




# Annual report on drinking water quality in Victoria 2022–23

A risk-based preventive management  
approach to safeguard drinking water





To receive this document in another format, phone 1300 761 874, using the National Relay Service 13 36 77 if required, or [email the Water Unit](mailto:water@health.vic.gov.au) <water@health.vic.gov.au>.

Authorised and published by the Victorian Government, 1 Treasury Place, Melbourne.

© State of Victoria, Australia, Department of Health, February 2024. (2401697)

ISSN 2205-7641 (online)

Available from the [Drinking water quality annual reports webpage](https://www.health.vic.gov.au/water/drinking-water-quality-annual-reports)

<<https://www.health.vic.gov.au/water/drinking-water-quality-annual-reports>>.



# **Annual report on drinking water quality in Victoria 2022–23**

A risk-based preventive management  
approach to safeguard drinking water

# Contents

<b>Secretary's foreword</b>	<b>8</b>
<b>Acknowledgement of Aboriginal people living in Victoria</b>	<b>10</b>
<b>Introduction</b>	<b>11</b>
<b>Overview of performance in 2022–23</b>	<b>12</b>
<b>Victoria's safe drinking water regulatory framework</b>	<b>13</b>
Minister for Health	13
Department of Health	13
Water Unit	14
Water agencies	15
Water storage managers	16
Water suppliers	17
<b>Better regulation</b>	<b>19</b>
Ministerial statement of expectations	19
Continuous improvement	20
Whole-of-government approach to drinking water regulation	21
<b>Safe drinking water administration levy</b>	<b>22</b>
Department expenditure associated with administering the Act	22
Salaries, allowances, salary-related on-costs and indirect costs	23
Operating costs	23
Communication and education costs	23
Research and development costs	24
Information technology costs	27

<b>Drinking water quality performance and regulatory requirements in 2022–23</b>	<b>28</b>
Water sampling localities	28
Drinking water quality standards	28
Section 22 reports of known or suspected contamination	36
Drinking water quality complaints	40
Risk management plan audits	41
Regulated water declarations	46
Undertakings	46
Water agency annual reports	47
<b>Emergency preparedness and incident management</b>	<b>48</b>
Boil water advisory incidents	50
Boil water advisory due to a dead mouse in Waubra treated water storage tank – Central Highlands Water	50
Boil water advisory for Heathcote due to a water main break – Coliban Water	51
Boil water advisory at Echuca due to ingress into clear water storage – Coliban Water	52
Boil water advisory as a result of a depressurisation event in the Merino locality – Wannon Water	53
Boil water advisory at Cohuna from compromised water treatment process – Coliban Water	54
Boil water advisory at Harrietville due to loss of water pressure – North East Water	55
Boil water advisory at Gunbower resulting from <i>E. coli</i> detections – Coliban Water	56
Boil water advisory at Kyneton and Malmsbury due to a mains break – Coliban Water	57
Do not drink advisory incidents	58
Taste and odour complaints resulting in a do not drink advisory at Templestowe – Yarra Valley Water	58
Water quality incident resulting in a do not drink advisory in the Mirimbah Locality – Alpine Resorts Victoria: Mt Buller and Mt Stirling Alpine Resort	59

Do not use advisory incident	61
Do not use advisory from chemical contamination in the Moonee Ponds locality – Greater Western Water	61
Other incidents	62
Water quality incident within Camperdown clear water storage – Wannon Water	62
Dead lizard in Chiltern clear water storage – North East Water	63
<b>Water fluoridation for healthy teeth</b>	<b>64</b>
Victorian action plan to prevent oral disease	65
Health (Fluoridation) Act	65
Key achievements and activities	66
Water fluoridation plant performance	67
<b>On the horizon</b>	<b>68</b>
Climate change	68
Department of Health strategic plan 2023–27	69
Safe Drinking Water Regulations 2015 review	69
Revisions to the Australian Drinking Water Guidelines	70
<b>Appendices</b>	<b>71</b>
Appendix 1: Water agency contact details	71
Appendix 2: Section 18 notifications for drinking water quality standards, 2022–23	72
Appendix 3: Section 22 reports, 2022–23	73
Appendix 4: Drinking water quality complaints reported by water suppliers	78
Appendix 5: Water agency risk management plan audit outcomes – noncompliance with section 7(1) of the Act	79
Appendix 6: Regulated water supplies at 30 June 2023	84
<b>Glossary</b>	<b>85</b>

## List of tables and figures

### Tables

Table 1: Department expenditure to administer the Safe Drinking Water Act, 2020–21 to 2022–23	22
Table 2: Safe Drinking Water Regulations Schedule 2 drinking water quality standards	28
Table 3: Water samples not meeting Schedule 2 drinking water quality standards, 2020–21 to 2022–23	30
Table 4: Water samples not meeting other drinking water quality standards, 2020–21 to 2022–23	34
Table 5: Number of reports made under section 22 of the Act, 2020–21 to 2022–23	37
Table 6: Water agencies 2023 risk management plan audit outcomes	44

### Figures

Figure 1: Water storage managers	16
Figure 2: Water suppliers	18
Figure 3: Victoria’s drinking water regulatory system	21
Figure 4: Percentage of water sampling localities compliant with Schedule 2 drinking water quality standards, 2020–21 to 2022–23	30
Figure 5: Percentage of water sampling localities continuously compliant with Schedule 2 drinking water quality standards, 2013–14 to 2022–23	33
Figure 6: Categories of reports made under section 22 of the Act, 2020–21 to 2022–23	37
Figure 7: Auditable element category relating to each non-compliance in the 2023 risk management plan audits	42
Figure 8: Opportunity for improvement categories relating to the 2023 risk management plan audits	43
Figure 9: Trend of section 22 reports with primary cause related to asset performance, 2019–20 to 2022–23	48
Figure 10: Trend of section 22 reports and drinking water advisories, 2014–15 to 2021–23	49

## Secretary's foreword

Our vision is that Victorians are the healthiest people in the world. The provision of affordable, safe, clean drinking water is a fundamental necessity for that vision to be realised. High quality water is essential for the health and wellbeing of Victorian communities and our vision for a better future.

In 2022 Victoria faced record-breaking floods, as extreme weather events continue to impact our communities with ever increasing frequency. As well as destroying homes, hospitals and businesses, these devastating floods directly affected the drinking water supply to some communities. The flooding compromised source water quality, diminished the effectiveness of water treatment, and introduced harmful contaminants.

During the floods we supported water agencies to navigate multiple risks to drinking water quality. Water agency staff, many of whom themselves lived in flood-affected communities and were directly impacted, worked tirelessly with the department to maintain safe drinking water supplies during critical stages. We are ever grateful for their sacrifices, efforts, commitment, and resilience.

Climate change is an undeniable reality. Other extreme weather events like bushfires, heatwaves and storms can have far-reaching consequences for the quality of our drinking water. So we must adapt. The department is leading Victoria's preparedness and response to the public health risks posed by these events, working hard to embed climate resilience in everything we do.

During 2022–23 the department continued to support Victoria's water agencies through drinking water quality incidents. In 2022–23 there were 68 reports of known or suspected water contamination received this past year compared with 43 reports in 2021–22 and 63 reports in 2020–21. Eleven incidents in 2022–23 resulted in drinking water advisories issued to mitigate public health risk.

There were 19 notifications of water supplied that did not meet drinking water quality standards. The department is committed to working with water agencies to understand and address the underlying causes of these noncomplying events. All water sampling localities met the turbidity water quality standard for the sixth consecutive year.



In 2022 we began work on improving the safe drinking water risk management plan audit process. Twenty-three water agency risk management plans were audited in 2023. Nine agencies were found not to have complied with their obligations under the *Safe Drinking Water Act 2003*, compared to four in the previous year. Auditors also identified 171 opportunities for improvement across the sector, a significant number of which related to drinking water quality risk identification, assessment and management. This work aims to support agencies in their continued improvement in providing safe drinking water.

I would like to thank everyone involved in providing Victorians with safe, high quality drinking water – for putting the health of Victorians first and supporting us to pursue our vision.

A handwritten signature in blue ink, appearing to read 'Euan M Wallace', with a long horizontal flourish extending to the right.

**Professor Euan M Wallace AM**  
Secretary  
Department of Health

## Acknowledgement of Aboriginal people living in Victoria

The department acknowledges the strength of Aboriginal people across Country and the power and resilience that is shared as members of the world's oldest living culture.

We acknowledge Aboriginal people as Australia's First People and recognise the richness and diversity of all Traditional Owners across Victoria.

We recognise that Aboriginal people in Victoria practise their lore, customs and languages, and nurture Country through their deep spiritual and cultural connections and practices to land and water.

We are committed to a future based on equality, truth and justice. We acknowledge that the entrenched systemic injustices experienced by Aboriginal people endure and that Victoria's ongoing treaty and truth-telling processes provide an opportunity to right these wrongs and ensure Aboriginal people have the freedom and power to make the decisions that affect their communities.

We pay our deepest respect and gratitude to ancestors, Elders and leaders – past and present. They have paved the way, with strength and fortitude, for our future generations.

# Introduction

The *Safe Drinking Water Act 2003* (the Act) and *Safe Drinking Water Regulations 2015* (the Regulations) provide Victorian water agencies and the Department of Health (the department) with a framework to ensure the supply of safe drinking water that supports the health and wellbeing of Victorian communities.

A primary aim of this framework is to give Victorians objective information about their drinking water quality. This annual report provides a statewide perspective of drinking water quality and details the department's regulatory activities during the 2022–23 financial year.

The annual report recognises the ongoing efforts made by water agencies in supplying safe, high-quality drinking water to Victorians and the department's regulatory role in protecting public health.

The annual report is prepared in accordance with s 32 of the Act, that requires the Secretary to provide the annual report to Minister for Health by 28 February each year.

Victoria's 20 water agencies<sup>1</sup> are required, under s 26 of the Act, to submit an annual report to the Secretary on issues relating to the quality of drinking water and regulated water by 31 October each year. Water agencies' annual reports help inform the statewide perspective of drinking water quality.

In-depth information on the performance of each water agency can be found in their annual reports, that are available on their websites (refer to Appendix 1 for water agency contact details). A summary of water agency performance is included in this annual report's 'Drinking water quality performance and regulatory requirements in 2022–23' section.

An overview of performance for Victoria's drinking water quality in 2022–23 is on page 12.

<sup>1</sup> There were 23 water agencies until 1 October 2022, when the 4 alpine resort management boards merged to form Alpine Resorts Victoria. Following this merger, there are 20 water agencies comprising 17 water suppliers and 4 water storage managers, one being both a water supplier and water storage manager.

## Overview of performance in 2022–23



**476**  
water sampling  
localities



**Customer complaints**  
**8,334** drinking  
water quality complaints  
reported by water suppliers.

### Noncomplying water

**19** notifications were made under s 18 of the Act regarding water that **did not meet a drinking water quality standard** under r 12 of the Regulations.



### Known or suspected contamination



**68** reports of known or suspected contamination were made under s 22 of the Act.

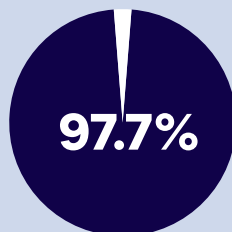


**11** reports resulted in **drinking water advisories** comprising of 8 boil water advisories, 2 do not use and 1 do not drink.

**31** reports due to ***E. coli* detections**. Following investigations by the water agencies, 20 of these reports were found to be false-positive samples.



### Drinking water quality standards

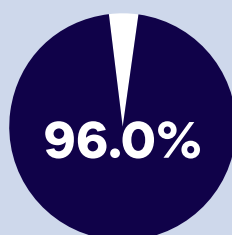


of water sampling localities continuously **met all three Schedule 2 water quality standards** in the Regulations and:

**98.4%** met the *E. coli* standard

**98.9%** met the total trihalomethane standard

**100%** met the turbidity water quality standard



of water sampling localities continuously **met all water quality standards** in the Regulations.



**Audits**  
**23** risk management  
plan audits conducted.

### Audit outcomes



**9** water agencies were found to be **noncompliant**.

**171** opportunities for improvement identified across the sector.

# Victoria's safe drinking water regulatory framework

Victoria's drinking water is managed under a comprehensive regulatory framework that began on 1 July 2004. This framework aims to ensure a consistent and reliable supply of safe, good-quality drinking water for Victorians. The framework consists of the:

- *Safe Drinking Water Act 2003*
- Safe Drinking Water Regulations 2015.

The safe drinking water legislation requires water agencies to:

- adopt a proactive catchment-to-tap risk management approach
- meet drinking water quality standards
- disclose information to the department and the public.

The framework is consistent with the risk management approach in the *Australian drinking water guidelines 2011* (ADWG; version 3.8 at September 2022) and supports the *Health (Fluoridation) Act 1973*.

## Minister for Health

The Act provides several functions and powers to the Minister for Health, including the authority for:

- declaring non-drinking water to be regulated water
- approving water supplier variations to drinking water aesthetic standards
- exempting water suppliers from a drinking water quality standard
- imposing conditions relating to drinking water variations or exemptions
- determining a period for which an administration levy is payable by water agencies, apportioning the amount between the water agencies and ensuring payment into the Consolidated Fund
- ensuring an annual report on drinking water quality is provided to each House of the Parliament no later than the sixth sitting day after receiving the report.

## Department of Health

The Secretary of the department is the authority empowered to administer and enforce the Act. The functions of the Secretary under the Act include:

- protecting public health in relation to the supply of drinking water
- monitoring and enforcing compliance with the Act and the Regulations
- reporting on the performance of water agencies in relation to the requirements under the Act
- investigating and reporting on any aspect of drinking water quality in Victoria
- making recommendations to the Minister for Health on any matter relating to drinking water or regulated water
- promoting industry and public awareness and understanding of drinking water quality issues.

The Secretary also has the following specific authority under the Act:

- do all things necessary to carry out their functions, including requiring a water agency to give specified information
- accept an undertaking by a water agency relating to a contravention of the Act
- issue an enforcement notice to a water agency if it contravenes specific sections of the Act or breaches an undertaking
- establish and maintain a register of variations, exemptions and undertakings
- direct a water agency to provide specified information and take specified corrective action, if there is a risk to public health
- appoint authorised officers and permit them to assess and address immediate risks to public health relating to drinking water
- require water agencies to have their risk management plans audited and approve the auditor.

## Water Unit

The department's Water Unit plays an important role in administering Victoria's safe drinking water regulatory framework on behalf of the Secretary. The Water Unit undertakes a wide range of regulatory activities including:

- reviewing and assessing the health significance of s 18 notifications and s 22 reports made by water agencies under the Act and ensuring water agencies implement appropriate corrective actions and mitigation measures to minimise reoccurrences
- discussing current and future regulatory issues with water agencies and following up on compliance actions
- conducting on-site visits and inspections of water treatment plants
- reviewing water agencies' drinking water quality annual reports
- reviewing and processing proposals by water agencies to vary water sampling localities and declarations concerning regulated water
- supporting water agencies to comply with the Act and the Regulations by providing guidance and advice on the safe drinking water regulatory framework and drinking water quality issues
- contributing to the national drinking water guidelines and policy development
- promoting awareness of drinking water-related public health issues across government, industry, and the community
- reviewing technical appraisals and audit reports for water fluoridation schemes and overseeing the operational efficacy of fluoridation plants to ensure reliability in terms of safety and desired oral health benefits
- contributing to research on emerging drinking water quality issues
- responding to drinking water contamination incidents and emergencies.

## Water agencies

The Act requires water agencies to provide safe, good-quality drinking water. In 2022–23 the department regulated 20 water agencies,<sup>2</sup> with the Act distinguishing between 2 types of water agencies: water storage manager and water supplier. The Act applies to all water agencies involved with the storage, treatment and distribution of drinking water and regulated water. This includes state-owned water corporations and other statutory authorities that supply drinking water to the public, including Parks Victoria and Alpine Resorts Victoria. A list of water agencies can be found in Appendix 1.

Water agencies, depending on whether they are a water storage manager or a water supplier, have a range of obligations under the Act, including:

- preparing, implementing and continuously reviewing a risk management plan in relation to drinking water, that is subject to audits
- ensuring the drinking water they supply meets drinking water quality standards specified by the Regulations
- notifying the Secretary of drinking water that does not comply with a water quality standard
- reporting any known or suspected contamination of drinking water to the Secretary
- providing an annual report related to the quality of drinking water and regulated water to the Secretary no later than 31 October each year.

<sup>2</sup> As of 1 October 2022 there are 20 water agencies following the merger of Southern Alpine Resort Management Board, Mt Hotham Alpine Resort Management Board, Mt Buller & Mt Stirling Alpine Resort Management Board and Falls Creek Alpine Resort Management Board to form Alpine Resorts Victoria.

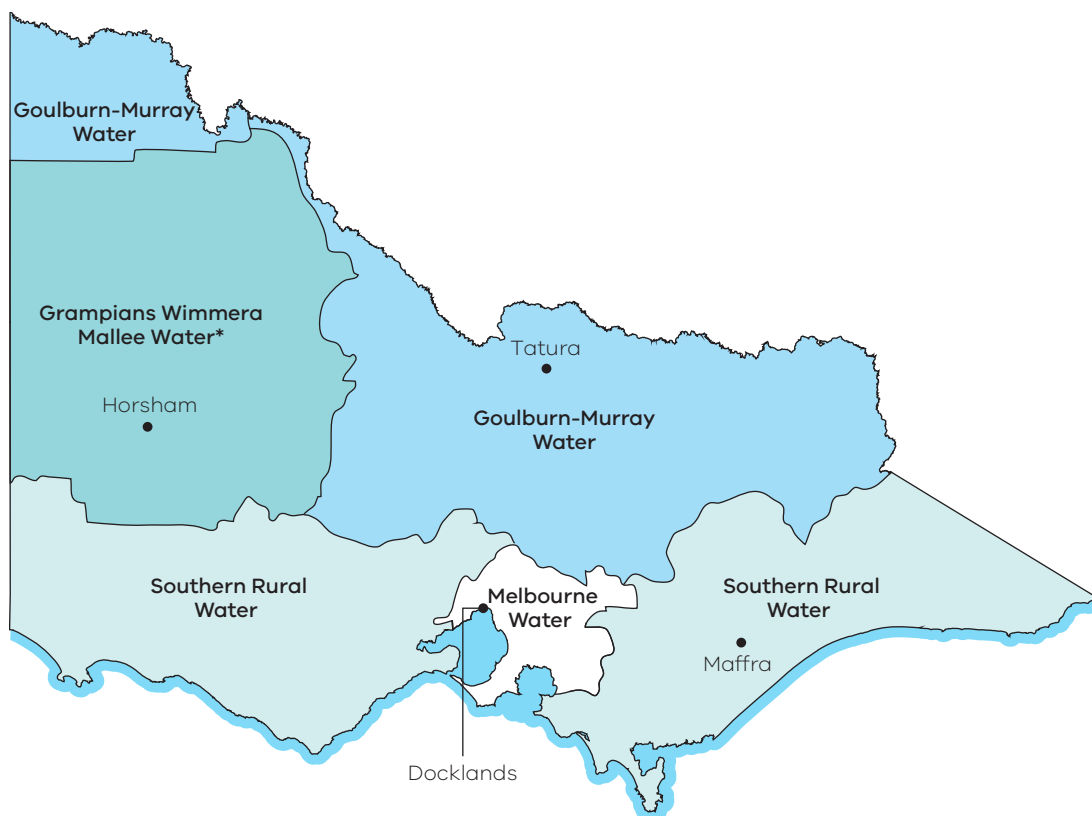
## Water storage managers

Water storage managers (Figure 1) store water and supply it to water suppliers.

There are 4 water storage managers: Melbourne Water supplies untreated and treated drinking water to water suppliers, while Goulburn-Murray Water, Southern Rural Water and Grampians Wimmera Mallee Water supply untreated water to water suppliers.

Grampians Wimmera Mallee Water operates as both a water storage manager and a water supplier.

**Figure 1: Water storage managers**



- Water storage manager head office location

\* Grampians Wimmera Mallee Water is both a water supplier and water storage manager



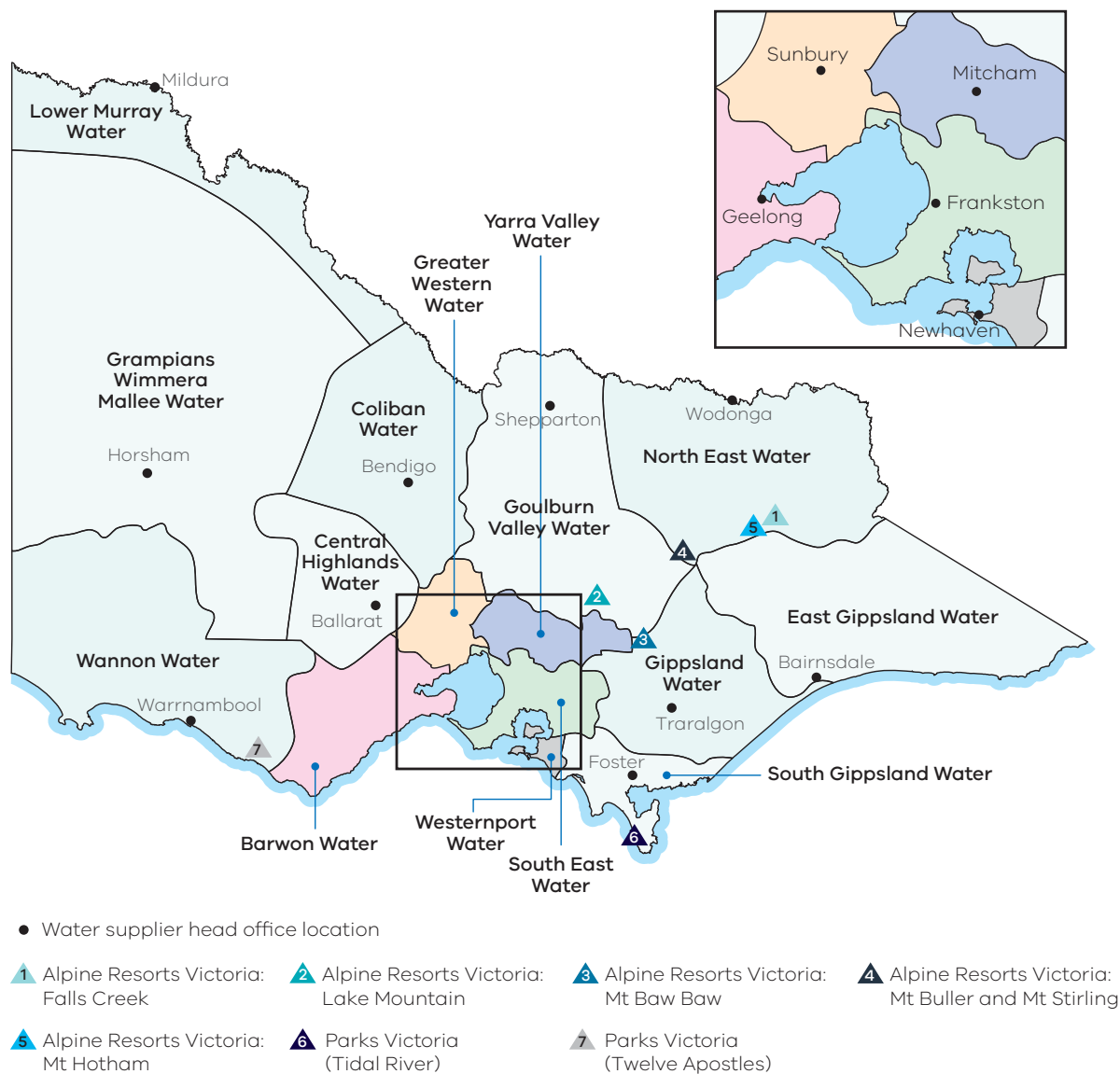
## Water suppliers

Most Victorians receive reticulated drinking water from a water supplier, that serves a specific geographic region (Figure 2). Within each region, all areas that are supplied with drinking water must be within a water sampling locality, as defined under the Regulations. A water sampling locality is an area where collected water samples are representative of the drinking water supplied to that specific area.

As of 1 October 2022, 17 water suppliers in Victoria are responsible for ensuring their drinking water meets the drinking water quality standards. Among these, 3 metropolitan water suppliers receive treated drinking water from Melbourne Water (water storage manager) and apply additional treatment (secondary chlorination). Fourteen water suppliers apply primary and secondary treatment to untreated water to ensure all customers receive safe drinking water.

Seven water suppliers also manage regulated water supplies (water that could be mistaken for drinking water, such as untreated reticulated water for irrigation, stock use or non-drinking domestic uses). Specific provisions for managing the risks associated with these water supplies are included in the Act and the Regulations.

**Figure 2: Water suppliers**



Alpine Resorts Victoria was established on 1 October 2022 through the merger of Victoria’s 4 Alpine Resort Management Boards, that oversaw 6 alpine resorts: Falls Creek, Mt Buller, Mt Hotham, Mt Baw Baw, Mt Stirling, and Lake Mountain.

# Better regulation

The department is committed to contemporary regulatory practice and is actively involved in initiatives that aim to protect communities from risk of harm, reduce the regulatory burden on regulated entities and increase regulator efficiency and effectiveness.

The department works closely with a range of organisations including drinking water and health regulators from jurisdictions across Australia, the National Health and Medical Research Council (NHMRC) and Water Research Australia (WaterRA) to inform evidence-based regulation, address knowledge gaps and promote harmonisation in national regulatory practice.

To help support best practice, the Water Unit aligns its regulatory reform and improvement activities with Better Regulation Victoria's *Towards best practice* guide.

## Ministerial statement of expectations

The Victorian Government developed the *Statement of expectations framework* to support dialogue between ministers, departments and regulators. The framework tasks ministers with issuing a letter to their regulators to establish their expectations. This initiative helps identify government priorities and emerging risks to inform regulator business planning processes.

Throughout 2022–23 the Water Unit continued to prioritise performance objectives and continuous improvement opportunities identified in its letter of *Ministerial statement of expectations 2019–21*, such as:

- improving compliance outcomes and regulatory efficiency and effectiveness through guidance, assistance and advice
- timely response to drinking water quality incidents
- developing and implementing risk-based strategies
- facilitating stakeholder consultation and engagement.

The Department of Treasury and Finance published changes to the *Statement of expectations framework* in March 2023. Under the revised framework:

- ministers have greater scope to tailor their letter to the regulator outlining priorities and risks
- regulators' business plans need to show how they plan to meet the minister's expectations
- regulators are required to provide progress updates through the annual reporting process.

After consulting with the department about government priorities and emerging risks, the Minister for Health issued a statement of expectation letter for the Water Unit on 1 July 2023. The letter is available on [the department's website](https://www.health.vic.gov.au/ministerial-statements-of-expectations-1-july-2023) <<https://www.health.vic.gov.au/ministerial-statements-of-expectations-1-july-2023>>.

## Continuous improvement

### Collaboration with the Essential Services Commission

The department continues to work with the Essential Services Commission to promote efficiency and to ensure water agencies can deliver outcomes that reflect customer preferences and priorities while meeting their regulatory obligations.

In the current reporting period, the department collaborated with the Essential Services Commission on the following:

- forecasting the Act's administration levy payable by the Victorian water agencies
- reviewing water agencies' price submissions, particularly regarding water agencies meeting their regulatory obligations within the proposed revenue allowance
- water agency regulatory performance.

### Engagement with water agencies to support compliance

The department's Water Unit supports water agencies to meet regulatory standards and protect public health. To help achieve this, the department provides clear and accessible guidance and advice.

Engagement with water agencies is varied and includes regular liaison meetings, incident response activities and advice on regulatory compliance. The department works to prioritise targeted, open and transparent dialogue with water agencies to understand and address the unique challenges they face.

During 2022–23 the department continued to promote water agency compliance and improvement through various engagement opportunities such as:

- conducting water quality incident debriefs to identify lessons learnt and opportunities for improvement
- supporting agencies through changes in the risk management plan audit process
- facilitating targeted discussions about noncompliances with the risk management plan audit outcomes
- conducting site visits to water treatment facilities.

The department also pursued training and education opportunities on contemporary regulatory practice and drinking water quality management.

Proactive engagement, through dedicated channels, supports a culture of best practice. Continuous improvement underpins the department's approach to working with water agencies to achieve shared objectives.

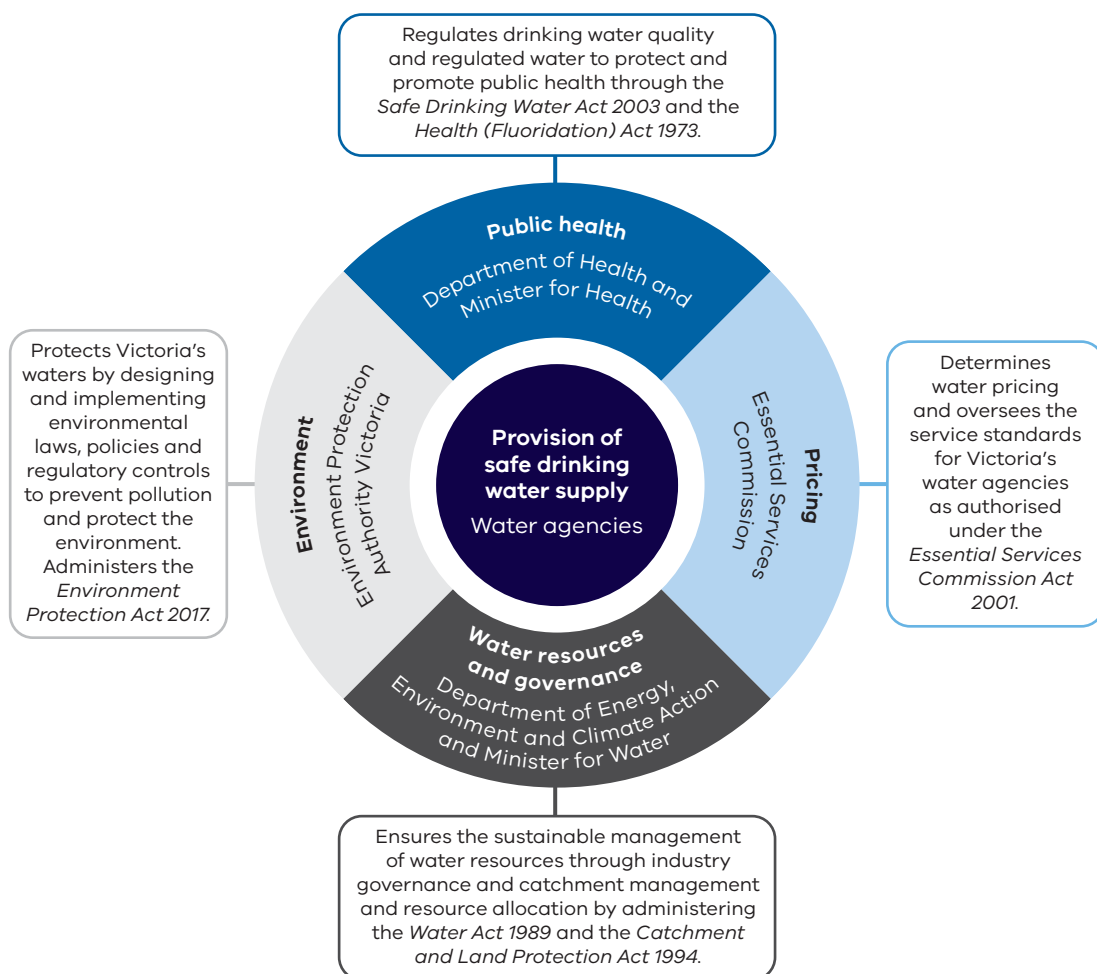
## Whole-of-government approach to drinking water regulation

The department partners with 3 government agencies (shown in Figure 3) to effectively plan, manage and regulate Victoria’s water agencies. While each government agency has a clearly defined regulatory role, interagency collaboration helps drive outcomes that support the health, safety and prosperity of Victorian communities.

A holistic government approach is essential to safeguarding drinking water quantity and quality. Central to this strategy is protecting the natural environment, particularly the sources of our drinking water. Source water protection must be prioritised and can be achieved by implementing comprehensive catchment management strategies and maintaining strict contamination controls.

Collaboration across agencies enables the government to address complex challenges such as source water protection, ensuring the supply of safe drinking water to Victorians.

**Figure 3: Victoria’s drinking water regulatory system**



## Safe drinking water administration levy

In accordance with s 51 of the Act, water agencies pay a levy to assist in covering the costs of administering the Act. The meaning of *costs of administering the Act* is detailed in s 52 of the Act. The proportion of levy that each water agency pays is based on a methodology that the Minister for Health considers fair and has been subject to consultation with stakeholders as required under s 53(d) of the Act.

For 2022–23 there was no change to the levy methodology. Key steps in its calculation were:

1. The department estimates its annual cost of administering the Act.
2. The rural water storage managers, Parks Victoria and alpine resort management boards<sup>3</sup> are levied a flat rate of 0.15% of the department's annual cost estimate.
3. The balance of the department's annual cost estimate is apportioned to each of the state's water suppliers proportional to their number of customer connections previously approved by the minister.
4. The levy for the 3 metropolitan water suppliers is discounted by 25%, and this proportion is allocated to Melbourne Water, that supplies their treated drinking water.

### Department expenditure associated with administering the Act

The administration levy for the 2022–23 financial year was \$1,353,763. It was \$1,330,480 in 2021–22. The levy is slightly higher due to a 1.75% increase for cost indexation based on the Department of Treasury and Finance's annual rate for 2022–23.

Table 1 shows the department's costs in administering the Act in this reporting period, along with a comparison with the previous 2 financial years.

**Table 1: Department expenditure to administer the Safe Drinking Water Act, 2020–21 to 2022–23**

Expenditure type	2020–21	2021–22	2022–23	Variance to prior year
Salaries, allowances and salary-related on-costs	\$979,112	\$929,748	\$1,139,612	\$209,864
Indirect costs	\$99,478	\$114,688	\$157,974	\$43,286
Operating costs	\$169,132	\$225,899	\$81,493	-\$144,406
Communication and education	\$0	\$0	\$2,080	\$2,080
Research and development	\$20,000	\$60,500	\$5,500	-\$55,000
Information technology	\$7,608	\$22,259	\$32,350	\$10,090
<b>Total expenditure</b>	<b>\$1,275,330</b>	<b>\$1,353,094</b>	<b>\$1,419,009</b>	<b>\$65,914</b>

<sup>3</sup> Alpine Resorts Victoria paid the combined levy for the 4 alpine resort management boards that are under its management as of 1 October 2022.

## Salaries, allowances, salary-related on-costs and indirect costs

The department's salaries and related on-costs, and indirect costs (overheads, depreciation, and amortisation), were higher in 2022–23 than the previous period due to additional positions created to undertake regulatory improvement initiatives and regulatory oversight activities, including performance and compliance monitoring. These additional positions have resulted in the total expenditure for 2022–23 exceeding the administration levy. However, a number of these positions were funded as part of the 2022–23 State Budget.

## Operating costs

The operating costs were notably lower during this period because there were no significant investigations undertaken by the department. Resources primarily focused on responding to drinking water quality incidents, particularly during the 2022 Victorian floods, and overseeing the risk management plan audit process. This included changes to this process as part of the department's regulatory improvement initiatives.

The department endeavours to maintain a strong knowledge base through its memberships with WaterRA, the Water Services Association of Australia (the peak body of the Australian water industry), the Australian Water Association and the Water Information Sharing and Analysis Centre.

Such activities included under operating costs are:

- attendances at conferences
- professional association memberships
- costs associated with engaging contractors to conduct technical appraisals and audits on fluoridation plants
- developing technical guidance to assist water agencies
- undertaking investigations and risk assessments.

## Communication and education costs

Section 27(f) of the Act gives the Secretary the function of promoting industry and public awareness and understanding of drinking water quality issues. This includes informing the community and the water sector about drinking water and public health. In this reporting period there were limited costs attributed to communication and education activities due to resources focusing on responding to drinking water quality incidents.

## Research and development costs

The department is committed to supporting improved management of drinking water quality risks and ensuring evidence-based decision making provides better public health outcomes for Victorians.

WaterRA coordinates and manages a structured program of collaborative research to advance water quality and to ensure the knowledge generated is transferred to industry. The department aims to ensure public health priorities are considered in developing and delivering the research agenda.

The department provides financial and in-kind support to research projects that will enhance available information, improve knowledge and understanding of various topical issues and inform regulatory decisions. The following WaterRA-led projects, to which the department previously contributed funds, were completed in the current reporting period:

- Determining the cost of algal bloom to the Australian water industry (Project 1125).  
The project outputs include a comprehensive assessment of the economic impact of harmful and nuisance algal blooms, including cyanobacteria, to the water industry. This assessment provides an improved understanding of the economic risk posed by harmful and nuisance algal blooms, that in turn will provide an economic rationale for adopting control and/or treatment strategies.
- Understanding water quality risks under low and variable water level conditions (Project 1133). The project outputs include a Bayesian network model of water quality impacts from low and variable water levels in dams and reservoir. The project provides valuable knowledge to water agencies on how to better adapt and respond to the effect of climate change on catchment runoff to reservoirs.

The department commenced participation in the following WaterRA-led research project in 2022–23:

- (CRC SAAFE) – the Cooperative Research Centre for Solving Antimicrobial Resistance in Agribusiness, Food and Environments (Project 3051).

There were also several WaterRA-led research projects ongoing throughout 2022–23 to which the department had contributed financial support in previous financial years:

- Characterising the drivers of cyanotoxin production to embed into a cyanobacteria risk management framework (Project 1146)
- Water Operations Technical Competency Benchmark (Project 1139)
- Significance of the environment as a reservoir for antimicrobial resistance from agricultural origins (Project 3040)
- Understanding impacts of recreational access to drinking water catchments and storages in Australia (Project 1124)
- Catchment health metrics (Project 1140)
- Guidance for integration of gene testing in cyanobacterial management (Project 1141).



### **CRC SAAFE – the Cooperative Research Centre for Solving Antimicrobial Resistance in Agribusiness, Food and Environments (Project 3051)**

The department is participating in the 10-year program of work in the CRC SAAFE through the WaterRA-led Water Industry Consortium.

Antimicrobial resistance (AMR) is the ability of microorganisms to resist antibiotics, antifungals and antivirals. AMR is one of the greatest health threats of the 21st century. It also presents a major challenge to agricultural industries, with significant impacts for biosecurity, productivity, food safety/quality and market access. Through focused collaboration between researchers and industry, CRC SAAFE will lead the AMR response for the Australian water, waste, agribusiness and food sectors, anticipating and addressing future challenges and capitalising on emerging opportunities.

The 10-year CRC SAAFE program is expected to be completed in 2032.

### **Characterising the drivers of cyanotoxin production to embed into a cyanobacteria risk management framework (Project 1146)**

Several cyanobacteria species are well known for their potential to produce cyanotoxins. However, not all genotypes of known toxin-producing species produce cyanotoxins, and of these there is significant variation in the spatial and temporal dynamics of toxin production. The water industry currently relies on observational measurement of the presence of 'potentially toxic species', toxin gene and toxin presence to inform management of cyanobacteria blooms in water supply storages. Understanding the drivers for toxin production that inform risk management frameworks would greatly benefit water supply managers and help inform alternate management options. These tools will enable better responses to bloom events and allow pre-emptive measures to be established to minimise cyanotoxin production by targeted manipulation of environmental drivers.

This project aims to identify key cyanobacteria metabolic functions (organism-specific biochemical metabolism events/expressed pathways) and environmental covariates that identify when toxin production is 'switched on' in cyanobacteria species and strains that are known toxin producers and quantify their environmental drivers to improve decision frameworks.

The project is expected to be completed in 2024.

### **Water Operations Technical Competency Benchmark (Project 1139)**

This project proposes to bring industry and regulators together to develop minimum standards for a more consistent approach towards technical competency and implementing learning and development programs for frontline water industry operations. The department made a financial contribution of \$5,500 (GST inclusive) in this reporting period.

The project is expected to be completed in 2024.

### **Significance of the environment as a reservoir for antimicrobial resistance from agricultural origin (Project 3040)**

This project is a collaboration between the water, environment, health and agriculture sectors that aims to investigate the diversity and abundance of pathogenic bacteria and AMR genes in Victorian environments, with a focus on agricultural effluents and run-off inputs.

The project is expected to be completed in 2024.

### **Understanding impacts of recreational access to drinking water catchments and storages in Australia (Project 1124)**

Source water protection underpins the safety and affordability of drinking water supplies whereby preventing contamination provides greater surety than removing contaminants. As part of the multiple barrier approach, the ADWG emphasises protecting source waters to the maximum degree possible. Water agencies have been placed under increasing pressure to introduce or increase recreational access to drinking water catchments and water storages. There is a lack of consensus around recreational access approaches across Australia.

This project seeks the best available scientific, economic and risk management knowledge to inform current and future decision-making processes. This will support communication with recreational bodies, state/territory governments, influencers, lobbyists, regulators, water agencies and their drinking water customers.

The project is expected to be completed in 2024.

### **Catchment health metrics (Project 1140)**

Catchment health metrics are physical, chemical, biological and socioeconomic indicators that collectively provide a holistic measure of a catchment's state and functional capacity. The catchments within Australia display vastly different characteristics and are impacted by a variety of land uses, levels of public access, types of water sources and receiving environments. Differing demands often result in very varied management responses. These interacting factors give rise to complex and unique relationships between catchment pressures, states and community environmental values in each individual catchment. Catchments experience interconnected processes at multiple spatial scales, feedback mechanisms and lag effects, that produce direct and cumulative impacts to land and water quality.

This project will deliver a consistent framework that can be used to develop the catchment health metrics for individual catchments across Australia.

The project is expected to be completed in 2025.

## **Guidance for integration of gene testing in cyanobacterial management (Project 1141)**

Cyanobacteria gene testing is used by some water agencies as a timely and efficient approach for cyanobacterial management. Gene testing aims to determine the genetic potential of known toxin producers to produce toxins. However, the current guidelines only use speciation, counts and biovolume to determine the risk to consumers, recreational users and stock.

This project aims to develop guidelines (and a methodology) for including toxin gene testing in cyanobacteria management. This testing could improve the management of cyanobacteria blooms in water supplies by reducing the toxin risk and provide more accurate information of the toxin risks associated with cyanobacteria blooms.

The project is expected to be completed in 2024.

## **Information technology costs**

In this reporting period the information technology costs were higher than the previous period. This increase is attributed to increased expenditure on IT equipment for new employees.

# Drinking water quality performance and regulatory requirements in 2022–23

## Water sampling localities

Water suppliers are required to collect drinking water samples from water sampling localities that have been specified under r 6 of the Regulations. A water sampling locality is a discrete geographical area where water samples collected are representative of the drinking water supplied to that area.

All locations supplied with drinking water must be within a water sampling locality boundary. This allows water suppliers to determine any issues with drinking water sources, treatment processes or distribution, and to identify customers receiving drinking water in the water sampling locality.

Water suppliers must submit sampling locality proposals to the Secretary to specify new drinking water distribution systems, including when regulated water supplies are to be upgraded to drinking water supplies. Proposals by water suppliers to vary and/or revoke existing water sampling localities may be required due to redefining of boundaries, merging or dividing current water sampling localities, or changes to supply arrangements.

As of 30 June 2023, there were 476 water sampling localities across the state, remaining unchanged from the previous reporting period.

## Drinking water quality standards

Section 17 of the Act requires water suppliers to ensure all drinking water supplied complies with quality standards. The drinking water quality standards are specified under r 12 of the Regulations, that states that drinking water supplied within a water sampling locality must not:

- exceed the standard set out in Schedule 2 of the Regulations (r 12(a))
- contain any algal toxin, pathogen, substance or chemical, whether alone or in combination with another toxin, pathogen, substance or chemical, in such amounts that may pose a risk to human health (r 12(b)).

Schedule 2 of the Regulations prescribes 3 drinking water sample parameters that must be analysed, the required frequency of analysis and the respective water quality standard that must be met (Table 2).

**Table 2: Safe Drinking Water Regulations Schedule 2 drinking water quality standards**

Parameter	Sampling frequency	Quality standard
<i>E. coli</i>	Weekly	No <i>E. coli</i> per 100 mL, with the exception of any false-positive sample
Total trihalomethanes	Monthly	≤ 0.25 mg/L
Turbidity	Weekly	The 95th percentile of results for samples in any 12-month period must be ≤ 5.0 Nephelometric Turbidity Units (NTU)

For parameters not specified in Schedule 2 of the Regulations, the ADWG is the authoritative reference for health-based guideline values. It is used to determine compliance with r 12 (b) of the Regulations.

### **Section 18 notifications**

The Act requires water suppliers to notify the department if it becomes aware that the drinking water it is supplying does not comply, or is unlikely to comply, with a relevant drinking water quality standard. Section 18 of the Act requires this notification in writing and within 10 days of the water supplier becoming aware of the noncomplying water.

There are two benefits of s 18 notifications. First, they provide an overview of agency performance against the drinking water quality standards. Second, they enable the department to work with respective agencies to ensure corrective measures are implemented to mitigate any public health risks and to prevent recurrence.

In this reporting period, drinking water samples were collected from 476 water sampling localities around Victoria. The samples were tested for water quality parameters to determine compliance with water quality standards.

In 2022–23, 8 water suppliers submitted to the department a total of 19 notifications on water that did not meet a standard under either r 12(a) (compliance with Schedule 2 drinking water quality standards) or r 12(b) (compliance with any other drinking water quality standards). This is a significant increase compared with 2021–22 when 4 notifications were made by 3 suppliers and an increase on what was reported in 2020–21 (13 notifications).

Of the 19 notifications in 2022–23, 12 were noncompliant under r 12(a) and 7 related to noncompliance with any other drinking water quality standards under r 12(b), as outlined in the sections below.

Appendix 2 lists all s 18 notifications for the reporting period.

### **Regulation 12(a): compliance with Schedule 2 drinking water quality standards**

To comply with r 12(a), drinking water samples must be analysed for the parameters under Schedule 2 drinking water quality standards of the Regulations, as shown in Table 2 above.

In this reporting period, there were 12 notifications by 6 water suppliers representing 14 water sampling localities that did not meet either the *E. coli* or total trihalomethanes (THMs) parameter of the Schedule 2 drinking water quality standards. This is an increase from 4 notifications from 3 water suppliers in 2021–22. There was an almost threefold increase in the number of *E. coli* samples not meeting the drinking water quality standard and a threefold increase to the total THMs standard not being met compared with the previous reporting period.

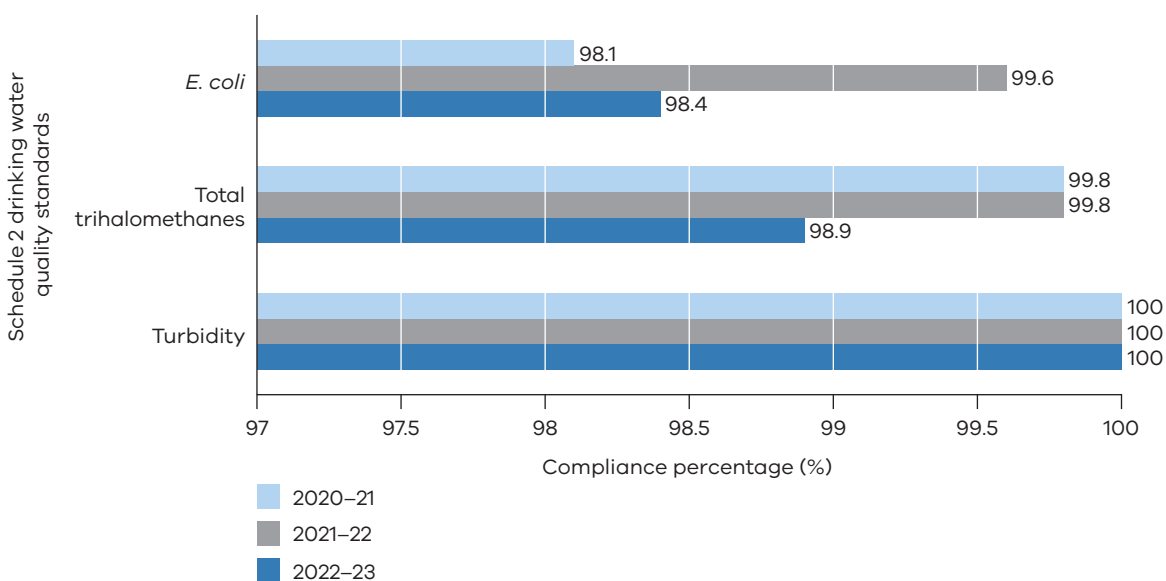
This is the sixth consecutive year where water suppliers were fully compliant with the water quality standard for turbidity.

Table 3 and Figure 4 are interlinked and refer to compliance with Schedule 2 drinking water quality standards. Table 3 represents the actual number of **water samples** that did not meet r 12(a) drinking water quality standards, and Figure 4 illustrates the percentage of **water sampling localities** that complied with r 12(a) drinking water quality standards.

**Table 3: Water samples not meeting Schedule 2 drinking water quality standards, 2020–21 to 2022–23**

Parameter	Water samples not meeting the quality standard		
	2020–21	2021–22	2022–23
<i>E. coli</i>	9	3	9
Total trihalomethanes	1	1	3
Turbidity	0	0	0
<b>Total</b>	<b>10</b>	<b>4</b>	<b>12</b>

**Figure 4: Percentage of water sampling localities that complied with Schedule 2 drinking water quality standards, 2020–21 to 2022–23**



### ***Escherichia coli***

*E. coli* is a microbial indicator of microbial drinking water safety. Schedule 2 of the Regulations requires that all drinking water samples collected are found to contain no *E. coli* per 100 mL, with the exception of any false-positive samples. The detection of *E. coli* can signal microbial contamination and therefore any detection must be immediately reported to the department under s 22 of the Act. More information on all *E. coli* detections, including false positives, can be found in the 'Section 22 reports of known or suspected contamination' section of this report.

When *E. coli* is detected in drinking water, an investigation is undertaken by the water supplier in accordance with the department's *Guidelines for the investigation and reporting of E. coli detections*. The investigation is to determine the cause, take corrective actions and implement procedures to prevent recurrences. If the investigation concludes that the sample taken was representative of the drinking water supplied in the relevant water sampling locality, a notification must be made to the department under s 18 of the Act.

Five water suppliers made 9 *E. coli* notifications in 2022–23. The investigations into these notifications concluded that the samples did not meet the criteria for a 'false positive' under Schedule 2 of the regulations. Generally, the noncompliance notifications related to inadequate residual disinfection and other water quality issues within the reticulation. Two detections from the Gunbower locality led to Coliban Water issuing boil water advisories. More details on these incidents can be found in the 'Emergency preparedness and incident management' section of this report.

The department continues to encourage water agencies to:

- establish strategies to ensure residual chlorine levels are kept at target operating ranges
- sample from more than one sample point within the same locality every week to maintain confidence in the drinking water quality across the network, including in the extremities of the system.

The department also continues to emphasise the importance of following the Secretary's guidance for investigating and reporting *E. coli* detections in line with the criteria outlined in Schedule 2 of the Regulations.

With the increase in *E. coli* detections, there was a decrease in the number of water sampling localities complying with the *E. coli* drinking water quality standard: 98.4% in 2022–23 compared with 99.6% in the previous year (refer to Figure 4 on the previous page).

### **Total trihalomethanes**

Total THMs are a group of disinfection by-products formed when chlorine reacts with a range of organic matter in water. Schedule 2 of the Regulations require drinking water to be tested for total THMs to ensure the result does not exceed 0.25 mg/L.

Coliban Water made 2 notifications for exceeding total THMs, one at the Tarnagulla water sampling locality and the other at the Laanecoorie water treatment plant (WTP) contact point, that supplies drinking water to the localities of Bealiba, Dunolly, Tarnagulla and Laanecoorie. The Tarnagulla exceedance was attributed to increased organic matter in raw water due to flooding events that occurred from October to November 2022. High electrical conductivity contributed to total THMs formation at the Laanecoorie WTP. Coliban Water's long-term plan is to change its source water to the Waranga channel.

The third notification was made by Grampians Wimmera Mallee Water for a sample taken in the Natimuk locality. Upon investigation the likely cause of the total THMs exceedance was due to higher-than-usual chlorine dosing and decreased water age. The raw water also had higher colour due to flood events experienced before the sample was taken. Corrective actions undertaken to bring the total THMs levels back within the standards included optimising chlorine dosing and flushing of dead ends within the drinking water distribution system.

All water agencies in Victoria monitor for total THMs as required by the Regulations, including those that only use ultraviolet (UV) disinfection for primary treatment.

The percentage of water sampling localities that complied with the total THMs standard decreased slightly from the previous year at 98.9% (Figure 4).

### **Turbidity**

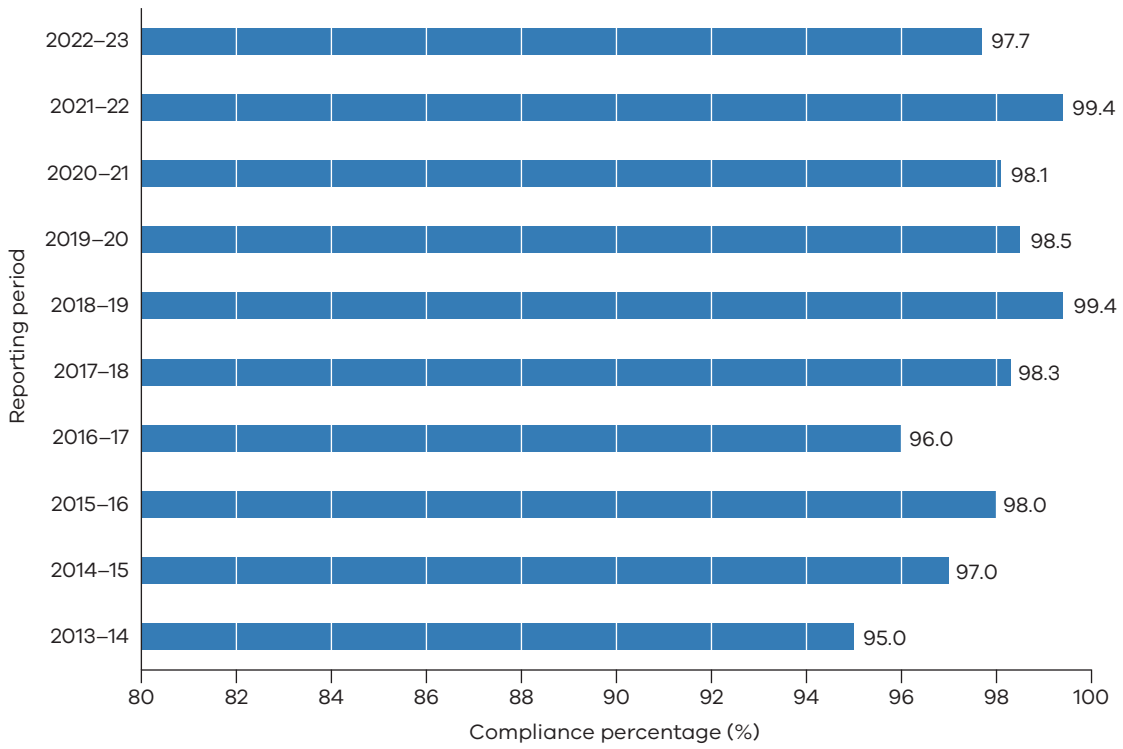
Turbidity is the cloudiness of water caused by the presence of fine, suspended matter. Schedule 2 of the Regulations requires the 95th percentile of results for drinking water samples in any 12-month period to not exceed 5.0 Nephelometric Turbidity Units (NTU). In the 2022–23 reporting period, all water agencies were 100% compliant with the turbidity water quality standard (Table 3 and Figure 4), a result that has been consistently achieved since 2017–18.

### **Performance summary of Schedule 2 parameters**

Figure 5 presents the past 10 years of performance of water sampling localities continuously compliant with Schedule 2 parameters. In 2022–23, 465 out of 476 sampling localities continuously met Schedule 2 drinking water quality standards, achieving an overall compliance of 97.7%. This represents a decrease from the 99.4% of compliant localities in the 2021–22 reporting period.



**Figure 5: Percentage of water sampling localities continuously compliant with Schedule 2 drinking water quality standards, 2013–14 to 2022–23**



## Regulation 12(b): compliance with other drinking water quality standards

To demonstrate compliance with r 12(b), and as part of their water sampling program, water suppliers use a risk-based approach to determine the water quality parameters, water sampling locations and frequency of testing in their risk management plans. Water suppliers and each water supply system face different risks, that can be influenced by factors such as the characteristics of the water supply catchment, treatments applied and supply system arrangements. Water suppliers' water sampling programs are commensurate with this risk and tailored to each water sampling locality and supply system.

Four water suppliers notified the department of 4 parameters that did not meet a water quality standard under r 12(b) (compliance with any other drinking water quality standards).

As Table 4 shows, there were 7 notifications in 2022–23, an increase of 3 instances in water samples not meeting other drinking water quality standards compared with 2021–22.

**Table 4: Water samples not meeting other drinking water quality standards, 2020–21 to 2022–23**

Parameter	Water samples not meeting the quality standards		
	2020–21	2021–22	2022–23
Chlorine+	0	1	1
Bromate*	0	1	0
Chloral hydrate*	0	0	0
Dichloroacetic acid*	0	0	0
N-Nitrosodimethylamine*	1	0	0
Trichloroacetic acid*	1	0	3
Aluminium**	0	0	0
Lead	0	1	1
Manganese	1	1	2
Nickel	0	0	0
<b>Total</b>	<b>3</b>	<b>4</b>	<b>7</b>

+ Refer below to s 22 reports of known or suspected contamination, elevated disinfectants for discussion on the chlorine exceedance.

\* Disinfection by-products.

\*\* Under the ADWG, no health-based guideline is set for aluminium at this time, but this issue will be kept under review.

## Disinfection by-products

Production of safe drinking water and maintaining microbial safety throughout the supply and reticulation system typically requires the addition of a residual disinfectant. Reactions of chlorine disinfectants with natural organic material in source waters can produce disinfection by-products. Although prolonged exposure to high concentrations of disinfection by-products may increase risks to human health, short-term, low-level exceedances of the health guideline values do not present a risk to health. The ADWG states that:

*Although the microbial quality of drinking water is of primary importance and must never be compromised, chlorine levels and the formation of chlorination by-products should be controlled to prevent any adverse health effects that may eventually be found to be attributable to disinfection by-products.*

While total THMs are included in the Schedule 2 standards, water agencies also sample for other disinfection by-products where relevant. In 2022–23 North East Water made one notification for the water sampling locality Eskdale, that did not meet the standard for chlorine (Table 4 and Appendix 2). Grampians Wimmera Mallee Water made 3 notifications for trichloroacetic acid during the reporting period. There were 2 notifications for the Greater Western Water sampling locality and one for the Ouyen locality (Table 4 and Appendix 2).

## Metals

Metals may be present in drinking water for several reasons including:

- those resulting from contamination or naturally present in source waters that haven't been removed via treatment
- leaching from metal pipework and fittings
- their use in treatment processes (such as alum coagulant).

Goulburn Valley Water made 2 notifications in which the Nathalia and Murchison water sampling localities did not meet the standard for manganese. Greater Western Water made one notification in which the Sunbury water sampling locality did not meet the standard for lead (Table 4 and Appendix 2).

## Variations of aesthetic standards

Section 19 of the Act allows the Minister for Health to vary the aesthetic standards of drinking water on application from a water supplier. During the year there were no applications from water suppliers to vary aesthetic standards.

## Exemption from water quality standards

Section 20 of the Act allows the Minister for Health to exempt a water supplier from the obligation to comply with a drinking water quality standard for a specified period, provided that adequate measures are proposed to eliminate or minimise any risks to public health.

During the year there were no applications from water suppliers to be exempted from meeting a drinking water quality standard under the Regulations. There are no existing exemptions from meeting a water quality standard.

## Section 22 reports of known or suspected contamination

Under s 22 of the Act, an officer of a water supplier, water storage manager or council must immediately report to the Secretary if they believe, or suspect on reasonable grounds, that water supplied, or to be supplied, for drinking purposes either:

- may be the cause of an illness
- may be the means by which an illness is being, has been or will be, transmitted
- may contain any pathogen, substance, chemical or blue-green algae toxin, whether alone or in combination, at levels that may pose a risk to human health, or
- may cause widespread public complaint.

The requirement to report immediately to the department enables:

- rapid assessment to determine public health risks
- timely response measures to prevent harm, including issuing a drinking water advisory to affected customers by the relevant water agency where necessary
- the department to ensure the incident is being managed to protect public health
- water agencies to seek guidance from the department in managing incidents
- the department to identify trends or emerging issues that may not be adequately addressed in a water agency's risk management plan.

Prompt action in reporting under s 22 of the Act can help prevent or minimise illness. As such, there are penalties associated with a water agency not meeting the requirement to immediately report known or suspected contamination to the department.

Following a s 22 report, the department supports water agencies to ensure all relevant corrective actions are taken to reduce risks to acceptable levels and that preventive measures minimise the likelihood of the issue reoccurring.

In 2022–23 there were 68 reports made under s 22 of the Act by 15 water agencies. This compares with 43 reports in the previous year (Table 5), an increase of approximately 58%.

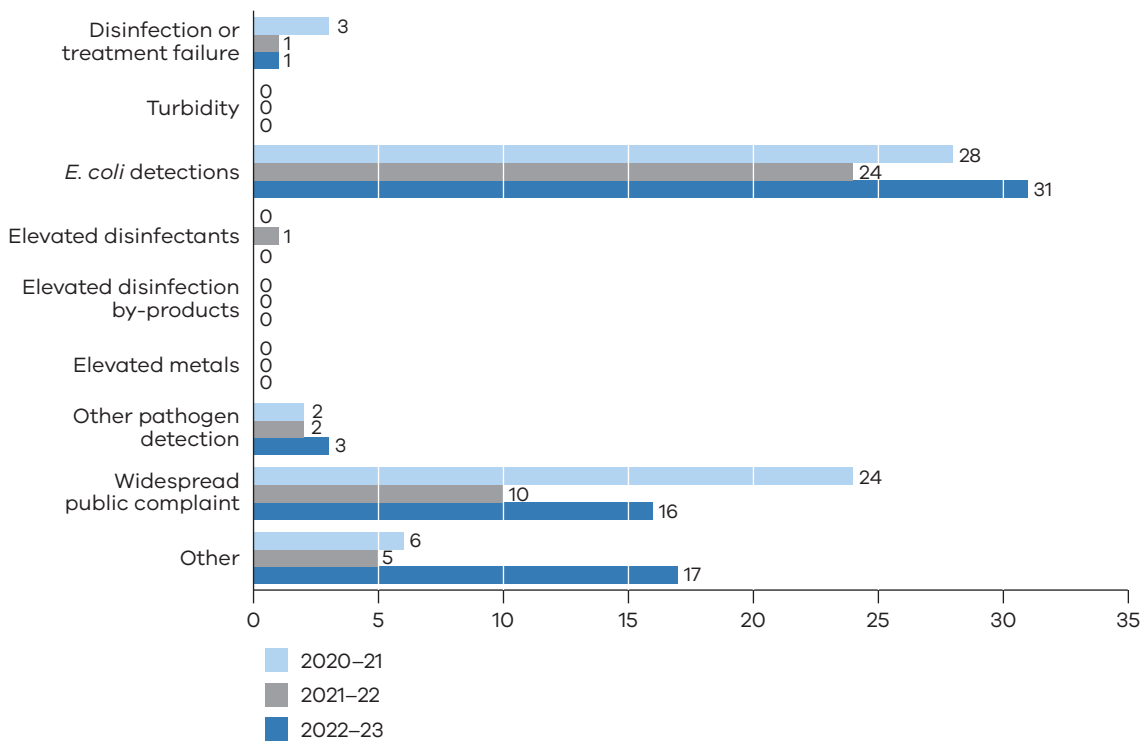
While some of the circumstances underpinning these events were due to extreme climatic conditions, many were preventable, indicating that water agencies need to improve their proactive management of foreseeable risks to their drinking water quality. Incident trends and some specific incidents are discussed in more detail in the 'Emergency preparedness and incident management' section of this report.

Reported issues are broadly grouped into various categories in Figure 6. *E. coli* detections, widespread public complaints and potential ingress due to network depressurisation events in the other category dominated the primary causes for s 22 reports this year. These reports are discussed in detail below. Refer to Appendix 3 for all s 22 reports received in 2022–23.

**Table 5: Number of reports made under section 22 of the Act, 2020–21 to 2022–23**

Reporting period	Number of s 22 reports
2022–23	68
2021–22	43
2020–21	63

**Figure 6: Categories of reports made under section 22 of the Act, 2020–21 to 2022–23**



### **Escherichia coli detections**

During this reporting period there were 31 reports of *E. coli* detections compared with 24 in the previous year, an increase of 29% (Figure 6). Of the 31 reports to the department, 29 water samples with *E. coli* detections were assessed for compliance with the *E. coli* drinking water quality standard. Twenty were found to have met the criteria of false-positive samples under the *E. coli* standard, with 9 noncompliant samples requiring water suppliers to submit 18 notifications during 2022–23. Two drinking water advisories were issued because of the *E. coli* detections. A do not drink advisory was issued for Mirimbah (Alpine Resorts Victoria) and a boil water advisory was issued for Gunbower (Coliban Water).

Water suppliers' investigations into *E. coli* detections continue to attribute a vast majority to sample contamination through sampler error, poor weather conditions, poor sample tap conditions, not following sampling procedures and laboratory analysis.

A departmental review of water agency investigation reports following *E. coli* detections over the past 4 years revealed that errors related to sampling processes and procedure (sampling errors) increased between 2019–20 and 2022–23.

The department remains concerned with the increasing numbers of *E. coli* detections caused by sampling errors, particularly sample contamination. The department has raised these concerns with water agencies to identify gaps in their systems and to implement measures to improve the integrity of sample taps and quality assurance processes relating to sampling and analysis.

Twelve water agencies reported *E. coli* detections, with Grampians Wimmera Mallee Water reporting detections on 5 occasions and Alpine Resort Victoria, Coliban Water and Goulburn Valley Water each reporting on 4 occasions (Appendix 3).

### **Widespread public complaints**

Under s 22 of the Act, water agencies must immediately report any issues to the department that may cause, or have resulted in, widespread public complaint. These s 22 reports typically relate to taste, odour or aesthetic drinking water quality issues.

There were 16 reports of widespread public complaints in this reporting period, this is higher than the average number reported (between 9 and 11 reports per year) by water suppliers over the past 5 years, with the exception of the 24 reports received in 2020–21.

Six water agencies reported widespread public complaints, with Coliban Water reporting on 5 occasions, Yarra Valley Water on 4 occasions and Goulburn Valley Water on 3 occasions (Appendix 3).

Widespread public complaints in 2022–23 were due to:

- the presence of taste and odour compounds (geosmin and 2-methylisoborneol)
- manganese levels in raw water following flooding and blackwater events
- resuspension of sediments from increase water demand
- water main bursts
- commissioning of a water storage following surface recoating.

### **Other pathogen detection**

There were 3 reports for other pathogen detection during 2022–23. Central Highlands Water, North East Water and Wannon Water each made a s 22 report to the department after discovering an animal carcass in a water storage tank. Central Highlands Water issued a boil water advisory for the Waubra community to manage the risk to its drinking water supply. North East Water and Wannon Water issued communications via letter, website and social media of their respective detection events to the Chiltern and Springhurst (North East Water) and Camperdown (urban), Camperdown (rural), Lismore and Derrinallum (Wannon Water) communities. Based on risk assessments undertaken by North East Water and Wannon Water, drinking water advisories were not issued.

### **Other reports**

There were 17 'Other' category of reports during 2022–23. Of the 17 reports, 10 related to water supply system depressurisation events resulting in the need to issue 5 boil water advisories (Coliban Water (3), North East Water (1) and Wannon Water (1)) and a do not use advisory (Greater Western Water (1)). The number of depressurisation events reported highlights a key risk for water agencies to consider and address for their supply systems in future.

The types of incidents from the remaining 7 reports include:

- stormwater ingress to a storage tank
- faulty chlorine dosing equipment
- elevated fluoride caused by manual maintenance
- potential inadequate chlorine disinfection due to a rapid change in the supply system flow rate from a water main burst
- unauthorised access to a storage tank
- water supply concerns due to a raw water main break.

During the 2023 Victorian floods, a stormwater ingress to storage tank incident for Echuca also resulted in Coliban Water issuing a boil water advisory.

Thirteen s 22 reports are described in more detail in the 'Emergency preparedness and incident management' section of this report.

## Drinking water quality complaints

Customer satisfaction can be a key indicator of water agency performance. As per the Regulations, water suppliers are required to provide in their annual reports a summary of drinking water quality complaints received during the year. This summary should include complaint responses and analysis of identified issues.

Customer complaints do not always correlate directly to human health risks, such as those relating to water quality aesthetics or taste and odour issues. However, these issues may result in customers consuming alternative, less healthy drinks such as sugar-sweetened beverages or more costly bottled water, that often end up in landfill.

In 2022–23, 15 water suppliers received a total of 8,334 drinking water quality complaints. Overall, 9 water suppliers reported an increase in drinking water quality complaints in 2022–23, and 6 reported a decrease in complaints. Appendix 4 presents details of drinking water quality complaints reported by water suppliers.

Water quality complaints comprise 3 categories: discoloured/turbidity/dirty water, taste and odour, and other. The most common drinking water quality complaint was for discoloured/turbidity/dirty water, reported by 10 water suppliers reported, followed by taste and odour and then other. The 'other' category covers a broad range of complaints such as alleged illness, requests for data, white water, blue water, air in water, problems with aquatic animal/pets and corrosion of internal household plumbing or appliances.

Lower Murray Water reported the largest percentage increase in drinking water quality complaints, with a 204% (53 complaints) increase on the previous year. This increase was not due to any particular incident. South East Water reported the largest increase in complaints, with an increase of 456 complaints (147%). This was due to South East Water expanding the definition of a 'complaint', in line with the Essential Services Commission's advice, to include all enquiries in reported complaint numbers.

Complaints to Wannon Water and Coliban Water increased by more than 20% in 2022–23. Complaints to Goulburn Valley Water rose by over 100% and Gippsland Water and North East Water rose by more than 60%.

Gippsland Water's increase is mostly due to 74 complaints about the taste and odour compounds (geosmin and 2-methylisoborneol) in the water at Warragul and Drouin supply system during March 2023. Goulburn Valley Water has attributed its increase in complaints to 2 events in Shepparton and Mooroopna in December 2022, following a sudden increase in demand that caused the suspension of sediments within the reticulation network, and an issue with manganese at Nathalia.

Westernport Water saw the largest percentage decrease in complaints at 54% (25 complaints). This was due to several projects that were undertaken to improve water quality including ice piggings and air scouring to remove built-up naturally occurring sediment.

Yarra Valley Water, Central Highlands, East Gippsland Water, Grampians Wimmera Mallee Water and South Gippsland Water also saw decreases in this reporting period.

All water suppliers are implementing appropriate actions to minimise the number of drinking water quality complaints.



## Risk management plan audits

Providing safe drinking water requires a robust approach to risk management. Under s 7 and s 8 of the Act, water agencies must prepare, implement, continuously review and revise risk management plans. Section 11 of the Act enables the Secretary to require a water agency to have its risk management plan audited by an approved auditor during a specified period. The audits are carried out about every 2 years, a timeframe that allows water agencies to drive continuous improvement and best practice, reinforcing and promoting the risk management principles of Victoria's safe drinking water legislative framework.

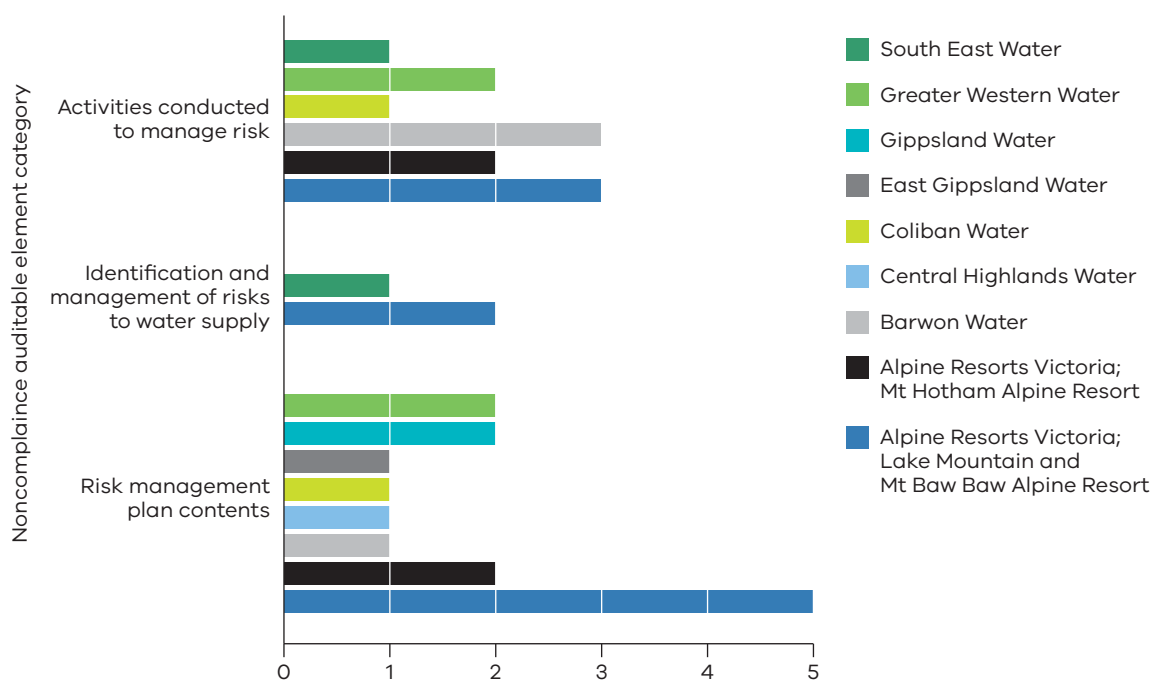
Auditors must assess the risk management plan as compliant or noncompliant with the legislated requirements under s 7 of the Act for water agencies designated as water suppliers or s 8 of the Act for water agencies designated as water storage managers. Auditors may also identify 'opportunities for improvement' (OFI). The department follows up on noncompliances to discuss and agree an action plan with agencies to address the noncompliances. OFIs are generally outcome-focused suggestions on how to improve risk management plans and associated activities or documents. Actioning OFIs gives water agencies the opportunity to address issues before potentially progressing to the level of a noncompliant finding.

Risk management plan audits completed during 2023 covered the period from 1 January 2021 to 31 December 2022 to determine compliance with s 7 and/or s 8 of the Act. In brief, the audits identified that 9 water suppliers did not comply with s 7(1) during the audit period: Alpine Resorts Victoria – Mt Hotham, Alpine Resorts Victoria – Lake Mountain and Mt Baw Baw, Barwon Water, Central Highlands Water, Coliban Water, East Gippsland Water, Gippsland Water, Greater Western Water and South East Water. Barwon Water and East Gippsland Water were found to be noncompliant for the second consecutive audit period.

The high number of noncompliances is concerning. In this reporting period, the department's review found that 15 noncompliant findings related to risk management plan contents, 13 to activities conducted to manage risk and 3 to identifying and managing risks to water supply. The department will work with relevant water agencies to address the noncompliant audit findings. Improvements to the risk management plan audit process will continue to support a proactive risk-based approach to auditing and provide greater oversight in identifying and responding to emerging issues.

A summary of noncompliance auditable element categories for relevant water agencies can be found in Figure 7. Details of all noncompliances for each water agency, as reported by the auditor, can be found in Appendix 5.

**Figure 7: Auditable element category relating to each noncompliance in the 2023 risk management plan audits**

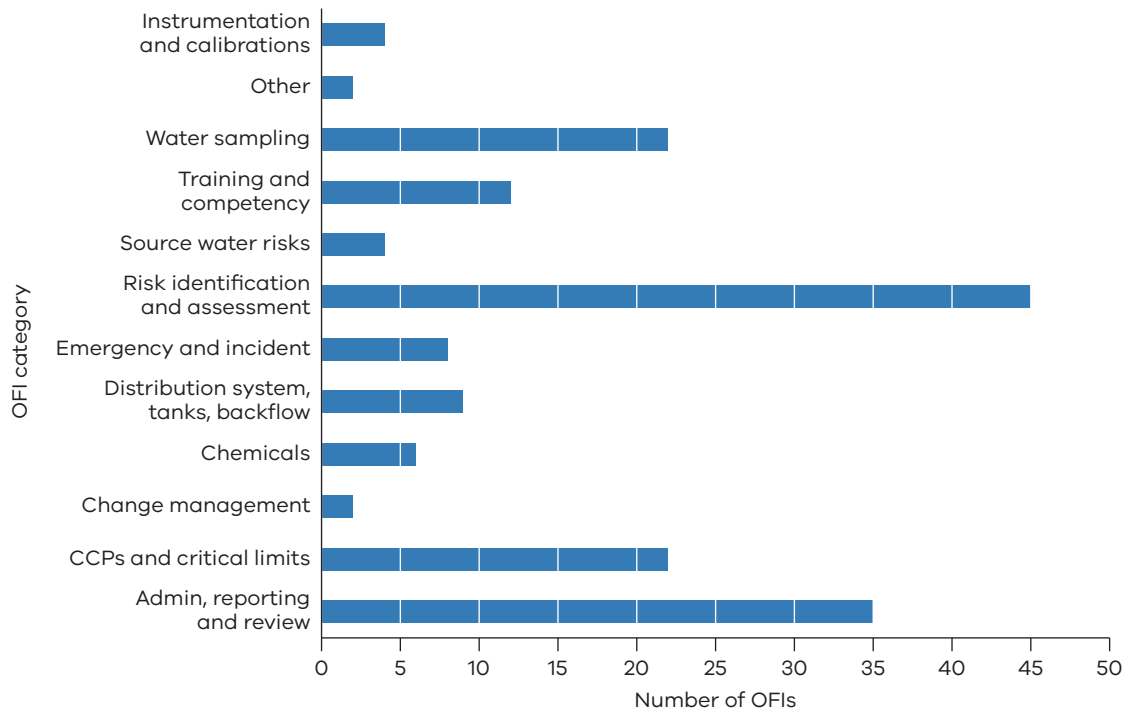


Collectively, the risk management plan audits identified 171 OFIs. As per the department’s review, the OFIs spanned a breadth of areas, with most relating to the following categories: risk identification and assessment; water sampling; critical control points and critical limits; and administration reporting and review.

The number of OFIs for each water agency can be found in Table 6 and Figure 8, along with the type and a short description. Full descriptions of the OFIs can be found in each water agency’s drinking water quality annual report, that are on their websites. Appendix 1 lists the websites for each water agency.

The high number of noncompliances and OFIs relating to risk identification and assessment underscores a need for water agencies to focus on continuous improvement of their risk management practices.

**Figure 8: Opportunity for improvement categories relating to the 2023 risk management plan audits**



In August 2022 water agencies were given written notice to have their risk management plans audited. It should be noted that the alpine resort management boards were regarded as distinct water agencies before merging on 1 October 2022, therefore individual audits were conducted for each Alpine Resort Management Board’s risk management plan.

**Table 6: Water agencies 2023 risk management plan audit outcomes**

<b>Water agency</b>	<b>Risk management plan audit outcome</b>	<b>No. of opportunities for improvement</b>
Alpine Resorts Victoria; Falls Creek Alpine Resort	Complied with the obligations imposed by s 7(1) of the Act during the audit period.	8
Alpine Resorts Victoria; Lake Mountain and Mt Baw Baw Alpine Resort	<b>Did not comply</b> with the obligations imposed by s 7(1) of the Act during the audit period, with 5 major noncompliances and 5 minor noncompliances.	23
Alpine Resorts Victoria; Mt Buller and Mt Stirling	Complied with the obligations imposed by s 7(1) of the Act during the audit period.	9
Alpine Resorts Victoria; Mt Hotham	<b>Did not comply</b> with the obligations imposed by s 7(1) of the Act during the audit period, with 4 minor noncompliances.	12
Barwon Water	<b>Did not comply</b> with the obligations imposed by s 7(1) of the Act during the audit period, with 4 minor noncompliances.	15
Central Highlands Water	<b>Did not comply</b> with the obligations imposed by s 7(1) of the Act during the audit period, with 1 minor noncompliance.	5
Coliban Water	<b>Did not comply</b> with the obligations imposed by s 7(1) of the Act during the audit period, with 2 minor noncompliances.	5
East Gippsland Water	<b>Did not comply</b> with the obligations imposed by s 7(1) of the Act during the audit period, with 1 minor noncompliance.	4
Gippsland Water	<b>Did not comply</b> with the obligations imposed by s 7(1) of the Act during the audit period, with 2 minor noncompliances.	5
Goulburn-Murray Water	Complied with the obligations imposed by s 8(1) of the Act during the audit period.	1
Goulburn Valley Water	Complied with the obligations imposed by s 7(1) of the Act during the audit period.	0
Grampians Wimmera Mallee Water	Complied with the obligations imposed by s 7(1) and s 8(1) of the Act during the audit period.	12

**Table 6: Water agencies 2023 risk management plan audit outcomes** (continued)

<b>Water agency</b>	<b>Risk management plan audit outcome</b>	<b>No. of opportunities for improvement</b>
Greater Western Water	<b>Did not comply</b> with the obligations imposed by s 7(1) of the Act during the audit period, with 4 minor noncompliances.	11
Lower Murray Water	Complied with the obligations imposed by s 7(1) of the Act during the audit period.	18
Melbourne Water	Complied with the obligations imposed by s 8(1) of the Act during the audit period.	4
North East Water	Complied with the obligations imposed by s 7(1) of the Act during the audit period.	7
Park Victoria	Complied with the obligations imposed by s 7(1) of the Act during the audit period.	4
South East Water	<b>Did not comply</b> with the obligations imposed by s 7(1) of the Act during the audit period, with 1 major and 1 minor noncompliance.	8
South Gippsland Water	Complied with the obligations imposed by s 7(1) of the Act during the audit period.	5
Southern Rural Water	Complied with the obligations imposed by s 8(1) of the Act during the audit period.	0
Wannon Water	Complied with the obligations imposed by s 7(1) of the Act during the audit period.	2
Westernport Water	Complied with the obligations imposed by s 7(1) of the Act during the audit period.	10
Yarra Valley Water	Complied with the obligations imposed by s 7(1) of the Act during the audit period.	3

## Regulated water declarations

Some water agencies supply untreated water directly to communities through a piped distribution system. This water is not intended for human consumption; rather, it is used for watering gardens, flushing toilets and other non-drinking domestic uses. If this water could be mistaken for drinking water, the Minister for Health may, under s 6 of the Act, declare the water to be regulated water.

Regulated water declarations are a means for managing these non-drinking water supplies within the safe drinking water regulatory framework. When a water agency supplies regulated water, it must have a risk management plan for that water supply. Also, it must take all reasonable steps to inform the community of the nature of the water and provide information about the health risks associated with drinking the water.

The process for considering whether a particular supply is declared as regulated water involves consultation between the water supplier and the affected community.

Regulated water declarations can also be made if drinking water supplies deteriorate to the point where drinking water quality standards cannot be met. This has occurred when extreme weather events significantly changed the characteristics of source water quality.

No variations were made to regulated water declarations during this reporting period. Appendix 6 lists regulated water supplies for this reporting period.

## Undertakings

Under s 30 of the Act, the Secretary may accept undertakings from water agencies to address water quality issues and deliver permanent water quality improvements. An undertaking can be used when the department or the water agency identifies a contravention under the safe drinking water regulatory framework. The undertaking describes how the water agency will resolve the issue and how it will manage public health risks while addressing the contravention within a specified timeframe. During this reporting period, there were no undertakings in place.

## Water agency annual reports

Under s 26 of the Act, all water agencies must produce an annual report on the quality of drinking water and regulated water for every financial year. These reports must be submitted to the Secretary by 31 October, and then made available to the public on the water agencies' websites by the next business day.

Part 5 of the Regulations and the department's Guidance: Water quality annual report outline the information water agencies need to include in their annual reports, such as:

- actions taken in response to each emergency, incident or event that affected water quality
- written undertakings that have been accepted by the Secretary
- findings from the most recent risk management plan audit and any issues raised by the auditor
- an overview of disinfection or treatment processes, including a list of all chemicals and other substances used to disinfect and treat the water
- compliance or noncompliance with specific sections of the Regulations and actions taken
- analysis of water sample information, data and results
- a summary of variations in aesthetic standards and exemptions from water quality standards
- a summary of complaints, responses and analysis
- details of any regulated water supplied.

As part of its commitment to better regulation, the department has improved its internal review process of water agencies' annual reports to ensure consistent compliance with the Act, the Regulations and the guidance.

All water agencies submitted their annual reports to the department within the required timeframe for this reporting period.

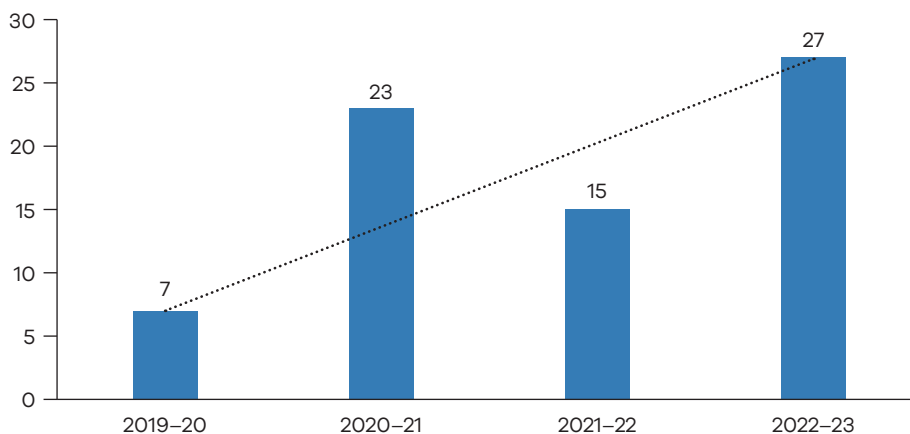
Individual water agency's drinking water quality annual reports can be viewed on their websites. Appendix 1 lists the contact details for each water agency.

## Emergency preparedness and incident management

In addition to ensuring a prompt response to potential public health risks, s 22 reports contribute to the department's understanding of statewide trends, systemic issues and emerging threats to the supply of drinking water. These reports enable the department to identify where support is required and inform a strategic regulatory response to assuring the ongoing supply of safe drinking water.

The department's review of the primary cause of s 22 reports submitted by water agencies over the past 4 years has shown more than double the number of reports related to asset performance (Figure 9), where an asset was not performing as expected (i.e. tank integrity failure, poor treatment plant performance or sample tap condition). This increase sheds light on a growing trend of challenges related to infrastructure integrity, management and robustness. It underscores the importance of vigilant monitoring, maintenance and upgrading of all water quality assets to ensure they function optimally.

**Figure 9: Trend of section 22 reports with the primary cause related to asset performance, 2019–20 to 2022–23**



In 2022–23 multiple drinking water quality incidents required significant departmental involvement. Thirteen drinking water quality incidents between 1 July 2022 and 30 June 2023 have been captured in this section. Most of these incidents related to extreme weather events, burst water mains increasing the potential for ingress and asset integrity issues, including animal entry.

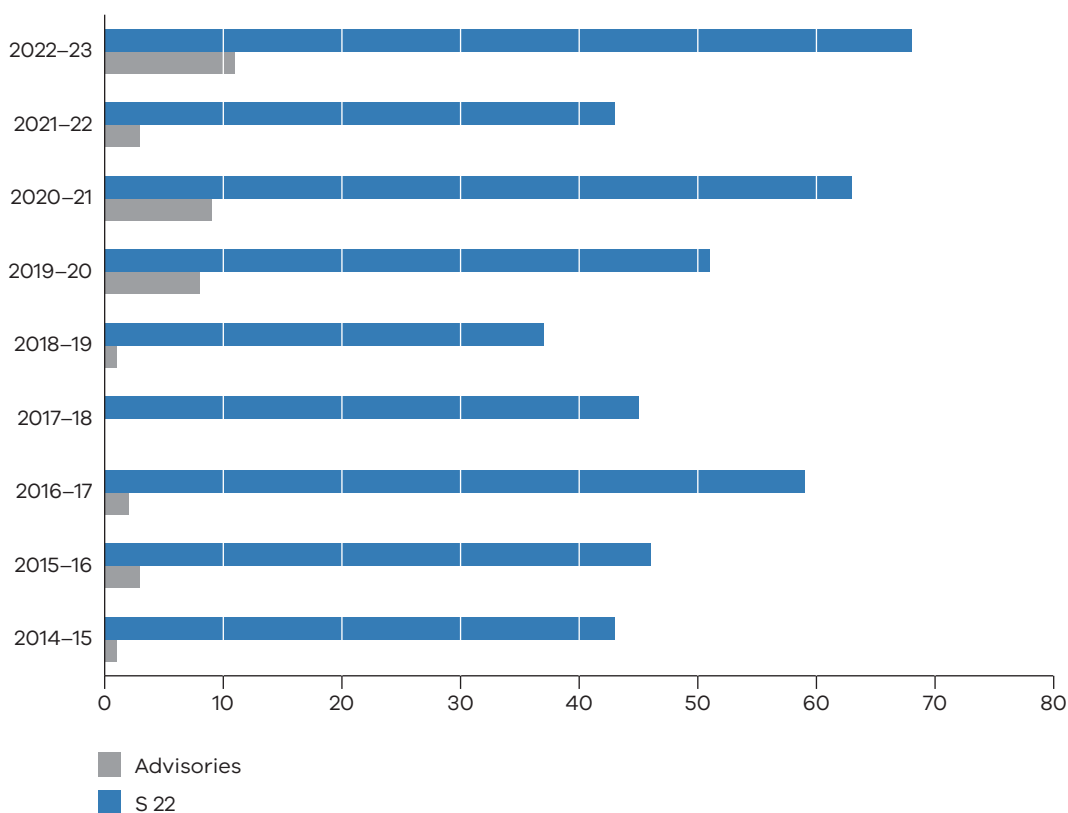
In this reporting period there were 8 boil water advisories, 2 do not drink advisories and 1 do not use advisory issued by 7 water suppliers. Figure 10 shows that since 2018–19 there has been an increase in advisories, with 31 advisories issued over the past 4 reporting periods.



Many of these incidents were preventable and highlight an urgent need for water agencies to focus on inspection and maintenance schedules of drinking water infrastructure to ensure they are fit for purpose, including asset end-of-life replacement. These incidents also reveal opportunities for improvement in embedding incident management protocols, preparedness for a range of contamination events and preparedness and response to extreme weather events. The importance of drinking water complaints in offering real-time indicators of changes in water quality is also captured.

Reducing the occurrence of water quality incidents requires maintaining a focus on forecasting risk, avoiding or reducing precursors and an ongoing commitment to risk reduction through quality assurance and continuous improvement.

**Figure 10: Trend of section 22 reports and drinking water advisories, 2014–15 to 2022–23**



The 11 drinking water advisory incidents below resulted in water agencies issuing 'boil water', 'do not drink' or 'do not use' advisories. A description of each of these advisories can be found in the glossary.

## Boil water advisory incidents

### Boil water advisory due to a dead mouse in Waubra treated water storage tank – Central Highlands Water

#### Causal factors

On 22 September 2022, during a response to an extended power outage, a dead mouse was discovered floating in a treated water storage (TWS) in Waubra. However, the incident was not reported to the department under s 22 of the Act until 26 September 2022. Central Highlands Water (CHW) could not determine how long the mouse had been in the tank. There were no microbial detections associated with this incident, and adequate disinfection residuals were maintained throughout the system.

#### Actions undertaken by the water agency

In response to this incident, a series of corrective actions were initiated. CHW issued a boil water advisory on 26 September 2022 and bottled water was made available to customers in the Waubra township. This advisory was disseminated through various communication channels, including CHW's website, social media, an online notice board, SMS and door knocking.

To ensure an uninterrupted water supply, a temporary tanker was provided. The dead mouse was removed from the storage tank, and all 3 tanks were taken out of service for a comprehensive integrity inspection. This inspection was conducted using a remote-operated vehicle. The investigation identified a potential entry point for the mouse, a small hole between the corrugated iron roof and the top of the TWS, that was then sealed. CHW superchlorinated the 3 affected tanks, flushed the network and verified the water quality.

The boil water advisory was lifted on 3 October 2022, following the successful completion of the reinstatement plan actions and after verification monitoring results showed no contamination.

#### Preventive actions and lessons

This incident highlighted the need for robust inspection programs, prompt action through reporting and embedding incident management protocols and awareness. Following the incident, CHW attended a constructive debrief meeting with the department on 9 November 2022, where several preventative actions were identified for CHW:

- initiate refresher training in water quality awareness for operational teams and frontline contractors with a focus on incident reporting and identifying water quality hazards
- share the outcomes and lessons learnt from the incident with members of CHW's Emergency Management Planning Committee and on-call incident managers
- develop and implement a water quality incident support plan that aligns with CHW and the department's emergency management arrangements
- review the TWS inspection program and procedures, including existing TWS tanks for similar failure modes and, if necessary, provide refresher training for staff and contractors performing these inspections
- review the tank return-to-service protocol and ensure operational awareness with relevant areas
- review communications and engagement procedures to support water quality incidents
- review tank design standards, considering water quality risk controls.

## Boil water advisory for Heathcote due to a water main break – Coliban Water

### Causal factors

A significant water main break on 29 September 2022 all but drained the TWS at Heathcote WTP and the storage was isolated to safeguard the WTP's processes. The main break caused depressurisation of the system, that raised concerns about potential ingress in the network resulting in the supply of unsafe drinking water.

### Actions undertaken by the water agency

In response to this public health risk, a boil water advisory was issued on 29 September 2022. Initially, the TWS at the Heathcote WTP was isolated to facilitate repairs to the broken main. The TWS was reinstated, the pressure in the water network reviewed and adjustments made, including an increase in chlorine dosing to safeguard against potential contamination.

To ensure the quality and safety of the water supply, Coliban Water initiated network flushing. Verification sampling was conducted on 30 September 2022 and 1 October 2022, that included checks for chlorine residuals, turbidity and the presence of *E. coli* and coliforms. To validate the safety of the water supply, 2 sets of microbiological samples were taken and analysed.

Acceptance criteria included having clear microbiological sample results to determine whether the water could be considered safe to drink and was within normal operating conditions for the Heathcote distribution system.

Coliban Water lifted the boil water advisory on 2 October 2022 after consultation with the department and meeting all the requirements of the reinstatement plan. This included repairing the burst main, flushing the system and taking samples, confirming the water was safe to drink.

### Preventive actions and lessons

Coliban Water cited a need to develop an assessment framework that factors in the age of the main, the size of the main, the type of main pipe and the pressure of the main to allow for an objective assessment of whether a main should be isolated prior to tapping or is suitable to tap while it is live.

## **Boil water advisory at Echuca due to ingress into clear water storage – Coliban Water**

### **Causal factors**

During a storm event in Echuca on 13 October 2022 the stormwater pumps in the Echuca WTP could not keep up with the volume of water onsite, and the excess water flooded the area where the 2 below-ground TWS are located.

To mitigate possible flooding as a result of the October 2022 floods, the stormwater valve at the WTP was closed to isolate the stormwater onsite. A pump was set up to transfer stormwater from the outlet pit over the levee and into the surrounding floodwaters. However, the intensity of the rainfall accumulation within the WTP site surpassed the pump's capacity. This led to the stormwater system being overwhelmed. Stormwater backed up into one of the 2 TWSs at the Echuca WTP, presenting a risk of microbial contamination. The turbidity analyser on one of the TWS indicated stormwater had entered it.

### **Actions undertaken by the water agency**

To protect public health, a boil water advisory was issued to affected customers on 13 October 2022. The affected TWS, where the stormwater inflow occurred, was isolated and thoroughly drained to remove any potential contaminants. The other TWS was checked and verified to have not been affected. The network was flushed, and the pressure and system were checked for potential bursts or leaks. Sampling was conducted in accordance with a reinstatement plan, that included verification monitoring for *E. coli*, coliforms, turbidity and free chlorine residuals.

After consultation with the department and meeting the requirements of the reinstatement plan, Coliban Water lifted the boil water advisory on 15 October 2022.

The affected TWS remained isolated until all corrective actions were completed and verification monitoring results showed the drinking water was safe. The impacted TWS was brought back online in early December 2022.

### **Preventive actions and lessons**

Preventive actions that Coliban Water took during the incident included installing extra pumps to manage flood water. Coliban Water also verified the stormwater drainage pit pump size, installed multiple stand by pumps and flagged that a review of the site drainage would be undertaken. Levelling the area around the TWS to direct stormwater flow away from the TWS is currently under consideration.

## **Boil water advisory as a result of a depressurisation event in the Merino locality – Wannon Water**

### **Causal factors**

In the early hours of 28 October 2022 a burst water main at Merino led to a rapid draining of the town's clear water storage (CWS) tank. To maintain supply to customers, the tank's outlet valve was adjusted to reduce water flow until alternative water supply arrangements could be made.

The reduced water flow caused a drop in pressure in elevated sections of the local water distribution network, that resulted in the potential for ingress of untreated water into the drinking water supply.

### **Actions undertaken by the water agency**

On 28 October 2022, a boil water advisory was issued to residents in the affected area, advising them to boil water due to suspected contamination in the drinking water supply resulting from potential ingress during the depressurisation event. Wannon Water promptly conducted a rapid risk assessment, determining that the public health risk was low. The assessment considered factors such as the low probability of contamination from sewage, chemicals and backflow in the reticulation system.

The primary identified risk of contamination stemmed from pooled water around fire plugs after a recent rainfall event. Wannon Water devised a reinstatement plan/procedure to lift the boil water advisory, that underwent review by the department. To lift the advisory, Wannon Water took steps to repair the damaged water main, restore pressure to the water distribution system and increase chlorine in the Merino CWS. The township's water supply system was also flushed to eliminate any potentially contaminated water.

With verification monitoring confirming clear microbiological results and consultation with the department, Wannon Water officially lifted the boil water advisory on 1 November 2022.

### **Preventative actions and lessons**

Wannon Water conducted an internal debrief of the incident and then attended a debriefing session with the department on 29 November 2022. The importance of using a prepared boil water advisory template was discussed. This approach ensures a quick review and turnaround by the department, facilitating a more efficient and timely response. The aspect of fatigue management was also noted. Recognising and addressing the issue of staff fatigue is crucial, especially during prolonged or intense response scenarios. Another important learning emphasised was the need for more timely reporting to the department.

## **Boil water advisory at Cohuna from compromised water treatment process – Coliban Water**

### **Causal factors**

On 8 November 2022 the Cohuna water treatment process was compromised due to poor water quality resulting from heavy rain and a previous flooding event. These events affected the Cohuna WTP's capacity to produce sufficient water of a drinking water standard to meet demand. To optimise the performance, production flow rates were reduced. To maintain the supply to Cohuna's urban system customers, Coliban Water restricted the flow to its rural systems. But because these rural schemes were depressurised for 2 days, there was a risk of microbial contamination.

### **Actions undertaken by the water agency**

Due to the depressurisation and associated risks of microbiological contamination, Coliban Water issued a boil water advisory on 10 November 2022 to Cohuna rural system customers of Horfield, Mead and Northwest.

Coliban Water optimised the functioning of the WTP, tailoring its operation to cope with the changed environmental demands. This optimisation included a strategic reduction in production flow rates and an increase in the chlorine dosing set point. To supplement the existing supply, Coliban Water carted water from Echuca.

To ensure the safety of the water supply, a network flushing program was initiated to remove any contaminated water from the network. A reinstatement plan for lifting the boil water advisory was prepared and submitted to the department. The plan included verification sampling and acceptance criteria that were to be met before lifting the advisory, that occurred on 17 November 2022.

### **Preventive actions and lessons**

Coliban Water has reviewed the WTP to consider how to manage this type of issue better in the future. The existing 3 decommissioned clarifiers are being refurbished to expand treatment performance. A review of the requirement/ability for fire plugs in the rural system will also take place, as well as a review of communications to rural properties.

## **Boil water advisory at Harrietville due to loss of water pressure – North East Water**

### **Causal factors**

On 13 November 2022 several customers in Harrietville notified North East Water that they had no water supply. An earlier storm had damaged communications hardware at Alpine Road CWS, Harrietville. The hardware was responsible for registering the water level at the water storage tank and relaying the information to the WTP. Due to the damage, the tank had emptied and not refilled, leading to a loss of water pressure in the system and localised loss of water supply to 235 customers in the town of Harrietville.

### **Actions undertaken by the water agency**

North East Water inspected the water supply tank and confirmed it was empty and that the WTP was not registering the tank's water level. A boil water advisory was issued to affected customers on 13 November 2022 via SMS and a letter drop. The advisory was issued because the lack of water pressure introduced a potential risk of backflow and ingress of untreated water into the system.

The empty Alpine Road CWS was refilled and water pressure reinstated to safe operating levels. WTP operation could not be sustained overnight because ongoing storm activity in the area caused a spike in raw water turbidity requiring additional water carting from Freeburgh WTP to assist the filling of the CWS. As the CWS level was restored, chlorine dosage was increased, and the network was flushed and turned over in excess of 100% of the system volume to remove any potentially contaminated drinking water. The damaged hardware was also replaced and tested. Verification monitoring of the water treatment and supply system was undertaken and affected and surrounding areas tested for water quality and safety. The boil water advisory was lifted on 16 November 2022.

### **Preventative actions and lessons**

North East Water sent the damaged hardware back to the supplier for analysis and testing. North East Water also implemented an alarm to alert staff if the WTP has not communicated successfully to the Alpine Road CWS on a regular basis.

## Boil water advisory at Gunbower resulting from *E. coli* detections – Coliban Water

### Causal factors

A routine sample collected on 15 November 2022 from the Gunbower elevated tank and a customer tap in the Gunbower locality were found to be positive for *E. coli*. In response to these results, Coliban Water issued a boil water advisory for Gunbower on 16 November 2022 and began an investigation into the incident.

Due to the extremely poor quality of the flood-affected source water from Gunbower WTP at the time of detection, the Gunbower WTP was turned off and treated water was carted from Coliban Water's Leitchville WTP to Gunbower WTP.

The investigation report indicated that the *E. coli* drinking water quality standard was not met. The report concluded that the contamination likely occurred during the transfer of water from the water carter's tanker to the tank farm (12 above-ground TWS tanks), specifically implicating the lay flat hose as the most probable source of contamination.

### Actions undertaken by the water agency

Following consultation with the department, Coliban Water issued a boil water advisory due to an unknown source of contamination resulting from 2 positive *E. coli* detections from the same locality with relatively low free chlorine residuals in the samples tested.

An initial inspection of the high-level tank was conducted using a drone, with no integrity issues or points of ingress identified. The TWSs were booster chlorinated and the elevated tank emptied for cleaning. A booster chlorinator trailer dosed hypochlorite solution downstream of the elevated storage. The raw water was assessed and found to be within the operational parameters. The treatment plant was then started, eliminating the need to cart water.

Public health messaging was distributed via Coliban Water's website, social media, SMS messaging and media statements. Bottled water was made available in Gunbower on the evening of 16 November 2022 and a water trailer was positioned in town from 17 November 2022 to allow customers to replenish drinking water supplies. Comprehensive network flushing was carried out to remove any potentially contaminated water from the system.

A reinstatement plan was developed, outlining the corrective actions and verification monitoring that would be undertaken before lifting the advisory. On completing all corrective actions and 2 rounds of microbiological sampling on 20 and 21 November 2022 showing no *E. coli* or coliforms, the boil water advisory was lifted on the evening of 22 November 2022.

### Preventive actions and lessons

The department took active surveillance around the region during and after the incident on any gastrointestinal presentations made during this period. Coliban Water will review the treatment capability of the Gunbower WTP to better understand the operational envelope for treating raw water. Greater focus will be placed on following water carting procedures, to ensure water quality is not compromised and a review of water carting fill points at all WTPs will be undertaken to ensure they are appropriate.



## **Boil water advisory at Kyneton and Malmsbury due to a mains break – Coliban Water**

### **Causal factors**

A significant water main break occurred late in the evening on 11 April 2023 in Kyneton, that drained the TWS at the Kyneton WTP.

### **Actions undertaken by the water agency**

Following consultation with the department, Coliban Water issued a boil water advisory on 12 April 2023 because the low level of water in the TWS caused the pressure to drop, increasing the risk of ingress.

Water carts were deployed to Malmsbury and Kyneton for residents to access potable water. Bottled water was supplied to a local aged care facility in Kyneton, and a temporary water supply was installed at the Kyneton Hospital. Corrective actions included repairing the mains break and flushing the network. Air trapped in the network was observed and slowly bled from the system over the remaining days. Verification monitoring included network water quality sampling and confirmation of normal network pressure.

Public health messaging was issued via Coliban Water's website, social media, SMS messaging, media releases and the VicEmergency App. Drinking water trailers were made available at the Kyneton Showgrounds and Malmsbury Botanical Gardens so residents could fill drinking water to supplement their home supply. A water tanker was also stationed at the hospital.

A rescind plan detailing all planned corrective actions and verification monitoring of drinking water supply was developed. The rescind plan, with supporting evidence, was provided to the department for review, and after confirming the safety of the drinking water supply, Coliban Water lifted the boil water advisory on 16 April 2023.

### **Preventive actions and lessons**

Following this incident, the department worked with its communications team to develop guidance to advise water agency communications staff on using the VicEmergency app to communicate drinking water advisories. Coliban Water flagged improvements for the SCADA view access to the TWS to expand notification for changes in the network.

## Do not drink advisory incidents

### Taste and odour complaints resulting in a do not drink advisory at Templestowe – Yarra Valley Water

#### Causal factors

Between 29 October and 3 November 2022, Yarra Valley Water received several taste and odour complaints from customers along Tuckers Road, Templestowe. The suspected cause of contamination was related to a water main burst on 27 October 2022, with potential ingress during depressurisations as part of the burst repair. Customers reported that the water supplied had a petrol-like smell and taste. The main was repaired on the same day, however, a valve had mistakenly been left closed during flushing of the main following repairs, limiting the effectiveness of the main flushing.

#### Actions undertaken by the water agency

Yarra Valley Water undertook a field and network investigation on 3 November 2022 to identify the cause of the potential hydrocarbon chemical contamination. The investigation focused on a short section of water main that supplies water to 3 customer premises related to the complaints. The investigation found that the main had not been sufficiently flushed following repairs.

The 3 affected customers received do not drink advisories via hand-delivered letters at 8:00 pm on 3 November 2022. Customers were provided with bottled water for drinking. Yarra Valley Water then:

- provided a temporary alternative supply to customers affected via an above-ground poly pipe
- flushed mains and service lines as well as customer internal and garden taps
- drained and refilled customer hot water units to clear all contaminated water.

The do not drink advisory was lifted in relation to the temporary supply line on 18 November 2022 after testing the water supply. The permanent water supply was placed back online for the affected customers on 23 November 2022, once testing of the water supply within and around the supply area confirmed the safety of the drinking water.

#### Preventative actions and lessons

Taste and odour complaints from customers can serve as crucial early warning signs of potential contamination events in a drinking water supply system. Unlike routine testing, that occurs at set intervals, taste and odour complaints can offer real-time indicators of changes in water quality.

## **Water quality incident resulting in a do not drink advisory in the Mirimbah Locality – Alpine Resorts Victoria: Mt Buller and Mt Stirling Alpine Resort**

### **Causal factors**

On 28 June 2023 *E. coli* was detected in the Mirimbah reticulation system. Alpine Resorts Victoria: Mt Buller and Mt Stirling Alpine Resort (ARV) identified several issues contributing to the water quality incident. These included a malfunctioning chlorine probe leading to insufficient chlorine dosing and potential ingress from a faulty lid on the CWS. Also, the water age in the CWS resulted in chlorine dissipating, that contributed to a lack of residual protection against contamination.

### **Actions undertaken by the water agency**

A do not drink advisory was issued on 29 June 2023 after resampling results showed further *E. coli* detections and low chlorine residuals.

Once the do not drink advisory was issued for the Mirimbah locality, each occupied site was visited and informed of the advisory. 'Do not drink tap water' signage was installed at all affected locations including the Mirimbah store, traffic control/resort entry, ski patrol accommodation, public toilets and the park tap. Bottled water was also supplied to all occupied sites.

To reinstate the affected drinking water supply, ARV developed a reinstatement plan, that the department approved. The reinstatement plan included a timeline of actions ARV would take to address the causes of the contamination. ARV replaced the inspection lid on the CWS with a lockable lid and cleaned the tank roof to remove all debris. To address the low chlorine residual in the reticulation system, the chlorine target was increased at the WTP and the CWS was drained and refilled. The reticulation system was flushed and turned over to remove any contaminated water. Samples taken on 5 separate days had no *E. coli* detections, and the target free chlorine residuals were achieved.

Improvements were also undertaken at the WTP where a new chlorine probe and Process Logic Controller (PLC) function are installed, the PLC will be reprogrammed for more accurate chlorine dosing. This resulted in a reliable and steady state of chlorine dosing. A 24v chlorine analyser was installed at the CWS to monitor the chlorine residuals.

The do not drink advisory was lifted on 17 July 2023 following corrective actions from ARV including verification sampling with no *E. coli* detections and adequate chlorine residual in the reticulation.

### **Preventive actions and lessons**

Key lessons learnt from this incident include undertaking thorough visual inspections and cleaning of the CWS. The current maintenance schedule was found to be insufficient in identifying signs of contamination or tank integrity issues. ARV also secured access to the Mirimbah CWS by removing access ladders and installed a lockable inspection lid.

Goulburn Valley Water will undertake a peer review of the ARV's standard operating procedures, including sampling technique and methods to reduce the likelihood of environmental contamination. A fully operational chlorine probe was installed and commissioned in the Mirimbah WTP. A SCADA upgrade has been implemented and chlorine levels are now visible in the CWS. Low and high chlorine levels are alarmed via text message to ensure they are within the target range. ARV will carry out a review of the Mirimbah monitoring plan, that will form part of the updated review of the catchment assessment to ensure water quality risks are appropriately addressed.

## Do not use advisory incident

### Do not use advisory from chemical contamination in the Moonee Ponds locality – Greater Western Water

#### Causal factors

On 9 August 2022 Greater Western Water (GWW) reported a backflow event with suspected chemical contamination in a localised section of water main pipe supplying Langs Road, Ascot Vale. It was suspected at the time that a third party contractor was accessing a water hydrant to fill a water tanker that contained a residual amount of non-toxic construction chemical. The water main was isolated at the time as part of emergency repair work and no customers were being supplied with drinking water.

#### Actions undertaken by the water agency

Customer service lines were isolated and alternative drinking water was supplied to the 38 affected customers. GWW declared an incident to investigate the issue and support the impacted customers.

The do not use advisory notice was issued on 9 August 2022, with information hand delivered to affected customers. GWW staff also attended the site to answer questions. Bottled water was provided to affected customers as well as temporary accommodation and a temporary above-ground water supply was made available while the main was renewed.

The chemicals present in the tanker were determined to be 2 widely used drilling aid polymers, that were identified to be non-hazardous chemicals that are not toxic and highly soluble. Therefore, it was determined that they could be removed by flushing the affected mains with drinking water. The flushing of service lines and internal plumbing for affected properties was also carried out before reinstating supply.

GWW lifted the advisory on 11 August 2022 after completing the targeted flushing program and water sampling of the affected and surrounding areas and confirmed the safety of the water supply.

#### Preventative actions and lessons

GWW and the department held an incident debrief on 2 September 2022. Actions identified for GWW and the department from the debrief included:

- sharing the details of the findings from the incident cause analysis method (ICAM) investigation with the department
- where applicable, reviewing the lessons learnt from the incident to inform water quality emergency responses.

## Other incidents

Some incidents, while recognising suspected contamination, did not result in the issuing of an advisory after the respective water agency undertook a rapid risk assessment and determined that the risk to public health was low. The nature of the incidents, the preventive actions taken and insights gained are reported below.

### Water quality incident within Camperdown clear water storage – Wannon Water

#### Causal factors

On 16 September 2022 divers found a dead bird on the floor of Camperdown CWS during a routine inspection and cleaning process. The bird was suspected to have entered the tank through a small hole in the tank roof approximately 2 weeks before its discovery.

#### Actions undertaken by the water agency

Wannon Water on-duty staff did not notify the department of the incident on 16 September 2022, determining that the public was not at risk. On 19 September 2022, 3 days after discovering the bird, Wannon Water colleagues told staff returning from leave about the incident and the issue was then escalated to the department. At this stage Wannon Water determined that there was a very low risk to public health because the bird had been removed from the CWS and the affected water had already passed through the distribution system. To ensure there was no public health risk, Wannon Water undertook 3 consecutive days of microbial samples at the tank and throughout the distribution system.

A boil water advisory was not issued, but all affected customers were notified of the incident via Wannon Water's website, social media platforms and letter drops.

The CWS was inspected and gaps identified on the roof and around external spouting. The gaps in the tank roof were fixed and stainless-steel mesh installed on the external spouting and around the roof of the tank to protect against animals entering. Monitoring of water treatment performance was also undertaken.

#### Preventative actions and lessons

Following a debrief with the department, Wannon Water wrote to the department on 9 November 2022, identifying several preventative actions and timelines for their completion.

Wannon Water will identify and mitigate the risk of wildlife entry in the Camperdown water system, establish an inspection program for all CWS tanks and expand the scope of tank cleaning activities through diving contractors. Structural faults identified in CWS tank audits will be promptly repaired and a review of the water quality response contingency plan will ensure appropriate escalations for incidents. There was also a thorough examination of the boil water advisory process and template options. A risk-based protocol for CWS cleaning and condition assessments was developed and staff underwent training encompassing all these actions to ensure comprehensive implementation.

## Dead lizard in Chiltern clear water storage – North East Water

### Causal factors

On 21 October 2022 an external contractor conducted a drone inspection inside the Chiltern CWS focusing on the concrete and structural integrity of the tank. Review of the footage on 22 October 2022 revealed a dead lizard at the base of the storage and the operator of Chiltern CWS was notified of the finding. On 24 October 2022 notification of the dead lizard was made to the water systems manager and the operations tactical manager for the area. Operators were immediately sent to the tank to assess bypass options and the department was notified.

### Actions undertaken by the water agency

North East Water conducted a detailed risk assessment and determined the public health risk to be low. As part of their assessment, North East Water considered scientific literature, recent weekly sample results showing no coliform counts, chlorine residuals averaging 1.1 mg/L and the lizard being there for some time without any reports of illness.

Consequently, no boil water advisory was issued. However, following the department's advice, North East Water communicated with the public, advising them to seek medical care if they felt unwell.

North East Water removed the Chiltern CWS from service to prevent any possible further contamination. The tank was emptied, cleaned, disinfected, inspected, refilled and tested before returning to service. To remove any potentially contaminated water from the Chiltern and Springhurst reticulation, the systems were flushed.

North East Water increased the chlorine concentration supplied to the towns of Chiltern and Springhurst to ensure they received high-quality water and provided further contact time for inactivation of pathogens. On completing the reticulation flushing activity, North East Water conducted verification monitoring and the Chiltern CWS was returned to supply on 28 October 2022.

### Preventive actions and lessons

To prevent similar incidents, North East Water implemented measures such as screening the CWS overflow outlet and removing overhanging trees. North East Water also engaged with WaterRA to enhance the industry knowledge of the risk of pathogens from lizards in water storages, collating scientific literature and assessing that the risk presented by lizards to human health is very low.

## Water fluoridation for healthy teeth

People need to have healthy teeth and a healthy mouth to be able to eat, speak and smile well. Unfortunately, oral disease remains prevalent in our community. Tooth decay can cause pain and have a negative effect on a person's appearance, self-esteem, social interaction and the ability to eat, speak and chew, that can affect their general health.

While there have been significant improvements in oral health over the past 20 to 30 years, there is still evidence of poor oral health among many Victorians. Preventing tooth decay through measures like community water fluoridation leads to improvements in health and reductions in dental treatment costs. This benefits both individuals and the health system.

Fluoride is a naturally occurring mineral found in rock, air, soil, plants and all water sources including fresh and sea water. Many foods and drinks naturally contain fluoride. Fluoride is also added to:

- drinking water, where fluoride is added to the local water supply
- fluoride toothpastes, gels and mouth rinses
- fluoride products painted on the teeth by qualified health professionals.

Fluoride acts as a constant repair kit for teeth. It strengthens teeth and can reduce the risk of tooth decay or even reverse it in the early stages. Many studies have proven the safety and oral health benefits of water fluoridation. Water fluoridation involves adjusting the fluoride concentration in reticulated drinking water to reach a level that can help reduce tooth decay.<sup>4</sup> This effective intervention:

- significantly reduces tooth decay in people of all ages and reduces tooth decay rates by 26 to 44% in children and adolescents<sup>5</sup>
- reduces inequalities – children living in non-fluoridated communities experience higher rates of potentially preventable hospital admissions for dental conditions<sup>6</sup>
- reduces costs associated with tooth decay – oral disease is one of the costliest health conditions to treat and is among the most prevalent diseases in our community. For each dollar invested in water fluoridation, up to \$18 is saved in avoided treatment costs.<sup>7</sup>

More than 25 years after the introduction of water fluoridation in metropolitan Melbourne in 1977, water fluoridation has saved Victoria an estimated \$1 billion through avoided dental costs, days away from work or school and other costs.

Today about 97% of Victorians have access to fluoridated water via reticulated drinking water networks that reach 99% of Victorians living in metropolitan Melbourne and 88% of Victorians living in rural and regional areas. However, approximately 200,000 people living in rural and regional Victoria are connected to reticulated water supplies that are not fluoridated.

4 In Victoria, fluoride in drinking water is adjusted to an optimal level of approximately 1 mg/L to provide a community oral health benefit.

5 National Health and Medical Research Council (NHMRC) 2017, *NHMRC Public Statement 2017 – Water fluoridation and human health in Australia*.

6 Rogers JG, et al. 2018, *Reducing potentially preventable dental hospitalizations of young children: a community-level analysis*. JDR Clin Trans Res, 3(3): 272–278.

7 National Health and Medical Research Council (NHMRC) 2017, Information paper – Water fluoridation: dental and other human health outcomes (p. 69), report prepared by the Clinical Trials Centre at University of Sydney, NHMRC, Canberra. Available from <https://www.nhmrc.gov.au/about-us/publications/water-fluoridation-dental-and-other-human-health-outcomes>.



## Victorian action plan to prevent oral disease

Good oral health is a key contributor to overall health and wellbeing. The *Victorian action plan to prevent oral disease 2020–2030* sets out a vision to achieve good oral health for all Victorians by 2030 and to reduce the gap in oral health for people who are at higher risk of oral disease.

The action plan includes opportunities for oral health promotion across the life course. Priority actions and key goals relevant to the water sector include:

- increasing the proportion of rural and regional Victorians accessing fluoridated drinking water to 95% from a baseline of 87% by 2030
- collaborating with water agencies to promote the benefits of drinking water, preferably fluoridated water if available.

## Health (Fluoridation) Act

Under the *Health (Fluoridation) Act 1973*, the department oversees the ongoing compliance and performance of existing water fluoridation plants in Victoria and increasing access to water fluoridation in areas with non-fluoridated reticulated water supplies.

Before adding fluoride to any water supply, a water agency must submit plans and specifications to the department for consideration. To ensure the fluoridation plant can operate safely and reliably, the department conducts a technical appraisal of the fluoridation plant under section 2.3.3 of Victoria's *Code of practice for the fluoridation of drinking water supplies* (second edition). When the technical appraisal is complete and the water agency has satisfactorily addressed any issues, the department can approve the addition of fluoride into the drinking water supply.

Within 12 months of beginning fluoride dosing, the code of practice requires the department to undertake a fluoride audit by suitably qualified individuals. This assists water agencies to ensure the ongoing safe operation of their water fluoridation plants and optimal fluoridation of the drinking water supply to enhance oral health for their customers. The audit verifies whether the recommendations of the technical appraisal and the approval have been implemented.

## Key achievements and activities

In 2022–23 the key achievements and activities included the following:

- March 2023: Melbourne Water’s replacement water fluoridation plant at the Winneke WTP was approved to start operating. This enabled the continued supply of fluoridated drinking water to residents of Parkville, Werribee, Maribyrnong, Altona, Caroline Springs, Moonee Ponds, Taylors Lakes, Deer Park, Williamstown, East Keilor, Richmond, Tullamarine, Strathmore, Werribee South, Little River, Epping, Plenty, Mernda/Hurstbridge, Bundoora, Eltham and Whittlesea.
- April 2023: A technical appraisal began for Melbourne Water’s replacement water fluoridation plant at the Yan Yean WTP. Commissioning of the replacement plant is anticipated to occur in 2024. This will facilitate the continued provision of fluoridated drinking water to residents of Epping, Plenty, Mernda/Hurstbridge, Eltham, Whittlesea and Bundoora.
- May 2023:
  - The department audited Melbourne Water’s replacement water fluoridation plant at Cardinia WTP. This plant provides fluoridated drinking water to residents of Brighton-Heatherton, Dandenong, Berwick, Hallam, Chelsea, Pakenham, Mordialloc, Rowville, Beaumaris, Carrum Downs, Dandenong North, Upper Beaconsfield, Caulfield, Glen Waverley, Malvern and South Melbourne.
  - The department began audits of the following water fluoridation plants:
    - Wannon Water’s Camperdown plant, that provides fluoridated drinking water to residents of Camperdown, Derrinallum and Lismore
    - Coliban Water’s Cohuna plant, that provides fluoridated drinking water to residents of Cohuna.
- June 2023: The department began a technical appraisal of Wannon Water’s new water fluoridation plant at the Terang WTP. Commissioning of the new plant is anticipated to occur in 2024. This will supply fluoridated drinking water to residents of Terang, Mortlake, Noorat and Glenormiston for the first time.
- January to September 2023: Greater Western Water’s replacement water fluoridation plant at the Merrimu WTP was approved to begin operating. This enabled the continued supply of fluoridated drinking water to residents of Melton, Brookfield, Hopetoun Park, Toolern, Mount Cottrell, Plumpton, Melton West, Kurunjang, Long Forest, Rockbank, Bacchus Marsh, Merrimu, Coimadaí, Darley, Pentland Hills, Maddingley, Parwan, Eynesbury and Toolern Vale.

The department, via its partnership with Dental Health Services Victoria, will continue to monitor and review community oral health data. For example, local government area oral health profiles are available from the [Dental Health Services Victoria website](https://www.dhsv.org.au/research-insights-and-policy/LGA-oral-health-profiles) <<https://www.dhsv.org.au/research-insights-and-policy/LGA-oral-health-profiles>>.

## Water fluoridation plant performance

In the 2022–23 reporting period, Victoria had 52 water fluoridation plants operated by 14 water agencies and Aquasure (the Victorian desalination plant operator). To support water agencies to achieve reliable operation of water fluoridation plants and optimally fluoridated drinking water, the code of practice requires water agencies to report on water fluoridation plant performance including:

- the annual average, minimum and maximum fluoride concentrations at each water sampling locality, water supply and fluoridation plant
- a summary of incidents and emergencies reported during the year
- a summary of the fluoridation process and chemicals used at each fluoridation plant.

The code of practice also requires water agencies to notify the department of emergencies and exceptional situations. During 2022–23 the department received:

- 14 notifications about the fluoride concentration in drinking water, measured at the fluoridation plant, being less than 0.6 mg/L for a continuous period longer than 72 hours
- 2 notifications about the rolling annual average fluoride concentration of drinking water supplied or to be supplied, being less than the department's specified operating range.

The notifications related to plant shutdowns stemming from mass balance faults in the dosing system, chemical blockages, electrical faults following a lightning strike and maintenance and upgrade works.

These operational disruptions could have been prevented with adequate preventative routine system inspection and maintenance. The department continues to engage with water agencies to ensure all water fluoridation plants are consistently performing at maximum efficiency to enable the optimal fluoride concentration to provide a dental benefit for our community.

## On the horizon

### Climate change

Victoria has faced significant climate-related challenges over previous years including bushfires, floods, heatwaves, algal blooms and storms. Many of these events have negatively affected the state's drinking water supplies. Climate change presents an increased risk of extreme weather events, that could have profound impacts on drinking water quality in the future.

The department's review of s 22 reports shows that from 2019–20 to 2022–23 there have been 20 drinking water quality incidents in Victoria with a causal link to extreme weather events. To enhance our understanding of how to effectively assess water quality following extreme weather events such as floods and fires, the department is planning to engage with WaterRA on related research projects. It is expected that this information will support water agencies with guidance on responding to and potentially mitigating risks to drinking water following extreme weather events.

The department's commitment to supporting the health and safety of Victorian communities faced with climate change is captured in the *Health and human services climate change adaptation action plan 2022–2026*. The plan details strategies for adapting to climate change and managing associated risks including those related to drinking water quality such as increased water-borne pathogens, harmful chemicals, algal blooms and the impact of floods and bushfires.

Climate change is often described as a crisis of water. As the climate changes, so too must the department's response to regulating risks to drinking water quality. This includes gaining a deeper understanding of key risks, prioritising adaptation initiatives and ensuring Victoria's safe drinking water regulatory framework is best positioned to address known and emerging climate threats.

The climate change adaptation plan can be found on [the department's website](https://www.health.vic.gov.au/environmental-health/climate-change-strategy) <<https://www.health.vic.gov.au/environmental-health/climate-change-strategy>>.

## Department of Health strategic plan 2023–27

The department is focused on supporting the health and wellbeing of Victorians, from disease notifications and medical research to developing healthcare facilities and ensuring safe drinking water. They all play a role in helping the department achieve its vision that Victorians are the healthiest people in the world.

The *Department of Health strategic plan for 2023–27* sets out what the department needs to achieve over the coming 4 years to deliver on the government’s priorities and commitments. The strategic plan outlines 7 strategic priorities to help achieve the department’s vision:

1. Keeping people healthy and safe in the community
2. Providing care closer to home
3. Keep innovating and improving care
4. Improving Aboriginal health and wellbeing
5. Moving from competition to collaboration
6. A stronger and more sustainable workforce
7. A safe and sustainable health, wellbeing and care system.

The strategic plan can be accessed on [the department’s website](https://www.health.vic.gov.au/our-strategic-plan-2023-27) <<https://www.health.vic.gov.au/our-strategic-plan-2023-27>>.

## Safe Drinking Water Regulations 2015 review

The Regulations form part of Victoria’s regulatory framework for drinking water. In Victoria, regulations undergo a mandatory review every 10 years. This is to ensure regulations are reviewed regularly, remain relevant and can be improved to better achieve the desired benefits and/or reduce the cost that they impose.

The Regulations were last made in 2015 and are due to be remade by July 2025. The department’s review will assess the performance of the Regulations since 2015 and consider future regulatory and drinking water quality risks including those posed by climate change. As part of its review, the department will engage with water agencies and other key stakeholders in early 2024.

## Revisions to the Australian Drinking Water Guidelines

The department, through its representation on the enHealth Water Quality Expert Reference Panel, continues to engage with regulators across Australia and the National Health Medical Research Council (NHMRC) on planned and proposed updates to the ADWG.

### Lead in plumbing products

Lead leaching from plumbing products is known to be a major source of lead in drinking water. The department continues to engage at the state and national levels, and with relevant plumbing regulatory bodies, to address this important public health issue, including on initiatives to reduce the lead content in plumbing products.

With the Australian Building Codes Board's plan to reduce the allowable lead content in plumbing products to no more than 0.25% of average weight from 1 September 2025, the NHMRC has planned to review and update guidance as part of its 2022–25 workplan. This guidance will improve the understanding of the risks from lead in plumbing products and ensure any potential risks of lead replacements are understood and communicated with Victorian water agencies.

To also support the community and building and asset managers to reduce exposure to lead and other metals from plumbing products, the department supports the cross-referencing of enHealth's Guidance on reducing exposure to metals in drinking water from plumbing products in future revisions of the ADWG. This guidance document, published in 2021, is available on the [enHealth website](https://www.health.gov.au/resources/publications/enhealth-guidance-reducing-exposure-to-metals-in-drinking-water-from-plumbing-products?language=en) <<https://www.health.gov.au/resources/publications/enhealth-guidance-reducing-exposure-to-metals-in-drinking-water-from-plumbing-products?language=en>>.

# Appendices

## Appendix 1: Water agency contact details

Water agency	Telephone	Website
Alpine Resorts Victoria	0447 282 793	<a href="http://www.alpineresorts.vic.gov.au">www.alpineresorts.vic.gov.au</a>
Falls Creek Alpine Resort	03 5758 1200	<a href="http://www.fallscreek.com.au">www.fallscreek.com.au</a>
Lake Mountain Alpine Resort	03 5957 7201	<a href="http://www.lakemountainresort.com.au">www.lakemountainresort.com.au</a>
Mt Baw Baw Alpine Resort	03 5165 1136	<a href="http://www.mountbawbaw.com.au">www.mountbawbaw.com.au</a>
Mt Buller and Mt Stirling Alpine Resort	03 5777 6077	<a href="http://www.mtbuller.com.au">www.mtbuller.com.au</a>
Mt Hotham Alpine Resort	03 5759 3550	<a href="http://www.mthotham.com.au">www.mthotham.com.au</a>
Barwon Water	1300 656 007	<a href="http://www.barwonwater.vic.gov.au">www.barwonwater.vic.gov.au</a>
Central Highlands Water	1800 061 514	<a href="http://www.chw.net.au">www.chw.net.au</a>
Coliban Water	1300 363 200	<a href="http://www.coliban.com.au">www.coliban.com.au</a>
East Gippsland Water	1800 671 841	<a href="http://www.egwater.vic.gov.au">www.egwater.vic.gov.au</a>
Gippsland Water	1800 050 500	<a href="http://www.gippswater.com.au">www.gippswater.com.au</a>
Goulburn-Murray Water	1800 013 357	<a href="http://www.g-mwater.com.au">www.g-mwater.com.au</a>
Goulburn Valley Water	03 5832 4800	<a href="http://www.gvwater.vic.gov.au">www.gvwater.vic.gov.au</a>
Grampians Wimmera Mallee Water	1300 659 961	<a href="http://www.gwmwater.org.au">www.gwmwater.org.au</a>
Greater Western Water	13 44 99	<a href="http://www.gww.com.au">www.gww.com.au</a>
Lower Murray Water	1800 808 830	<a href="http://www.lmw.vic.gov.au">www.lmw.vic.gov.au</a>
Melbourne Water	131 722	<a href="http://www.melbournewater.com.au">www.melbournewater.com.au</a>
North East Water	1300 361 622	<a href="http://www.newater.com.au">www.newater.com.au</a>
Parks Victoria	131 963	<a href="http://www.parkweb.vic.gov.au">www.parkweb.vic.gov.au</a>
South East Water	131 694	<a href="http://www.southeastwater.com.au">www.southeastwater.com.au</a>
South Gippsland Water	1300 851 636	<a href="http://www.sgwater.com.au">www.sgwater.com.au</a>
Southern Rural Water	1300 139 510	<a href="http://www.srw.com.au">www.srw.com.au</a>
Wannon Water	1300 926 666	<a href="http://www.wannonwater.com.au">www.wannonwater.com.au</a>
Westernport Water	1300 720 711	<a href="http://www.westernportwater.com.au">www.westernportwater.com.au</a>
Yarra Valley Water	1300 853 811	<a href="http://www.yvw.com.au">www.yvw.com.au</a>

## Appendix 2: Section 18 notifications for drinking water quality standards, 2022–23

No.	Water agency	Water sampling locality	Water quality standard	Date
1	Alpine Resorts Victoria – Mt Buller and Mt Stirling Alpine Resort	Mirimbah	<i>E. coli</i>	Jun-23
2	Central Highlands Water	Buninyong / Mt Helen	<i>E. coli</i>	Feb-23
3	Coliban Water	Gunbower	<i>E. coli</i>	Nov-22
4	Coliban Water	Gunbower	<i>E. coli</i>	Nov-22
5	Coliban Water	Tooborac	<i>E. coli</i>	Jan-23
6	Coliban Water	Tarnagulla	Total trihalomethanes	Mar-23
7	Coliban Water	Kyneton	<i>E. coli</i>	Mar-23
8	Coliban Water	Bealiba, Dunolly, Tarnagulla and Laanecoorie	Total trihalomethanes	Jun-23
9	Coliban Water	Goornong	<i>E. coli</i>	Jun-23
10	Goulburn Valley Water	Nathalia	Manganese	Oct-22
11	Goulburn Valley Water	Murchison	Manganese	Jan-23
12	Grampians Wimmera Mallee Water	Ouyen	Trichloroacetic acid	Oct-22
13	Grampians Wimmera Mallee Water	Great Western	Trichloroacetic acid	Jan-23
14	Grampians Wimmera Mallee Water	Great Western	Trichloroacetic acid	Jan-23
15	Grampians Wimmera Mallee Water	Natimuk	Total trihalomethanes	Jan-23
16	Greater Western Water	Sunbury	Lead	Aug-22
17	North East Water	Goorambat	<i>E. coli</i>	Jan-23
18	North East Water	Eskdale	Chlorine	Feb-23
19	South East Water	Bayswater	<i>E. coli</i>	Feb-23



## Appendix 3: Section 22 reports, 2022–23

No.	Water agency	Water sampling locality	Reason	Date
1	Alpine Resorts Victoria	Mt Stirling – Telephone Box Junction	<i>E. coli</i> detection	Nov-22
2	Alpine Resorts Victoria	Falls Creek	<i>E. coli</i> detection	May-23
3	Alpine Resorts Victoria	Mirimbah	<i>E. coli</i> detection <sup>#</sup>	Jun-23
4	Alpine Resorts Victoria	Mt Buller High Level Reticulation	<i>E. coli</i> detection	Jun-23
5	Central Highlands Water	Waubra	Other pathogen detection (mouse found in clear water storage)*	Sep-22
6	Central Highlands Water	Buninyong / Mt Helen	<i>E. coli</i> detection	Feb-23
7	Coliban Water	Boort	Widespread public complaint	Jul-22
8	Coliban Water	Heathcote	Other incident (system depressurisation – water mains break)*	Sep-22
9	Coliban Water	Echuca	Other incident (stormwater ingress at clear water storage)*	Oct-22
10	Coliban Water	Echuca	Turbidity	Oct-22
11	Coliban Water	Echuca	Widespread public complaint	Oct-22
12	Coliban Water	Boort	Widespread public complaint	Nov-22
13	Coliban Water	Cohuna (rural)	Other incident (system depressurisation – Blackwater event)*	Nov-22
14	Coliban Water	Gunbower	<i>E. coli</i> detection	Nov-22
15	Coliban Water	Goornong	Widespread public complaint	Dec-22
16	Coliban Water	Echuca	Widespread public complaint	Jan-23

\* 'Boil water' advisory issued

\*\* 'Do not use' advisory issued

# 'Do not drink' advisory issued

^ *E. coli* detection in water trailers used in regulated water towns.

† Related s 22 reports

### Appendix 3: Section 22 reports, 2022–23 (continued)

No.	Water agency	Water sampling locality	Reason	Date
17	Coliban Water	Tooborac	<i>E. coli</i> detection	Jan-23
18	Coliban Water	Bealiba	Other incident (system depressurisation – water mains break)	Feb-23
19	Coliban Water	Kyneton	<i>E. coli</i> detection	Mar-23
20	Coliban Water	Kyneton, Malmsbury	Other incident (system depressurisation – water mains break)*	Apr-23
21	Coliban Water	Goornong	<i>E. coli</i> detection	Jun-23
22	East Gippsland Water	Mallacoota	<i>E. coli</i> detection	Oct-22
23	Gippsland Water	Traralgon	<i>E. coli</i> detection	Aug-22
24	Gippsland Water	Yinnar	<i>E. coli</i> detection	Jan-23
25	Gippsland Water	Warragul, Drouin, Rokeby / Buln Buln	Widespread public complaint	Mar-23
26	Goulburn Valley Water	Nathalia	Widespread public complaint	Nov-22
27	Goulburn Valley Water	Mooroopna, Shepparton, Tallygaroopna, Toolamba	Widespread public complaint	Dec-22
28	Goulburn Valley Water	Numurkah	<i>E. coli</i> detection	Dec-22
29	Goulburn Valley Water	Mooroopna, Shepparton, Tallygaroopna, Toolamba	Widespread public complaint	Dec-22
30	Goulburn Valley Water	Alexandra	<i>E. coli</i> detection	Jan-23
31	Goulburn Valley Water	Katandra West	<i>E. coli</i> detection	Apr-23
32	Goulburn Valley Water	Barmah	<i>E. coli</i> detection	Apr-23
33	Grampians Wimmera Mallee Water	Nullawil water trailer	<i>E. coli</i> detection <sup>^</sup>	Oct-22

\* 'Boil water' advisory issued

\*\* 'Do not use' advisory issued

# 'Do not drink' advisory issued

<sup>^</sup> *E. coli* detection in water trailers used in regulated water towns.

<sup>†</sup> Related s 22 reports

**Appendix 3: Section 22 reports, 2022–23** (continued)

No.	Water agency	Water sampling locality	Reason	Date
34	Grampians Wimmera Mallee Water	Lalbert water trailer	<i>E. coli</i> detection <sup>^</sup>	Oct-22
35	Grampians Wimmera Mallee Water	Ararat	<i>E. coli</i> detection	Nov-22
36	Grampians Wimmera Mallee Water	Manangatang	<i>E. coli</i> detection	Nov-22
37	Grampians Wimmera Mallee Water	Walpeup water trailer	<i>E. coli</i> detection <sup>^</sup>	Nov-22
38	Grampians Wimmera Mallee Water	Horsham	Other incident (faulty chlorine equipment)	Jan-23
39	Greater Western Water	Moonee Ponds	Other incident (system depressurisation – chemical contamination via backflow)**	Aug-22
40	Greater Western Water	Richmond	<i>E. coli</i> detection	Oct-22
41	Greater Western Water	Gisborne, Macedon, Mount Macedon	Other incident (unauthorised access at water storage tank)	Dec-22
42	Greater Western Water	Sunbury	<i>E. coli</i> detection	Mar-23
43	Lower Murray Water	Swan Hill	Other incident (elevated fluoride)	May-23
44	Melbourne Water	Lyrebird Avenue Water Treatment Plant	Other incident (inadequate disinfection) <sup>†</sup>	Jan-23
45	North East Water	Beechworth Low Level	<i>E. coli</i> detection	Sep-23
46	North East Water	Chiltern, Springhurst	Other pathogen detection (lizard found in clear storage tank)	Oct-22
47	North East Water	Harrietville	Other incident (system depressurisation – clear water storage run dry due to communications equipment failure)*	Nov-22

\* 'Boil water' advisory issued

\*\* 'Do not use' advisory issued

# 'Do not drink' advisory issued

<sup>^</sup> *E. coli* detection in water trailers used in regulated water towns.

<sup>†</sup> Related s 22 reports

**Appendix 3: Section 22 reports, 2022–23** (continued)

No.	Water agency	Water sampling locality	Reason	Date
48	North East Water	Wodonga/Baranduda High Level, Chiltern, Kiewa, Springhurst, Tangambalanga, Wodonga Low Level, Wodonga High Level, Wodonga Logic Centre	Widespread public complaint	Jan-23
49	North East Water	Yarrawonga, Bundalong, Tungamah, St James, Devenish, Goorambat	Widespread public complaint	Jan-23
50	North East Water	Goorambat	<i>E. coli</i> detection	Jan-23
51	South East Water	Belgrave	<i>E. coli</i> detection	Dec-22
52	South East Water	Bayswater	<i>E. coli</i> detection	Feb-23
53	South East Water	Bunyip	Other incident (system depressurisation – water mains break)	Apr-23
54	South East Water	Cranbourne	<i>E. coli</i> detection	Apr-23
55	South Gippsland Water	Koonwarra, Leongatha	Other incident (Leongatha raw water main break)	Aug-22
56	South Gippsland Water	Poowong, Loch, Nyora	Other incident (system depressurisation – water mains break)	Nov-22
57	Wannon Water	Camperdown (Rural), Camperdown (Urban), Derrinallum, Lismore	Other pathogen detection (bird found in clear water storage) <sup>†</sup>	Sep-22
58	Wannon Water	Merino	Other incident (system depressurisation – water mains break) <sup>*</sup>	Oct-22
59	Wannon Water	Camperdown (Rural), Camperdown (Urban), Derrinallum, Lismore	<i>E. coli</i> detection	Nov-22

\* 'Boil water' advisory issued

\*\* 'Do not use' advisory issued

# 'Do not drink' advisory issued

^ *E. coli* detection in water trailers used in regulated water towns.

† Related s 22 reports

**Appendix 3: Section 22 reports, 2022–23** (continued)

No.	Water agency	Water sampling locality	Reason	Date
60	Wannon Water	Warrnambool	Widespread public complaint	Apr-22
61	Yarra Valley Water	Montrose	Widespread public complaint	Jul-22
62	Yarra Valley Water	Croydon	Widespread public complaint**	Oct 22
63	Yarra Valley Water	Preston	<i>E. coli</i> detection	Dec-22
64	Yarra Valley Water	Ivanhoe	Widespread public complaint	Dec-22
65	Yarra Valley Water	Lyrebird Avenue	Other incident (inadequate disinfection) <sup>†</sup>	Jan-23
66	Yarra Valley Water	Ridge/Monbulk	Other incident (system depressurisation – valve operation error)	Feb-23
67	Yarra Valley Water	Craigieburn	Widespread public complaint	Apr-23
68	Yarra Valley Water	Lyrebird Avenue	<i>E. coli</i> detection	Jun-23

\* 'Boil water' advisory issued

\*\* 'Do not use' advisory issued

# 'Do not drink' advisory issued

^ *E. coli* detection in water trailers used in regulated water towns.

† Related s 22 reports

## Appendix 4: Drinking water quality complaints reported by water suppliers

		Number of complaints				Type of complaints		
		2020–21	2021–22	2022–23	Variance from 2021–22 to 2022–23 <sup>a</sup>	Discolour/turbidity/dirty water	Taste and odour	Other <sup>c</sup>
<b>Metropolitan water suppliers</b>								
1	Greater Western Water	1,271	1,170	1,242	▲ 6%	***	**	*
2	South East Water	1,008	966	2,388	▲ 147%	***	*	**
3	Yarra Valley Water	4,004	3,081	2,994	▼ -3%	***	**	*
<b>Regional water suppliers</b>								
4	Barwon Water	242	201	209	▲ 4%	***	*	**
5	Central Highlands	70	88	84	▼ -5%	***	**	*
6	Coliban Water	232	181	244	▲ 35%	**	***	*
7	East Gippsland Water	51	53	36	▼ -32%	**	***	**
8	Gippsland Water	144	112	223	▲ 99%	**	***	*
9	Goulburn Valley Water	170	155	323	▲ 108%	***	**	*
10	Grampians Wimmera Mallee Water	88	51	49	▼ -4%	***	**	*
11	Lower Murray Water	28	26	79	▲ 204%	***	**	*
12	North East Water	169	170	276	▲ 62%	***	**	*
13	South Gippsland Water	81	51	39	▼ -24%	**	***	*
14	Wannon Water	203	101	127	▲ 26%	**	***	*
15	Westernport Water	167	46	21	▼ -54%	***	***	**
16	Other water suppliers <sup>b</sup>	0	0	0	–	–	–	–
<b>Total</b>		<b>7,928</b>	<b>6,452</b>	<b>8,334</b>	<b>▲ 29%</b>	<b>***</b>	<b>**</b>	<b>**</b>

a. Figures with a grey upwards arrow denote an increase in customer complaints from 2021–22. Figures with a blue downwards arrow denote a decrease in customer complaints from 2021–22.

b. Parks Victoria and Alpine Resorts Victoria did not have any water quality complaints during the reporting year.

c. The section relating to 'Other' complaints covers a broad range of enquiries such as alleged illness, requests for data, white water, blue water, air in water, problems with aquatic animal pets and corrosion of internal household plumbing or appliances.

\*\*\* Most common

\*\* Second most common

\* Least common

## Appendix 5: Water agency risk management plan audit outcomes – noncompliance with section 7(1) of the Act

Risk management plan audits conducted in 2023 identified 9 water agencies as noncompliant with s 7(1) for the 2021–22 audit period. This table provides minor and major noncompliant audit findings identified during the risk management plan audit process.

### Alpine Resorts Victoria: Mt Hotham Alpine Resort

There is not a control measure in place to provide an immediate alert if the UV disinfection process performance is suboptimal i.e. UVI < 80%.

There is not a control measure in place to provide an immediate alert if the emergency chlorine disinfection performance is suboptimal i.e. under / over dosing.

THM samples collected from the same sample location on two consecutive occasions.

The Drinking Water Safety Management Plan (DWSMP) does not identify the treatment processes (UV and chlorine disinfection) as critical control points with limits and corrective action documented if a critical limit is exceeded.

### Alpine Resorts Victoria: Lake Mountain and Mt Baw Baw Alpine Resort

The Mt Baw Baw risk management plan does not identify the extent of microorganisms in the raw water or the extent that they are removed by treatment.

The details and reference to emergency management arrangements and procedures for dealing with an incident, event or emergency that may adversely affect the quality or safety of drinking water has been found to be a major non-compliance.

Mt Baw Baw failed to notify the Department of Health appropriately of a water quality incident. No improvement has been provided for this in particular as a new procedure has been developed following the incident, but an increase of scope in the procedure has been recommended.

The inclusion of a detailed water sampling program in the RMP that specifies appropriately chosen parameters and frequency, has been found to have a minor noncompliance. This was due to there being no monitoring or historical data on ultra violet transmittance (UVT) in the water supply. The raw water contains a lot of organics, and these have the potential to absorb ultra violet light (UV) and affect the performance of the UV disinfection system. It was considered to be minor as a new GAC has been installed to remove organics prior to the UV system.

The documentation of procedures and management systems detailing the amount, purity and control of chemicals added to drinking water to ensure the quality of water and safety of human health was determined to be a non-compliance as there was no evidence available for chemical procurement processes to ensure the purity of chemicals dosed.

## Appendix 5: Water agency risk management plan audit outcomes – noncompliance with section 7(1) of the Act (continued)

### Alpine Resorts Victoria: Lake Mountain and Mt Baw Baw Alpine Resort (continued)

Details, including the verification, of the infrastructure and other features of the system of supply that are designed to assist in the management of risks to the quality of water that are identified in the RMP has been found to be non-compliant due to some considerable issues in the way the controls of the schemes are being implemented. It was major and not critical because the current operation at Mt Baw Baw provides an initial dose of chlorine that should satisfy disinfection requirements and there are multiple barriers with the installation of a validated UV system.

The inclusion of detailed Critical Control Points (CCPs), critical limits and their relevant actions, procedures, processes, policies, standards, or guidelines in the RMP has been found to be non-compliant due to some considerable issues in the way the controls the schemes are being implement. It was major and not critical only because the current operation at MBB does provide an initial dose of chlorine that should satisfy disinfection requirements and there are multiple barriers with the implementation of the UV system.

Details contained within the RMP of the methodology used to quantify and remove or reduce microbial hazards present in the drinking water treatment process, has been identified as a major non-conformance. There is not a methodology identified for the quantification of microbial hazards.

The RMP must address the risk of organisms, substances and matters referred to in R. 8(3) (a) that enter in to supplied water by reason of the transfer or distribution of that water was found to have a major non-compliance. As discussed in a previous element, CCP limits need to be reviewed. Notwithstanding having the appropriate critical limits, it REC-23-036 | WQ RMP Audit Report Page 3 can be seen in Table 4 of the MBB risk management plan that exceedance of a critical limit for chlorine does include stopping the supply of water, however, the alarm limits set in SCADA do not match those in the RMP.

The preventive measures at Lake Mountain (LM) were not fully implemented. Awareness training was also not formally implemented, however, it was noted that all the signage was in place, which is why this was considered to be a minor.

The revision of the RMP was considered to be non-compliant because the Mt Baw Baw risk management plan did not address additional preventive measures for residual risks as detailed in the RMP and in the ADWG methodology that was used. It was identified as minor, as even though it has the potential for unacceptable risks to be left untreated, it is a low-risk source water, multiple barriers are in place and many risks seemed to be overestimated.



## Appendix 5: Water agency risk management plan audit outcomes – noncompliance with section 7(1) of the Act (continued)

### Barwon Water

The Act requires development and implementation of preventative strategies (including appropriate control and monitoring measures). (s. 9(1)(d)). While minor, a GAC Filtration CCP was identified as part of the Apollo Bay WTP Process Control, but not listed on the CCP Locations list, creating potential for a gap in process understanding.

Some minor noncompliances in implementation were observed including gaps in completion of chemical deliveries record requirements, omission of one test on PAC23 (Colac WTP), raw and treated water turbidity meters at Colac WTP not been externally calibrated when due, instrument numbers on calibration stickers at Colac WTP did not always align with the instrument number in SCADA.

Colac WTP fluoridation critical limit was inconsistent between CCP documentation (1.5 mg/L) and SCADA (1.6 mg/L). This is considered a minor noncompliance as there are more conservative shutdown processes prior to the CCP limit.

Chemical delivery records were not available for the entire audit period at Colac WTP (older records had been thrown out as part of a tidy-up). This fact meant that the auditors were unable to confirm the audit guidance component: "During the audit all documentation must be available for inspection."

### Central Highlands Water

A number of instances where chemical samples were taken from the same location on consecutive sampling events during routine sampling.

### Coliban Water

Not adequately managing risks associated with regulated water (Section 9(1b) Safe Drinking water Act 2003) and (Safe Drinking Water Regulations 2015 8(3))

Failure to collect and analyse all samples listed in water sampling program, and delays in identifying missed samples. (Safe Drinking Water Regulations 2015 8(1)(d)(iv))

### East Gippsland Water

The audit noted that some chemical parameters were sampled from the same location within a sampling location on two or more consecutive occasions.

**Appendix 5: Water agency risk management plan audit outcomes – noncompliance with section 7(1) of the Act** (continued)

**Gippsland Water**

Failure to collect and analyse small number of samples listed in water sampling program, and the absence of an effective process to identify missed samples.

Chemical parameters that were sampled from the same location within a sampling location on two or more consecutive occasions.

**Greater Western Water**

The implementation of, and compliance with the requirements of the risk management plan has been given a minor non-compliance as GWW failed to fully implement the RMP water quality monitoring plan in the audit period.

The development and implementation of preventative strategies (including appropriate control and monitoring measures) has been given a minor non-compliance as the backflow prevention devices owned by GWW in Area 2 have not been tested within an adequate timeframe.

The requirement for competency and training of personnel who are employed or engaged by the water agency, in relation to the monitoring and management of hazards and risks, has been given a minor non-compliance as a gap was identified in the competency and training processes for contract staff undertaking field services. This was considered to be minor as there are some informal structures in place and contract oversight through audits by GWW.

There is a potential shortfall in the treatment of virus at the Romsey Water Filtration Plant (WFP). Due to the size of the treatment gap identified in GWW's 2020 report immediate action was required to address it. Action has been taken in the medium-term to replace the plant, however, short-term actions were not sufficient to verify the risk or mitigate the risk.

## Appendix 5: Water agency risk management plan audit outcomes – noncompliance with section 7(1) of the Act (continued)

### South East Water

The Water Quality Management System does not have technical internal IT support to maintain its functionality. The system is essential to monitor water quality and provide alerts for exceedances of water quality parameters. The Water Quality team has limited capability to make changes to the database, as a result the WQ team are unable to update the Water Quality Management System without external support. There is reliance on external consultant to provide ongoing system support for daily issues or system alterations. There already has been an instance where the system was inaccessible due to the rollout of the Microsoft 365 Office software suite. If there was an exceedance during this time, the water quality team would need to rely on manual notification between South East Water and the laboratory to manage the event. This system has been identified for replacement with funds sought in the recent pricing submission for the period commencing July 2023-2028. However, no evidence of meetings to indicate the WQMS will be prioritised for replacement within the next 12 months.

It is imperative that either internal technical assistance be provided, or the system be migrated to platforms within SE Water.

The audit sample identified a high level of concern for the management and maintenance of the identified risks for storage tanks. The risks to storage tanks and preventive measures have been detailed in the DW HACCP plan, however during the audit I was not satisfied that the preventative measures are being implemented in all cases.

The auditees at the time of the audit could not provide a risk analysis/assessment for each storage tank to determine when the tanks should be cleaned or inspected. A tank cleaning schedule was provided; however, the schedule demonstrates that the tank cleans are not complying with SEW's procedure that states that tanks shall be cleaned every 5 years. There is also evidence that the Koo Wee Rup tank has a 10-year gap between cleaning and was cleaned as a reactive measure due to the *E. coli* detection.

The current tank inspection checklist is focused on monitoring the security level onsite with limited water quality focus.

Interviews with the onsite water operators revealed that tank inspections are not being conducted due to safety concerns and appropriate safety equipment not being available at McKenzie Rd, Koo Wee Rup High Level, Upwey and Cook St tanks for the month of January, the 10 critical tanks had not been inspected due to a lack of resources, the information provided to the auditor did not align with the interview conversations onsite.

Considering there have been *E. coli* incidents at tanks from 2021 with issues identified related to the maintenance of tanks, and despite the actions that have been undertaken, including those within the Chlorination Strategy, there seems to have not been sufficient progress to manage the risks associated with tank inspection and cleaning. Given this, there is a high potential for a risk situation and that risk is likely to compromise public health.

#### Note:

This is the second consecutive risk management audit that Barwon Water and East Gippsland Water have been assessed as noncompliant.

## Appendix 6: Regulated water supplies at 30 June 2023

Water agency	Water supply area
Alpine Resorts Victoria	Lake Mountain Alpine Resort
Central Highlands Water	Amphitheatre, Raglan, Redbank
Coliban Water	Borong, Dingee, Jarklin, Macorna, Mitiamo, Mysia, Wychitella
Goulburn Valley Water	Corop, Goulburn Weir, Kirwans Bridge, Molesworth, Strathbogie, Woods Point
Grampians Wimmera Mallee Water	Antwerp, Apsley, Berriwillock, Buangor, Chillingollah, Chinkapook, Cowangie, Culgoa, Dooen, Elmhurst, Glenorchy, Goroke, Harrow, Jung, Kaniva, Kiata, Lalbert, Lascelles, Lillimur, Marnoo, Miram, Moyston, Murrayville, Nandaly, Nullawil, Patchewollock, Pimpinio, Serviceton, Speed, Streatham, Tarranyurk, Tempy, Ultima, Waitchie, Walpeup, Watchem, Westmere, Wickliffe, Yaapeet Pipelines: Ararat-Lake Fyans pipeline, Mount Cole pipeline, Mount Zero pipeline, Moyston pipeline, Northern Mallee pipeline, St Arnaud pipeline, Stawell supply main, Wickliffe pipeline, Willaura pipeline, Willaura-Lake Bolac pipeline
Lower Murray Water	Millewa water supply system (Cullulleraine, Meringur, Werrimull), Mystic Park
Wannon Water	Darlington, North Otway pipeline

## Glossary

<b>Blue-green algae</b>	Blue-green algae, or cyanobacteria, are a type of microscopic, algae-like bacteria that inhabit freshwater, coastal waters and marine waters. Blue-green algae in water bodies can potentially affect human health. Refer also to 'Harmful algal bloom'.
<b>'Boil water' advisory</b>	Advice issued by a water supplier that requires consumers to boil their drinking water before consumption (or for purposes connected to human consumption such as food preparation, tooth brushing or ice making) due to a deterioration in the quality of drinking water that has been assessed as posing an unacceptable risk to public health.
<b>Catchment</b>	An area of land that collects rainfall and contributes to surface water (streams, rivers, wetlands) or to groundwater.
<b>Catchment-to-tap</b>	A risk management approach based on the principle that multiple treatment barriers minimise or mitigate identified hazards in raw water and produce water that meets drinking water quality standards.
<b>Chloral hydrate</b>	A by-product formed in drinking water via a reaction between chlorine and naturally occurring organic material.
<b>Corrective actions</b>	Actions put in place following an incident or issue to alleviate immediate concerns.
<b>Dichloroacetic acid</b>	A by-product formed in drinking water via a reaction between chlorine and naturally occurring organic material.
<b>Disinfectant</b>	An oxidising agent (for example, chlorine, chlorine dioxide, chloramines or ozone) added to water in any part of the treatment process or distribution system to reduce microorganisms to acceptable levels.
<b>Disinfection</b>	The process designed to destroy or inactivate microorganisms in water, including essentially all pathogenic (disease-causing) bacteria. There are numerous disinfection processes including chlorination, chloramination, chlorine dioxide disinfection, ozonation and ultraviolet disinfection.
<b>Disinfection by-products</b>	Products formed from the reaction between disinfectants, particularly chlorine, and naturally occurring organic materials in water.
<b>Distribution system</b>	A network of pipes leading from a water treatment plant to customers' plumbing systems.
<b>'Do not drink' advisory</b>	<p>Advice issued by a water supplier when the risk of chemical or radiological contamination in the drinking water supply may pose an unacceptable risk to public health.</p> <p>Consumers are usually advised to 'do not drink water or use affected water for human consumption such as food preparation, tooth brushing or ice making'. In such cases, boiling water will not make it safe for drinking and an alternative drinking water source is required.</p>

<b>'Do not use' advisory</b>	<p>Advice issued by a water supplier when the risk of chemical or radiological contamination in the drinking water supply may pose an unacceptable risk to public health.</p> <p>Consumers are usually advised to 'do not use tap water for any purposes while a do not use advisory is in place'. In such cases, boiling water will not make it safe for use and an alternative water source is required.</p>
<b>Drinking water</b>	Water that is intended for human consumption or for purposes connected with human consumption such as preparing food and making ice (excludes pre-packaged bottled water).
<b>Drinking water quality standards</b>	Drinking water quality standards specified in r 12 of the Safe Drinking Water Regulations 2015 for the purposes of s 17 of the <i>Safe Drinking Water Act 2003</i> .
<b><i>Escherichia coli</i></b>	<i>Escherichia coli</i> (also known as <i>E. coli</i> ) is a type of faecal coliform bacteria. The presence of <i>E. coli</i> is an indicator of contamination from human or animal waste. Its presence most likely indicates a breach of a water quality treatment barrier or contamination during the distribution of the water. It is used as an indicator for the presence of microbial pathogens.
<b>False-positive sample</b>	An investigation concluded that the detection of <i>E. coli</i> in a sample is not representative of the drinking water in the relevant water sampling locality. Refer to the meaning of 'false positive' in Schedule 2 of the Safe Drinking Water Regulations 2015.
<b>Groundwater</b>	Water contained in rocks or subsoil.
<b>Harmful algal bloom</b>	Naturally occurring algae that sometimes produce toxins that affect either aquatic life, such as fish, or human health. This includes blue-green algae and many other algae.
<b>Hazard</b>	A biological, chemical, physical or radiological agent that has the potential to cause harm. Physical and chemical hazards include heavy metals, trace organic compounds, total suspended solids and turbidity. Microbiological hazards include bacteria, viruses and protozoan parasites.
<b>N-Nitrosodimethylamine</b>	A by-product formed in drinking water via a reaction between chlorine and naturally occurring organic material.
<b>Nephelometric turbidity units</b>	A measure of clarity determined by a nephelometer that emits a light beam through water.
<b>Notification</b>	Verbal and written communication received by the department from water suppliers under s 18 of the <i>Safe Drinking Water Act 2003</i> when drinking water supplied to the public does not (or is not likely to) comply with drinking water quality standards.

<b>Parameters</b>	Parameters for drinking water quality fall under 4 categories: physical, chemical, microbiological and radiological. Physical parameters include colour and turbidity. Chemical parameters include metals and organic compounds. Microbiological parameters include viruses, protozoa and bacteria. Radiological parameters include beta- and gamma-emitting radionuclides.
<b>Pathogen</b>	Disease-causing microorganism. Pathogen types include viruses, protozoa and bacteria.
<b>Preventive actions</b>	Actions put in place following immediate corrective actions to minimise the risk of a recurrence of an incident or issue.
<b>Raw water</b>	Water found in the environment – such as rainwater, groundwater, reservoir water and river water – that has not been treated.
<b>Regulated water</b>	Water that is not intended for drinking but that could reasonably be mistaken for drinking water.
<b>Report</b>	Verbal and written communication received by the department from water suppliers, water storage managers or council officers under s 22 of the <i>Safe Drinking Water Act 2003</i> about known or suspected contamination of water.
<b>Reticulated drinking water supply</b>	The piped drinking water network.
<b>Risk</b>	The likelihood and consequence of a hazard causing harm in exposed populations in a specified timeframe.
<b>Risk management</b>	The systematic evaluation of the water supply system, the identification of present and potential hazards and hazardous events, the assessment of risks and the development and implementation of preventive strategies to manage those risks.
<b>Risk management plan</b>	A plan prepared by water agencies under the <i>Safe Drinking Water Act 2003</i> that details how risk is managed in relation to the storage or supply of drinking water and regulated water to the public.
<b>Safe drinking water regulatory framework</b>	The legislation used to regulate the supply of Victoria's drinking water is referred to as the safe drinking water regulatory framework. The framework consists of the <i>Safe Drinking Water Act 2003</i> and the <i>Safe Drinking Water Regulations 2015</i> . The safe drinking water regulatory framework supports the <i>Health (Fluoridation) Act 1973</i> and is consistent with the risk management approach in the <i>Australian drinking water guidelines</i> .

<b>Section 18</b>	Refers to a notification required if noncomplying water is supplied. The <i>Safe Drinking Water Act 2003</i> states that '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 that fact'.
<b>Section 22</b>	Refers to the reporting of known or suspected contamination. The <i>Safe Drinking Water Act 2003</i> states that it 'applies if an officer of a water supplier, water storage manager or council believes, or suspects, on reasonable grounds, that water supplied, or to be supplied, for drinking purposes: <ul style="list-style-type: none"> <li>• may be the cause of an illness; or</li> <li>• may be the means by which an illness is being, has been or will be, transmitted; or</li> <li>• may contain any pathogen, substance, chemical or blue-green algae toxin, whether alone or in combination, at levels that may pose a risk to human health; or</li> <li>• may cause widespread public complaint'.</li> </ul> A section 22 must be reported immediately to the Secretary.
<b>Surface water</b>	Water naturally open to the atmosphere such as that in rivers, streams, lakes and reservoirs.
<b>The Act</b>	<i>Safe Drinking Water Act 2003</i>
<b>The Regulations</b>	Safe Drinking Water Regulations 2015
<b>Trichloroacetic acid</b>	A by-product formed in drinking water via a reaction between chlorine and naturally occurring organic material.
<b>Trihalomethanes</b>	Organic compounds formed when chlorine reacts with naturally occurring organic matter in water supplies.
<b>Turbidity</b>	The cloudiness of water caused by the presence of fine, suspended matter.
<b>Ultraviolet (UV) disinfection</b>	A method of water disinfection in which light in the 100 to 400 nanometre wavelength range is applied to inactivate microbial pathogens.
<b>Water agency</b>	Water storage managers and water suppliers are referred to collectively as water agencies.
<b>Water fluoridation</b>	The adjustment of the level of fluoride in drinking water to around 1 mg/L (also known as 1 part per million), a level that helps to protect teeth against decay.



<b>Water sampling locality</b>	A geographic area defined by the following criteria: an area supplied with drinking water; a discrete area of similar water quality, inclusive of all customers supplied with drinking water of similar water quality; and able to be described by its boundaries. Water samples are required to be taken and analysed from water sampling localities.
<b>Water storage manager</b>	The Melbourne Water Corporation constituted under the <i>Water Act 1989</i> or a water corporation within the meaning of the Water Act (other than Melbourne Water Corporation constituted under the Water Act) that supplies water to a water supplier; or any other person or body declared by the Regulations to be a storage manager for the purposes of the <i>Safe Drinking Water Act 2003</i> .
<b>Water supplier</b>	A supplier of drinking water or regulated water to the public; the holder of a water licence issued in Part 2 Division 1 of the <i>Water Industry Act 1994</i> ; an authority within the meaning of the <i>Water Act 1989</i> ; Parks Victoria established under the <i>Parks Victoria Act 1998</i> ; an alpine resort managed under Alpine Resorts Victoria in accordance with the <i>Alpine Resorts (Management) Act 1997</i> ; or any other person or body declared by the Regulations to be a water supplier for the purposes of the <i>Safe Drinking Water Act 2003</i> .

