Gippsland Water 2005/06 Annual Report on Drinking Water Quality

Safe Drinking Water Act 2003

GIPPSLAND WATER

EXECUTIVE SUMMARY

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 Human Services (DHS) with an annual report each financial year, covering issues relating to the quality and management of drinking water.

Gippsland Water is committed to providing a water service that meets customer and stakeholder expectations. It is Gippsland Water's objective to ensure that the quality of water supplied to its customers meets the requirements of the *Safe Drinking Water Act 2003*.

This annual report has been prepared in accordance with the guidance notes provided by DHS. This identifies water sources, towns supplied and treatment process for each of Gippsland Water's 19 water supply systems.

A region-wide water quality monitoring program has been implemented to test the quality of the drinking water present at customers' taps in accordance with the *Safe Drinking Water Regulations 2005*. A summary of these results for the reporting period of July 2005 to June 2006 has been provided for water quality parameters including *E.coli*, turbidity, aluminium and disinfection by-products (chloroacetic acid, dichloroacetic acid, trichloroacetic acid and trihalomethanes).

As part of Gippsland Water's monitoring program, 6,092 tests were performed on samples taken from customer taps. Of these 6,092 tests, 13 were found to be non-compliant for the following water quality parameters:

- *E.coli* detected in Seaspray due to contamination within a storage tank;
- dichloroacetic acid and trichloroacetic acid non-compliance at Rawson and Erica due to the presence of natural organic matter in the water and the addition of disinfectant;
- aluminium non-compliance for Toongabbie, Cowwarr, Trafalgar and Tyers water localities.

All non-compliance incidents reported for this period have been fully investigated and remedial actions undertaken to minimise the risk of non-compliance occurring in the future. The non-compliance reported for this period in Erica and Rawson will be addressed by the water treatment plant currently being constructed and commissioned. This treatment plant will reduce the level of organic matter in the raw water supply and therefore reduce the potential for disinfection by-products to form.

Additional developments through the reporting period have included the connection of two raw water systems (Boisdale and Toongabbie/Cowwarr) to existing fully treated water supplies. This change resulted in the original 19 Gippsland Water systems condensing down to 17 systems from April 2006 onwards. These developments coupled with the future connection of Erica and Rawson residents to a new water treatment plant, will see all of Gippsland Water's water supplies fully treated.

Gippsland Water supplies 61,392 customers (properties) with water. Of those customers, 100 complaints regarding water quality were reported for the 2005/06 period. A summary of the complaints received by Gippsland Water relating to the quality of drinking water supplied has been provided. Gippsland Water has an extensive customer complaint response procedure to ensure 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.

TABLE OF CONTENTS

1 INTRODUCTION

1.1 CHARACTERISATION OF THE SYSTEM

The provision of water services is one of five business streams managed by Gippsland Water. The region consists of 42 towns with approximately 61,392 properties connected to the 19 drinking water supply systems. These towns are grouped into 36 localities for the purposes of monitoring and reporting in accordance with the *Safe Drinking Water Regulations 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 the Customer Charter targets.

The achievement and maintenance of a high level of community confidence in the safety, reliability and quality of the region's water treatment and supply is a major objective for Gippsland Water.

Our Purpose

To provide high quality water, sewerage and waste recovery services that secure social, environmental and economic benefits for Central Gippsland.

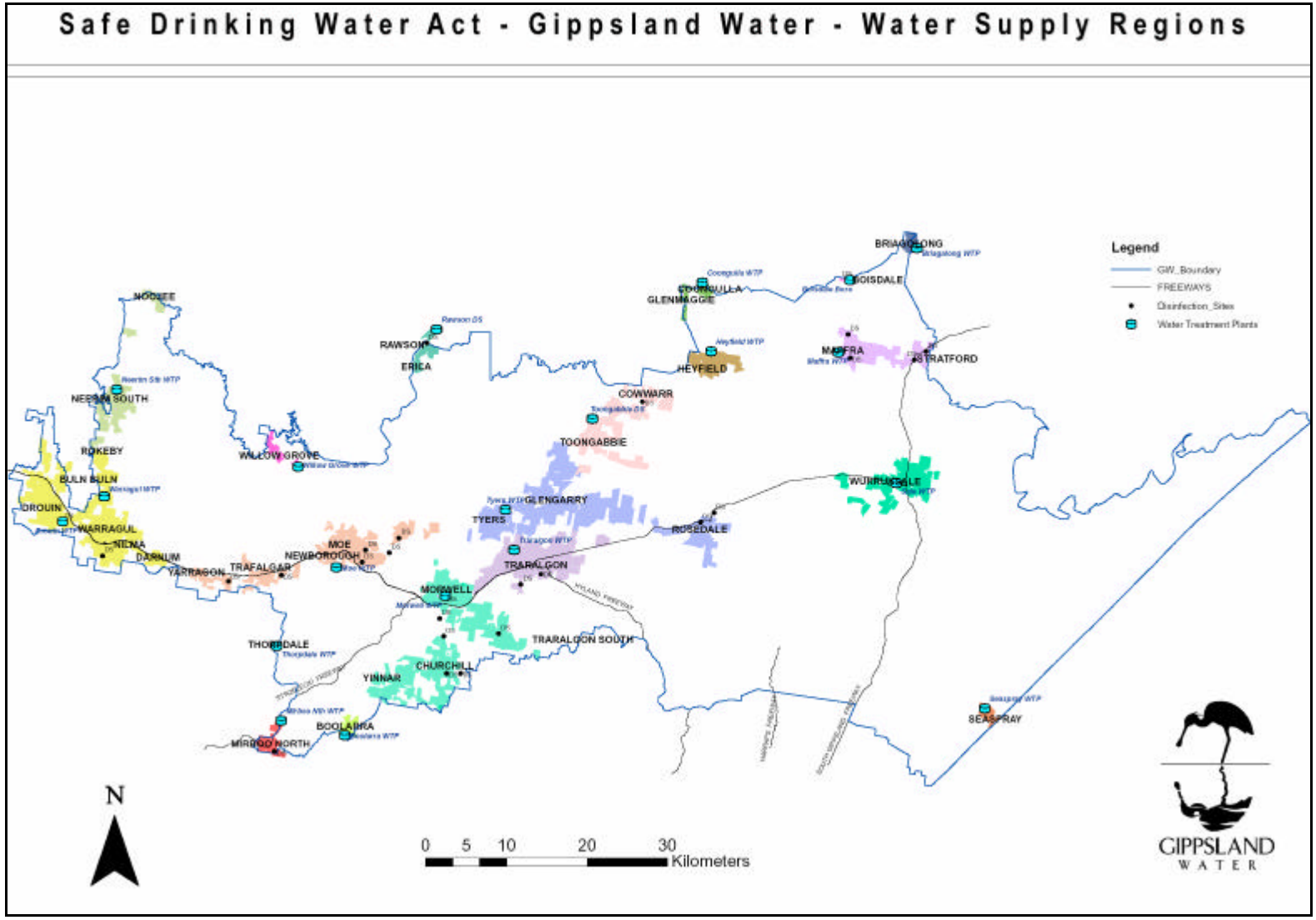
Our Vision

To manage the water cycle and waste recovery services in a manner that adds value to our customers, our stakeholders, our region and the environment, whilst ensuring Gippsland Water's sustainability.

1.1.1 Overall map of the Gippsland Water System

Figure 1 provides an overview of the water supply system operated by Gippsland Water.

Figure 1



1.2 SOURCE OF WATER

Gippsland Water operated 19 water treatment systems for the majority of the year and 17 from April onwards, supplying 36 localities (42 towns) in the 2005/06 period. The water for these systems is sourced from a variety of water supplies including stream off-takes, reservoirs, and groundwater (bore water) supplies. Table 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: Water Source

Locality	Population	Source Water	Storage	Water Treatment Plant
Maffra	3,916	Macalister River	NA	Maffra
Stratford	1,330			
Boisdale	70	Bore (Boisdale Aquifer operation up to April 2006) *-refer to section 2.2.1*		Boisdale disinfection up to April 2006
Boolarra	478	Walkley Creek O'Gradys Creek (supplement supply)	Raw Water Basin	Boolarra
Briagolong	472	Bore (Boisdale Aquifer)	NA	Briagolong
Morwell	12,278	Tyers River	Moondarra	Morwell
Churchill	4,898			
Yinnar	550			
Jumbuk	180			
Traralgon Sth / Hazelwood Nth	1,053			
Tyers	226	Tyers River	Moondarra	Tyers
Glengarry	688			
Rosedale	1,042			
Toongabbie	463	Thomson River (Cowwarr Weir) for the Toongabbie/Cowwarr system up until April 2006 *-refer to section 2.2.3*		Toongabbie/Cowwarr disinfection up to April 2006 only.
Cowwarr	225			
Traralgon	19,614	Tyers River	Moondarra	Traralgon
Warragul	13,196	Pederson Weir (Tarago River)	NA	Warragul ^ determined from combined population of Nilma/Darnum/Warragul Sth
Warragul South/ Nilma/ Darnum	1,157^			
Drouin	5,815			
Rokeby/Buln Buln	831			
Coongulla/ Glenmaggie	176	Macalister River	Lake Glenmaggie	Coongulla
Rawson	277	Trigger Creek	Amours Basins	Erica/Rawson Disinfection only
Erica	194			
Heyfield	1,436	Thomson River	NA	Heyfield

Locality	Population	Source Water	Storage	Water Treatment Plant
Mirboo North	1,382	Little Morwell River	NA	Mirboo North
Moe	15,117	Tanjil River and Narracan Creek	NA	Moe
Newborough	4,666			
Yallourn North	1,185			
Trafalgar	2,279			
Yarragon	707			
Neerim South	535	Tarago River	Tarago Reservoir	Neerim South
Noojee	119			
Sale/Wurruk	12,854	Bore (Boisdale Aquifer)	NA	Sale
Seaspray	208	Merrimans Creek	NA	Seaspray
Thorpdale	155	Easterbrook Creek	Thorpdale raw water storage	Thorpdale
Willow Grove	194	Tanjil River	Blue Rock Lake	Willow Grove

2 QUALITY MANAGEMENT SYSTEM

2.1 WATER TREATMENT

Gippsland Water operates 19 water treatment systems, with 16 water treatment plants, supplying 36 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 process varies for each water supply system with the level of treatment required dependant on the quality of the source water. Table 2 identifies the regular treatment process for each of the water localities, and lists the added substances and any periodic treatment activities.

The following treatment processes are employed by Gippsland Water 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 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 flocculated (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 that measures 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 at Noojee.

2.1.5 Fluoridation

Fluoridation has been part of the treatment process for the following of Gippsland Water's water supply systems for a number of years: Maffra, Stratford, and Drouin. In late 2005, under the *Health (Fluoridation) Act 1973*, the secretary to the Department of Human Services, requested that Gippsland Water fluoridate the drinking water supplies of Moe, Morwell, Traralgon, Sale, and Warragul. Fluoridation was introduced to these towns and the connecting systems, from July 2006 onwards. For information about the health issues associated with the water fluoridation program, please call the Department of Human Services on 1800 651 723.

Table 2 Water Treatment Process

Locality	WTP	Treatment Process	Added Substances	Comments
Maffra Stratford Boisdale	Maffra	Coagulation Primary Solids Separation - (Clarification) Secondary Solids Separation - (Sand Filters) Primary & Secondary Disinfection, pH Correction, Fluoridation	Soda Ash Hydrofluorosilic acid Alum Polymer LT22 Chlorine (gas) Sodium Hypochlorite Powdered Activated Carbon (PAC)	PAC use as required to treat for taste & odour compounds. Boisdale locality connected to Maffra water system from April 2006 onwards. Refer section 2.2.1
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 & 1160 Sodium Hypochlorite Soda Ash	---
Morwell Churchill Yinnar Jumbuk Traralgon Sth / Hazelwood Nth	Morwell	Coagulation, Flocculation Primary Solids Separation (Clarification), Secondary Solids Separation – (Dual Sand Filters Primary and Secondary Disinfection, pH Correction, Fluoridation	Soda Ash Alum, Polymer LT20 Chlorine (gas) Sodium Hypochlorite Sodium Fluoride Calcium Hypochlorite	Sodium Fluoride Addition started in the Morwell system in July 2006.
Tyers Glengarry Rosedale Toongabbie Cowwarr	Tyers	Coagulation, Flocculation Primary and Secondary Filtration Primary and Secondary Disinfection, pH Correction	Soda Ash Alum Polymers 1115 & 1160 Sodium Hypochlorite	Toongabbie and Cowwarr systems were connected to the Tyers water supply in April 2006. Refer to section 2.2.2

Locality	WTP	Treatment Process	Added Substances	Comments
Traralgon	Traralgon	Coagulation, Flocculation Primary Solids Separation - (Dissolved Air Flotation) Secondary Solids Separation - (Dual Media Filters) Primary and Secondary Disinfection, pH Correction, Fluoridation	Soda Ash, Alum Polymer LT22 Chlorine (gas) Sodium Hypochlorite Sodium Fluoride	Sodium Fluoride addition began at Traralgon in September 2006.
Warragul Warragul South/ Nilma/ Darnum Drouin Rokeby/Buln Buln	Warragul	Coagulation, Flocculation Primary Solids Separation - (Dissolved Air Flotation) Secondary Solids Separation - (Dual Media Filters) Primary and Secondary Disinfection, pH Correction, Fluoridation	Lime Alum, Polymer LT20 Chlorine (gas) Sodium Hypochlorite Hydrofluorosilic acid Sodium Fluoride	Hydrofluorosilic acid addition ceased at Drouin and Sodium Fluoride addition commenced in the Warragul system in August 2006
Coongulla/ Glenmaggie	Coongulla	Coagulation, Flocculation Primary and Secondary Filtration Disinfection, pH Correction, Granular Activated Carbon (GAC) Filtration	Soda Ash Alum, Polymers 1190, 1115 (1160) Sodium Hypochlorite	Granular Activated Carbon filters attached post treatment to remove taste & odour compounds refer to section 2.2.3
Rawson Erica	Erica/Rawson Disinfection only	Primary and Secondary Disinfection	Sodium Hypochlorite	---
Heyfield	Heyfield	Coagulation, Flocculation Primary and Secondary Filtration Disinfection, pH Correction	PFS, Polymers 1115 & 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 Flotation) 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 Primary Solids Separation - (Clarification) Secondary Solids Separation - (Sand Filters) Primary and Secondary Disinfection, pH Correction, Fluoridation	Alum, Polymer LT20 Chlorine (gas) Lime Sodium Hypochlorite Sodium Fluoride Carbon Dioxide	Sodium Fluoride addition began in September 2006
Neerim South Noojee	Neerim South	Coagulation, Flocculation Primary and Secondary Filtration Chlorination and Chloramination Disinfection, pH Correction	Soda Ash PFS, Polymers 1115 & 1160 Sodium Hypochlorite Ammonia (Noojee system)	---
Sale/Wurruk	Sale	Aeration, Chemical Oxidisation, Precipitation Primary Solids Separation - (Sedimentation) Secondary Solids Separation - (Dual Media Filters) Disinfection, pH Correction, Fluoridation	Lime Potassium Permanganate Chlorine (gas) Sodium Fluoride	Sodium Fluoride addition began in the Sale system in August 2006
Seaspray	Seaspray	Coagulation, Flocculation Primary and Secondary Filtration Disinfection, pH Correction	Soda Ash Alum, Polymers 1115, 1190, (1160) Sodium Hypochlorite PAC	Powder Activated Carbon use as required during high raw water organic colour periods

Locality	WTP	Treatment Process	Added Substances	Comments
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 PFS, Polymer 1115 & 1160 Sodium Hypochlorite Ammonia	---

2.2 SYSTEM UPGRADES/CHANGES FOR 2005/06

During the 2005/06 monitoring period, the following upgrades/changes to Gippsland Water's water supply system have been implemented. The Boisdale and Toongabbie changes have been quite significant for Gippsland Water and the outcomes have ensured more stable water quality for our customers. The changes identified in 2.2.1 and 2.2.2, have reduced the number of Gippsland Water water systems from 19 to 17.

2.2.1 Boisdale water supply system

Boisdale's water system has previously been supplied with water from a bore water supply with disinfection treatment only. From April 2006 onwards, this system was connected to the Maffra water supply via the Sandy Creek Road storage tanks. This upgrade now connects the Boisdale locality to the Maffra system where the water undergoes full water treatment before reaching Boisdale customers.

2.2.2 Toongabbie water supply system (including Cowwarr)

Raw water had previously been supplied to Toongabbie and Cowwarr from the Cowwarr Weir on the Thomson River. The previous treatment involved disinfection only, and as a consequence, these towns were subject to poorer water quality after heavy rainfall in the catchment. Appendix B illustrates the higher trends for turbidity. These towns also experienced non-compliance for aluminium on occasion as reported in section 3.4. In April 2006, the Toongabbie and Cowwarr systems were connected to the Tyers water supply where the water undergoes full water treatment before reaching the Toongabbie and Cowwarr customers.

2.2.3 Coongulla (inc. Glenmaggie)/Maffra water supply system (inc. Stratford & Boisdale)

Raw water is supplied to the Coongulla Water Treatment Plant from the northern shoreline of Lake Glenmaggie on the Macalister River. Maffra Water Treatment Plant is supplied with water from an off take on the Macalister River at Maffra. Beginning in April 2006, the water storage managers of Southern Rural Water reported the existence of an extensive algae outbreak in the lake and later down stream in the Macalister River. Although the water was safe to consume after treatment, the algae produced by-products which tainted the taste and odour of the water supply (musty and earthy tastes). The normal water treatment process was not able to remove these taste and odour products from the supply. Enhanced filter treatment (additional activated carbon) was introduced at the Coongulla and Maffra water treatment plants to remove these products (refer to section 3.7.1 and section 4.1).

3 WATER QUALITY RESULTS FOR 2005/2006

The *Safe Drinking Water Regulations* 2005 require a water quality monitoring program to be undertaken to verify compliance or non-compliance of specified water quality parameters to the regulations. The quality of water is to be measured at a customer's tap in each of the 36 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 2004* prepared by the National Health and Medical Research Council.

Escherichia coli (*E.coli*) – *E.coli* is the most common thermotolerant 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 DHS under section 22 or section 18 of the SDWA.

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 most likely to be reported to the DHS under section 18 of the SDWA.

Trihalomethanes (THM) – Trihalomethanes are a category of by-products produced in drinking water, principally as a result of disinfection chemicals (chlorine) reacting with naturally occurring organic matter derived from the decay of aquatic and terrestrial vegetative matter, present in water supplies. Results from samples taken at customer taps that exceed the maximum levels for these parameters are most likely to be reported to the DHS under section 18 of the SDWA.

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 to be reported to the DHS under section 22 or section 18 of the SDWA.

Turbidity – Turbidity is caused by the presence of fine suspended matter such as clay, silt, colloidal particles, algae and other microscopic organisms in the water. In high levels, this matter gives the water the appearance of being dirty, muddy or milky. Turbidity is best removed by coagulation and filtration treatment processes. Results from samples taken at customer taps that exceed the maximum level of this parameter are to be reported to the DHS under section 22 or section 18 of the SDWA.

3.1 ESCHERICHIA COLI (*E. COLI*) RESULTS

3.1.1 Compliance

For compliance under the *Safe Drinking Water Regulations 2005*, at least 98% of all samples of drinking water collected within a locality in any 12 month period must contain no *E.coli* organism/100mL (org/100ml) of drinking water.

Table 3: E.coli results for towns 2005/06

Locality	Frequency of Sampling	No. of Samples	Max Result (orgs/100mL)	% with no *E. coli*	Complying (Yes/No)
Boisdale	Weekly	52	0	100%	Yes
Boolarra	Weekly	52	0	100%	Yes
Briagolong	Weekly	52	0	100%	Yes
Churchill	Weekly	52	0	100%	Yes
Coongulla & Glenmaggie	Weekly	52	0	100%	Yes
Cowwarr	Weekly	52	0	100%	Yes
Drouin	Weekly	64	0	100%	Yes
Erica	Weekly	52	0	100%	Yes
Glengarry	Weekly	52	0	100%	Yes
Heyfield	Weekly	52	0	100%	Yes
Jumbuk	Weekly	52	0	100%	Yes
Maffra	Weekly	52	0	100%	Yes
Mirboo North	Weekly	52	0	100%	Yes
Moe	Weekly	104	0	100%	Yes
Morwell	Weekly	76	0	100%	Yes
Neerim South	Weekly	52	0	100%	Yes
Newborough	Weekly	52	0	100%	Yes
Noojee	Weekly	52	0	100%	Yes
Rawson	Weekly	52	0	100%	Yes
Rokeby & Buln Buln	Weekly	52	0	100%	Yes
Rosedale	Weekly	52	0	100%	Yes
Sale/Wurruk	Weekly	76	0	100%	Yes
Seaspray	Weekly	52	4	98%	Yes (refer 3.1.2)
Stratford	Weekly	52	0	100%	Yes
Thorpdale	Weekly	52	0	100%	Yes
Toongabbie	Weekly	52	0	100%	Yes
Trafalgar	Weekly	52	0	100%	Yes
Traralgon	Weekly	104	0	100%	Yes
Traralgon South & Hazelwood North	Weekly	52	0	100%	Yes
Tyers	Weekly	52	0	100%	Yes
Warragul	Weekly	76	0	100%	Yes
Warragul South Nilma & Darnum	Weekly	52	0	100%	Yes
Willow Grove	Weekly	52	0	100%	Yes
Yallourn North	Weekly	52	0	100%	Yes
Yarragon	Weekly	52	0	100%	Yes
Yinnar	Weekly	52	0	100%	Yes

3.1.2 Actions taken in relation to non-compliance

All towns except for the following exception, complied with this water quality parameter:

Seaspray - February 2006

One sample out of 52 samples experienced a positive result for *E.coli* in the high level area of the Seaspray system. This did not represent a non-conformance as the per cent of conforming samples for Seaspray for the year was greater than 98%. Gippsland Water responded to this incident and reported this under a Section 22 notification to DHS (please refer to section 4.1 Emergencies/Event). The source of contamination was believed to be due to birds gaining access to the storage tank. Once identified the disinfection levels were increased and the reticulation flushed. Resamples were clear of the presence of *E.coli*. Works have since been performed to secure the storage tank to prevent bird access.

3.2 CHLORINE BASED DISINFECTION BYPRODUCT CHEMICALS

3.2.1 Chloroacetic acid results

For compliance with the *Safe Drinking Water Regulations 2005*, a sample result must not exceed 0.150 mg/L for chloroacetic acid. Results of <0.050 mg/L are at the detection limit for this parameter.

Table 4: Chloroacetic acid results for all towns 2005/06

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	<0.050	<0.050	Yes
Boolarra	Monthly	12	<0.050	<0.050	Yes
Briagolong	Monthly	12	<0.050	<0.050	Yes
Churchill	Monthly	12	<0.050	<0.050	Yes
Coongulla & Glenmaggie	Monthly	12	<0.050	<0.050	Yes
Cowwarr	Monthly	12	<0.050	<0.050	Yes
Drouin	Monthly	12	<0.050	<0.050	Yes
Erica	Monthly	12	<0.050	<0.050	Yes
Glengarry	Monthly	12	<0.050	<0.050	Yes
Heyfield	Monthly	12	<0.050	<0.050	Yes
Jumbuk	Monthly	12	<0.050	<0.050	Yes
Maffra	Monthly	12	<0.050	<0.050	Yes
Mirboo North	Monthly	12	<0.050	<0.050	Yes
Moe	Monthly	12	<0.050	<0.050	Yes
Morwell	Monthly	12	<0.050	<0.050	Yes
Neerim South	Monthly	12	<0.050	<0.050	Yes
Newborough	Monthly	12	<0.050	<0.050	Yes
Noojee	Monthly	12	<0.050	<0.050	Yes
Rawson	Monthly	12	<0.050	<0.050	Yes
Rokeby & Buln Buln	Monthly	12	<0.050	<0.050	Yes
Rosedale	Monthly	12	<0.050	<0.050	Yes
Sale/Wurruk	Monthly	12	<0.050	<0.050	Yes
Seaspray	Monthly	12	<0.050	<0.050	Yes
Stratford	Monthly	12	<0.050	<0.050	Yes
Thorpdale	Monthly	12	<0.050	<0.050	Yes
Toongabbie	Monthly	12	<0.050	<0.050	Yes
Trafalgar	Monthly	12	<0.050	<0.050	Yes
Traralgon	Monthly	12	<0.050	<0.050	Yes

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Traralgon South & Hazelwood North	Monthly	12	<0.050	<0.050	Yes
Tyers	Monthly	12	<0.050	<0.050	Yes
Warragul	Monthly	12	<0.050	<0.050	Yes
Warragul South Nilma & Darnum	Monthly	12	<0.050	<0.050	Yes
Willow Grove	Monthly	12	<0.050	<0.050	Yes
Yallourn North	Monthly	12	<0.050	<0.050	Yes
Yarragon	Monthly	12	<0.050	<0.050	Yes
Yinnar	Monthly	12	<0.050	<0.050	Yes

3.2.1.1 Actions taken in relation to non-compliance

All towns experienced low levels for chloroacetic acid and therefore there were no non-compliance issues to report.

3.2.2 Dichloroacetic acid results

For compliance with the *Safe Drinking Water Regulations 2005*, a sample result must not exceed 0.100 mg/L dichloroacetic acid. Results of <0.020 mg/L are at the detection limit for the parameter.

Table 5: Dichloroacetic acid results for all towns 2005/06

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	<0.020	<0.020	Yes
Boolarra	Monthly	12	<0.020	<0.020	Yes
Briagolong	Monthly	12	<0.020	<0.020	Yes
Churchill	Monthly	12	<0.020	<0.020	Yes
Coongulla & Glenmaggie	Monthly	12	<0.020	<0.020	Yes
Cowwarr	Monthly	12	<0.020	<0.020	Yes
Drouin	Monthly	12	<0.020	<0.020	Yes
Erica	Monthly	12	0.098	<0.020	Yes
Glengarry	Monthly	12	<0.020	<0.020	Yes
Heyfield	Monthly	12	<0.020	<0.020	Yes
Jumbuk	Monthly	12	<0.020	<0.020	Yes
Maffra	Monthly	12	<0.020	<0.020	Yes
Mirboo North	Monthly	12	<0.020	<0.020	Yes
Moe	Monthly	12	<0.020	<0.020	Yes
Morwell	Monthly	12	<0.020	<0.020	Yes
Neerim South	Monthly	12	<0.020	<0.020	Yes
Newborough	Monthly	12	<0.020	<0.020	Yes
Noojee	Monthly	12	<0.020	<0.020	Yes
Rawson	Monthly	12	0.110	<0.020	No (refer 3.2.2.1)
Rokeby & Buln Buln	Monthly	12	<0.020	<0.020	Yes
Rosedale	Monthly	12	<0.020	<0.020	Yes
Sale/Wurruk	Monthly	12	<0.020	<0.020	Yes
Seaspray	Monthly	12	<0.020	<0.020	Yes
Stratford	Monthly	12	<0.020	<0.020	Yes

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Thorpdale	Monthly	12	<0.020	<0.020	Yes
Toongabbie	Monthly	12	<0.020	<0.020	Yes
Trafalgar	Monthly	12	<0.020	<0.020	Yes
Traralgon	Monthly	12	<0.020	<0.020	Yes
Traralgon South & Hazelwood North	Monthly	12	<0.020	<0.020	Yes
Tyers	Monthly	12	<0.020	<0.020	Yes
Warragul	Monthly	12	<0.020	<0.020	Yes
Warragul South Nilma & Darnum	Monthly	12	<0.020	<0.020	Yes
Willow Grove	Monthly	12	<0.020	<0.020	Yes
Yallourn North	Monthly	12	<0.020	<0.020	Yes
Yarragon	Monthly	12	<0.020	<0.020	Yes
Yinnar	Monthly	12	<0.020	<0.020	Yes

3.2.2.1 Actions taken in relation to non-compliance

As most of Gippsland Waters systems have full water treatment plants to remove the organic matter, there was only one system that experienced a non-conformance.

Rawson - March 2006

One sample taken within the year for dichloroacetic acid in Rawson was above the maximum allowable limit, with a reported level of 0.110 mg/L. The Erica/Rawson system has disinfection treatment of the raw water supply only, which typically has high organic content. A malfunction of the secondary disinfection unit caused a higher than normal level of chlorine to be dosed into the water system prior to sampling. As a result, elevated concentrations of disinfection by-products were formed downstream from the secondary disinfection unit. In response, chlorine dosing levels were reduced and tighter monitoring controls employed, resulting in disinfection by-product concentrations returning to typical levels.

3.2.3 Trichloroacetic acid results

For compliance with the *Safe Drinking Water Regulations 2005*, a sample result must not exceed 0.100 mg/L. Results of <0.020 mg/L are at the detection limit for the parameter.

Table 6: Trichloroacetic acid for all towns 2005/06

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	<0.020	<0.020	Yes
Boolarra	Monthly	12	<0.020	<0.020	Yes
Briagolong	Monthly	12	<0.020	<0.020	Yes
Churchill	Monthly	12	0.025	<0.020	Yes
Coongulla & Glenmaggie	Monthly	12	<0.020	<0.020	Yes
Cowwarr	Monthly	12	0.056	<0.020	Yes
Drouin	Monthly	12	0.022	<0.020	Yes
Erica	Monthly	12	0.120	0.054	No (refer 3.2.3.1)
Glengarry	Monthly	12	<0.020	<0.020	Yes
Heyfield	Monthly	12	<0.020	<0.020	Yes
Jumbuk	Monthly	12	0.036	<0.020	Yes
Maffra	Monthly	12	<0.020	<0.020	Yes
Mirboo North	Monthly	12	<0.020	<0.020	Yes
Moe	Monthly	12	<0.020	<0.020	Yes
Morwell	Monthly	12	<0.020	<0.020	Yes
Neerim South	Monthly	12	<0.020	<0.020	Yes
Newborough	Monthly	12	<0.020	<0.020	Yes
Noojee	Monthly	12	<0.020	<0.020	Yes
Rawson	Monthly	12	0.120	0.038	No (refer 3.2.3.1)
Rokeby & Buln Buln	Monthly	12	<0.020	<0.020	Yes
Rosedale	Monthly	12	<0.020	<0.020	Yes
Sale/Wurruk	Monthly	12	<0.020	<0.020	Yes
Seaspray	Monthly	12	<0.020	<0.020	Yes
Stratford	Monthly	12	<0.020	<0.020	Yes
Thorpdale	Monthly	12	<0.020	<0.020	Yes
Toongabbie	Monthly	12	0.049	<0.020	Yes
Trafalgar	Monthly	12	<0.020	<0.020	Yes
Traralgon	Monthly	12	<0.020	<0.020	Yes
Traralgon South & Hazelwood North	Monthly	12	0.022	<0.020	Yes
Tyers	Monthly	12	<0.020	<0.020	Yes
Warragul	Monthly	12	<0.020	<0.020	Yes
Warragul South Nilma & Darnum	Monthly	12	<0.020	<0.020	Yes
Willow Grove	Monthly	12	<0.020	<0.020	Yes
Yallourn North	Monthly	12	<0.020	<0.020	Yes
Yarragon	Monthly	12	0.021	<0.020	Yes
Yinnar	Monthly	12	0.025	<0.020	Yes

3.2.3.1 Actions taken in relation to non-compliance

Most of the fully treated water supplies experienced low levels for this parameter. However, the following towns did exceed this limit:

Erica and Rawson - September 2005, March 2006, and April 2006

Five separate incidents of elevated trichloroacetic acid were reported: two in Erica and three in Rawson during the 2005/06 monitoring period. These incidents occurred as a result of a disinfection unit malfunction, and the necessary higher disinfection levels required to achieve microbiological compliance in an untreated water supply with naturally high organic material. A new water treatment plant for this system is under construction and due to be completed in 2006-07. The water treatment plant will remove organic material from the water and significantly reduce the potential for formation of disinfection by-products.

3.2.4 Trihalomethanes (THM) results

For compliance with the *Safe Drinking Water Regulations 2005*, a sample result must not exceed 0.250 mg/L for trihalomethanes.

Table 7: Trihalomethanes results for all towns for 2005/06

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	0.053	0.007	Yes
Boolarra	Monthly	12	0.100	0.033	Yes
Briagolong	Monthly	12	0.045	0.008	Yes
Churchill	Monthly	12	0.150	0.025	Yes
Coongulla & Glenmaggie	Monthly	12	0.050	0.007	Yes
Cowwarr	Monthly	12	0.100	0.049	Yes
Drouin	Monthly	12	0.083	0.022	Yes
Erica	Monthly	12	0.280	0.120	No (refer 3.2. 4.1)
Glengarry	Monthly	12	0.120	0.045	Yes
Heyfield	Monthly	12	0.075	0.018	Yes
Jumbuk	Monthly	12	0.200	0.042	Yes
Maffra	Monthly	12	0.056	0.015	Yes
Mirboo North	Monthly	12	0.074	0.031	Yes
Moe	Monthly	12	0.078	0.048	Yes
Morwell	Monthly	12	0.082	0.024	Yes
Neerim South	Monthly	12	0.063	0.022	Yes
Newborough	Monthly	12	0.098	0.018	Yes
Noojee	Monthly	12	0.044	0.011	Yes
Rawson	Monthly	12	0.220	0.120	Yes
Rokeby & Buln Buln	Monthly	12	0.063	0.024	Yes
Rosedale	Monthly	12	0.130	0.024	Yes
Sale/Wurruk	Monthly	12	0.042	0.022	Yes
Seaspray	Monthly	12	0.110	0.061	Yes
Stratford	Monthly	12	0.069	0.028	Yes
Thorpdale	Monthly	12	0.100	0.034	Yes
Toongabbie	Monthly	12	0.072	0.046	Yes
Trafalgar	Monthly	12	0.095	0.048	Yes
Traralgon	Monthly	12	0.079	0.007	Yes
Traralgon South & Hazelwood North	Monthly	12	0.093	0.016	Yes

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Tyers	Monthly	12	0.140	0.043	Yes
Warragul	Monthly	12	0.090	0.026	Yes
Warragul South Nilma & Darnum	Monthly	12	0.092	0.029	Yes
Willow Grove	Monthly	12	0.002	0.002	Yes
Yallourn North	Monthly	12	0.086	0.038	Yes
Yarragon	Monthly	12	0.120	0.068	Yes
Yinnar	Monthly	12	0.120	0.038	Yes

3.2.4.1 Actions taken in relation to non-compliance

Most of the fully treated water supplies experienced low levels for this parameter. The following town did exceed this limit:

Erica - February 2006

One sample exceeded the THM limit of 0.250 mg/L (reported level was 0.280 mg/L). This non-conformance was due to elevated disinfection levels in an untreated water supply with naturally high organic material. A new water treatment plant for this system is under construction and due for completion in 2006-07. The water treatment plant will remove organic material from the water and significantly reduce the potential for formation of disinfection by-products.

3.3 OZONE BASED DISINFECTION BYPRODUCT CHEMICALS

Gippsland Water does not have any 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 *Safe Drinking Water Regulations 2005*, a sample result must not exceed a maximum of 0.20 mg/L aluminium (acid soluble) in drinking water.

3.4.1 Aluminium results

Table 8: Aluminium results for all towns in 2005/06

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	0.03	<0.02	Yes
Boolarra	Monthly	12	0.03	<0.02	Yes
Briagolong	Monthly	12	<0.02	<0.02	Yes
Churchill	Monthly	12	0.13	<0.02	Yes
Coongulla & Glenmaggie	Monthly	12	0.13	<0.02	Yes
Cowwarr	Monthly	12	0.34	<0.02	No (refer 3.4.2.1)
Drouin	Monthly	12	0.07	<0.02	Yes
Erica	Monthly	12	0.14	0.09	Yes
Glengarry	Monthly	12	0.04	<0.02	Yes
Heyfield	Monthly	12	<0.02	<0.02	Yes
Jumbuk	Monthly	12	0.15	<0.02	Yes
Maffra	Monthly	12	0.03	<0.02	Yes
Mirboo North	Monthly	12	<0.02	<0.02	Yes
Moe	Monthly	12	0.15	<0.02	Yes
Morwell	Monthly	12	0.14	0.03	Yes
Neerim South	Monthly	12	<0.02	<0.02	Yes
Newborough	Monthly	12	0.15	0.03	Yes
Noojee	Monthly	12	<0.02	<0.02	Yes
Rawson	Monthly	12	0.14	0.09	Yes
Rokeby & Buln Buln	Monthly	12	0.06	0.03	Yes
Rosedale	Monthly	12	0.06	<0.02	Yes
Sale/Wurruk	Monthly	12	0.03	<0.02	Yes
Seaspray	Monthly	12	<0.02	<0.02	Yes
Stratford	Monthly	12	0.07	<0.02	Yes
Thorpdale	Monthly	12	0.06	<0.02	Yes
Toongabbie	Monthly	12	0.28	<0.02	No (refer 3.4.2.1)
Trafalgar	Monthly	12	0.26	<0.02	No (refer 3.4.2.2)
Traralgon	Monthly	12	0.04	<0.02	Yes
Traralgon South & Hazelwood North	Monthly	12	0.08	<0.02	Yes
Tyers	Monthly	12	0.28	<0.02	No (refer 3.4.2.3)
Warragul	Monthly	12	0.06	0.03	Yes
Warragul South, Nilma &Darnum	Monthly	12	0.07	0.03	Yes
Willow Grove	Monthly	12	0.05	<0.02	Yes
Yallourn North	Monthly	12	0.13	0.03	Yes
Yarragon	Monthly	12	0.16	<0.02	Yes
Yinnar	Monthly	12	0.10	<0.02	Yes

3.4.2 Actions taken in relation to non-compliance

There were 3 water systems that experienced non-compliance for this parameter.

3.4.2.1 Toongabbie and Cowwarr -July 2005

One sample in each of these towns had reported aluminium levels above the compliance level of 0.20 mg/L (0.28 mg/L & 0.34 mg/L **total** aluminium respectively). Gippsland Water had historically tested potable water for total aluminium concentration. Under the *Safe Drinking Water Regulations 2005* (which came into effect in July 2005), compliance was to be measured against the concentration of acid soluble aluminium. The acid soluble determination is more reflective of the biologically available aluminium, whereas total aluminium includes all naturally occurring aluminium levels contained within the silts and sands suspended in the water supplies. After heavy rainfall, the total aluminium levels had increased in the Toongabbie and Cowwarr systems. Investigations proved that Gippsland Water had over-reported the aluminium concentrations (as total aluminium) up to September 2005, and subsequently changed to the required acid soluble aluminium determinations from the October 2005 sampling period onwards. Trials performed on similar samples indicated that the acid soluble concentrations would most likely have met acid soluble guideline limits.

3.4.2.2 Trafalgar - March 2006

One sample indicated an aluminium level of 0.26 mg/L. The cause was unknown.

3.4.2.3 Tyers - December 2005

One sample had a reportable level of 0.28 mg/L. Laboratory data indicated high acid soluble aluminium levels in water from the Tyers Water Treatment Plant during trials to maximise treated water production. Investigations identified a discrepancy between in-house aluminium monitoring and laboratory data. All in-house testing equipment has since been calibrated, with quality assurance checks performed as part of a regular program. Aluminium levels reduced once the Tyers Water Treatment Plant returned to normal operation.

3.5 TURBIDITY RESULTS

For compliance with the *Safe Drinking Water Regulations 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).

Table 9: Turbidity results for all towns in 2005/06

Locality	Frequency of Sampling	No. of Samples	Max (NTU)	Min (NTU)	95% UCL of mean	Complying (Yes/No)
Boisdale	Weekly	52	0.5	0.1	0.26	Yes
Boolarra	Weekly	52	3.5	0.1	0.43	Yes
Briagolong	Weekly	52	0.6	0.1	0.25	Yes
Churchill	Weekly	52	0.5	0.1	0.23	Yes
Coongulla & Glenmaggie	Weekly	52	0.4	0.1	0.30	Yes
Cowwarr	Weekly	52	6.8	0.1	1.93	Yes
Drouin	Weekly	52	0.9	0.1	0.26	Yes
Erica	Weekly	52	1.8	0.5	0.93	Yes
Glengarry	Weekly	52	0.3	0.1	0.18	Yes
Heyfield	Weekly	52	1.5	0.1	0.29	Yes
Jumbuk	Weekly	52	0.7	0.1	0.24	Yes

Locality	Frequency of Sampling	No. of Samples	Max (NTU)	Min (NTU)	95% UCL of mean	Complying (Yes/No)
Maffra	Weekly	52	0.3	0.1	0.19	Yes
Mirboo North	Weekly	52	0.4	0.1	0.20	Yes
Moe	Weekly	52	2.7	0.2	0.48	Yes
Morwell	Weekly	52	0.4	0.1	0.20	Yes
Neerim South	Weekly	52	0.5	0.1	0.23	Yes
Newborough	Weekly	52	1.1	0.1	0.40	Yes
Noojee	Weekly	52	3.2	0.2	0.44	Yes
Rawson	Weekly	52	10.0	0.5	1.33	Yes
Rokeby & Buln Buln	Weekly	52	0.5	0.1	0.24	Yes
Rosedale	Weekly	52	0.5	0.1	0.22	Yes
Sale/Wurruk	Weekly	52	0.4	0.1	0.20	Yes
Seaspray	Weekly	51 (a)	2.7	0.1	0.71	Yes
Stratford	Weekly	52	3.5	0.1	0.38	Yes
Thorpdale	Weekly	52	0.9	0.1	0.39	Yes
Toongabbie	Weekly	52	4.4	0.1	1.70	Yes
Trafalgar	Weekly	52	3.1	0.1	0.56	Yes
Traralgon	Weekly	52	0.3	0.1	0.16	Yes
Traralgon South & Hazelwood North	Weekly	52	0.3	0.1	0.21	Yes
Tyers	Weekly	52	1.1	0.1	0.24	Yes
Warragul	Weekly	52	0.6	0.1	0.25	Yes
Warragul South Nilma & Darnum	Weekly	52	0.5	0.1	0.23	Yes
Willow Grove	Weekly	52	0.3	0.1	0.20	Yes
Yallourn North	Weekly	52	0.6	0.2	0.38	Yes
Yarragon	Weekly	52	0.8	0.1	0.36	Yes
Yinnar	Weekly	52	1.1	0.1	0.25	Yes

(a) In the final week of March 2006, an error occurred where a turbidity sample for the locality of Seaspray was inadvertently missed. Corrective action was too late to remedy the fault within the required weekly sampling frequency. 51 samples, rather than the required 52 samples were taken in Seaspray in the 2005-06 period. This incident was reported to DHS.

3.5.1.1 Actions taken in relation to non-compliance

No non-compliance issues to report.

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

3.6.1 Overall results

During the 2005/06 reporting period, Gippsland Water monitored for the following health related aspects of the drinking water supplied to customer taps. The information provided lists the parameters and the frequency of samples taken. The results are compared to the *2004 Australian Drinking Water Guidelines* (ADWG) and Table 10 below identifies the recommended value. All of the parameters listed, were reported below the respective recommended value.

Table 10: Other sampled parameter results for all towns in 2005/06

Parameter	Frequency of sampling	No. samples	Results above ADWG values		
			Recommended value	Result	Locality
Ammonia	Weekly (2 Localities)	103	≤ 0.5 mg/L	All results were less than the recommended value	
Nitrite	Weekly (2 Localities)	103	≤ 3 mg/L		
Nitrate	Quarterly	144	≤ 50 mg/L		
Mercury	Quarterly	144	≤ 0.02 mg/L		
Chromium	Quarterly	144	≤ 0.05 mg/L		
Cadmium	Quarterly	144	≤ 0.002 mg/L		
Sulphate	Quarterly	144	≤ 250 mg/L		
Arsenic	Quarterly (2 Localities)	7	≤ 0.007 mg/L		
Selenium	Quarterly (2 Localities)	7	≤ 0.01 mg/L		
Nickel	Annual	36	≤ 0.001 mg/L		
Zinc	Annual	36	≤ 3 mg/L		

All 'recommended values' in the above table are health limits as stated in the ADWG.

3.6.2 Manganese

Manganese can be present in either soluble or insoluble form in water. When concentrations exceed 0.1mg/L, manganese can create unacceptable tastes in the water, as well as stain fixtures and laundry. For all the localities, the reported managanese levels were below this level.

Table 11: Manganese results for all towns in 2005/06 (Compliance <0.10 mg/L)

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying ** (Yes/No)
Boisdale	Monthly	12	0.002	<0.001	Yes
Boolarra	Monthly	12	0.015	<0.001	Yes
Briagolong	Monthly	12	0.002	<0.001	Yes
Churchill	Monthly	12	0.004	<0.001	Yes
Coongulla & Glenmaggie	Monthly	12	0.009	0.002	Yes
Cowwarr	Monthly	12	0.006	<0.001	Yes
Drouin	Monthly	12	0.002	<0.001	Yes
Erica	Monthly	12	0.008	<0.001	Yes
Glengarry	Monthly	12	0.007	<0.001	Yes
Heyfield	Monthly	12	0.008	0.001	Yes
Jumbuk	Monthly	12	0.002	<0.001	Yes

Maffra	Monthly	12	0.064	<0.001	Yes
Mirboo North	Monthly	12	0.001	<0.001	Yes
Moe	Monthly	12	0.006	<0.001	Yes
Morwell	Monthly	12	0.009	<0.001	Yes
Neerim South	Monthly	12	0.006	<0.001	Yes
Newborough	Monthly	12	0.003	<0.001	Yes
Noojee	Monthly	12	0.014	0.002	Yes
Rawson	Monthly	12	0.009	<0.001	Yes
Rokeby & Buln Buln	Monthly	12	0.002	<0.001	Yes
Rosedale	Monthly	12	0.006	<0.001	Yes
Sale/Wurruk	Monthly	12	0.002	<0.001	Yes
Seaspray	Monthly	12	0.045	<0.001	Yes
Stratford	Monthly	12	0.006	<0.001	Yes
Thorpdale	Monthly	12	0.030	0.005	Yes
Toongabbie	Monthly	12	0.008	<0.001	Yes
Trafalgar	Monthly	12	0.017	0.001	Yes
Traralgon	Monthly	12	0.001	<0.001	Yes
Traralgon South & Hazelwood North	Monthly	12	0.001	<0.001	Yes
Tyers	Monthly	12	0.006	<0.001	Yes
Warragul	Monthly	12	0.002	<0.001	Yes
Warragul South Nilma & Darnum	Monthly	12	<0.001	<0.001	Yes
Willow Grove	Monthly	12	0.021	0.001	Yes
Yallourn North	Monthly	12	0.003	<0.001	Yes
Yarragon	Monthly	12	0.009	<0.001	Yes
Yinnar	Monthly	12	0.002	<0.001	Yes

** Compliance as measured against the aesthetic guideline values in ADWG.

3.6.3 Lead

Lead can be present in drinking water as a result of dissolution from natural sources or from household plumbing. Based on heath considerations, concentrations of lead in drinking water should not exceed 0.01mg/L. For the reporting period, all sample results were below this level.

Table 12: Lead results for all towns in 2005/06 (Compliance <0.01 mg/L)

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying # # (Yes/No)
Boisdale	Monthly	12	<0.002	<0.001	Yes
Boolarra	Monthly	12	<0.001	<0.001	Yes
Briagolong	Monthly	12	<0.002	<0.001	Yes
Churchill	Monthly	12	<0.002	<0.001	Yes
Coongulla & Glenmaggie	Monthly	12	<0.002	<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
Glengarry	Monthly	12	<0.001	<0.001	Yes
Heyfield	Monthly	12	<0.001	<0.001	Yes
Jumbuk	Monthly	12	<0.002	<0.001	Yes
Maffra	Monthly	12	<0.002	<0.001	Yes
Mirboo North	Monthly	12	0.001	<0.001	Yes

Moe	Monthly	12	<0.002	<0.001	Yes
Morwell	Monthly	12	<0.001	<0.001	Yes
Neerim South	Monthly	12	<0.002	<0.001	Yes
Newborough	Monthly	12	<0.002	<0.001	Yes
Noojee	Monthly	12	<0.002	<0.001	Yes
Rawson	Monthly	12	<0.001	<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	<0.002	<0.001	Yes
Stratford	Monthly	12	<0.002	<0.001	Yes
Thorpdale	Monthly	12	<0.001	<0.001	Yes
Toongabbie	Monthly	12	<0.001	<0.001	Yes
Trafalgar	Monthly	12	<0.001	<0.001	Yes
Traralgon	Monthly	12	<0.002	<0.001	Yes
Traralgon South & Hazelwood North	Monthly	12	<0.001	<0.001	Yes
Tyers	Monthly	12	<0.001	<0.001	Yes
Warragul	Monthly	12	<0.002	<0.001	Yes
Warragul South Nilma & Darnum	Monthly	12	<0.002	<0.001	Yes
Willow Grove	Monthly	12	<0.002	<0.001	Yes
Yallourn North	Monthly	12	<0.001	<0.001	Yes
Yarragon	Monthly	12	<0.001	<0.001	Yes
Yinnar	Monthly	12	<0.002	<0.001	Yes

Compliance as measured against the health related guideline values in ADWG.

3.6.4 Arsenic

Arsenic is a naturally occurring element and its origin can come from dissolution of minerals and ores. Based on health considerations, the concentration of arsenic in drinking water should not exceed 0.007 mg/L. Arsenic is usually removed from drinking water by conventional treatment process, so arsenic measurements were usually performed on raw water samples only. Arsenic was sampled at the customer taps for Toongabbie and Boisdale as these systems had no formal water treatment. All samples were reported below the compliance level.

Table 13: Arsenic results for all towns in 2005/06 (Compliance <0.007 mg/L)

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying ## (Yes/No)
Boisdale	Quarterly	4	<0.001	<0.001	Yes
Toongabbie	Quarterly	3	0.001	<0.001	Yes

Compliance as measured against the health related guideline values in ADWG

3.6.5 Fluoride

Fluoride testing has been performed in the towns (Maffra, Stratford and Drouin) where fluoride is added to the water artificially. The level of fluoride is monitored in house by online instrumentation as well as field measurements on a daily or weekly basis. Based on health considerations, the concentration of fluoride in drinking water should not exceed 1.5 mg/L. In the reporting period of 2005/06, all results for fluoride that were processed by an independent laboratory from these towns were below this concentration.

Table 14: Fluoride results for all towns in 2005/06 (Compliance <1.5 mg/L)

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying # # (Yes/No)
Drouin	Quarterly	4	0.98	0.80	Yes
Maffra	Quarterly	4	1.20	<0.10	Yes
Stratford	Quarterly	4	0.90	0.60	Yes

Compliance as measured against the health related guideline values in ADWG

No other parameters of concern have been detected at customer taps that require reporting in this area.

3.7 AESTHETICS

3.7.1 Taste and odour

Due to the ongoing algal bloom in the Macalister River System (February 2005 – onwards), potable water supplies for Coongulla/Glenmaggie and Maffra were reported to experience earthy and /or musty odours. These odours are caused by the microbial metabolites of Geosmin, and 2-methlyisoborneol (MIB). These compounds can cause concern to the customer as they have extremely low threshold concentrations and can persist through conventional water treatment process. Threshold concentrations for Geosmin and MIB are approximately 4 and 9 ng/L respectively. These compounds are generally removed by an additional process of activated carbon treatment at the water treatment. Extra monitoring was performed to determine the total number and type of algae present in the raw water, as well as the levels of the taste and odour compounds to determine the level of risk to the water supply. Figure 2 and 3 demonstrates the algae levels and Geosmin levels experienced in the Maffra and Coongulla raw water supply. Monitoring of algae and Geosmin levels in the treated water leaving the water treatment plant was also performed but both levels were extremely low and therefore not represented in graph form.

Figure 2 Total algae results for Maffra, Coongulla & Glenmaggie raw water– February to June 2006

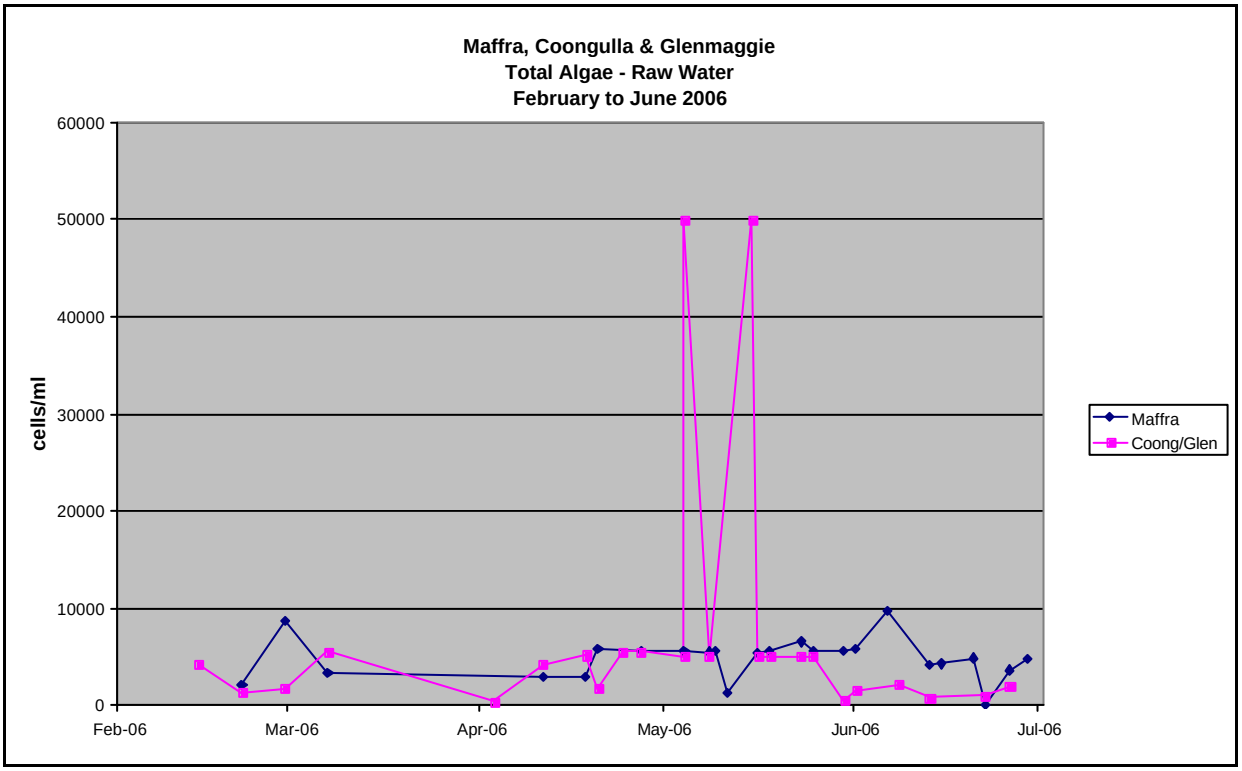
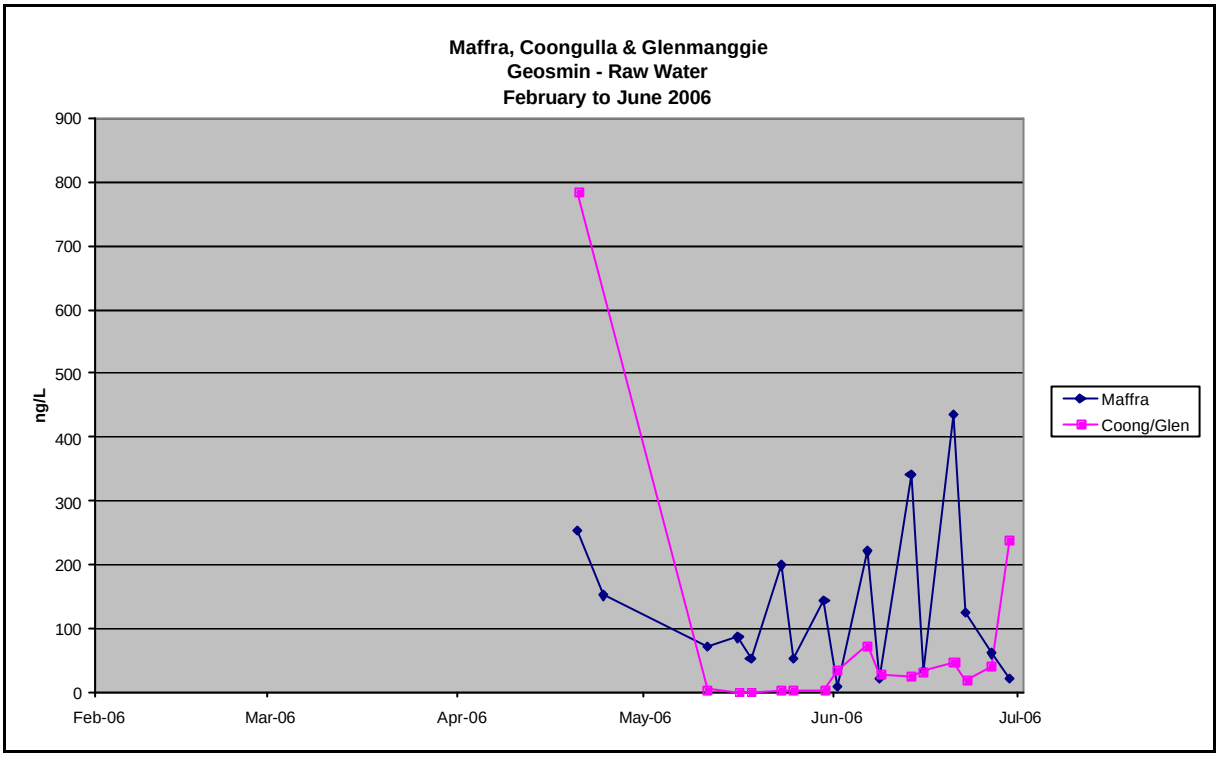


Figure 3 Geosmin results for Maffra, Coongulla & Glenmaggie – February to June 2006



3.7.2 Iron

Iron has a taste threshold of about 0.3 mg/L and with higher concentrations, the water may become discoloured and stain laundry. Based on aesthetic considerations, the recommended levels should be below 0.3 mg/L. There is no health limit determined for iron (ADWG).

Table 15: Iron concentration exceedances above ADWG values for 2005/06

Parameter	Frequency of Sampling	No. Samples	Results above ADWG values		
			Recommended Value	Result	Locality
Iron	Monthly	432	≤ 0.3 mg/L	0.4 mg/L	Yinnar*

*All other samples were below the Recommended Value of < 0.3 mg/L

3.7.3 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. Most of the sample results were between these figures except where long residence times are experienced in the reticulation, such as those experienced at some sampling points in Cowwarr, Erica, Rawson, Morwell, Noojee, Rokeby Buln Buln, Warragul, resulted in higher pH levels at times. Yarragon and Coongulla & Glenmaggie experience higher pH levels due to the presence of cement lined pipes. 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. The results for pH for all the towns are provided in Table 16.

Table 16: pH results for all towns in 2005/06

Locality	Frequency of Sampling	No. of Samples	Max (units)	Min (units)
Boisdale	Weekly	52	8.2	6.5
Boolarra	Weekly	52	7.7	6.7
Briagolong	Weekly	52	7.7	6.6
Churchill	Weekly	52	8.6	7.2
Coongulla & Glenmaggie	Weekly	52	9.2	7.3
Cowwarr	Weekly	52	8.7	6.7
Drouin	Weekly	52	7.3	6.6
Erica	Weekly	52	9.0	6.4
Glengarry	Weekly	52	8.6	6.9
Heyfield	Weekly	52	7.8	7.1
Jumbuk	Weekly	52	8.2	7.0
Maffra	Weekly	52	8.3	6.8
Mirboo North	Weekly	52	7.6	6.7
Moe	Weekly	52	7.6	6.4
Morwell	Weekly	52	8.7	6.7
Neerim South	Weekly	52	7.4	6.5
Newborough	Weekly	52	7.8	6.8
Noojee	Weekly	52	9.0	6.6
Rawson	Weekly	52	8.6	7.1
Rokeby & Buln Buln	Weekly	52	9.1	6.5
Rosedale	Weekly	52	8.8	7.2
Sale/Wurruk	Weekly	52	9.0	7.8
Seaspray	Weekly	52	7.8	6.7
Stratford	Weekly	52	8.4	7.2
Thorpdale	Weekly	52	8.3	7.1
Toongabbie	Weekly	52	7.8	6.4
Trafalgar	Weekly	52	8.7	6.9
Traralgon	Weekly	52	7.6	6.6
Traralgon South & Hazelwood North	Weekly	52	7.9	6.5
Tyers	Weekly	52	8.3	7.1
Warragul	Weekly	52	9.0	6.6
Warragul South, Nilma & Darnum	Weekly	52	8.9	6.9
Willow Grove	Weekly	52	7.8	6.7
Yallourn North	Weekly	52	7.7	6.5
Yarragon	Weekly	52	9.1	6.7
Yinnar	Weekly	52	8.2	7.2

3.8 ANALYSIS OF RESULTS

3.8.1 Comparison to previous years

The water quality parameters required under the SDW regulations have been represented as trend data over the previous two financial years. This information allows for a comparison of data for the major towns.

See Appendices for trend information on the major towns for each of the water quality reporting standards.

4 EMERGENCY / INCIDENT MANAGEMENT

4.1 EMERGENCY/INCIDENT MANAGEMENT

The following information relates to 15 (1) (c) of the regulations:
"information about actions taken by the water supplier in respect of each emergency, incident or event that has arisen that has affected-

- *the quality of the water supplied for drinking purposes generally; and*
- *the quality of water supplied where that supply posed a risk to human health."*

During the reporting year there were four reportable events that required notification to the Environmental Health Unit of DHS under section 22 of the *Safe Drinking Water Act 2003*. These events are summarised in Table 17.

Water quality testing performed in Toongabbie (October 2005) and Seaspray (February 2006) experienced positive *E.coli* results in potable water samples taken at the water entry site, and at a customer tap respectively. Gippsland Water staff reacted to each of these events by testing and flushing the water and both were resolved with in two days.

In late January 2006, the Moondarra bush fire threatened towns within the Gippsland Water region. During this event, the towns of Erica and Rawson were isolated with minimal access allowed by the fire managers. A voluntary 'boil water' event was implemented after discussions with DHS. This was because the high demand for water, the threat of possible power outages and the inability of operational staff to attend and replenish disinfectant supplies, created a risk of the disinfection system failing. Once the fire activity ceased and the reticulation water was tested for contamination, the boil water alert was lifted.

A blue green algae (BGA) outbreak that resulted in a regional bloom in Lake Glenmaggie and downstream Macalister River, caused the reporting of taste and odour complaints within the town of Coongulla/Glenmaggie. The levels of algae species reported in the raw water have fluctuated throughout the season, and resulted in ongoing taste and odours experienced in the raw water. Emergency supply of water was provided to the customers as a short-term solution, until extra activated carbon treatment at the water treatment plant was implemented to control the taste and odours. With little rainfall experienced in the area, the extra treatment strategy is ongoing.

4.1.1 A summary of actions taken

Please see Table 17 for actions taken in response to the reported incidents.

Table 17: 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
Toongabbie	26 Oct to 28 Oct 2005 2 days	Water Entry point	*E.coli* detected in the water entry sample for the Toongabbie water supply.	Toongabbie	Department Human Services (DHS) Notification under Section 22 SDWA 25 Oct 2005 Disinfection system fully operational during specified dates. Potential source of contamination was identified as chemical dosing pit flooded due to a faulty sub pump. Submersible pump repaired, water entry re-samples contained zero *E.coli*. Dosing pit sub pump routinely inspected as an ongoing action
Rawson & Erica	22 Jan 06 to 31 Jan 06 1.5 weeks	Reticulation	Bushfire activity in area	Rawson & Erica	Boil Water alert in Erica and Rawson due to the Moondarra bush fire event from the 22 Jan through to 31 Jan 2006. Due to bushfire activity in area, disinfection treatment was deemed to be unreliable due to power outages, high consumptions of water and operator inability to access facility
Seaspray	14 - 16 Feb 06 2 days	Lot 10 Panaroma Dve	4 org/100ml *E.coli*	Seaspray	Contamination associated with the high level area of Seaspray only due to bird access to the high level tank. Flushing of high level tank and high level reticulation system. Re-samples contained zero *E.coli* throughout entire Seaspray reticulation system. Tank roof repaired.
Coongulla/ Glenmaggie	18 Apr 06- Ongoing	Reticulation	18 April 06 Customer	Coongulla/ Glenmaggie	Sampling of reticulation by Water Quality Group confirmed earthy taste and odours.

Locality	Date and duration of incident	Location of incident	Nature of the incident	Drinking water supplies affected	Actions taken in response to the incident
Townships			complaints received reporting of offensive tastes and odours of the drinking water		Flushing of reticulation system performed to prevent water stagnation in reticulation system. Notifications received from Southern Rural Water confirm elevated Blue Green Algae levels in Lake Glenmaggie under Regional Algal Management Plan. Treated water remained fully compliant with public health requirements at all times during this period. Temporary water tanks were supplied within the townships of Coongulla and Glenmaggie as an alternative supply for the public while treatment process was enhanced. Enhanced filter treatment using Granular Activated Carbon (GAC) initiated at Coongulla Water Treatment Plant to assist in removal of taste and odour causing compounds associated with blue green algal bloom Ongoing twice weekly monitoring of algae, taste and odour causing compounds pre and post treatment process to confirm enhanced treatment effectiveness.

5 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.

6 COMPLAINTS

6.1 WATER QUALITY COMPLAINTS

A summary of customer complaints received by Gippsland Water relating to the quality of drinking water supplied is reported below in Table 18 and Figure 4. A summary of how Gippsland Water reacts to such complaints is provided below.

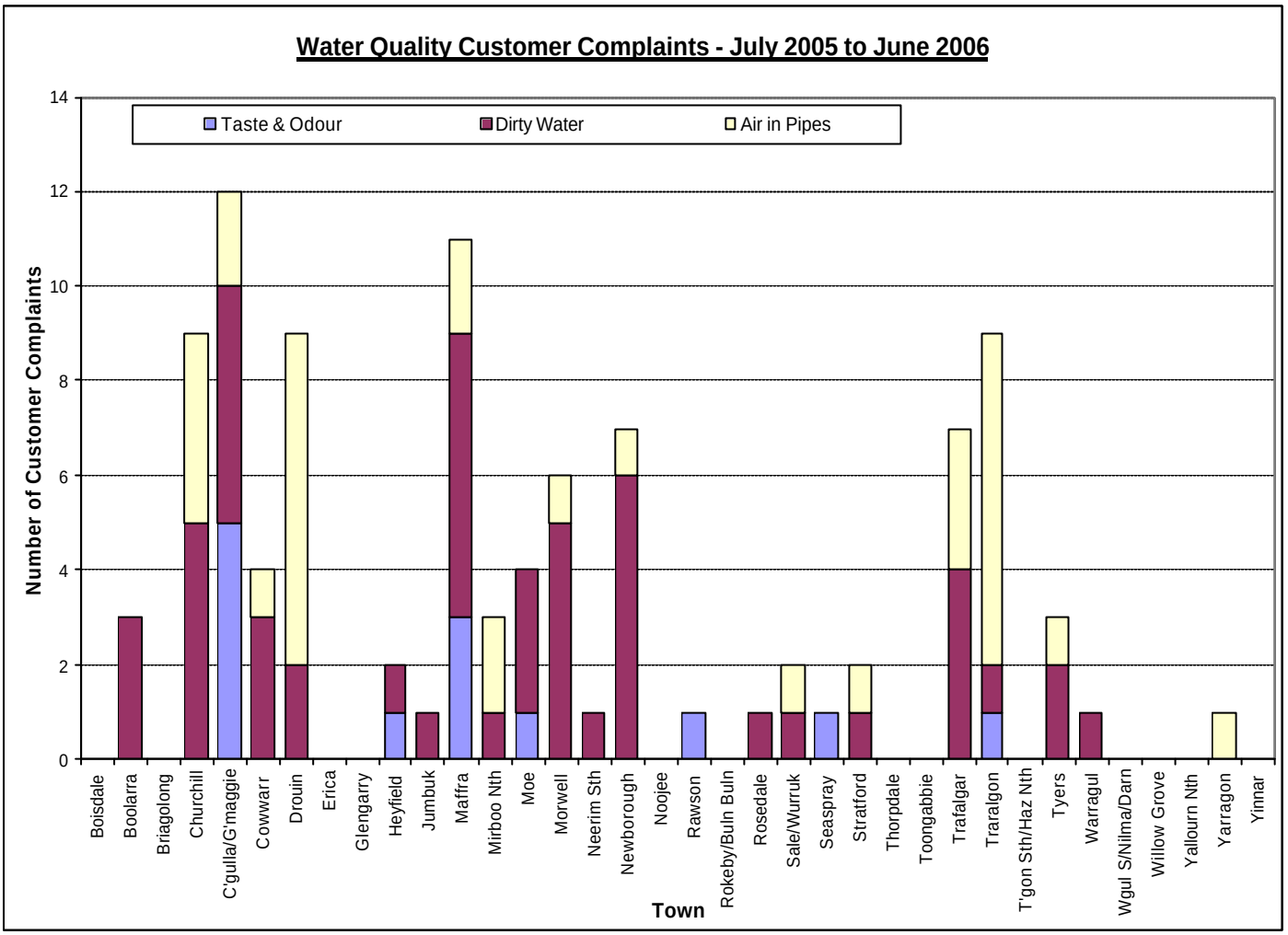
Gippsland Water records and reports on customer complaints relating to dirty water, taste and odour problems, and appearance of air-filled or "white" water received from the tap. Blue water complaints would be included in discoloured water category.

Within this reporting period, illness has not been captured as a separate category as there have been very few enquiries received through the year. Any such complaints are usually responded to directly and are generally not associated with water, rather customers seeking clarification and understanding that Gippsland Water does monitor the water quality, and that the water supply meets health requirements. Changes have been made to Gippsland Water's corporate data base to capture this category of complaint for future reports.

Table 18: Water quality complaints per 100 customers supplied

Type of Complaint	No. of Complaints	No. of complaints per 100 customers supplied
Discoloured water	53	0.086
Taste / odour	13	0.021
Blue Water	0	0
Air in Water	34	0.055
Illness	0	0
Other	0	0

Figure 4 Customer complaints summary for 2005/06



6.2 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 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.

In February 2006, Gippsland Water commissioned a Customer Satisfaction Survey which featured a section on customer satisfaction with water quality. Strong ratings were received for overall satisfaction with water quality (8.0 out of 10) with customers also indicating a high level of satisfaction with all attributes, including taste, smell, clarity, safety and water pressure (all rating at 8.1 and higher).

7 UNDERTAKING UNDER SECTION 30 OF THE ACT

7.1 CURRENT UNDERTAKING

During the reporting period, Gippsland Water was required to enter into an undertaking with DHS for the town of Erica and Rawson due to the non-compliance experienced for Trichloroacetic acid. Table 19 provides a summary of this undertaking.

Table 19 Erica Rawson Undertaking

Erica and Rawson **Undertaking Under Section 30 of the *Safe Drinking Water Act 2003***	
Contravention of the SDWA or Regulations	**Trichloroaceatic acid exceeding the SDWA limit of 0.100 mg/L**
Commencement date of Undertaking	**08/11/2005**
Details of the actions being taken to address the contravention and details of interim measures being undertaken.	Gippsland Water has been balancing the management of pathogen (*E.coli*) risk and levels of treatment byproducts in this system for a number of years. Unsatisfactory non conformance with these parameters over time is the key driver for the construction of a treatment plant. In the short term Gippsland Water has reviewed its management of the existing system and implemented a range of measures including: • closer control of chlorine dosing, • review of sampling, • improving fault response, • installation of mains power to chlorinator site (remove battery power) to reduce risk, • increased air scouring / pigging and flushing of the system, • installation of a disinfection contact tank to reduce chlorine demand, • improve mixing and lower the possibility of elevated chlorine residual treated water entering the reticulation system. It is hoped that these measures will be successful during this period. Medium Term (2007 onwards) Gippsland Water plans to have a new water treatment plant at Rawson to service both Erica and Rawson Townships with completion and full operation expected early 2007.
Summary of milestones completed.	Mains power connect to Parkers Corner chlorinator (disinfection site) Air scour and swabbing during August 2006 Majority of Water Treatment Plant construction completed and commissioning anticipated to commence October 2006
End date of undertaking	**31 March 2007**

8 FURTHER INFORMATION

For further information about the details of this report, or to make an enquiry related to water quality issues, please contact Gippsland Water on 1800 066 401 or visit **www.gippswater.com.au.**

9 REFERENCES

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

Department of Human Services *2005/2006 Annual Report format- Drinking Water Regulation Guidance Note*

Safe Drinking Water Act 2003 Act No.46/2003

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

APPENDIX A: E.COLI TRENDS

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 to June 2006 period, for each major water system for the drinking water quality standards.

Trends for *E.coli* were not produced due to the consistent reporting of <1 orgs/100ml. During the previous two report periods (2004-2005 and 2005-2006) Gippsland Water has only had two samples across all localities show *E.coli*:

Jumbuk – 14/12/2004 – 62 orgs/100ml
Seaspray – 14/02/2006 – 4 orgs/100ml

APPENDIX B: TURBIDITY TRENDS

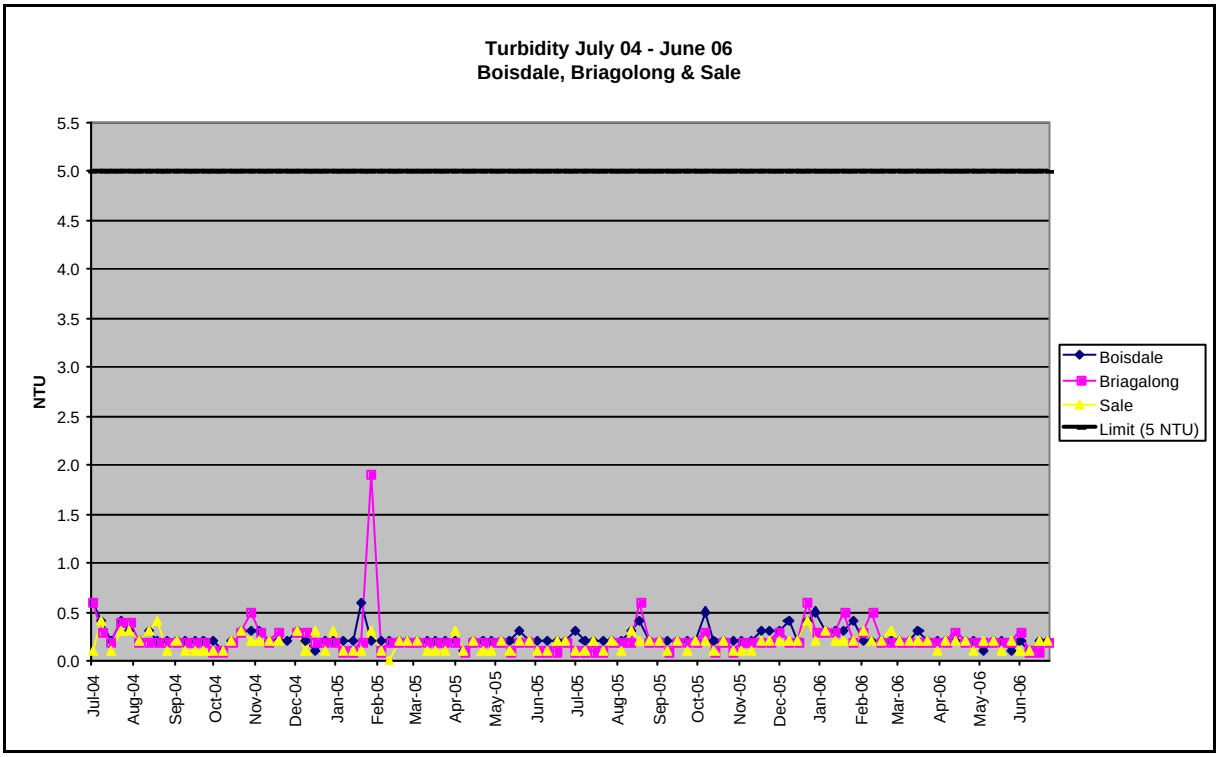
To allow for a comparison of information, data and results relating to the quality of water supplied, trend graphs have been provided from the July 2004 to June 2006 period, for each major water system for the drinking water quality standards.

Turbidity in all supplies is consistently well below the regulatory limit, with the exception of one extreme result in the Rawson supply in September 2005. This was attributed to changing raw water quality. GW is working to resolve this issue by constructing a new water treatment plant, which is due to be operational by early 2007.

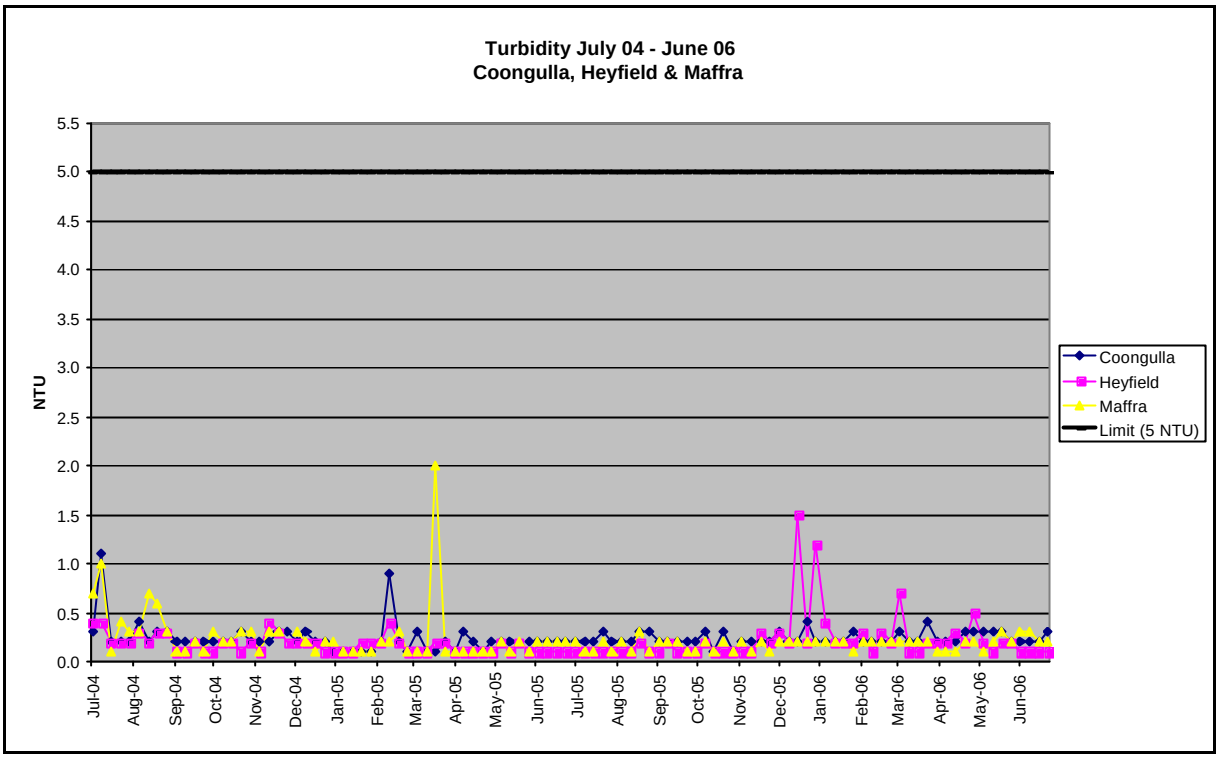
Occasional low level spikes in turbidity are seen in all supplies, and these a typically associated with variances experienced in reticulation samples.

These trend graphs also indicate the positive improvement in the Toongabbie system after April 2006 when it was connected to the fully treated Tyers system.

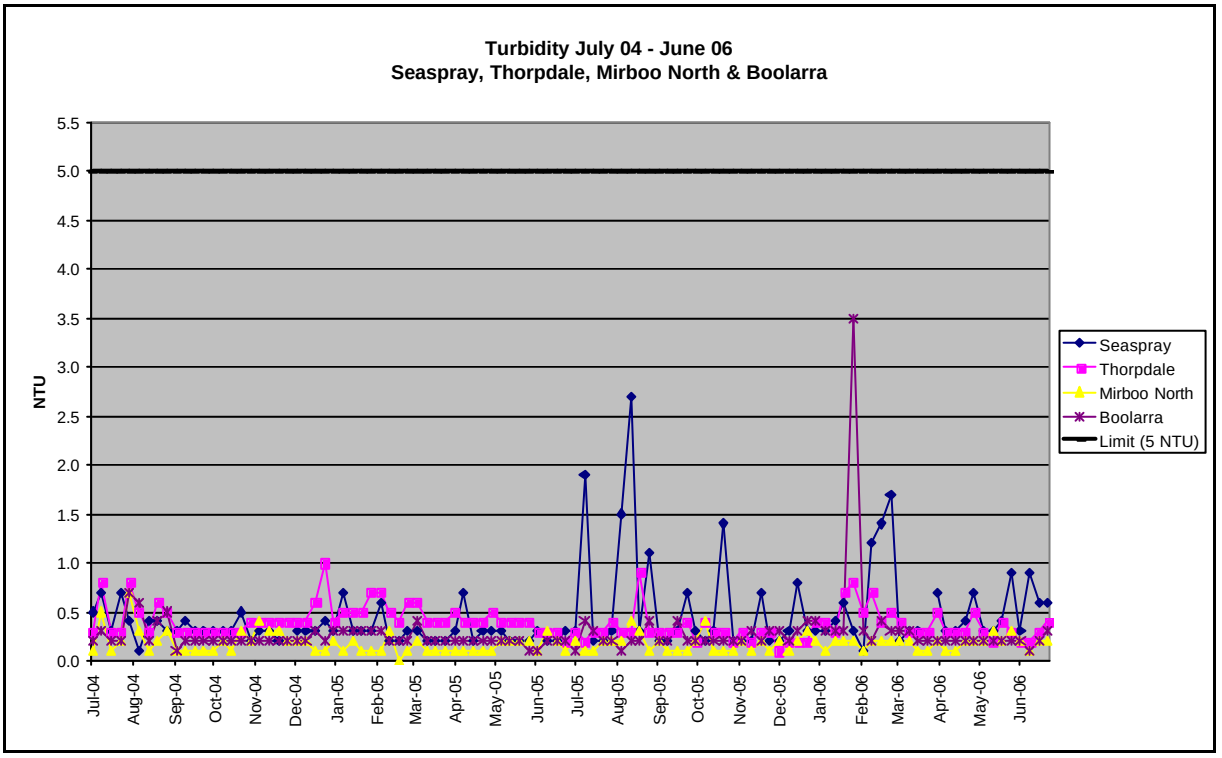
Boisdale, Briagolong, and Sale



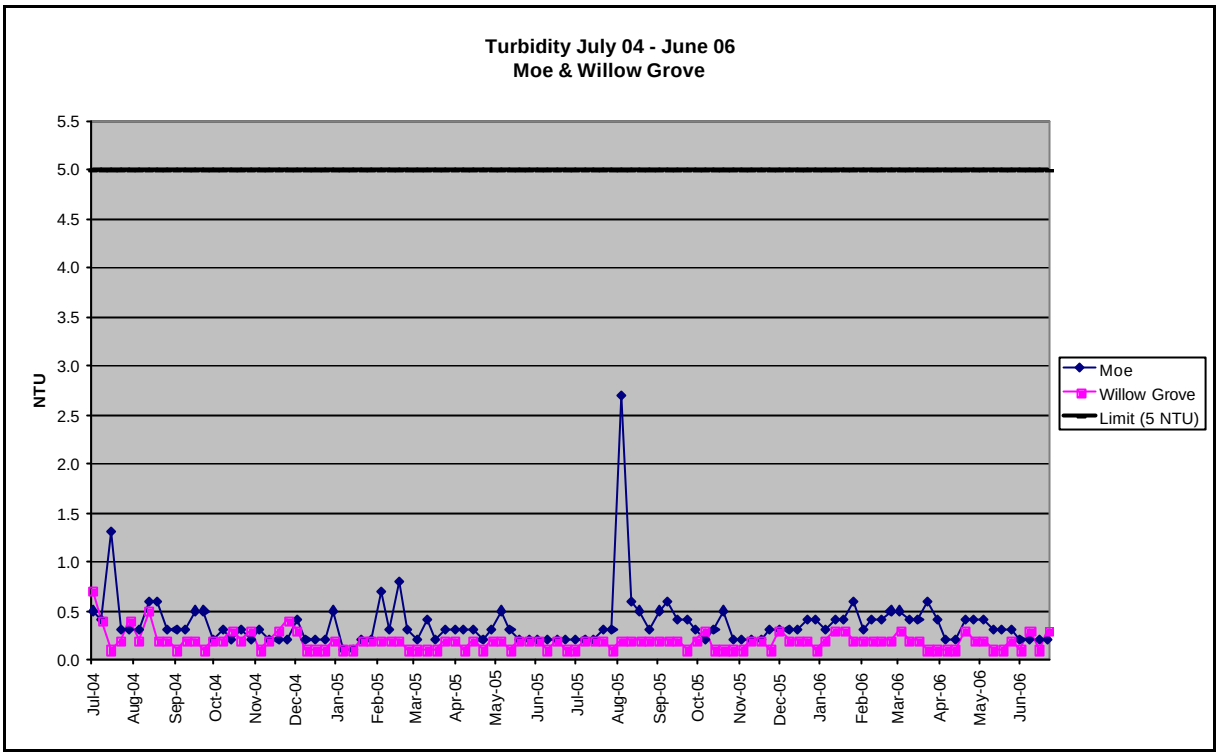
Coongulla, Heyfield, and Maffra



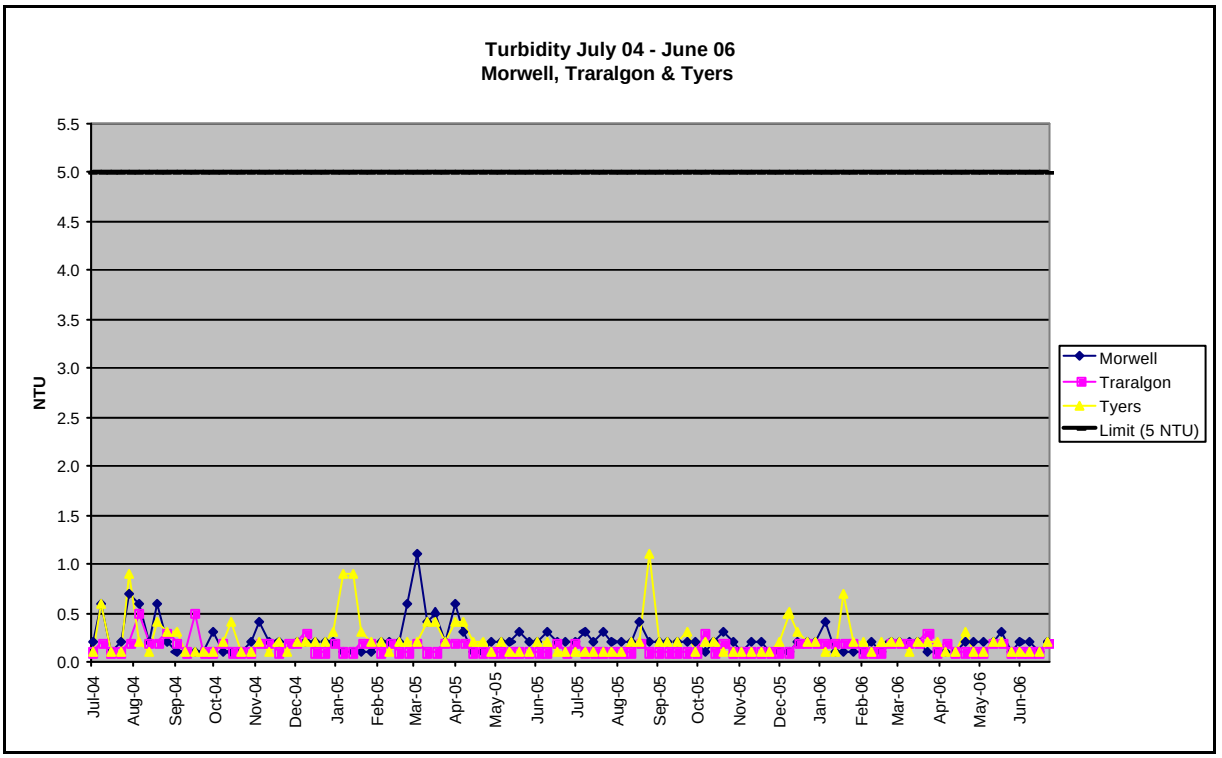
Seaspray, Thorpdale, Mirboo North, and Boolarra



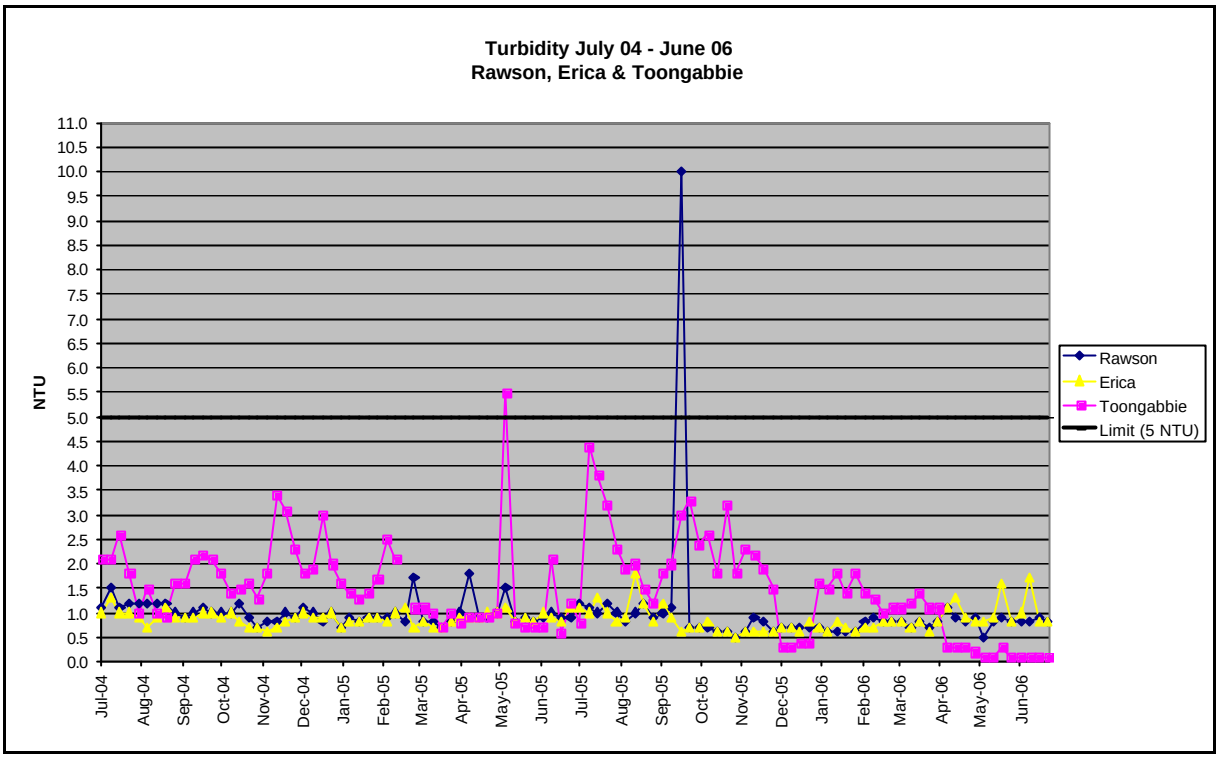
Moe and Willow Grove



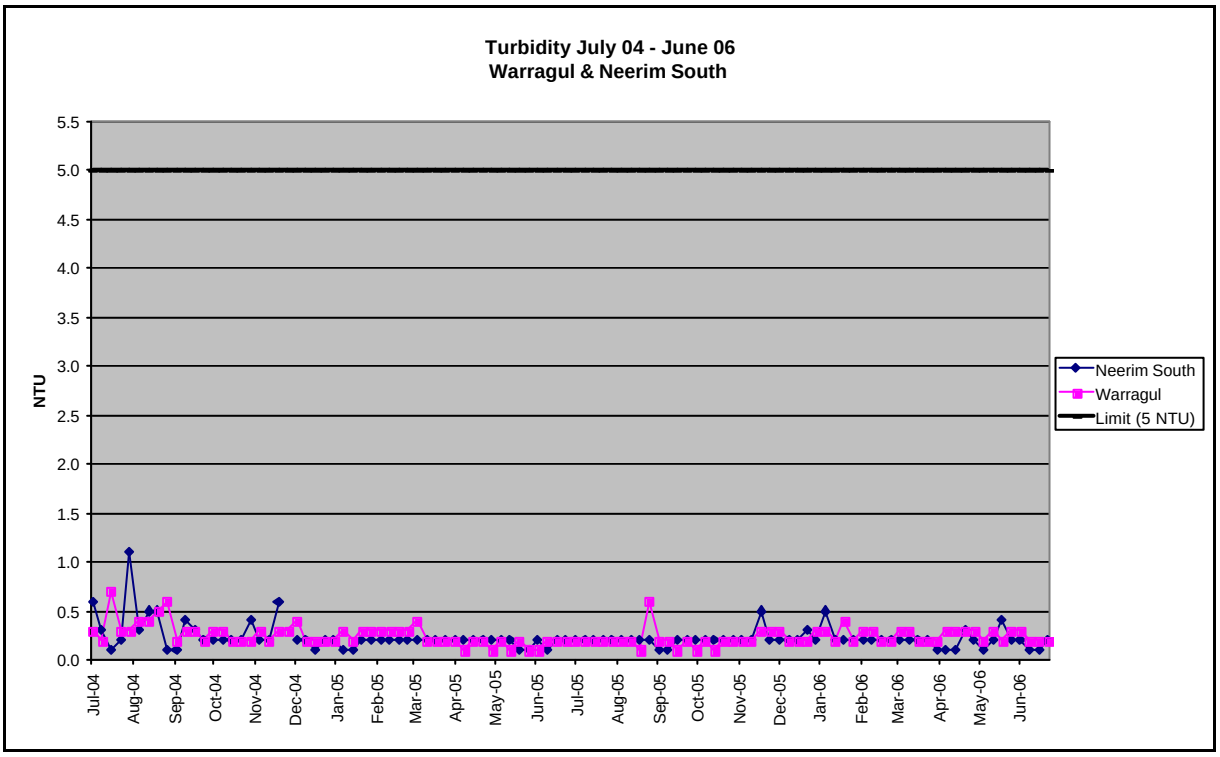
Morwell, Traralgon, and Tyers



Rawson, Erica and Toongabbie



Warragul and Neerim South

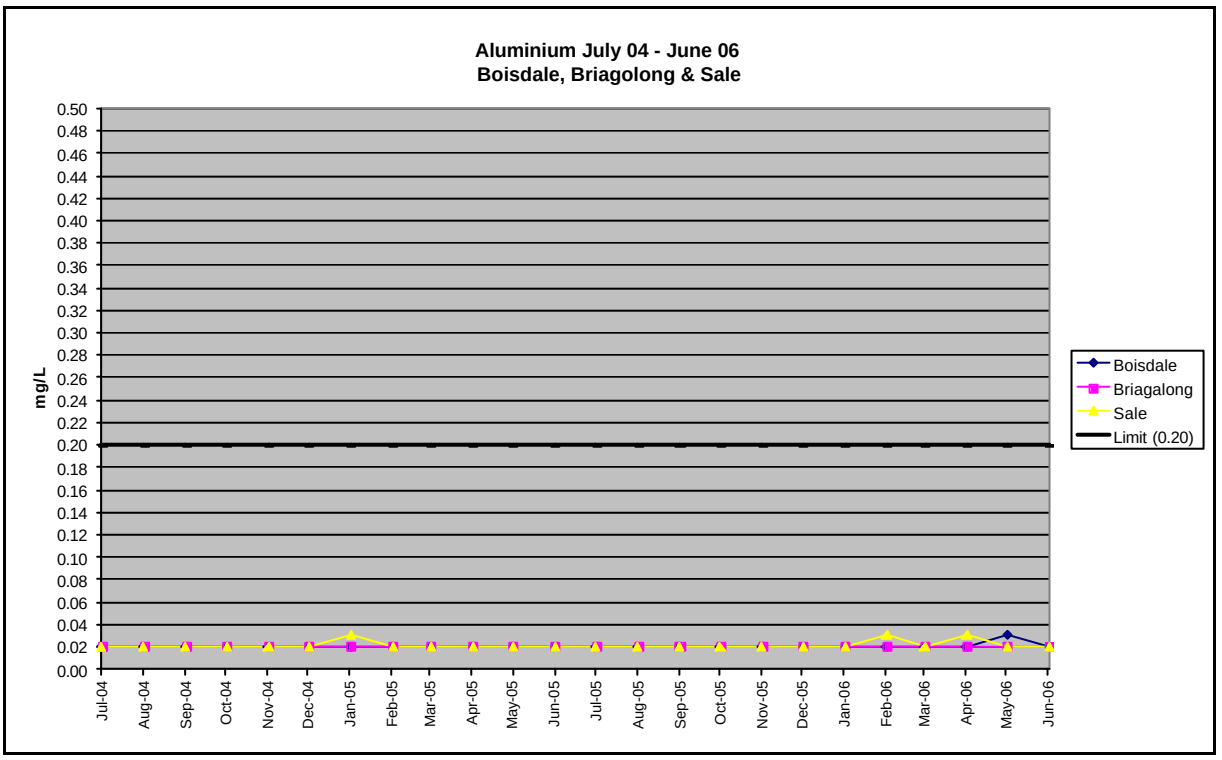


APPENDIX C: ALUMINIUM TRENDS

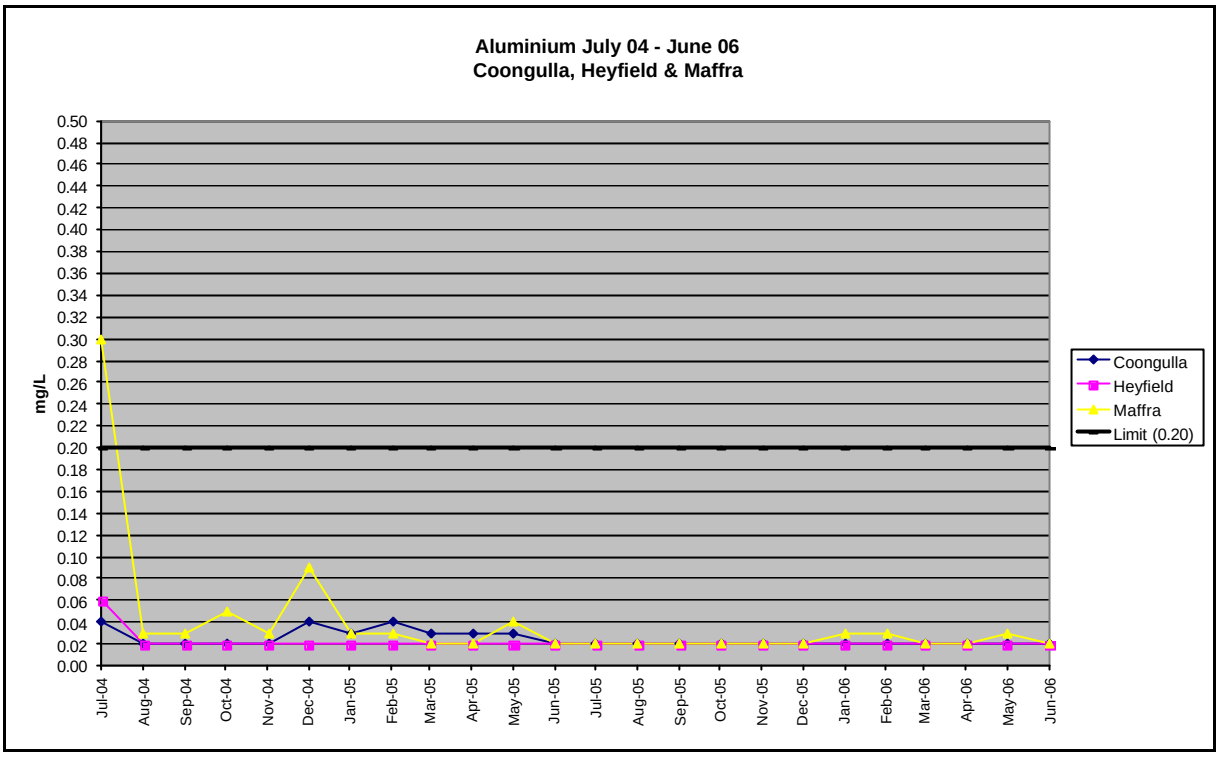
To allow for a comparison of information, data and results relating to the quality of water supplied, trend graphs have been provided from the July 2004 to June 2006 period, for each major water system for the drinking water quality standards.

As mentioned in Section 3.4.2.1, prior to October 2005, total aluminium was routinely measured, and not acid soluble aluminium which is what the regulatory limit is based on. Several localities had experienced spikes of total aluminium above the regulatory limit, but it is likely that the acid soluble fraction was below the regulatory limit. This was the case for the spike experienced in the Toongabbie system when the raw water quality changed after heavy rainfall. The Tyers supply experienced a spike above the limit (see section 3.4.2.3) due to the Tyers WTP being trialled at a maximum capacity run period, and an excess of dosing resulted in residual aluminium reported.

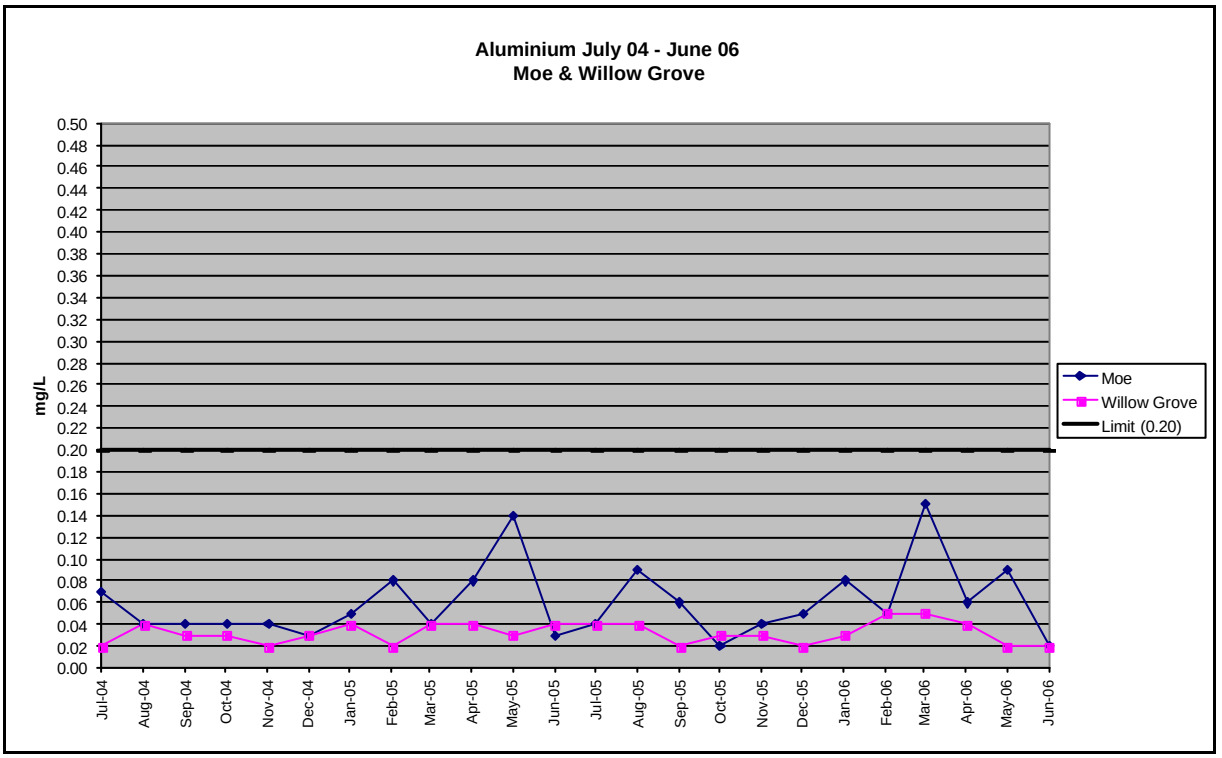
Boisdale, Briagolong, and Sale



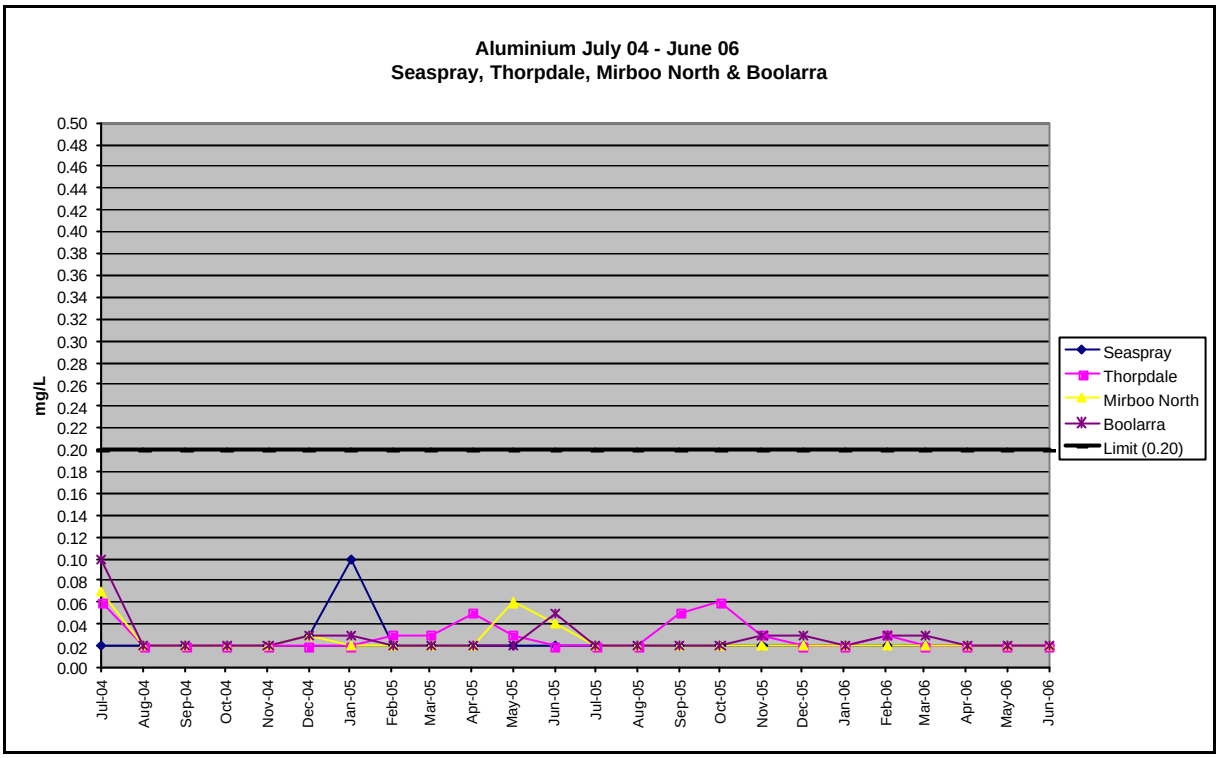
Coongulla, Heyfield, and Maffra



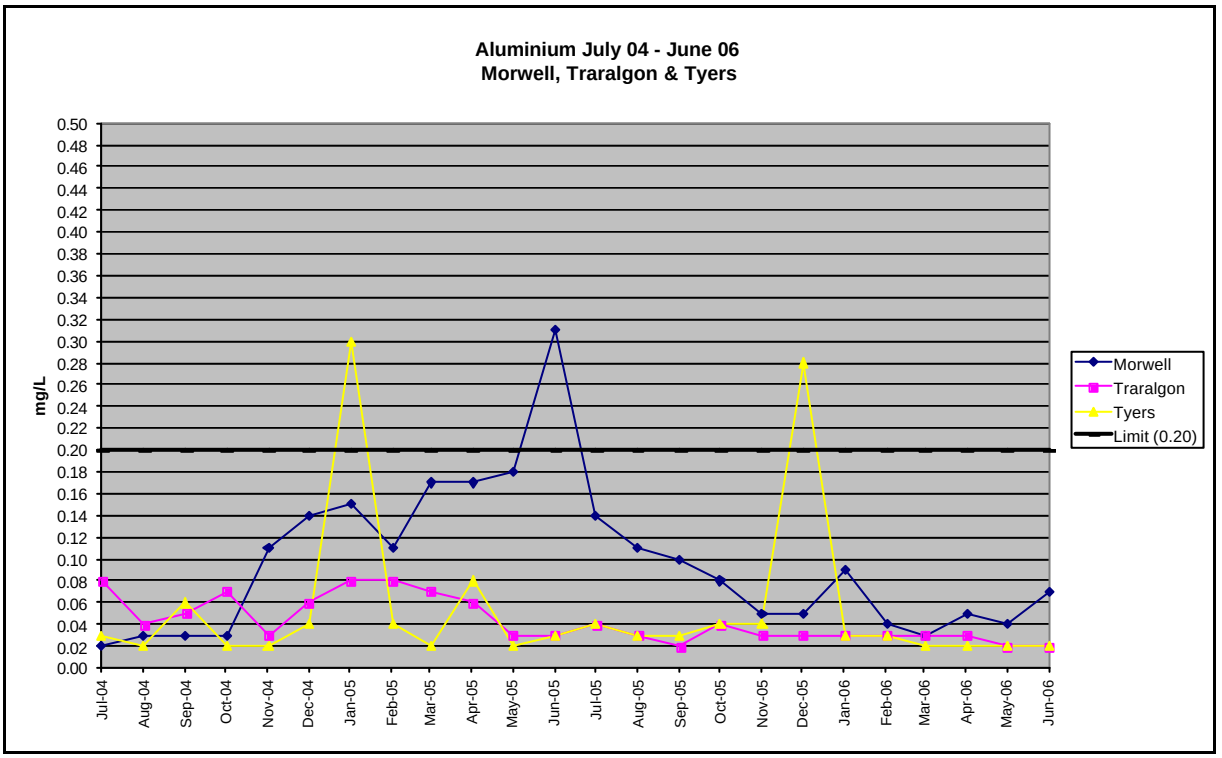
Moe and Willow Grove



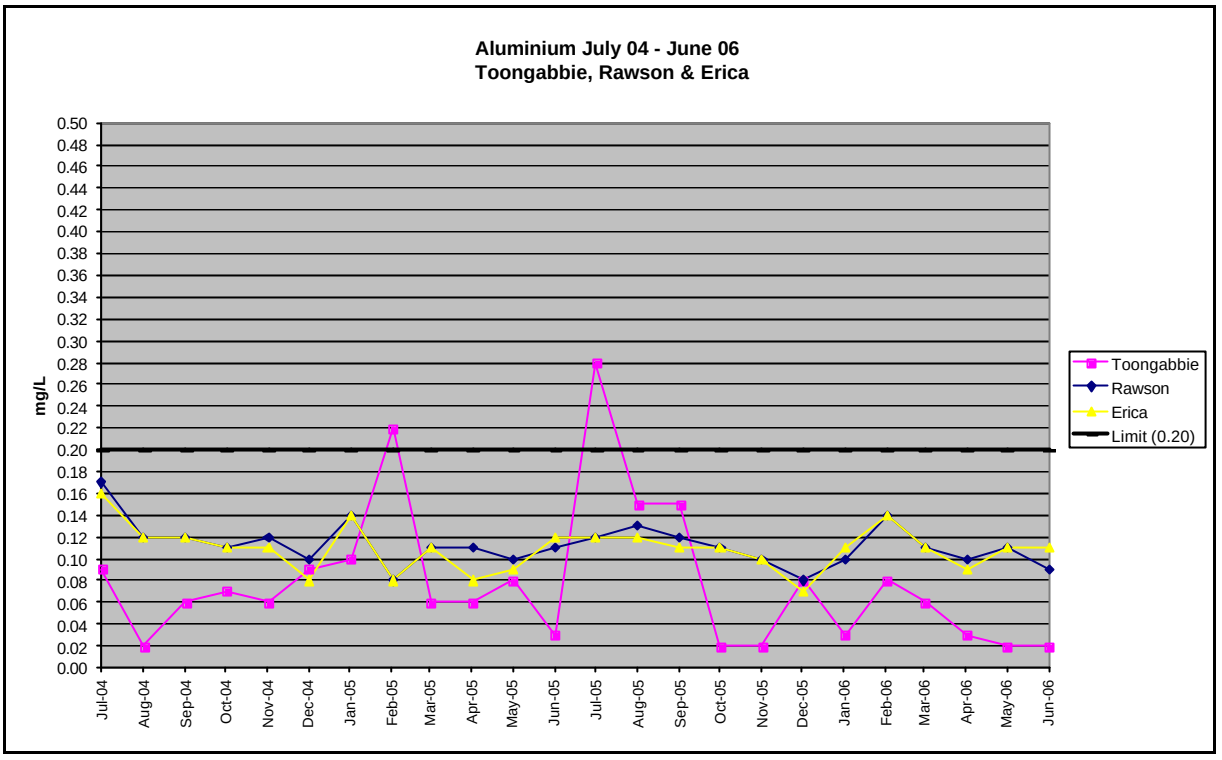
Seaspray, Thorpdale, Mirboo North, and Boolarra



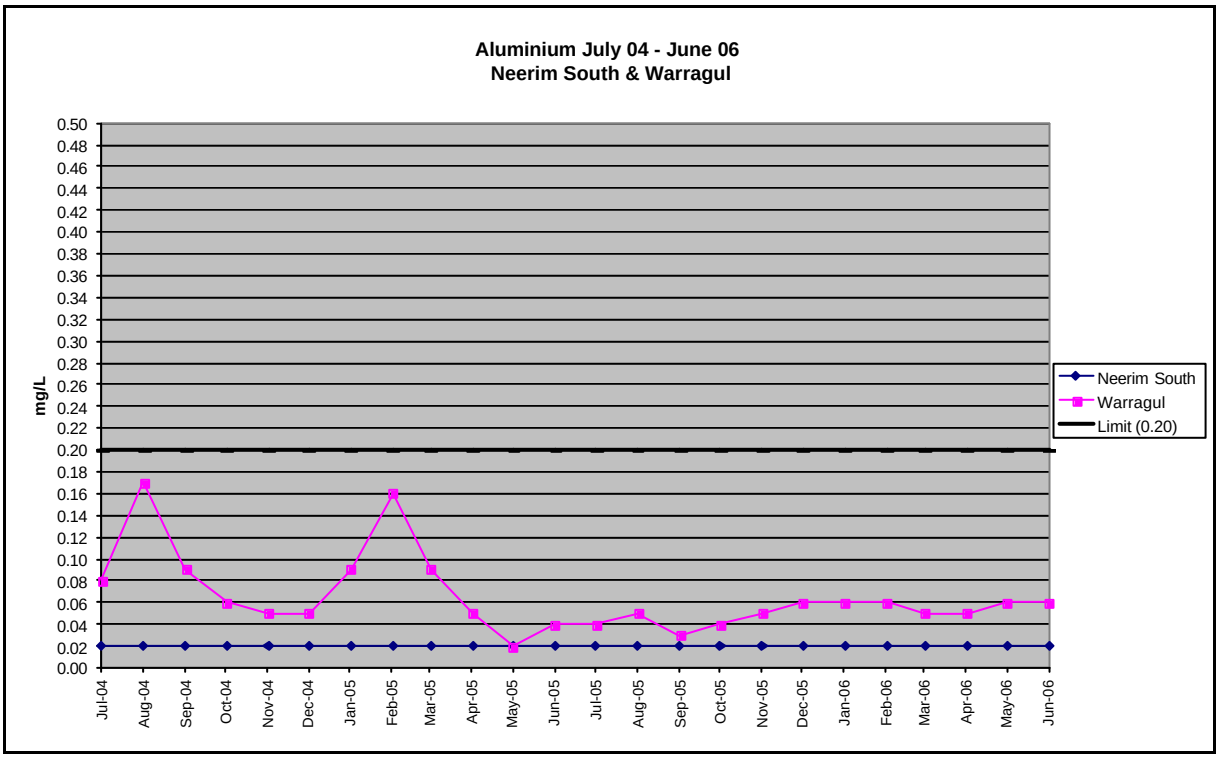
Morwell, Traralgon, and Tyers



Toongabbie, Rawson & Erica



Neerim South and Warragul

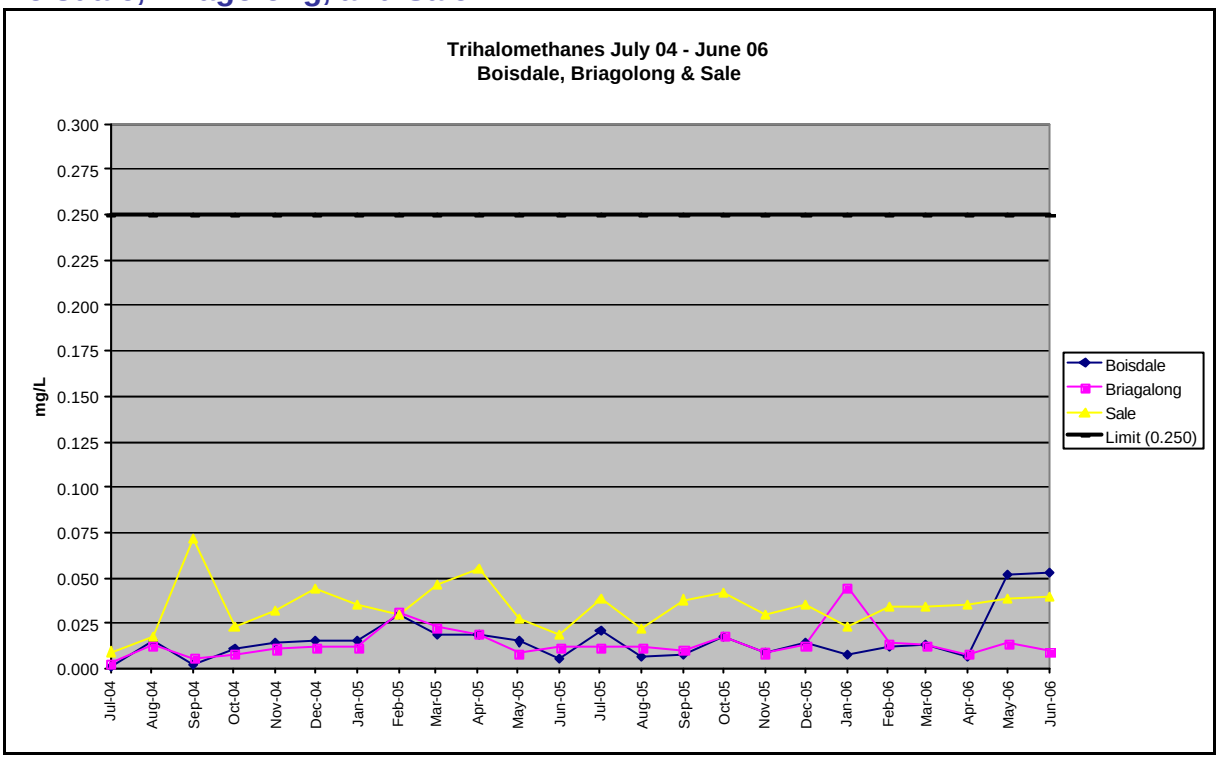


APPENDIX D: TRIHALOMETHANE TRENDS

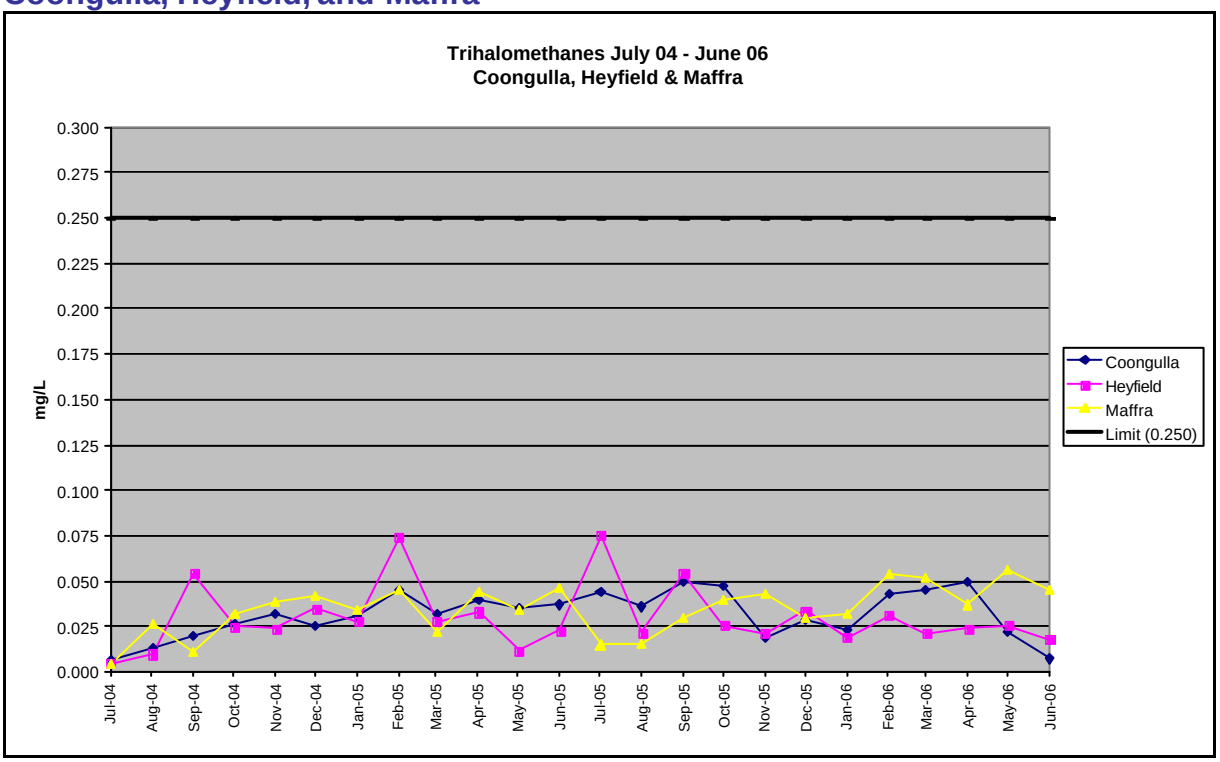
To allow for a comparison of information, data and results relating to the quality of water supplied, trend graphs have been provided from the July 2004 to June 2006 period, for each major water system for the drinking water quality standards.

The only Gippsland Water supplies that have ongoing issues with chlorine based disinfection by products are the supplies at Erica and Rawson. GW is working to resolve this issue by constructing a new water treatment plant, which is due to be operational by early 2007

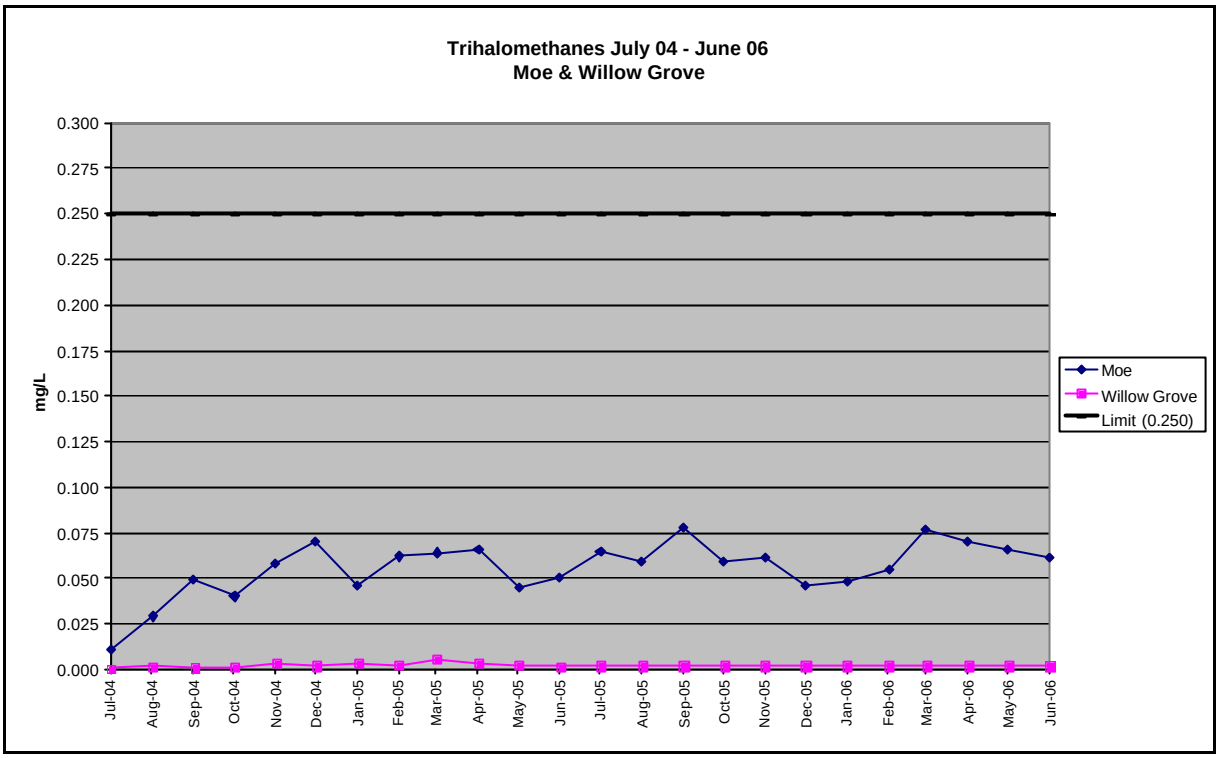
Boisdale, Briagolong, and Sale



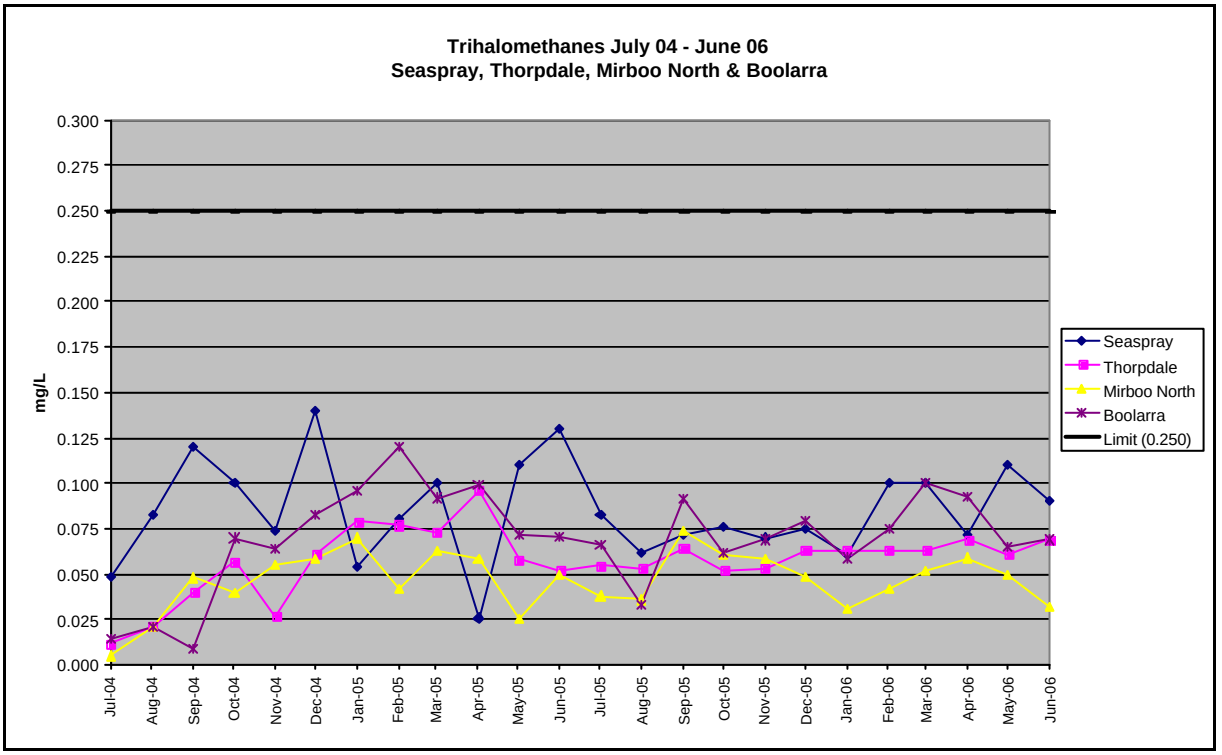
Coongulla, Heyfield, and Maffra



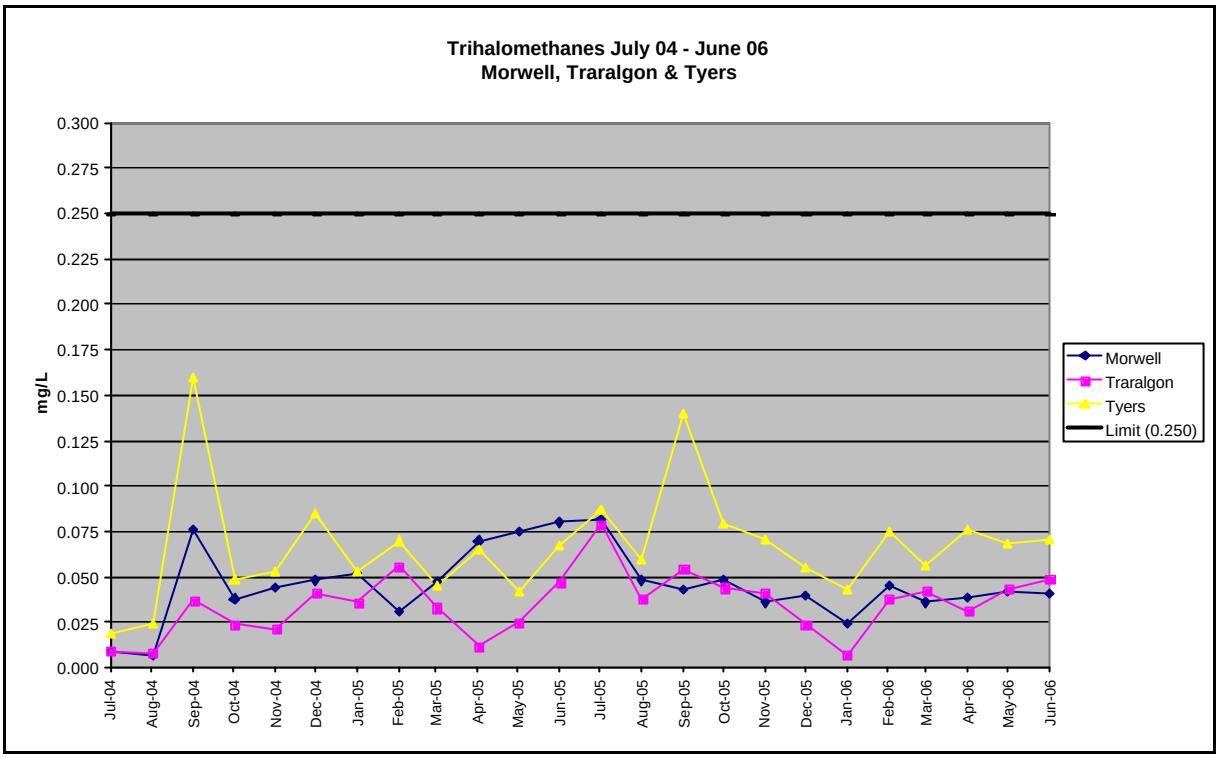
Moe and Willow Grove



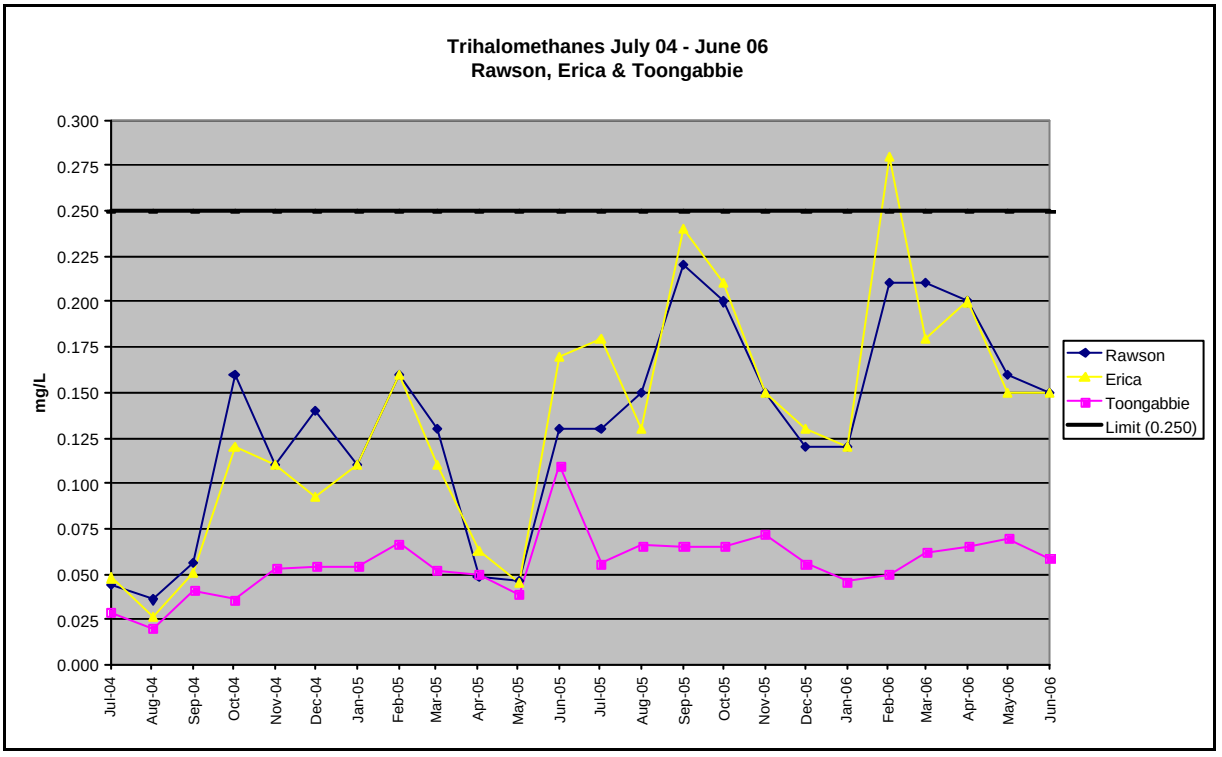
Seaspray, Thorpdale, Mirboo North, and Boolarra



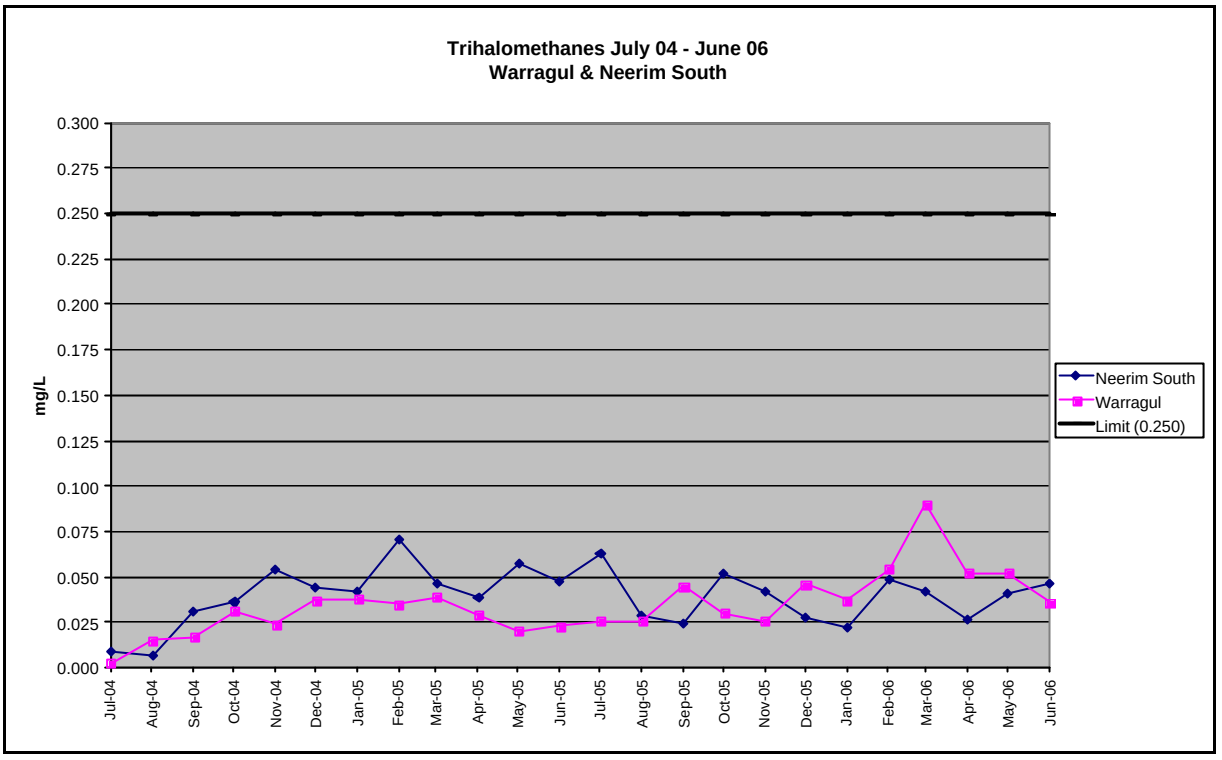
Morwell, Traralgon, and Tyers



Rawson, Erica and Toongabbie



Warragul and Neerim South



APPENDIX E: CHLOROACETIC ACID TRENDS

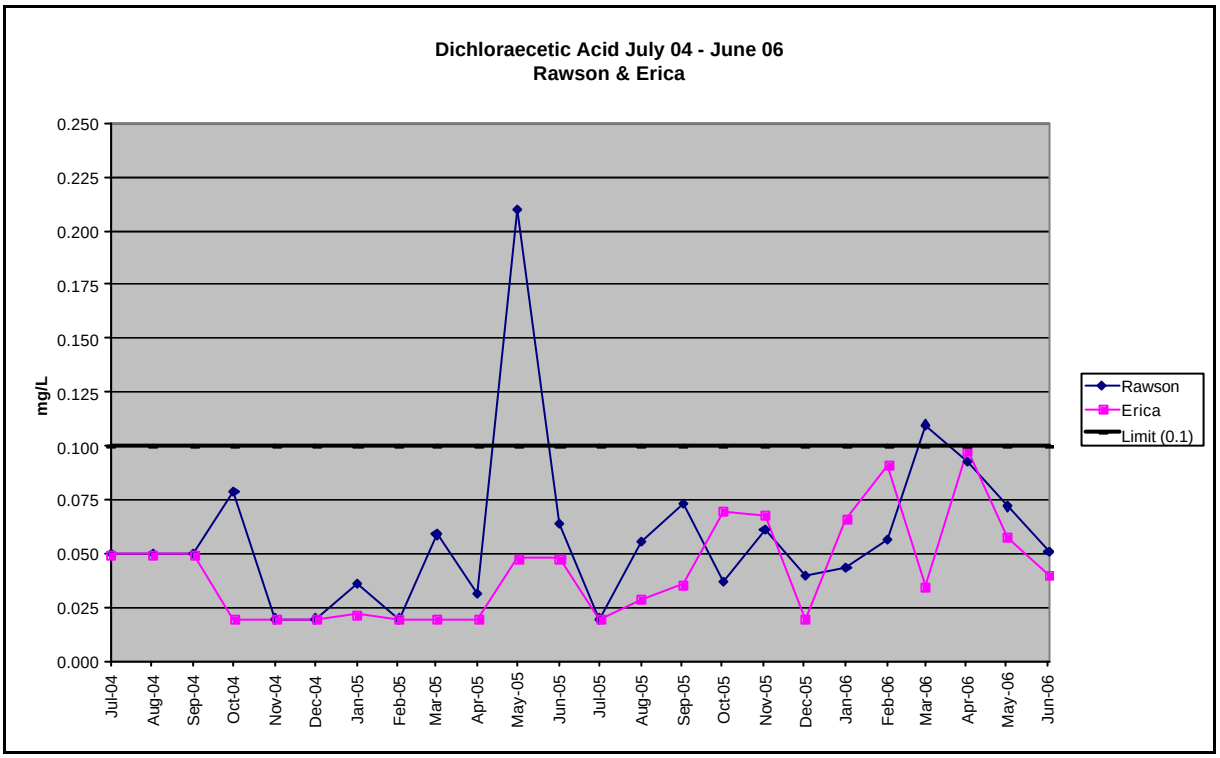
All Localities

All samples, across all localities reported results of chloroacetic acid below the detection limit (<0.050 mg/L), therefore graphs will not be required to illustrate these results.

APPENDIX F: DICHLOROACETIC ACID TRENDS

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 to June 2006 period, for each major water system for the drinking water quality standards. The only Gippsland Water supplies that have ongoing issues with chlorine based disinfection by products are the supplies at Erica and Rawson. GW is working to resolve this issue by constructing a new water treatment plant, which is due to be operational by early 2007

Rawson and Erica



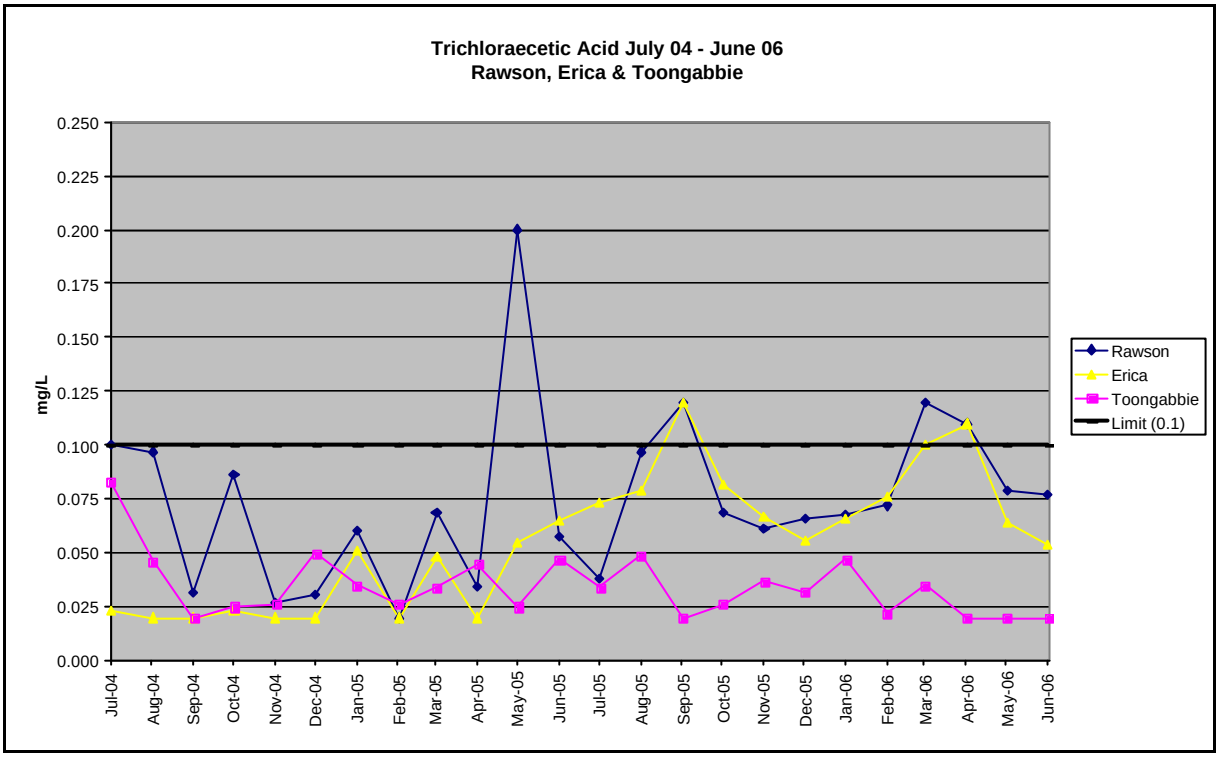
All other localities

All other localities compliance results were below the detection limit (<0.020 mg/L), therefore graphs will not be required to illustrate these results.

APPENDIX G: TRICHLOROACETIC ACID TRENDS

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 to June 2006 period, for each major water system for the drinking water quality standards. The only Gippsland Water supplies that have ongoing issues with chlorine based disinfection by products are the supplies at Erica and Rawson. GW is working to resolve this issue by constructing a new water treatment plant, which is due to be operational by early 2007

Rawson, Erica and Toongabbie



All other Localities

All other localities compliance results were below the detection limit (<0.020 mg/L), therefore graphs will not be required to illustrate these results.