation and Audit.
   (i) Long term evaluation of results
   (ii) Audit of drinking water quality management
12. Review and Continual Improvement
   (i) Review by senior executive
   (ii) Drinking water quality management improvement plan

- *Health (Fluoridation) Act 1973*

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

Under the Act, the Secretary to the Department of Health and Human Services 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).

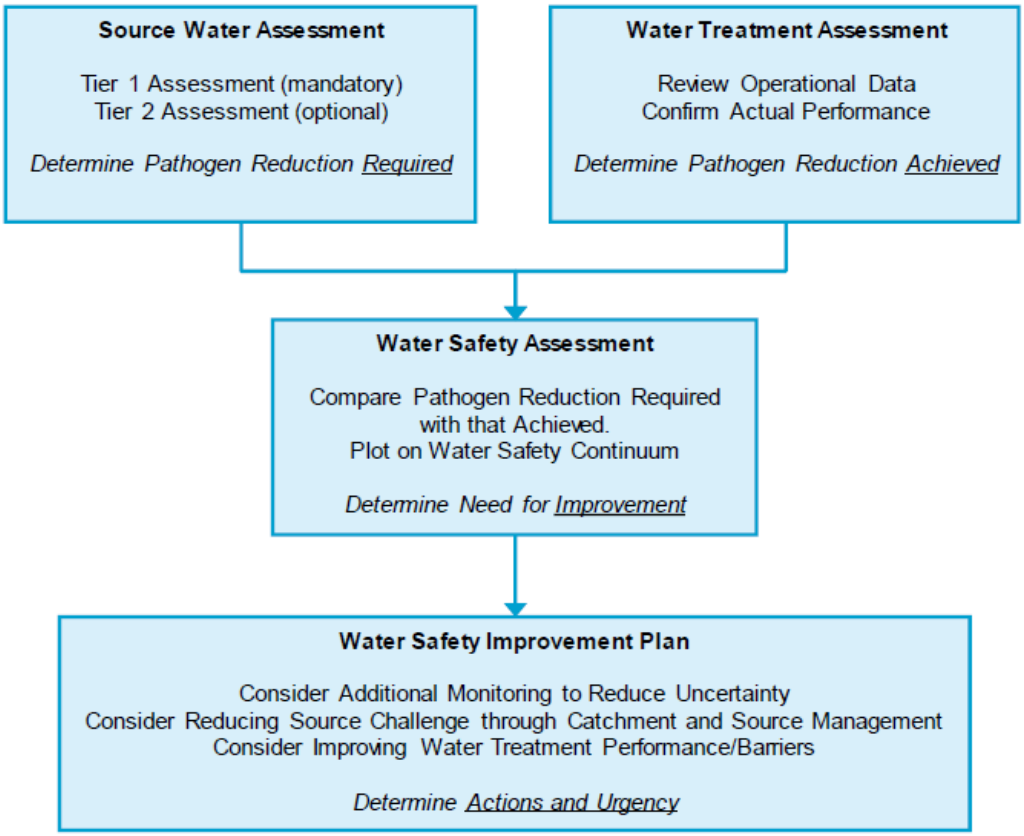
The WSAA *Drinking Water Source Assessment and Treatment Requirements Manual for the Application of Health-Based Treatment Targets Release No. 2 September 2015* was adopted by Gippsland Water for assessing the microbiological risk associated with its catchments and treatment processes in place (log removal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

Gippsland Water operated 15 water treatment systems supplying 35 water sampling localities and 42 towns in 2019-20. 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.

Gippsland Water interacts 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 process

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	2,260																					
Boisdale	80																					
Briagolong	790	Bore - Wa De Lock Aquifer	N/A	Briagolong	X			X				X				Soda Ash		Polymerised Ferric		1115 & 1160		

- 1 = The listed populations are for the water sampling localities calculated using 2006 census data to calculate the number of persons per dwelling per water sampling locality and then multiplying it with Gippsland Water's 2019-20 figures for number of connections. Figures have also been rounded to the nearest 10.
- 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 process

Water Sampling Locality	Estimated Population Serviced[1]	Source 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
Morwell	16,620	Tyers River	Moondarra	Morwell	X	X		X		X		Morwell, Churchill, Jumbuk, Hazelwood Nth, Boolarra	Traralgon South			Soda Ash	Alum			LT20	Sodium Fluoride
Boolarra	650																				
Churchill	5,630																				
Yinnar	1,200																				
Jumbuk	360																				
Traralgon South/Hazelwood North	2,010																				
Tyers/Glengarry	2,280	Tyers River	Moondarra	Tyers (Plant 1)	X			X				Tyers, Rosedale & Toongabbie			X	Soda Ash	Alum			1115 & 1160	
Rosedale	1,810																				
Toongabbie	1,020			Tyers (Plant 2)	X		X	X	X												
Cowwarr	270																				
Traralgon	30,950	Tyers River	Moondarra	Traralgon	X		X	X		X						Soda Ash	Alum			LT20	Sodium Fluoride

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Warragul[3] (including Nilma, Drouin East)	18,390	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	160																					
Drouin	13,140																					
Rokeby/Buln Buln	470																					
Coongulla/ Glenmaggie	260	Macalister River	Lake Glenmaggie	Coongulla	X			X				X		X	X	Soda Ash	Alum 90			1160, 1115		
Rawson	330	Trigger Creek	Amours Basins	Rawson	X		X	X				Rawson WTP, Parkers Corner			X	Soda Ash		PFS (Polymerised Ferric Sulphate)		1160		
Erica	340																					
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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					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
Mirboo North	1,970	Little Morwell River	N/A	Mirboo North	X	X	X	X				X			X	Soda Ash	PASS			LT20		
Moe	11,660	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	7,400																					
Yallourn North	1,620																					
Trafalgar	3,770																					
Yarragon	1,640																					
Darnum[3]	470																					
Neerim South	1,340	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	330																					
Sale/Wurruk	17,880	Bore (Boisdale Aquifer)	N/A	Sale				X		X						Lime			X		Sodium Fluoride	

- 1 = The listed populations are for the water sampling localities calculated using 2006 census data to calculate the number of persons per dwelling per water sampling locality and then multiplying it with Gippsland Water's 2019-20 figures for number of connections. Figures have also been rounded to the nearest 10.
- 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 process

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					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
Seaspray	230	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)	210	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	350	Tanjil River	Blue Rock Lake	Willow Grove	X			X			X				X	Soda Ash	Alum			1115, 1160		

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- * = PACl-23 used as required to treat high turbidity raw water.
- X_1 = Plant capability for activated carbon dosing (not currently in use).

4.2 WATER QUALITY MANAGEMENT SYSTEM

The *Safe Drinking Water Act 2003* (the Act) provides a regulatory framework for drinking water quality including a risk management framework and water quality standards. The Act requires all Victorian Water Corporations to prepare, implement and review a risk management plan. To assist with this requirement, Gippsland Water has 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.

Gippsland Water utilises 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, Gippsland Water undertakes 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 Gippsland Water's 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. Gippsland Water technicians are trained in accordance with the Department of Health and Human Services and Victorian Water Industry Association's *Framework for Water Treatment Operator Competencies (2010)* 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. Verification and monitoring at Gippsland Water 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 Gippsland Water's 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 Gippsland Water's 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 Gippsland Water's 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.

Gippsland Water operates 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 DHHS requirements, Gippsland Water fluoridates the drinking water supplies at 6 of its 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 and Human Services (DHHS) 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. Gippsland Water uses 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 Gippsland Water's 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 2019-20

During the 2019-20 monitoring period, there was one event reportable under Section 22 of the SDWA, and is detailed in Section 6.5 of this report. Two other system issues requiring response by us are outlined below.

Briagolong Water Supply:

Briagolong, for which we source water from the shallow Wa De Lock aquifer, is on the western edge of East Gippsland and endured a three year unprecedented drought from 2017-19. This led to a major change in the typically reliable behaviour of the aquifer. In our Annual Water Outlook which we released to the public on 1 December 2019, we signalled the high likelihood of the need for water restrictions during summer. In the lead up to Christmas we conducted an information session for the community at the Briagolong Hall, followed by another session in January prior to the implementation of stage 2 water restrictions on 21 January 2020. By this point the aquifer level was lower than we've seen before and we were also putting in place contingencies to continue to meet restricted demand in the event of the aquifer source failing.

21 January 2020 marked the commencement of an extraordinary wet period, with several significant rain events both at Briagolong and in the Freestone Creek catchment upstream of the town. Significant streamflows resulted, and with the creek's strong localised connection to the Wa De Lock aquifer, aquifer levels rose rapidly to pre-drought levels, making a complete recovery. Water restrictions were lifted shortly after.

Coongulla Water Supply:

Water carting to the Coongulla and Glenmaggie townships commenced in April 2019 when water levels in Lake Glenmaggie fell to a point where we could no longer extract raw water for treatment. Water carting is ongoing as of 30 June 2019, and will continue until the water level rises to a level, and is of a quality, to allow pumping and treatment to recommence.

Figure 2: Lake Glenmaggie May 2019 – showing low water level

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 2019-20

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, approximately 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).
(https://nhmrc.gov.au/about-us/publications/australian-drinking-water-guidelines#block-views-block-file-attachments-content-block-1)

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 DHHS, as required under Section 18 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 DHHS, 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 DHHS, 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.

6.2 WATER QUALITY STANDARDS

Gippsland Water must ensure that all drinking water supplied to its 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

Gippsland Water has aligned its 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.

Gippsland Water has audited and updated its All Hazards Incident Management Plan in June 2016 to comply with the requirements of Part 7a of the *Emergency Management Act (2013).*

6.4 INCIDENT 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 2019-20, the water quality events reported to the DHHS 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
There were no events reported to the DHHS pursuant to section 18.					

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 2019-20 reporting year, there was one reportable event that required notification to the Drinking Water Regulatory Unit of DHHS, under section 22 of the SDWA. This notification is 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
Moe Water Sampling Locality	15 February 2020 – 28 February 2020	Moe Water Treatment Plant	A significant storm event occurred in the Latrobe Valley and across the Moe township. As a result the Moe Water Treatment Plant (WTP) lost one phase of a three phase electrical supply to the plant causing, critical control point alarms (CCP) across the plant to malfunction. This resulted in a treatment process failure and out of specification high turbidity water entering the Moe supply system which posed a risk to health from micro-organisims.	Hernes Oak, Moe, Moe South, Newborough, Trafalgar East, Westbury, Yallourn, Yallourn Heights and Yallourn North townships	Rectification of process control systems and additional protections implemented. Increased reticulation monitoring and testing (Turbidity, Free chlorine, E.coli Cryptosporidium and Giardia) for the duration of the boil water alert. Flushing and turnover of water in the storage basins and reticulation network to remove any contaminated water. Review of risk management procedures (dirty water and boil water management plans) to incorporate learnings and operational improvements identified.	Yes A Boil Water Advisory notice was issued to the affected communities through local media (print, radio, sms, social media and incident banner on website with up to date information for customers). The Boil Water Advisory was in place from 15 Feb 2020 to 28 Feb 2020.

During the early hours of Saturday 15 February 2020 the raw water quality from the Narracan catchment deteriorated, however the plant continued to operate without any CCP process inhibitors and alarms in place. This resulted in a process failure enabling out of specification high turbidity water up to 300 NTU to break through the filters and enter the clear water storage (CWS) that supplies the Moe water supply system. This required the issuing of a precautionary boil water advisory for the community to manage the risk of consuming potentially unsafe drinking water. Gippsland Water was able to isolate a number of water sampling localities and providing an alternative supply to prevent them becoming contaminated and reducing the number of affected customers.

Following an investigation the CCP control mechanisms were rectified and the plant was returned to service on the afternoon of Saturday 15 February 2020. Following this, specific system management of the Moe water supply system was undertaken which continued throughout the partially impacted reticulation system to flush the high turbidity water out of the system in a safe manner.

Water quality monitoring at both the water treatment plant and across the water supply system commenced immediately on Saturday 15 February through to Wednesday 26 February 2020. This monitoring involved both field and laboratory analysis of water samples to inform the flushing of high turbidity water out of the affected pipe networks. Note that at all times a chlorine residual had been maintained across the system.

The following tables summarise the water quality data for *E.coli* and Turbidity across the affected localities from Saturday 15 February to Friday 28 February 2020.

Table 5: E.Coli results during incident

Water Sampling Locality	Number of Samples	Maximum detected (orgs/100mL)	Average detected (orgs/100mL)
Moe	184	0	0
Newborough	127	0	0
Yallourn North	48	0	0

Table 6: Turbidity results during incident

Water Sampling Locality	Number of Samples	Minimum turbidity (NTU)	Maximum turbidity (NTU)	Average turbidity (NTU)	Maximum 95th Percentile turbidity (NTU)
Moe	189	0.1	10	2.2	9.6
Newborough	92	0.1	3.9	1.3	3.0
Yallourn North	50	0.1	1	0.5	1.0

Other water quality parameters tested during the incident response included :

- Microbiological : *Cryptosporidium, Clostridium perfringens*,
- Chemical : Free chlorine, pH
- Physical : temperature

The incident based water quality data was used to inform Gippsland Water's corrective actions and determine that the drinking water system had returned to normal operation and was safe to drink.

The incident based water quality sampling data has not been included in the data presented in Section 9.

In consultation with DHHS, the boil water advisory was lifted on 28 February 2020 once the high turbidity water was removed from the system and water sampling results demonstrated that the drinking water supplied to the Moe supply system had returned to being safe.

Gippsland Water completed a detailed incident investigation into the incident causes and has implemented system changes to prevent a similar event in the future. DHHS was provided with an outcome of the investigation.

6.6 OTHER EVENTS NOT REPORTABLE

In 2019-20, there were no other water quality events that occurred.

7 COMPLAINTS

7.1 WATER QUALITY COMPLAINTS

Gippsland Water is committed to providing safe drinking water to our customers at all times. Gippsland Water records all complaints relating to drinking water quality. The types of water quality complaints logged by Gippsland Water 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 received by Gippsland Water relating to the quality of drinking water supplied is reported below.

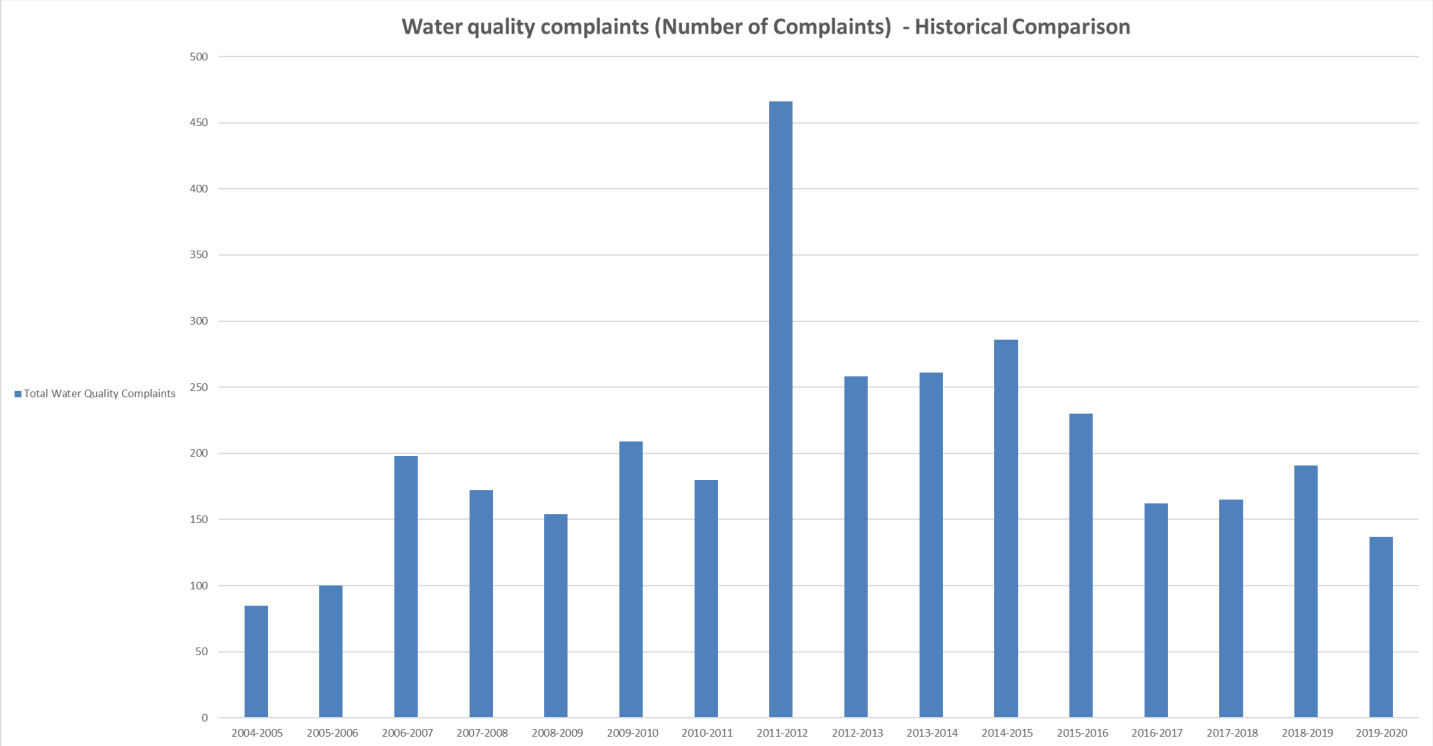
Each water quality complaint received is responded to as per Figure 6 whereby the customer complaint is logged by Gippsland Water's Customer Service or after-hours staff, and a Gippsland Water representative responds to the complaint and initiates any corrective actions as required.

Table 7: Water quality complaints per 100 customers supplied

Type of Complaint	2019-20		2018-19	2017-18	2016-17	2015-16
	No. of Complaints	Complaints per 100 customers	Complaints per 100 customers	Complaints per 100 customers	Complaints per 100 customers	Complaints per 100 customers
Discoloured water	47	0.072	0.166	0.112	0.124	0.185
Taste / Odour	64	0.098	0.075	0.084	0.083	0.112
Blue water	4	0.006	0.002	0.000	0.002	0.003
Air in water	11	0.017	0.041	0.031	0.026	0.026
Alleged illness	10	0.015	0.009	0.020	0.014	0.012
Total	136	0.209	0.293	0.247	0.248	0.339

The total number of complaints received by Gippsland Water during the 2019-20 reporting period was similar to the 2015-19 reporting period. The results are presented below by type and locality.

Figure 3: Total customer complaints for 2004-05 to 2019-20



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

Figure 4: Customer complaints per 100 customers for 2019-20

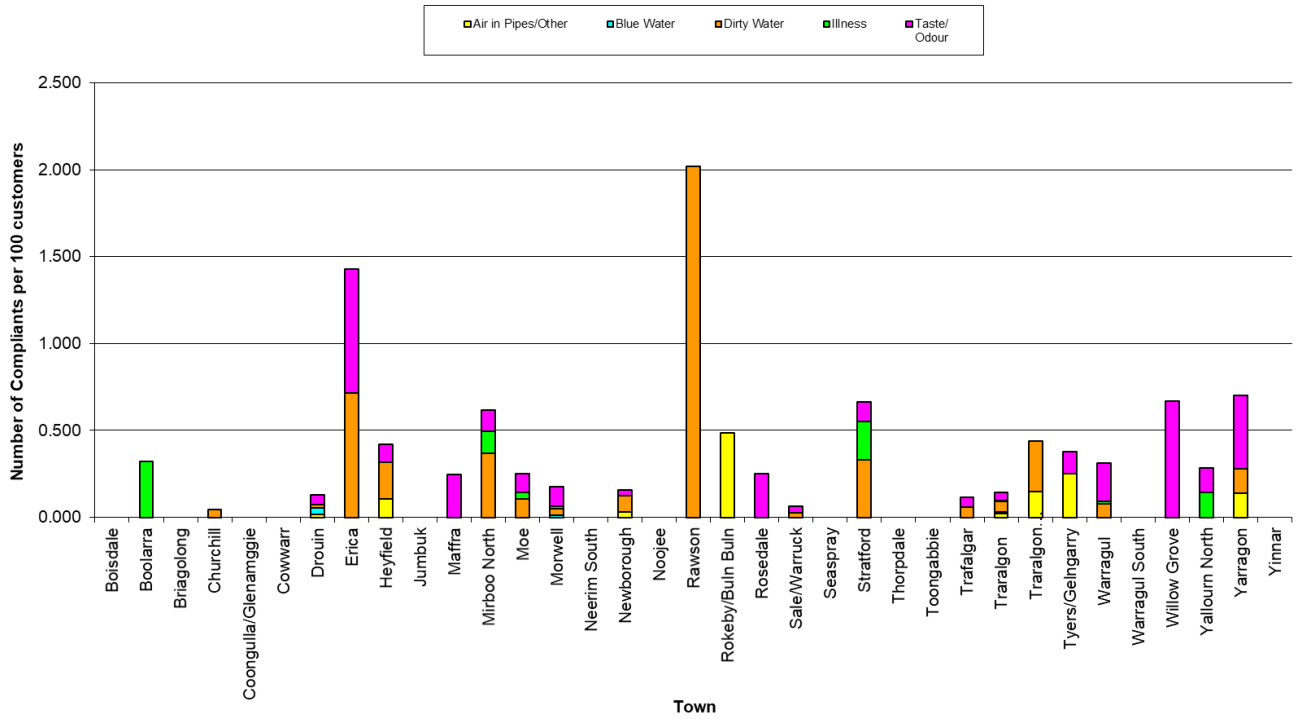


Figure 5: Customer water quality complaints by type 2019-20

The majority of customer complaints for the 2019-20 period related to discoloured/dirty water followed by taste and odour (Figure 5):

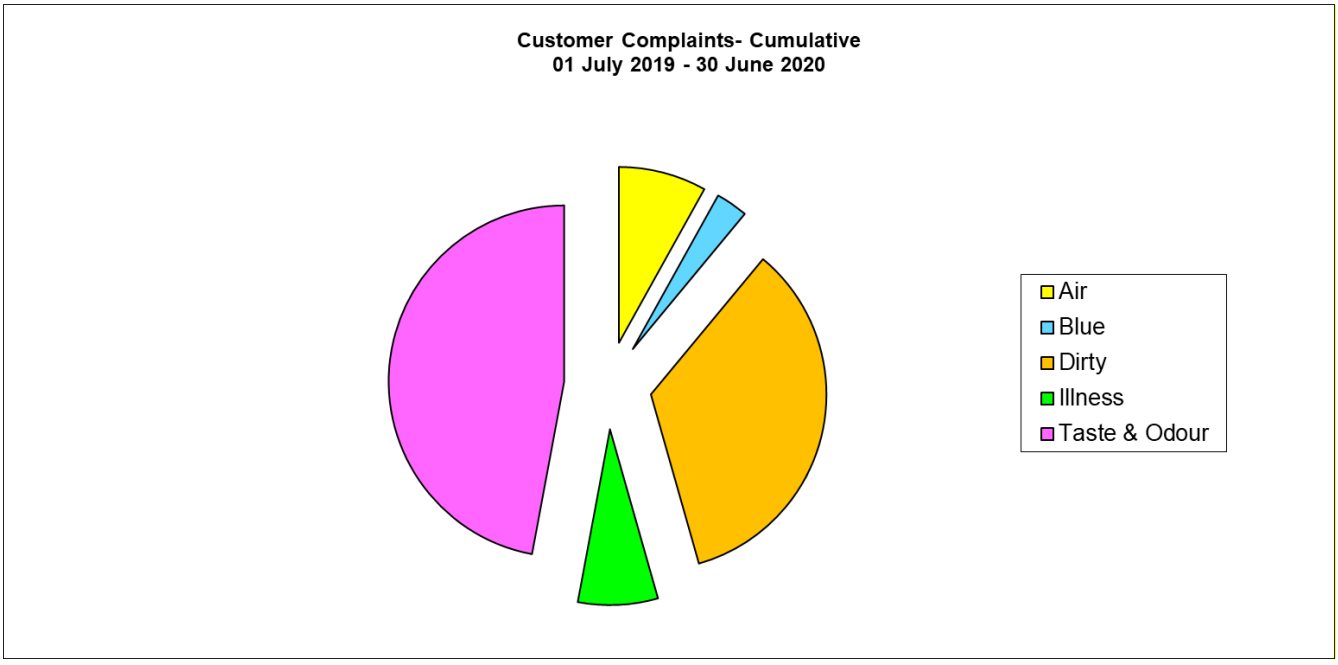


Table 8: Customer complaints summary for each water sampling locality 2019-20

Water Sampling Locality	Population (Customers = Number of Connections)	Total Complaints Received 2019-20	No. Complaints per 100 customers 2019-20
Boisdale	35	0	0.000
Boolarra	309	1	0.324
Briagolong	338	0	0.000
Churchill	2219	1	0.045
Coongulla/Glenmaggie	409	0	0.000
Cowwarr	116	0	0.000
Drouin	5632	7	0.124
Erica	141	2	1.418
Heyfield	954	4	0.419
Jumbuk	152	0	0.000
Maffra	2436	6	0.246
Mirboo North	790	5	0.633
Moe	5437	14	0.257
Morwell	8011	14	0.175
Neerim South	578	0	0.000
Newborough	2642	5	0.189
Noojee	134	0	0.000
Rawson	195	4	2.051
Rokeby / Buln Buln	194	1	0.515
Rosedale	806	2	0.248
Sale / Wurruk	7323	5	0.068
Seaspray	345	0	0.000
Stratford	933	6	0.643
Thorpdale	92	0	0.000
Toongabbie	368	0	0.000
Trafalgar	1836	2	0.109
Traralgon	13301	19	0.143
Traralgon South / Hazelwood Nth	696	3	0.431
Tyers / Glengarry	797	3	0.376
Warragul	7824	24	0.307
Warragul South	195	0	0.000
Willow Grove	161	1	0.621
Yallourn North	702	2	0.285
Yarragon	1173	5	0.426
Yinnar	505	0	0.000

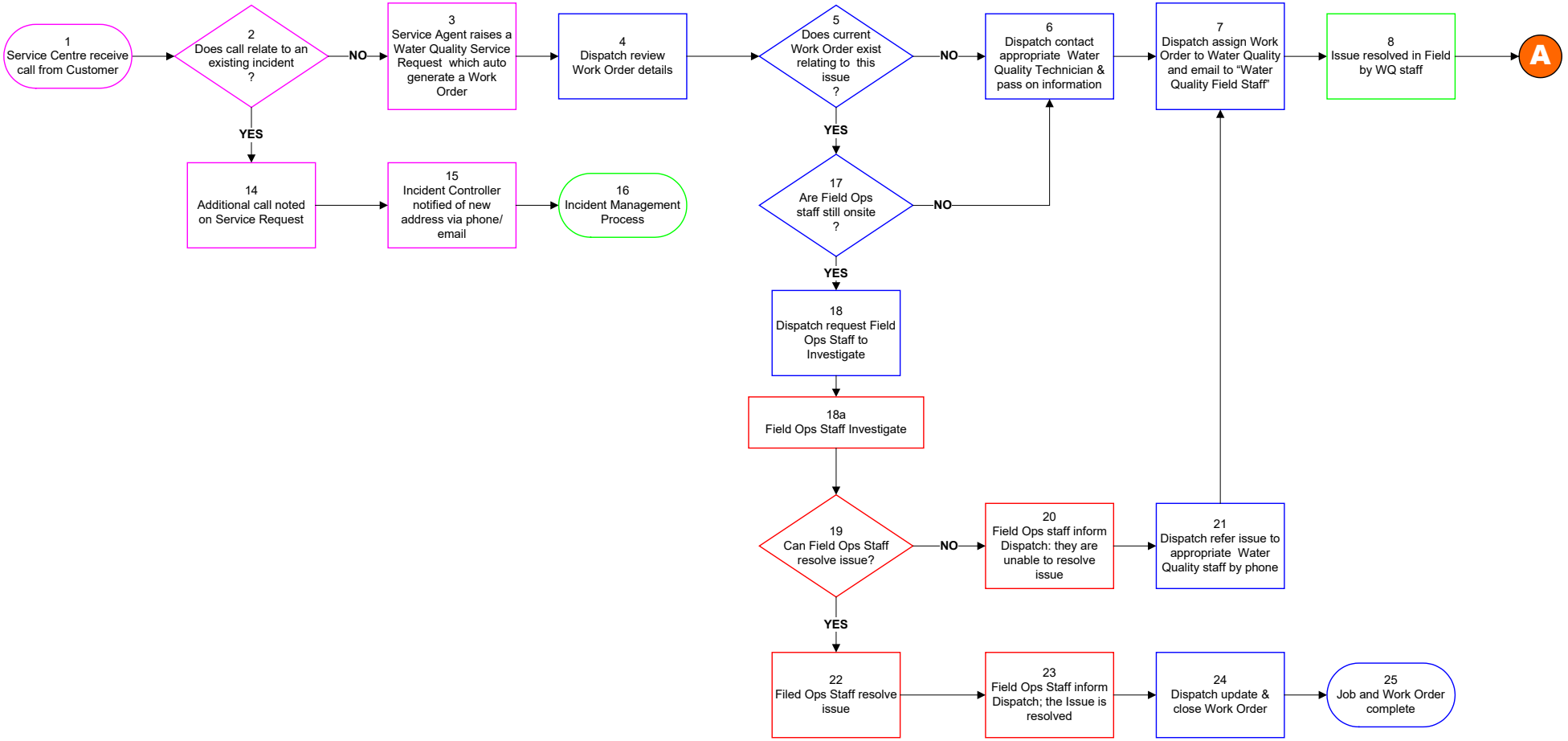
7.2 A SUMMARY OF THE CUSTOMER COMPLAINT PROCESS

Customer complaints are managed according to the following summary procedure:

- Customer complaints received by Gippsland Water's 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 a standard Gippsland Water contact card is left with the customer. This also encourages customers to keep Gippsland Water 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 6: Water quality complaints resolution procedure



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8 RISK MANAGEMENT PLAN AUDIT

Gippsland Water's 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.

Gippsland Water's Water Quality Risk Management Plan was last audited in April 2018 by DHHS approved (Exemplar Global) auditors for compliance with section 7(1) of the SDWA 2003.

Gippsland Water was found to be compliant with the requirements of the Act and Regulations. Two opportunities for improvement (OFI) were identified during the audit which were completed in 2018. These are summarised in the following table, Table 9.

A copy of the compliant risk management plan audit certificate, 30 May 2018, is attached in Appendix 2.

The DHHS (Exemplar Global) risk management plan audit initially scheduled for completion in May 2020 was extended by DHHS due to COVID-19 restrictions and will be reported in future annual reports.

Table 9: Risk Management Plan Completed Opportunity for Improvements

Opportunity for Improvement (OFI)	GW Action Identified and Status
2018 Audit outcome	
OFI 1 : Gippsland Water develop and implement a timely program to expedite the implementation of the backflow prevention program	Gippsland Water identified the following actions. • Permanent Fulltime Backflow Prevention role appointed • Steering committee Terms of Reference established • High risk installations have been identified and implementation of the action plan underway **Actions completed**
OFI 2: Gippsland Water expedite the implementation of the clean-up and vermin-proofing of the Warragul store area, rectify the potential contamination from the nearby WWTP, bag parts and create a more fit-for-purpose storage facility.	Gippsland Water have implemented vermin proofing and security of the shed to remove potential for contamination. **Action completed**

9 WATER QUALITY RESULTS FOR 2019-20

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. All Gippsland Water localities achieved compliance with this standard for the 2019-20 reporting period.

Tables 10 and 11 below details all *E.coli* notifications for the reporting period 1 July 2019 to 30 June 2020 under the *Safe Drinking Water Regulations (2015)*.

Table 10: *E. coli* detections for water sampling localities 2019-20

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

Table 11: *E. coli* results for all water sampling localities for 2019-20

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	107	0	0	0
Boolarra	Weekly	107	0	0	0
Briagolong	Weekly	106	0	0	0
Churchill	Weekly	173	0	0	0
Coongulla-Glenmaggie	Weekly	106	0	0	0
Cowwarr	Weekly	53	0	0	0
Drouin	Weekly	159	0	0	0
Erica	Weekly	53	0	0	0
Heyfield	Weekly	106	0	0	0
Jumbuk	Weekly	106	0	0	0
Maffra	Weekly	120	0	0	0
Mirboo North	Weekly	105	0	0	0
Moe#	Weekly	156	0	0	0
Morwell	Weekly	245	0	0	0
Neerim South	Weekly	108	0	0	0
Newborough#	Weekly	71	0	0	0
Noojee	Weekly	159	0	0	0
Rawson	Weekly	106	0	0	0
Rokeby-Buln Buln	Weekly	53	0	0	0
Rosedale	Weekly	106	0	0	0
Sale-Wurruk	Weekly	188	0	0	0
Seaspray	Weekly	104	0	0	0

Table 11: *E. coli* results for all localities for 2019-20 (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	53	0	0	0
Thorpdale	Weekly	104	0	0	0
Toongabbie	Weekly	106	0	0	0
Trafalgar	Weekly	121	0	0	0
Traralgon	Weekly	159	0	0	0
Traralgon South-Hazelwood North	Weekly	52	0	0	0
Tyers-Glengarry	Weekly	101	0	0	0
Warragul	Weekly	134	0	0	0
Warragul South	Weekly	108	0	0	0
Willow Grove	Weekly	106	0	0	0
Yallourn North#	Weekly	106	0	0	0
Yarragon	Weekly	177	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.

= Only scheduled sampling data is included in the values provided. Incident based sampling data is discussed in Section 6.5

Table 12: Comparison of *E. coli* results for previous years (2017 - 2020)

Water Sampling Locality	2019 - 2020		2018 - 2019		2017- 2018	
	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	0	0	0	0
Boolarra	0	0	0	0	1	0
Briagolong	0	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	1	0
Newborough	0	0	0	0	0	0
Noojee	0	0	0	0	0	0

Table 12: Comparison of E. coli results for previous years (2017 – 2020) (cont.)

Water Sampling Locality	2019 - 2020		2018 - 2019		2017- 2018	
	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 2019 – 2020 reporting period for each of the localities was similar to that of previous years.

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 Gippsland Water sites achieved 100% compliance with this standard for the 2019-20 reporting period.

Table 13: Trihalomethanes results for all localities for 2019-20

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	0.100	0.019	Yes
Boolarra	Monthly	12	0	0.086	0.046	Yes
Briagolong	Monthly	12	0	0.028	0.001	Yes
Churchill	Monthly	12	0	0.093	0.025	Yes
Coongulla-Glenmaggie	Monthly	12	0	0.019	0.007	Yes
Cowwarr	Monthly	12	0	0.086	0.046	Yes
Drouin	Monthly	12	0	0.075	0.037	Yes
Erica	Monthly	12	0	0.032	0.011	Yes
Heyfield	Monthly	12	0	0.033	0.013	Yes
Jumbuk	Monthly	12	0	0.093	0.043	Yes
Maffra	Monthly	12	0	0.031	0.013	Yes
Mirboo North	Monthly	12	0	0.053	0.025	Yes
Moe	Monthly	12	0	0.069	0.022	Yes
Morwell	Monthly	12	0	0.049	0.012	Yes
Neerim South	Monthly	12	0	0.055	0.025	Yes
Newborough	Monthly	12	0	0.070	0.027	Yes
Noojee	Monthly	12	0	0.039	0.022	Yes
Rawson	Monthly	12	0	0.022	0.010	Yes
Rokeby-Buln Buln	Monthly	12	0	0.076	0.033	Yes
Rosedale	Monthly	12	0	0.120	0.037	Yes
Sale-Wurruk	Monthly	12	0	0.023	0.012	Yes
Seaspray	Monthly	12	0	0.160	0.110	Yes
Stratford	Monthly	12	0	0.042	0.016	Yes
Thorpdale	Monthly	12	0	0.095	0.042	Yes
Toongabbie	Monthly	12	0	0.071	0.040	Yes
Trafalgar	Monthly	12	0	0.072	0.024	Yes
Traralgon	Monthly	12	0	0.060	0.014	Yes
Traralgon South-Hazelwood North	Monthly	12	0	0.052	0.029	Yes
Tyers-Glengarry	Monthly	12	0	0.059	0.028	Yes
Warragul	Monthly	12	0	0.087	0.037	Yes
Warragul South	Monthly	12	0	0.092	0.061	Yes
Willow Grove	Monthly	12	0	0.001	0.001	Yes
Yallourn North	Monthly	12	0	0.064	0.032	Yes
Yarragon	Monthly	12	0	0.093	0.034	Yes
Yinnar	Monthly	12	0	0.070	0.035	Yes

Table 14: Comparison of Trihalomethane (THM) results for previous years (2017 - 2019)

Water Sampling Locality	2019 - 2020		2018 - 2019		2017 - 2018	
	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	0.100	Yes	0.036	Yes	0.057	Yes
Boolarra	0.086	Yes	0.072	Yes	0.076	Yes
Briagolong	0.028	Yes	0.006	Yes	0.010	Yes
Churchill	0.093	Yes	0.068	Yes	0.080	Yes
Coongulla/Glenmaggie	0.019	Yes	0.020	Yes	0.018	Yes
Cowwarr	0.086	Yes	0.073	Yes	0.075	Yes
Drouin	0.075	Yes	0.096	Yes	0.080	Yes
Erica	0.032	Yes	0.040	Yes	0.036	Yes
Heyfield	0.033	Yes	0.027	Yes	0.037	Yes
Jumbuk	0.093	Yes	0.088	Yes	0.097	Yes
Maffra	0.031	Yes	0.027	Yes	0.047	Yes
Mirboo North	0.053	Yes	0.052	Yes	0.056	Yes
Moe	0.069	Yes	0.048	Yes	0.060	Yes
Morwell	0.049	Yes	0.041	Yes	0.040	Yes
Neerim South	0.055	Yes	0.070	Yes	0.060	Yes
Newborough	0.070	Yes	0.051	Yes	0.069	Yes
Noojee	0.039	Yes	0.047	Yes	0.033	Yes
Rawson	0.022	Yes	0.027	Yes	0.040	Yes
Rokeby/Buln Buln	0.076	Yes	0.094	Yes	0.087	Yes
Rosedale	0.120	Yes	0.085	Yes	0.120	Yes
Sale/Wurruk	0.023	Yes	0.029	Yes	0.032	Yes
Seaspray	0.160	Yes	0.190	Yes	0.170	Yes
Stratford	0.042	Yes	0.032	Yes	0.050	Yes
Thorpdale	0.095	Yes	0.074	Yes	0.100	Yes
Toongabbie	0.071	Yes	0.065	Yes	0.065	Yes
Trafalgar	0.072	Yes	0.041	Yes	0.064	Yes
Traralgon	0.060	Yes	0.064	Yes	0.075	Yes
Traralgon South/ Hazelwood North	0.052	Yes	0.045	Yes	0.049	Yes
Tyers/Glengarry	0.059	Yes	0.064	Yes	0.059	Yes
Warragul	0.087	Yes	0.081	Yes	0.081	Yes
Warragul South	0.092	Yes	0.100	Yes	0.095	Yes
Willow Grove	0.001	Yes	0.001	Yes	0.001	Yes
Yallourn North	0.064	Yes	0.050	Yes	0.079	Yes
Yarragon	0.093	Yes	0.094	Yes	0.075	Yes
Yinnar	0.070	Yes	0.056	Yes	0.064	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 Gippsland Water's water sampling localities achieved 100% compliance with this standard for the 2019-20 reporting period for the scheduled sampling results. Further detail on the Moe, Newborough and Yallourn North water sampling localities affected during the high turbidity event in February 2020 is available in section 6.5.

Table 15: Turbidity results for all water sampling localities in 2019-20

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	53	0.1	0.1	0	Yes
Boolarra	Weekly	53	0.5	0.3	0	Yes
Briagolong	Weekly	53	0.2	0.1	0	Yes
Churchill	Weekly	53	0.1	0.1	0	Yes
Coongulla/Glenmaggie	Weekly	53	0.2	0.2	0	Yes
Cowwarr	Weekly	53	5.0	0.2	0	Yes
Drouin	Weekly	53	0.2	0.1	0	Yes
Erica	Weekly	53	2.2	0.5	0	Yes
Heyfield	Weekly	53	0.8	0.2	0	Yes
Jumbuk	Weekly	53	0.2	0.1	0	Yes
Maffra	Weekly	53	0.2	0.1	0	Yes
Mirboo North	Weekly	52	0.5	0.2	0	Yes
Moe #	Weekly	53	1.6	0.3	0	Yes
Morwell	Weekly	52	0.2	0.1	0	Yes
Neerim South	Weekly	52	0.4	0.4	0	Yes
Newborough #	Weekly	53	31.79	0.7	0	Yes
Noojee	Weekly	53	0.7	0.3	0	Yes
Rawson	Weekly	53	0.3	0.3	0	Yes
Rokeby/Buln Buln	Weekly	53	0.1	0.1	0	Yes
Rosedale	Weekly	53	0.2	0.2	0	Yes
Sale/Wurruk	Weekly	52	0.1	0.1	0	Yes
Seaspray	Weekly	52	0.8	0.6	0	Yes
Stratford	Weekly	53	0.2	0.1	0	Yes
Thorpdale	Weekly	52	0.3	0.2	0	Yes
Toongabbie	Weekly	53	0.2	0.1	0	Yes
Trafalgar	Weekly	56	0.2	0.1	0	Yes
Traralgon	Weekly	53	0.3	0.2	0	Yes
Traralgon South/ Hazelwood North	Weekly	52	0.2	0.1	0	Yes
Tyers/Glengarry	Weekly	52	3.2	1.2	0	Yes
Warragul	Weekly	53	0.4	0.1	0	Yes
Warragul South	Weekly	54	1.0	0.3	0	Yes
Willow Grove	Weekly	53	0.2	0.1	0	Yes
Yallourn North #	Weekly	53	1.0	0.7	0	Yes
Yarragon	Weekly	106	1.0	0.2	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.

= Only scheduled sampling data is included in the values provided. Incident based sampling data is discussed in Section 6.5

Table 16: Comparison of Turbidity results for previous years (2017 - 2020)

Water Sampling Locality	2019 - 2020		2018 - 2019		2017 - 2018	
	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	0.3	0.1	0.2	0.1
Boolarra	0.5	0.3	0.4	0.3	0.4	0.3
Briagolong	0.2	0.1	0.1	0.1	0.1	0.1
Churchill	0.1	0.1	0.5	0.2	1.1	0.1
Coongulla/Glenmaggie	0.2	0.2	0.2	0.2	0.4	0.2
Cowwarr	5.0	0.2	0.2	0.1	0.2	0.1
Drouin	0.2	0.1	0.2	0.1	0.6	0.2
Erica	2.2	0.5	1.3	0.7	3.1	1.4
Heyfield	0.8	0.2	0.3	0.2	0.3	0.3
Jumbuk	0.2	0.1	0.3	0.2	0.3	0.2
Maffra	0.2	0.1	0.1	0.1	0.3	0.2
Mirboo North	0.5	0.2	0.3	0.1	0.4	0.2
Moe#	1.6	0.3	4.4	0.6	0.4	0.1
Morwell	0.2	0.1	0.1	0.1	0.3	0.2
Neerim South	0.4	0.4	0.3	0.2	0.2	0.2
Newborough#	1.7	0.7	2.8	0.4	1.4	0.8
Noojee	0.7	0.3	0.4	0.4	0.3	0.3
Rawson	0.3	0.3	2.2	0.9	0.2	0.2
Rokeby/Buln Buln	0.1	0.1	0.2	0.1	0.3	0.1
Rosedale	0.2	0.2	0.3	0.2	4.7	1.0
Sale/Wurruk	0.1	0.1	0.1	0.1	0.2	0.2
Seaspray	0.8	0.6	1.9	0.7	0.9	0.7
Stratford	0.2	0.1	0.4	0.3	1.4	0.6
Thorpdale	0.3	0.2	0.7	0.3	0.6	0.5
Toongabbie	0.2	0.1	0.1	0.1	0.3	0.1
Trafalgar	0.2	0.1	0.7	0.3	0.1	0.1
Traralgon	0.3	0.2	0.1	0.1	0.6	0.1
Traralgon South/ Hazelwood North	0.2	0.1	0.5	0.2	0.8	0.1
Tyers/Glengarry	3.2	1.2	2.6	0.2	0.5	0.2
Warragul	0.4	0.1	0.4	0.2	0.2	0.2
Warragul South	1.0	0.3	0.1	0.1	0.1	0.1
Willow Grove	0.2	0.1	0.1	0.1	0.3	0.2
Yallourn North#	1.0	0.7	0.6	0.4	0.2	0.1
Yarragon	1.0	0.2	0.7	0.2	0.1	0.1
Yinnar	0.4	0.3	0.4	0.3	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.

= Only scheduled sampling data is included in the values provided. Incident based sampling data is discussed in Section 6.5

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

The effects of the storm damage to the treatment plant control system for Moe in February 2020 have been rectified and comprehensively tested. Gippsland Water also completed a proactive review of all other treatment plants to assess if a similar failure mode could exist. Preventative changes were completed as necessary and systems tested.

9.4 FLUORIDE

Fluoride testing has been performed in the water supply systems where fluoride is added to the water (Maffra, Warragul, Sale, Traralgon, Morwell and Moe).

Gippsland Water has sampled localities on a weekly basis even though some of the localities listed in Table 17 require only 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 Gippsland Water sites achieved 100% compliance with this standard for the 2019-20 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 Department of Health and Human Services (0.9mg/L for Gippsland Water's plants) plus/minus 0.1 mg/L of fluoride. All drinking water fluoridation system operating averages achieved this target for the reporting period. Overall averages of fluoride concentration for the Moe, Newborough and Yarragon localities recorded 0.01mg/L lower than the operating range.

Table 17: Fluoride results for all fluoridated localities in 2019-20

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	53	0.9	0.91	0.64	0.81	0.81	Yes	Yes
	Maffra	Weekly	106	0.9	0.92	<0.05	0.81	0.82	Yes	Yes
	Stratford	Weekly	53	0.9	0.90	0.74	0.81	0.81	Yes	Yes
Morwell	Churchill	Monthly	53	0.9	0.92	0.74	0.83	0.83	Yes	Yes
	Boolarra	Monthly	53	0.9	0.89	0.76	0.83	0.83	Yes	Yes
	Jumbuk	Monthly	53	0.9	0.91	0.74	0.84	0.84	Yes	Yes
	Morwell	Weekly	104	0.9	1.00	0.54	0.84	0.85	Yes	Yes
	Traralgon South/ Hazelwood North	Monthly	52	0.9	0.93	0.71	0.85	0.85	Yes	Yes
	Yinnar	Monthly	52	0.9	0.90	0.74	0.83	0.83	Yes	Yes
Moe	Moe	Weekly	104	0.9	0.93	0.17	0.79	0.80	Yes	Yes
	Newborough	Monthly	52	0.9	0.90	0.28	0.79	0.80	Yes	Yes
	Trafalgar	Monthly	54	0.9	0.96	0.31	0.80	0.81	Yes	Yes
	Yallourn North	Monthly	53	0.9	0.87	0.69	0.80	0.80	Yes	Yes
	Thorpdale[5]	Monthly	52	0.9	0.88	0.62	0.80	0.80	Yes	Yes
	Yarragon	Monthly	53	0.9	0.97	0.46	0.79	0.80	Yes	Yes
Sale	Sale/Wurruk	Weekly	104	0.9	0.99	0.59	0.81	0.82	Yes	Yes
Traralgon*	Traralgon	Weekly	106	0.9	0.94	0.42	0.82	0.82	Yes	Yes

Table 17 (cont.): Fluoride results for all fluoridated localities in 2019-20

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	53	0.9	0.90	0.65	0.80	0.80	Yes	Yes
	Rokeby/Buln Buln	Weekly	53	0.9	0.92	0.65	0.81	0.81	Yes	Yes
	Warragul	Weekly	106	0.9	0.90	0.56	0.80	0.80	Yes	Yes
	Warragul South	Weekly	54	0.9	0.87	0.68	0.80	0.80	Yes	Yes

1 = The overall average value calculated based on all monitoring conducted over the 2019-20 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 18: Comparison of Fluoride results for previous years (2017- 2020)

Treatment Plant	Water Sampling Locality	2019 - 2020			2018 - 2019			2017 - 2018		
		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	0.91	0.64	0.81	0.90	0.71	0.81	0.92	0.66	0.80
	Maffra	0.92	<0.05	0.81	0.92	0.58	0.82	0.95	0.06	0.80
	Stratford	0.90	0.74	0.81	0.90	0.68	0.82	0.92	0.41	0.78
Morwell	Churchill	0.92	0.74	0.83	0.92	0.80	0.86	0.94	0.80	0.87
	Boolarra	0.89	0.76	0.83	0.90	0.80	0.85	0.90	0.81	0.86
	Jumbuk	0.91	0.74	0.84	0.90	0.81	0.86	0.90	0.80	0.87
	Morwell	1.00	0.54	0.84	1.00	0.08	0.83	1.10	0.62	0.87
	Traralgon South/ Hazelwood North	0.93	0.71	0.85	0.95	0.64	0.86	0.93	0.78	0.87
	Yinnar	0.90	0.74	0.83	0.90	0.80	0.85	0.91	0.78	0.87
Moe	Moe	0.93	0.17	0.79	0.92	0.35	0.80	0.94	0.57	0.82
	Newborough	0.90	0.28	0.79	0.88	0.58	0.79	0.90	0.63	0.82
	Trafalgar	0.96	0.31	0.80	0.90	0.50	0.80	0.92	0.61	0.82
	Yallourn North	0.87	0.69	0.80	0.89	0.55	0.79	0.90	0.68	0.82
	Thorpdale[5]	0.88	0.62	0.80	0.88	0.54	0.79	0.89	0.61	0.81
	Yarragon	0.97	0.46	0.79	0.96	0.54	0.80	0.93	0.63	0.83
Sale	Sale/Wurruk	0.99	0.59	0.81	0.90	0.65	0.84	0.93	0.76	0.85
Traralgon*	Traralgon	0.94	0.42	0.82	0.90	0.20	0.79	0.87	0.70	0.79
Warragul	Drouin	0.90	0.65	0.80	1.00	0.80	0.90	1.10	0.73	0.92
	Rokeby/Buln Buln	0.92	0.65	0.81	1.00	0.79	0.90	1.10	0.79	0.92
	Warragul	0.90	0.56	0.80	1.00	0.79	0.90	1.10	0.57	0.93
	Warragul South	0.87	0.68	0.80	0.97	0.83	0.90	1.00	0.84	0.92

1 = The average value calculated based on all monitoring conducted over the 2019-20 reporting period, including when dosing did not occur.

All fluoride dosing systems performed within requirements for the 2019-2020 reporting period. Overall system performance has improved compared to 2017-2018 & 2018-2019 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).

All systems achieved the operating range requirements of the *Code of Practice for Fluoridation of Drinking Water Supplies (second edition) 2018* for the reporting period.

9.4.3 Fluoride dosing systems performance and maintenance 2019-20

The Gippsland Water fluoride dosing systems upgrade program was completed during the 2019-20 year. Gippsland Water has now upgraded all fluoride dosing systems (from a dissolvable PVA bag process to a fully enclosed delivery system) to improve health and safety associated with the handling of a sodium fluoride powder.
Under the *Code of Practice for Fluoridation of Drinking Water Supplies (second edition) 2018*, Gippsland Water is required to notify the DHHS 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

- Traralgon

The fluoride dosing system at the Traralgon Water Treatment Plant was operational for the duration of the reporting period.

- Maffra

The fluoride dosing system at the Maffra Water Treatment Plant was operational for the duration of the reporting period.

DHHS was notified of one occasion which required the Maffra fluoride system to be turned off for a period of five days for control instrumentation replacement.

- Warragul

The fluoride dosing system at the Warragul Water Treatment Plant was operational for the duration of the reporting period.

- Sale

The fluoride dosing system at the Sale Water Treatment Plant was operational for the duration of the reporting period.

- 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.

DHHS was notified of one occasion which required the Moe fluoride system to be turned off for a period of eight days for control instrumentation replacement and system maintenance (routine cleaning and replacement of the filter media on the sodium fluoride saturation tank).

9.5 WATER TREATMENT PROJECTS AND PROGRAMS UNDERTAKEN

During the 2019-20 reporting period, Gippsland Water undertook a number of works, programs or projects to ensure that continual improvements were made to ensure the ongoing provision of safe drinking water to its customers. These included:

- ❑ 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;
- ❑ installation and upgrades of remote secondary disinfection sites;
- ❑ ongoing implementation of water reticulation mains air scouring program, flushing and pigging;
- ❑ ongoing replacement and upgrade of water quality on-line and field instrumentation;
- ❑ minor upgrade works across multiple sites that included replacement of high lift pumps (to transfer treated water from water treatment plant to system storages), upgrades of diesel generator points at all water treatment plants for alternative emergency power supply, and improvements to chemical storage bund enclosures; and
- ❑ catchment sanitary survey activities to manage microbial and water quality risks as part of our health based target risk assessment.

Figure 7: Rawson Raw Water Basin Upgrade

Raw Water Basin bypass and repair work was undertaken at the Rawson raw water storage. Bypass pipework was installed to allow for the basin to be taken off line for periodic maintenance and to ensure the raw water can be supplied to the water treatment plant during these activities.

Figure 8: Traralgon raw water main upgrade
The Traralgon raw water main was upgraded to an above ground transfer pipeline for ease of access for maintenance and to ensure security of supply to the Traralgon water treatment plant.

Figure 9: Moondarra catchment – fire track maintenance
Fire track and access maintenance works undertaken in the Moondarra catchment to ensure access tracks are maintained to standards required should access be required during hot summer fire seasons.

Figure 10: Jeeralang North water supply locality Ridge Reservoir project – Chemical dosing system
Jeeralang North remote disinfection site for water disinfection and removal of a safety risk and ongoing provision of safe drinking water. This disinfection site, boosts the chlorine residual in the drinking water produced at the Morwell WTP back up to required SDWA levels before distribution around the Jeeralang reticulation network.

Figure 11: Rosedale disinfection site project – Chemical dosing system
Rosedale remote disinfection site for water disinfection and removal of a safety risk and ongoing provision of safe drinking water.

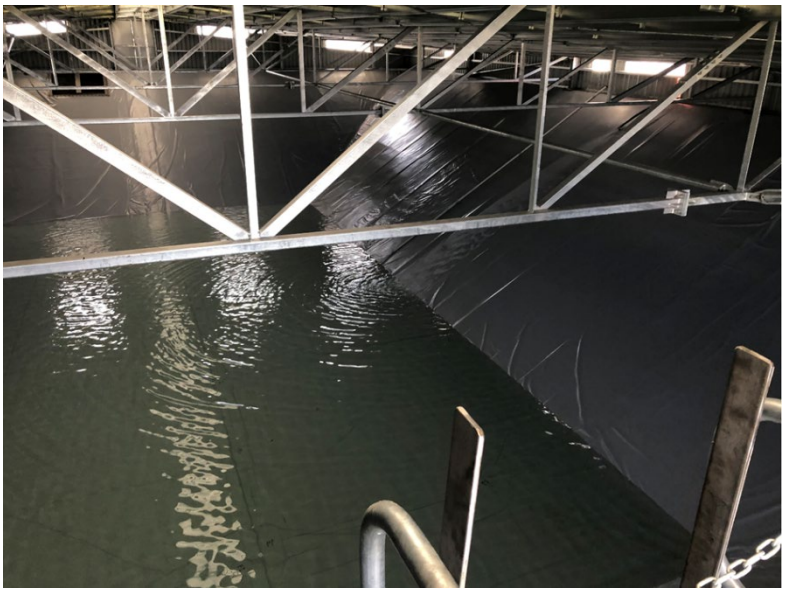

Figure 12: Neerim South Water Treatment Plant – Treated water basin cover and liner upgrade

The Neerim South water treatment plant treated water storage liner and floating were replaced as part of our treated water storage upgrade program. The floating cover was replaced with a fixed roof for ease of access when undertaking future maintenance and to ensure the treated water remains safe to drink after treatment.

Figure 13: Traralgon Water Treatment Plant – Filter Upgrade

Traralgon Water Treatment Plant upgrade of water treatment filter for improved water quality.

Figure 14: Mirboo North Water Quality
Installation of raw water source monitoring instrumentation for improved raw water quality monitoring and water treatment process control including alarms when high turbidity raw water is observed during weather events.

Figure 15: Water Quality – Monitoring Instrumentation Upgrades
Upgrade of various water quality instruments (benchtop and on line) to manage water quality parameters for compliance with SDWA and process requirements. Implementation of a water information management system (WIMS) to remove paper based systems for improved process, operational and compliance data management and reporting across all Water Quality Remote Disinfection Sites

9.6 CATCHMENT PROJECTS AND PROGRAMS UNDERTAKEN

Gippsland Water engages with many different stakeholders regarding the protection of water quality within drinking water catchments.

We work closely with West Gippsland Catchment Management Authority (WGCMA) to preserve and improve the waterways and lakes ecosystems for the community, and to supply safe drinking water to our customers.

This year, we partnered with the WGCMA, local agronomists and local farmers in a program to keep nutrients and sediment on farms by turning run-off into an asset, contributing to productivity and improving the health of local waterways.

We also partnered with Baw Baw Shire Council and Wellington Shire Council to assess septic tank conditions within our drinking water catchments. The program aims to increase understanding of how well on-site waste is being managed in and around catchments as well as areas for future improvements.

Interactions regarding catchment issues with stakeholders is detailed in Table 20

During the reporting period Gippsland water catchment projects have included:

- Land Use Options assessment for future use for the Moondarra Catchment;
- Desilting of Mirboo North raw water offtake.
- Finalisation of the 2nd round sanitary surveys on our highest risk level 4 catchments (Thomson & Macalister) will inform the final catchment declaration submission. This review is specifically focused on organic chemical monitoring and an enhanced review of our risk based monitoring program

Figure 16: Mirboo North Weir – Desilt clean-up activities
Programmed Mirboo North weir desilt activities to ensure raw water catchment remains operational year round.

Table 19: Gippsland Water water supply locality water source and activities undertaken

Water Sampling Locality	Source water	Raw Water Storage	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Maffra	Macalister River	Lake Glenmaggie	Southern Rural Water	West Gippsland Catchment Management Authority	• Water Quality Risk Assessment – chemical (External) • Sanitary Survey • Domestic Wastewater Management Plan – resource funding • Assist with funding inspections of on-site waste treatment facilities (septics) • Provision of advice to Fire Agencies regarding water quality impacts during incidents • Water Licence applications referrals – water quality assessments • Planning application assessments • Participate in Gippsland Strategic Bushfire Fuel Management Planning Project • Discussion with DELWP regarding future catchment declaration
Stratford					
Boisdale					
Briagolong	Bore - Wa De Lock Aquifer	N/A	Southern Rural Water	West Gippsland Catchment Management Authority	• Sanitary Survey • CSG baseline monitoring • On-site landholder engagement & risk assessment • Participate in Gippsland Strategic Bushfire Fuel Management Planning Project • Provision of advice to Fire Agencies regarding water quality impacts during incidents • Planning application assessments • Domestic Wastewater Management Plan – resource funding • Domestic Wastewater Management Plan – resource funding • PFAS/PFOA monitoring

Table 20 (cont.): Gippsland Water water sampling locality water source

Water Sampling Locality	Source water	Raw Water Storage	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Morwell	Tyers River	Moondarra	Gippsland Water	West Gippsland Catchment Management Authority	• Moondarra Land Use Assessment • Sanitary Survey • Moondarra Fire Prevention Plan • Road Maintenance • Carp Biomass Survey • Participate in Gippsland Strategic Bushfire Fuel Management Planning Project • Provision of advice to Fire Agencies regarding water quality impacts during incidents • Forestry Spray application program review
Boolarra					
Churchill					
Yinnar					
Jumbuk					
Traralgon South/Hazelwood North					
Tyers/Glengarry	Tyers River	Moondarra	Gippsland Water	West Gippsland Catchment Management Authority	• Moondarra Land Use Assessment • Sanitary Survey • Moondarra Fire Prevention Plan • Road Maintenance • Carp Biomass Survey • Participate in Gippsland Strategic Bushfire Fuel Management Planning Project • Provision of advice to Fire Agencies regarding water quality impacts during incidents • Forestry Spray application program review
Rosedale					
Toongabbie					
Cowwarr					
Traralgon	Tyers River	Moondarra	Gippsland Water	West Gippsland Catchment Management Authority	• Moondarra Land Use Assessment • Sanitary Survey • Moondarra Fire Prevention Plan • Road Maintenance • Carp Biomass Survey • Participate in Gippsland Strategic Bushfire Fuel Management Planning Project • Provision of advice to Fire Agencies regarding water quality impacts during incidents • Forestry Spray application program review

Table 20 (cont.): Gippsland Water water sampling locality water source

Water Sampling Locality	Source water	Raw Water Storage	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Warragul (including Nilma, Drouin East)	Pederson Weir (Tarago River) Tarago Reservoir - (supplementary supply)	Tarago Reservoir (supplementary supply)	Melbourne Water	West Gippsland Catchment Management Authority	• Sanitary Survey • Domestic Wastewater Management Plan – resource funding • Assist with funding inspections of on-site waste treatment facilities (septics) • Provision of advice to Fire Agencies regarding water quality impacts during incidents • Planning application assessments • Participate in Gippsland Strategic Bushfire Fuel Management Planning Project • Forestry Spray application program review • Liaise with Melbourne Water
Warragul South					
Drouin					
Rokeby/Buln Buln					
Coongulla/ Glenmaggie	Macalister River	Lake Glenmaggie	Southern Rural Water	West Gippsland Catchment Management Authority	• Sanitary Survey • Domestic Wastewater Management Plan – resource funding • Assist with funding inspections of on-site waste treatment facilities (septics) • Provision of advice to Fire Agencies regarding water quality impacts during incidents • Planning application assessments • Participate in Gippsland Strategic Bushfire Fuel Management Planning Project • Forestry Spray application program review
Rawson	Trigger Creek	Amours Basins	Gippsland Water	West Gippsland Catchment Management Authority	• Sanitary Survey
Erica					

Table 20 (cont.): Gippsland Water water sampling locality water source

Water Sampling Locality	Source water	Raw Water Storage	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Heyfield	Thomson River	Heyfield raw water storage	Gippsland Water	West Gippsland Catchment Management Authority	• Sanitary Survey • Domestic Wastewater Management Plan – resource funding • Provision of advice to Fire Agencies regarding water quality impacts during incidents • Planning application assessments • Participate in Gippsland Strategic Bushfire Fuel Management Planning Project • Discussion with DELWP regarding future catchment declaration • Forestry Spray application program review • Liaise with Melbourne Water • Water Quality Risk Assessment – chemical (External) • Environmental flow Planning
Mirboo North	Little Morwell River	N/A	N/A	West Gippsland Catchment Management Authority	• Weir Desilting • Sanitary Survey
Moe	Tanjil River and Narracan Creek	N/A	N/A	West Gippsland Catchment Management Authority	• Sanitary Survey • Domestic Wastewater Management Plan – resource funding • Assist with funding inspections of on-site waste treatment facilities (septics) • Provision of advice to Fire Agencies regarding water quality impacts during incidents • Planning application assessments • Participate in Gippsland Strategic Bushfire Fuel Management Planning Project • Forestry Spray application program review • Arranging FertSmart program • Environmental Flow planning • Assist in provision of advice for waste treatment works for Industrial customer in catchment • Water sampling and analysis of waste system performance for Industrial customer
Newborough					
Yallourn North					
Trafalgar					
Yarragon					
Darnum					

Table 20 (cont.): Gippsland Water water sampling locality water source

Water Sampling Locality	Source water	Raw Water Storage	Water Storage Manager	Catchment Management Authority	Catchment Activity / Interactions
Neerim South Noojee	Tarago River	Tarago Reservoir	Melbourne Water	West Gippsland Catchment Management Authority	• Sanitary Survey • Domestic Wastewater Management Plan – resource funding • Assist with funding inspections of on-site waste treatment facilities (septics) • Provision of advice to Fire Agencies regarding water quality impacts during incidents • Planning application assessments • Participate in Gippsland Strategic Bushfire Fuel Management Planning Project • Forestry Spray application program review • Liaise with Melbourne Water
Sale / Wurruk	Bore (Boisdale Aquifer)	N/A	Southern Rural Water	West Gippsland Catchment Management Authority	• Sanitary Survey • CSG baseline monitoring • PFAS/PFOA monitoring
Seaspray	Merrimans Creek	Seaspray raw water storage	Gippsland Water	West Gippsland Catchment Management Authority	• Sanitary Survey • CSG baseline monitoring • Weir desilting • Assist with funding inspections of on-site waste treatment facilities (septics) • PFAS/PFOA monitoring • Trial of algae control measures
Thorpdale (water carting from Moe water sampling locality)	Tanjil River and Narracan Creek (September 2015 - ongoing)	N/A	N/A	West Gippsland Catchment Management Authority	• Refer to Moe water sampling Locality
Willow Grove	Tanjil River	Blue Rock Lake	Southern Rural Water	West Gippsland Catchment Management Authority	• Revegetation of stormwater gully (Blue Rock Reservoir) • Integrated Water Management Projects • Sanitary Survey

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. Table 21 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 20: Other sampled parameter results for all localities in 2019-20

Parameter	Frequency of sampling	2019-20 No. of Samples	2019-20 Maximum Value Recorded for All Localities (mg/L)	2018-19 Maximum Value Recorded for All Localities (mg/L)	2017-18 Maximum Value Recorded for All Localities (mg/L)	Health Based Guideline value (mg/L)	Result
Nitrite	Weekly*/6 Monthly	459	0.031	0.018	0.5	< 3	All results below ADWG health guideline values
Mercury	Quarterly	606	0.0001	0.0001	0.0004	< 0.001	
Chromium	Quarterly	234	<0.001	<0.001	0.002	< 0.05	
Cadmium	Quarterly	234	<0.0002	<0.0002	0.0003	< 0.002	
Nitrate	Weekly*/Quarterly	325	1.5	1.4	1.2	< 50	
Nickel	Annually	129	0.004	0.004	0.01	< 0.02	
Arsenic	Annually/Quarterly	209	<0.001	<0.001	<0.001	< 0.01	
Cyanide	Annually	36	<0.005	<0.005	<0.005	< 0.08	
Selenium	Annually/Quarterly	209	<0.001	<0.001	<0.001	< 0.01	
Beryllium	Annually/6 Monthly	64	<0.001	<0.01	<0.01	< 0.06	
Chloryl Hydrate	Monthly	144	0.014	0.017	0.016	< 0.1	
2, 4-Dichlorophenoxy acetic acid	Monthly	144	<0.01	<0.01	<0.01	< 0.03	
Nitrosodimethylamin	Monthly**	24	0.000023	0.000014	0.000017	< 0.0001	
2,4,6-	Monthly***	136	<0.001	<0.001	<0.001	< 0.02	
2,4-Dichlorophenol	Monthly***	136	<0.001	<0.001	<0.001	< 0.2	
2- Chlorophenol	Monthly***	136	<0.001	<0.001	<0.001	< 0.3	
Pentachlorophenol	Monthly	144	<0.00	<0.001	<0.001	< 0.01	
Parameter	**Frequency of sampling**	**2019-20 No. of Samples**	**2019-20 Maximum Value Recorded for All Localities (mg/L)**	**2018-19 Maximum Value Recorded for All Localities (mg/L)**	**2017-18 Maximum Value Recorded for All Localities (mg/L)**	**Aesthetic Based Guideline value (mg/L)**	**Result**
Chloride	Annually/Quarterly	229	220	180	150	<250	All results below ADWG health guideline values
Zinc	Annually	129	0.046	0.018	0.17	<3	
Hardness ($CaCO_3$)	Annually/Quarterly	148	170	130	120	<200	
Total dissolved	Annually/Quarterly	134	370	380	330	<600	
Silica	Annually/Quarterly	181	15	15	15	<80	
Sulphate	Annually/Quarterly	156	130	63	45	<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 contained in Appendix 1. Additional monitoring is performed on a risk basis and as the need arises.

Blue Green Algae (BGA) monitoring is undertaken across Gippsland Water 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 Gippsland Water, the Water Storage Manager (Melbourne Water – Tarago, Southern Rural Water – Blue Rock and Lake Glenmaggie) undertakes monitoring and advised Gippsland Water of the results in accordance with their respective algae management plans.

Table 21: Routine BGA monitoring for raw water supplies in 2019-20 (samples per month collected)

Location	Jul `19	Aug `19	Sept `19	Oct `19	Nov `19	Dec `19	Jan `20	Feb `20	Mar `20	Apr `20	May `20	Jun `20
Maffra Weir	2	2	2	4	5	4	5	4	4	4	2	2
Heyfield Raw Water Storage	2	2	2	4	5	4	5	4	4	4	2	2
Thorpdale Raw Water Storage	No longer in use (drained)											
Neerim South Tarago Reservoir	1	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	2	2	4	5	4	5	4	4	4	2	2
Seaspray – Merriman Creek	1	1	1	2	2	2	2	2	2	2	1	1
Blue Rock Lake (Southern Rural Water BGA Program)	Southern Rural Water (SRW) BGA Monitoring Program											
Willow Grove WTP Inlet - Blue Rock	1	1	1	1	1	1	1	1	1	1	1	1
Lake Glenmaggie (Southern Rural Water BGA Program)	Southern Rural Water (SRW) BGA Monitoring Program											
Coongulla WTP Inlet – Lake Glenmaggie	2	2	2	4	5	4	5	4	4	4	2	2
Tarago Reservoir (Melbourne Water BGA Program)	Melbourne Water BGA Monitoring Program											
Warragul WTP Inlet – Tarago Reservoir	1	1	1	1	1	1	1	1	1	1	1	1
Moondarra Surface	1	1	1	1	1	1	1	1	1	1	1	1
Moondarra pipeline	1	1	1	1	1	1	1	1	1	1	1	1
Moondarra Upper reaches	*As required*											

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. Gippsland Water sites achieved 100% manganese ADWG guideline value.

Table 22: Manganese results for all water sampling localities in 2019-20

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	0.002	0.006	<0.001	Yes
Boolarra	Weekly	65	<0.001	<0.001	<0.001	Yes
Briagolong	Weekly	65	0.001	0.001	<0.001	Yes
Churchill	Monthly	12	<0.001	<0.001	<0.001	Yes
Coongulla/Glenmaggie	Weekly	65	0.003	0.007	<0.001	Yes
Cowwarr	Monthly	12	<0.001	<0.001	<0.001	Yes
Drouin	Monthly	12	0.001	0.002	<0.001	Yes
Erica	Monthly	12	0.009	0.012	0.005	Yes
Heyfield	Weekly	65	0.006	0.018	<0.001	Yes
Jumbuk	Monthly	12	<0.001	<0.001	<0.001	Yes
Maffra	Weekly	65	0.011	0.14	<0.001	Yes
Mirboo North	Weekly	117	0.008	0.025	<0.001	Yes
Moe	Weekly	104	0.005	0.025	<0.001	Yes
Morwell	Weekly	159	0.001	0.008	<0.001	Yes
Neerim South	Weekly	65	0.009	0.018	0.006	Yes
Newborough	Monthly	28	0.002	0.009	<0.001	Yes
Noojee	Monthly	12	0.010	0.019	0.006	Yes
Rawson	Weekly	65	0.010	0.002	0.002	Yes
Rokeby/Buln Buln	Monthly	12	0.001	0.002	<0.001	Yes
Rosedale	Monthly	12	<0.001	<0.001	<0.001	Yes
Sale/Wurruk	Weekly	117	0.001	0.009	<0.001	Yes
Seaspray	Weekly	64	0.008	0.014	0.004	Yes
Stratford	Monthly	12	0.002	0.004	<0.001	Yes
Thorpdale	Weekly	64	0.001	0.001	<0.001	Yes
Toongabbie	Monthly	12	0.001	<0.001	<0.001	Yes
Trafalgar	Weekly	65	0.001	0.004	<0.001	Yes
Traralgon	Weekly	65	0.002	0.007	<0.001	Yes
Traralgon South/Hazelwood North	Monthly	12	0.001	<0.001	<0.001	Yes
Tyers/Glengarry	Weekly	154	0.003	0.014	<0.001	Yes
Warragul	Weekly	65	0.002	0.010	<0.001	Yes
Warragul South	Monthly	12	0.001	<0.001	<0.001	Yes
Willow Grove	Weekly	65	0.004	0.010	<0.001	Yes
Yallourn North	Monthly	20	0.001	0.001	<0.001	Yes
Yarragon	Weekly	118	0.001	0.006	<0.001	Yes
Yinnar	Monthly	12	0.001	0.002	<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 complied with this water quality parameter.

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. Gippsland Water sites achieved 100% ADWG guideline value against lead guideline values for all customer tap sites.

Table 23: Lead results for all water sampling localities in 2019-20

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	8	<0.001	<0.001	<0.001	Yes
Moe	Quarterly	44	<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	20	<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	8	<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	10	<0.001	<0.001	<0.001	Yes
Warragul	Monthly	4	<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	12	<0.001	<0.001	<0.001	Yes
Yarragon	Quarterly	16	<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. Gippsland Water sites achieved 100% ADWG guideline value against both copper guideline values.

Table 24: Copper results for all water sampling localities in 2019-20

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	0.003	0.005	0.002	Yes
Boolarra	Quarterly	4	0.003	0.003	<0.001	Yes
Briagolong	Quarterly	4	0.007	0.010	0.004	Yes
Churchill	Quarterly	4	0.004	0.004	0.003	Yes
Coongulla/Glenmaggie	Quarterly	4	0.003	0.006	<0.001	Yes
Cowwarr	Quarterly	4	0.005	0.013	<0.001	Yes
Drouin	Quarterly	4	0.003	0.005	0.002	Yes
Erica	Quarterly	4	0.006	0.006	0.005	Yes
Heyfield	Quarterly	4	0.005	0.007	0.002	Yes
Jumbuk	Quarterly	4	0.008	0.014	0.003	Yes
Maffra	Quarterly	4	0.005	0.009	0.002	Yes
Mirboo North	Quarterly	8	0.006	0.014	<0.001	Yes
Moe	Quarterly	44	0.009	0.084	<0.001	Yes
Morwell	Quarterly	4	0.006	0.012	0.003	Yes
Neerim South	Quarterly	4	0.010	0.012	0.008	Yes
Newborough	Quarterly	20	0.019	0.095	<0.001	Yes
Noojee	Quarterly	4	0.009	0.015	0.006	Yes
Rawson	Quarterly	4	0.006	0.009	0.004	Yes
Rokeby/Buln Buln	Quarterly	4	0.005	0.007	0.002	Yes
Rosedale	Quarterly	4	0.003	0.008	<0.001	Yes
Sale/Wurruk	Quarterly	8	0.007	0.016	<0.001	Yes
Seaspray	Quarterly	4	0.017	0.024	0.008	Yes
Stratford	Quarterly	4	0.006	0.007	0.005	Yes
Thorpdale	Quarterly	4	0.002	0.002	0.001	Yes
Toongabbie	Quarterly	4	0.009	0.018	0.004	Yes
Trafalgar	Quarterly	4	0.004	0.006	<0.001	Yes
Traralgon	Quarterly	4	0.004	0.009	0.002	Yes
Traralgon South/Hazelwood North	Quarterly	4	0.002	0.003	0.001	Yes
Tyers/Glengarry	Quarterly	10	0.004	0.024	<0.001	Yes
Warragul	Monthly/Qrty	4	0.003	0.004	<0.001	Yes
Warragul South	Quarterly	4	0.005	0.008	0.001	Yes
Willow Grove	Quarterly	4	0.004	0.004	0.003	Yes
Yallourn North	Quarterly	12	0.009	0.023	0.002	Yes
Yarragon	Quarterly	16	0.002	0.007	<0.001	Yes
Yinnar	Quarterly	4	0.003	0.003	<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 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 25: pH results for all water sampling localities in 2019-20

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	53	7.5	7.7	7.2	Yes
Boolarra	Weekly	53	7.5	8.3	7.1	Yes
Briagolong	Weekly	53	7.0	7.2	6.9	Yes
Churchill	Weekly	53	7.3	7.8	7.0	Yes
Coongulla/Glenmaggie	Weekly	53	7.8	8.5	7.2	Yes
Cowwarr	Weekly	53	7.7	8.2	7.4	Yes
Drouin	Weekly	53	7.1	7.5	6.9	Yes
Erica	Weekly	53	7.5	8.4	6.7	Yes
Heyfield	Weekly	53	7.2	7.3	7.0	Yes
Jumbuk	Weekly	53	7.2	7.4	7.0	Yes
Maffra	Weekly	53	7.3	7.6	7.0	Yes
Mirboo North	Weekly	52	7.2	7.5	7.0	Yes
Moe	Weekly	163	7.2	8.9	6.8	No
Morwell	Weekly	52	7.1	9.1	6.8	No
Neerim South	Weekly	53	7.6	8.4	7.2	Yes
Newborough	Weekly	101	7.3	9.0	6.9	No
Noojee	Weekly	53	7.8	8.9	7.4	No
Rawson	Weekly	53	7.2	8.2	6.8	Yes
Rokeby/Buln Buln	Weekly	53	7.1	7.4	6.9	Yes
Rosedale	Weekly	53	7.8	9.2	7.2	No
Sale/Wurruk	Weekly	52	7.2	7.9	6.8	Yes
Seaspray	Weekly	52	7.2	7.8	6.8	Yes
Stratford	Weekly	53	7.4	7.7	7.1	Yes
Thorpdale	Weekly	52	8.0	8.8	7.5	No
Toongabbie	Weekly	53	7.2	7.4	7.1	Yes
Trafalgar	Weekly	56	7.3	8.6	7.1	No
Traralgon	Weekly	53	7.2	7.5	7.0	Yes
Traralgon South/Hazelwood North	Weekly	52	7.2	7.5	7.0	Yes
Tyers/Glengarry	Weekly	52	7.3	8.4	7.0	Yes
Warragul	Weekly	53	7.1	7.4	6.9	Yes
Warragul South	Weekly	54	7.3	8.2	7.1	Yes
Willow Grove	Weekly	53	7.8	8.5	7.4	Yes
Yallourn North	Weekly	79	7.2	7.7	6.8	Yes
Yarragon	Weekly	106	7.6	9.8	7.0	No
Yinnar	Weekly	52	7.3	7.8	7.1	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 systems (such as Moe, Morwell, Newborough, Noojee, Rosedale, Thorpdale, Trafalgar and Yarragon) have experienced elevated pH results, 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. Gippsland Water has continued to monitor pH variations and modify system operation where possible to reduce variability.

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. All sites achieved 100% ADWG guideline value against the aesthetic iron guideline value.

Table 26: Iron results for all water sampling localities in 2019-20

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	65	0.04	0.09	0.03	Yes
Briagolong	Weekly	65	0.01	0.04	<0.01	Yes
Churchill	Monthly	12	0.01	0.04	<0.01	Yes
Coongulla/Glenmaggie	Weekly	65	0.04	0.11	<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	0.08	0.14	0.01	Yes
Heyfield	Weekly	65	0.01	0.02	<0.01	Yes
Jumbuk	Monthly	12	0.02	0.04	<0.01	Yes
Maffra	Weekly	65	<0.01	<0.01	<0.01	Yes
Mirboo North	Weekly	117	0.01	0.01	<0.01	Yes
Moe	Weekly	104	0.02	0.14	<0.01	Yes
Morwell	Weekly	159	0.02	0.25	<0.01	Yes
Neerim South	Weekly	65	0.01	0.05	<0.01	Yes
Newborough	Monthly	28	0.02	0.07	<0.01	Yes
Noojee	Monthly	12	0.02	0.03	<0.01	Yes
Rawson	Weekly	65	0.03	0.11	<0.01	Yes
Rokeby/Buln Buln	Monthly	12	0.01	0.02	<0.01	Yes
Rosedale	Monthly	12	0.01	0.04	<0.01	Yes
Sale/Wurruk	Weekly	117	0.01	0.01	<0.01	Yes
Seaspray	Weekly	64	0.05	0.10	0.01	Yes
Stratford	Monthly	12	0.02	0.06	<0.01	Yes
Thorpdale	Weekly	64	0.02	0.06	0.01	Yes
Toongabbie	Monthly	12	<0.01	<0.01	<0.01	Yes
Trafalgar	Weekly	65	<0.01	<0.01	<0.01	Yes
Traralgon	Weekly	65	0.01	0.03	<0.01	Yes
Traralgon South/Hazelwood North	Monthly	12	0.01	0.02	<0.01	Yes
Tyers/Glengarry	Weekly	154	0.03	0.25	<0.01	Yes
Warragul	Weekly	65	0.01	0.05	<0.01	Yes
Warragul South	Monthly	12	0.01	0.02	<0.01	Yes
Willow Grove	Weekly	65	0.01	0.01	<0.01	Yes
Yallourn North	Monthly	20	0.02	0.04	<0.01	Yes
Yarragon	Weekly	118	0.01	0.02	<0.01	Yes
Yinnar	Monthly	12	0.04	0.14	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.

9.9 ANALYSIS OF RESULTS

Comparison to previous years

For the 2019-2020 reporting period, all samples analysed complied with the relevant water quality standards, with the exception of Moe. Refer to Section 6.5 for discussion of the Moe Boil Water Incident in February 2020. 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 27: Compliance by water sampling locality and population

	Percentage by water sampling Locality			Percentage by Population		
Parameter	**2017-18**	**2018-19**	**2019-20**	**2017-18**	**2018-19**	**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%	100%	100%	100%	100%	100%
Trichloroacetic Acid	100%	100%	100%	100%	100%	100%
Trihalomethanes	100%	100%	100%	100%	100%	100%
Turbidity	100%	100%	97%	100%	100%	93%
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	100%	100%	100%	100%	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%

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10 UNDERTAKINGS UNDER SECTION 30 OF THE SDWA

Gippsland Water has no undertakings relevant to the 2019-20 reporting year.

11 EXEMPTIONS UNDER SECTION 20 OF THE SDWA

Gippsland Water has no exemptions relevant to the 2019-20 reporting year.

12 VARIATION IN AESTHETIC STANDARDS

Gippsland Water has no variations in aesthetic standards sought under section 19 of the SDWA.

13 REGULATED WATER

Gippsland Water does not manage any regulated water supplies.

14 GLOSSARY OF TERMS

Table 28: 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.
DHHS	Department of Health and Human Services.
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 Gippsland Water to disclose water quality monitoring information publically. Gippsland Water publishes this Annual Drinking Water Report on the following website :

https://www.gippswater.com.au/residential/about-us/governance/corporate-documents/annual-reports

Customers and members of the public may contact Gippsland Water on 1800 050 500 or visiting www.gippswater.com.au to request further drinking 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 2018

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

<table>
<tr><th rowspan="2">Water Sampling Locality</th><th rowspan="2">Source water</th><th colspan="3">Nature of other raw water monitoring programs</th></tr>
<tr><th>Weekly/Fortnightly</th><th>Monthly</th><th>Annual/Quarterly</th></tr>
<tr><td>Morwell
Churchill
Yinnar
Jumbuk
Boolarra
Traralgon South/
Hazelwood North</td><td rowspan="3">Moondarra Reservoir via Tyers River</td><td rowspan="11"><u>Physicals</u>
• Absorbance (254nm)
• Colour True (465nm)
• Dissolved Oxygen
• SUVA (245nm)
• Turbidity
• Electrical Conductivity @25ºC
• pH

<u>Microbiological</u>
• Escherichia coli
• Total Coliforms
• Heterotrophic Plate Count

<u>Metals*</u>
• Iron Total
• Manganese Total
• Mercury</td><td rowspan="11"><u>Physicals</u>
• 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

<u>Chemical inorganic</u>
• 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

<u>Biological</u>
• Algae
• Blue Green Algae
(sampling frequency may vary depending on the season and results received)</td><td rowspan="11"><u>Physicals*</u>
• Total Dissolved Solids (TDS)
• Suspended Solids

<u>Chemical inorganic</u>
• Cyanide
• Dissolved Organic Carbon (DOC)
• Total Organic Carbon (TOC)
• Bromide
• Fluoride

<u>Metals*</u>
• Aluminium Total
• Arsenic Total
• Selenium
• Cadmium Total
• Copper Total
• Lead Total
• Mercury
• Zinc Total

<u>Radiological</u>
• Gross Alpha Activity
• Gross Beta Activity

<u>Microbiological</u>
• Cryptosporidium spp
• Giardia spp</td></tr>
<tr><td>Traralgon</td></tr>
<tr><td>Tyers/Glengarry
Rosedale
Cowwarr
Toongabbie</td></tr>
<tr><td>Maffra</td><td rowspan="3">Macalister River</td></tr>
<tr><td>Stratford</td></tr>
<tr><td>Boisdale</td></tr>
<tr><td>Briagolong</td><td>Bore – Wa De Lock Aquifer</td></tr>
<tr><td>Warragul
(including Nilma, Darnum, Drouin East)</td><td rowspan="4">Pederson Weir (Tarago River)

Tarago Reservoir - (supplementary supply)</td></tr>
<tr><td>Warragul South</td></tr>
<tr><td>Drouin</td></tr>
<tr><td>Rokeby/Buln Buln</td></tr>
<tr><td>Coongulla/
Glenmaggie</td><td>Macalister River</td></tr>
<tr><td>Rawson</td><td rowspan="2">Trigger Creek</td></tr>
<tr><td>Erica</td></tr>
</table>

Water Sampling Locality	Source water	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
Heyfield	Thomson River		**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)
Mirboo North	Little Morwell River			
Moe	Tanjil River and Narracan Creek			
Newborough				
Yallourn North				
Trafalgar				
Yarragon				
Neerim South	Tarago River			
Noojee				
Sale/Wurruk	Bore (Boisdale Aquifer)			
Seaspray	Merrimans Creek			
Thorpdale	Tanjil River and Narracan Creek			
Willow Grove	Tanjil River			

Water Sampling Locality	Source water	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• BHC (Beta) • 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

Water Sampling Locality	Source water	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• Dicamba • 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

Water Sampling Locality	Source water	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• Flamprop Methyl • 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

Water Sampling Locality	Source water	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• Myclobutanil • 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

Water Sampling Locality	Source water	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• Prothiofos • 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

Water Sampling Locality	Source water	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• Trifloxystrobin • 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

Schedule 1

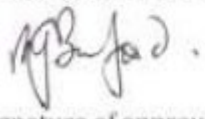
Risk management plan audit certificate

Safe Drinking Water Regulations 2015 – Regulation 10

Certificate Number:	150
Audit period:	10 June 2016 to 30 May 2018
To:	Lynley Keene, Manager, Governance Gippsland Water PO Box 348 Traralgon, Vic, 3844
Australian Business Number (ABN):	75 830 750 413

I, Robert Burford, 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.



Signature of approved auditor:

Date: 30 May 2018.

PO BOX 348
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Traralgon VIC 3844

Enquiries 1800 050 500
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Gippsland Water