GIPPSLAND WATER

Gippsland Water 2008-09 Annual Report on Drinking Water Quality

SDWA 2003

Photo: Rawson Raw Water Basin after Bushfires Feb 2009

EXECUTIVE SUMMARY

Gippsland Water is committed to providing safe drinking water that meets customer and stakeholder expectations. Gippsland Water's objective is to ensure the quality of water supplied to its customers meets the requirements of the *SDWA 2003*.

The *Safe Drinking Water Act 2003* (SDWA) came into effect on 1 July 2004 and is the first Act in Victoria to deal specifically with the regulation of drinking water supplies.

The SDWA requires water suppliers and water storage managers to provide the Department of Health (DOH) with an annual report, covering issues relating to the quality and management of drinking water.

A region-wide water quality monitoring program tests the quality of the drinking water present at customer taps in accordance with the Safe Drinking Water Regulations (SDWR) 2005. A summary of the results for the reporting period of July 2008 to June 2009 has been provided for water quality parameters. The regulated parameters include *E.coli*, turbidity, aluminium and disinfection by-products (chloroacetic acid, dichloroacetic acid, trichloroacetic acid and trihalomethanes).

As part of Gippsland Water's monitoring program, 5,928 tests were performed on samples taken from customer taps against the requirements of the SDWA 2003. One was were found to be non-compliant for the following water quality parameters:

- Aluminium:
    - Rawson (April 2009)

During the reporting year, the Boolarra, Mirboo, Warragul and Rawson and Neerim South Water Treatment Plants were placed at risk due to bushfires in January and February 2009. Six water supply catchments were impacted at varying degrees.

Gippsland Water successfully implemented its emergency management and business continuity response, and customer water supply quality was maintained within regulatory requirements.

Gippsland Water supplies 59,820 properties with water and received 162 complaints regarding water quality (discoloured, air in water, blue water, illness, taste, odour, and other) during the reporting period. The corporation's extensive customer complaint response procedure ensures all complaints are responded to effectively and in a timely manner. There have been no outstanding or major issues arising from the customer complaints process.

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1 INTRODUCTION

1.1 CHARACTERISATION OF THE SYSTEM

Gippsland Water manages five business streams, one of which is the provision of water services. Its region consists of 42 towns with approximately 59,820 properties connected to the 17 drinking water supply systems. These towns are grouped into 35 localities for the purposes of monitoring and reporting in accordance with the SDWR 2005.

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

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

Our mission

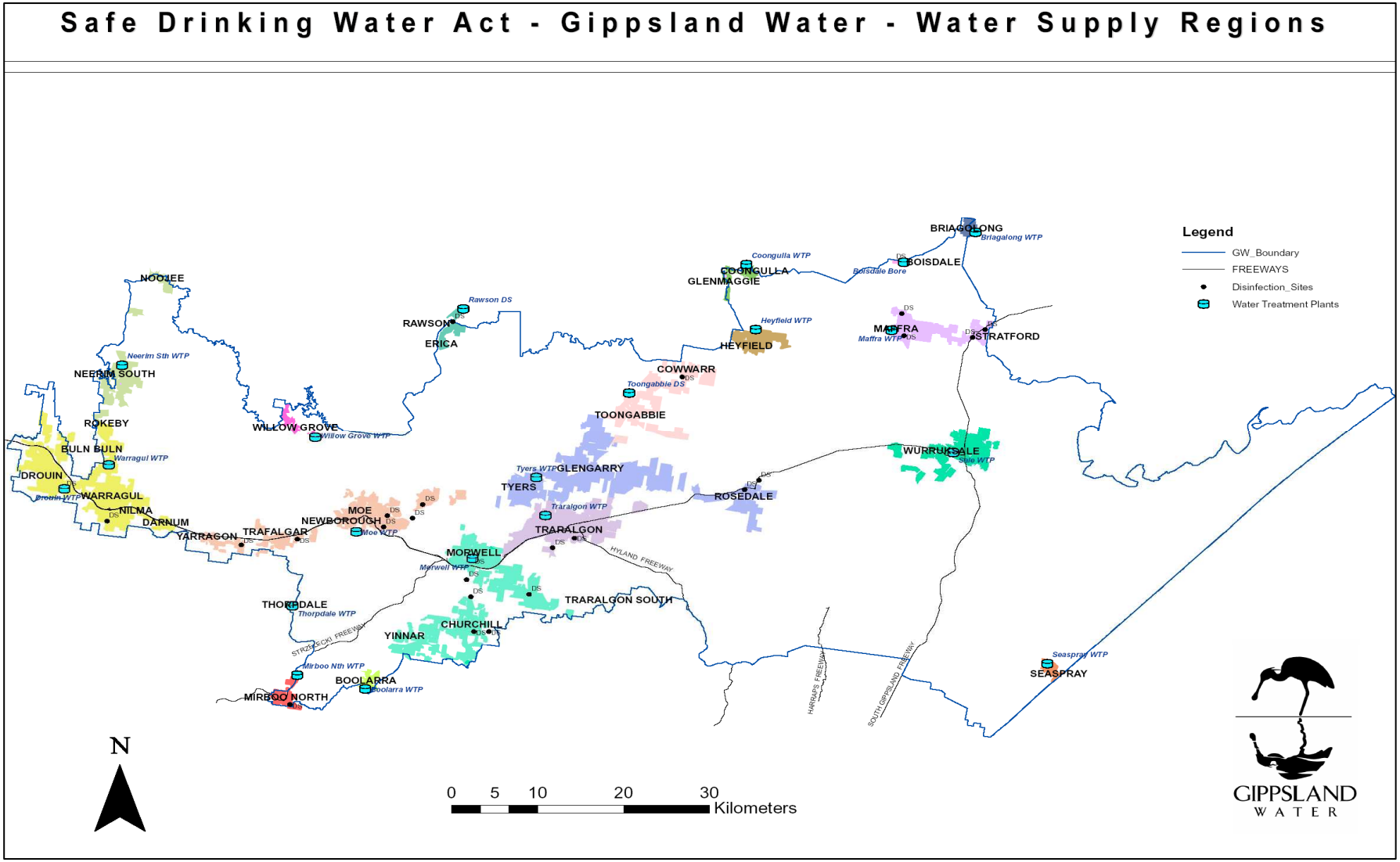
To manage the resources in our care in a manner that ensures Gippsland's sustainability and secures social, environmental and economic benefits to our customers, stakeholders and region.

Our vision

In an increasingly challenging operating environment, Gippsland Water will strive for best practice sustainable water and waste management within central Gippsland.

1.1.1 Map of the Gippsland Water system

Figure 1 Overview of water supply system operated by Gippsland Water



1.1.2 Source of water

Gippsland Water operated 17 water treatment systems supplying 35 localities (42 towns) in 2008-09. The water for these systems is sourced from a variety of water supplies including stream off-takes, reservoirs, and groundwater (bore water). Table 1.1 provides information on where the raw water is sourced for each of the water sampling localities and identifies the raw water storage - if one exists prior to the water treatment plants.

Table 1: Gippsland Water Locality Water Source

Locality	Population[1]	Source water	Storage	Water treatment plant
Maffra	3,920	Macalister River	N/A	Maffra
Stratford	1,330			
Boisdale	70			
Boolarra	480	Walkley Creek O'Gradys Creek (supplementary supply) Tankered water supplied during bushfires and boil water alert	Boolarra Raw water basin	Boolarra
Briagolong	470	Bore (Freestone Creek Aquifer)	N/A	Briagolong
Morwell	12,280	Tyers River	Moondarra	Morwell
Churchill	4,8900			
Yinnar	550			
Jumbuk	180			
Traralgon South/Hazelwood North	1,050			
Tyers/Glengarry	910	Tyers River	Moondarra	Tyers
Rosedale	1,040			
Toongabbie	460			
Cowwarr	230			
Traralgon	19,610	Tyers River	Moondarra	Traralgon
Warragul (including Nilma, Darnum, Drouin East)	14,040	Pederson Weir (Tarago River) Tarago Reservoir - (supplementary supply)	Tarago Reservoir (supplementary supply)	Warragul
Warragul South	330			
Drouin	5,820			
Rokeby/Buln Buln	360			
Coongulla/ Glenmaggie	180	Macalister River	Lake Glenmaggie	Coongulla
Rawson	280	Trigger Creek	Amours Basins	Rawson
Erica	190			
Heyfield	1,440	Thomson River	Heyfield Raw water storage	Heyfield
Mirboo North	1,380	Little Morwell River	N/A	Mirboo North
Moe	15,770	Tanjil River and Narracan Creek	N/A	Moe
Newborough	4010			

Locality	Population[1]	Source water	Storage	Water treatment plant
Yallourn North	1,190			
Trafalgar	2,280			
Yarragon	710			
Neerim South	540	Tarago River	Tarago Reservoir	Neerim South
Noojee	120			
Sale/Wurruk	12,860	Bore (Boisdale Aquifer)	N/A	Sale
Seaspray	210	Merrimans Creek	N/A	Seaspray
Thorpdale	160	Easterbrook Creek	Thorpdale raw water storage	Thorpdale
Willow Grove	190	Tanjil River	Blue Rock Lake	Willow Grove

[1.] The listed populations are for the water sampling localities as registered with DOH in June 2006.

2 WATER TREATMENT AND QUALITY MANAGEMENT SYSTEMS

2.1 WATER TREATMENT

Gippsland Water operates 17 water supply systems, with 17 water treatment plants (WTP), supplying 35 localities (42 towns). The source waters are treated prior to distribution to Gippsland Water's customers with the objective of providing safe drinking water at all times. The treatment varies for each water supply system with the specific treatment process dependent on the quality and risks of the source water. Table 2.1 identifies the regular treatment process for each of the water localities and lists the added substances and any periodic treatment activities.

The corporation uses the following treatment processes to produce safe drinking water.

2.1.1 Coagulation and flocculation

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

2.1.2 Clarification/sedimentation

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

2.1.3 Filtration

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

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

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

2.1.4 Disinfection

Drinking water is disinfected to prevent the spread of waterborne pathogens that cause diseases such as dysentery, cholera, typhoid and gastroenteritis. A low residual level of disinfection also ensures that the water remains disinfected once it leaves the water treatment plant until it arrives at the customer's tap. In Gippsland Water's service area, chlorination is the most commonly used disinfectant because of its reliability and cost effectiveness. Chlorine is the most widely used disinfectant for water supplies in the world. The other disinfection treatment processes used in our region is chloramination.

2.1.5 Fluoridation

Gippsland Water fluoridates the drinking water supplies of Moe, Morwell, Maffra Traralgon, Sale, and Warragul. For information about the health issues associated with the water fluoridation program contact the Department of Health on 1800 651 723.

Table 2: Water treatment process

Locality	WTP	Treatment process	Added substances	Comments
Maffra Stratford Boisdale	Maffra	Coagulation, Flocculation Primary Solids Separation - (Clarification) Secondary Solids Separation - (Sand Filters) Primary and Secondary Disinfection, pH Correction, Fluoridation	Soda Ash Hydrofluorosilic acid Alum Polymer LT22, PACL-23, Chlorine (gas) Sodium Hypochlorite Powdered Activated Carbon (PAC)	PAC use as required to treat for taste and odour compounds. PACL-23 is used as required, to treat highly turbid waters.
Boolarra	Boolarra	Coagulation Primary Solids Separation – (Plate Clarifier) Secondary Solids Separation – (Dual Media Filter) Disinfection, pH Correction	Alum Chlorine (gas) Soda Ash	
Briagolong	Briagolong	Coagulation, Flocculation Primary and Secondary Filtration Disinfection, pH Correction	PFS (Polymerised Ferric Sulphate) Polymers 1115 and 1160 Sodium Hypochlorite Soda Ash	
Morwell Churchill Yinnar Jumbuk Traralgon South/Hazelwood North	Morwell	Coagulation, Flocculation Primary Solids Separation (Clarification), Secondary Solids Separation – (Sand Filters), Primary and Secondary Disinfection, pH Correction, Fluoridation	Soda Ash Alum, Polymer LT20 Chlorine (gas) Sodium Hypochlorite Sodium Fluoride * Calcium Hypochlorite	
Tyers/Glengarry Rosedale Toongabbie Cowwarr	Tyers	Coagulation, Flocculation **Plant 1** Primary and Secondary Filtration Primary and Secondary Disinfection, pH Correction **Plant 2** Primary Solids Separation (Dissolved Air Flotation) Secondary Solids Separation (Dual Media Filters) Tertiary Solids Separation (Micro Membrane Filtration)	Soda Ash Alum Polymers 1115 and 1160 Sodium Hypochlorite Calcium Hypochlorite	

Locality	WTP	Treatment process	Added substances	Comments
Traralgon	Traralgon	Coagulation, Flocculation Primary Solids Separation - (Dissolved Air Floatation) Secondary Solids Separation - (Dual Media Filters) Primary and Secondary Disinfection, pH Correction, Fluoridation	Soda Ash, Alum Polymer LT20 Chlorine (gas) Sodium Hypochlorite Sodium Fluoride *	
Warragul Warragul South Drouin Rokeby/Buln Buln	Warragul	Coagulation, Flocculation Primary Solids Separation - (Dissolved Air Floatation) Secondary Solids Separation - (Dual Media Filters) Primary and Secondary Disinfection, pH Correction, Fluoridation	Lime Alum, Polymer LT20 Chlorine (gas) Sodium Hypochlorite Sodium Fluoride *	
Coongulla/ Glenmaggie	Coongulla	Coagulation, Flocculation Primary and Secondary Filtration Disinfection, pH Correction, Granular Activated Carbon (GAC) Filtration	Soda Ash Alum 90, Polymers 1190, 1115 (1160) Sodium Hypochlorite	
Rawson Erica	Rawson	Coagulation, Flocculation Primary Solids Separation - (Dissolved Air Flotation) Secondary Solids Separation - (Dual Media Filters) Primary and Secondary Disinfection, pH Correction	Soda Ash Polymer 1160, PACL Sodium Hypochlorite	
Heyfield	Heyfield	Coagulation, Flocculation Primary and Secondary Filtration Disinfection, pH Correction	PFS, Polymers 1115 and 1160, Chlorine (gas) Soda Ash, Alum 90	Alum 90 coagulant used during poor/dirty raw water periods.
Mirboo North	Mirboo North	Coagulation, Flocculation Primary Solids Separation - (Dissolved Air Floatation) Secondary Solids Separation - (Dual Media Filters) Primary and Secondary Disinfection, pH Correction	Soda Ash PASS, Polymer LT20 Chlorine (gas) Sodium Hypochlorite	
Moe Newborough Yallourn North Trafalgar Yarragon	Moe	Coagulation, Flocculation Primary Solids Separation - (Clarification) Secondary Solids Separation - (Sand Filters & Dual Media Filters) Primary and Secondary Disinfection, pH Correction, Fluoridation	Alum, Polymer LT20 Chlorine (gas) Lime, Soda Ash Sodium Hypochlorite Sodium Fluoride * Carbon Dioxide	
Neerim South Noojee	Neerim South	Coagulation, Flocculation Primary and Secondary Filtration Chlorination and Chloramination Disinfection, pH Correction	Soda Ash PFS, Polymers 1115 and 1160 Sodium Hypochlorite Ammonia (Noojee system only)	
Sale/Wurruk	Sale	Aeration, Chemical Oxidisation, Precipitation Primary Solids Separation - (Sedimentation) Secondary Solids Separation - (Dual Media Filters) Disinfection, Fluoridation	Lime Potassium Permanganate Chlorine (gas), Sodium Fluoride *	

Locality	WTP	Treatment process	Added substances	Comments
Seaspray	Seaspray	Coagulation, Flocculation Primary and Secondary Filtration Disinfection, pH Correction	Soda Ash, Alum 90, Polymers 1115, (1160) Sodium Hypochlorite	
Thorpdale	Thorpdale	Coagulation, Flocculation Primary Solids Separation - (Clarification) Secondary Solids Separation - (Dual Media Filters) Disinfection, pH Correction	Alum Soda Ash Sodium Hypochlorite	
Willow Grove	Willow Grove	Coagulation, Flocculation Secondary Solids Separation - (Dual Media Filter) Chloramination Disinfection pH Correction	Soda Ash Alum, Polymer 1115 and 1160 Sodium Hypochlorite Ammonia	

* Sodium Fluoride -(dissolvable PVA bag)

2.2 SYSTEM ISSUES FOR 2008-09

During the 2008-09 monitoring period, the following issues occurred in the water supply systems;

- Bunyip Noojee Complex Fires January and February 2009 – Impacting on the catchment around the Tarago River (Warragul, Drouin, Neerim South and Noojee) and on the Warragul and Neerim South Water Treatment Plants;

- Delburn Complex Fires January and February 2009 - Impacting on the catchments around the Little Morwell River (Mirboo North) and O'Gradys Creek (Boolarra) and on the Boolarra and Mirboo North Water Treatment Plants;

- Churchill Jeeralang Complex January and February 2009 – Impacting on the catchment around Merrimans Creek (Seaspray); and

- East Tyers-Thomson Complex January and February 2009 - Impacting on the catchment around Thomson River (Heyfield) and Tyers River (Moondarra) and the Rawson Water Treatment Plant.

Alternative drinking water supplies were provided by water tankers to the township of Boolarra during the Delburn complex fires while a Gippsland Water self imposed boil water alert was in place.

Rainfall has been gentle in the above catchments and has enabled regrowth to occur to begin the bush recovery process. No significant water quality impacts have been observed in the catchments during the reporting period.

All incidents and events that were notifiable under Section 18 & 22 are detailed in Section 4 of this report, including the Boolarra Boil Water incident.

3 WATER QUALITY RESULTS FOR 2008-09

The *SDWR 2005* require a water quality monitoring program to be undertaken to verify compliance or non-compliance of specified water quality parameters as listed in the regulations. The quality of water is to be measured at a customer's tap in each of the 35 localities to determine that the water meets the specified quality standard. The following

section provides a summary of the results against the water quality parameters monitored through the year at the required sampling frequency.

A brief explanation of the required water quality parameters is provided below. A more detailed explanation can be obtained from the *Australian Drinking Water Guidelines (ADWG) 2004* prepared by the National Health and Medical Research Council (Section 10).

Escherichia coli (*E.coli*) – *E.coli* is the most common thermo tolerant coliform present in faeces and is regarded as the most specific indicator of recent faecal contamination from warm blooded animals. The presence of *E.coli* in the water supply can therefore indicate the potential for other pathogenic bacteria to be present. Any *E.coli* detections at customer tap samples must be reported to DOH under SDWA reporting requirements.

Chloroacetic, Dichloroacetic and Trichloroacetic Acid – These chloroacetic acids are produced in drinking water as by-products of the reaction between chlorine and naturally occurring organic matter derived from the decay of aquatic and terrestrial vegetative matter, present in water supplies. Results from samples taken at customer taps that exceed the maximum levels for these parameters are reported to the DOH under SDWA reporting requirements.

Trihalomethanes (THM) – Trihalomethanes are a category of by-products produced in drinking water, principally as a result of disinfection chemicals (chlorine) reacting with naturally occurring organic matter derived from the decay of aquatic and terrestrial vegetative matter, present in water supplies. Results from samples taken at customer taps that exceed the maximum levels for these parameters are most reported to DOH under SDWA reporting requirements.

Acid Soluble Aluminium – Aluminium concentrations may be present in water through natural leaching from soil and rock, or from the use of aluminium salts as coagulants in water treatment. The naturally occurring aluminium concentrations are removed using conventional water treatment practices. "Acid soluble aluminium" is the biologically available fraction of aluminium present in water. Results from samples taken at customer taps that exceed the maximum level of this parameter are reported to DOH under under SDWA reporting requirements.

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

3.1 ESCHERICHIA COLI (*E. COLI*) RESULTS

3.1.1 Compliance

Compliance under the *SDWR 2005* requires at least 98% of all samples of drinking water collected within a locality in any 12 month period to contain no *E.coli* organism/100ml of drinking water. All Gippsland Water sites achieved complied with this standard.

Table 3: *E.coli* results for towns 2008-09

Locality	Sampling Frequency	No. of samples #	No. of Non complying results	Max result	% with no *E. coli*	Complying (Yes/No)
Boisdale	Weekly	52	0	0	100%	Yes
Boolarra	Weekly	52	0	0	100%	Yes
Briagolong	Weekly	52	0	0	100%	Yes
Churchill	Weekly	52	0	0	100%	Yes
Coongulla-Glenmaggie	Weekly	52	0	0	100%	Yes
Cowwarr	Weekly	52	0	0	100%	Yes
Drouin	Weekly	64	0	0	100%	Yes
Erica	Weekly	52	0	0	100%	Yes
Heyfield	Weekly	52	0	0	100%	Yes
Jumbuk	Weekly	52	0	0	100%	Yes
Maffra	Weekly	52	0	0	100%	Yes
Mirboo North	Weekly	52	0	0	100%	Yes
Moe	2 samples/Week	104	0	0	100%	Yes
Morwell	Weekly	76	0	0	100%	Yes
Neerim South	Weekly	52	0	0	100%	Yes
Newborough	Weekly	52	0	0	100%	Yes
Noojee	Weekly	52	0	0	100%	Yes
Rawson	Weekly	52	0	0	100%	Yes
Rokeby-Buln Buln	Weekly	52	0	0	100%	Yes
Rosedale	Weekly	52	0	0	100%	Yes
Sale-Wurruk	Weekly	76	0	0	100%	Yes
Seaspray	Weekly	52	0	0	100%	Yes
Stratford	Weekly	52	0	0	100%	Yes
Thorpdale	Weekly	52	0	0	100%	Yes
Toongabbie	Weekly	52	0	0	100%	Yes
Trafalgar	Weekly	52	0	0	100%	Yes
Traralgon	2 samples/Week	104	1	0	99%	Yes
Traralgon South-Hazelwood North	Weekly	52	0	0	100%	Yes
Tyers-Glengarry	Weekly	52	0	0	100%	Yes
Warragul	Weekly	76	0	0	100%	Yes
Warragul South	Weekly	52	0	0	100%	Yes
Willow Grove	Weekly	52	0	0	100%	Yes
Yallourn North	Weekly	52	0	0	100%	Yes
Yarragon	Weekly	52	0	0	100%	Yes
Yinnar	Weekly	52	0	0	100%	Yes

The number of samples collected in a locality is determined by the ADWG recommendations (10-5) regarding population-based sampling frequency for *E.coli*. Localities with populations greater than 5,000 have samples taken more frequently than weekly.

3.1.2 Actions taken in relation to non-compliance

During the 2008-2009 reporting period, one locality recorded a positive E.coli

Traralgon – One sample containing a positive E.coli result was recorded in March 2009. Gippsland Water investigated the positive result and identified the cause as a contaminated sample tap that was subsequently replaced. All follow up monitoring showed no detection of E.coli. Refer to Section 4.1 where this incident was reported under SDWA Section 22 to DoH.

3.2 CHLORINE BASED DISINFECTION BY-PRODUCT CHEMICALS

3.2.1 Chloroacetic acid results

For compliance with the *SDWR 2005,* a sample result must not exceed 0.15 mg/L for chloroacetic acid. Results of <0.050 mg/L are at the detection limit for this parameter. Gippsland Water has an internal target of 100% compliance for chloroacetic acid. All Gippsland Water sites achieved 100% compliance with chloroacetic acid levels.

Table 4: Chloroacetic acid results for all towns 2008-09

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)	Non compliant results
Boisdale	Monthly	12	<0.050	<0.050	Yes	0
Boolarra	Monthly	12	<0.050	<0.050	Yes	0
Briagolong	Monthly	12	<0.050	<0.050	Yes	0
Churchill	Monthly	12	<0.050	<0.050	Yes	0
Coongulla-Glenmaggie	Monthly	12	<0.050	<0.050	Yes	0
Cowwarr	Monthly	12	<0.050	<0.050	Yes	0
Drouin	Monthly	12	<0.050	<0.050	Yes	0
Erica	Monthly	12	<0.050	<0.050	Yes	0
Heyfield	Monthly	12	<0.050	<0.050	Yes	0
Jumbuk	Monthly	12	<0.050	<0.050	Yes	0
Maffra	Monthly	12	<0.050	<0.050	Yes	0
Mirboo North	Monthly	12	<0.050	<0.050	Yes	0
Moe	Monthly	12	<0.050	<0.050	Yes	0
Morwell	Monthly	12	<0.050	<0.050	Yes	0
Neerim South	Monthly	12	<0.050	<0.050	Yes	0
Newborough	Monthly	12	<0.050	<0.050	Yes	0
Noojee	Monthly	12	<0.050	<0.050	Yes	0
Rawson	Monthly	12	<0.050	<0.050	Yes	0
Rokeby-Buln Buln	Monthly	12	<0.050	<0.050	Yes	0
Rosedale	Monthly	12	<0.050	<0.050	Yes	0
Sale-Wurruk	Monthly	12	<0.050	<0.050	Yes	0
Seaspray	Monthly	12	<0.050	<0.050	Yes	0
Stratford	Monthly	12	<0.050	<0.050	Yes	0
Thorpdale	Monthly	12	<0.050	<0.050	Yes	0
Toongabbie	Monthly	12	<0.050	<0.050	Yes	0
Trafalgar	Monthly	12	<0.050	<0.050	Yes	0
Traralgon	Monthly	12	<0.050	<0.050	Yes	0
Traralgon South-Hazelwood North	Monthly	12	<0.050	<0.050	Yes	0
Tyers-Glengarry	Monthly	12	<0.050	<0.050	Yes	0
Warragul	Monthly	12	<0.050	<0.050	Yes	0
Warragul South	Monthly	12	<0.050	<0.050	Yes	0
Willow Grove	Monthly	12	<0.050	<0.050	Yes	0
Yallourn North	Monthly	12	<0.050	<0.050	Yes	0
Yarragon	Monthly	12	<0.050	<0.050	Yes	0
Yinnar	Monthly	12	<0.050	<0.050	Yes	0

3.2.1.1 Actions taken in relation to non-compliance

All towns complied with this water quality parameter.

3.2.2 Dichloroacetic acid results

For compliance with the *SDWR 2005*, a sample result must not exceed 0.1 mg/L dichloroacetic acid. Results of <0.020 mg/L are at the detection limit for the parameter. Gippsland Water has an internal target of 100% compliance for dichloroacetic acid. All Gippsland Water sites achieved 100% compliance with dichloroacetic acid levels.

Table 5: Dichloroacetic acid results for all towns 2008-09

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)	Non compliant results
Boisdale	Monthly	12	<0.020	<0.020	Yes	0
Boolarra	Monthly	12	<0.020	<0.020	Yes	0
Briagolong	Monthly	12	<0.020	<0.020	Yes	0
Churchill	Monthly	12	<0.020	<0.020	Yes	0
Coongulla-Glenmaggie	Monthly	12	<0.020	<0.020	Yes	0
Cowwarr	Monthly	12	<0.020	<0.020	Yes	0
Drouin	Monthly	12	<0.020	<0.020	Yes	0
Erica	Monthly	12	<0.020	<0.020	Yes	0
Heyfield	Monthly	12	<0.020	<0.020	Yes	0
Jumbuk	Monthly	12	<0.020	<0.020	Yes	0
Maffra	Monthly	12	<0.020	<0.020	Yes	0
Mirboo North	Monthly	12	<0.020	<0.020	Yes	0
Moe	Monthly	12	<0.020	<0.020	Yes	0
Morwell	Monthly	12	<0.020	<0.020	Yes	0
Neerim South	Monthly	12	<0.020	<0.020	Yes	0
Newborough	Monthly	12	<0.020	<0.020	Yes	0
Noojee	Monthly	12	<0.020	<0.020	Yes	0
Rawson	Monthly	12	0.024	<0.020	Yes	0
Rokeby-Buln Buln	Monthly	12	<0.020	<0.020	Yes	0
Rosedale	Monthly	12	<0.020	<0.020	Yes	0
Sale-Wurruk	Monthly	12	0.047	<0.020	Yes	0
Seaspray	Monthly	12	<0.020	<0.020	Yes	0
Stratford	Monthly	12	<0.020	<0.020	Yes	0
Thorpdale	Monthly	12	<0.020	<0.020	Yes	0
Toongabbie	Monthly	12	<0.020	<0.020	Yes	0
Trafalgar	Monthly	12	<0.020	<0.020	Yes	0
Traralgon	Monthly	12	<0.020	<0.020	Yes	0
Traralgon South-Hazelwood North	Monthly	12	<0.020	<0.020	Yes	0
Tyers-Glengarry	Monthly	12	<0.020	<0.020	Yes	0
Warragul	Monthly	12	<0.020	<0.020	Yes	0
Warragul South	Monthly	12	0.021	<0.020	Yes	0
Willow Grove	Monthly	12	<0.020	<0.020	Yes	0
Yallourn North	Monthly	12	<0.020	<0.020	Yes	0
Yarragon	Monthly	12	<0.020	<0.020	Yes	0
Yinnar	Monthly	12	<0.020	<0.020	Yes	0

3.2.2.1 Actions taken in relation to non-compliance

All towns complied with this water quality parameter.

3.2.3 Trichloroacetic acid results

For compliance with the *SDWR 2005*, a sample result must not exceed 0.1 mg/L trichloroacetic acid. Results of <0.020 mg/L are at the detection limit for the parameter. Gippsland Water has an internal target of 100% compliance for trichloroacetic acid. All Gippsland Water sites achieved 100% compliance with trichloroacetic acid levels.

Table 6: Trichloroacetic acid for all towns 2008-09

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)	Non Compliant Results
Boisdale	Monthly	12	<0.020	<0.020	Yes	0
Boolarra	Monthly	12	<0.020	<0.020	Yes	0
Briagolong	Monthly	12	<0.020	<0.020	Yes	0
Churchill	Monthly	12	0.038	<0.020	Yes	0
Coongulla-Glenmaggie	Monthly	12	<0.020	<0.020	Yes	0
Cowwarr	Monthly	12	0.026	<0.020	Yes	0
Drouin	Monthly	12	0.029	<0.020	Yes	0
Erica	Monthly	12	0.026	<0.020	Yes	0
Heyfield	Monthly	12	<0.020	<0.020	Yes	0
Jumbuk	Monthly	12	0.032	<0.020	Yes	0
Maffra	Monthly	12	<0.020	<0.020	Yes	0
Mirboo North	Monthly	12	<0.020	<0.020	Yes	0
Moe	Monthly	12	<0.020	<0.020	Yes	0
Morwell	Monthly	12	0.020	<0.020	Yes	0
Neerim South	Monthly	12	<0.020	<0.020	Yes	0
Newborough	Monthly	12	<0.020	<0.020	Yes	0
Noojee	Monthly	12	<0.020	<0.020	Yes	0
Rawson	Monthly	12	0.023	<0.020	Yes	0
Rokeby-Buln Buln	Monthly	12	0.023	<0.020	Yes	0
Rosedale	Monthly	12	0.024	<0.020	Yes	0
Sale-Wurruk	Monthly	12	0.050	<0.020	Yes	0
Seaspray	Monthly	12	<0.020	<0.020	Yes	0
Stratford	Monthly	12	<0.020	<0.020	Yes	0
Thorpdale	Monthly	12	<0.020	<0.020	Yes	0
Toongabbie	Monthly	12	0.023	<0.020	Yes	0
Trafalgar	Monthly	12	<0.020	<0.020	Yes	0
Traralgon	Monthly	12	<0.020	<0.020	Yes	0
Traralgon South-Hazelwood North	Monthly	12	0.035	<0.020	Yes	0
Tyers-Glengarry	Monthly	12	<0.020	<0.020	Yes	0
Warragul	Monthly	12	0.025	<0.020	Yes	0
Warragul South	Monthly	12	0.029	<0.020	Yes	0
Willow Grove	Monthly	12	<0.020	<0.020	Yes	0
Yallourn North	Monthly	12	<0.020	<0.020	Yes	0
Yarragon	Monthly	12	<0.020	<0.020	Yes	0
Yinnar	Monthly	12	0.034	<0.020	Yes	0

3.2.3.1 Actions taken in relation to non-compliance

All towns complied with this water quality parameter.

3.2.4 Trihalomethanes (THM) results

For compliance with the *SDWR 2005*, a sample result must not exceed 0.25 mg/L trihalomethane. Gippsland Water has an internal target of 100% compliance for trihalomethane.

Table 7: Trihalomethanes results for all towns for 2008-09

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)	Non compliant results
Boisdale	Monthly	12	0.075	0.035	Yes	0
Boolarra	Monthly	12	0.120	0.012	Yes	0
Briagolong	Monthly	12	0.021	0.007	Yes	0
Churchill	Monthly	12	0.077	0.038	Yes	0
Coongulla-Glenmaggie	Monthly	12	0.027	0.012	Yes	0
Cowwarr	Monthly	12	0.077	0.023	Yes	0
Drouin	Monthly	12	0.078	0.033	Yes	0
Erica	Monthly	12	0.060	0.033	Yes	0
Heyfield	Monthly	12	0.048	0.019	Yes	0
Jumbuk	Monthly	12	0.110	0.045	Yes	0
Maffra	Monthly	12	0.061	0.028	Yes	0
Mirboo North	Monthly	12	0.066	0.018	Yes	0
Moe	Monthly	12	0.077	0.032	Yes	0
Morwell	Monthly	12	0.058	0.032	Yes	0
Neerim South	Monthly	12	0.053	0.029	Yes	0
Newborough	Monthly	12	0.065	0.033	Yes	0
Noojee	Monthly	12	0.051	0.017	Yes	0
Rawson	Monthly	12	0.068	0.031	Yes	0
Rokeby-Buln Buln	Monthly	12	0.074	0.037	Yes	0
Rosedale	Monthly	12	0.077	0.04	Yes	0
Sale-Wurruk	Monthly	12	0.064	0.021	Yes	0
Seaspray	Monthly	12	0.190	0.051	Yes	0
Stratford	Monthly	12	0.066	0.031	Yes	0
Thorpdale	Monthly	12	0.082	0.043	Yes	0
Toongabbie	Monthly	12	0.081	0.025	Yes	0
Trafalgar	Monthly	12	0.095	0.042	Yes	0
Traralgon	Monthly	12	0.054	0.015	Yes	0
Traralgon South-Hazelwood North	Monthly	12	0.071	0.021	Yes	0
Tyers-Glengarry	Monthly	12	0.055	0.03	Yes	0
Warragul	Monthly	12	0.095	0.03	Yes	0
Warragul South	Monthly	12	0.110	0.052	Yes	0
Willow Grove	Monthly	12	<0.002	<0.002	Yes	0
Yallourn North	Monthly	12	0.095	0.027	Yes	0
Yarragon	Monthly	12	0.092	0.049	Yes	0
Yinnar	Monthly	12	0.084	0.043	Yes	0

3.2.4.1 Actions taken in relation to non-compliance

All towns complied with this water quality parameter.

3.3 OZONE BASED DISINFECTION BY-PRODUCT CHEMICALS

Gippsland Water has no ozone dosing systems and therefore the ozone based chemical concentrations of bromate and formaldehyde have not been included in the routine testing program.

3.4 ALUMINIUM

For compliance with the *SDWR 2005*, a sample result must not exceed a maximum of 0.2 mg/L aluminium (acid soluble) in drinking water. Gippsland Water has an internal target of 100% compliance for aluminium.

3.4.1 Aluminium results

Table 8: Aluminium results for all towns in 2008-09

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)	Non Compliant Results
Boisdale	Monthly	12	0.03	<0.02	Yes	0
Boolarra	Monthly	12	0.15	<0.02	Yes	0
Briagolong	Monthly	12	<0.02	<0.02	Yes	0
Churchill	Monthly	12	0.03	0.02	Yes	0
Coongulla & Glenmaggie	Monthly	12	<0.02	<0.02	Yes	0
Cowwarr	Monthly	12	0.07	0.02	Yes	0
Drouin	Monthly	12	0.08	0.03	Yes	0
Erica	Monthly	12	0.09	0.02	Yes	0
Heyfield	Monthly	12	<0.02	<0.02	Yes	0
Jumbuk	Monthly	12	0.03	<0.02	Yes	0
Maffra	Monthly	12	0.03	<0.02	Yes	0
Mirboo North	Monthly	12	<0.02	<0.02	Yes	0
Moe	Monthly	12	0.05	<0.02	Yes	0
Morwell	Monthly	12	0.04	<0.02	Yes	0
Neerim South	Monthly	12	<0.02	<0.02	Yes	0
Newborough	Monthly	12	0.02	<0.02	Yes	0
Noojee	Monthly	12	<0.02	<0.02	Yes	0
Rawson	Monthly	12	0.30	0.02	**No**	1
Rokeby & Buln Buln	Monthly	12	0.07	0.03	Yes	0
Rosedale	Monthly	12	0.07	0.02	Yes	0
Sale/Wurruk	Monthly	12	0.02	<0.02	Yes	0
Seaspray	Monthly	12	0.04	<0.02	Yes	0
Stratford	Monthly	12	<0.02	<0.02	Yes	0
Thorpdale	Monthly	12	0.06	<0.02	Yes	0
Toongabbie	Monthly	12	0.07	<0.02	Yes	0
Trafalgar	Monthly	12	0.04	<0.02	Yes	0
Traralgon	Monthly	12	0.05	<0.02	Yes	0
Traralgon South & Hazelwood North	Monthly	12	0.04	<0.02	Yes	0
Tyers & Glengarry	Monthly	12	0.08	0.02	Yes	0
Warragul	Monthly	12	0.08	0.03	Yes	0
Warragul South	Monthly	12	0.06	0.04	Yes	0
Willow Grove	Monthly	12	0.04	<0.02	Yes	0
Yallourn North	Monthly	12	0.03	<0.02	Yes	0
Yarragon	Monthly	12	0.20	<0.02	Yes	0
Yinnar	Monthly	12	0.03	<0.02	Yes	0

3.4.2 Actions taken in relation to non-compliance

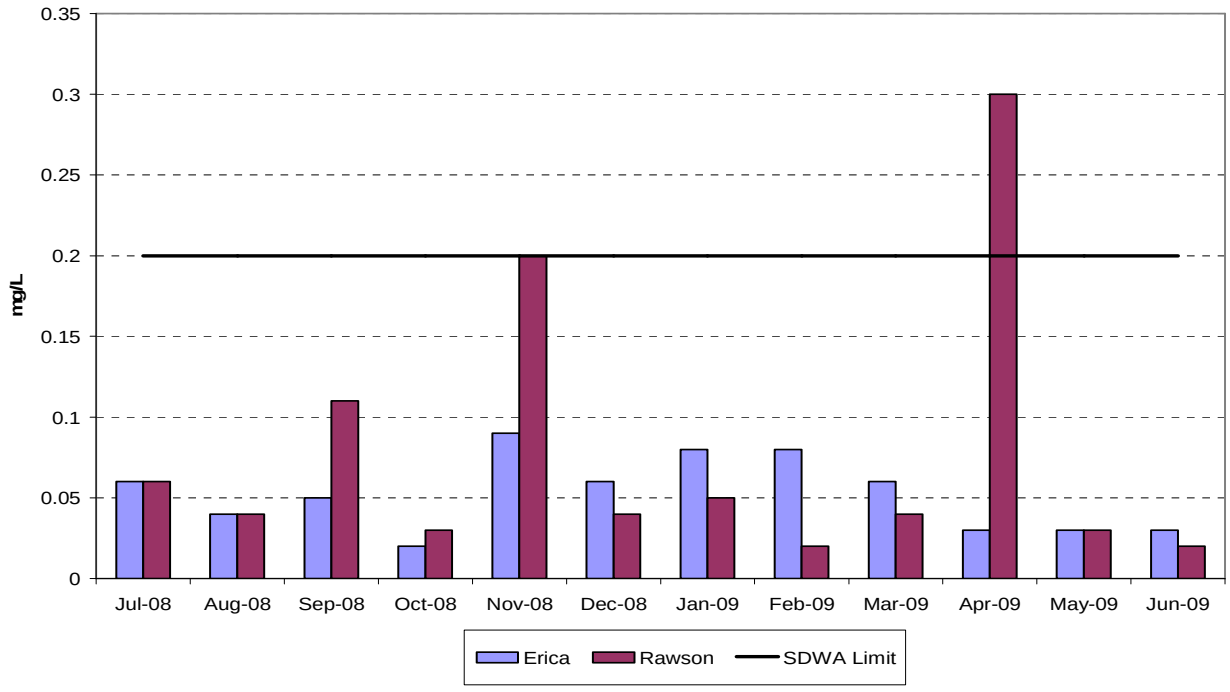
During the 2008-2009 reporting period, one locality recorded an elevated Aluminium (Acid Soluble) levels

Rawson – One sample of elevated aluminium level was recorded in April 2009. Gippsland Water investigated the exceedance and could not identify a cause. All follow up monitoring samples complied with the Aluminium standard. Refer to Section 4.1 where this incident was reported under SDWA Section 18 to DoH.

The Rawson WTP Clear Water Storage is scheduled to be cleaned internally in July 2009 to remove sediment build up from the treatment process that may be contributing to elevated acid soluble aluminium's being detected in the reticulation Rawson/Erica system.

Figure 9 gives a 12-month trend for each of the Erica and Rawson townships supplied with treated water from the Rawson WTP Township where Rawson experienced an Acid Soluble Aluminium non-conformance in the year.

Figure 2: Acid Soluble Aluminium mg/L for 2008-09



3.5 TURBIDITY RESULTS

For compliance with the *SDWR 2005*, the 95% upper confidence limit of the mean of all values for samples of drinking water collected in any 12-month period, must have turbidity measured as less than or equal to 5.0 NTU (Nephelometric Turbidity Unit). Gippsland Water has an internal target of 0.2 NTU for major systems and 0.5 NTU for small systems.

Table 9: Turbidity results for all towns in 2008-09

Locality	Frequency of Sampling	No. of Samples	Max (NTU)	Min (NTU)	95% UCL of mean	Complying (Yes/No)	Non Compliant Results
Boisdale	Weekly	52	0.5	0.1	0.1	Yes	0
Boolarra	Weekly	52	0.8	0.1	0.3	Yes	0
Briagolong	Weekly	52	0.4	0.1	0.2	Yes	0
Churchill	Weekly	52	0.7	0.1	0.2	Yes	0
Coongulla & Glenmaggie	Weekly	52	0.4	0.1	0.2	Yes	0
Cowwarr	Weekly	52	1.2	0.1	0.4	Yes	0
Drouin	Weekly	52	4.2	0.1	1.5	Yes	0
Erica	Weekly	52	0.5	0.1	0.6	Yes	0
Heyfield	Weekly	52	0.4	0.1	0.2	Yes	0
Jumbuk	Weekly	52	0.5	0.1	0.2	Yes	0
Maffra	Weekly	52	1.6	0.1	0.5	Yes	0
Mirboo North	Weekly	52	0.4	0.1	0.2	Yes	0
Moe	Weekly	52	2.5	0.1	0.9	Yes	0
Morwell	Weekly	52	0.8	0.1	0.3	Yes	0
Neerim South	Weekly	52	0.5	0.1	0.2	Yes	0
Newborough	Weekly	52	0.4	0.1	0.2	Yes	0
Noojee	Weekly	52	2.4	0.1	0.8	Yes	0
Rawson	Weekly	52	0.6	0.1	0.2	Yes	0
Rokeby & Buln Buln	Weekly	52	0.4	0.1	0.2	Yes	0
Rosedale	Weekly	52	0.8	0.1	0.3	Yes	0
Sale/Wurruk	Weekly	52	0.6	0.1	0.2	Yes	0
Seaspray	Weekly	52	0.8	0.1	0.3	Yes	0
Stratford	Weekly	52	0.6	0.1	0.3	Yes	0
Thorpdale	Weekly	52	1.6	0.1	0.6	Yes	0
Toongabbie	Weekly	52	0.5	0.1	0.2	Yes	0
Trafalgar	Weekly	52	0.9	0.1	0.4	Yes	0
Traralgon	Weekly	52	0.5	0.1	0.2	Yes	0
Traralgon South & Hazelwood North	Weekly	52	1.0	0.1	0.4	Yes	0
Tyers & Glengarry	Weekly	52	0.5	0.1	0.3	Yes	0
Warragul	Weekly	52	0.5	0.1	0.2	Yes	0
Warragul South	Weekly	52	0.4	0.1	0.2	Yes	0
Willow Grove	Weekly	52	0.4	0.1	0.2	Yes	0
Yallourn North	Weekly	52	0.3	0.1	0.1	Yes	0
Yarragon	Weekly	52	1.2	0.1	0.5	Yes	0
Yinnar	Weekly	52	0.7	0.2	0.3	Yes	0

3.5.1.1 Actions taken in relation to non-compliance

All towns complied with this water quality parameter.

3.6 FLUORIDE

Fluoride testing has been performed in the water supply systems where fluoride is artificially added to the water (supplies of Maffra, Warragul, Sale Traralgon, Morwell and Moe). The operational level of fluoride is monitored by online instrumentation as well as field measurements on a weekly basis. Based on health considerations, no single sample concentration of fluoride in drinking water should exceed 1.5 mg/L, and the average level of fluoride should not exceed 1.0 mg/L. In the reporting period all samples were processed by an independent laboratory, with all results showing fluoride below these concentration levels. Gippsland Water's general target is 0.7-1.0 mg/L.

Table 10: Fluoride results for all systems in 2008-09 (Compliance - Max < 1.5 mg/L and Average < 1.0mg/L)

Supplies (WTP)	Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Average (mg/L)	Complying(Yes /No)
Maffra	Maffra	Monthly	12	1.4	0.1	0.85	Yes
	Stratford	Monthly	12	1.4	0.1	0.85	Yes
Moe	Moe	Monthly	12	1.3	0.1	0.82	Yes
Morwell,	Morwell	Monthly	12	1.4	0.1	0.86	Yes
Sale	Sale	Monthly	12	1.0	0.7	0.79	Yes
Traralgon	Traralgon	Monthly	12	1.4	0.1	0.79	Yes
Warragul	Warragul	Monthly	12	1.4	0.1	0.87	Yes
	Drouin	Monthly	12	1.4	0.1	0.86	Yes

All localities supplied with fluoridated water are listed in Table 2.

During the reporting period Moe fluoride dosing was offline due to the Moe WTP clear well pipe work upgrade bring undertaken on the 7th and 8th April 2009.

Fluoride was not dosed at Moe Treatment plant between 27 March 2009 and 1 April 2009 when incorrect fluoride product was supplied to Gippsland Water. The product was supplied due to mislabelling at the suppliers packaging warehouse. Gippsland Waters Chemical delivery protocols were followed and the product supplied was not used. A non conformance was raised with the supplier who has modified its packaging & handling procedures to minimise the potential of reoccurrence.

3.7 OTHER ALGAE, PATHOGEN, CHEMICAL OR SUBSTANCE NOT SPECIFIED THAT MAY POSE A RISK TO HUMAN HEALTH

3.7.1 Overall results

During the reporting period, the corporation monitored for the following health-related aspects of the drinking water supplied to customer taps. Table 11 lists the parameters and the frequency of samples taken, comparing the results to the ADWG 2004 and the recommended value.

Table 11: Other sampled parameter results for all towns in 2008-09

Parameter	Frequency of sampling	No. samples	Results According to ADWG values		
			Recommended value	Result	Locality
Nitrite	Weekly (2 Localities)	104	≤ 3 mg/L	All results below ADWG health guideline values.	
Mercury	Quarterly	140	≤ 0.001 mg/L		
Chromium	Quarterly	140	≤ 0.05 mg/L		
Cadmium	Quarterly	140	≤ 0.002 mg/L		
Nitrate	Quarterly	140	≤ 50 mg/L		
Nickel	Annual	35	≤ 0.02 mg/L		

The parameters listed in table 11 were tested in all localities across Gippsland Water.

Monitoring for other parameters such as radiological pesticides, protozoan organisms is conducted routinely and as additional catchment risks arise and are identified in the source water catchment areas targeted monitoring occurs.

A complete list of raw water parameters monitored as part of our risk management within the catchment and our treatment systems is contained in Appendix 2.

Blue Green Algae (BGA) monitoring is undertaken across Gippsland water storages based on visual and water quality issue triggers. Moondarra reservoir is routinely monitored for BGA as part of the routine catchment monitoring program

3.7.2 Manganese

Manganese can be naturally present in either soluble or insoluble forms in water. When concentrations exceed the aesthetic guideline of 0.1 mg/L, manganese can create unacceptable tastes in water, as well as stain fixtures and laundry. Compliance is measured against the health guideline value of 0.5 mg/L in ADWG. During the 2008-09 year all drinking water were below this value.

Table 12: Manganese results for all towns in 2008-09 (Compliance <0.5 mg/L – ADWG)

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	0.006	<0.001	Yes
Boolarra	Monthly	12	0.020	0.007	Yes
Briagolong	Monthly	12	0.001	<0.001	Yes
Churchill	Monthly	12	<0.001	<0.001	Yes
Coongulla & Glenmaggie	Monthly	12	0.007	0.001	Yes
Cowwarr	Monthly	12	<0.001	<0.001	Yes
Drouin	Monthly	12	0.002	<0.001	Yes
Erica	Monthly	12	0.001	<0.001	Yes
Heyfield	Monthly	12	0.009	0.001	Yes
Jumbuk	Monthly	12	<0.001	<0.001	Yes
Maffra	Monthly	12	0.005	<0.001	Yes
Mirboo North	Monthly	12	0.002	<0.001	Yes
Moe	Monthly	12	0.009	<0.001	Yes
Morwell	Monthly	12	0.004	<0.001	Yes
Neerim South	Monthly	12	0.015	<0.001	Yes
Newborough	Monthly	12	0.004	<0.001	Yes
Noojee	Monthly	12	0.032	<0.001	Yes
Rawson	Monthly	12	0.003	<0.001	Yes
Rokeby & Buln Buln	Monthly	12	0.001	<0.001	Yes
Rosedale	Monthly	12	0.001	<0.001	Yes
Sale/Wurruk	Monthly	12	0.002	<0.001	Yes
Seaspray	Monthly	12	0.1	0.007	Yes
Stratford	Monthly	12	0.005	<0.001	Yes
Thorpdale	Monthly	12	0.082	0.004	Yes
Toongabbie	Monthly	12	<0.001	<0.001	Yes
Trafalgar	Monthly	12	0.018	<0.001	Yes
Traralgon	Monthly	12	<0.001	<0.001	Yes
Traralgon South & Hazelwood North	Monthly	12	0.001	<0.001	Yes
Tyers & Glengarry	Monthly	12	0.002	<0.001	Yes
Warragul	Monthly	12	0.002	<0.001	Yes
Warragul South	Monthly	12	0.001	<0.001	Yes
Willow Grove	Monthly	12	0.012	0.003	Yes
Yallourn North	Monthly	12	0.004	<0.001	Yes
Yarragon	Monthly	12	0.190	<0.001	Yes
Yinnar	Monthly	12	0.001	<0.001	Yes

The aesthetic guideline value was exceeded in the Yarragon supply during the 2008-2009 reporting period and was most likely due to the disturbance of biofilm in the supply main during a main break event.

3.7.3 Lead

Lead can be present in drinking water as a result of dissolution from natural sources or from household plumbing. Based on heath considerations in the ADWG, concentrations of lead in drinking water should not exceed 0.01 mg/L. During the 2008-09 year all drinking water supplies satisfied the health related guideline value in the Australian Drinking Water Guidelines 2004 for Lead and were below this value.

Table 13: Lead results for all towns in 2008-09 (Compliance <0.01 mg/L - ADWG)

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Quarterly	4	<0.002	<0.001	Yes
Boolarra	Quarterly	4	<0.002	<0.001	Yes
Briagolong	Quarterly	4	<0.002	<0.001	Yes
Churchill	Quarterly	4	<0.002	<0.001	Yes
Coongulla & Glenmaggie	Quarterly	4	<0.002	<0.001	Yes
Cowwarr	Quarterly	4	<0.002	<0.001	Yes
Drouin	Quarterly	4	<0.002	<0.001	Yes
Erica	Quarterly	4	<0.002	<0.001	Yes
Heyfield	Quarterly	4	<0.002	<0.001	Yes
Jumbuk	Quarterly	4	<0.002	<0.001	Yes
Maffra	Quarterly	4	0.002	<0.001	Yes
Mirboo North	Quarterly	4	<0.002	<0.001	Yes
Moe	Quarterly	4	<0.002	<0.001	Yes
Morwell	Quarterly	4	<0.002	<0.001	Yes
Neerim South	Quarterly	4	<0.002	<0.001	Yes
Newborough	Quarterly	4	<0.002	<0.001	Yes
Noojee	Quarterly	4	<0.002	<0.001	Yes
Rawson	Quarterly	4	<0.002	<0.001	Yes
Rokeby & Buln Buln	Quarterly	4	<0.002	<0.001	Yes
Rosedale	Quarterly	4	<0.002	<0.001	Yes
Sale/Wurruk	Quarterly	4	<0.002	<0.001	Yes
Seaspray	Quarterly	4	<0.002	<0.001	Yes
Stratford	Quarterly	4	<0.002	<0.001	Yes
Thorpdale	Quarterly	4	<0.002	<0.001	Yes
Toongabbie	Quarterly	4	<0.002	<0.001	Yes
Trafalgar	Quarterly	4	<0.002	<0.001	Yes
Traralgon	Quarterly	4	<0.002	<0.001	Yes
Traralgon South & Hazelwood North	Quarterly	4	<0.002	<0.001	Yes
Tyers & Glengarry	Quarterly	4	<0.002	<0.001	Yes
Warragul	Quarterly	4	<0.002	<0.001	Yes
Warragul South	Quarterly	4	<0.002	<0.001	Yes
Willow Grove	Quarterly	4	<0.002	<0.001	Yes
Yallourn North	Quarterly	4	<0.002	<0.001	Yes
Yarragon	Quarterly	4	<0.002	<0.001	Yes
Yinnar	Quarterly	4	<0.002	<0.001	Yes

3.7.4 Copper

Copper is present in raw water supplies at very low concentrations. Copper can be found in higher concentrations in drinking water as a result of corrosion of copper pipes and fittings. Based on heath considerations in the ADWG, the aesthetic guideline value is 1 mg/L and concentrations of copper in drinking water should not exceed 2 mg/L for health impacts. During the 2008-09 year all drinking water supplies were below this value.

Table 14: Copper results for all towns in 2008-09 (Compliance <2 mg/L - ADWG)

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Quarterly	4	0.003	0.002	Yes
Boolarra	Quarterly	4	0.010	0.004	Yes
Briagolong	Quarterly	4	0.007	0.004	Yes
Churchill	Quarterly	4	0.012	0.004	Yes
Coongulla & Glenmaggie	Quarterly	4	0.016	0.003	Yes
Cowwarr	Quarterly	4	0.015	0.001	Yes
Drouin	Quarterly	4	0.011	<0.001	Yes
Erica	Quarterly	4	0.006	0.002	Yes
Heyfield	Quarterly	4	0.052	0.016	Yes
Jumbuk	Quarterly	4	0.019	0.004	Yes
Maffra	Quarterly	4	0.06	0.006	Yes
Mirboo North	Quarterly	4	0.056	0.008	Yes
Moe	Quarterly	4	0.011	0.005	Yes
Morwell	Quarterly	4	0.008	0.003	Yes
Neerim South	Quarterly	4	0.059	0.014	Yes
Newborough	Quarterly	4	0.007	0.002	Yes
Noojee	Quarterly	4	0.012	0.004	Yes
Rawson	Quarterly	4	0.015	<0.001	Yes
Rokeby & Buln Buln	Quarterly	4	0.003	0.002	Yes
Rosedale	Quarterly	4	0.024	0.003	Yes
Sale-Wurruk	Quarterly	4	0.002	<0.001	Yes
Seaspray	Quarterly	4	0.037	0.008	Yes
Stratford	Quarterly	4	0.021	0.003	Yes
Thorpdale	Quarterly	4	0.160	0.010	Yes
Toongabbie	Quarterly	4	0.020	0.002	Yes
Trafalgar	Quarterly	4	0.002	<0.001	Yes
Traralgon	Quarterly	4	0.013	0.002	Yes
Traralgon South & Hazelwood North	Quarterly	4	0.005	0.004	Yes
Tyers & Glengarry	Quarterly	4	0.012	0.003	Yes
Warragul	Quarterly	4	0.008	0.001	Yes
Warragul South	Quarterly	4	0.019	<0.001	Yes
Willow Grove	Quarterly	4	0.019	0.004	Yes
Yallourn North	Quarterly	4	0.017	0.004	Yes
Yarragon	Quarterly	4	0.005	<0.001	Yes
Yinnar	Quarterly	4	0.002	0.001	Yes

3.8 AESTHETICS

3.8.1 pH results

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

The pH results for all towns are provided below.

Table 15: pH results for all towns in 2008-09

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)
Boisdale	Weekly	52	8.2	7.4
Boolarra	Weekly	52	8.0	7.1
Briagolong	Weekly	52	**8.9**	7.2
Churchill	Weekly	52	8.3	6.9
Coongulla & Glenmaggie	Weekly	52	8.0	7.0
Cowwarr	Weekly	52	8.4	7.1
Drouin	Weekly	52	8.5	6.9
Erica	Weekly	52	**9.4**	7.2
Heyfield	Weekly	52	8.1	7.2
Jumbuk	Weekly	52	8.2	6.9
Maffra	Weekly	52	8.3	7.0
Mirboo North	Weekly	52	7.9	6.7
Moe	Weekly	52	8.4	6.8
Morwell	Weekly	52	**9.0**	6.7
Neerim South	Weekly	52	8.3	6.8
Newborough	Weekly	52	8.2	7.0
Noojee	Weekly	52	**9.3**	7.0
Rawson	Weekly	52	**8.8**	7.2
Rokeby & Buln Buln	Weekly	52	**9.1**	6.9
Rosedale	Weekly	52	**9.0**	7.1
Sale/Wurruk	Weekly	52	**9.1**	7.5
Seaspray	Weekly	52	**8.6**	7.1
Stratford	Weekly	52	8.2	7.2
Thorpdale	Weekly	52	8.1	6.8
Toongabbie	Weekly	52	7.7	6.8
Trafalgar	Weekly	52	8.5	7.4
Traralgon	Weekly	52	7.8	6.9
Traralgon South & Hazelwood North	Weekly	52	8.3	6.9
Tyers & Glengarry	Weekly	52	8.0	6.6
Warragul	Weekly	52	8.5	7.0
Warragul South	Weekly	52	**8.9**	7.1
Willow Grove	Weekly	52	8.0	7.2
Yallourn North	Weekly	52	**8.6**	7.0
Yarragon	Weekly	52	**9.5**	7.2
Yinnar	Weekly	52	7.9	6.9

Yarragon elevated pH levels were generally experienced due to cement-lined pipes in the reticulation. Sale pH is generally in the higher range due to the treatment process required to eliminate the naturally occurring iron and manganese levels present in the raw water. Other systems experience elevated pH results, as a result of long residence of water in the reticulation, cement-lined pipes in parts of the reticulation and reduced flushing programs due to the permanent water saving rules in place.

3.8.2 Iron results

Iron can become apparent in taste in water at about 0.3 mg/L and above. High concentrations can give water a rust-brown appearance and cause staining of laundry and plumbing fittings. During the 2008-09 year all drinking water supplies satisfied the aesthetic related guideline value in the ADWG for Iron and were below this value.

Table 16: Iron results for all towns in 2008-09

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	<0.1	<0.1	Yes
Boolarra	Monthly	12	<0.1	<0.1	Yes
Briagolong	Monthly	12	<0.1	<0.1	Yes
Churchill	Monthly	12	<0.1	<0.1	Yes
Coongulla & Glenmaggie	Monthly	12	<0.1	<0.1	Yes
Cowwarr	Monthly	12	<0.1	<0.1	Yes
Drouin	Monthly	12	<0.1	<0.1	Yes
Erica	Monthly	12	<0.1	<0.1	Yes
Heyfield	Monthly	12	<0.1	<0.1	Yes
Jumbuk	Monthly	12	<0.1	<0.1	Yes
Maffra	Monthly	12	<0.1	<0.1	Yes
Mirboo North	Monthly	12	0.1	<0.1	Yes
Moe	Monthly	12	<0.1	<0.1	Yes
Morwell	Monthly	12	<0.1	<0.1	Yes
Neerim South	Monthly	12	<0.1	<0.1	Yes
Newborough	Monthly	12	<0.1	<0.1	Yes
Noojee	Monthly	12	0.1	<0.1	Yes
Rawson	Monthly	12	<0.1	<0.1	Yes
Rokeby & Buln Buln	Monthly	12	0.1	<0.1	Yes
Rosedale	Monthly	12	<0.1	<0.1	Yes
Sale/Wurruk	Monthly	12	<0.1	<0.1	Yes
Seaspray	Monthly	12	0.2	<0.1	Yes
Stratford	Monthly	12	<0.1	<0.1	Yes
Thorpdale	Monthly	12	0.0	<0.1	Yes
Toongabbie	Monthly	12	<0.1	<0.1	Yes
Trafalgar	Monthly	12	<0.1	<0.1	Yes
Traralgon	Monthly	12	<0.1	<0.1	Yes
Traralgon South & Hazelwood North	Monthly	12	<0.1	<0.1	Yes
Tyers & Glengarry	Monthly	12	<0.1	<0.1	Yes
Warragul	Monthly	12	<0.1	<0.1	Yes
Warragul South	Monthly	12	<0.1	<0.1	Yes
Willow Grove	Monthly	12	<0.1	<0.1	Yes
Yallourn North	Monthly	12	<0.1	<0.1	Yes
Yarragon	Monthly	12	0.1	<0.1	Yes
Yinnar	Monthly	12	0.1	<0.1	Yes

3.9 ANALYSIS OF RESULTS

3.9.1 Comparison to previous years

The water quality parameters required under the SDWA regulations have been represented as trend data over the previous four financial years. This information allows for a comparison of data for the major towns. See Appendix 1 for trend information on the major towns for each of the water quality reporting standards.

An analysis by the percentage of water sampling localities where the drinking water complied with each of Schedule 2 of the *SDWR* parameters, over the past three reporting periods, is shown below in Figure 17. The table also shows an analysis of the percentage of customers supplied with drinking water that complied with the standards.

Table 17: Compliance by locality and population

	Percentage by Locality			Percentage by Population		
Parameter	**2006-2007**	**2007-2008**	**2008-2009**	**2006-2007**	**2007-2008**	**2008-2009**
Aluminium	100%	91.43%	97.15	100%	81.82%	99.75
Chloroacetic Acid	100%	100%	100%	100%	100%	100%
Dichloroacetic Acid	100%	100%	100%	100%	100%	100%
E.coli	100%	100%	100%	100%	100%	100%
Trichloroacetic Acid	100%	100%	100%	100%	100%	100%
Trihalomethanes	97.14%	97.14%	100%	99.82%	99.81%	100%
Turbidity	100%	100%	100%	100%	100%	100%

4 EMERGENCY/INCIDENT MANAGEMENT

4.1 EMERGENCY/INCIDENT MANAGEMENT

During the reporting year there was one reportable event that required notification to the Drinking Water Regulatory Unit of DOH, under section 22 of the SDWA 2003.

As a result of the January 2009, Delburn Complex bushfires in the Boolarra region, the township of Boolarra Water Treatment Plant lost power and exhausted its water storages resulting in Gippsland Water being unable to produce drinking water. The subsequent low pressure in reticulation system meant dirty water and microbiological contamination may have entered the reticulation when the water supply system was returned to service and the mains are recharged to operational levels.

DOH was notified of this incident under a SDWA Section 22 notification. The 2008-2009 Events and Incidents are summarised in Figure 18.

Table 18: Summary of incidents and actions taken

Locality	Date and duration of incident	Location of incident	Nature of the incident	Drinking water supplies affected	Actions taken in response to the incident	Was the community notified
Section 22 Notifications						
Boolarra	31/01/09 ~76 hours	Boolarra Township	Self imposed Boil Water Alert during Bushfire period	Boolarra	Department of Health (DOH) Notification under Section 22 *SDWA*. Monitoring of system during and after event until WTP resumed operation.	Yes
Traralgon	26/03/09	Traralgon Water Entry	Positive E.coli result obtained	Traralgon Water Entry	Department of Health (DOH) Notification under Section 22 *SDWA*. All reticulation monitoring on day of incident and subsequent follow up monitoring of the Traralgon system was compliant.	No
Section 18 Notifications						
Rawson	15/04/09	Rawson Township	Non Compliant Acid Soluble Aluminium result	Rawson	Department of Health (DOH) Notification under Section 18 *SDWA*. All follow up monitoring of the Rawson system was compliant.	No

4.1.1 Other Events Not Reportable

Other events not reportable under section 22 of the SDWA that had potential or actual impact on water quality during the 2008-2009 reporting period included; the Boolarra, Mirboo, Warragul and Rawson and Neerim South Water Treatment Plants were placed at risk due to bushfires in January and February 2009. Six water supply catchments were impacted at varying degrees.

Gippsland Water successfully implemented its emergency management and business continuity response, and customer water supply quality was maintained within regulatory requirements.

For further information refer to Section 2.2.

5 COMPLAINTS

5.1 WATER QUALITY COMPLAINTS

A summary of customer complaints received by Gippsland Water relating to the quality of drinking water supplied is reported below in Figure 19 and 20. A summary of how Gippsland Water responds to such complaints is provided below.

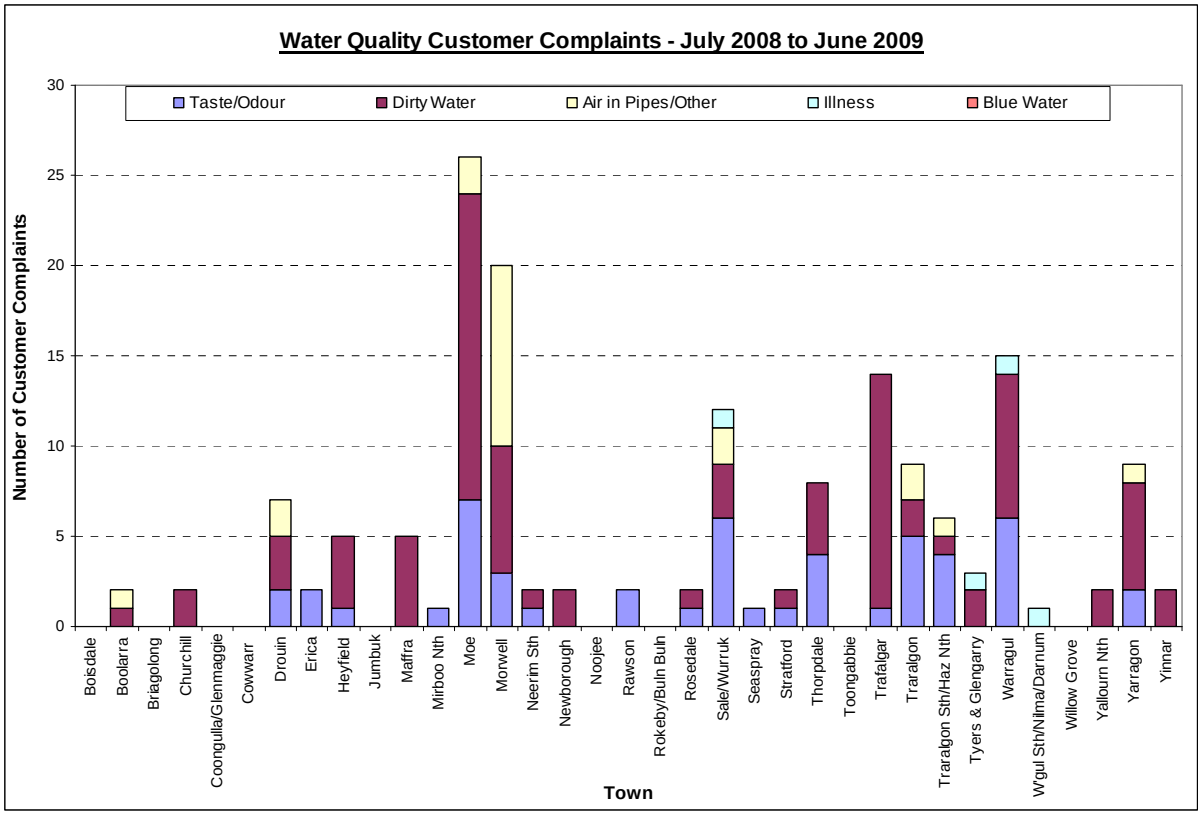
Gippsland Water records and reports on customer complaints relating to dirty water, taste and odour problems, illness/health concerns, blue water, and appearance of air-filled or "white" water received from the tap.

Table 19: Water quality complaints per 100 customers supplied

Type of Complaint	2008-2009		2007-2008	2006-2007	2005-2006
	No. of Complaints	Complaints per 100 properties	Complaints per 100 properties	Complaints per 100 properties	Complaints per 100 properties
Discoloured water	87	0.145	0.116	0.162	0.086
Taste / odour	50	0.084	0.113	0.091	0.021
Blue water	0	0.000	0.000	0.005	N/A
Air in water	21	0.035	0.042	0.039	0.055
Illness	4	0.007	0.019	0.025	N/A
Other	0	0.000	0.000	0.012	N/A
Total	162	0.270	0.290	0.334	0.161

Gippsland Water experienced increase in discoloured water complaints during the reporting period up from 69 during the 2007-2008 reporting period. This was a normal outcome as a result of operational activities (planned and unplanned) and a reduced air scouring and flushing program due to the implementation of the permanent water saving rules.

Figure 3: Customer complaints summary for 2008-09



5.2 A SUMMARY OF THE CUSTOMER COMPLAINT PROCESS

Customer complaints are managed according to the following procedure:

Customer complaints received by Gippsland Water's Service Centre are recorded in a database. Details include information of who, where, time and nature of complaint. The Water Quality Group investigates by visiting the site and contacting the customer to determine details of the water quality problem.

- For complaints associated with taste and odour, dirty water, and air in pipes, the reticulation system is typically flushed, field measurements performed and once the problem has been corrected, returned to service.
- Follow up contact is made with the customer to determine if they are satisfied with the quality of service. This also encourages customers to keep Gippsland Water informed of any reoccurrence of water quality problems.
- Details of actions undertaken are entered into a database to provide a record/history of the site, to document issues for maintenance programs, and to inform capital upgrade requirements where a history of system failures occurs.

6 RISK MANAGEMENT

Gippsland Water's Water Quality Risk Management Plan was audited in June 2008 for compliance with section 7(1) of the SDWA. The auditor found that Gippsland Water complied with the obligations of the Act, and seven opportunities for improvement as minor non-compliances were identified.

Gippsland Water actioned the seven opportunities for improvement during the 2008-2009 reporting period. By the end of the reporting period, all proposed outcomes actioned were completed as part of the Risk Management Review process.

Table 20: Risk Management Plan Opportunity for Improvements

Continuous Improvement Opportunity	Action Completed
Remove inconsistencies between the Risk Management Plan, Alert Limit Tables and SCADA Alarm Limits	Risk Management Plan updated to reflect alert limit are variable and upper limits inserted
Develop summarised flow diagrams from catchment to consumer clearly showing Gippsland Waters responsibility	Risk Management Plan updated with summarised flow diagrams clearly showing Gippsland Water responsibility
Expand the Risk Management documentation on areas of management of catchment water quality risks to cover specific types of pollution and major pollution sources of concern and how the treatment meets the challenges faced	Risk Management Plans updated to reflect monitoring programs for pollution in catchments. Regular liaisons with key stakeholders established. Risk Management Plan updated to include table of treatment processes and hazards treated (Physical, Microbiological, Chemical)
Formalise communication procedures with bulk water suppliers in relation to water quality management	Formalised communications with bulk water suppliers established through scheduled operational/liaison meetings
Noting water quality parameters that are not considered a significant risk in Risk Management Plans, and explaining why	Risk Management Plans updated to reflect which parameters are not considered a significant risk and a statement as to why based on historical monitoring data.
Maintain accurate dates and currency information on water quality critical documentation	Water Quality Risk Management Plan updated to reflect currency including quality compliance statistics and customer complaint data.
State where contact details within the Risk Management Plan for key personnel can be found in the Gippsland Water intranet to ensure most current information available	Contact details in Risk Management Plan linked to Gippsland Water Intranet for currency

7 UNDERTAKINGS UNDER SECTION 30 OF THE ACT

Gippsland Water has no undertakings relevant to the 2008-09 reporting year.

8 EXEMPTIONS UNDER SECTION 20 OF THE ACT

Gippsland Water has no exemptions relevant to the 2008-09 reporting year.

9 REGULATED WATER

Regulated water refers to water that has subject of declaration made by the Minister under Section 6 of the SDWA. This is water which is not intended for drinking and cannot be mistaken as being drinking water. Gippsland Water does not manage any regulated water supplies.

10 GLOSSARY OF TERMS

ADWG	*Australian Drinking Water Guidelines* prepared by National Health and Medical Research Council.
DoH	Department of Health formerly known as DHS (Department of Human Services)
Detection limit	The lowest concentration of analytical parameter in the sample that can be detected by the process laboratory.
Drinking Water Supply systems	Towns supplied with water from a common water source (WTP, supply mains and reticulation pipework).
E.coli	Escherichia coli.
Locality	Under the SDWR, a specified area that is supplied with drinking water by a water supplier.
mg/L	Milligram per litre.
NTU	Nephelometric Turbidity Units.
Properties	A registered customer connection to the drinking water supply.
SDWA	*SDWA 2003* Act No.46/2003.
SDWR	Safe Drinking Water Regulations 2005 S.R No.88/2005.
Source Water	Raw water supply for town, prior to treatment.
THM	Trihalomethane.
WTP	Water Treatment Plant.
100mL	100 millilitres.
<	Less than.
>	Greater than.
≤	Less than or equal to.
≥	Greater than or equal to.
<1 MPN/100ml	Reporting for *E.coli* where the detection limit is less then 1 most probable number of *E.coli* organism per 100ml.

11 FURTHER INFORMATION

Customers and members of the public may access drinking water quality data and data for associated with water quality, by contacting Gippsland Water on the details 1800 066 401 or visit www.gippswater.com.au.

12 REFERENCES

National Health and Medical Research Council. *Australian Drinking Water Guidelines 2004.* Web address www.nhmrc.gov.au

Department of Human Services *2008-09 Annual report format - Drinking Water Regulation Guidance Note 10 June 2008*

SDWA 2003 Act No.46/2003

Safe Drinking Water Regulations 2005 S.R No.88/2005

APPENDIX 1: TREND GRAPHS

To allow for a comparison of information, data and results relating to the quality of water supplied trend graphs have been provided from the July 2004 and June 2008 period for each major water system for the drinking water quality standards.

1.1 E.COLI TRENDS

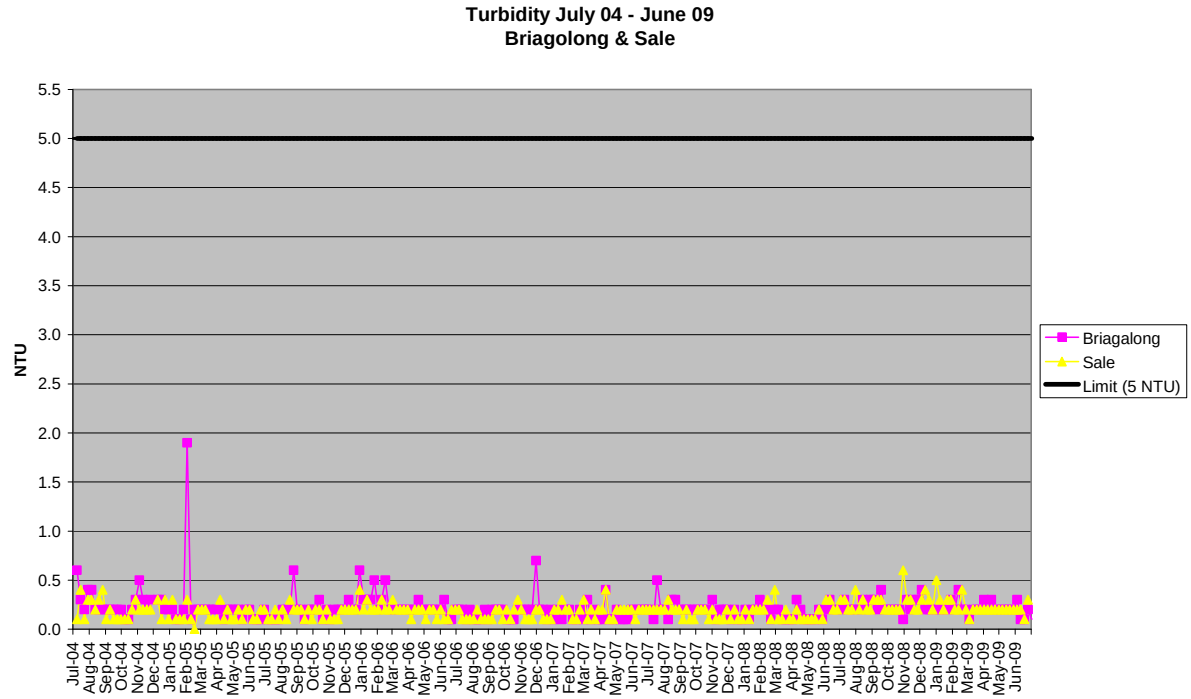
Trends for *E.coli* were not produced due to the consistent reporting of <1 MPN/100ml (a results of 0 MPN/100ml or 0 org/100ml is equivalent to <1 MPN/100ml or <1 org/100ml). During the previous five reporting periods (2004-05 to 2008-09) Gippsland Water has had three samples across all localities show *E.coli*:

Jumbuk – 14/12/2004 – 62 MPN/100ml
Seaspray – 14/02/2006 – 4 MPN/100ml
Traralgon – 26/03/2009 – 1 org/100ml

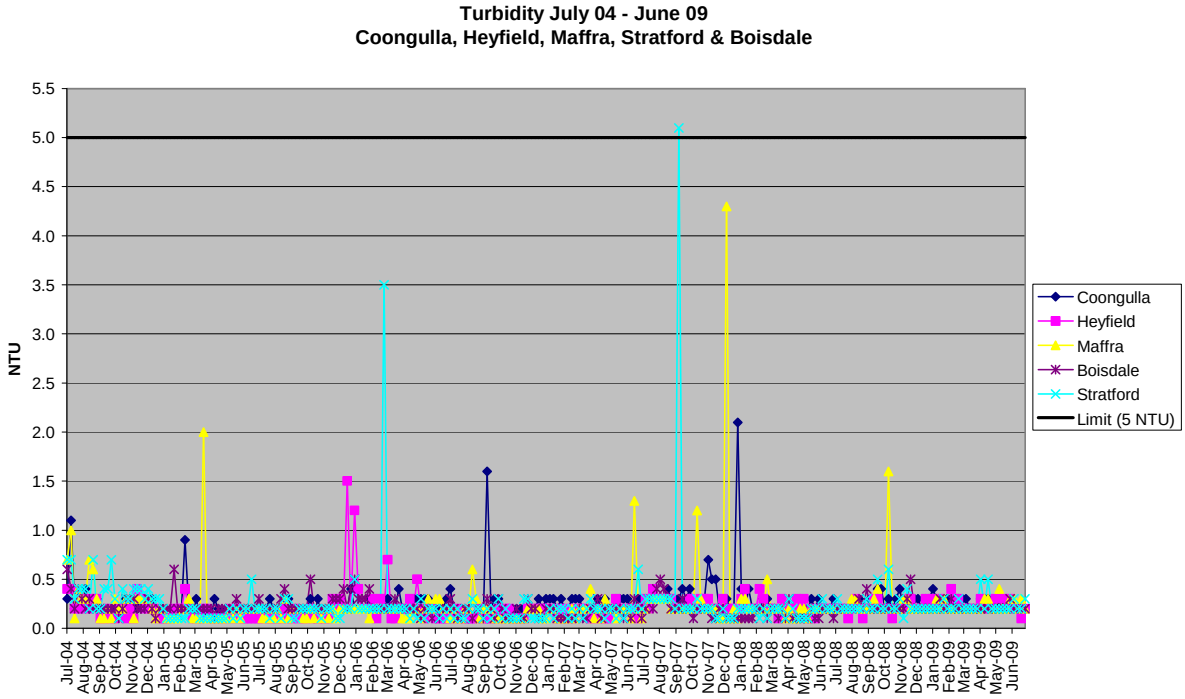
One (Traralgon) sample recorded a positive *E.coli* during the 2008-09 reporting period.

1.2 TURBIDITY TRENDS

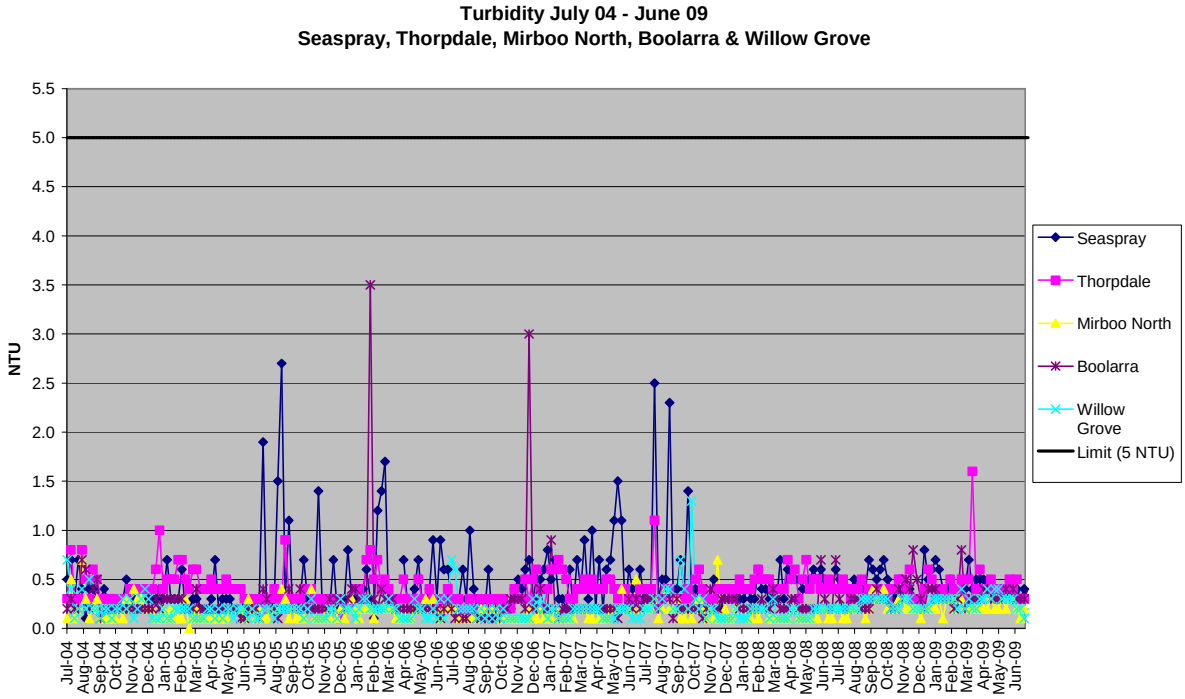
1.2.1 Briagolong and Sale



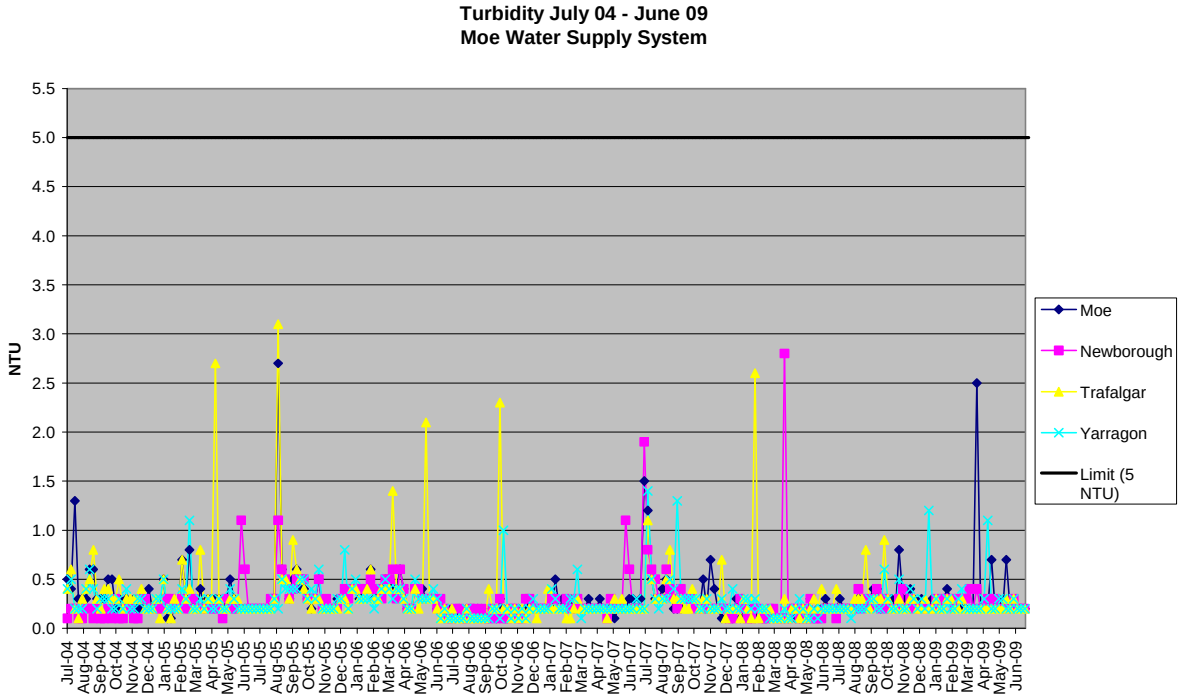
1.2.2 Coongulla, Heyfield, Maffra, Stratford and Boisdale



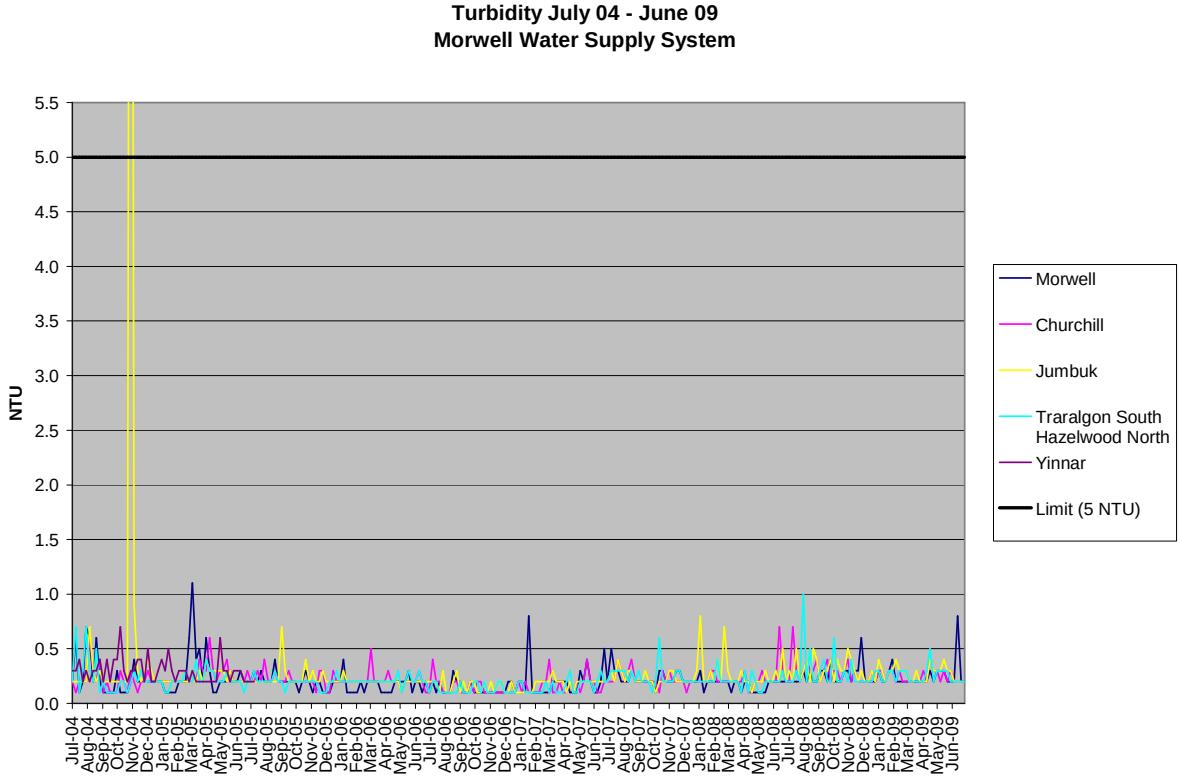
1.2.3 Seaspray, Thorpdale, Mirboo North Boolarra and Willow Grove



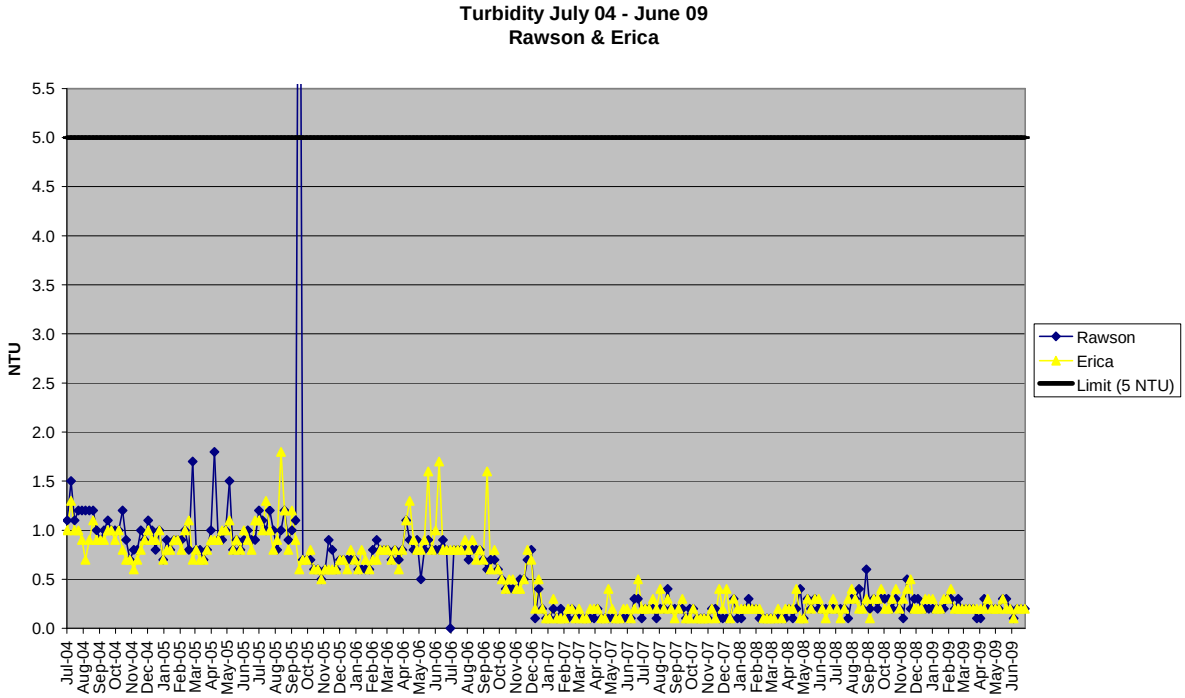
1.2.4 Moe, Newborough, Trafalgar, and Yarragon



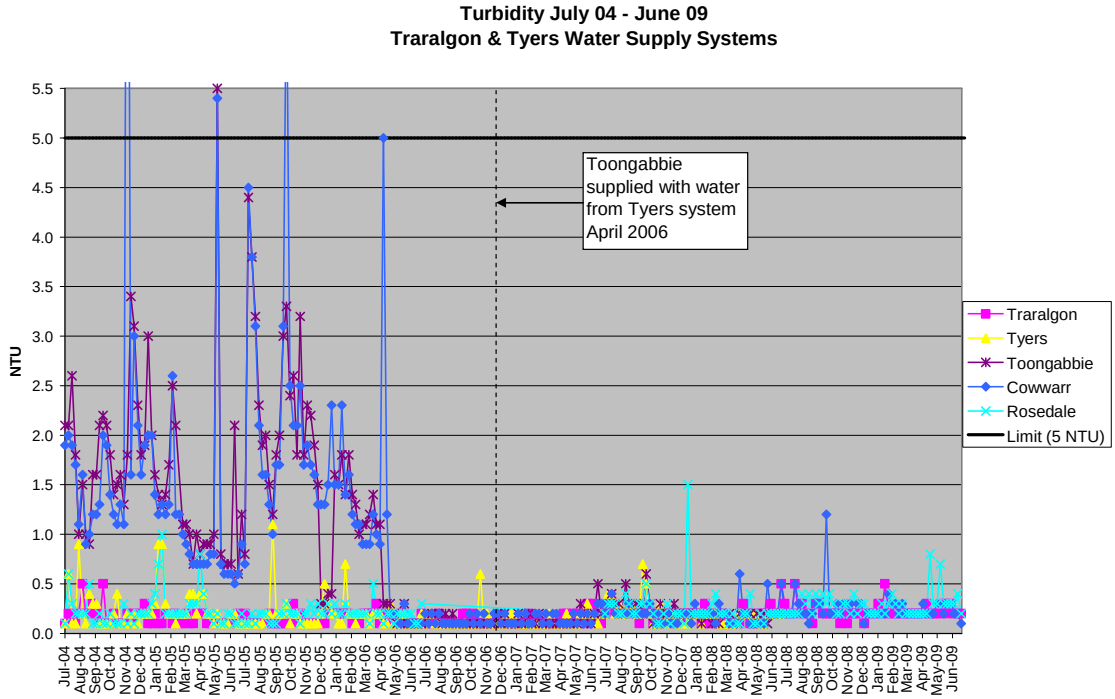
1.2.5 Morwell, Churchill, Jumbuk, Yinnar and Traralgon South/Hazelwood North



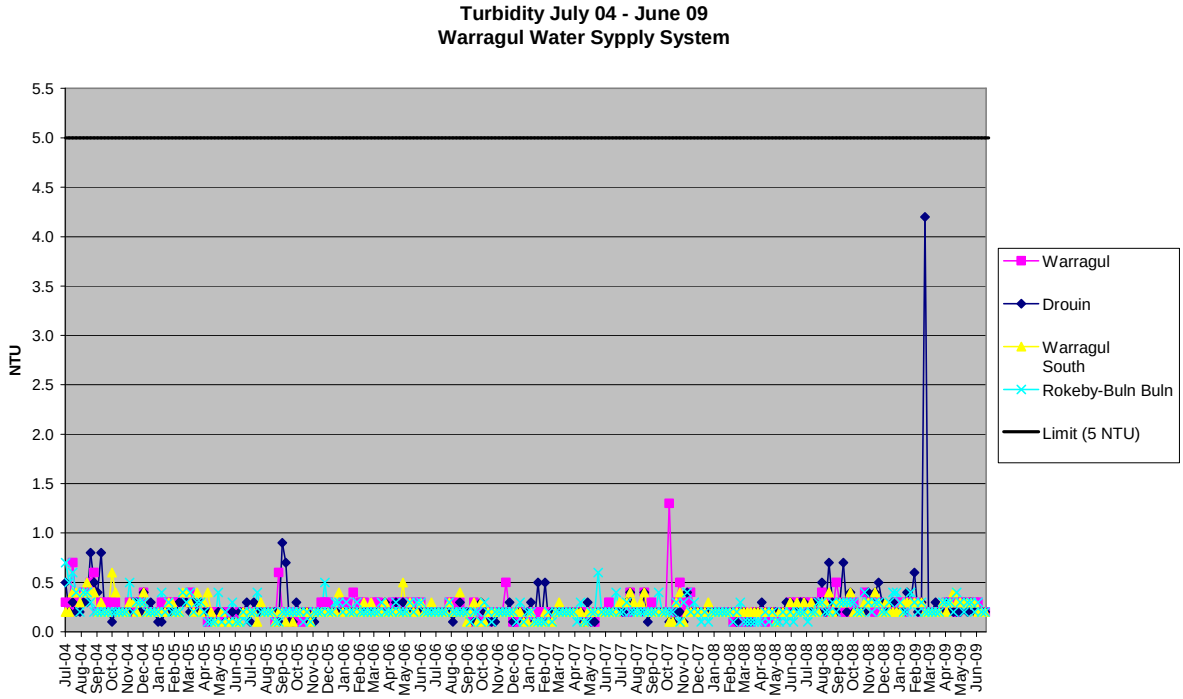
1.2.6 Rawson and Erica



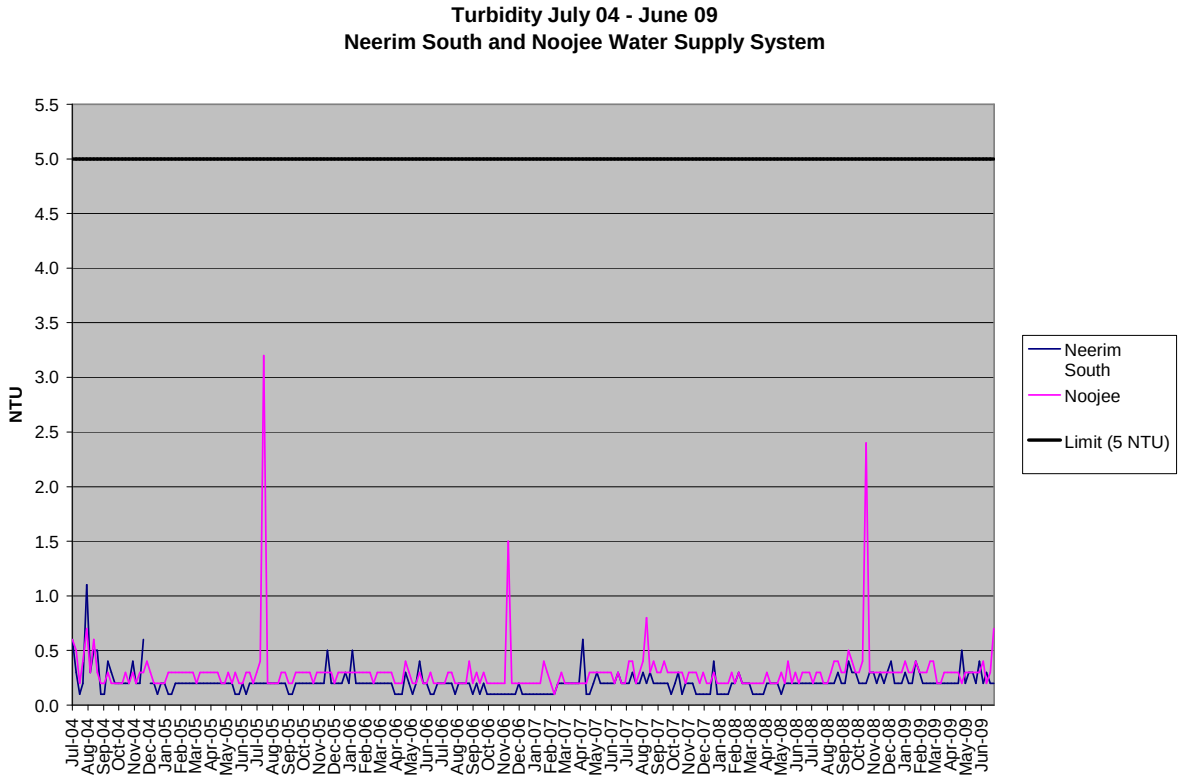
1.2.7 Traralgon, Tyers, Toongabbie, Cowwarr and Rosedale



1.2.8 Warragul , Drouin, Warragul South and Rokeby/Buln Buln

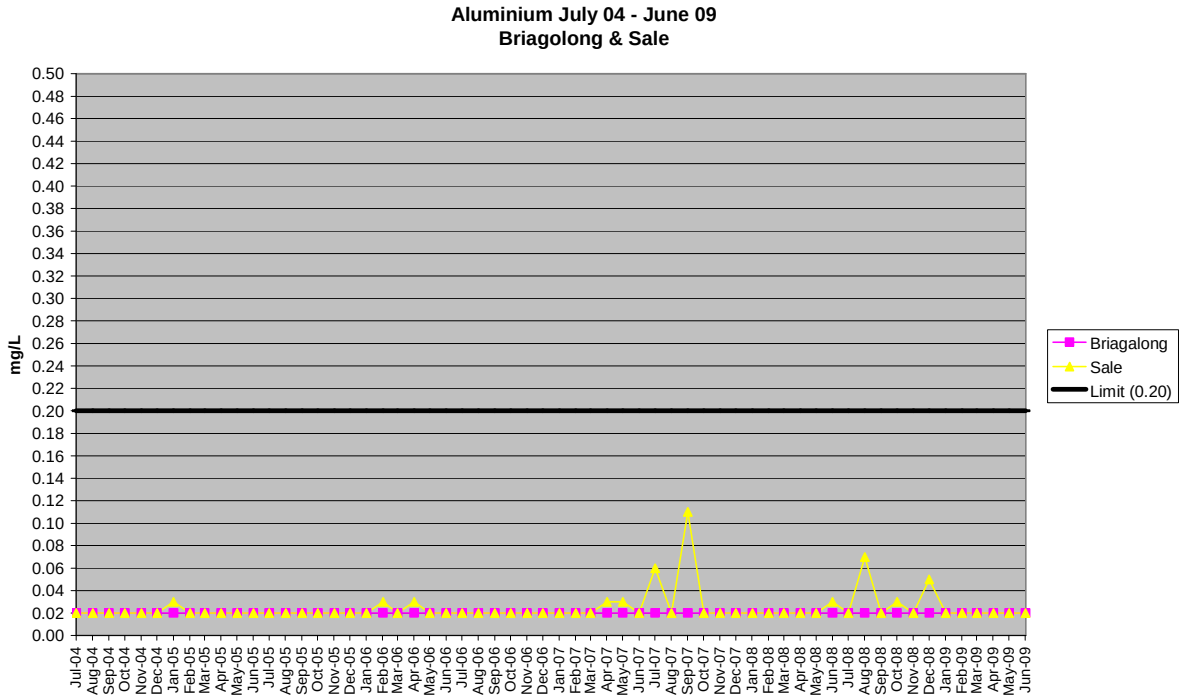


1.2.9 Neerim South and Noojee

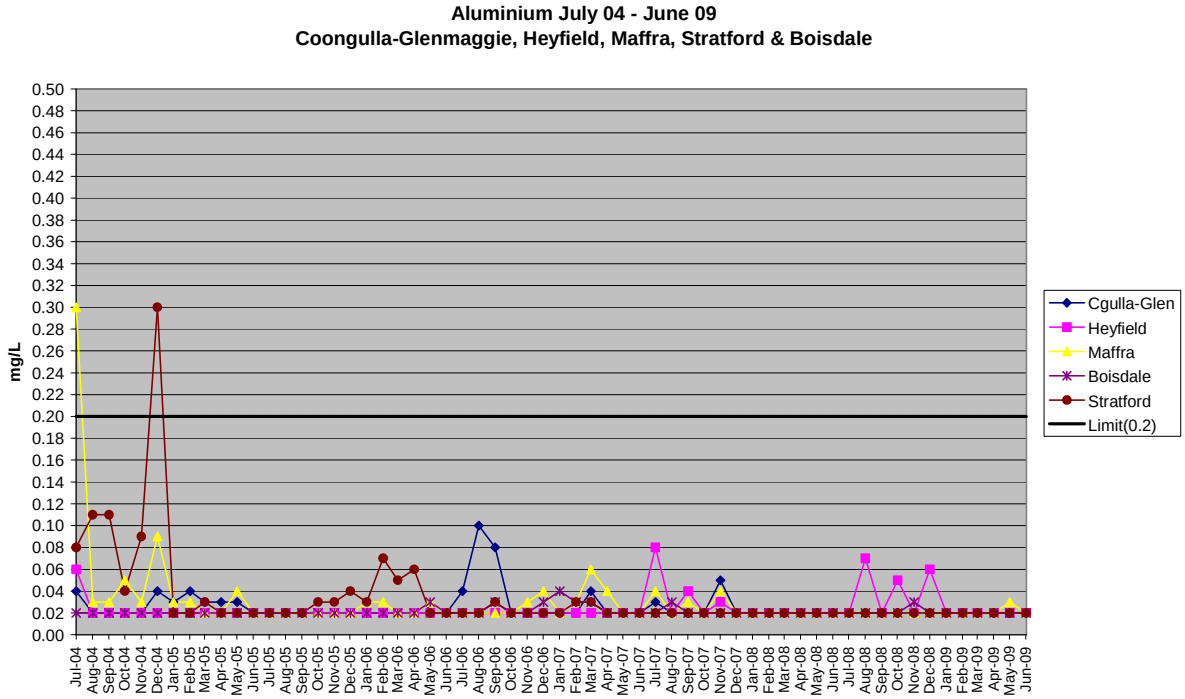


1.3 ALUMINIUM TRENDS

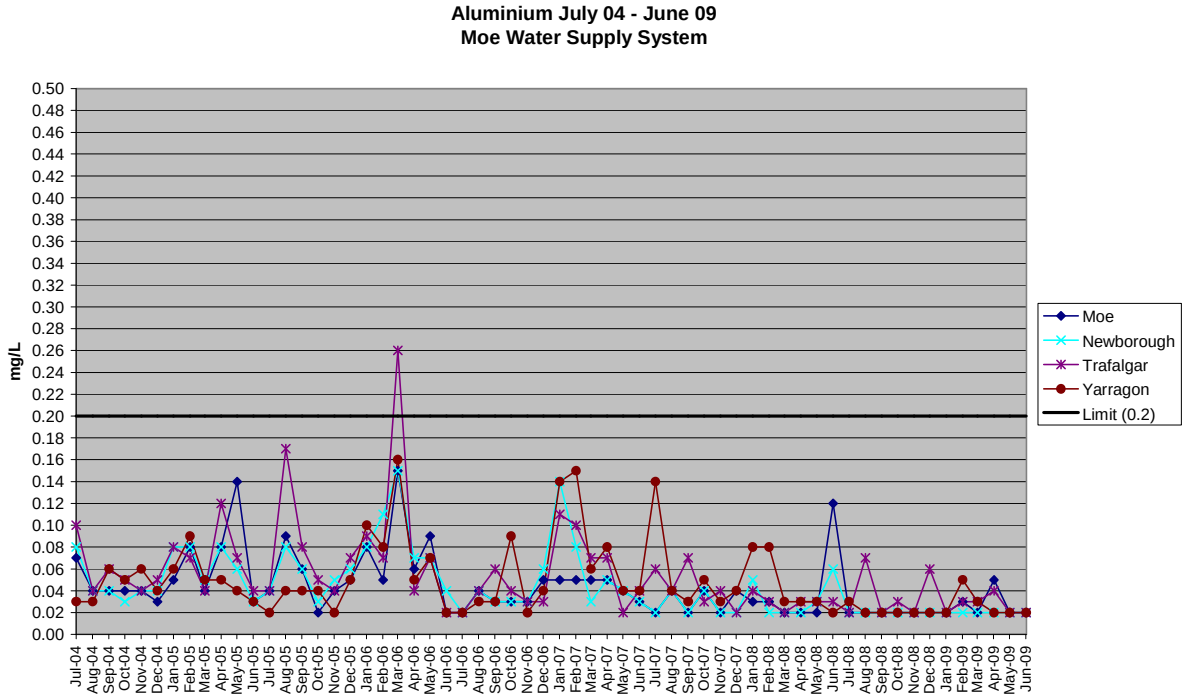
1.3.1 Briagolong and Sale



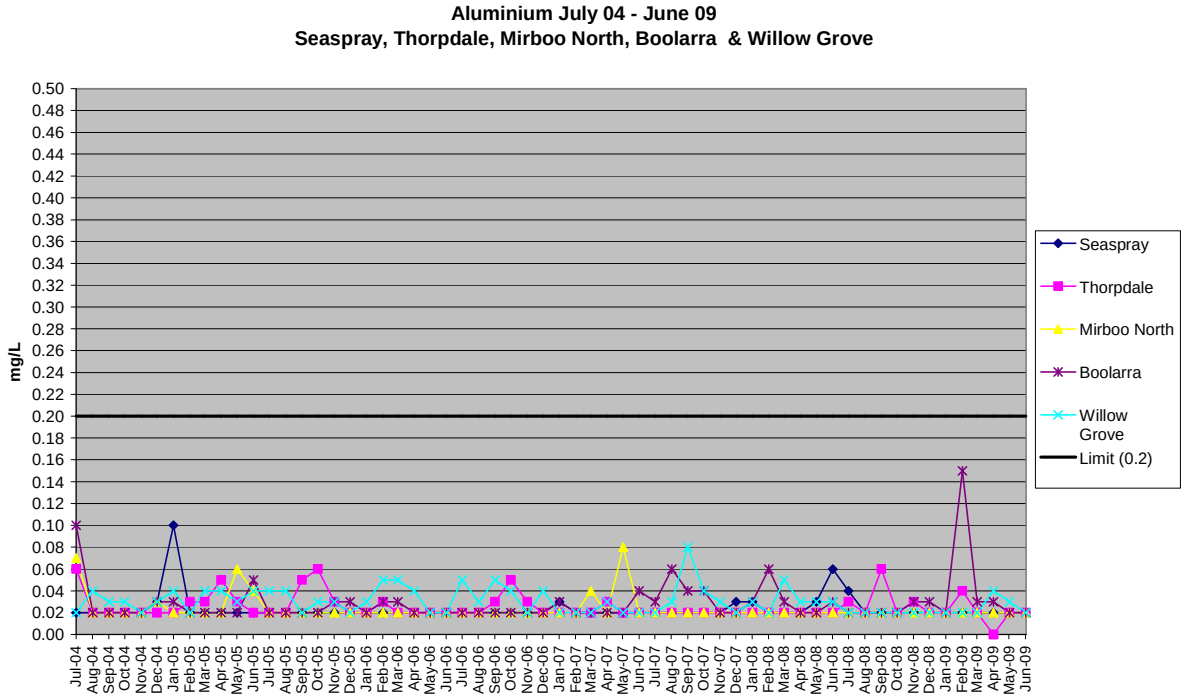
1.3.2 Coongulla, Glenmaggie, Heyfield, Maffra Stratford and Boisdale



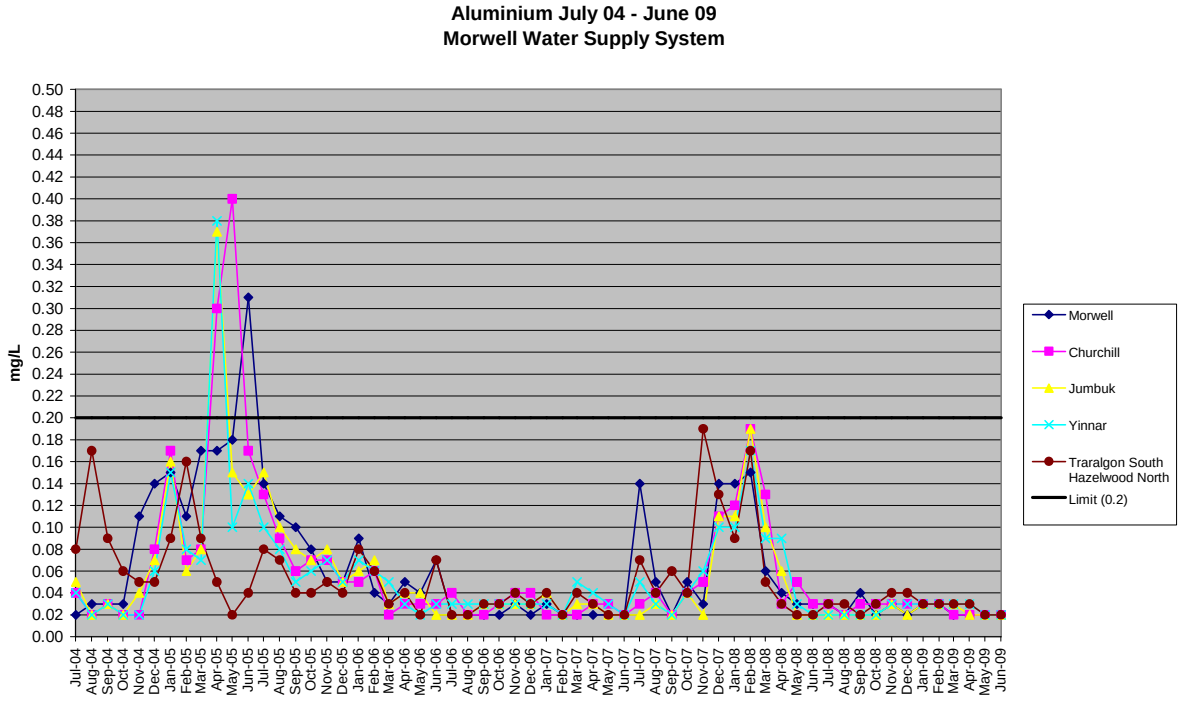
1.3.3 Moe, Newborough, Trafalgar and Yarragon



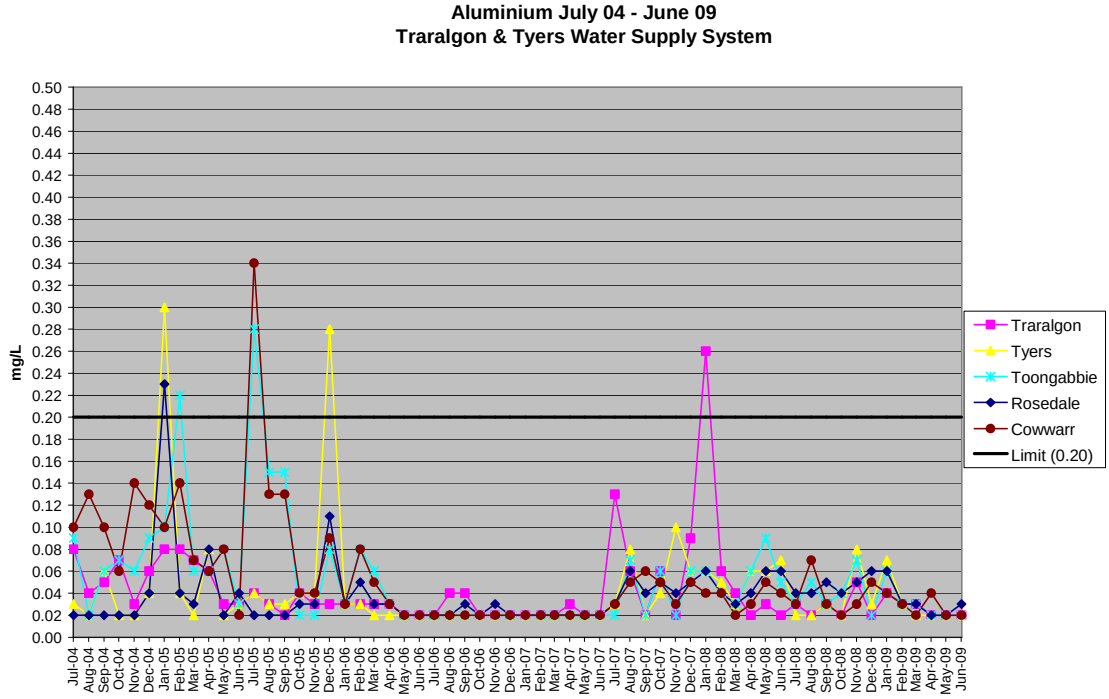
1.3.4 Seaspray, Thorpdale, Mirboo North, Boolarra and Willow Grove



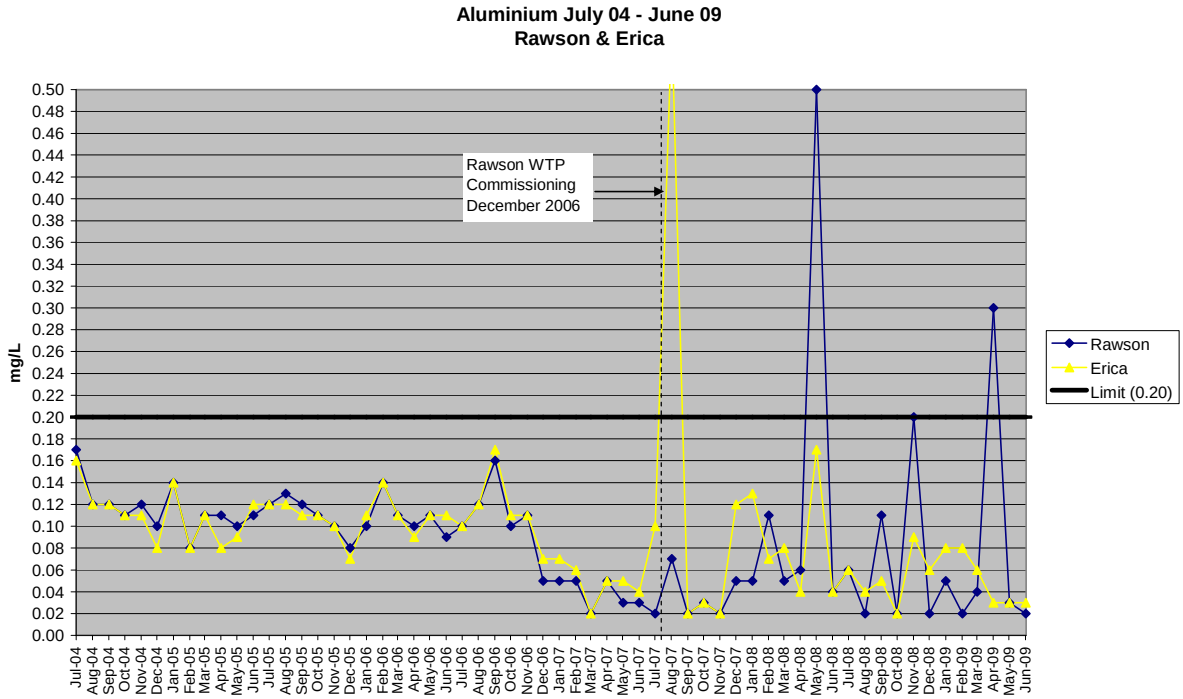
1.3.5 Morwell, Churchill, Yinnar Jumbuk, Traralgon South/Hazelwood North



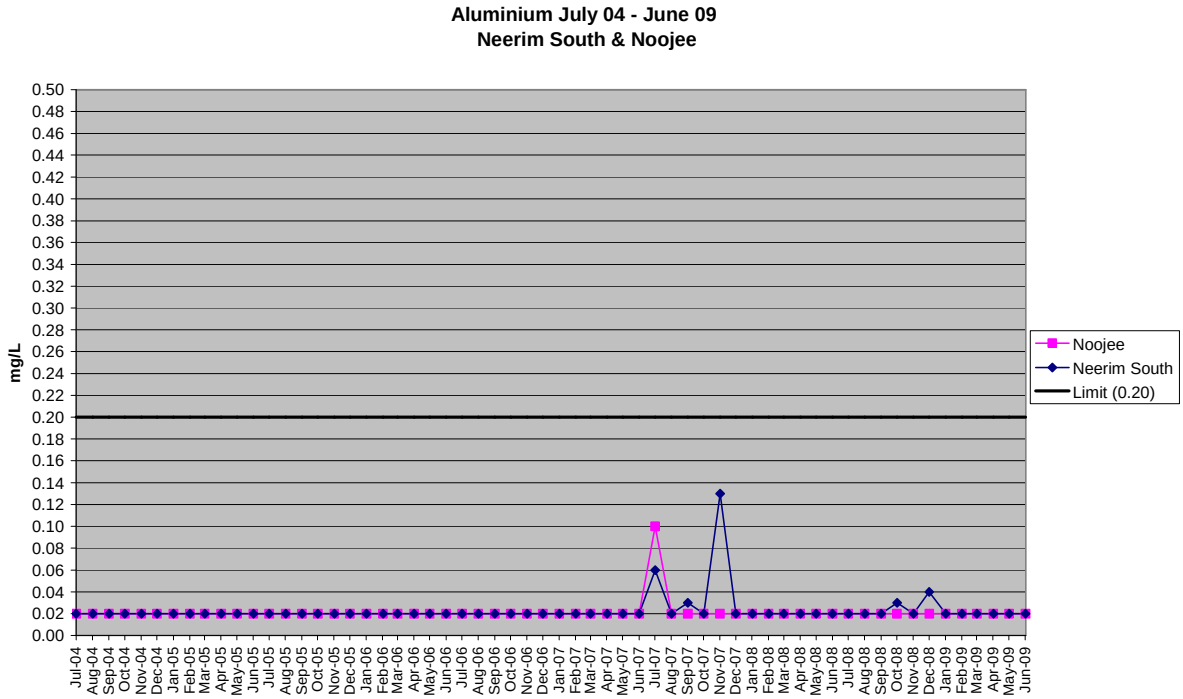
1.3.6 Traralgon, Tyers, Toongabbie, Rosedale and Cowwarr



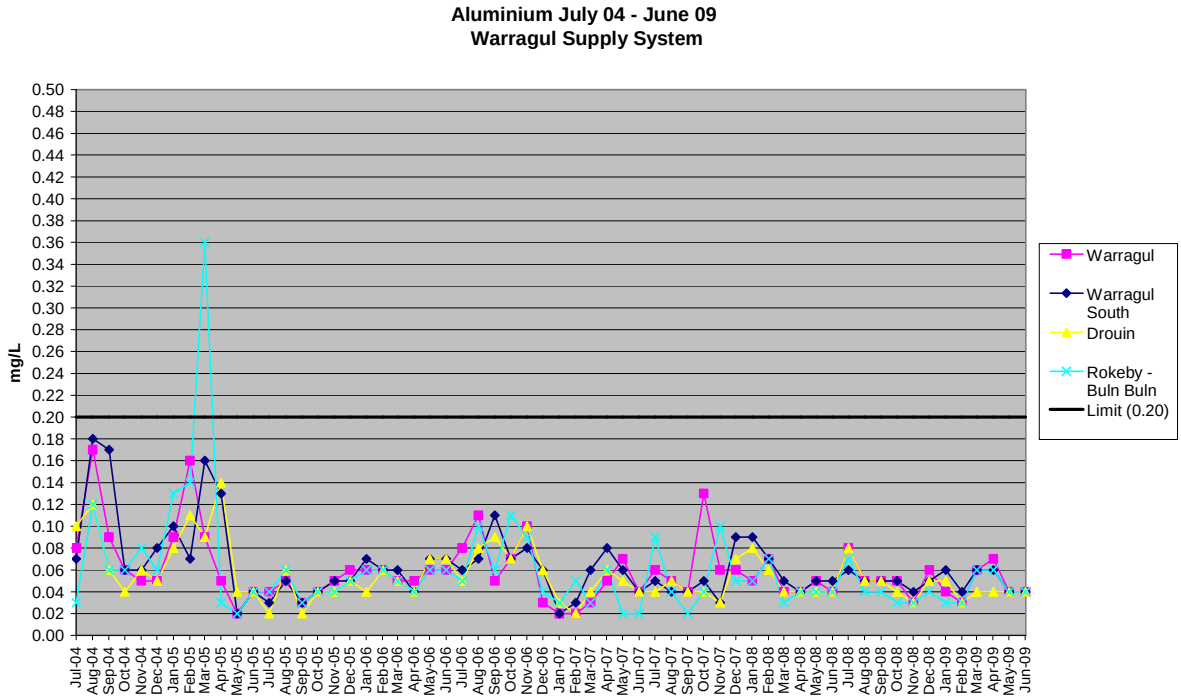
1.3.7 Rawson and Erica



1.3.8 Neerim South and Noojee

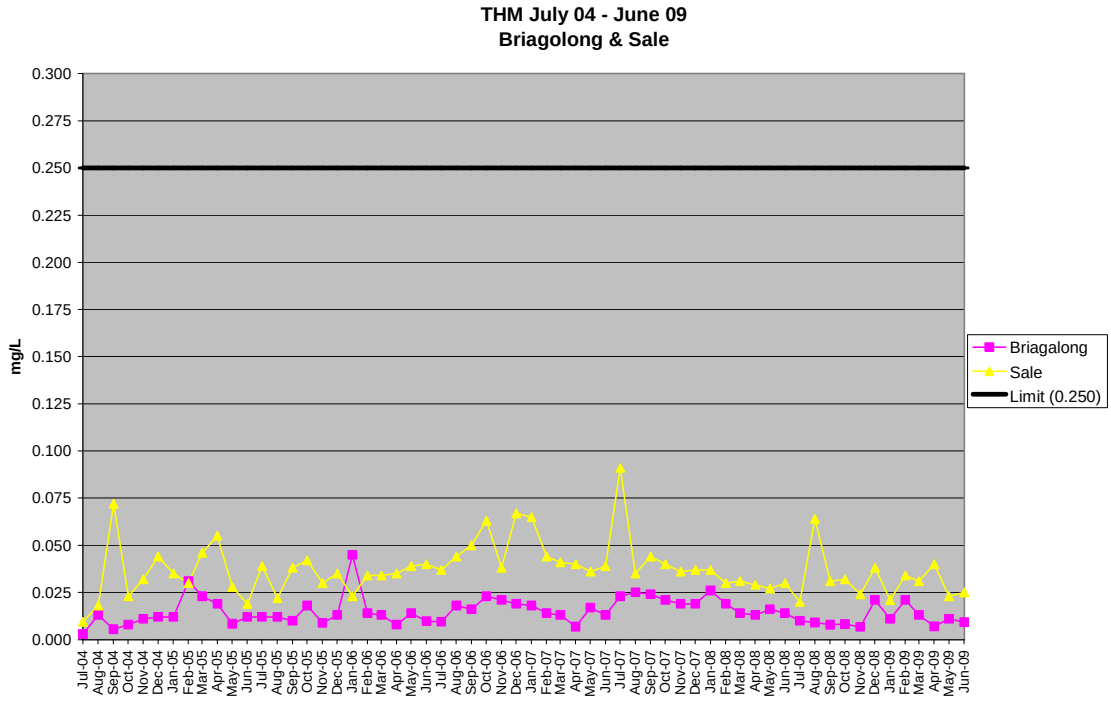


1.3.9 Warragul, Drouin, Warragul South and Rokeby/Buln Buln

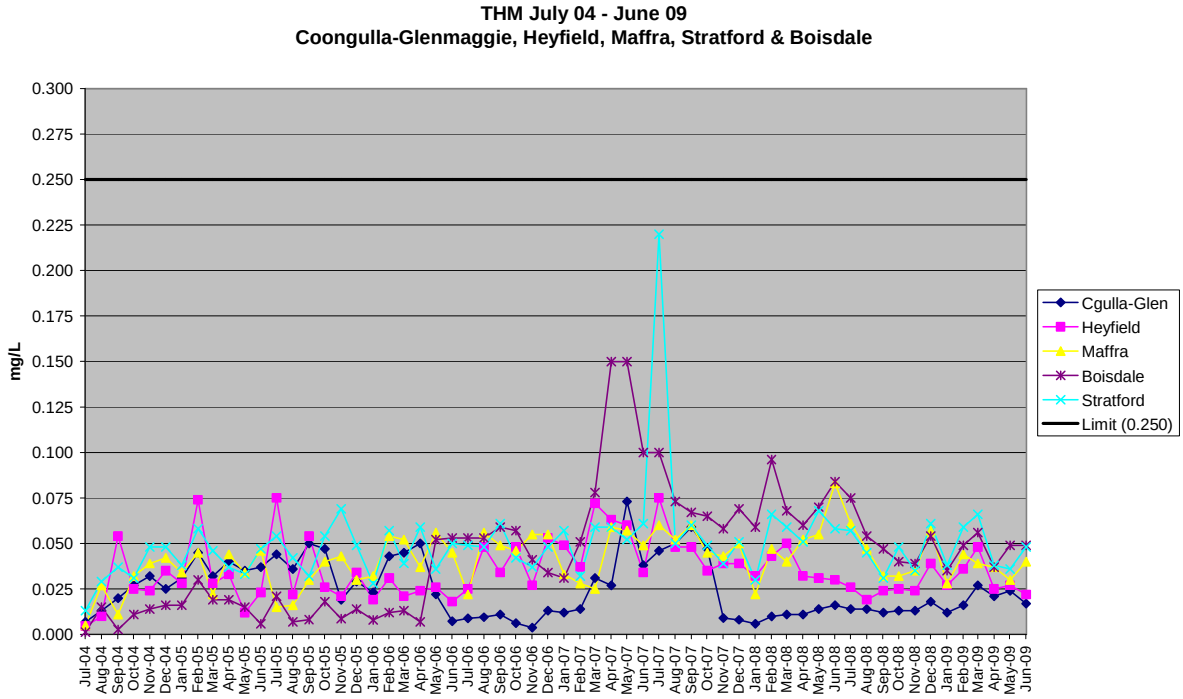


1.4 TRIHALOMETHANE TRENDS

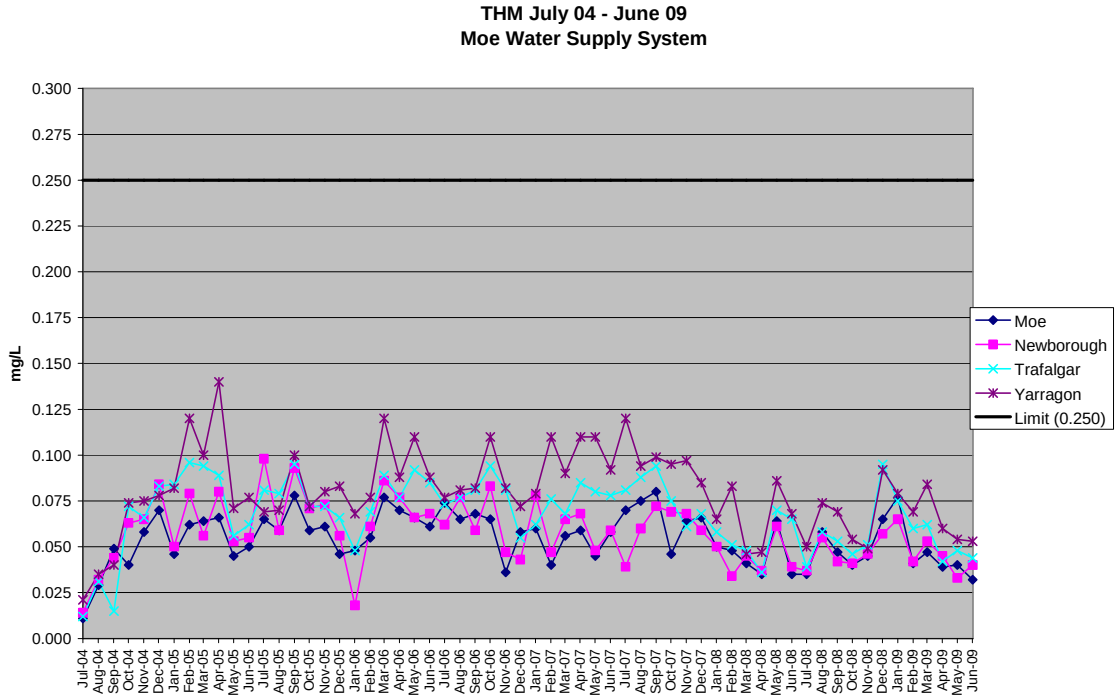
1.4.1 Briagolong and Sale



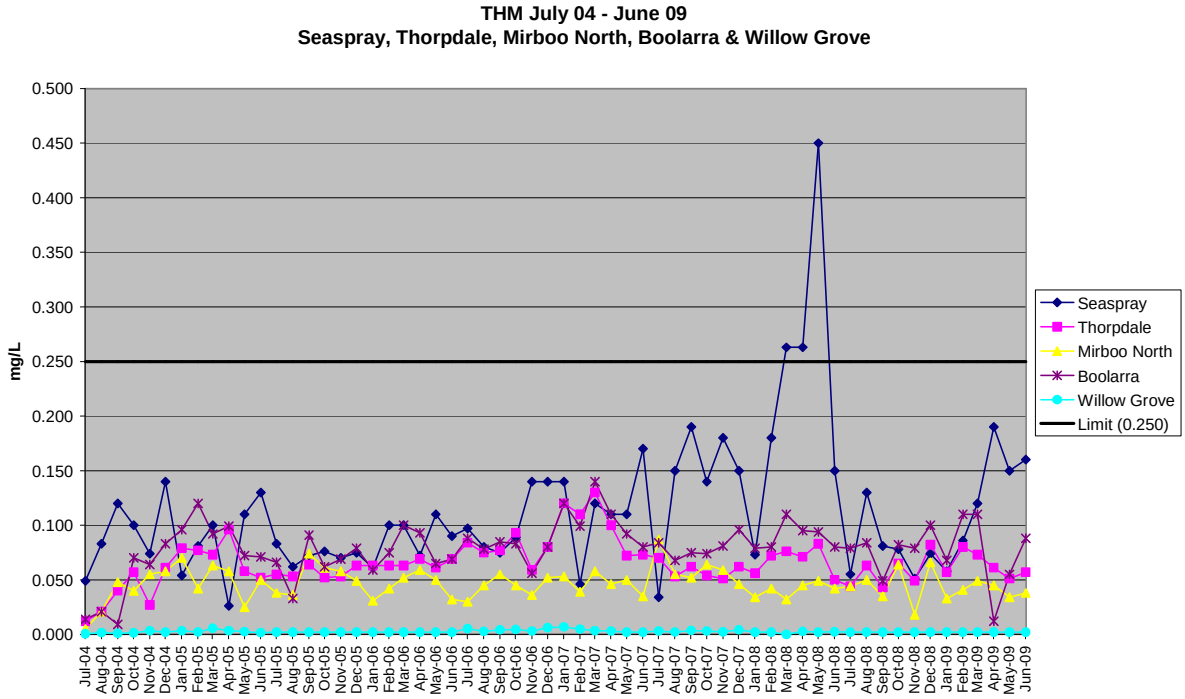
1.4.2 Coongulla, Heyfield, Maffra, Stratford and Boisdale



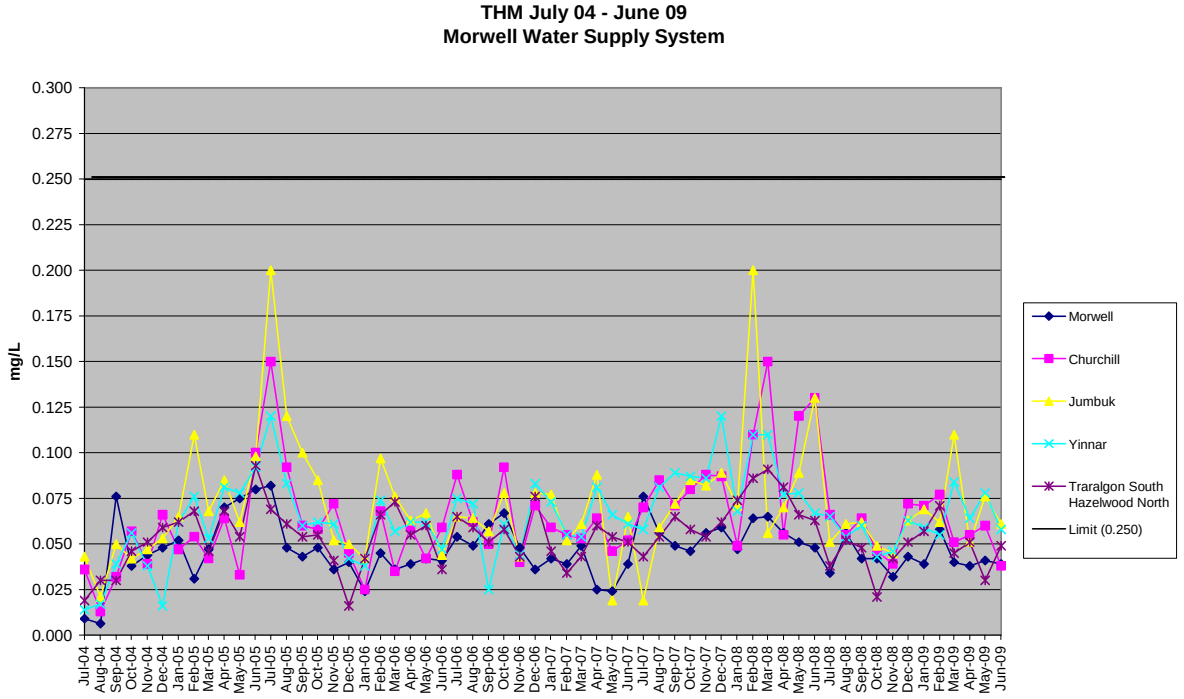
1.4.3 Moe, Newborough, Trafalgar and Yarragon



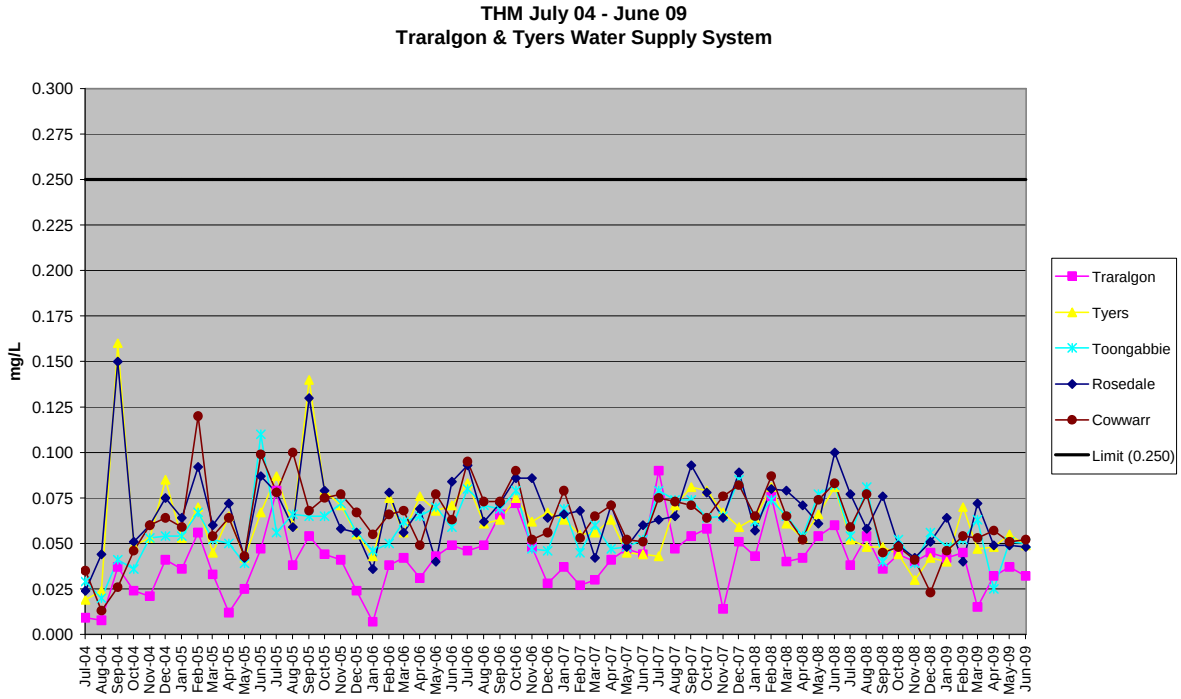
1.4.4 Seaspray, Thorpdale, Mirboo North, Boolarra and Willow Grove



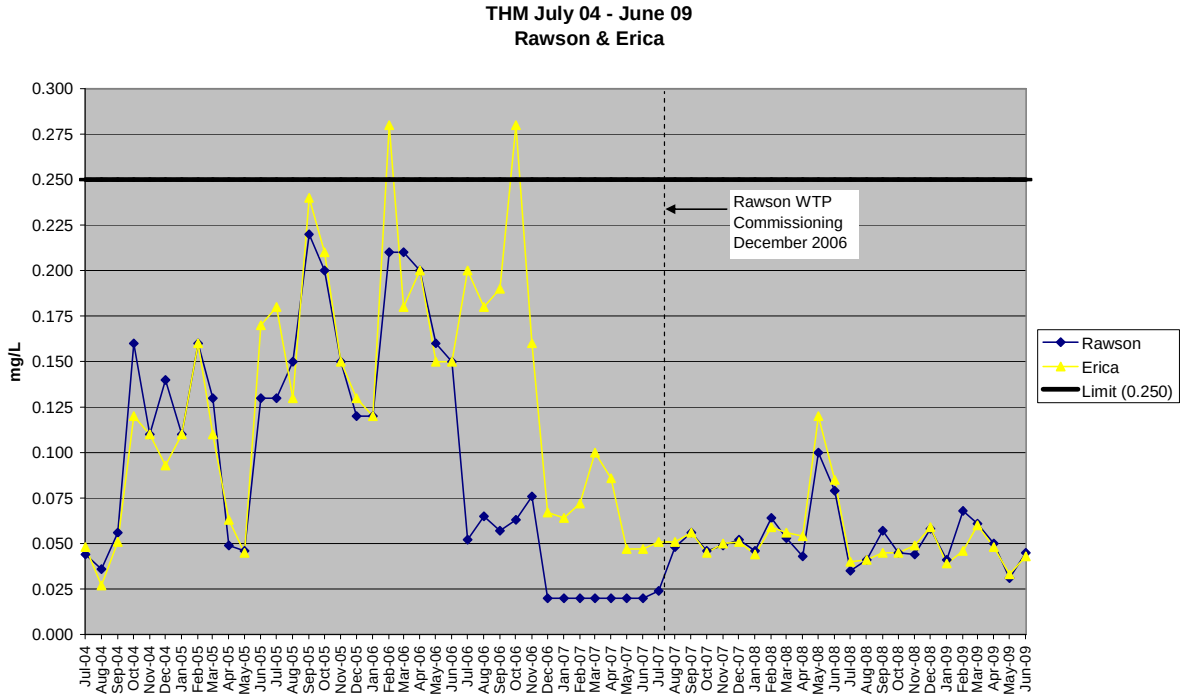
1.4.5 Morwell, Churchill, Jumbuk, Yinnar and Traralgon South/Hazelwood North



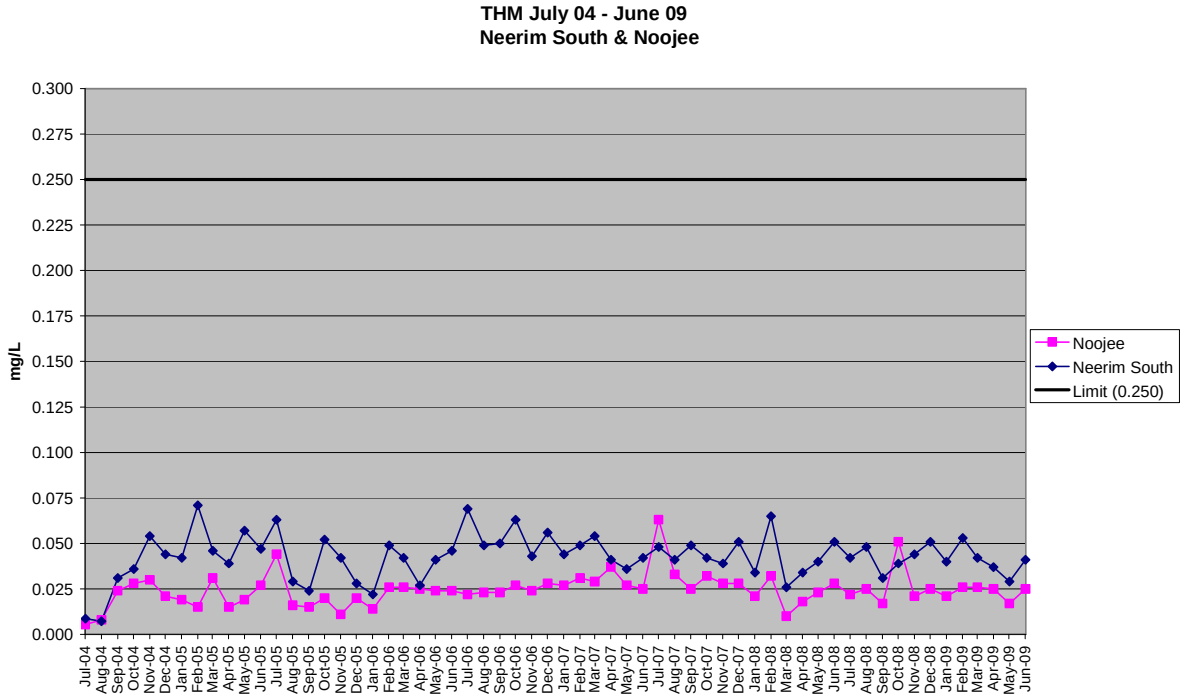
1.4.6 Traralgon, Tyers, Toongabbie, Rosedale and Cowwarr



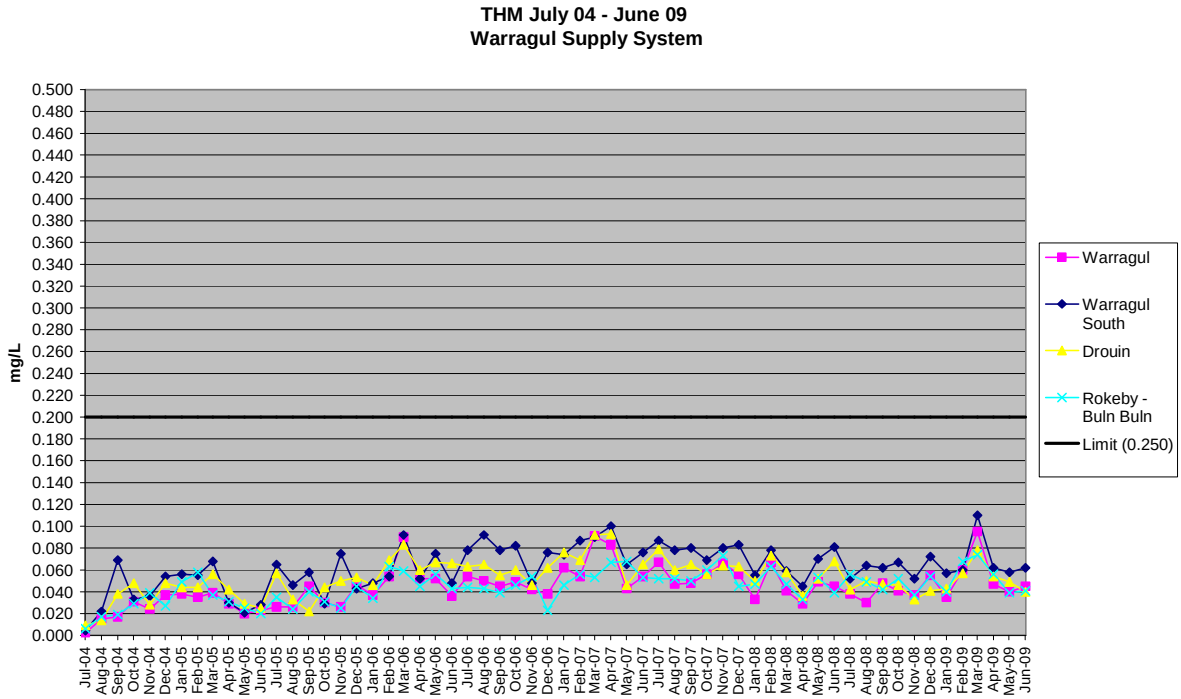
1.4.7 Erica and Rawson



1.4.8 Neerim South and Noojee



1.4.9 Warragul, Drouin, Warragul South and Rokeby/BulnBuln



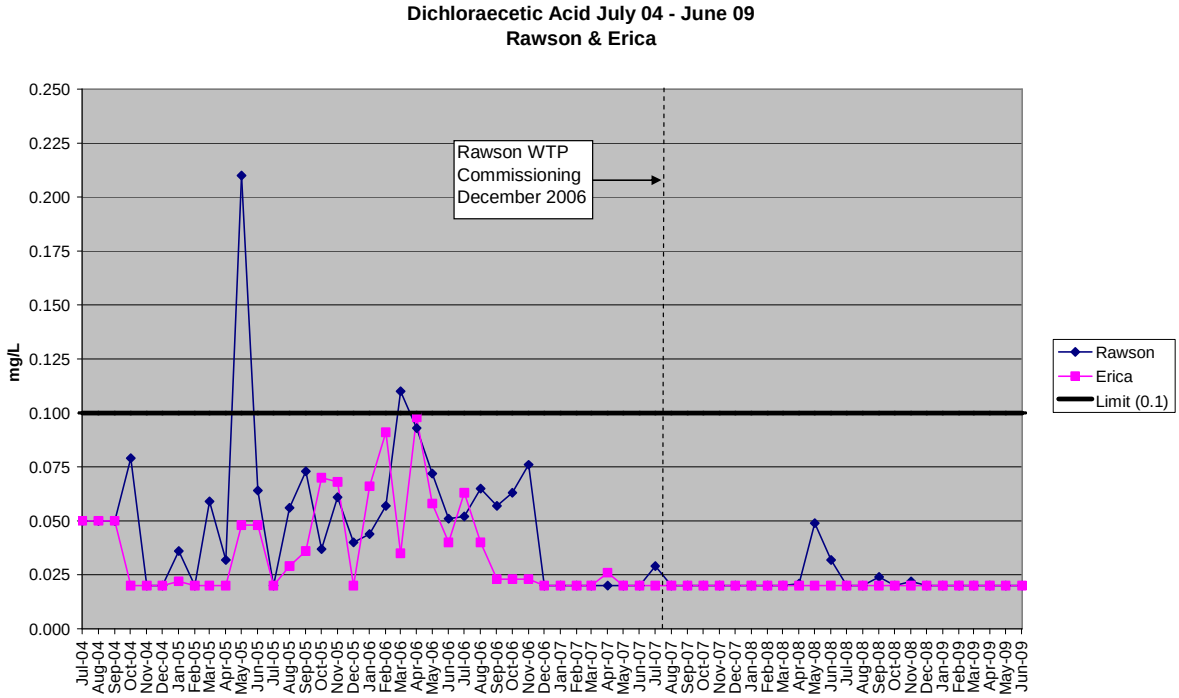
1.5 CHLOROACETIC ACID TRENDS

1.5.1 All localities

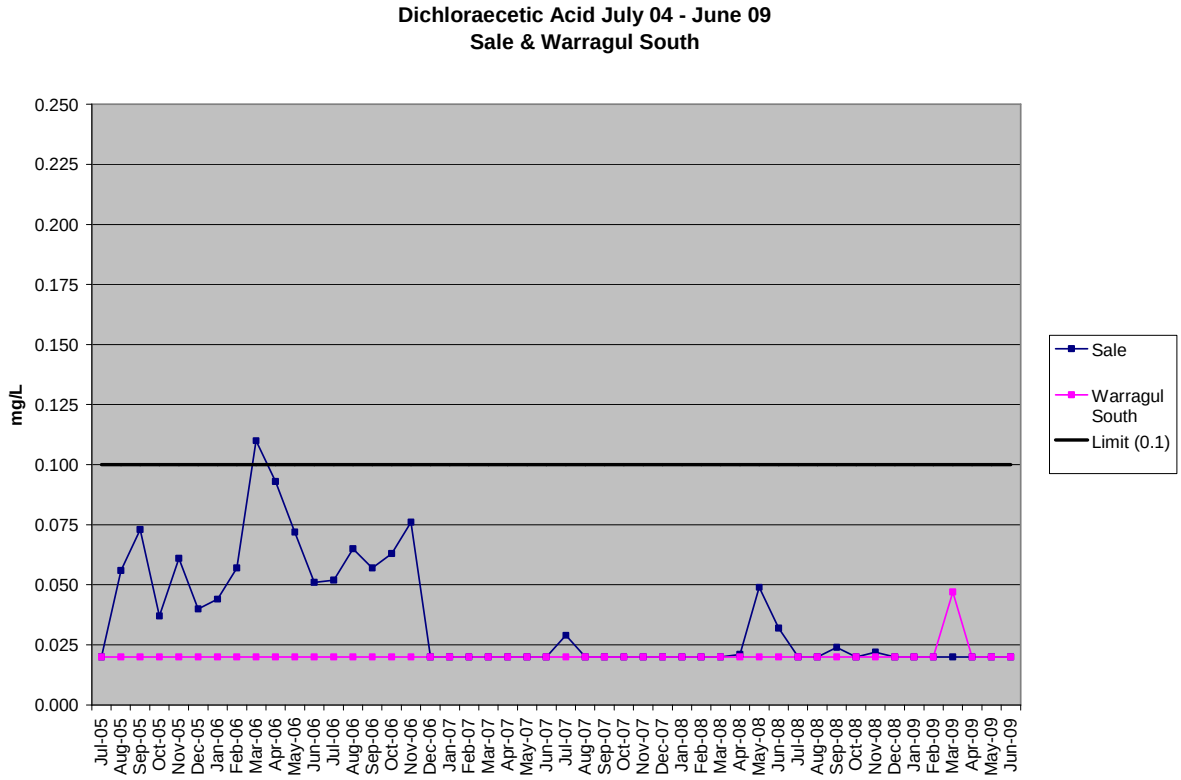
All samples across localities reported results of chloroacetic acid below the detection limit (<0.050 mg/L).

1.6 DICHLOROACETIC ACID TRENDS

1.6.1 Rawson and Erica



1.6.2 Sale and Warragul South

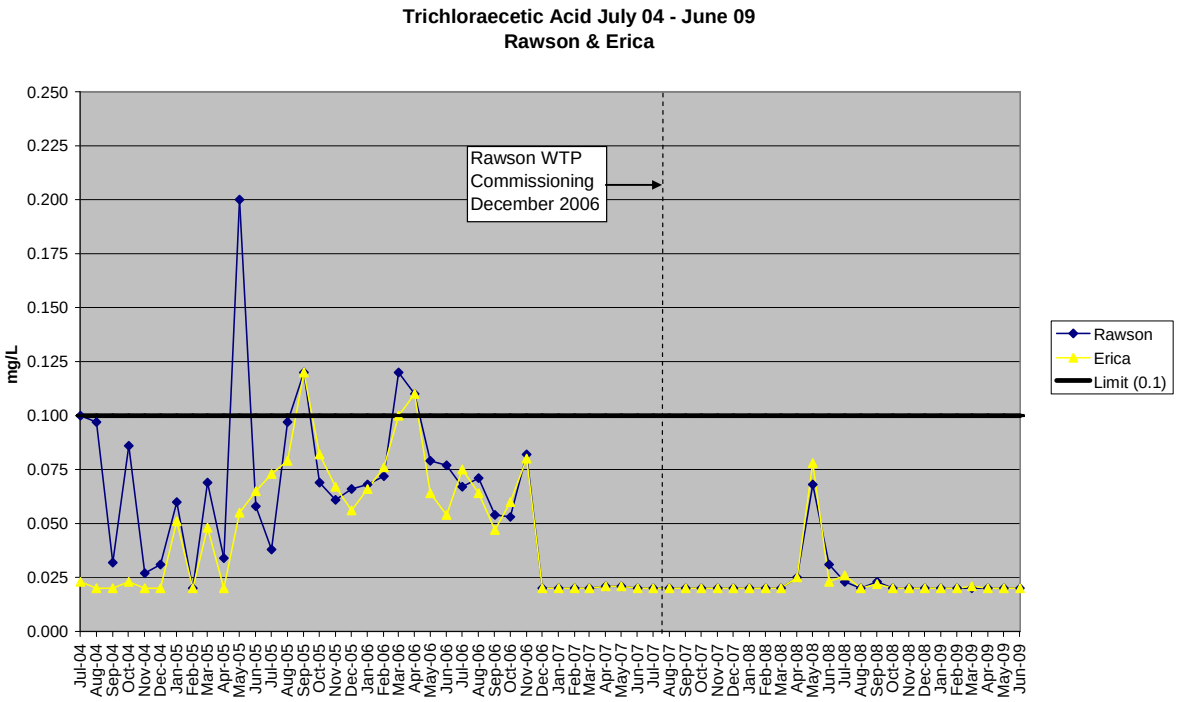


1.6.3 All other localities

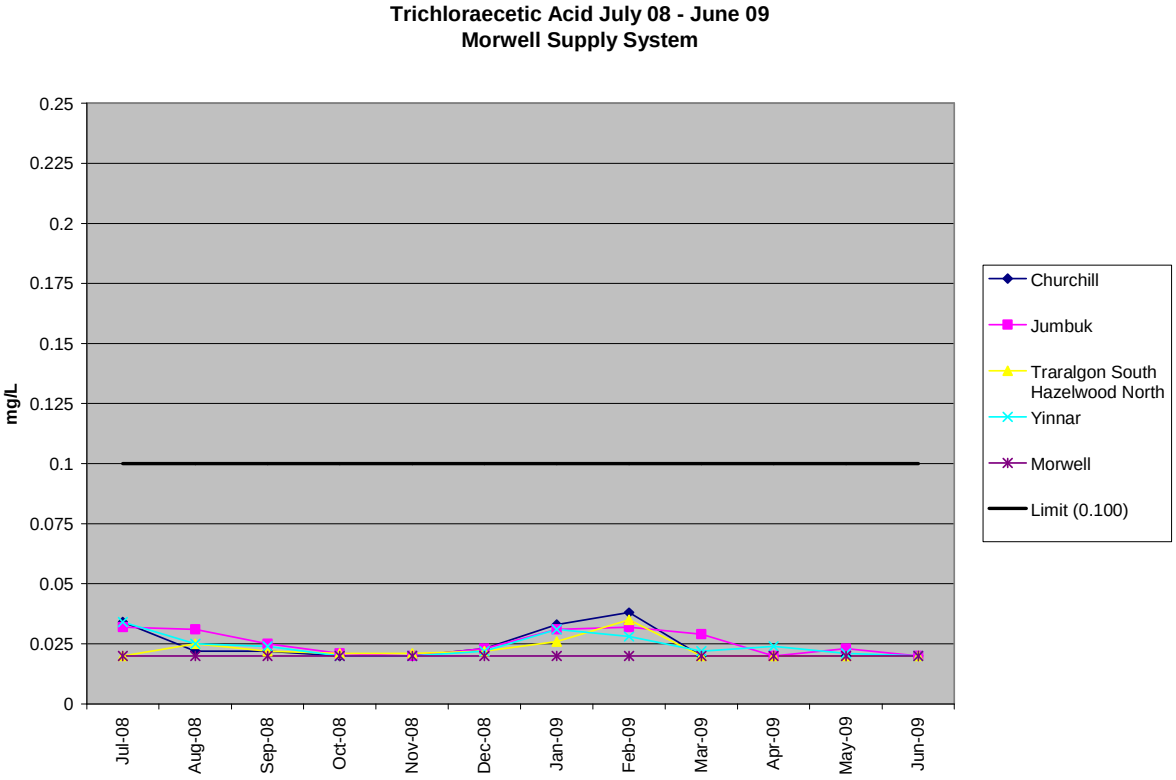
All other localities compliance results were below or marginally above the detection limit (<0.020 mg/L).

1.7 TRICHLOROACETIC ACID TRENDS

1.7.1 Rawson and Erica



1.7.2 Morwell, Churchill, Jumbuk, Yinnar and Traralgon South/Hazelwood North



1.7.3 All other localities

All other localities compliance results were below or marginally above the detection limit (<0.020 mg/L).

APPENDIX 2: RAW WATER MONITORING

Locality	Source water	Nature of Other Monitoring	
Maffra Stratford Boisdale	Macalister River	**Physicals** • Absorbance (254nm) • Alkalinity Bicarbonate as $CaCO_3$ • Alkalinity Total as $CaCO_3$ • Colour True (456nm) • Chlorophyll a • Dissolved Oxygen • Dissolved Organic Carbon (DOC) • Electrical Conductivity @25°C • pH • Suspended Solids • SUVA (245nm) • Total Dissolved Solids (TDS) • Total Organic Carbon (TOC) • Turbidity	**Radiological** • Gross Alpha Activity • Gross Beta Activity **Microbiological** • Escherichia coli • Total Coliforms • Heterotrophic Plate Count • Cryptosporidium spp • Giradia spp **Biological** • Blue Green Algae (BGA) • Green Algae •
Boolarra	Walkley Creek O'Gradys Creek (supplementary supply)		
Briagolong	Bore (Freestone Creek Aquifer)		
Morwell Churchill Yinnar Jumbuk Traralgon South/Hazelwood North	Moondarra Res via Tyers River		
Tyers/Glengarry Rosedale Toongabbie Cowwarr	Moondarra Res via Tyers River		
Traralgon	Moondarra Res via Tyers River		
Warragul (including Nilma, Darnum, Drouin East) Warragul South Drouin Rokeby/Buln Buln	Pederson Weir (Tarago River) Tarago Reservoir - (supplementary supply)		

Locality	Source water	Nature of Other Monitoring	
Coongulla/ Glenmaggie	Macalister River		
Rawson	Trigger Creek	**Chemical Inorganic** • Ammonia as N • Bromide • Chloride • Cyanide • Nitrate as N • Nitrite as N • Organic Nitrogen as N • Phosphorous, Reactive as P • Phosphorous Total as N • Sulphate • Total Kjeldahl Nitrogen as N • Total Nitrogen as N • **Metals** • Aluminium Total • Aluminium Soluble • Arsenic Total • Calcium Total • Cadmium Total • Copper Total • Iron Total • Iron Soluble • Lead Total • Mercury • Potassium • Magnesium • Manganese Total • Manganese Soluble • Selenium Total	**Pesticides, Herbicides and Chemical Organics** • 2,4,5 T (Hebicide) • 2,4,5 TP (Silvex) • 2,4,5- Trichlorophenol • 2,4,6- Trichlorophenol • 2,4 D • 2,4 DB • Aldrin • Atrazine • BHC (beta) • BHC (delta) • Chlordane (alpha) • Chlordane (gamma) • Cynazine • Delapon • Dicamba • Dichlorprop • Deildrin • Dinoseb • Endosulfan (alpha) • Endosulfan (beta) • Endosulfan Sulphate • Eldrin • Endrin Ketone • Heptachlor • Haxazinone • Lindane • MCPA • Methoxychlor • Pentachlorophenol • Prometryn • Propazine
Erica			
Heyfield	Thomson River		
Mirboo North	Little Morwell River		
Moe	Tanjil River and Narracan Creek		
Newborough			
Yallourn North			
Trafalgar			
Yarragon			
Neerim South	Tarago River		
Noojee			
Sale/Wurruk	Bore (Boisdale Aquifer)		
Seaspray	Merrimans Creek		
Thorpdale	Easterbrook Creek		
Willow Grove	Tanjil River		

Locality	Source water	Nature of Other Monitoring	
		• Zinc Total	• Simazine • Terbuthylazine • Terbutryn

Not all parameters were measured at all localities or source waters.

Purpose of Monitoring - Risk Management within Catchment and Treatment Systems

Comprehensiveness (Frequency) - Monthly Quarterly and Annual Monitoring or as Risks Identified