

2014/15

Water Quality ANNUAL REPORT



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Human Services
(Water Program)

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Cover photo – Solar Bee (a solar powered mixing system) is being dragged by a boat during installation at Glenthompson reservoir. Wind turbines can be seen in the background (photo courtesy of Jenith Jesuthasan).

TABLE OF CONTENTS

1.	INTRODUCTION	5
	Defining Drinking Water	5
	Sources of Water	5
2.	MANAGING WATER QUALITY	9
	Undertakings under Section 30 of the Act.....	9
	Variation to Aesthetic Standards	9
	Exemptions from water quality standards.....	9
	Drinking Water	9
	Regulated Water	9
	Non-potable supplies	10
3.	ENSURING SAFE DRINKING WATER	11
	Water Quality Management System	11
	Risk Management Plan Audit.....	11
4.	WATER TREATMENT.....	12
5.	MAINTAINING HIGH QUALITY WATER.....	14
	Staff Awareness and Training	14
	Distribution System	14
	Water Treatment Plant Changes and Improvements	14
6.	DRINKING WATER QUALITY RESULTS 2014/15	15
	Sampling Frequency	15
	Testing Programs	15
	Interpreting the results	15
	<i>Safe Drinking Water Regulations 2005 Standards</i>	16
	<i>Escherichia coli (E. coli)</i>	16
	Actions in relation to noncompliance for <i>E.coli</i>	17
	Chlorine-based Disinfection By-Product Chemicals	18
	Compliance – Trihalomethanes Results.....	18
	Compliance – Chloroacetic Acid Results.....	19
	Compliance – Dichloroacetic Acid Results	20
	Compliance – Trichloroacetic Acid Results	21
	Ozone-based Disinfection By-Product Chemicals.....	22
	Aluminium	23
	Actions in relation to noncompliance for Aluminium	24
	Turbidity	25
	Additional monitoring: Other algae, pathogen, chemical or substance that may pose a risk to human health	26
	Chlorite	26
	Fluoride.....	26
	Arsenic Results	27
	Copper Results	28
	Manganese Results.....	30
	Water treatment related chemicals	31
	Nitrate and Nitrite	31
	Inorganics	31
	Polycyclic Aromatic Hydrocarbon Results	31
	Pesticide/Herbicide Results.....	32
	Industrial Chemical Results.....	33
	Aesthetic Parameters.....	35
	Alkalinity Results	36

	Hardness Results.....	39
	Iron Results	41
	Colour Results	43
	Analysis of Results	45
	Compliance as a Percentage of Localities	45
	Compliance as a Percentage of Population	45
7.	EMERGENCY AND INCIDENT MANAGEMENT.....	46
	Section 22 Incidents.....	46
	Section 18 Incidents.....	47
	Other Incidents.....	48
	Customer Complaints.....	48
8.	GLOSSARY	50
9.	WANNON WATER SERVICE AREA MAP	52

I. INTRODUCTION

Wannon Water is committed to providing safe, reliable drinking water to South-west Victoria. Wannon Water provides water and water reclamation services to a population of approximately 83,000 people (100,000 during peak season) in South-west Victoria. The area serviced extends from the South Australian border in the west, to Balmoral in the north, to Lismore in the east and the lower Gellibrand River catchment on the coast.

Wannon Water has aligned its drinking water quality management system with the Australian Drinking Water Guidelines 2011 (ADWG) and Hazard Analysis and Critical Control Point (HACCP) risk management principles. Wannon Water will continue to improve its drinking water quality management program to ensure that water is delivered to our customers within the limits of the *Safe Drinking Water Act 2003* and associated Regulations.

This 2014/15 Drinking Water Quality annual report has been developed in accordance with the requirements of the *Safe Drinking Water Act 2003* and *Safe Drinking Water Regulations 2005*. The report highlights the programs and initiatives Wannon Water has in place to provide safe drinking water to the people living in Wannon Water's water sampling localities.

Wannon Water has a comprehensive water quality monitoring program extending across a region of 24,500 square kilometres. Samples are collected from: raw water sources; water entry points; water storages and at specific points in the reticulation representing the "customers tap". All samples collected are analysed by an independent laboratory certified by the National Association of Testing Authorities (NATA).

During 2014/15, Wannon Water continued to achieve a high level of compliance against the requirements of the *Safe Drinking Water Act 2003* and *Safe Drinking Water Regulations 2005*.

The high standard of drinking water provided is reflected in customers' continued satisfaction with Wannon Water's performance. The 2014 customer satisfaction survey showed that 94% of domestic customers were satisfied or

very satisfied with the performance of Wannon Water. Business customers were not surveyed in 2014.

Defining Drinking Water

The *Safe Drinking Water Act 2003* defines three types of water quality categories.

Drinking Water – Water that is intended for human consumption or for purposes connected with human consumption, such as the preparation of food or the making of ice for consumption or for the preservation of unpackaged food, whether or not the water is used for other purposes.

Regulated Water – This is water that is not intended for human consumption, but could be mistaken as drinking water. If there is a potential for the supply to be mistaken as drinking water exists, then the Minister for Health will declare the water as Regulated Water.

Non Potable Water – This is water that is not intended for human consumption and cannot be mistaken as drinking water. This water falls outside the *Safe Drinking Water Act 2003* and *Safe Drinking Water Regulations 2005*.

Sources of Water

During 2014/15, Wannon Water supplied drinking water to residential, rural, commercial and industrial customers. The water is harvested from a variety of sources and supplied through approximately 1,884 kilometres of water mains.

Wannon Water harvested approximately 11,397 megalitres (ML) of water to supply its customers. This water comes from an array of sources; namely, protected catchment areas, agricultural land, groundwater and, in two instances, supply from another regional water corporation. This water is supplied to customers with varying degrees of treatment, dependent on the characteristics of the quality.

Table I-1 details: Wannon Water's water sampling localities; the sources of supply; how the water is stored subsequent to treatment and the treatment facilities operated by Wannon Water. Figure 9 -1 illustrates the localities and where the water is sourced from.

Table I-1 - Source water and treatment systems summary

Water Sampling Locality	Source Water	Raw Water Storage	Treatment Plant	Number of customers ¹
Allansford - via Warrnambool Water Treatment Plant (WTP)	Arkins Creeks (3)	Gellibrand Tank	Warrnambool WTP	360
	Gellibrand River	South Otway Tank	Allansford Disinfection Plant (DP)	
	Carlisle Bores (2)	Ewen's Hill Reservoir		
	Curdievale Bores (2)			
	– via North Otway Pipeline	Plantation Rd Storage		
		Tank Hill Reservoir		
	Gellibrand River – South Otway Pipeline	Warrnambool Storage 1		
		Warrnambool Storage 2		
	Albert Park Bores (3)	Brierly Basin		
	Roof water (North Warrnambool)	Albert Park Raw Water Storage		
Balmoral	Rocklands Reservoir (Grampians Wimmera Mallee Water)	Balmoral Service Basin	Balmoral WTP	160
Camperdown (Rural)	Arkins Creeks (3)	Gellibrand Tank	Camperdown WTP	390
	Gellibrand River	Donald's Hill Reservoir		
	Carlisle Bores (2)			
	Curdievale Bores (2)			
	– via North Otway Pipeline			
Camperdown (Urban)	Arkins Creeks (3)	Gellibrand Tank	Camperdown WTP	1870
	Gellibrand River	Donald's Hill Reservoir		
	Carlisle Bores (2)			
	Curdievale Bores (2)			
	– via North Otway Pipeline			
Caramut	Caramut Bores (2)	Caramut Service Basin	Caramut DP	80
		Caramut Tank (Raw Water)		
Casterton	Tullich Bores (4)	N/A	Casterton WTP	1010
Cavendish	Grampians National Park	Cavendish Service Basin	Cavendish Disinfection Plant	110
	7 streams on the western slopes of the Victoria Range and drought relief bores (2)			
Cobden	Arkins Creeks (3)	Gellibrand Tank	Cobden WTP	920
	Gellibrand River	Cobden Service Basin		
	Carlisle Bores (2)			
	Curdievale Bores (2)			
	– via North Otway Pipeline			
Coleraine - via Casterton WTP	Tullich Bores (4)	N/A	Casterton WTP	660
			Coleraine DP	
Darlington (Regulated Supply)	Darlington Bore (1)	Darlington Elevated Tank	Nil Treatment	20
Dartmoor	Dartmoor Bore (1)	N/A	Dartmoor DP	180
Derrinallum - via Camperdown WTP	Arkins Creeks (3)	Gellibrand Tank	Camperdown WTP	270 ²
	Gellibrand River	Donald's Hill Reservoir	Ettrick's Springs DP	
	Carlisle Bores (2)		Lismore/Derrinallum Tank DP	
	Curdievale Bores (2)			
	– via North Otway Pipeline			
Dunkeld - via Hamilton WTP	Grampians National Park	Hayes Reservoir	Hamilton WTP	420
	7 streams on the western slopes of the Victoria Range and drought relief bores (2)	Cruckoor Reservoir	Dunkeld DP	
		Hartwicks Reservoir		
		Hamilton Service Basins 1 & 2		
Glenthompson	Yuppeckiar Creek Catchment and	Glenthompson Reservoir	Glenthompson WTP	140

Water Sampling Locality	Source Water	Raw Water Storage	Treatment Plant	Number of customers ¹
	Grampians Wimmera Mallee Water (32ML supplementary purchase from Willaura Catchment)	Railway Reservoir		
Hamilton	Grampians National Park	Hayes Reservoir	Hamilton WTP	5530
	7 streams on the western slopes of the Victoria Range and drought relief bores (2)	Cruckoor Reservoir		
		Hartwichs Reservoir		
		Hamilton Service Basins 1 & 2		
Heywood	Heywood Bores (2)	N/A	Heywood WTP	780
Koroit - via Warrnambool WTP	Arkins Creeks (3)	Gellibrand Tank	Warrnambool WTP	800
	Gellibrand River	South Otway Tank	Illowa (Koroit) DP	
	Carlisle Bores (2)	Ewen’s Hill Reservoir		
	Curdievale Bores (2)	Plantation Rd Storage Tank Hill Reservoir		
	– via North Otway Pipeline			
	Gellibrand River – South Otway Pipeline	Warrnambool Storage 1		
		Warrnambool Storage 2		
	Albert Park Bores (3)	Brierly Basin		
	Roof water (North Warrnambool)	Albert Park Raw Water Storage		
Lismore - via Camperdown WTP	Arkins Creeks (3)	Gellibrand Tank		Camperdown WTP
	Gellibrand River	Donald’s Hill Reservoir	Ettrick’s Springs DP	
	Carlisle Bores (2)		Lismore/Derrinallum Tank DP	
	– via North Otway Pipeline			
Macarthur	Macarthur Bore	N/A	Macarthur WTP	180
Merino - via Casterton WTP	Tullich Bores - Bore Field (4)	N/A	Casterton WTP	180
			Merino DP	
Mortlake - via Terang WTP	Arkins Creeks (3)	Gellibrand Tank	Terang WTP	740
	Gellibrand River	Ewen’s Hill Reservoir	Mortlake DP	
	Carlisle Bores (2)	Absolom’s Bore Balance Tank		
	Curdievale Bores (2)			
	– via North Otway Pipeline			
	and Absolom’s Bore (2)			
Noorat/Glenormiston - via Terang WTP	Arkins Creeks (3)		Gellibrand Tank	Terang WTP
	Gellibrand River	Ewen’s Hill Reservoir		
	Carlisle Bores (2)			
	Curdievale Bores (2)			
	– via North Otway Pipeline			
Paaratte - via Port Campbell WTP	Port Campbell Bore (1)	N/A	Port Campbell WTP	30
Penshurst	Penshurst Bore (1)	N/A	Penshurst DP	340
Peterborough - via Port Campbell WTP	Port Campbell Bore (1)	N/A	Port Campbell WTP	410
Port Campbell	Port Campbell Bore (1)	N/A	Port Campbell WTP	310
Port Fairy	Port Fairy Bores (2)	N/A	Port Fairy WTP	2400
Portland	Wyatt Street Bore (1)	N/A	Portland Wyatt St WTP	6160
	Bald Hill Bores (2)		Portland Bald Hill WTP	

Water Sampling Locality	Source Water	Raw Water Storage	Treatment Plant	Number of customers ¹
Purnim	Arkins Creeks (3)	Gellibrand Tank	Purnim DP	90
	Gellibrand River	Ewen’s Hill Reservoir		
	Carlisle Bores (2)	Tank Hill Reservoir		
	Curdievale Bores (2)			
	– via North Otway Pipeline	Purnim Raw Water Tank		
Sandford - via Casterton WTP	Tullich Bores - (4)	N/A	Casterton WTP	90
Simpson	Arkins Creeks (3)	Gellibrand Tank	Simpson WTP	110
	Gellibrand River	Simpson Service Basin		
	Carlisle Bores (2)			
	Curdievale Bores (2)			
	– via North Otway Pipeline			
Tarrington - via Hamilton WTP	Grampians National Park	Hayes Reservoir	Hamilton WTP	160
	7 streams on the western slopes of the Victoria Range and drought relief bores (2)	Cruckoor Reservoir		
		Hartwich’s Reservoir		
		Hamilton Service Basins 1 & 2		
Terang	Arkins Creeks (3)	Gellibrand Tank	Terang WTP	1110
	Gellibrand River	Ewen’s Hill Reservoir		
	Carlisle Bores (2)			
	Curdievale Bores (2)			
	– via North Otway Pipeline			
Timboon - via Port Campbell WTP	Port Campbell Bore (1)	N/A	Port Campbell WTP	620
Warrnambool	Arkins Creeks (3)	Gellibrand Tank	Warrnambool WTP	15960
	Gellibrand River	South Otway Tank		
	Carlisle Bores (2)	Ewen’s Hill Reservoir		
	Curdievale Bores (2)			
	– via North Otway Pipeline	Plantation Rd Storage		
		Tank Hill Reservoir		
	Gellibrand River – South Otway Pipeline	Warrnambool Storage 1		
		Warrnambool Storage 2		
	Albert Park Bores (3)	Brierly Basin		
Roof water (North Warrnambool)	Albert Park Raw Water Storage			

N/A not applicable

¹ The figure used is the number of connections² Assumption (Lismore and Derrinalum customers 485)

2. MANAGING WATER QUALITY

Wannon Water bases its water quality compliance on the ADWG, as governed by the *Safe Drinking Water Act 2003* and associated Regulations. These guidelines are used for establishing microbiological, physical and chemical monitoring programs, which provide the basis for assessing drinking water quality.

Water Quality Standards

The Safe Drinking Water Regulations 2005 specify the water quality standards and the frequency at which they will be sampled. A brief explanation of the mandated water quality standards is given below.

***Escherichia coli* (E. coli)** - is a bacterial species belonging to the Coliforms group. It is only found naturally in the digestive tract of warm blooded animals. The presence of *E. coli* is indicative that faecal contamination may have occurred. The water quality standard for *E. coli* is zero organisms per 100mL in 98% of samples collected within the locality in any 12 month period.

Chlorine Based Disinfection By-Product Chemicals - are compounds which form when chlorine reacts with naturally-occurring organic matter in the water supply. The most significant disinfection by-products are trihalomethanes (THMs), chloroacetic acid, dichloroacetic acid and trichloroacetic acid. The standard limits for THMs, chloroacetic acid, dichloroacetic acid and trichloroacetic acid are 0.25 mg/L, 0.15 mg/L, 0.10 mg/L and 0.10 mg/L, respectively.

Aluminium - may be present naturally in waters through leaching from soil and rocks. It may also be present through the addition of aluminium-based coagulants used for water treatment, such as aluminium sulphate. The standard limit for aluminium is 0.2 mg/L (acid soluble).

Turbidity - is a measure of particulate and suspended matter in water (cloudiness). Turbidity is caused by the presence of fine suspended matter such as clay, silt, colloidal particles and micro-organisms. Turbidity is measured in Nephelometric Turbidity Units (NTU). Based on aesthetic considerations, the standard is defined as the 95% upper confidence limit of the mean of samples of drinking water collected in a 12 month period must be less than or equal to 5.0 NTU.

Wannon Water also monitors for additional algal, microbiological, chemical, physical and radiological parameters. Results from the monitoring of the parameters that have a potential health or aesthetic impact on customers are presented in Section 6.

Undertakings under Section 30 of the Act

Should drinking water continually not meet the quality criterion then the Corporation is required to commit to an undertaking with DHHS to remediate the problem. Wannon Water did not apply for any undertakings in 2014/15.

Variation to Aesthetic Standards

No variations under section 19 or 21 of the Act were sought.

Exemptions from water quality standards

In accordance with the *Safe Drinking Water Act 2003* a water supplier may apply to the Minister for Health for an exemption to a water quality standard. The Minister will, if satisfied, exempt the water supplier from complying with the water quality standard, as it applies to drinking water supplied by the water supplier. As noted, approved exemptions release water suppliers from the requirement to meet a specified quality standard for a period of time, but do not release them from the obligation to minimise any risk to the public.

Cavendish has an exemption from complying with the aluminium water quality standard because the exceedances were due to natural aluminium and not introduced via treatment. This was granted by the Minister on 30 June 2013 and applies until 30 June 2018.

Drinking Water

Wannon Water manages 32 drinking water systems. Wannon Water also provides drinking water to another business, Parks Victoria at 12 Apostles. This is water produced at either Simpson or Cobden and carted to Port Campbell National Park.

Regulated Water

The Minister for Health has declared the following systems as regulated water:

- Darlington was declared a regulated water supply on 7 September 2006 (Gazette number G36). Darlington's water is sourced from a bore at Darlington. The number of properties connected to this system is 19.
- North Otway Pipeline was declared a regulated water supply on 26 June 2008 (Gazette number S168). The North Otway Pipeline is sourced from Arkins Creek Catchment and Gellibrand River Catchment and is supplemented in the drier months from the Carlisle River Borefield. The number of properties connected to the system is 454.

In accordance with section 7 of the *Safe Drinking Water Act 2003* Wannon Water has a regulated water risk management plan that covers the two regulated water localities.

Non-potable supplies

Nine of the 34 systems managed by Wannon Water contain customers that are supplied with non-potable water.

All these customers are known as non-drinking water 'supply-by-agreement' customers. They have each signed a contract with Wannon Water that indicates that the water is not fit for human consumption. These customers receive water from the system prior to disinfection.

3. ENSURING SAFE DRINKING WATER

Water Quality Management System

Wannon Water maintains a drinking water quality management system based on Hazard Analysis Critical Control Point (HACCP) and the ADWG risk management principles. Wannon Water utilises a multiple barrier approach to ensure that drinking water is safe and aesthetically pleasing. The strength of this approach is that if a barrier is compromised it is able to be compensated for by the effective operation of the remaining barriers. This approach minimises the likelihood of contaminants passing through the treatment system and potentially causing harm to consumers.

The barriers utilised are:

- Catchment management and source water protection;
- Detention in protected reservoirs or storages;
- Extraction management;
- Treatment;
- Disinfection; and
- Maintenance of the distribution system; including maintaining adequate chlorine or chloramine residuals.

Raw (source) water from surface and groundwater supplies may contain contaminants such as sediment, microorganisms and dissolved organic compounds. Such water may not be aesthetically pleasing or safe to drink. To create a safe drinking supply Wannon Water applies a range of treatment processes. The treated water is then

reticulated through a number of storage tanks and pipes before being delivered to customers.

Risk Management Plan Audit

A regulatory audit was not carried out during the reporting period.

Two HACCP surveillance audits were conducted in 2014/15. Three minor non-conformances were identified over the two audits:

1. pH (high and low) and chlorine (high) limits were different to the limits defined in the HACCP plan at Simpson.
2. Some anomalies were identified with data security and corrective actions related to online monitoring at Port Campbell.
3. Some anomalies were identified at Terang and Port Campbell in documentation and review of critical control points was required in the Heywood risk management plan.



4. WATER TREATMENT

Water treatment at Wannon Water varies by system, ranging from no treatment in regulated water supplies, to full treatment via a water treatment plant.

Table 4-1 details the treatment processes utilised within each of Wannon Water's drinking water treatment plants.

The water treatment processes employed during 2014/15 were similar to 2013/14. Changes and improvements to the system are outlined in Section 5.



Table 4-1 - Treatment Processes and Added Substances 2014/15

Plants					pH Adjust				Coagulation			Flocculation			Clarification						Disinfection				pH Adjust				
					Caustic soda	Soda Ash	Hydrated Lime	Carbon Dioxide	Ferric Chloride	Aluminium chlorohydrate (ACH)	Aluminium Sulphate	Polyelectrolyte Nalco 3482	Magnafloc LT20 flocculant	Polymer Nalclear 8170PULN	Polymer Klaraid	Clarifier					Dissolved air floatation	Filtration	Activated Carbon	Sequestration Calgon	Chlorine gas	Sodium hypochlorite	Aqueous ammonia		
Allansford			✓																			✓						✓	
Balmoral	✓				✓				✓							✓	✓	✓	✓					✓				✓	
Camperdown	✓					✓				✓						✓	✓			✓					✓			✓	
Caramut																											✓		
Carlisle River																											✓		
Casterton				✓				✓				✓					✓					✓						✓	
Cavendish	✓								✓												✓	✓						✓	
Cobden	✓				✓					✓				✓	✓			✓	✓					✓				✓	
Coleraine			✓																									✓	
Dartmoor																												✓	
Dunkeld			✓																									✓	
Ewen's Hill	✓									✓							✓	✓	✓				✓					✓	
Glenthompson	✓								✓					✓			✓	✓	✓		✓	✓	✓					✓	
Hamilton	✓				✓					✓			✓			✓	✓			✓	✓				✓	✓		✓	
Heywood		✓																	✓	✓								✓	
Koroit			✓																	✓								✓	
Ettrick Springs			✓																	✓		✓						✓	
Lismore/Derrinallum			✓																	✓		✓						✓	
Macarthur				✓				✓				✓		✓			✓					✓						✓	
Merino			✓																			✓						✓	
Mortlake			✓																	✓								✓	
Penshurst																						✓						✓	
Port Campbell		✓															✓				✓							✓	
Port Fairy		✓																	✓		✓							✓	
Portland Wyatt St		✓																		✓								✓	
Portland Bald Hill		✓																		✓								✓	
Purnim	✓																					✓						✓	
Sandford			✓																			✓						✓	
Simpson	✓				✓					✓						✓	✓			✓					✓			✓	
Tank Hill	✓																			✓				✓				✓	
Terang	✓				✓					✓			✓	✓			✓			✓				✓				✓	
Warrnambool	✓								✓	✓				✓	✓		✓			✓				✓	✓	✓		✓	

*Pressure filters plus iron sorption filters

Legend

	Raw Water
	Oxidation
	Coagulation, Flocculation and Clarification
	Filtration
	Sequestration
	Disinfection
	Fluoridation
	Treated Water Storage

5. MAINTAINING HIGH QUALITY WATER

Staff Awareness and Training

To ensure our staff members are appropriately trained, qualified and competent, Wannon Water has adopted the Victorian Framework for Water Treatment Operator Competencies – Best Practice Guidelines. Wannon Water is dedicated to providing relevant employees with appropriate water industry training and awareness via formal training and attendance at relevant conferences and information sessions. In 2014/15 this included:

- Internal auditor training
- Certification III and IV in Water Industry Operations
- Attendance at Water Industry Operators Association (WIOA) Conference
- Oz Water Conference
- Attendance at Victorian Drinking Water Network meetings

Distribution System

Flushing Program

Wannon Water has a regular flushing program for drinking water localities. Frequency of flushing is risk-based and Wannon Water utilises field data and customer feedback in scheduling the program, which is reviewed as required.

Wannon Water uses flushing to remove colour or turbidity in response to reaching critical limits or when a customer complaint is received. Flushing is also used to increase chlorine residual and reduce pH at locations where water usage is low.

Air Scouring Program

Wannon Water utilises contractors to conduct air scouring on a regular basis; however there was no scheduled air scouring in 2014/15.

Mains Renewal Program

Wannon Water has an asset replacement program created and prioritised via a risk-based process using event information, condition assessments and asset modelling. In 2014/15 Wannon Water spent over \$790,000 replacing or extending ~2 km of mains at Koroit, Port Fairy and Warrnambool.

Tank Cleaning Program

Wannon Water utilises contractors on a regular basis to clean tanks within the distribution system and storages at water treatment plants. In 2014/15 cleaning occurred at:

- Warrnambool clear water storage
- Purnim raw water tank
- Purnim high level tank
- Pierrepont tank Tarrington
- Heywood clear water storage
- Cavendish clear water storage

Tank Inspections were carried out at:

- Arundel Road clear water storage Casterton
- Dunkeld clear water storage
- Bald Hill clear water storage Portland

Water Treatment Plant Changes and Improvements

Conversion of chloraminated systems

Wannon Water continued its program to reduce its aesthetic ammonia exceedances. The process involves converting chloraminated systems back to chlorinated systems. In 2014/15, the locality of Portland was converted to a chlorinated system for a period of approximately 7 weeks from the end of October to mid December 2014.

The conversion successfully removed biofilms from the system resulting in reduced ammonia levels and compliance being achieved.

NOTE: Ammonia is added to systems for two principle reasons: it reduces the amount of disinfection by-products (Schedule 2 parameters) in systems which have high organics in their source water; and it helps maintain chlorine residual in long systems/mains. Ammonia can be found naturally in raw water, which is the case in the Portland supply.

Isolation of storages

During 2014/15 trigger levels for blue green algae and Geosmin/MIB were exceeded at Warrnambool Storage 1, Warrnambool Storage 2, Brierly Basin and Albert Park raw water storage. On two occasions these storages were isolated from the system and Warrnambool Storage 1 and Albert Park storages were also dosed with copper sulphate in November 2014.

6. DRINKING WATER QUALITY RESULTS 2014/15

Sampling Frequency

The frequency of sampling of the water quality standards (*Escherichia coli*, disinfection by-products, aluminium and turbidity) is specified in Schedule 2 of the Safe Drinking Water Regulations 2005. Wannon Water uses its risk assessment process to select an appropriate sampling frequency for additional microbiological, chemical, physical, radiological and algal monitoring.

Regulation 11 of the Safe Drinking Water Regulations 2005 (the Regulations) provides that the Secretary to the Department of Health may, by notice published in the Government Gazette, vary the frequencies specified in Schedule 2 of the Regulations at which samples of drinking water are to be collected at a water sampling point located within a water sampling locality. A request to increase sample frequency at a number of localities due to population size was made. On 5 June 2009 the Secretary approved a variation to the frequency at which a sample of drinking water for *Escherichia coli* (*E.coli*) and turbidity were to be collected at:

- Port Fairy – from 1 sample per week to 2 samples per week
- Portland – from 1 sample per week to 2 samples per week
- Hamilton – from 1 sample per week to 2 samples per week
- Warrnambool – from 1 sample per week to 3 samples per week

Testing Programs

The number of samples collected and frequency of testing varies for each locality according to population and risk. The geographic location of customer sampling taps is designed to ensure that the samples are collected representative of the supply system. The sampling program is reviewed on a regular basis to align with changes in the risk profile of each locality.

During 2014/15 Wannon Water performed over 66,000 individual tests. Approximately 40% of the tests were sampled at customer's taps within 34 localities.

On occasion, scheduled testing will be missed for various reasons, such as human error, broken or missing sample bottles or the sample point being out of action (e.g. bore not operational at time of sampling). Any missed regulatory samples are communicated to DHHS at the time. In 2014/15 no regulatory samples were missed.

Interpreting the results

The units of results are dependent on the parameter being analysed. The most common unit used within this report is milligrams per litre (**mg/L**). This unit is interchangeable with parts per million (ppm). Other units within this report include:

- **orgs/100mL** used for measurement of *E.coli*
- Nephelometric Turbidity Units (**NTU**) a measurement for turbidity
- **pH units** for measurement of pH
- Platinum-Cobalt (**Pt.-Co.**) units for measurement of colour. This unit is interchangeable with Hazen Units (HU)
- **mg/L as calcium carbonate (CaCO₃)** used for measuring total hardness and total alkalinity

More than one sample collected per week – Localities where more than one sample is collected per week are marked with an asterisk (*).

Missing tests – All missing tests are marked with the hash symbol (#) within the report and due to reasons stated under Testing Programs.

Less than limit of detection – The symbol for less than (<) is used when the concentration of a parameter is less than what can be detected accurately by the instrument. The level which an instrument can accurately detect is known as the "limit of detection".

Aesthetic exceedance – All tests marked with "A^x" are aesthetic exceedance, "x" indicating the number of exceedances.

Safe Drinking Water Regulations 2005 Standards

Escherichia coli (*E. coli*)

Standard At least 98% of all samples of drinking water collected within a locality in any 12 month period to contain no *E. coli* (SDWR).

Table 6-1 *E. coli* results by locality 2014/15

<i>E.coli</i>						
Locality	Sampling Frequency	No. of Samples	No. of samples containing <i>E.coli</i>	Maximum result (orgs/ 100 mL)	% of samples with no <i>E.coli</i>	Complying (Yes/No)
ALLANSFORD	Weekly	52	0	0	100.0	Yes
BALMORAL	Weekly	52	0	0	100.0	Yes
CAMPERDOWN (RURAL)	Weekly	52	0	0	100.0	Yes
CAMPERDOWN (URBAN)	Weekly	52	1	1	98.1	Yes
CARAMUT	Weekly	52	0	0	100.0	Yes
CASTERTON	Weekly	52	0	0	100.0	Yes
CAVENDISH	Weekly	52	0	0	100.0	Yes
COBDEN	Weekly	52	0	0	100.0	Yes
COLERAINE	Weekly	52	0	0	100.0	Yes
DARTMOOR	Weekly	52	0	0	100.0	Yes
DERRINALLUM	Weekly	52	0	0	100.0	Yes
DUNKELD	Weekly	52	0	0	100.0	Yes
GLENTHOMPSON	Weekly	52	0	0	100.0	Yes
HAMILTON*	Weekly	104	0	0	100.0	Yes
HEYWOOD	Weekly	52	0	0	100.0	Yes
KOROIT	Weekly	52	0	0	100.0	Yes
LISMORE	Weekly	52	0	0	100.0	Yes
MACARTHUR	Weekly	52	0	0	100.0	Yes
MERINO	Weekly	52	0	0	100.0	Yes
MORTLAKE	Weekly	52	0	0	100.0	Yes
NOORAT/GLENORMISTON	Weekly	52	0	0	100.0	Yes
PAARATTE	Weekly	52	0	0	100.0	Yes
PENSHURST	Weekly	52	0	0	100.0	Yes
PETERBOROUGH	Weekly	52	0	0	100.0	Yes
PORT CAMPBELL	Weekly	52	0	0	100.0	Yes
PORT FAIRY*	Weekly	104	0	0	100.0	Yes
PORTLAND*	Weekly	104	0	0	100.0	Yes
PURNIM	Weekly	52	0	0	100.0	Yes
SANDFORD	Weekly	52	0	0	100.0	Yes
SIMPSON	Weekly	52	0	0	100.0	Yes
TARRINGTON	Weekly	52	0	0	100.0	Yes
TERANG	Weekly	52	0	0	100.0	Yes
TIMBOON	Weekly	52	0	0	100.0	Yes
WARRNAMBOOL*	Weekly	156	0	0	100.0	Yes

* Weekly sampling with increases for population (ADWG, Section 9.5.2)

Actions in relation to noncompliance for *E.coli*

All localities were compliant with the Regulations for *E.coli*; however there was a single detection for *E.coli* in the locality of Camperdown Urban. Refer to the section entitled “Emergency and incident management” for more detail. Although the incident was found to be a false positive, the investigation process identified improvement opportunities for tank monitoring and management and also changes to the risk management plan for Camperdown. This includes regular manual chlorine dosing and monitoring of chlorine residual to ensure maintained residual in clear water tanks, including offline tanks.



Chlorine-based Disinfection By-Product Chemicals

Compliance – Trihalomethanes Results

Standard All samples of drinking water collected within a locality in any 12 month period must not exceed 0.25 mg/L (SDWR)

Table 6-2 Trihalomethanes results by locality 2014/15

Trihalomethanes

Locality	Sampling Frequency	No. of Samples	No. of Non complying samples	Maximum result (mg/L)	Complying (Yes/No)
ALLANSFORD	Monthly	12	0	0.110	Yes
BALMORAL	Monthly	12	0	0.110	Yes
CAMPERDOWN (RURAL)	Monthly	12	0	0.087	Yes
CAMPERDOWN (URBAN)	Monthly	12	0	0.053	Yes
CARAMUT	Monthly	12	0	0.044	Yes
CASTERTON	Monthly	12	0	0.170	Yes
CAVENDISH	Monthly	12	0	0.043	Yes
COBDEN	Monthly	12	0	0.071	Yes
COLERAINE	Monthly	12	0	0.200	Yes
DARTMOOR	Monthly	12	0	0.003	Yes
DERRINALLUM	Monthly	12	0	0.140	Yes
DUNKELD	Monthly	12	0	0.096	Yes
GLENTHOMPSON	Monthly	12	0	0.160	Yes
HAMILTON	Monthly	12	0	0.014	Yes
HEYWOOD	Monthly	12	0	0.045	Yes
KOROIT	Monthly	12	0	0.110	Yes
LISMORE	Monthly	12	0	0.110	Yes
MACARTHUR	Monthly	12	0	0.057	Yes
MERINO	Monthly	12	0	0.160	Yes
MORTLAKE	Monthly	12	0	0.130	Yes
NOORAT/GLENORMISTON	Monthly	12	0	0.120	Yes
PAARATTE	Monthly	12	0	0.011	Yes
PENSHURST	Monthly	12	0	0.044	Yes
PETERBOROUGH	Monthly	12	0	0.013	Yes
PORT CAMPBELL	Monthly	12	0	0.016	Yes
PORT FAIRY	Monthly	12	0	<0.001	Yes
PORTLAND	Monthly	12	0	0.110	Yes
PURNIM	Monthly	12	0	0.150	Yes
SANDFORD	Monthly	12	0	0.170	Yes
SIMPSON	Monthly	12	0	0.059	Yes
TARRINGTON	Monthly	12	0	0.008	Yes
TERANG	Monthly	12	0	0.120	Yes
TIMBOON	Monthly	12	0	0.052	Yes
WARRNAMBOOL	Monthly	12	0	0.100	Yes

I - For total trihalomethanes, if the maximum result is 0.255mg/L or greater, then the locality is non-compliant

Compliance – Chloroacetic Acid Results

Standard All samples of drinking water collected within a locality in any 12 month period must not exceed 0.15 mg/L (SDWR)

Table 6-3 Chloroacetic acid results by locality 2014/15

Chloroacetic Acid

Locality	Sampling Frequency	No. of Samples	No. of Non complying samples	Maximum result (mg/L)	Complying (Yes/No)
ALLANSFORD	Monthly	12	0	<0.002	Yes
BALMORAL	Monthly	12	0	<0.002	Yes
CAMPERDOWN (RURAL)	Monthly	12	0	<0.002	Yes
CAMPERDOWN (URBAN)	Monthly	12	0	<0.002	Yes
CARAMUT	Monthly	12	0	<0.002	Yes
CASTERTON	Monthly	12	0	<0.002	Yes
CAVENDISH	Monthly	12	0	0.015	Yes
COBDEN	Monthly	12	0	<0.002	Yes
COLERAINE	Monthly	12	0	0.004	Yes
DARTMOOR	Monthly	12	0	<0.002	Yes
DERRINALLUM	Monthly	12	0	<0.002	Yes
DUNKELD	Monthly	12	0	0.004	Yes
GLENTHOMPSON	Monthly	12	0	0.003	Yes
HAMILTON	Monthly	12	0	0.005	Yes
HEYWOOD	Monthly	12	0	<0.002	Yes
KOROIT	Monthly	12	0	<0.002	Yes
LISMORE	Monthly	12	0	<0.002	Yes
MACARTHUR	Monthly	12	0	<0.002	Yes
MERINO	Monthly	12	0	0.004	Yes
MORTLAKE	Monthly	12	0	0.003	Yes
NOORAT/GLENORMISTON	Monthly	12	0	<0.002	Yes
PAARATTE	Monthly	12	0	<0.002	Yes
PENSHURST	Monthly	12	0	<0.002	Yes
PETERBOROUGH	Monthly	12	0	<0.002	Yes
PORT CAMPBELL	Monthly	12	0	<0.002	Yes
PORT FAIRY	Monthly	12	0	<0.002	Yes
PORTLAND	Monthly	12	0	<0.002	Yes
PURNIM	Monthly	17	0	0.003	Yes
SANDFORD	Monthly	12	0	0.003	Yes
SIMPSON	Monthly	12	0	<0.002	Yes
TARRINGTON	Monthly	12	0	<0.002	Yes
TERANG	Monthly	12	0	<0.002	Yes
TIMBOON	Monthly	12	0	<0.002	Yes
WARRNAMBOOL	Monthly	12	0	<0.002	Yes

I - For chloroacetic acid, if the maximum result is 0.155mg/L or greater, then the locality is non-compliant

Compliance – Dichloroacetic Acid Results

Standard All samples of drinking water collected within a locality in any 12 month period must not exceed 0.10 mg/L (SDWR)

Table 6-4 Dichloroacetic acid results by locality 2014/15

Dichloroacetic Acid

Locality	Sampling Frequency	No. of Samples	No. of Non complying samples	Maximum result (mg/L)	Complying (Yes/No)
ALLANSFORD	Monthly	12	0	0.019	Yes
BALMORAL	Monthly	12	0	0.009	Yes
CAMPERDOWN (RURAL)	Monthly	12	0	0.012	Yes
CAMPERDOWN (URBAN)	Monthly	12	0	0.012	Yes
CARAMUT	Monthly	12	0	0.003	Yes
CASTERTON	Monthly	12	0	0.014	Yes
CAVENDISH	Monthly	12	0	0.051	Yes
COBDEN	Monthly	12	0	0.011	Yes
COLERAINE	Monthly	12	0	0.019	Yes
DARTMOOR	Monthly	12	0	<0.002	Yes
DERRINALLUM	Monthly	12	0	0.019	Yes
DUNKELD	Monthly	12	0	0.018	Yes
GLENTHOMPSON	Monthly	12	0	0.013	Yes
HAMILTON	Monthly	12	0	0.014	Yes
HEYWOOD	Monthly	12	0	<0.002	Yes
KOROIT	Monthly	12	0	0.015	Yes
LISMORE	Monthly	12	0	0.013	Yes
MACARTHUR	Monthly	12	0	0.006	Yes
MERINO	Monthly	12	0	0.015	Yes
MORTLAKE	Monthly	12	0	0.012	Yes
NOORAT/GLENORMISTON	Monthly	12	0	0.015	Yes
PAARATTE	Monthly	12	0	<0.002	Yes
PENSHURST	Monthly	12	0	<0.002	Yes
PETERBOROUGH	Monthly	12	0	<0.002	Yes
PORT CAMPBELL	Monthly	12	0	<0.002	Yes
PORT FAIRY	Monthly	12	0	<0.002	Yes
PORTLAND	Monthly	12	0	0.004	Yes
PURNIM	Monthly	12	0	0.042	Yes
SANDFORD	Monthly	12	0	0.014	Yes
SIMPSON	Monthly	12	0	0.008	Yes
TARRINGTON	Monthly	12	0	0.004	Yes
TERANG	Monthly	12	0	0.031	Yes
TIMBOON	Monthly	12	0	<0.002	Yes
WARRNAMBOOL	Monthly	12	0	0.010	Yes

I - For dichloroacetic acid, if the maximum result is 0.145mg/L or greater, then the locality is non-compliant

Compliance – Trichloroacetic Acid Results

Standard All samples of drinking water collected within a locality in any 12 month period must not exceed 0.10 mg/L (SDWR)

Table 6-5 Trichloroacetic acid results by locality 2014/15

Trichloroacetic Acid

Locality	Sampling Frequency	No. of Samples	No. of Non complying samples	Maximum result (mg/L)	Complying (Yes/No)
ALLANSFORD	Monthly	12	0	0.014	Yes
BALMORAL	Monthly	12	0	0.008	Yes
CAMPERDOWN (RURAL)	Monthly	12	0	0.011	Yes
CAMPERDOWN (URBAN)	Monthly	12	0	0.012	Yes
CARAMUT	Monthly	12	0	<0.002	Yes
CASTERTON	Monthly	12	0	0.009	Yes
CAVENDISH	Monthly	12	0	0.010	Yes
COBDEN	Monthly	12	0	0.016	Yes
COLERAINE	Monthly	12	0	0.012	Yes
DARTMOOR	Monthly	12	0	<0.002	Yes
DERRINALLUM	Monthly	12	0	0.016	Yes
DUNKELD	Monthly	12	0	0.012	Yes
GLENTHOMPSON	Monthly	12	0	<0.002	Yes
HAMILTON	Monthly	12	0	<0.002	Yes
HEYWOOD	Monthly	12	0	<0.002	Yes
KOROIT	Monthly	12	0	0.015	Yes
LISMORE	Monthly	12	0	0.019	Yes
MACARTHUR	Monthly	12	0	<0.002	Yes
MERINO	Monthly	12	0	0.011	Yes
MORTLAKE	Monthly	12	0	0.043	Yes
NOORAT/GLENORMISTON	Monthly	12	0	0.052	Yes
PAARATTE	Monthly	12	0	<0.002	Yes
PENSHURST	Monthly	12	0	<0.002	Yes
PETERBOROUGH	Monthly	12	0	<0.002	Yes
PORT CAMPBELL	Monthly	12	0	<0.002	Yes
PORT FAIRY	Monthly	12	0	<0.002	Yes
PORTLAND	Monthly	12	0	<0.002	Yes
PURNIM	Monthly	12	0	0.054	Yes
SANDFORD	Monthly	12	0	0.010	Yes
SIMPSON	Monthly	12	0	0.004	Yes
TARRINGTON	Monthly	12	0	<0.002	Yes
TERANG	Monthly	12	0	0.043	Yes
TIMBOON	Monthly	12	0	<0.002	Yes
WARRNAMBOOL	Monthly	12	0	0.013	Yes

I - For trichloroacetic acid, if the maximum result is 0.145mg/L or greater, then the locality is non-compliant

Ozone-based Disinfection By-Product Chemicals

Wannon Water does not use ozone in any treatment or disinfection plants. All the raw waters are sourced from surface and groundwater that have not been pre-treated with ozone.

The ADWG states “Bromate is a possible by-product of disinfection using ozone, otherwise unlikely to be found in drinking water”. Based on this information Wannon Water considers the risk of bromate low and did not sample for it during 2014/15.

Another disinfection by-product of ozone is formaldehyde. Formaldehyde may also enter a drinking water supply via deposition from the atmosphere or via industry spills. Wannon Water’s risk assessments have not identified any industries that utilise formaldehyde within the catchments. Wannon Water undertook base line formaldehyde monitoring in 2006/07 with all results returning less than the analytical detection limit. Based on this information Wannon Water considers the risk of formaldehyde low and did not sample for it during 2014/15.

Aluminium

Standard All samples of drinking water collected within a locality in any 12 month period must not exceed 0.2 mg/L (Acid Soluble) (SDWR)

Table 6-6 Aluminium results by locality 2014/15

Aluminium					
Locality	Sampling Frequency	No. of Samples	No. of Non complying samples	Maximum result (mg/L)	Complying (Yes/No)
ALLANSFORD	Monthly	12	1	0.26	No
BALMORAL	Monthly	12	0	0.03	Yes
CAMPERDOWN (RURAL)	Monthly	12	0	0.13	Yes
CAMPERDOWN (URBAN)	Monthly	12	0	0.17	Yes
CARAMUT	-	-	-	-	-
CASTERTON	-	-	-	-	-
CAVENDISH	Monthly	12	0	0.37	Yes*
COBDEN	Monthly	12	1	0.26	No
COLERAINE	-	-	-	-	-
DARTMOOR	-	-	-	-	-
DERRINALLUM	Monthly	12	0	0.05	Yes
DUNKELD	Monthly	12	0	0.04	Yes
GLENTHOMPSON	Monthly	12	0	0.05	Yes
HAMILTON	Monthly	12	0	0.17	Yes
HEYWOOD	-	-	-	-	-
KOROIT	Monthly	12	0	0.08	Yes
LISMORE	Monthly	12	0	0.08	Yes
MACARTHUR	-	-	-	-	-
MERINO	-	-	-	-	-
MORTLAKE	Monthly	12	0	0.03	Yes
NOORAT/GLENORMISTON	Monthly	12	0	0.04	Yes
PAARATTE	-	-	-	-	-
PENSHURST	-	-	-	-	-
PETERBOROUGH	-	-	-	-	-
PORT CAMPBELL	-	-	-	-	-
PORT FAIRY	-	-	-	-	-
PORTLAND	-	-	-	-	-
PUENIM	-	-	-	-	-
SANDFORD	-	-	-	-	-
SIMPSON	Monthly	12	0	0.04	Yes
TARRINGTON	Monthly	12	0	0.06	Yes
TERANG	Monthly	12	0	0.06	Yes
TIMBOON	-	-	-	-	-
WARRNAMBOOL	Monthly	12	0	0.09	Yes

If the maximum result for acid-soluble aluminium is 0.25 mg/L or greater, then the locality is non-compliant.
 - Supplies not utilising aluminium compounds in the water treatment process are not required to be sampled as part of the regulatory requirement.

Wannon Water's risk assessment identified that acid soluble aluminium should be monitored in all localities where an aluminium-based coagulant is used within the treatment process.

* As per Section entitled "Exemptions from water quality standards" Cavendish has an exemption for Aluminium.

Actions in relation to noncompliance for Aluminium

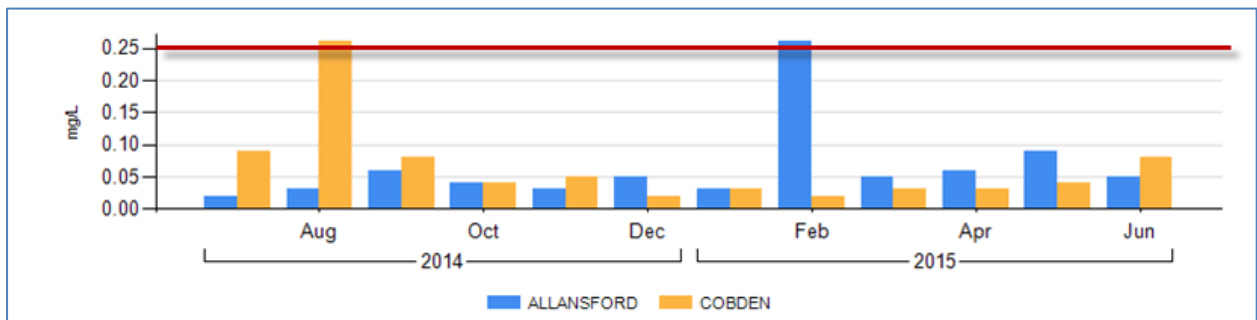


Figure 6-1 – Aluminium (acid soluble) in the Allansford and Cobden reticulations 2014-15

Allansford

The Allansford water sampling locality experienced a single non-conformance (Figure 6-3). This was reported as section 18 under the Act and is detailed in the section entitled "Emergency and incident management".

Cobden

The Cobden water sampling locality experienced a single non-conformance (Figure 6-3). This was reported as section 18 under the Act and is detailed in the section entitled "Emergency and incident management".

Turbidity

Standard 95% upper confidence limit (UCL) of the mean of samples of drinking water collected in a 12 month period must be less than or equal to 5.0 NTU (SDWR)

Table 6-7 Turbidity results by locality 2014/15

Turbidity					
Locality	Sampling Frequency	No. of Samples	Maximum result NTU	95% UCL of Mean	Complying (Yes/No)
ALLANSFORD	Weekly	52	3.7	0.4	Yes
BALMORAL	Weekly	52	7.9	0.9	Yes
CAMPERDOWN (RURAL)	Weekly	52	1.1	0.2	Yes
CAMPERDOWN (URBAN)	Weekly	52	0.6	0.2	Yes
CARAMUT	Weekly	52	2.3	0.5	Yes
CASTERTON	Weekly	52	0.6	0.1	Yes
CAVENDISH	Weekly	52	2.5	0.8	Yes
COBDEN	Weekly	52	0.3	0.1	Yes
COLERAINE	Weekly	52	1.3	0.2	Yes
DARTMOOR	Weekly	52	1.3	0.2	Yes
DERRINALLUM	Weekly	52	0.5	0.2	Yes
DUNKELD	Weekly	52	0.5	0.3	Yes
GLENTHOMPSON	Weekly	52	1.4	0.4	Yes
HAMILTON*	Weekly	104	3.5	0.3	Yes
HEYWOOD	Weekly	52	4.2	1.1	Yes
KOROIT	Weekly	52	1.6	0.3	Yes
LISMORE	Weekly	52	1.8	0.3	Yes
MACARTHUR	Weekly	52	1.4	0.2	Yes
MERINO	Weekly	52	0.4	0.1	Yes
MORTLAKE	Weekly	52	5.3	0.5	Yes
NOORAT/GLENORMISTON	Weekly	52	0.3	0.1	Yes
PAARATTE	Weekly	52	1.0	0.2	Yes
PENSHURST	Weekly	52	6.2	0.8	Yes
PETERBOROUGH	Weekly	52	0.3	0.1	Yes
PORT CAMPBELL	Weekly	52	0.3	0.2	Yes
PORT FAIRY*	Weekly	104	0.7	0.3	Yes
PORTLAND*	Weekly	104	2.8	0.2	Yes
PURNIM	Weekly	52	5.7	1.0	Yes
SANDFORD	Weekly	52	0.5	0.1	Yes
SIMPSON	Weekly	52	0.4	0.1	Yes
TARRINGTON	Weekly	52	1.4	0.3	Yes
TERANG	Weekly	52	0.2	0.1	Yes
TIMBOON	Weekly	52	1.0	0.2	Yes
WARRNAMBOOL*	Weekly	156	2.0	0.2	Yes

* Weekly sampling with increases for population (ADWG, Section 9.5.2)

Additional monitoring: Other algae, pathogen, chemical or substance that may pose a risk to human health

Chlorite

The ADWG states “Chlorite is a by-product of chlorine dioxide disinfection”. Wannon Water does not use chlorine dioxide in any treatment or disinfection plants. All the raw waters are sourced from surface and groundwater that have not been pre-treated with chlorine-dioxide. Based on this information Wannon Water considers the risk of chlorite low and did not sample for it during 2014/15.

Fluoride

Standard All samples of drinking water collected within a locality not to exceed 1.5 mg/L (ADWG – Health).

Table 6-8 Fluoride results by locality 2014/15

Fluoride						
Locality	Sampling Frequency	No. of Samples	Maximum result	Minimum result	Average	Compliant (Yes/No)
ALLANSFORD	Weekly+	52	1.10	0.43	0.90	Yes
DUNKELD	Weekly+	52	0.94	0.55	0.80	Yes
HAMILTON	Weekly+	52	0.98	0.10	0.79	Yes
KOROIT	Weekly+	52	1.10	0.59	0.92	Yes
PORTLAND	Weekly	52	1.30	0.49	1.01	Yes
TARRINGTON	Weekly+	52	0.95	0.10	0.77	Yes
WARRNAMBOOL	Weekly+	52	1.10	0.51	0.91	Yes

+ Fluoride added to drinking water supply. Results from other localities are background levels of naturally occurring fluoride.

^ For fluoridated supplies this is achieved if the annual average concentration of fluoride was greater than 0.6 mg/L.

Arsenic Results

Standard All samples of drinking water collected within a locality in any 12 month period having a concentration less than 0.01 mg/L (ADWG)

Table 6-9 Arsenic results by locality 2014/15

Arsenic					
Locality	Sampling Frequency	No. of Samples	No. of Non complying samples	Maximum result (mg/L)	Complying (Yes/No)
ALLANSFORD	Yearly	1	0	0.001	Yes
BALMORAL	Yearly	1	0	0.001	Yes
CAMPERDOWN (RURAL)	Yearly	1	0	0.001	Yes
CAMPERDOWN (URBAN)	Yearly	1	0	0.001	Yes
CARAMUT	Yearly	1	0	<0.001	Yes
CASTERTON	Yearly	1	0	0.001	Yes
CAVENDISH	Yearly	1	0	0.001	Yes
COBDEN	Yearly	1	0	0.001	Yes
COLERAINE	Yearly	1	0	0.001	Yes
DARTMOOR	Yearly	1	0	0.001	Yes
DERRINALLUM	Yearly	1	0	0.001	Yes
DUNKELD	Yearly	1	0	0.001	Yes
GLENTHOMPSON	Yearly	1	0	0.001	Yes
HAMILTON	Yearly	1	0	0.001	Yes
HEYWOOD	Yearly	1	0	0.001	Yes
KOROIT	Yearly	1	0	0.001	Yes
LISMORE	Yearly	1	0	0.001	Yes
MACARTHUR	Weekly	52	0	0.008	Yes
MERINO	Yearly	1	0	0.001	Yes
MORTLAKE	Yearly	1	0	0.001	Yes
NOORAT/GLENORMISTON	Yearly	1	0	0.001	Yes
PAARATTE	Yearly	1	0	0.001	Yes
PENSHURST	Yearly	1	0	0.002	Yes
PETERBOROUGH	Yearly	1	0	0.001	Yes
PORT CAMPBELL	Yearly	1	0	0.001	Yes
PORT FAIRY	Yearly	1	0	0.003	Yes
PORTLAND	Yearly	1	0	0.001	Yes
PURNIM	Yearly	1	0	0.001	Yes
SANDFORD	Yearly	1	0	0.001	Yes
SIMPSON	Yearly	1	0	0.001	Yes
TARRINGTON	Yearly	1	0	0.001	Yes
TERANG	Yearly	1	0	0.001	Yes
TIMBOON	Yearly	1	0	0.001	Yes
WARRNAMBOOL	Monthly	1	0	0.001	Yes

Copper Results

Standard All samples of drinking water collected within a locality in any 12 month period having a concentration less than 2 mg/L (ADWG)

Table 6-10 Copper results by locality 2014/15

Copper

Locality	Sampling Frequency	No. of Samples	No. of Non complying samples	Maximum result (mg/L)	Complying (Yes/No)
ALLANSFORD	Yearly	1	0	0.110	Yes
BALMORAL	Yearly	1	0	0.030	Yes
CAMPERDOWN (RURAL)	Yearly	1	0	0.002	Yes
CAMPERDOWN (URBAN)	Yearly	1	0	0.014	Yes
CARAMUT	Quarterly	4	0	0.005	Yes
CASTERTON	Yearly	1	0	0.064	Yes
CAVENDISH	Yearly	1	0	0.003	Yes
COBDEN	Yearly	1	0	0.005	Yes
COLERAINE	Yearly	1	0	0.110	Yes
DARTMOOR	Yearly	1	0	0.014	Yes
DERRINALLUM	Yearly	1	0	0.010	Yes
DUNKELD	Yearly	1	0	0.009	Yes
GLENTHOMPSON	Yearly	1	0	0.007	Yes
HAMILTON	Yearly	1	0	0.028	Yes
HEYWOOD	Yearly	1	0	0.012	Yes
KOROIT	Yearly	1	0	0.014	Yes
LISMORE	Yearly	1	0	0.001	Yes
MACARTHUR	Quarterly	4	0	0.012	Yes
MERINO	Yearly	1	0	0.028	Yes
MORTLAKE	Yearly	1	0	0.005	Yes
NOORAT/GLENORMISTON	Yearly	1	0	0.005	Yes
PAARATTE	Yearly	1	0	0.008	Yes
PENSHURST	Quarterly	4	0	0.004	Yes
PETERBOROUGH	Yearly	1	0	0.011	Yes
PORT CAMPBELL	Yearly	1	0	0.032	Yes
PORT FAIRY	Yearly	1	0	0.003	Yes
PORTLAND	Yearly	1	0	0.004	Yes
PURNIM	Yearly	1	0	0.026	Yes
SANDFORD	Yearly	1	0	0.057	Yes
SIMPSON	Yearly	1	0	0.022	Yes
TARRINGTON	Yearly	1	0	0.016	Yes
TERANG	Yearly	1	0	0.013	Yes
TIMBOON	Yearly	1	0	0.002	Yes
WARRNAMBOOL	Yearly	1	0	0.004	Yes

Lead Results

Standard All samples of drinking water collected within a locality in any 12 month period having a concentration less than 0.01 mg/L (ADWG)

Table 6-11 Lead results by locality 2014/15

Lead					
Locality	Sampling Frequency	No. of Samples	No. of Non complying samples	Maximum result (mg/L)	Complying (Yes/No)
ALLANSFORD	Yearly	1	0	0.001	Yes
BALMORAL	Yearly	1	0	0.001	Yes
CAMPERDOWN (RURAL)	Yearly	1	0	0.001	Yes
CAMPERDOWN (URBAN)	Yearly	1	0	0.001	Yes
CARAMUT	Quarterly	4	0	0.012	Yes
CASTERTON	Yearly	1	0	0.001	Yes
CAVENDISH	Yearly	1	0	0.001	Yes
COBDEN	Yearly	1	0	0.001	Yes
COLERAINE	Yearly	1	0	0.002	Yes
DARTMOOR	Yearly	1	0	0.002	Yes
DERRINALLUM	Yearly	1	0	0.001	Yes
DUNKELD	Yearly	1	0	0.001	Yes
GLENTHOMPSON	Yearly	1	0	0.001	Yes
HAMILTON	Yearly	1	0	0.001	Yes
HEYWOOD	Yearly	1	0	0.001	Yes
KOROIT	Yearly	1	0	0.001	Yes
LISMORE	Yearly	1	0	0.001	Yes
MACARTHUR	Quarterly	4	0	0.001	Yes
MERINO	Yearly	1	0	0.001	Yes
MORTLAKE	Yearly	1	0	0.001	Yes
NOORAT/GLENORMISTON	Yearly	1	0	0.001	Yes
PAARATTE	Yearly	1	0	0.001	Yes
PENSHURST	Yearly	1	0	0.001	Yes
PETERBOROUGH	Yearly	1	0	0.001	Yes
PORT CAMPBELL	Yearly	1	0	0.001	Yes
PORT FAIRY	Quarterly	4	0	0.001	Yes
PORTLAND	Yearly	1	0	0.001	Yes
PURNIM	Yearly	1	0	0.001	Yes
SANDFORD	Yearly	1	0	0.001	Yes
SIMPSON	Yearly	1	0	0.001	Yes
TARRINGTON	Yearly	1	0	0.001	Yes
TERANG	Yearly	1	0	0.001	Yes
TIMBOON	Yearly	1	0	0.001	Yes
WARRNAMBOOL	Yearly	1	0	0.001	Yes

Manganese Results

Standard All samples of drinking water collected within a locality in any 12 month period having a concentration less than 0.5 mg/L (ADWG)

Table 6-12 Manganese results by locality 2014/15

Manganese

Locality	Sampling Frequency	No. of Samples	No. of Non complying samples	Maximum result (mg/L)	Complying (Yes/No)
ALLANSFORD	Yearly A	1	0	0.110	Yes
BALMORAL#	Weekly	51	0	0.024	Yes
CAMPERDOWN (RURAL)	Yearly	1	0	0.003	Yes
CAMPERDOWN (URBAN)	Yearly	1	0	0.010	Yes
CARAMUT	Yearly	1	0	0.002	Yes
CASTERTON	Weekly	52	0	0.005	Yes
CAVENDISH	Yearly	1	0	0.002	Yes
COBDEN#	Weekly	51	0	0.009	Yes
COLERAINE	Weekly	52	0	0.003	Yes
DARTMOOR	Yearly	1	0	0.002	Yes
DERRINALLUM	Yearly	1	0	0.004	Yes
DUNKELD	Yearly	1	0	0.002	Yes
GLENTHOMPSON	Weekly	52	0	0.005	Yes
HAMILTON	Yearly	1	0	0.007	Yes
HEYWOOD	Weekly A ²	52	0	0.290	Yes
KOROIT	Yearly	1	0	0.006	Yes
LISMORE	Yearly	1	0	0.002	Yes
MACARTHUR	Yearly	1	0	0.002	Yes
MERINO	Weekly	52	0	0.002	Yes
MORTLAKE	Yearly	1	0	0.002	Yes
NOORAT/GLENORMISTON	Yearly	1	0	0.005	Yes
PAARATTE	Yearly	1	0	0.002	Yes
PENSHURST	Yearly	1	0	0.002	Yes
PETERBOROUGH	Yearly	1	0	0.002	Yes
PORT CAMPBELL	Yearly	1	0	0.002	Yes
PORT FAIRY	Weekly A ¹	52	0	0.140	Yes
PORTLAND	Yearly	1	0	0.002	Yes
PURNIM	Weekly	52	0	0.051	Yes
SANDFORD	Weekly	52	0	0.009	Yes
SIMPSON	Yearly	1	0	0.004	Yes
TARRINGTON	Yearly	1	0	0.004	Yes
TERANG	Yearly	1	0	0.100	Yes
TIMBOON	Yearly	1	0	0.002	Yes
WARRNAMBOOL	Yearly	1	0	0.002	Yes

If the maximum result manganese is 0.55 mg/L or greater, then the locality is non-compliant.

A - Exceedance of aesthetic limit. # - Single sample missed

Water treatment related chemicals

Table 6-13 lists the water treatment related chemicals monitored at each locality during 2014/15. Most results were less than detection limits. Trichloroacetaldehyde is a by-product of chlorination. There have been historical occurrences above the health limit at Purnim and Cavendish; hence these localities are tested at quarterly frequency. All results for Cavendish were less than detection limits; however Trichloroacetaldehyde at Purnim recorded levels above the health limits and a Section 18 notification was submitted, details are as per Section entitled “Emergency and incident management”.

Table 6-13 water treatment related chemical sampling summary and health-related guideline values

Parameter	Sampling frequency	ADWG Value (mg/L)
1,1,1-Trichloropropan-2-one	Yearly	-
1,1,3-Trichloropropan-2-one	Yearly	-
1,1-Dichloropropan-2-one	Yearly	-
1,3-Dichloropropan-2-one	Yearly	-
2,4,6-Trichlorophenol	Yearly	-
2,4-Dichlorophenol	Yearly	0.2
2-Chlorophenol	Yearly	0.3
Acrylamide	Yearly	0.0002
Carbon tetrachloride	Yearly	0.003
Cyanogen Chloride	Yearly	0.08
Epichlorohydrin	Yearly	0.0005
Trichloroacetaldehyde (chloral hydrate)	Quarterly/Yearly	0.02

Nitrate and Nitrite

The ADWG states Nitrate and Nitrite “occurs naturally in some waters (particularly groundwater)”. Caramut and Mortlake have been shown to have stable natural levels and hence these locations are monitored on a monthly basis. All other localities are tested on a yearly basis. Table 6-16 lists these parameters and their sampling frequency and the ADWG health limit. All test results were less than the ADWG health-related guideline values.

Table 6-16 – Nitrate and Nitrite sampling summary and health-related guideline values

Parameter	Sampling Frequency*	ADWG Value (mg/L)
Nitrate (as nitrate)	Monthly	50
Nitrite (as nitrite)	Monthly	3

*Caramut and Mortlake only

Inorganics

Table 6-14 lists the metals monitored at each locality during 2014/15. Most results were below detection limits and all localities recorded levels less than the ADWG health-related guideline values.

Table 6-14 – metals sampling summary and health-related guideline values

Parameter	Sampling Frequency	ADWG Value (mg/L)
Cadmium	Quarterly	0.002
Chromium	Quarterly	0.05
Nickel	Quarterly	0.02
Zinc	Quarterly	3
Tin	Yearly	-
Silver	Yearly	0.1
Beryllium	Yearly	0.06
Uranium	Yearly	0.017
Iodide	Yearly	0.5
Molybdenum	Yearly	0.05
Boron	Yearly	4
Barium	Yearly	2
Selenium	Yearly	0.01
Mercury	Yearly	0.001

Polycyclic Aromatic Hydrocarbon Results

Table 6- lists the suite of polycyclic aromatic hydrocarbons monitored at each locality during 2014/15. All test results were below the limit of detection.

Table 6-15 - PAH sampling summary and health related guideline values

Parameter	Sampling Frequency	ADWG Value (mg/L)
Acenaphthene	Yearly	-
Acenaphthylene	Yearly	-
Anthracene	Yearly	-
Benz(a)anthracene	Yearly	-
Benzo(a)pyrene	Yearly	0.00001
Benzo(b)fluoranthene	Yearly	-
Benzo(g,h,i)perylene	Yearly	-
Benzo(k)fluoranthene	Yearly	-
Chrysene	Yearly	-
Dibenz(a,h)anthracene	Yearly	-
Fluoranthene	Yearly	-
Indeno(1,2,3-cd)pyrene	Yearly	-
Naphthalene	Yearly	-
Phenanthrene	Yearly	-
Pyrene	Yearly	-
Total PAH	Yearly	-

Pesticide/Herbicide Results

Table 6-17 lists the pesticides and herbicides monitored either at representative raw water storage, and rivers/creeks so that all localities sourced from surface water are tested. During 2014/15 all test results were less than the ADWG health-related guideline values.

Table 6-17 – pesticide and herbicide sampling summary and health-related guideline values

Representative raw water storages and rivers/creeks tested for pesticides/herbicides

- Arkins Creek – East (North Otway Catchment)
- Arkins Creek – West (North Otway Catchment)
- Balmoral Service Basin
- Brierly Basin
- Cavendish Service Basin
- Cruckoor Reservoir
- Donald's Hill Reservoir
- Ewen's Hill Reservoir
- First Creek (North Otway Catchment)
- Gellibrand River Carlisle (North Otway Catchment)
- Glenthompson Reservoir
- Grampians Catchment Headworks surface water streams
- Hayes Reservoir
- Hartwich's Reservoir
- Hamilton Service Basin I
- Plantation Rd Storage
- Simpson Service Basin

Parameter	Sampling Frequency	ADWG Value (mg/L)
1,2-Dibromo-3-Chloropropane	Yearly	-
1,2-Dibromoethane	Yearly	-
2,4,5-T	Yearly	100
2,4,5-TP	Yearly	0.1
2,4,6-T	Yearly	20
2,4-D	Yearly	0.03
2,4-DB	Yearly	-
2,4-DP	Yearly	0.03
2,6-D	Yearly	-
4,4-DDD	Yearly	-
4,4-DDE	Yearly	-
4,4-DDT	Yearly	0.009
4-Chlorophenoxy acetic acid	Yearly	-
Aldrin	Yearly	0.0003
Ametryn	Yearly	0.07
Atrazine	Yearly	0.02
BHC (Alpha Isomer)	Yearly	-
BHC (Beta Isomer)	Yearly	-
BHC (Delta Isomer)	Yearly	-
Chlordane	Yearly	0.0015
Chloropicrin	Yearly	-
Chloropyrifos	Yearly	10
CIS-1,3-Dichloropropene	Yearly	-
cis-Chlordane	Yearly	0.002
Dicamba	Yearly	0.1
Dieldrin	Yearly	0.003
Endosulphan 1	Yearly	0.02
Endosulphan 2	Yearly	0.02
Endosulphan Sulphate	Yearly	0.02
Endrin	Yearly	-
Endrin Aldehyde	Yearly	-
Endrin Ketone	Yearly	-
Glyphosate	Yearly	1
Heptachlor	Yearly	0.0003
Heptachlor Epoxide	Yearly	0.0003
Hexachlorbenzene	Yearly	-
Hexazinone	Yearly	400
Lindane	Yearly	0.01
MCPA	Yearly	0.04
MCPB	Yearly	-
Mecoprop	Yearly	-
Methoxychlor	Yearly	0.3
Molinate	Yearly	4
oxy-Chlordane	Yearly	0.11
Prometon	Yearly	-
Prometryn	Yearly	-
Propazine	Yearly	0.05
Propiconazole	Yearly	100
Simazine	Yearly	0.02
Simetryn	Yearly	-
Temephos	Yearly	400
Terbutryn	Yearly	0.4
Tertbutylazine	Yearly	0.01
Trans-1,3-Dichloropropene	Yearly	-
Trans-Chlordane	Yearly	0.011
Trichlopyr	Yearly	0.02

Industrial Chemical Results

Table 6-18 lists industrial chemical health-related parameters tested at each locality during 2014/15. All test results were less than the ADWG health-related guideline values.

Table 6-18 – Industrial chemicals sampling summary and health-based guideline values

Parameter	Sampling Frequency	ADWG Value
1,1,1,2-Tetrachlorethane	Yearly	-
1,1,1-Trichloroethane	Yearly	-
1,1,2,2-Tetrachloroethane	Yearly	-
1,1,2-Trichloroethane	Yearly	-
1,1-Dichloroethane	Yearly	-
1,1-Dichloroethene	Yearly	0.03
1,1-Dichloropropene	Yearly	-
1,2,3-Trichlorobenzene	Yearly	-
1,2,3-Trichloropropane	Yearly	-
1,2,4-Trichlorobenzene	Yearly	0.03
1,2,4-Trimethylbenzene	Yearly	-
1,2-Dichlorobenzene	Yearly	1.5
1,2-Dichloroethane	Yearly	0.003
1,2-Dichloropropane	Yearly	-
1,3,5-Trimethylbenzene	Yearly	-
1,3-Dichlorobenzene	Yearly	0.02
1,3-Dichloropropane	Yearly	-
1,4-Dichlorobenzene	Yearly	0.04
2,2-Dichloropropane	Yearly	-
2-Chlorotoluene	Yearly	-
4-Chlorotoluene	Yearly	-
Benzene	Yearly	0.0011
Bromobenzene	Yearly	-
Bromochloromethane	Yearly	-
Carbon Disulphide	Yearly	-
Chlorobenzene	Yearly	0.3
CIS-1,2-Dichloroethene	Yearly	0.06
Dibromomethane	Yearly	-
Ethylbenzene	Yearly	0.3
Hexachloro-1,3-Butadiene	Yearly	0.0007
Isopropylbenzene	Yearly	-
M-&P-Xylene	Yearly	0.6
Methylenechloride	Yearly	0.04
N-Butylbenzene	Yearly	-
N-Propylbenzene	Yearly	-
o-Xylene	Yearly	0.6
P-Isopropyltoluene	Yearly	-
Sec-Butylbenzene	Yearly	-
Styrene	Yearly	0.03
Tert-Butylbenzene	Yearly	-
Tetrachloroethene	Yearly	0.05
Toluene	Yearly	0.8
Trans-1,2-Dichloroethene	Yearly	0.06
Tributyltin as Sn	Yearly	10.1
Trichloroethene	Yearly	-
Vinyl chloride	Yearly	0.0003

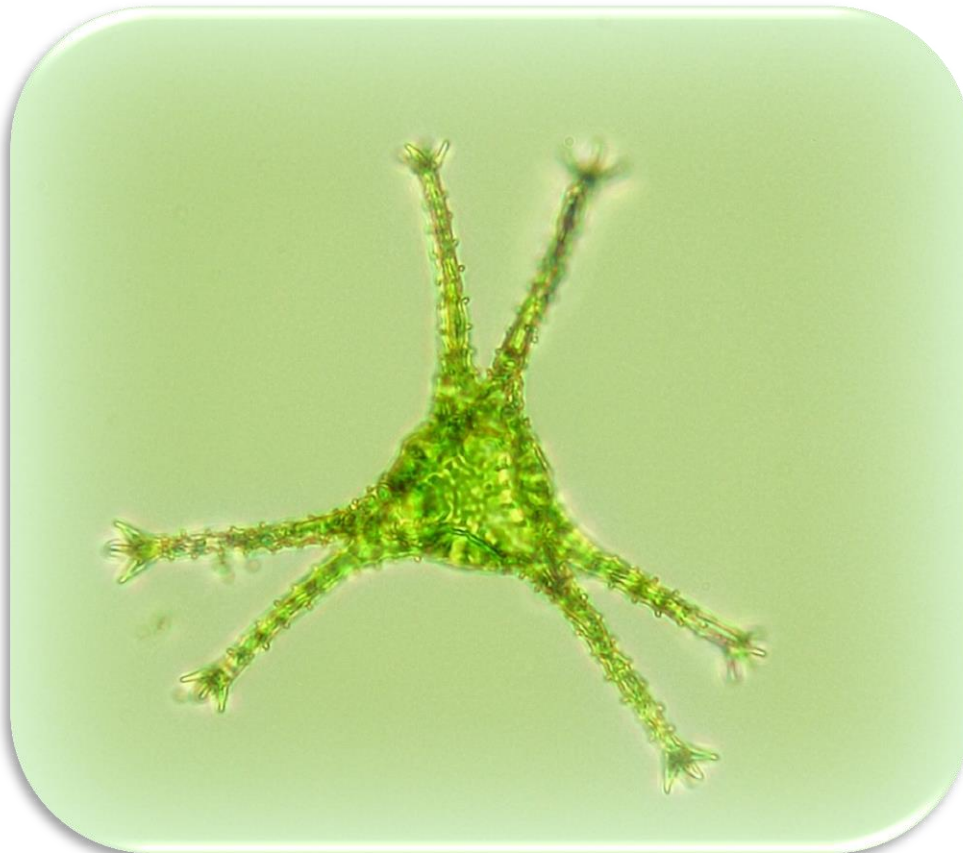
Algae

Wannon water has an obligation to notify DHHS if the presence of toxic blue green may pose a problem for drinking water supplies. The Blue Green algae circular (DELWP) sets out different ways toxic blue green algae species are measured and where it relates to drinking water these are:

- Total microcystins ≥ 1.3 ug/L (microcystin_LR toxicity equivalents)
- ≥ 6500 cells/mL *Microcystis aeruginosa*
- Total combined biovolume of known toxic species ≥ 0.6 mm³/L
- Total combined biovolume of all cyanobacterial > 10 mm³/L OR
- BGA is present in drinking water at levels that may cause widespread public complaint for example through taste and odour. If this occurs then a section 22 notification in accordance with the safe drinking water act should be made

During 2014/15 Wannon Water collected samples following a risk-rated approach, sampling fortnightly to monthly from all raw water storages that supply raw water to drinking water localities. These samples were sent to a NATA certified laboratory for algal identification and counts. The sampling frequency was increased if blue green algae were detected and the numbers were noted to be increasing.

On two occasions a number of raw water sources were isolated because the BGA results indicated trigger levels were exceeded at a number of storages as mentioned in Section 5.



Aesthetic Parameters

pH Results

Guideline The guideline limit for pH is 6.5-8.5 pH units. There is no health-based guideline.

Table 6-21 pH results by locality 2014/15

pH				
Locality	Sampling Frequency	No. of Samples	Min	Max
ALLANSFORD	Weekly	52	7.2	7.7
BALMORAL	Weekly	52	6.8	8.1
CAMPERDOWN (RURAL)	Weekly	52	6.5	9.3
CAMPERDOWN (URBAN)	Weekly	52	6.5	7.7
CARAMUT	Weekly	52	7.6	8.8
CASTERTON	Weekly	52	7.4	7.8
CAVENDISH	Weekly	52	6.7	9.6
COBDEN	Weekly	52	6.1	7.6
COLERAINE	Weekly	52	7.6	7.9
DARTMOOR	Weekly	52	7.7	7.9
DERRINALLUM	Weekly	52	6.9	9.9
DUNKELD	Weekly	52	6.5	8.9
GLENTHOMPSON	Weekly	52	7.3	8.8
HAMILTON*	Weekly	104	6.4	8.1
HEYWOOD	Weekly	52	8.3	9.1
KOROIT	Weekly	52	7.1	7.7
LISMORE	Weekly	52	6.7	9.3
MACARTHUR	Weekly	52	7.9	8.4
MERINO	Weekly	52	7.6	7.9
MORTLAKE	Weekly	52	7.6	8.2
NOORAT/GLENORMISTON	Weekly	52	6.5	9.3
PAARATTE	Weekly	52	7.8	8.2
PENSHURST	Weekly	52	8.1	8.7
PETERBOROUGH	Weekly	52	8.0	8.3
PORT CAMPBELL	Weekly	52	7.8	8.1
PORT FAIRY*	Weekly	104	8.2	8.5
PORTLAND*	Weekly	104	8.4	8.8
PUENIM	Weekly	94	6.8	7.5
SANDFORD	Weekly	52	7.5	7.9
SIMPSON	Weekly	52	6.5	7.4
TARRINGTON	Weekly	52	6.6	9.2
TERANG	Weekly	52	6.5	8.3
TIMBOON	Weekly	52	8.0	8.3
WARRNAMBOOL*	Weekly	156	6.9	7.9

* More than one sample

Description A pH of less than 6.5 may be corrosive; greater than pH 8 progressively decreases efficiency of chlorination, greater than 8.5 may cause scale and taste problems. New concrete tanks and cement-mortar lined pipes can significantly increase pH and a value of up to 9.2 may be tolerated provided monitoring indicates no deterioration in microbial quality.

Management of high pH

Camperdown Rural, Derrinallum and Lismore

These localities are all supplied from Camperdown WTP. Camperdown Rural has one instance where the pH was above 9.2 and three further instances where the pH was above 8.5. There is a chlorine booster station at Ettrick Springs which services Derrinallum and Lismore, the chlorination was changed from liquid to gas during 2013/14, which improved pH although further optimisation is still required.

Cavendish and Noorat/Glenormiston

These localities are both small in population and frequently experience low demand, which leads to long detention times in cement lined mains. Regular flushing is conducted to reduce detention times and improve pH levels.



Alkalinity Results

Guideline

There is no health-based or aesthetic guideline for alkalinity however low levels (<50) can corrode surfaces. High levels (>200) tend to deposit calcium carbonate on pipes, fittings and hot water services.

Table 6-22 Total Alkalinity as CaCO₃ by locality 2014/15

Total Alkalinity as CaCO ₃				
Locality	Sampling Frequency	No. of Samples	No. of Non complying samples*	Maximum result (mg/L)
ALLANSFORD	Yearly	1	0	80
BALMORAL	Yearly	1	0	13
CAMPERDOWN SYSTEM	Yearly	1	0	18
CAMPERDOWN (URBAN)	Yearly	1	0	17
CARAMUT	Quarterly	1	0	120
CASTERTON	Quarterly	1	2	210
CAVENDISH	Yearly	1	0	22
COBDEN	Yearly	1	0	24
COLERAINE	Quarterly	4	2	210
DARTMOOR	Quarterly	4	4	240
DERRINALLUM#	Yearly	1	0	-
DUNKELD	Yearly	1	0	8
GLENTHOMPSON	Yearly	1	0	31
HAMILTON	Yearly	1	0	8
HEYWOOD	Quarterly	4	4	250
KOROIT	Yearly	1	0	53
LISMORE#	Yearly	1	0	-
MACARTHUR	Quarterly	4	4	400
MERINO	Quarterly	4	4	340
MORTLAKE	Yearly	1	0	87
NOORAT/GLENORMISTON	Yearly	1	0	25
PAARATTE	Yearly	1	0	140
PENSHURST	Quarterly	4	0	200
PETERBOROUGH	Yearly	1	0	140
PORT CAMPBELL	Yearly	1	0	150
PORT FAIRY	Quarterly	4	4	330
PORTLAND	Quarterly	4	4	360
PUENIM	Yearly	1	0	17
SANDFORD#	Yearly	1	0	-
SIMPSON	Yearly	1	0	14
TARRINGTON	Yearly	1	0	10
TERANG	Yearly	1	0	17
TIMBOON	Yearly	1	0	140
WARRNAMBOOL	Yearly	1	0	48

- Single sample missed

Description Alkalinity is the ability of water to buffer changes in pH.

Management of Alkalinity

- Refer to Table 6-22
- Alkalinity is not controllable by treatment processes at any of Wannon Water's localities.
- The Casterton supply system (Casterton, Coleraine, Merino and Sandford), Dartmoor, Heywood, Macarthur, Mortlake, Port Fairy and Portland are all sourced from groundwater. The levels of alkalinity are typical of these systems. All systems are between 200-500 mg/L and hence can have scaling problems.
- The Macarthur community was consulted about treatment options to reduce alkalinity prior to moving from a regulated water supply to a drinking water supply. The community voted against these treatment processes.
- At this stage Heywood is the only locality identified in Water Plan 3 as having plant upgrade to improve both alkalinity and hardness.



Hardness Results

Guideline The guideline limit for hardness is 200 mg/L as calcium carbonate (CaCO_3). There is no health based guideline.

Table 6-14 Hardness as CaCO_3 results by locality 2014/15

Total Hardness as CaCO_3				
Locality	Sampling Frequency	No. of Samples	No. of Non complying samples*	Maximum result (mg/L)
ALLANSFORD	Yearly	1	0	79
BALMORAL	Yearly	1	0	93
CAMPERDOWN SYSTEM	Yearly	1	0	40
CAMPERDOWN (URBAN)	Yearly	1	0	40
CARAMUT	Quarterly	1	0	100
CASTERTON	Quarterly	4	2	250
CAVENDISH	Yearly	1	0	24
COBDEN	Yearly	1	0	26
COLERAINE	Quarterly	4	2	250
DARTMOOR	Quarterly	4	4	260
DERRINALLUM#	Yearly	1	0	-
DUNKELD	Yearly	1	0	44
GLENTHOMPSON	Yearly	1	0	160
HAMILTON	Yearly	1	0	45
HEYWOOD	Quarterly	4	4	180
KOROIT	Yearly	1	0	78
LISMORE#	Yearly	1	0	-
MACARTHUR	Quarterly	4	4	330
MERINO	Quarterly	4	4	250
MORTLAKE	Yearly	1	0	57
NOORAT/GLENORMISTON	Yearly	1	0	28
PAARATTE	Yearly	1	0	170
PENSHURST	Quarterly	4	0	440
PETERBOROUGH	Yearly	1	0	150
PORT CAMPBELL	Yearly	1	0	150
PORT FAIRY	Quarterly	4	4	180
PORTLAND	Quarterly	4	4	170
PURNIM#	Yearly	1	0	-
SANDFORD#	Yearly	1	0	-
SIMPSON	Yearly	1	0	24
TARRINGTON	Yearly	1	0	47
TERANG	Yearly	1	0	20
TIMBOON	Yearly	1	0	150
WARRNAMBOOL	Yearly	1	0	80

Single sample missed

Description Caused by calcium and magnesium salts. Hard water is difficult to lather.

Less than 60 mg/L CaCO_3 – soft but possible corrosive

60-200 mg/L CaCO_3 – good quality

200-500 mg/L CaCO_3 – increasing scaling problems

Greater than 500 mg/L CaCO_3 – severe scaling

Management of Hardness

- Refer to Table 6-23
- Hardness is not controllable by treatment at any of Wannon Water's localities.
- The Casterton supply system (Casterton, Coleraine, Merino and Sandford), Dartmoor, Macarthur and Penshurst are all sourced from groundwater. The levels of hardness are typical of these systems. All systems are between 200-500 mg/L and hence can have scaling problems.
- The Macarthur community was consulted about treatment options to reduce hardness prior to moving from a regulated water supply to a drinking water supply. The community voted against these treatment processes.
- At this stage Heywood is the only locality identified in Water Plan 3 as having plant upgrade in the future to improve both alkalinity and hardness.

Iron Results

Guideline The guideline value for iron is 0.3 mg/L. There is no health-related guideline value.

Table 6-24 Iron results by locality 2014 /15

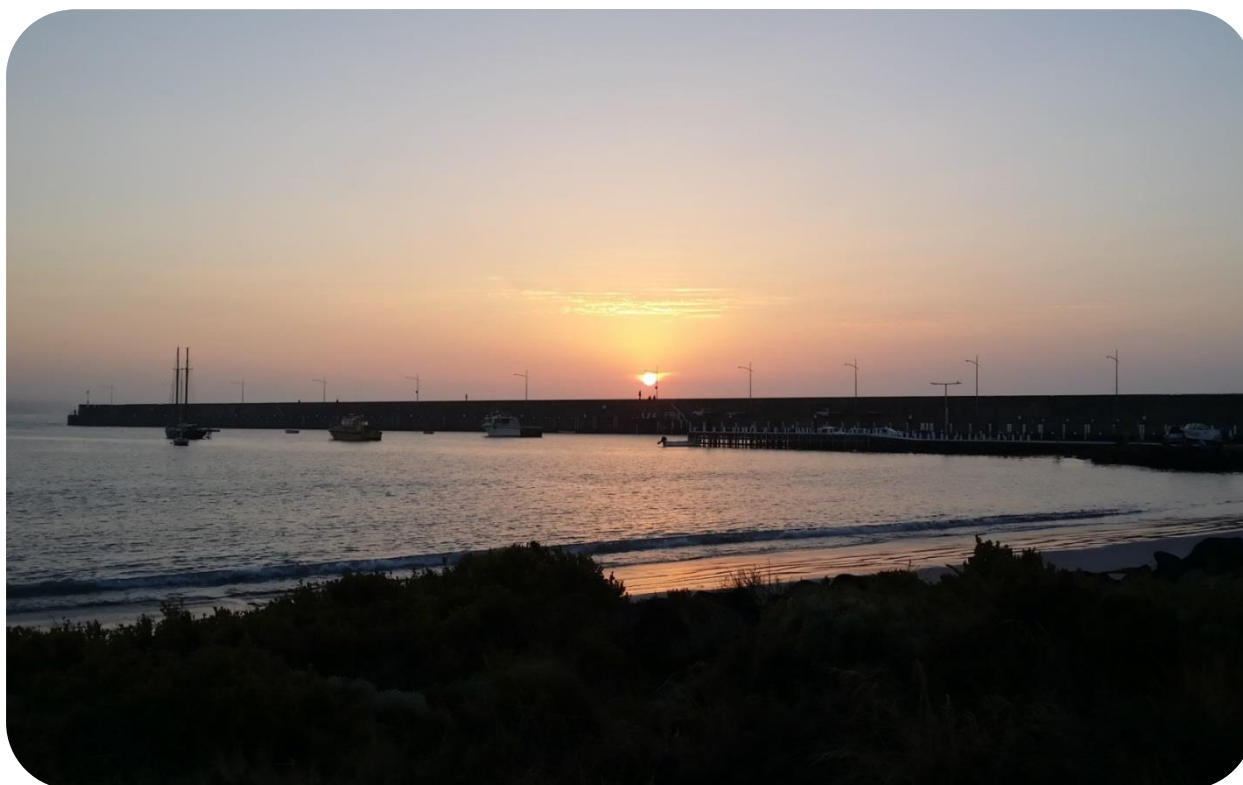
Iron				
Locality	Sampling Frequency	No. of Samples	No. of Non complying samples*	Maximum result (mg/L)
ALLANSFORD	Yearly	1	0	0.290
BALMORAL#	Weekly	51	2	1.700
CAMPERDOWN (RURAL)	Yearly	1	0	0.010
CAMPERDOWN (URBAN)	Yearly	1	0	0.045
CARAMUT	Yearly	1	0	0.010
CASTERTON	Weekly	52	0	0.050
CAVENDISH	Yearly	1	0	0.270
COBDEN#	Weekly	51	0	0.077
COLERAINE	Weekly	52	0	0.068
DARTMOOR	Yearly	1	0	0.013
DERRINALLUM	Yearly	1	0	0.075
DUNKELD	Yearly	1	0	0.057
GLENTHOMPSON	Weekly	52	0	0.220
HAMILTON	Yearly	1	0	0.034
HEYWOOD	Weekly	52	1	0.440
KOROIT	Yearly	1	0	0.049
LISMORE	Yearly	1	0	0.046
MACARTHUR	Yearly	1	0	0.083
MERINO	Weekly	52	0	0.036
MORTLAKE	Yearly	1	0	0.023
NOORAT/GLENORMISTON	Yearly	1	0	0.100
PAARATTE	Yearly	1	0	0.034
PENSHURST	Yearly	1	0	0.016
PETERBOROUGH	Yearly	1	0	0.025
PORT CAMPBELL	Yearly	1	0	0.028
PORT FAIRY	Weekly	52	7	1.500
PORTLAND	Yearly	1	0	0.028
PURNIM	Weekly	52	2	0.600
SANDFORD	Weekly	52	1	0.440
SIMPSON	Yearly	1	0	0.007
TARRINGTON	Yearly	1	0	0.120
TERANG	Yearly	1	0	0.094
TIMBOON	Yearly	1	0	0.018
WARRNAMBOOL	Yearly	1	0	0.018

- Single sample missed

Description Occurs naturally in water. Taste threshold is 0.3 mg/L. High concentrations stain laundry and fittings. Iron bacteria cause blockages, taste/odour and corrosion.

Management of Iron

- Refer to Table 6-24
- All exceedances were isolated incidents, the response action is initially indirect, being to flush if field tests indicate turbidity or colour issues or if a customer contact is received. When the result is received the relevant team is notified and flushing is conducted usually rectifying the issue.



Colour Results

Guideline < 15 HU. There is no health-based guideline.

Table 6-25 True Colour results by locality 2014/15

True Colour				
Locality	Sampling Frequency	No. of Samples	No. of Non complying samples*	Maximum result (mg/L)
ALLANSFORD	Yearly	1	0	1
BALMORAL	Weekly	52	0	9
CAMPERDOWN (RURAL)	Yearly	1	0	1
CAMPERDOWN (URBAN)	Yearly	1	0	1
CARAMUT	Yearly	1	0	1
CASTERTON	Weekly	52	0	4
CAVENDISH		4	2	71
COBDEN#	Weekly	51	0	3
COLERAINE	Weekly	52	0	3
DARTMOOR	Yearly	1	0	1
DERRINALLUM	Yearly	1	0	1
DUNKELD	Yearly	1	0	1
GLENTHOMPSON	Weekly	52	0	4
HAMILTON	Yearly	1	0	2
HEYWOOD	Weekly	52	0	3
KOROIT	Yearly	1	0	1
LISMORE	Yearly	1	0	2
MACARTHUR	Yearly	1	0	1
MERINO	Weekly	52	0	3
MORTLAKE	Yearly	1	0	1
NOORAT/GLENORMISTON	Yearly	1	0	1
PAARATTE	Yearly	1	0	2
PENSHURST	Yearly	1	0	2
PETERBOROUGH	Yearly	1	0	1
PORT CAMPBELL	Yearly	1	0	1
PORT FAIRY	Weekly	52	0	15
PORTLAND	Yearly	1	0	4
PURNIM	Weekly	52	1	62
SANDFORD	Weekly	52	0	3
SIMPSON	Yearly	1	0	1
TARRINGTON	Yearly	1	0	2
TERANG	Yearly	1	0	1
TIMBOON	Yearly	1	0	1
WARRNAMBOOL	Yearly	1	0	1

- Single sample missed

Description An important aesthetic characteristic for customer acceptance. Treatment processes can be optimised to remove colour.

Management of Colour

- Refer to Table 6-25
- Cavendish – The colour of the Cavendish supply is derived from the raw source water of the Grampians Headworks. Surface water run-off, particularly the initial flows, tends to be high in colour. Cavendish is a disinfection-only plant and therefore there is no capacity for colour removal.
- Purnim - The colour of the Purnim supply is derived from the raw source water of the Otway's. Surface water run-off, particularly the initial flows, tends to be high in colour. Purnim is a disinfection-only plant and therefore there is no capacity for colour removal.
- All exceedances were isolated; the response action is to flush if field tests indicate colour issues or if a customer contact relating to colour is received. When the result is received the relevant team is notified and flushing is conducted usually rectifying the issue.



Analysis of Results

Compliance as a Percentage of Localities

Table 6-26 shows the percentage of localities compliant with each of the Safe Drinking Water Regulation 2005 (SDWR) Schedule 2 parameters, which has been relatively consistent over the past three years.

Table 6-26 Compliance as a Percentage of Localities

Parameter	% of Localities Receiving Compliant Water		
	2014/15	2013/14	2012/13
<i>Escherichia coli</i>	100	100	100
Trihalomethanes	100	99.8	99.7
Chloroacetic acid	100	100	100
Dichloroacetic acid	100	100	100
Trichloroacetic acid	100	100	100
Aluminium (acid soluble)	99.1	98.6	99.1
Turbidity	100	100	100

Compliance as a Percentage of Population

The percentage of Wannon Water customers that were supplied with drinking water that complied with the SDWR Schedule 2 standards are detailed in Table 6-27. The percentage of customers receiving compliant water has remained relatively steady over the past three years for all parameters.

Table 6-27 Compliance as a Percentage of Population

Parameter	% of Customers Receiving Compliant Water		
	2014/15	2013/14	2012/13
<i>Escherichia coli</i>	100	100	100
Trihalomethanes	100	99.8	99.9
Chloroacetic acid	100	100	100
Dichloroacetic acid	100	100	100
Trichloroacetic acid	100	100	100
Aluminium (acid soluble)	96.4	80.6	99.9
Turbidity	100	100	100

7. EMERGENCY AND INCIDENT MANAGEMENT

Whilst every effort is made to prevent water quality incidents from occurring, there will inevitably be times when things go wrong. Such instances may be due to equipment failure, human error or unforeseen events. Wannon Water has incident management plans to manage such events to ensure the minimum possible impact on water quality. The incident management plans are a component of Wannon Water's Emergency Management Plan which uses the principles of prevention, response and recovery as outlined in the Australian Inter-Service Incidents Management System (AIIMS) structure. The objectives of the Emergency Management Plan are to ensure:

- The safety of customers, employees and the community in general;
- Continuity of operations;
- Protection of the environment; and
- Compliance with legislated and regulatory requirements

Wannon Water undertakes regular training and joint exercises in emergency simulations and emergency management with key stakeholders. These sessions are designed to put systems, processes and facilities into an environment as close as possible to a real event. The exercises provide participants with an opportunity to test communications, planning and management procedures and to include emergency management training.

Section 22 Incidents

The objective of Section 22 of the *Safe Drinking Water Act 2003* is to protect public health. Wannon Water must inform the Department of Health and Human Services of any potential or actual contaminated water supplied for drinking purposes. Information relating to all Section 22 incidents during 2014/15 is listed in Table 7-2.

Table 7-1 – Section 22 incidents 2014/15

Date (and Duration) of Incident	Location of Incident	Nature of Incident	Potentially Affected/ Affected Drinking Water Supplies	Actions Taken in Response to Incident
9 February	Camperdown Urban	E.coli – 1 org/100 mL	Camperdown Urban	Validation of the Camperdown WTP plant performance and system was conducted via trending of online monitoring and field testing results. Other validation included calculation of contact time for disinfection at time of event. retest of sample site then flushing. No issues were found at the plant or in the reticulation. No E.coli detected in the resample. DHHS notified of initial and resample result. Identified other improvements including offline tank management and monitoring to ensure chlorine residuals are maintained.
31 October – 14 November 2014 (15 days)	Warrnambool reticulation	Taste and odour complaints relating to algae in raw water storages	Warrnambool System	Numerous contacts and eight taste and odour complaints were received. Flushing was conducted and a media statement was released. Affected raw water storages were isolated and dosed with copper sulphate.

Section 18 Incidents

The objective of Section 18 of the *Safe Drinking Water Act 2003* is to indicate where drinking water has not complied with drinking water quality standards. Wannon Water must inform the Department of Health and Human Services when drinking water does not or is not likely to comply with any relevant water quality standard. These are listed at Table 7-3.

Table 7-3 – Section 18 incidents 2014/15

Date (and Duration) of Incident	Location of Incident	Nature of Incident	Potentially Affected/ Affected Drinking Water Supplies	Actions Taken in Response to Incident
5 August 2014	Cobden	Aluminium – 0.26 mg/L	Cobden	The raw water storage was dosed with lime to increase alkalinity of and therefore increase the buffering capacity to maintain an ideal pH in the flocculation process. This successfully eliminated aluminium carryover through the filters.
3 November 2014	Purnim	Trichloroacetaldehyde 0.029 mg/L	Purnim	The dosing rate of chlorine was reviewed with the aim to minimise the disinfection by-product formation without compromising disinfection. Flushing was also conducted.
2 February 2015	Allansford	Aluminium – 0.26 mg/L	Allansford	The Warrnambool WTP was found to be operating effectively. The result was identified as being due to a build-up in the main. Flushing was conducted,

Other Incidents

Wannon Water communicates other water quality related incidents to the Department of Health and Human Services. Information relating to other incidents which occurred during 2014/15 is listed in Table 7-4.

Table 7-4 – Other incidents 2014/15

Date (and Duration) of Incident	Location of Incident	Nature of Incident	Potentially Affected/ Affected Drinking Water Supplies	Actions Taken in Response to Incident
17 July – 29 July 2014 (13 days)	Hamilton	Fluoride offline >72 hours	Dunkeld, Hamilton and Tarrington	A number of leaks on the fluoride dosing system were identified and fixed, including manifold replacement.
15 August – 28 August 2014 (14 days)				
31 July – 3 August 2014 (4 days)	Warrnambool	Fluoride offline >72hrs	Allansford, Koroit and Warrnambool	A leaking RPZ was replaced.
9 – 16 September 2014 (8 days)	Warrnambool	Fluoride offline >72hrs	Allansford, Koroit and Warrnambool	Dosing pump service maintenance was conducted and flow meter repairs were made.
16 – 18 December 2014 (3 days)	Warrnambool	Fluoride offline >72hrs	Allansford, Koroit and Warrnambool	A new flow switch was installed.
16 March – 10 April 2015 (26 days)	Warrnambool	Algae in raw water storages	Allansford, Koroit and Warrnambool	The storages (Albert Park and Warrnambool Storage 1 and 2) were isolated from the system.

Customer Complaints

Wannon Water is actively committed to the successful and efficient management of complaints and disputes to ensure effective customer service.

Wannon Water's Corporate Complaints Management process is a "roadmap" to complaints management, allowing for a fair and detailed consideration of complaints and provides for genuine internal review if the complainant remains dissatisfied.

The collection, processing and reporting of Wannon Water's complaints is managed through a customer relationship database, allowing Wannon Water to meet its obligations under the Customer Service Code issued by the Essential Services Commission, under its reporting principles. This is also supported by Wannon Water's Customer Charter.

All customer complaints are investigated to determine the cause and significance of the complaint. Operational changes or capital improvements which optimise treated water quality may be implemented in response to valid and significant customer complaints.

In response to a complaint, customers are contacted directly and a site/vicinity inspection conducted. Appropriate action is then taken. This action will vary depending on the nature of the complaint.

Multiple complaints from a single locality are monitored closely. If the number of complaints within the locality exceeds five in any 24 hour period, an incident response team is assembled to investigate the event. Appropriate actions are then taken using AIIMS structure and Wannon Water's Emergency Management Plan.

The number of water quality customer complaints was similar to last year for all complaint types, with the exception of taste/odour, which increased due to presence of algae in the Warrnambool supply system (refer to Table 7-4; however the total number of complaints for 2014/15 was very low and similar to 2013/14. A summary

of the types of complaints received is presented in Table 7-1, with all localities recording less than 1 complaint per 100 customers.

During 2014/15 there were no instances where more than five water quality complaints were received within any 24 hour period.

Table 7-2 – Customer complaints 2014/15 by type

Type of complaint	No. of complaints	No. of complaints per 100 customers supplied [^]
Discoloured water	4	0.01
Taste/ odour	13	0.03
Blue Water	0	0
Air in Water	0	0
Alleged illness [#]	5	0.01
Other	1	0.002

[^] for the purposes of the complaints section, the term “customer” has the same meaning as that used by the Essential Services Commission, that is a customer = a connection

[#] alleged illness complaints include skin irritation.

Wannon Water continued to maintain its proactive approach to customer complaints by continuing to:

- Allocate specific resources to trouble shoot hot spot townships identified in the 2014/15 period
- Maintained resourcing to meet the scheduled flushing program for each of Wannon Water’s localities
- Proactive approach taken by Treatment Services Branch to quality trend variances

Hot spot townships

The Port Fairy Township was again flushed, and had a sequestering agent added to the water, just prior to Christmas, to clean the reticulation before the tourist season. These activities kept the number of customer complaints this locality low.

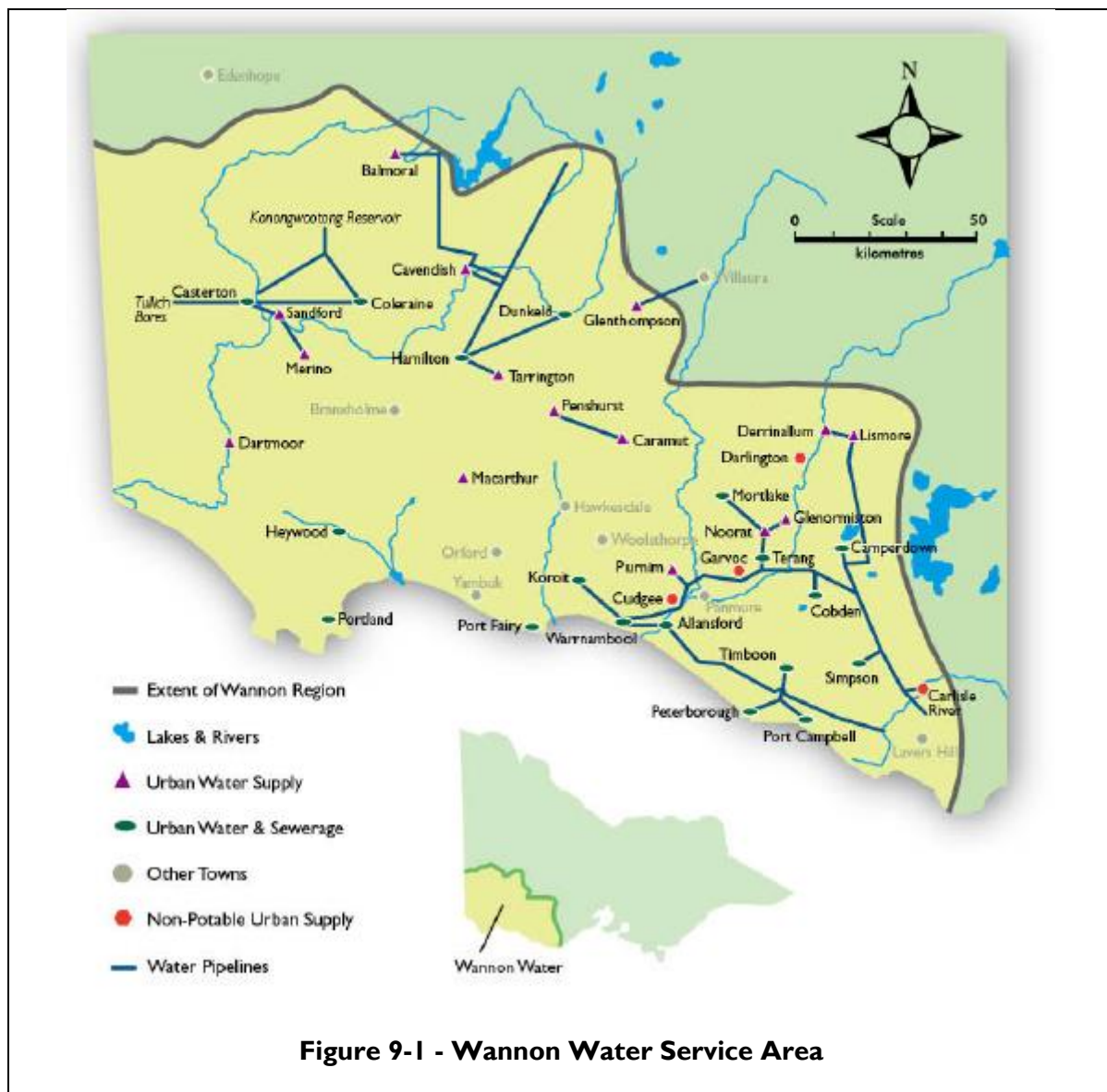
Warrnambool experienced taste and odour issues in November 2014. Numerous contacts and eight taste and odour complaints were received. Flushing was conducted and a media statement was released. Affected raw water storages were isolated and dosed with copper sulphate.

8. GLOSSARY

Adsorption	Process to remove dissolved organic matter, particles, algal toxins and compounds causing taste and odour problems. Granulated activated carbon (GAC) is used for adsorption at Wannon Water.
ADWG	Australian Drinking Water Guidelines (2011)
AIIMS	Australian Inter-Service Incidents Management System
BGA	Blue Green Algae
Dissolved Air Flotation (DAF)	Treatment process for coarse removal of particles through air flotation
DHHS	Department of Health and Human Services Victoria
DP	Disinfection Plant
CCP	Critical control point
Clarification	Two main primary solids removal processes are utilised; sedimentation and dissolved air flotation
Coagulation	Treatment to destabilise colloidal particles (turbidity and colour) by neutralising the surface charge of the particle to allow floc formation. Coagulants used at Wannon Water are ferric chloride, aluminium chlorohydrate (ACH) and aluminium sulphate (alum)
Cooling/ aeration towers	Treatment process which cools water via aeration.
Disinfection	Treatment process to kill bacteria and viruses. Note all drinking water supplied by Wannon Water is disinfected (chlorination, chloramination or UV disinfection) to ensure that microorganisms are eliminated. Chlorine gas, sodium hypochlorite, aqueous ammonia and UV are used for disinfection.
Filtration	Treatment process which remove suspended material by passing through a granular media such as sand.
Flocculation	Used to increase the floc size to enhance clarification and aid filtration. Flocculants used at Wannon Water include polyelectrolyte Nalco, Magnafloc, polymer Nalclean and polymer Klaraid.
Fluoridation	Treatment process to provide a dental health benefit. Fluorosilicic acid is used for fluoridation at Wannon Water.
GAC	Granulated Activated Carbon
HACCP	Hazard Analysis and Critical Control Point. A system that identifies evaluates and controls hazards.
Mean	The average of a number of numerical values.
ML	Megalitre – one million litres
NATA	National Association of Testing Authorities, Australia.
Oxidation	Process used to convert soluble contaminants to insoluble contaminants for easier removal. Sodium hypochlorite is used for oxidation at Wannon Water.
pH correction/ stabilisation	Treatment to adjust pH, to aid coagulation, to prevent corrosion or scaling and to optimise disinfection. Caustic soda, soda ash and hydrated lime are used for pH correction at Wannon Water.
UCL	Upper Confidence Limit
Raw water	Water that has not been treated in any way.
Raw water detention	Clarification, via settling, microbial die-off and reducing variability in water quality.
Risk assessment	The overall process of risk identification, risk analysis and risk evaluation. Risk analysis the systematic process to understand the nature of and to deduce the level of risk. Risk evaluation the process of comparing the level of risk against risk criteria.
RPZ	Reduced pressure zone valve. This is a backflow prevention device.

SDWA	<i>Safe Drinking Water Act 2003</i>
SDWR	Safe Drinking Water Regulations 2005
Sedimentation	Treatment process for coarse removal of particles through settling under gravity
Sequestration	Treatment process which involves the addition of sequestering agents to keeps dissolved iron and manganese from oxidising and precipitating. Calgon is used as a sequestering agent at Wannon Water.
WHO	World Health Organisation
WTP	Water Treatment Plant

9. WANNON WATER SERVICE AREA MAP



Information regarding water treatment can be obtained from Wannon Water's web site:

www.wannonwater.com.au

Results for water quality parameters can be provided upon request from Wannon Water via:

Tel 1300 926 666

Fax 03 5565 6050

Email info@wannonwater.com.au

Address PO Box 1158 Warrnambool Vic 3280