Gippsland Water 2006-07 Annual Report on Drinking Water Quality

Safe Drinking Water Act 2003

EXECUTIVE SUMMARY

Gippsland Water is committed to providing safe drinking water 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*.

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.

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 17 water supply systems.

A region-wide water quality monitoring program tests the quality of the drinking water present at customers' taps in accordance with the *Safe Drinking Water Regulations 2005*. A summary of the results for the reporting period of July 2006 to June 2007 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, 5,926 tests were performed on samples taken from customer taps. The total number of samples is down from 6,092 during 2005-2006, as Glengarry and Tyers are now considered to be one locality since the review of water sampling localities by the DHS determined they should no longer be deemed separate localities. Of the 5,926 tests, one was found to be non-compliant for the following water quality parameter:

- Trihalomethane (THM) non-compliance at Erica (October 2006) due to the presence of natural organic matter in an untreated water supply.

This non-compliance was addressed by the construction of a new water treatment plant at Rawson which was commissioned in December 2006. 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.

System developments in the past two years have seen all Gippsland Water towns now supplied with fully treated water.

During the reporting year, there were two water systems severely affected by drought. Seaspray and Thorpdale systems had to be supported by alternative source water either by tankered water and an emergency bore water supply respectively.

Gippsland Water supplies 59,345 customers with water. Of those customers, 198 complaints regarding water quality were reported for the 2006-07 period. 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.

Cover: Moondarra Reservoir

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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 59,338 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 *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 and *Safe Drinking Water Act 2003*.

The achievement and maintenance of a high level of community confidence in the safety, reliability and quality of the region's water 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.

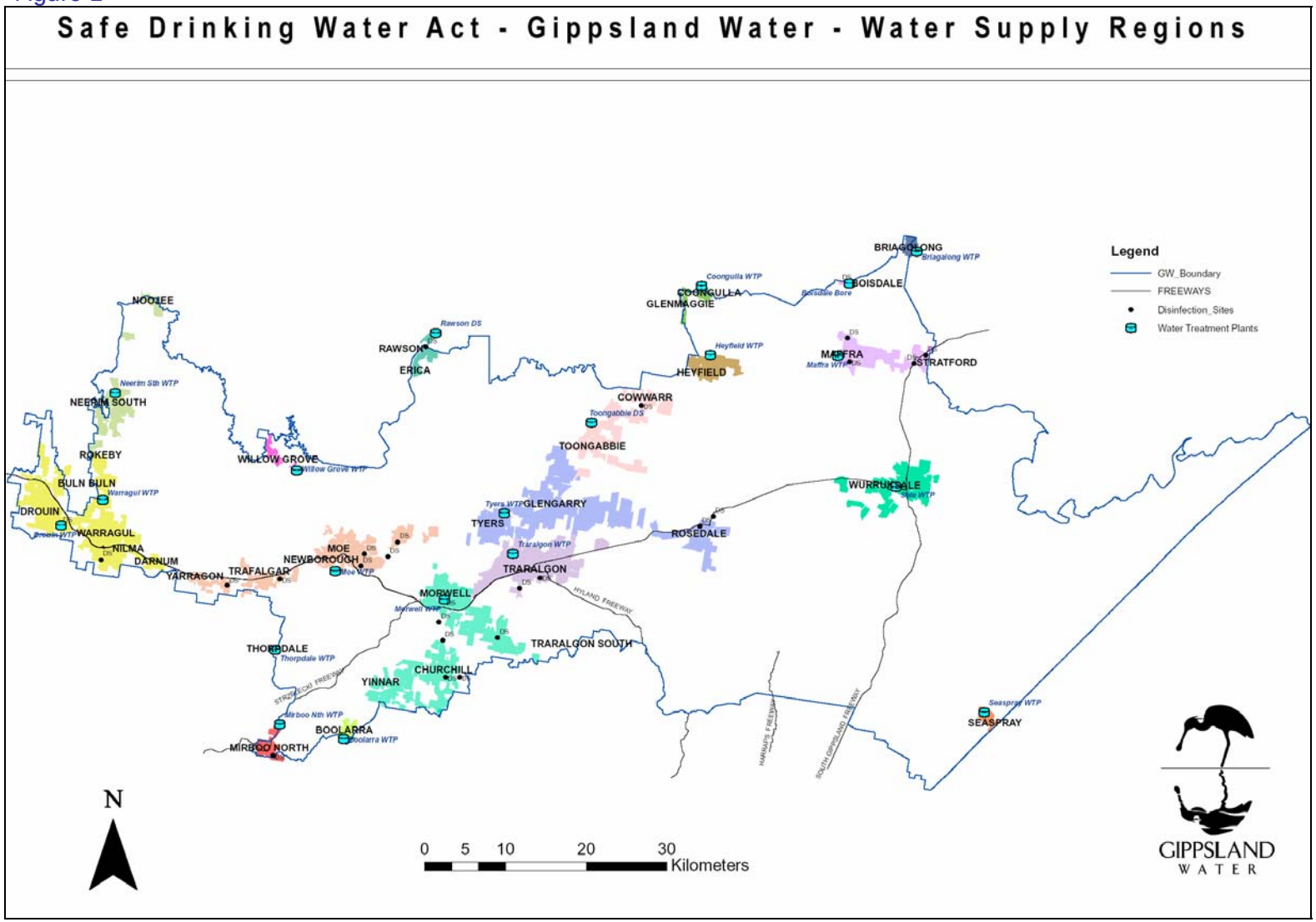
Our vision

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 17 water treatment systems supplying 35 localities (42 towns) in the 2006-07 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 1.1 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.

During the 2006-07 period, there were a number of source water supplies that deteriorated due to drought conditions, and alternative supplies were sourced to supply water to the affected towns. The systems affected were Seaspray and Thorpdale.

The Coongulla/Glenmaggie system was impacted by poor water quality in February 2007 due to previous bushfire activity in the Macalister River catchment and heavy rainfall. An alternative water source was supplied via mobile tanker into this system from February to September 2007.

Table 1.1 Water source

Locality	Population	Source water	Storage	Water treatment plant
Maffra	3,916	Macalister River	N/A	Maffra
Stratford	1,330			
Boisdale	70			
Boolarra	478	Walkley Creek O'Gradys Creek (supplementary supply)	Raw Water Basin	Boolarra
Briagolong	472	Bore (Boisdale Aquifer)	N/A	Briagolong
Morwell	12,278	Tyers River	Moondarra	Morwell
Churchill	4,898			
Yinnar	550			
Jumbuk	180			
Traralgon South/Hazelwood North	1,053			
Tyers/Glengarry	914	Tyers River	Moondarra	Tyers
Rosedale	1,042			
Toongabbie	463			
Cowwarr	225			
Traralgon	19,614	Tyers River	Moondarra	Traralgon
Warragul	13,196	Pederson Weir (Tarago River) Tarago Reservoir - (supplementary supply)	Tarago Reservoir (supplement supply)	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 Alternative source – tankered water from Heyfield for the period of February 2007 to September 2007.	Lake Glenmaggie	Coongulla

Locality	Population	Source water	Storage	Water treatment plant
Rawson	277	Trigger Creek	Amours Basins	Rawson WTP from December 2006 onwards. Disinfection only prior to December 2006
Erica	194			
Heyfield	1,436	Thomson River	N/A	Heyfield
Mirboo North	1,382	Little Morwell River	N/A	Mirboo North
Moe	15,117	Tanjil River and Narracan Creek	N/A	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)	N/A	Sale
Seaspray	208	Merrimans Creek Alternative source – trucked water from Sale for the period of December 2006 to February 2007.	N/A	Seaspray
Thorpdale	155	Easterbrook Creek Supplementary bore water for period from December 2006 to February 2007.	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 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 type of treatment process dependent on the quality 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 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 (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 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 DHS requested that Gippsland Water fluoridate the drinking water supplies of Moe, Morwell, Traralgon, Sale, and Warragul. Fluoridation was introduced to these towns and their 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 2.1 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 Chlorine (gas) Sodium Hypochlorite Powdered Activated Carbon (PAC)	PAC use as required to treat for taste and odour compounds.
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	Sodium Fluoride addition started in the Morwell system in July 2006.
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 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 Sodium Fluoride	Sodium Fluoride 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 and odour compounds refer to section 2.2.4.
Rawson Erica	Rawson	Coagulation, Flocculation Primary Solids Separation - (Dissolved Air Flotation) Secondary Solids Separation - (Dual Media Filters) Primary and Secondary Disinfection, pH Correction	Lime Alum, Polymer LT20 Chlorine (gas) Sodium Hypochlorite	Water Treatment Plant commissioned December 2006.
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 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, 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 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 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, pH Correction, Fluoridation	Lime Potassium Permanganate Chlorine (gas) Sodium Fluoride	Sodium Fluoride addition began in the Sale system in August 2006.

Locality	WTP	Treatment process	Added substances	Comments
Seaspray	Seaspray	Coagulation, Flocculation Primary and Secondary Filtration Disinfection, pH Correction	Soda Ash Alum, Polymers 1115, 1190, (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	---

2.2 SYSTEM ISSUES FOR 2006-07

During the 2006-07 monitoring period, the following upgrades/changes to Gippsland Water's water supply system have been implemented:

- A new water treatment plant was brought on line for Rawson and Erica from December 2006.
- Fluoride dosing was introduced for Warragul, Moe, Morwell, Traralgon and Sale (also refer to 3.6.4).

Other incidents to report arising from the processes used to treat or disinfect the water relate to a malfunction incident at the Traralgon WTP and the effects of fire and floods experienced in the Macalister River catchment region.

2.2.1 Rawson WTP commenced operation

During 2006 a new 0.9 Ml/day water treatment plant was constructed and commissioned at Rawson, to supply the Rawson and Erica town systems. These systems had a history of poor water quality and disinfection performance which generated customer complaints and higher than target disinfection by-products on occasions. The new water treatment plant commenced operation in December 2006, at a project cost of approximately $2.6 million. This water treatment plant is the latest addition to Gippsland Water's list of small town water treatment plants. The new treatment plant has achieved all performance requirements and now provides a reliable high quality treated water supply for customers of these two systems.

2.2.2 Introduction of fluoride to Warragul, Moe, Morwell, Traralgon and Sale systems

Under the direction of DHS, Gippsland Water introduced fluoride dosing systems into the major town systems across the region. Fluoride dosing commenced in the town systems of Warragul, Moe, Morwell, Traralgon, Sale and the corresponding connected neighbouring towns between July and September 2006. The town systems of Maffra and Drouin already had fluoride dosing for many years.

2.2.3 Traralgon Water Treatment Plant malfunction

Due to a malfunction at the Traralgon Water Treatment Plant in August 2006, treated water of a higher than usual turbidity level entered the clear water storage. This resulted in reduced disinfection levels for a period of time. The DHS were notified under a SDWA Section 22 notification of this incident as a precaution.

Traralgon Water Treatment Plant malfunction (*cont.*)

Turbidity levels discharged during the period remained below the water quality limits identified in the SDWA. During this event, adequate disinfection levels across the reticulation system were maintained and microbiological testing during this period confirmed compliant water (also refer to section 4.1).

2.2.4 Fire and flood effects on Gippsland Water region

During December 2006 and January 2007 the Gippsland area was ravaged by fire. Many catchment areas to the north of Heyfield and Maffra were severely burnt, with some towns under direct threat. The fire event caused significant demand on treated water resources during these events. Gippsland Water managed these systems during this time, with no major impact to customers' water supply or quality. The aftermath of the fires confirmed several catchments had suffered significant damage that is expected to have a lasting effect on raw water quality to several water supply systems. The upper reaches of the Macalister River were the most affected and as such the supplies to the Coongulla and Maffra systems needed review. Initial work identified some improvements to the Coongulla and Maffra water treatment plants would assist with future management of water quality in these supply systems.

During February 2007 the Macalister River catchment received some storm events which provided a strong indication of what raw water quality could be expected into the future. A river monitoring program was implemented to assess the behaviour of the catchment and river during these types of events. The Coongulla/Glenmaggie Water Treatment Plant was taken offline due to low water levels in Lake Glenmaggie and the very poor raw water quality coming from the Macalister River, which was beyond the capabilities of the treatment plant infrastructure. To overcome this lack of supply, drinking water was carted into Coongulla/Glenmaggie for customer consumption from the neighbouring Heyfield system and the town was placed on Stage Four Water Restrictions. This status has remained for this system until September 2007. A review of the operation of the Maffra Water Treatment Plant was also undertaken and several modifications, including additional chemical dosing systems and sludge removal, were implemented to improve the performance of this system to deal with the expected poor raw water quality.

During June 2007, a severe rainfall event occurred in the Macalister River catchment once again, causing significant runoff, flooding and damage in the area. Lake Glenmaggie filled and spilled in a weekend, causing major flooding downstream in the Maffra region. Raw water quality in the river deteriorated to levels never previously seen or recorded for this site. The Maffra Water Treatment Plant was isolated during the peak of the flood with supplies maintained to the customers from the treated water in storage. Once the peak had passed, operation of the Maffra Water Treatment Plant was re-initiated and following a short period of optimisation, treated water was produced to the required water quality parameters and provided to customers. Additional system monitoring was implemented during the first few days to identify any additional issues. The previously implemented improvements at the treatment plant achieved the expected outcomes and the water treatment plant produced treated water compliant with the *SDWA.*

3 WATER QUALITY RESULTS FOR 2006-07

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 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 2004* prepared by the National Health and Medical Research Council (Section 10).

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

Compliance under the *Safe Drinking Water Regulations 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. Gippsland Water has an internal target of 100% compliance for *E.coli.* All Gippsland Water sites achieved 100% compliance with no *E.coli*.

Figure 3: *E.coli* results for towns 2006-07

Locality	Frequency of sampling	No. of samples	Max result	% with no *E. coli*	Complying (Yes/No)	Non compliant results
Boisdale	Weekly	52	0	100%	Yes	0
Boolarra	Weekly	52	0	100%	Yes	0
Briagolong	Weekly	52	0	100%	Yes	0
Churchill	Weekly	52	0	100%	Yes	0
Coongulla-Glenmaggie	Weekly	52	0	100%	Yes	0
Cowwarr	Weekly	52	0	100%	Yes	0
Drouin	Weekly	64	0	100%	Yes	0
Erica	Weekly	52	0	100%	Yes	0
Heyfield	Weekly	52	0	100%	Yes	0
Jumbuk	Weekly	52	0	100%	Yes	0
Maffra	Weekly	52	0	100%	Yes	0
Mirboo North	Weekly	52	0	100%	Yes	0
Moe	Weekly	104	0	100%	Yes	0
Morwell	Weekly	76	0	100%	Yes	0
Neerim South	Weekly	52	0	100%	Yes	0
Newborough	Weekly	51**	0	100%	Yes	0
Noojee	Weekly	52	0	100%	Yes	0
Rawson	Weekly	52	0	100%	Yes	0
Rokeby-Buln Buln	Weekly	52	0	100%	Yes	0
Rosedale	Weekly	52	0	100%	Yes	0
Sale-Wurruk	Weekly	76	0	100%	Yes	0
Seaspray	Weekly	52	4	100%	Yes	0
Stratford	Weekly	52	0	100%	Yes	0
Thorpdale	Weekly	52	0	100%	Yes	0
Toongabbie	Weekly	52	0	100%	Yes	0
Trafalgar	Weekly	52	0	100%	Yes	0
Traralgon	Weekly	104	0	100%	Yes	0
Traralgon South-Hazelwood North	Weekly	52	0	100%	Yes	0
Tyers-Glengarry	Weekly	52	0	100%	Yes	0
Warragul	Weekly	76	0	100%	Yes	0
Warragul South	Weekly	52	0	100%	Yes	0
Willow Grove	Weekly	52	0	100%	Yes	0
Yallourn North	Weekly	52	0	100%	Yes	0
Yarragon	Weekly	52	0	100%	Yes	0
Yinnar	Weekly	52	0	100%	Yes	0

***E.coli* results (*cont.*)**

** One weekly sample in Newborough was inadvertently missed in early July 2006 due to changes in the DHS zoning of the water supply localities. A site in Newborough was sampled for the water quality parameters in the required week; however, it was situated in an area that has water supplied directly from the Moe water supply. DHS were notified of this error.

3.1.2 Actions taken in relation to non-compliance

All towns complied with this water quality parameter.

3.2 CHLORINE BASED DISINFECTION BY-PRODUCT 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. Gippsland Water has an internal target of 100% compliance for chloroacetic acid. All Gippsland Water sites achieved 100% compliance with chloroacetic acid levels.

Figure 4: Chloroacetic acid results for all towns 2006-07

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)	Non compliant results
Boisdale	Monthly	12	<0.05	<0.05	Yes	0
Boolarra	Monthly	12	<0.05	<0.05	Yes	0
Briagolong	Monthly	12	<0.05	<0.05	Yes	0
Churchill	Monthly	12	<0.05	<0.05	Yes	0
Coongulla-Glenmaggie	Monthly	12	<0.05	<0.05	Yes	0
Cowwarr	Monthly	12	<0.05	<0.05	Yes	0
Drouin	Monthly	12	<0.05	<0.05	Yes	0
Erica	Monthly	12	<0.05	<0.05	Yes	0
Heyfield	Monthly	12	<0.05	<0.05	Yes	0
Jumbuk	Monthly	12	<0.05	<0.05	Yes	0
Maffra	Monthly	12	<0.05	<0.05	Yes	0
Mirboo North	Monthly	12	<0.05	<0.05	Yes	0
Moe	Monthly	12	<0.05	<0.05	Yes	0
Morwell	Monthly	12	<0.05	<0.05	Yes	0
Neerim South	Monthly	12	<0.05	<0.05	Yes	0
Newborough	Monthly	12	<0.05	<0.05	Yes	0
Noojee	Monthly	12	<0.05	<0.05	Yes	0
Rawson	Monthly	12	<0.05	<0.05	Yes	0
Rokeby-Buln Buln	Monthly	12	<0.05	<0.05	Yes	0
Rosedale	Monthly	12	<0.05	<0.05	Yes	0
Sale-Wurruk	Monthly	12	<0.05	<0.05	Yes	0
Seaspray	Monthly	12	<0.05	<0.05	Yes	0
Stratford	Monthly	12	<0.05	<0.05	Yes	0
Thorpdale	Monthly	12	<0.05	<0.05	Yes	0
Toongabbie	Monthly	12	<0.05	<0.05	Yes	0
Trafalgar	Monthly	12	<0.05	<0.05	Yes	0
Traralgon	Monthly	12	<0.05	<0.05	Yes	0
Traralgon South-Hazelwood North	Monthly	12	<0.05	<0.05	Yes	0
Tyers-Glengarry	Monthly	12	<0.05	<0.05	Yes	0
Warragul	Monthly	12	<0.05	<0.05	Yes	0
Warragul South	Monthly	12	<0.05	<0.05	Yes	0
Willow Grove	Monthly	12	<0.05	<0.05	Yes	0
Yallourn North	Monthly	12	<0.05	<0.05	Yes	0
Yarragon	Monthly	12	<0.05	<0.05	Yes	0
Yinnar	Monthly	12	<0.05	<0.05	Yes	0

3.2.1.1 Actions taken in relation to non-compliance

No non-compliance issues to report as all towns experienced low levels for chloroacetic acid through the year.

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. Gippsland Water has an internal target of 100% compliance for dichloroacetic acid. All Gippsland Water sites achieved 100% compliance with dichloroacetic acid levels.

Figure 5: Dichloroacetic acid results for all towns 2006-07

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)	Non compliant results
Boisdale	Monthly	12	<0.02	<0.02	Yes	0
Boolarra	Monthly	12	<0.02	<0.02	Yes	0
Briagolong	Monthly	12	<0.02	<0.02	Yes	0
Churchill	Monthly	12	<0.02	<0.02	Yes	0
Coongulla-Glenmaggie	Monthly	12	<0.02	<0.02	Yes	0
Cowwarr	Monthly	12	<0.02	<0.02	Yes	0
Drouin	Monthly	12	<0.02	<0.02	Yes	0
Erica	Monthly	12	0.06	<0.02	Yes	0
Heyfield	Monthly	12	<0.02	<0.02	Yes	0
Jumbuk	Monthly	12	<0.02	<0.02	Yes	0
Maffra	Monthly	12	<0.02	<0.02	Yes	0
Mirboo North	Monthly	12	<0.02	<0.02	Yes	0
Moe	Monthly	12	<0.02	<0.02	Yes	0
Morwell	Monthly	12	<0.02	<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	0.08	<0.02	Yes	0
Rokeby-Buln Buln	Monthly	12	<0.02	<0.02	Yes	0
Rosedale	Monthly	12	<0.02	<0.02	Yes	0
Sale-Wurruk	Monthly	12	<0.02	<0.02	Yes	0
Seaspray	Monthly	12	<0.02	<0.02	Yes	0
Stratford	Monthly	12	<0.02	<0.02	Yes	0
Thorpdale	Monthly	12	<0.02	<0.02	Yes	0
Toongabbie	Monthly	12	0.02	<0.02	Yes	0
Trafalgar	Monthly	12	<0.02	<0.02	Yes	0
Traralgon	Monthly	12	<0.02	<0.02	Yes	0
Traralgon South-Hazelwood North	Monthly	12	<0.02	<0.02	Yes	0
Tyers-Glengarry	Monthly	12	<0.02	<0.02	Yes	0
Warragul	Monthly	12	<0.02	<0.02	Yes	0
Warragul South	Monthly	12	0.02	<0.02	Yes	0
Willow Grove	Monthly	12	<0.02	<0.02	Yes	0
Yallourn North	Monthly	12	<0.02	<0.02	Yes	0
Yarragon	Monthly	12	0.02	<0.02	Yes	0
Yinnar	Monthly	12	0.03	<0.02	Yes	0

3.2.2.1 Actions taken in relation to non-compliance

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

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 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.

Figure 6: Trichloroacetic acid for all towns 2006-07

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	<0.02	<0.02	Yes	0
Briagolong	Monthly	12	<0.02	<0.02	Yes	0
Churchill	Monthly	12	<0.02	<0.02	Yes	0
Coongulla-Glenmaggie	Monthly	12	<0.02	<0.02	Yes	0
Cowwarr	Monthly	12	0.02	<0.02	Yes	0
Drouin	Monthly	12	0.03	<0.02	Yes	0
Erica	Monthly	12	0.08	<0.02	Yes	0
Heyfield	Monthly	12	<0.02	<0.02	Yes	0
Jumbuk	Monthly	12	0.02	<0.02	Yes	0
Maffra	Monthly	12	<0.02	<0.02	Yes	0
Mirboo North	Monthly	12	<0.02	<0.02	Yes	0
Moe	Monthly	12	<0.02	<0.02	Yes	0
Morwell	Monthly	12	<0.02	<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	0.08	<0.02	Yes	0
Rokeby-Buln Buln	Monthly	12	<0.02	<0.02	Yes	0
Rosedale	Monthly	12	<0.02	<0.02	Yes	0
Sale-Wurruk	Monthly	12	<0.02	<0.02	Yes	0
Seaspray	Monthly	12	<0.02	<0.02	Yes	0
Stratford	Monthly	12	<0.02	<0.02	Yes	0
Thorpdale	Monthly	12	<0.02	<0.02	Yes	0
Toongabbie	Monthly	12	<0.02	<0.02	Yes	0
Trafalgar	Monthly	12	<0.02	<0.02	Yes	0
Traralgon	Monthly	12	<0.02	<0.02	Yes	0
Traralgon South-Hazelwood North	Monthly	12	<0.02	<0.02	Yes	0
Tyers-Glengarry	Monthly	12	<0.02	<0.02	Yes	0
Warragul	Monthly	12	0.02	<0.02	Yes	0
Warragul South	Monthly	12	0.02	<0.02	Yes	0
Willow Grove	Monthly	12	<0.02	<0.02	Yes	0
Yallourn North	Monthly	12	<0.02	<0.02	Yes	0
Yarragon	Monthly	12	0.02	<0.02	Yes	0
Yinnar	Monthly	12	0.02	<0.02	Yes	0

3.2.3.1 Actions taken in relation to non-compliance.

All towns experienced levels for trichloroacetic acid that were below the reportable compliance limit of 0.1mg/L.

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 trihalomethane. Gippsland Water has an internal target of 100% compliance for trihalomethane, how ever through the year one exceedance was experienced. See section 3.2.4.1.

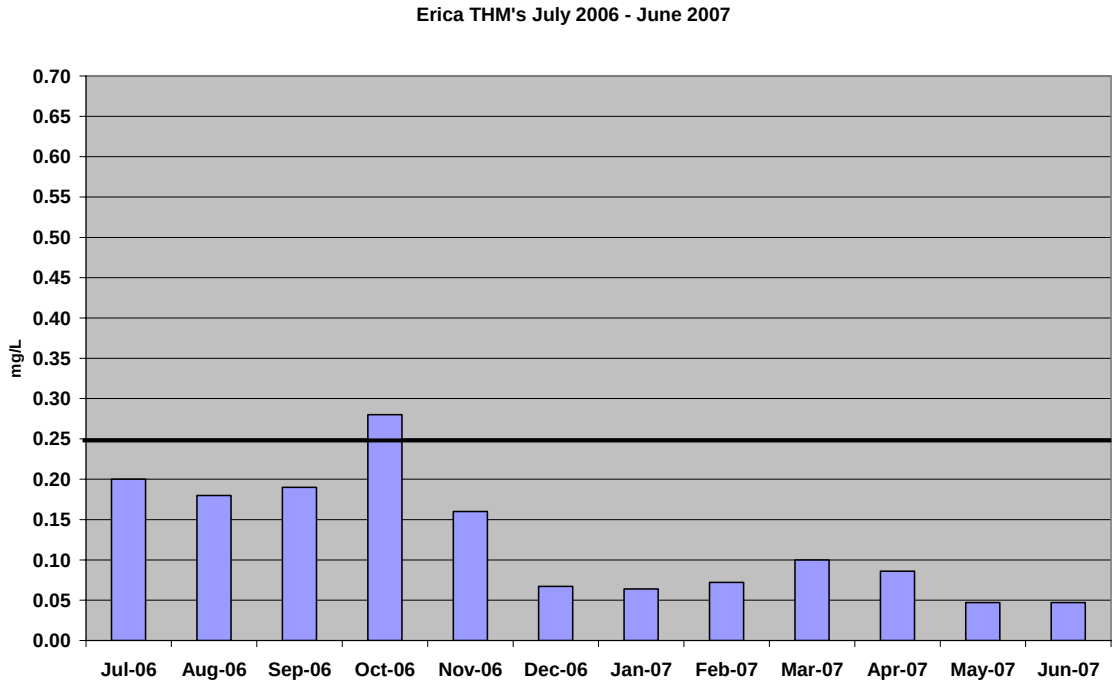
Figure 7: Trihalomethanes results for all towns for 2006-07

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)	Non compliant results
Boisdale	Monthly	12	0.150	0.031	Yes	0
Boolarra	Monthly	12	0.120	0.013	Yes	0
Briagolong	Monthly	12	0.140	0.007	Yes	0
Churchill	Monthly	12	0.092	0.040	Yes	0
Coongulla-Glenmaggie	Monthly	12	0.073	0.004	Yes	0
Cowwarr	Monthly	12	0.095	0.038	Yes	0
Drouin	Monthly	12	0.093	0.046	Yes	0
Erica	Monthly	12	0.280	0.047	**No**	1
Heyfield	Monthly	12	0.072	0.025	Yes	0
Jumbuk	Monthly	12	0.088	0.019	Yes	0
Maffra	Monthly	12	0.059	0.022	Yes	0
Mirboo North	Monthly	12	0.058	0.028	Yes	0
Moe	Monthly	12	0.074	0.036	Yes	0
Morwell	Monthly	12	0.067	0.024	Yes	0
Neerim South	Monthly	12	0.069	0.036	Yes	0
Newborough	Monthly	12	0.083	0.043	Yes	0
Noojee	Monthly	12	0.037	0.022	Yes	0
Rawson	Monthly	12	0.250	0.046	Yes	0
Rokeby-Buln Buln	Monthly	12	0.068	0.023	Yes	0
Rosedale	Monthly	12	0.093	0.042	Yes	0
Sale-Wurruk	Monthly	12	0.067	0.036	Yes	0
Seaspray	Monthly	12	0.170	0.046	Yes	0
Stratford	Monthly	12	0.061	0.032	Yes	0
Thorpdale	Monthly	12	0.130	0.059	Yes	0
Toongabbie	Monthly	12	0.080	0.045	Yes	0
Trafalgar	Monthly	12	0.094	0.055	Yes	0
Traralgon	Monthly	12	0.072	0.027	Yes	0
Traralgon South-Hazelwood North	Monthly	12	0.076	0.034	Yes	0
Tyers-Glengarry	Monthly	12	0.083	0.044	Yes	0
Warragul	Monthly	12	0.091	0.038	Yes	0
Warragul South	Monthly	12	0.100	0.048	Yes	0
Willow Grove	Monthly	12	0.007	0.002	Yes	0
Yallourn North	Monthly	12	0.089	0.053	Yes	0
Yarragon	Monthly	12	0.110	0.072	Yes	0
Yinnar	Monthly	12	0.083	0.025	Yes	0

3.2.4.1 Actions taken in relation to non-compliance

The township of Erica experienced one sample above the limit for trihalomethane in October 2006. Figure 8 indicates the THM levels for the past year for the Erica system. Prior to the commissioning of the new Rawson Water Treatment Plant in December 2006, this water system experienced naturally occurring organic load in the raw water supply which reacted with the disinfection chemicals (chlorine) producing elevated disinfection by-products. The new Rawson Water Treatment Plant (Refer 2.2.1) has now reduced the level of organic matter in the water supply and substantially lowered the potential for THM formation from the commissioning date of December 2006 onwards.

Figure 8: Erica THM's 2006-07



3.3 OZONE BASED DISINFECTION BY-PRODUCT 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. Gippsland Water has an internal target of 100% compliance for aluminium. All Gippsland Water sites achieved 100% compliance with aluminium levels.

3.4.1 Aluminium results

Figure 9: Aluminium results for all towns in 2006-07

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)	Non compliant results
Boisdale	Monthly	12	0.04	<0.02	Yes	0
Boolarra	Monthly	12	0.04	<0.02	Yes	0
Briagolong	Monthly	12	<0.02	<0.02	Yes	0
Churchill	Monthly	12	0.04	<0.02	Yes	0
Coongulla-Glenmaggie	Monthly	12	0.10	<0.02	Yes	0
Cowwarr	Monthly	12	0.06	<0.02	Yes	0
Drouin	Monthly	12	0.10	<0.02	Yes	0
Erica	Monthly	12	0.17	0.02	Yes	0
Heyfield	Monthly	12	<0.02	<0.02	Yes	0
Jumbuk	Monthly	12	0.04	<0.02	Yes	0
Maffra	Monthly	12	0.06	<0.02	Yes	0
Mirboo North	Monthly	12	0.08	<0.02	Yes	0
Moe	Monthly	12	0.05	<0.02	Yes	0
Morwell	Monthly	12	0.03	<0.02	Yes	0
Neerim South	Monthly	12	<0.02	<0.02	Yes	0
Newborough	Monthly	12	0.14	0.02	Yes	0
Noojee	Monthly	12	<0.02	<0.02	Yes	0
Rawson	Monthly	12	0.16	<0.02	Yes	0
Rokeby-Buln Buln	Monthly	12	0.11	<0.02	Yes	0
Rosedale	Monthly	12	0.03	<0.02	Yes	0
Sale-Wurruk	Monthly	12	0.03	<0.02	Yes	0
Seaspray	Monthly	12	0.03	<0.02	Yes	0
Stratford	Monthly	12	0.03	<0.02	Yes	0
Thorpdale	Monthly	12	0.05	<0.02	Yes	0
Toongabbie	Monthly	12	0.11	<0.02	Yes	0
Trafalgar	Monthly	12	0.11	<0.02	Yes	0
Traralgon	Monthly	12	0.04	<0.02	Yes	0
Traralgon South-Hazelwood North	Monthly	12	0.04	<0.02	Yes	0
Tyers-Glengarry	Monthly	12	0.02	<0.02	Yes	0
Warragul	Monthly	12	0.11	<0.02	Yes	0
Warragul South	Monthly	12	0.11	0.02	Yes	0
Willow Grove	Monthly	12	0.05	<0.02	Yes	0
Yallourn North	Monthly	12	0.09	<0.02	Yes	0
Yarragon	Monthly	12	0.15	<0.02	Yes	0
Yinnar	Monthly	12	0.05	<0.02	Yes	0

3.4.2 Actions taken in relation to non-compliance

All towns experienced levels for aluminium below the reportable compliance limit of 0.20mg/L.

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). Gippsland Water has an internal target of 0.2 NTU for major systems and 0.5 NTU for small systems. All Gippsland Water sites achieved 100% compliance for Turbidity levels through the year.

Figure 10: Turbidity results for all towns in 2006-07

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)	95% UCL of mean	Complying (Yes/No)	Non compliant results
Boisdale	Weekly	52	0.30	0.10	0.20	Yes	0
Boolarra	Weekly	52	3.00	0.10	0.56	Yes	0
Briagolong	Weekly	52	0.70	0.10	0.22	Yes	0
Churchill	Weekly	52	0.40	0.10	0.17	Yes	0
Coongulla-Glenmaggie	Weekly	52	1.60	0.10	0.43	Yes	0
Cowwarr	Weekly	52	0.30	0.10	0.17	Yes	0
Drouin	Weekly	52	0.50	0.10	0.21	Yes	0
Erica	Weekly	52	1.60	0.10	0.82	Yes	0
Heyfield	Weekly	52	0.30	0.10	0.15	Yes	0
Jumbuk	Weekly	52	0.30	0.10	0.20	Yes	0
Maffra	Weekly	52	1.30	0.10	0.21	Yes	0
Mirboo North	Weekly	52	0.50	0.10	0.18	Yes	0
Moe	Weekly	52	0.50	0.10	0.20	Yes	0
Morwell	Weekly	52	0.80	0.10	0.16	Yes	0
Neerim South	Weekly	52	0.60	0.10	0.17	Yes	0
Newborough	Weekly	51**	1.10	0.10	0.18	Yes	0
Noojee	Weekly	52	1.50	0.10	0.31	Yes	0
Rawson	Weekly	52	1.00	0.10	0.45	Yes	0
Rokeby-Buln Buln	Weekly	52	0.60	0.10	0.22	Yes	0
Rosedale	Weekly	52	0.40	0.10	0.18	Yes	0
Sale-Wurruk	Weekly	52	0.40	0.10	0.18	Yes	0
Seaspray	Weekly	52	1.50	0.10	0.57	Yes	0
Stratford	Weekly	52	0.60	0.10	0.20	Yes	0
Thorpdale	Weekly	52	0.60	0.10	0.35	Yes	0
Toongabbie	Weekly	52	0.50	0.10	0.17	Yes	0
Trafalgar	Weekly	52	2.30	0.10	0.31	Yes	0
Traralgon	Weekly	52	0.30	0.10	0.13	Yes	0
Traralgon South-Hazelwood North	Weekly	52	0.30	0.10	0.16	Yes	0
Tyers-Glengarry	Weekly	52	0.60	0.10	0.19	Yes	0
Warragul	Weekly	52	0.50	0.10	0.23	Yes	0
Warragul South	Weekly	52	0.40	0.10	0.25	Yes	0
Willow Grove	Weekly	52	0.70	0.10	0.21	Yes	0
Yallourn North	Weekly	52	0.60	0.10	0.22	Yes	0
Yarragon	Weekly	52	1.00	0.10	0.25	Yes	0
Yinnar	Weekly	52	0.50	0.10	0.21	Yes	0

** One weekly sample in Newborough was inadvertently missed in early July 2006, due to changes in the DHS zoning of the water supply systems. A site in Newborough was sampled for the water quality parameters in the required week; however it was situated in an area that has water supplied directly from the Moe water supply. DHS were notified of this oversight.

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 2006-07 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 Figure 11 below identifies the recommended value. All of the parameters listed, were reported below the respective recommended value.

Figure 11: Other sampled parameter results for all towns in 2006-07

Parameter	Frequency of sampling	No. samples	Results above ADWG values		
			Recommended value	Result	Locality
Ammonia	Weekly (2 Localities)	104	≤ 0.5 mg/L	All results were less than the recommended level	
Nitrite	Weekly (2 Localities)	104	≤ 3 mg/L		
Iron	Monthly	420	≤ 0.3 mg/L		
Mercury	Quarterly	140	≤ 0.02 mg/L		
Chromium	Quarterly	140	≤ 0.05 mg/L		
Cadmium	Quarterly	140	≤ 0.002 mg/L		
Sulphate	Quarterly	140	≤ 250 mg/L		
Nitrate	Quarterly	140	≤ 50 mg/L		
Arsenic	Discontinued*	1	≤ 0.007 mg/L		
Selenium	Discontinued*	1	≤ 0.01 mg/L		
Nickel	Annual	35	≤ 0.02 mg/L		
Zinc	Annual	35	≤ 3 mg/L		

*Boisdale was moved from a chlorinated raw water system, to the Maffra treated water system during the 2006-07 reporting period. Arsenic and Selenium testing of the bore water supply was no longer required. All 'recommended values' in the above table are health limits as stated in the ADWG.

3.6.2 Manganese

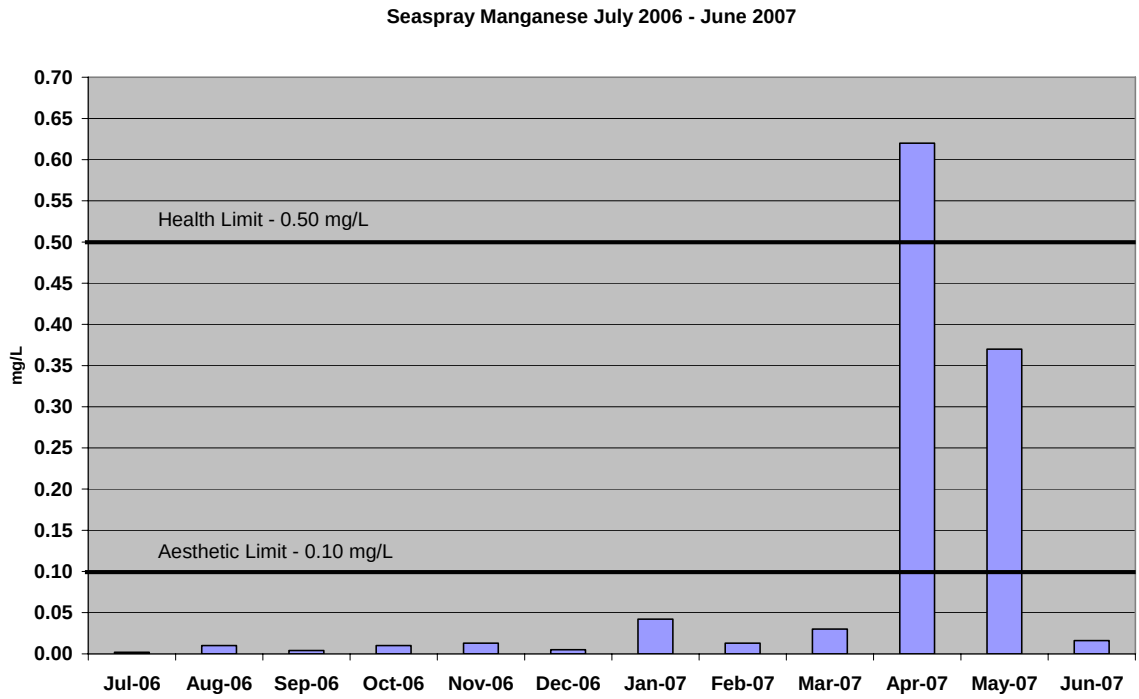
Manganese can be naturally present in either soluble or insoluble form in water. When concentrations exceed 0.1mg/L, manganese can create unacceptable tastes in the water, as well as stain fixtures and laundry. Compliance is measured against the aesthetic guideline values 0.1mg/L and the health guideline value of 0.5mg/L in ADWG.

Figure 12: Manganese results for all towns in 2006-07 (Compliance <0.10 mg/L – ADWG)

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	0.008	<0.001	Yes
Boolarra	Monthly	12	0.058	<0.001	Yes
Briagolong	Monthly	12	0.003	<0.001	Yes
Churchill	Monthly	12	0.001	<0.001	Yes
Coongulla-Glenmaggie	Monthly	12	0.028	0.002	Yes
Cowwarr	Monthly	12	0.005	<0.001	Yes
Drouin	Monthly	12	0.003	<0.001	Yes
Erica	Monthly	12	0.003	<0.001	Yes
Heyfield	Monthly	12	0.005	<0.001	Yes
Jumbuk	Monthly	12	0.001	<0.001	Yes
Maffra	Monthly	12	0.034	<0.001	Yes
Mirboo North	Monthly	12	0.004	<0.001	Yes
Moe	Monthly	12	0.004	<0.001	Yes
Morwell	Monthly	12	0.002	<0.001	Yes
Neerim South	Monthly	12	0.031	<0.001	Yes
Newborough	Monthly	12	0.002	<0.001	Yes
Noojee	Monthly	12	0.014	0.003	Yes
Rawson	Monthly	12	0.003	<0.001	Yes
Rokeby-Buln Buln	Monthly	12	0.002	<0.001	Yes
Rosedale	Monthly	12	0.002	<0.001	Yes
Sale-Wurruk	Monthly	12	0.002	<0.001	Yes
Seaspray	Monthly	12	0.620	0.002	**No[1]**
Stratford	Monthly	12	0.017	<0.001	Yes
Thorpdale	Monthly	12	0.046	0.003	Yes
Toongabbie	Monthly	12	0.002	<0.001	Yes
Trafalgar	Monthly	12	0.011	<0.001	Yes
Traralgon	Monthly	12	0.001	<0.001	Yes
Traralgon South-Hazelwood North	Monthly	12	0.002	<0.001	Yes
Tyers-Glengarry	Monthly	12	0.004	<0.001	Yes
Warragul	Monthly	12	0.002	<0.001	Yes
Warragul South	Monthly	12	0.002	<0.001	Yes
Willow Grove	Monthly	12	0.062	<0.001	Yes
Yallourn North	Monthly	12	0.003	<0.001	Yes
Yarragon	Monthly	12	0.066	<0.001	Yes
Yinnar	Monthly	12	0.003	<0.001	Yes

[1]Two samples taken from Seaspray exceeded the ADWG aesthetic guideline values of 0.1mg/L and one sample exceeded the ADWG health guideline value of 0.5mg/L. Figure 13 provides information about the manganese levels experienced in the 12 month reporting period and shows that two samples reported levels of 0.62mg/L and 0.37mg/L. This was due to the samples being taken at a time when there was a disturbance of biofilm within the reticulation system, as a result of increased flows due to nearby construction activity and the filling of water tankers. Seaspray system had been placed on Stage Four Water Restrictions due to the drought conditions, and as a consequence the routine maintenance program of flushing had ceased which may have prevented the likely build up of biofilm and subsequent release of manganese levels in the reticulation during high flow periods. A modified maintenance program of flushing in the town was initiated until levels reduced.

Figure 13: Seaspray manganese 2006-07



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 in the ADWG, concentrations of lead in drinking water should not exceed 0.01mg/L. For the reporting period, all sample results were below this level.

Figure 14: Lead results for all towns in 2006-07 (Compliance <0.01 mg/L - ADWG)

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	<0.002	<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	<0.002	<0.001	Yes
Drouin	Monthly	12	0.002	<0.001	Yes
Erica	Monthly	12	<0.002	<0.001	Yes
Heyfield	Monthly	12	<0.002	<0.001	Yes
Jumbuk	Monthly	12	<0.002	<0.001	Yes
Maffra	Monthly	12	<0.002	<0.001	Yes
Mirboo North	Monthly	12	<0.002	<0.001	Yes
Moe	Monthly	12	<0.002	<0.001	Yes
Morwell	Monthly	12	<0.002	<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	<0.002	<0.001	Yes
Rokeby-Buln Buln	Monthly	12	<0.002	<0.001	Yes
Rosedale	Monthly	12	<0.002	<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	<0.002	<0.001	Yes
Toongabbie	Monthly	12	<0.002	<0.001	Yes
Trafalgar	Monthly	12	<0.002	<0.001	Yes

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Traralgon	Monthly	12	<0.002	<0.001	Yes
Traralgon South-Hazelwood North	Monthly	12	<0.002	<0.001	Yes
Tyers-Glengarry	Monthly	12	<0.002	<0.001	Yes
Warragul	Monthly	12	<0.002	<0.001	Yes
Warragul South	Monthly	12	<0.002	<0.001	Yes
Yallourn North	Monthly	12	<0.002	<0.001	Yes
Yarragon	Monthly	12	<0.002	<0.001	Yes
Yinnar	Monthly	12	<0.002	<0.001	Yes

3.6.4 Fluoride

Fluoride testing has been performed in the water supply systems (Maffra, Warragul, Sale Traralgon, Morwell and Moe) where fluoride is added to the water artificially. The operational level of fluoride is monitored by online instrumentation as well as field measurements on a daily and 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 2006-07, all results for fluoride that were processed by an independent laboratory from these towns were below this concentration. Gippsland Water's general target is 0.7-1.0mg/L.

Figure 15: Fluoride results for all towns in 2006-07 (Compliance <1.5 mg/L - ADWG)

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)	Mean (mg/L)	Complying (Yes/No)
Churchill	Monthly	12	1.00	<0.10	0.85	Yes
Drouin	Monthly	12	0.90	0.60	0.77	Yes
Maffra	Monthly	12	1.20	0.70	0.89	Yes
Moe	Monthly	10	0.90	0.70	0.80	Yes
Morwell	Monthly	12	1.00	0.50	0.81	Yes
Sale	Monthly	10	0.90	0.60	0.81	Yes
Stratford	Monthly	12	1.20	0.70	0.86	Yes
Traralgon	Monthly	10	0.90	<0.10	0.72	Yes
Traralgon South	Monthly	12	0.90	0.10	0.77	Yes
Warragul	Monthly	10	0.80	0.60	0.71	Yes
Yinnar	Monthly	12	0.90	0.10	0.74	Yes

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

Algae Metabolites- Geosmin and 2-Methylisoborneol (MIB)

Ongoing monitoring for the odour causing microbial metabolites Geosmin and 2-methylisoborneol (MIB) was performed during the period February 2006 to January 2007 in the towns of Maffra, Coongulla and Glenmaggie due to an ongoing algal bloom experienced in Lake Glenmaggie and the Macalister River. These compounds had been a concern for Gippsland Water in the previous year and were removed by an additional process of activated carbon treatment at the water treatment plants. Monitoring continued into this year's reporting period as a precaution. Figures 16 and 17 show the algae and Geosmin levels monitored in the Maffra and Coongulla/Glenmaggie raw water supplies prior to treatment.

Figure 16: Total algae results for Maffra, Coongulla and Glenmaggie raw water – February 2006 to January 2007

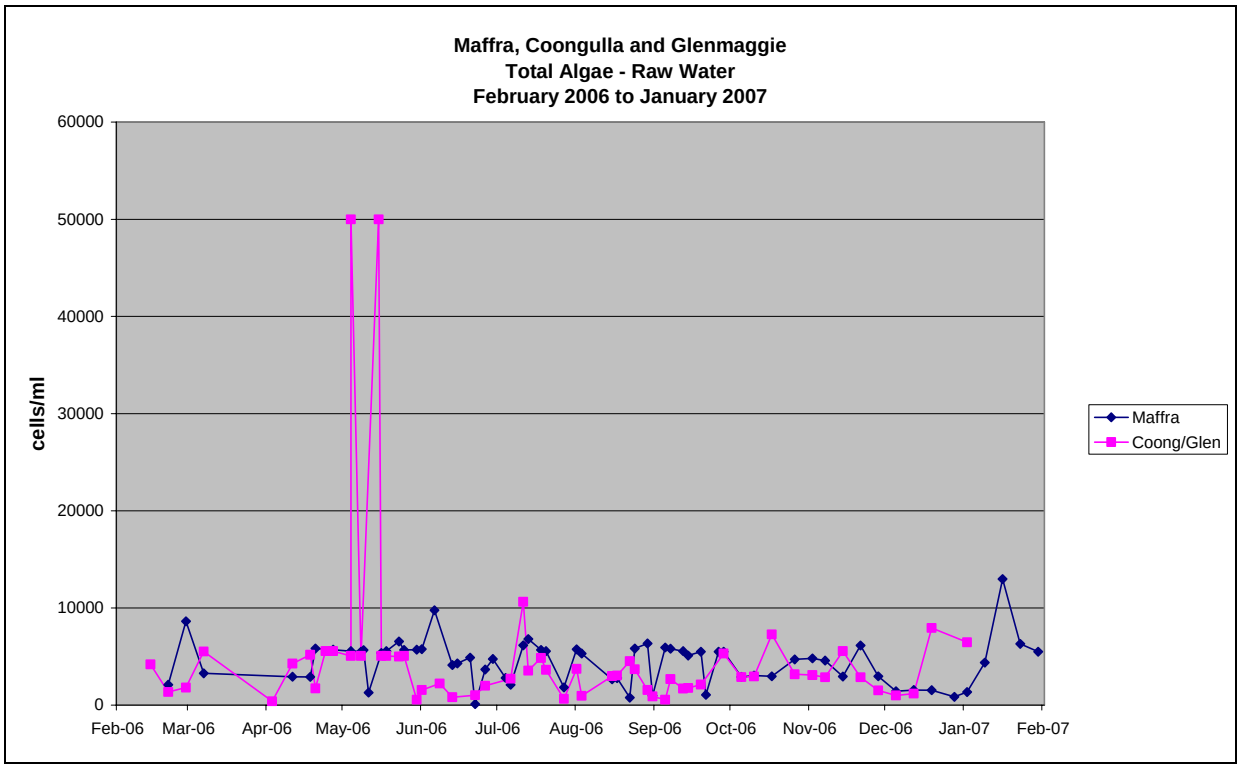
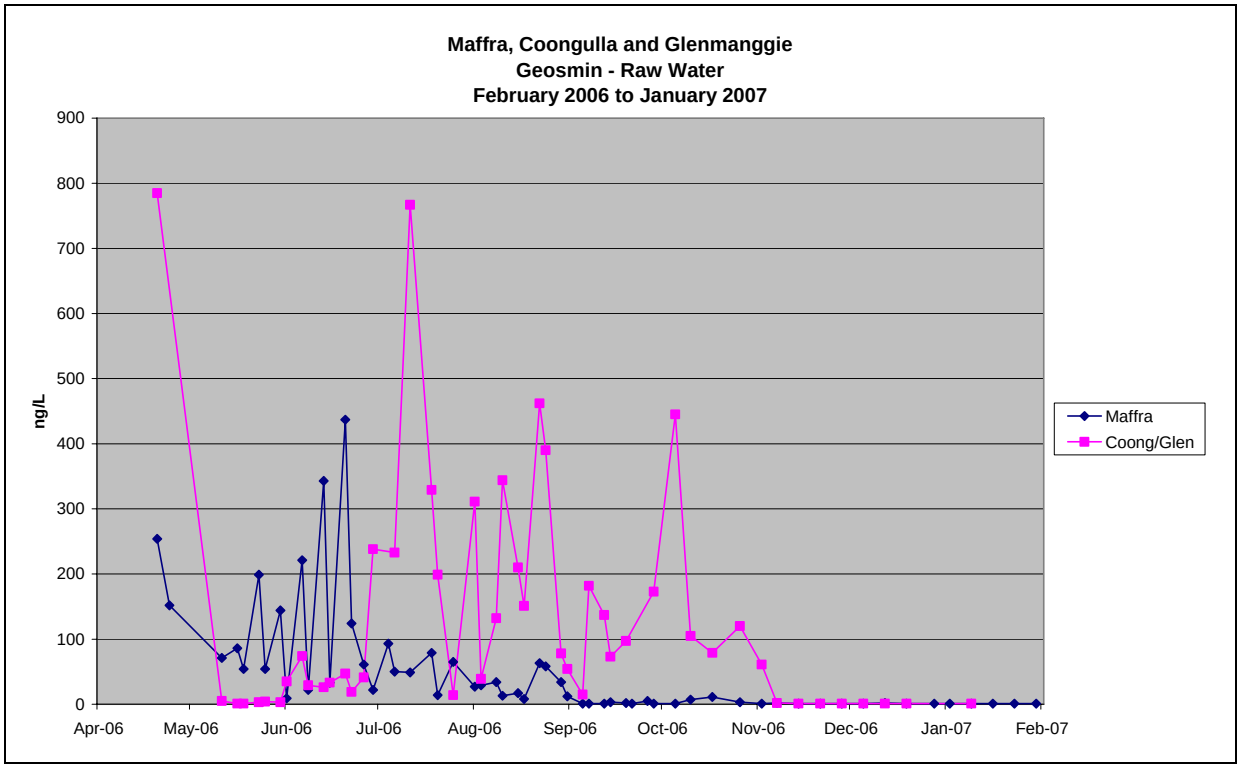


Figure 17: Geosmin results for Maffra, Coongulla and Glenmaggie – February 2006 to January 2007



All samples after 01/02/2007 returned very low Geosmin results (2 ng/L or less).

3.7.2 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.

Yarragon, Coongulla and 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. Other systems experience elevated pH results, where long residence times are experienced in the reticulation. Some towns experienced pH results below the 6.5 minimum. An investigation revealed these results were abnormal and due to a laboratory error. After the laboratory investigated the issue further, the problem was rectified and the results returned to the expected levels.

The results for pH for all the towns are provided in Figure 18.

Figure 18: pH results for all towns in 2006-07

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)
Boisdale	Weekly	52	7.9	7.3
Boolarra	Weekly	52	7.8	6.8
Briagolong	Weekly	52	7.5	6.8
Churchill	Weekly	52	8.7	7.0
Coongulla-Glenmaggie	Weekly	52	9.2	6.8
Cowwarr	Weekly	52	8.6	6.5
Drouin	Weekly	52	7.7	6.7
Erica	Weekly	52	8.9	6.7

Locality	Frequency of sampling	No. of samples	Max (mg/L)	Min (mg/L)
Heyfield	Weekly	52	8.0	6.7
Jumbuk	Weekly	52	8.4	6.9
Mirboo North	Weekly	52	8.6	6.7
Maffra	Weekly	52	7.9	6.6
Moe	Weekly	52	8.0	6.5
Morwell	Weekly	52	8.4	6.2
Neerim South	Weekly	52	7.3	6.2
Newborough	Weekly	52	8.0	6.7
Noojee	Weekly	52	8.3	6.5
Rawson	Weekly	52	8.6	6.8
Rokeby-Buln Buln	Weekly	52	8.4	6.5
Rosedale	Weekly	52	8.9	6.8
Sale-Wurruk	Weekly	52	8.9	7.2
Seaspray	Weekly	52	8.8	6.9
Stratford	Weekly	52	8.5	6.9
Thorpdale	Weekly	52	8.9	6.2
Toongabbie	Weekly	52	8.7	6.5
Trafalgar	Weekly	52	8.8	6.6
Traralgon	Weekly	52	8.1	6.4
Traralgon South-Hazelwood North	Weekly	52	8.1	6.0
Tyers-Glengarry	Weekly	52	8.3	6.6
Warragul	Weekly	52	8.0	6.6
Warragul South	Weekly	52	8.5	6.7
Willow Grove	Weekly	52	8.3	6.6
Yallourn North	Weekly	52	8.4	6.5
Yarragon	Weekly	52	9.2	6.6
Yinnar	Weekly	52	9.0	7.0

3.8 ANALYSIS OF RESULTS

3.8.1 Comparison to previous years

The water quality parameters required under the SDWA 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 Appendix 1 for trend information on the major towns for each of the water quality reporting standards.

Turbidity and Trichloroacetic Acid – Lowering in Toongabbie *(Refer to Appendix 1 – 10.2.5& 10.7.1)*

The connection of the Toongabbie and Cowwarr townships to the treated water supply from the Tyers Water Treatment Plant occurred in April 2006. These towns had a history of poor water quality and disinfection performance as the water was untreated and disinfected only. The connection to the Tyers system now provides a reliable high quality treated water supply for customers for these two townships with a marked improvement in the reported turbidity and Tricloroacetic acid levels.

THM's – Increasing in Boisdale *(Refer to Appendix 1 – 10.4.2)*

Although below the *SDWA* compliance levels, elevated THM levels were recorded in the Boisdale system during April and May 2007. The reason for this is unknown as the water supplied to the Boisdale system comes directly from the Maffra Water Treatment Plant which also supplies the systems of Maffra and Stratford which did not experience similar levels.

Trichloroacetic Acid – Lowering in Rawson/Erica *(Refer to Appendix 1 – 10.7.1)*

During 2006 a new 0.9 ML/day water treatment plant was constructed and commissioned at Rawson, to supply the Rawson and Erica town systems. These systems had a history of experiencing poorer water quality which periodically produced water outside of the *SDWA* water quality standards. The new water treatment plant has achieved all performance requirements and now provides a reliable high quality treated water supply for customers of these two townships.

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 DHS under section 22 of the *SDWA 2003*.

Due to a malfunction at the Traralgon Water Treatment Plant in August 2006, treated water of a higher than usual turbidity level entered the clear water storage. This resulted in reduced disinfection levels for a period of time. DHS were notified under a SDWA Section 22 notification of this incident. This event is summarised in Figure 19.

Figure 19: 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
Traralgon	14/08/06	Water entry point (clear water storage) and reticulation	Highly turbid water entered the clear water storage due to WTP malfunction	Traralgon	Department of Human Services (DHS) Notification under Section 22 *SDWA* 15/08/06	No

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 but coud 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 Figure 20 and 21. A summary of how Gippsland Water responds to such complaints is provided below.

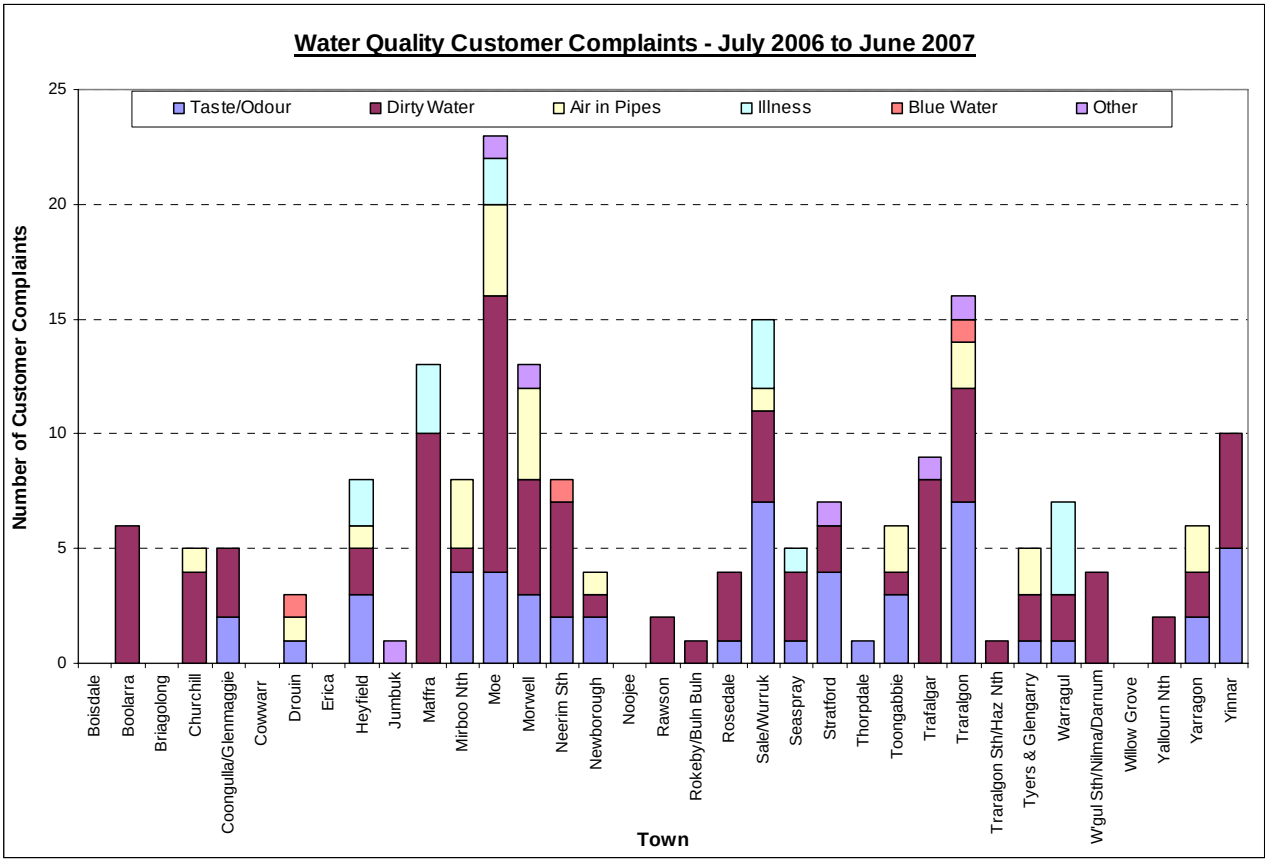
Gippsland Water records and reports on customer complaints relating to dirty water, taste and odour problems, illness/health concerns, blue water and appearance of air-filled or "white" water received from the tap.

Figure 20: Water quality complaints per 100 customers supplied

Type of complaint	No. of complaints	No. of complaints per 100 customers supplied
Discoloured water	96	0.162
Taste / odour	54	0.091
Blue water	3	0.005
Air in water	23	0.039
Illness	15	0.025
Other	7	0.012

The "illness" category was included in the complaints reporting during the 2006-07 reporting period. These complaints had previously been recorded as "other" and included any reportable concerns by customers regarding health issues such as skin and throat irritations, stomach complaints, etc., that the customers had felt may have been caused by the water supply. Often these complaints are just an enquiry with no verification with supporting medical information, and haven't to date proved to genuinely be attributed to water quality. The information is still considered important and investigated to assist with identification of potential localised issues.

Figure 21: Customer complaints summary for 2006-07



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 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.

7 UNDERTAKING UNDER SECTION 30 OF THE ACT

7.1 CURRENT UNDERTAKING

Due to the non-compliance experienced for Trichloroacetic acid in the Rawson and Erica water supply system during the 2005-06 reporting period, Gippsland Water entered into an undertaking with DHS in November 2005 to build a water treatment plant in Rawson to supply fully treated water to the townships of Erica and Rawson by early 2007.

The plant was commissioned in December 2006 and the undertaking signed off by DHS in May 2007 after water quality results confirmed the plant achieved all performance requirements. A reliable high quality treated water supply is now provided to customers of these two systems.

8 REVIEW OF THE RISK MANAGEMENT PLAN

As part of Gippsland Water's internal continuous improvement program and risk management process, a detailed review of our risk management plans was undertaken between July and October 2006.

The review included an assessment of the effectiveness of the current procedures involved in delivering safe drinking water. The review also identified critical control points and potential risks in each water supply system, then utilising a risk ranking tool assessed each risk and a schedule for action was prepared.

Annual reviews of the Risk Management Plans actions are undertaken by Gippsland Water to assess action schedule and add new actions as identified during the review.

9 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.**

10 REFERENCES

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

Department of Human Services *2006-07 Annual report format- Drinking Water Regulation Guidance Note 9 June 2007*

Safe Drinking Water Act 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 2007 period, for each major water system for the drinking water quality standards.

10.1 *E.COLI* TRENDS

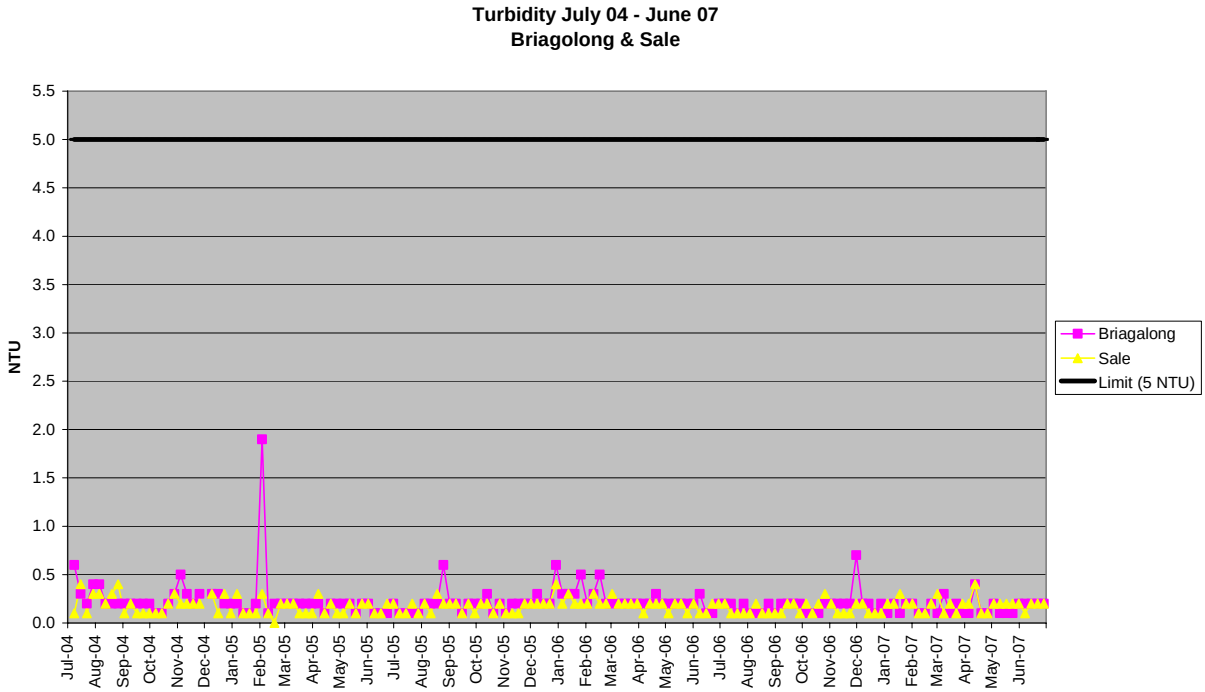
Trends for *E.coli* were not produced due to the consistent reporting of <1 orgs/100ml. During the previous three report periods (2004-05, 2005-06 and 2006-07) Gippsland Water has only had two samples across all localities show *E.coli*:

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

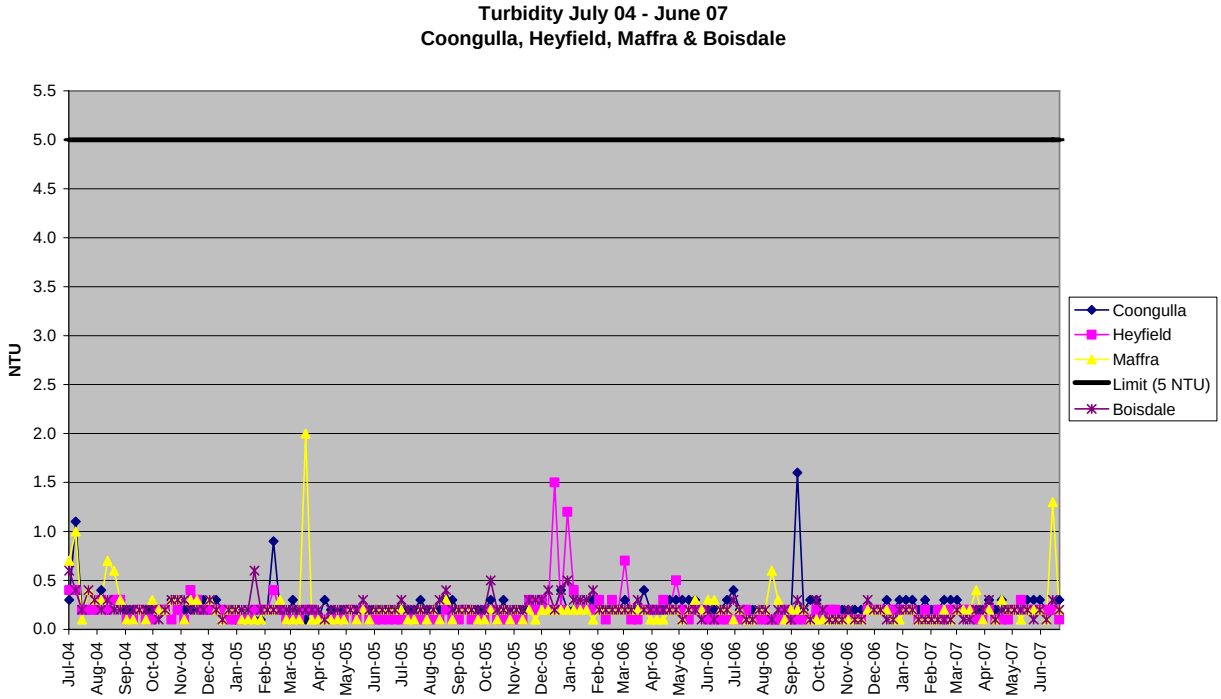
No samples recorded a positive *E.coli* during the 2006-07 reporting period.

10.2 TURBIDITY TRENDS

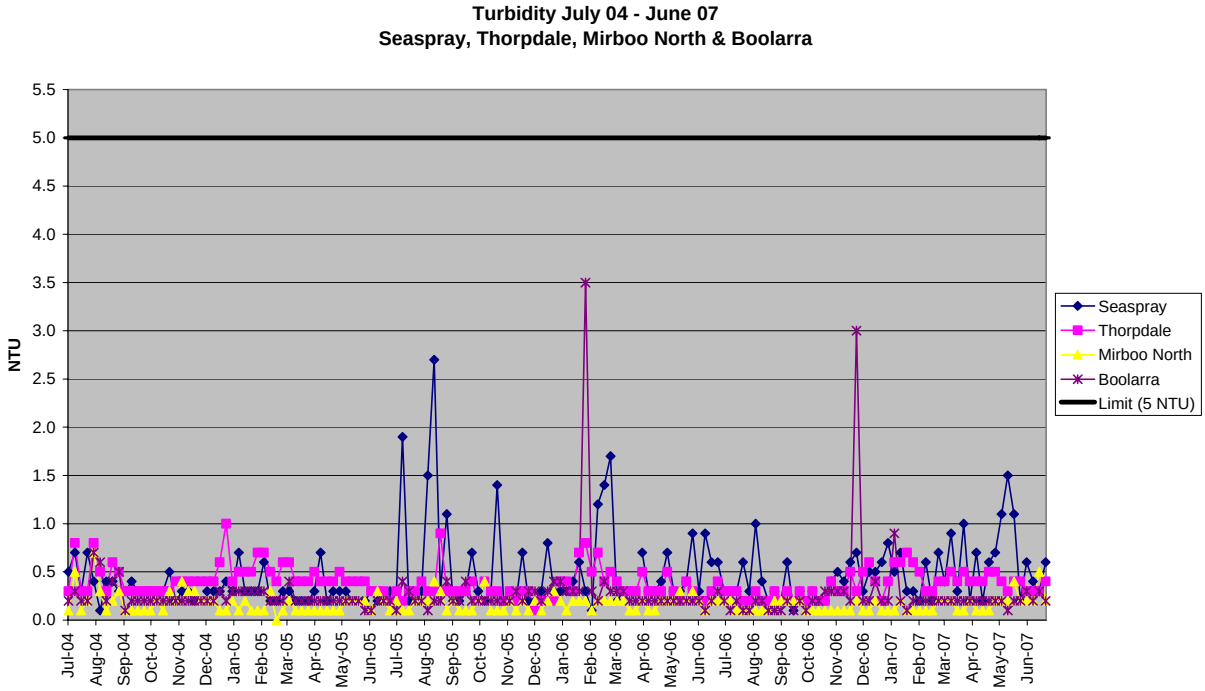
10.2.1 Briagolong and Sale



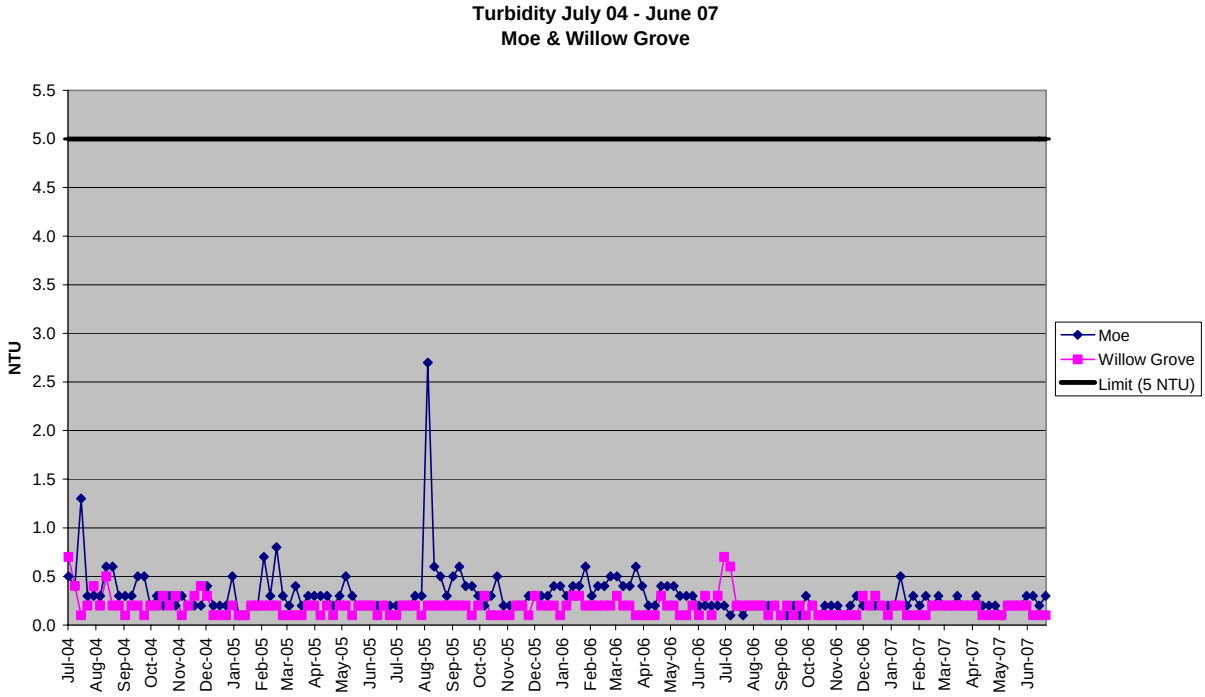
10.2.2 Coongulla, Heyfield, Maffra, and Boisdale



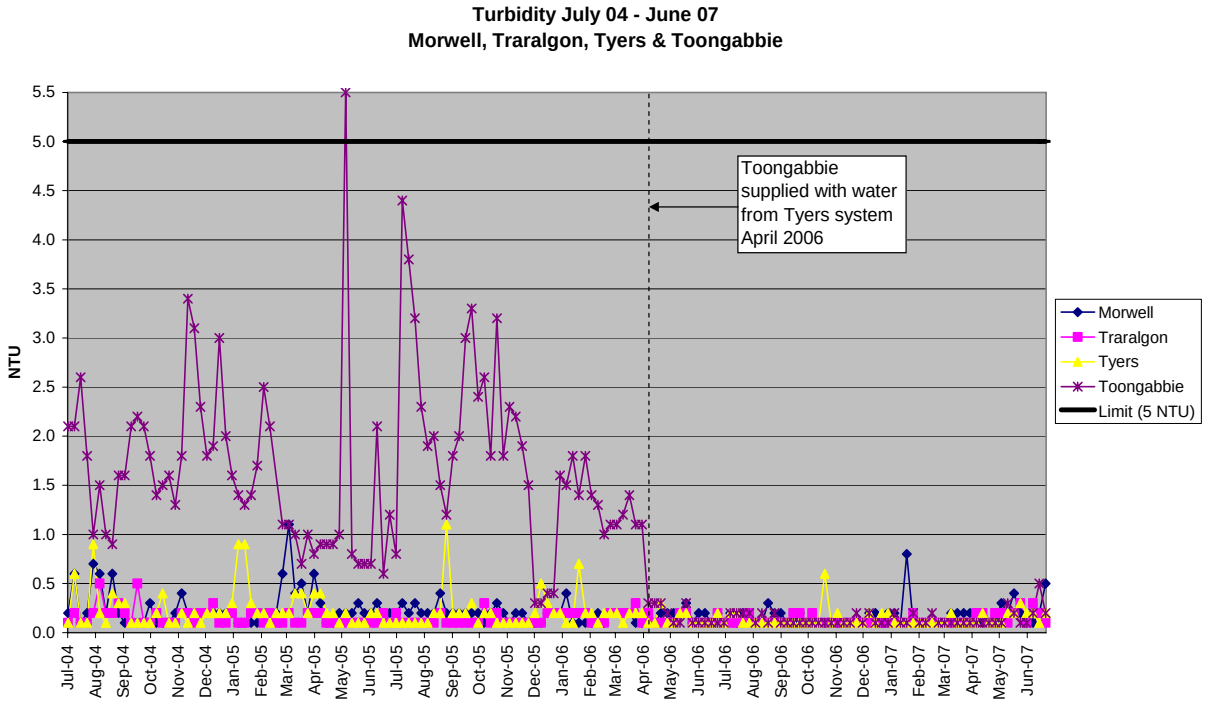
10.2.3 Seaspray, Thorpdale, Mirboo North, and Boolarra



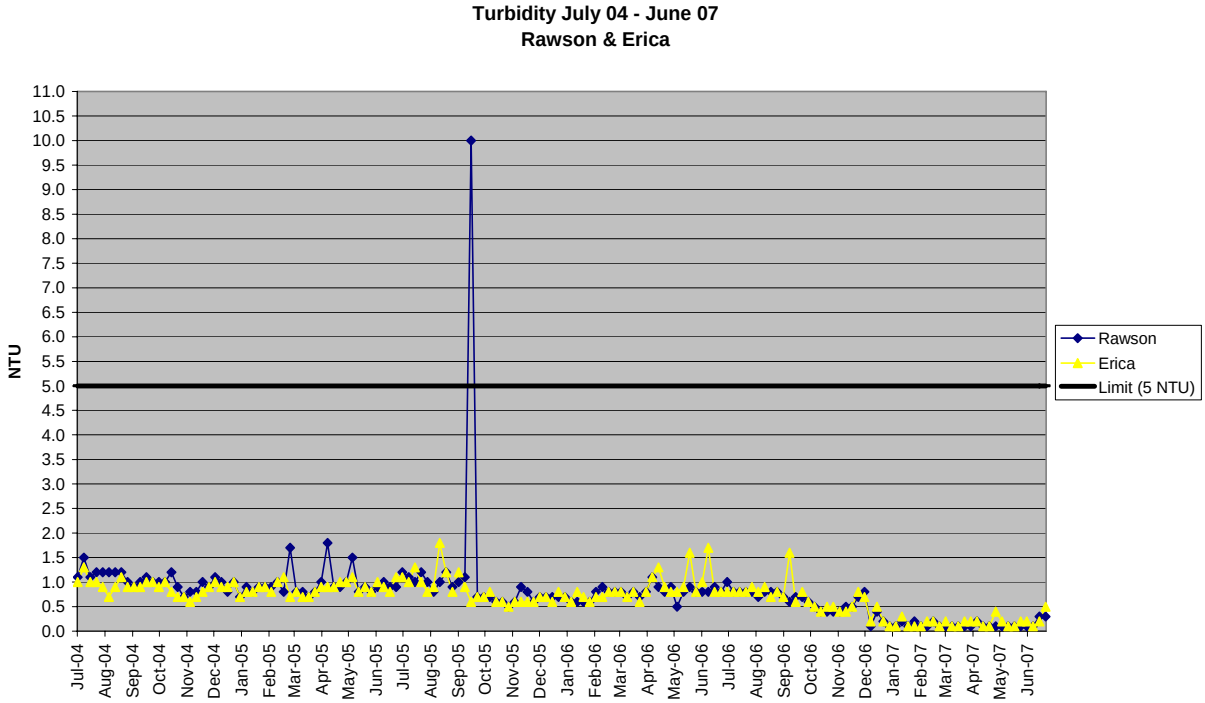
10.2.4 Moe and Willow Grove



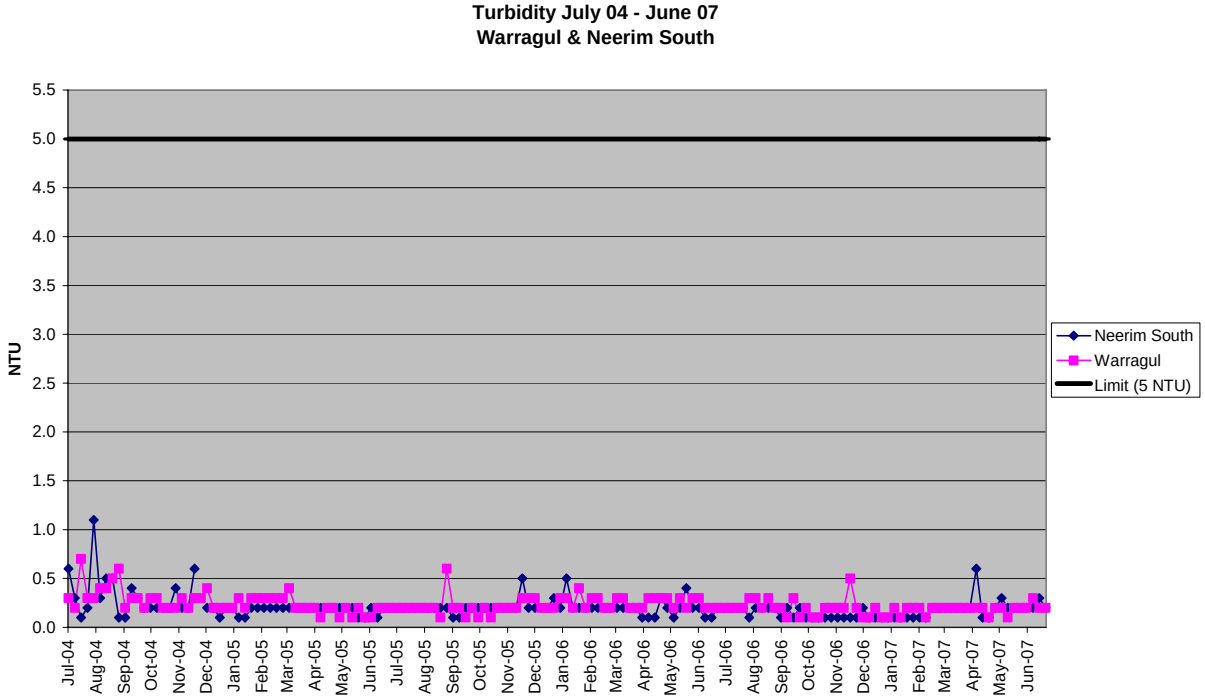
10.2.5 Morwell, Traralgon, Tyers, and Toongabbie



10.2.6 Rawson and Erica

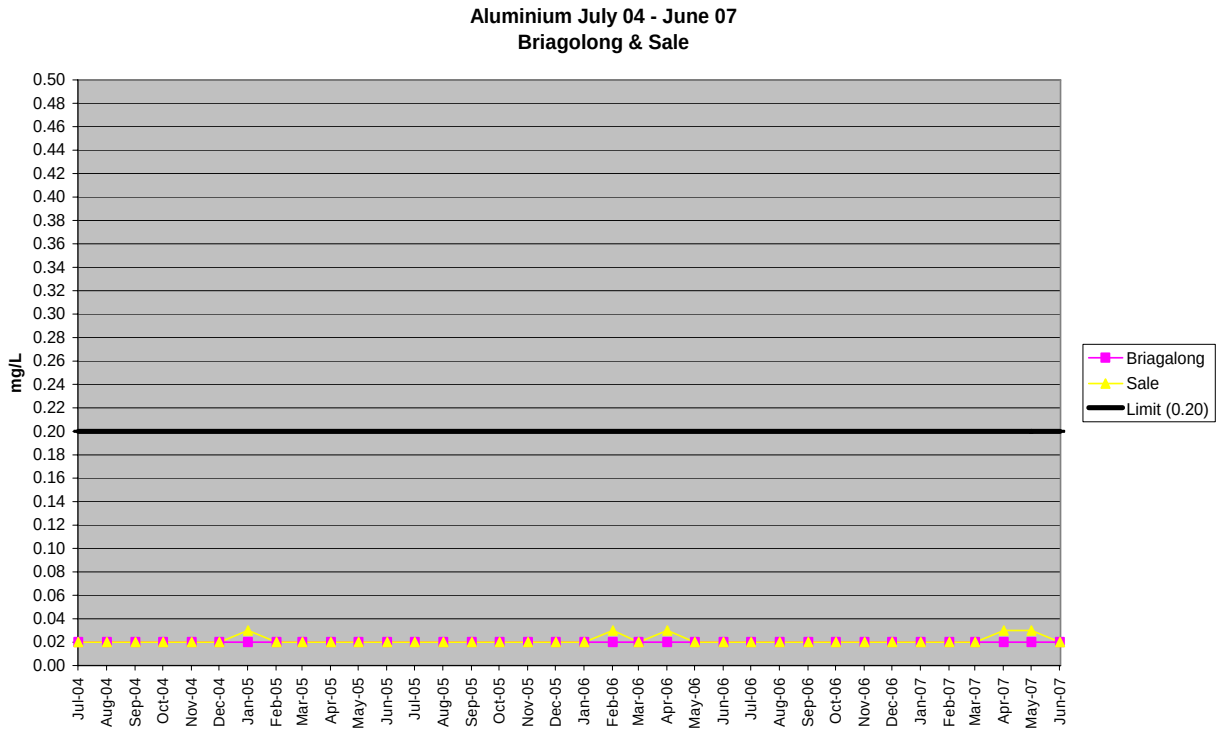


10.2.7 Warragul and Neerim South

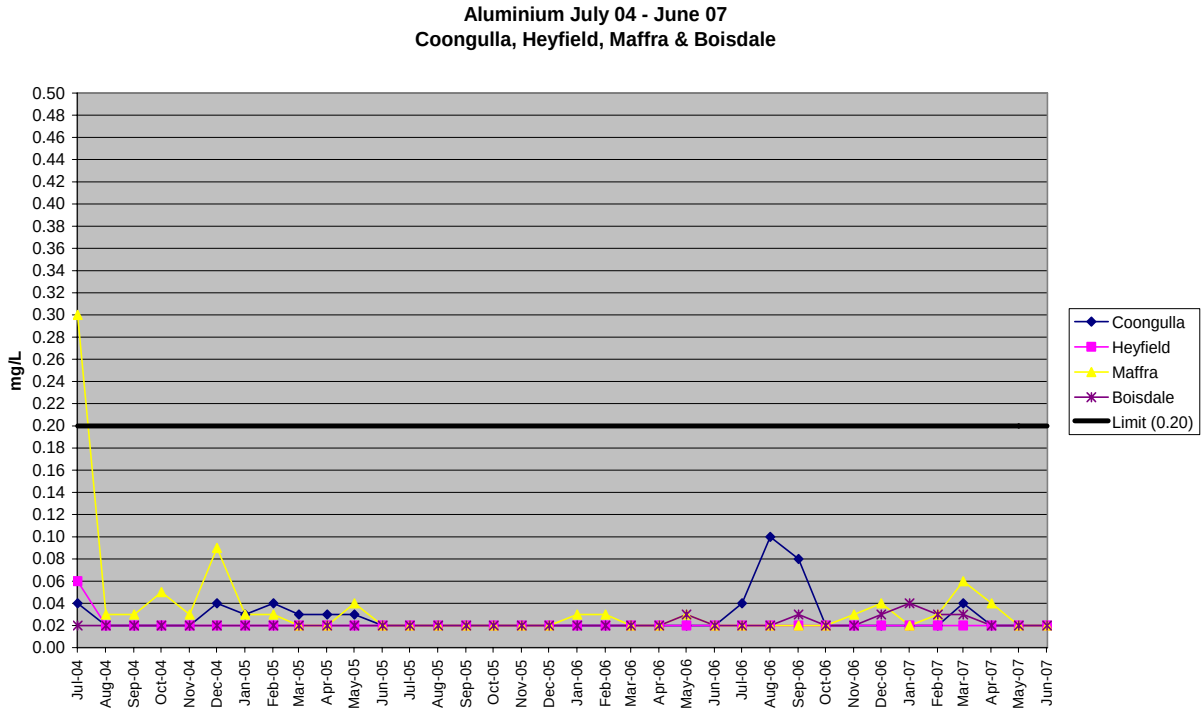


10.3 ALUMINIUM TRENDS

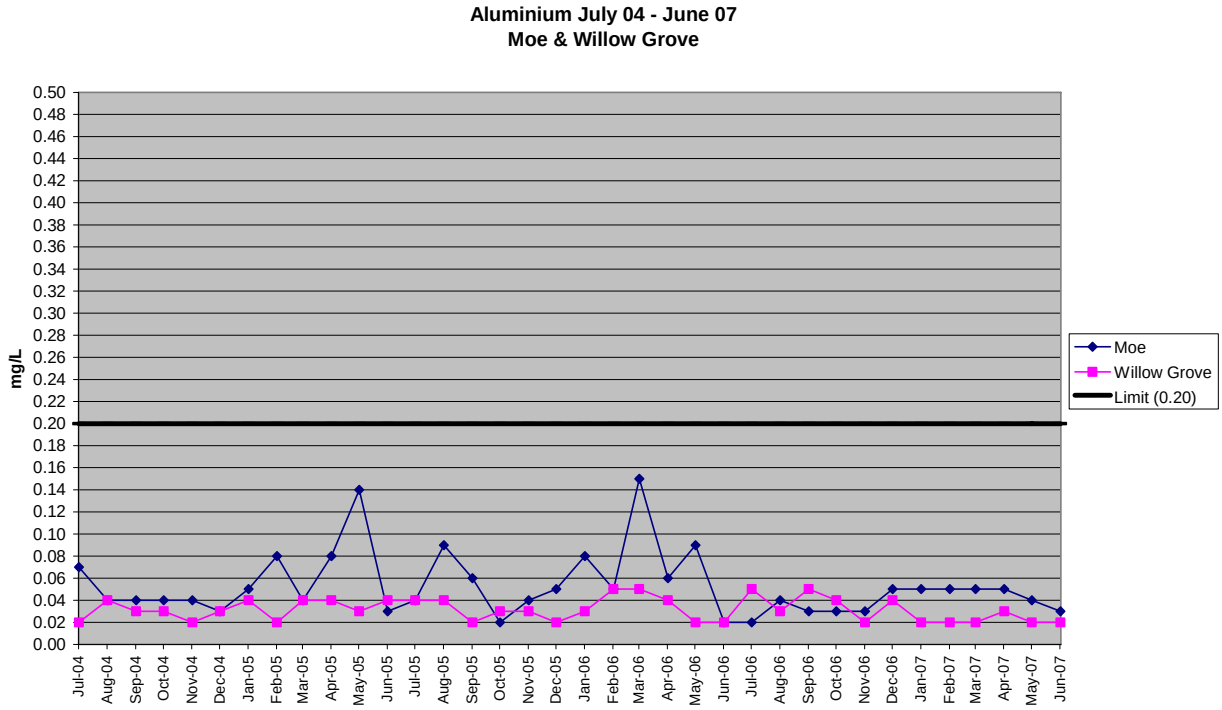
10.3.1 Briagolong and Sale



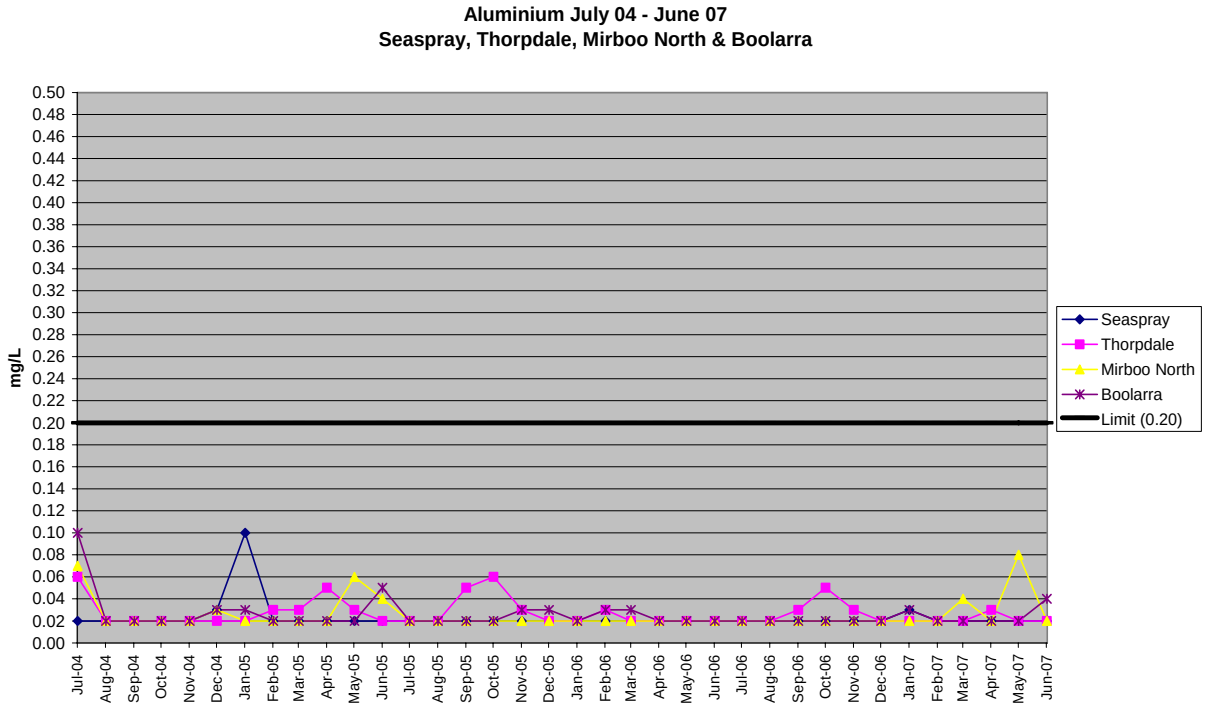
10.3.2 Coongulla, Heyfield, Maffra, and Boisdale



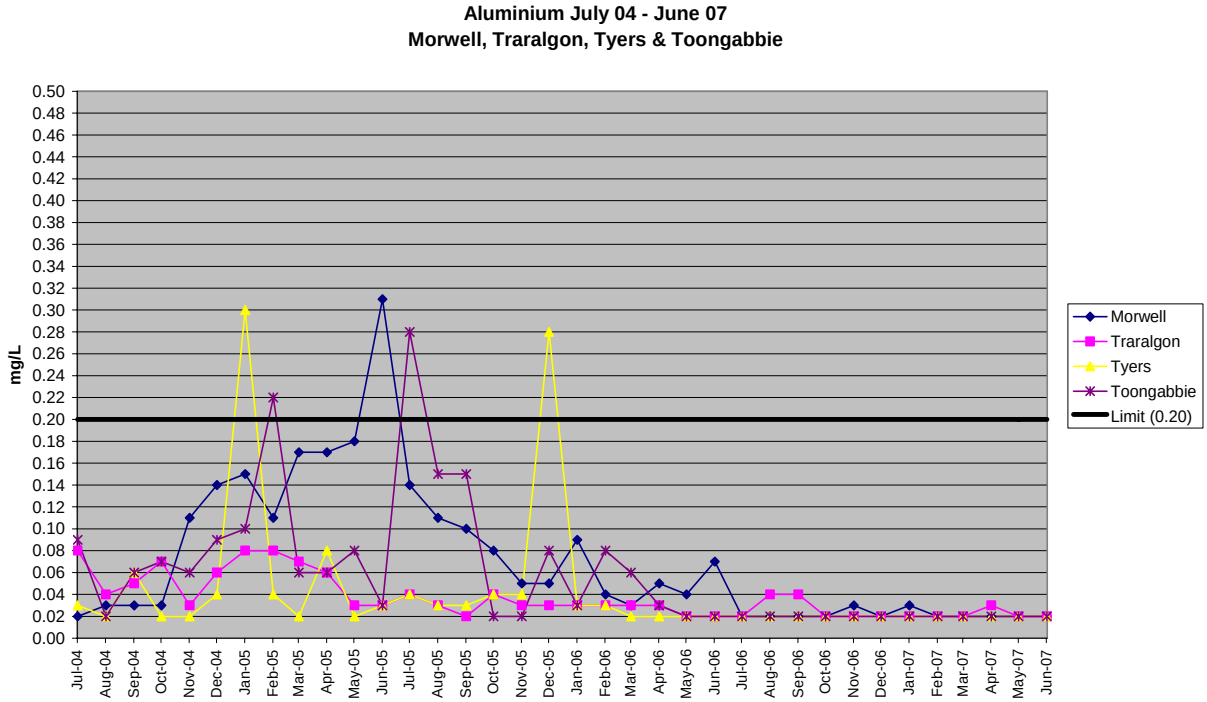
10.3.3 Moe and Willow Grove



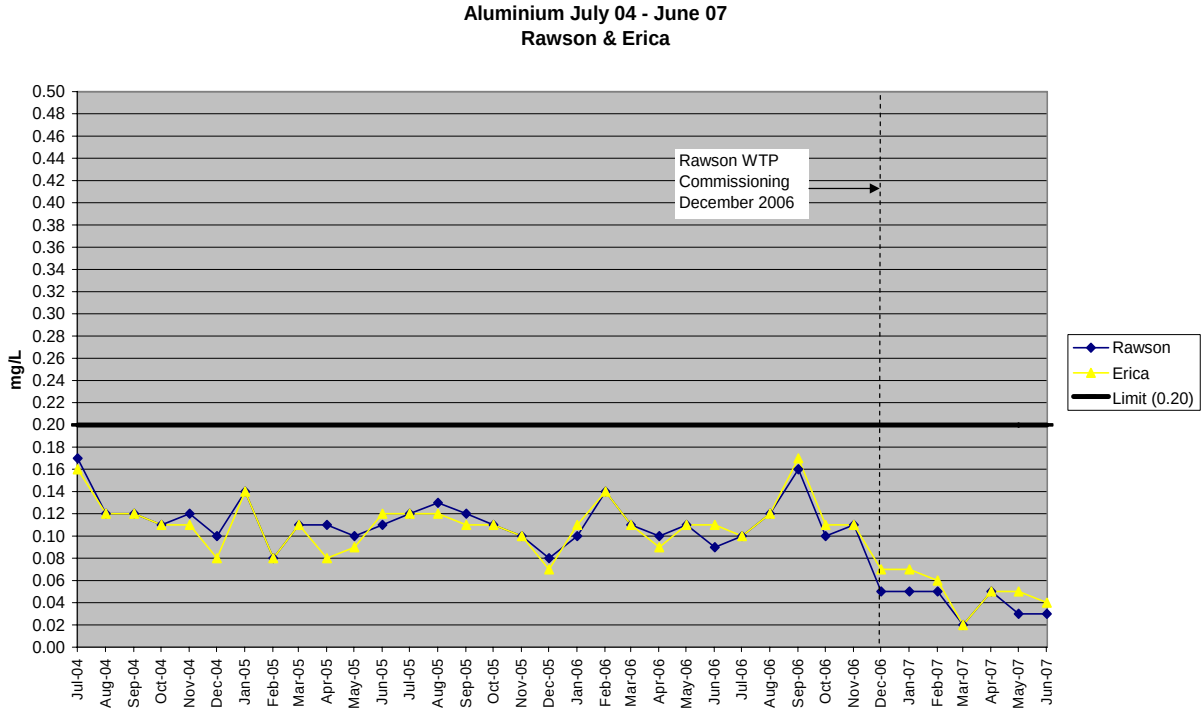
10.3.4 Seaspray, Thorpdale, Mirboo North, and Boolarra



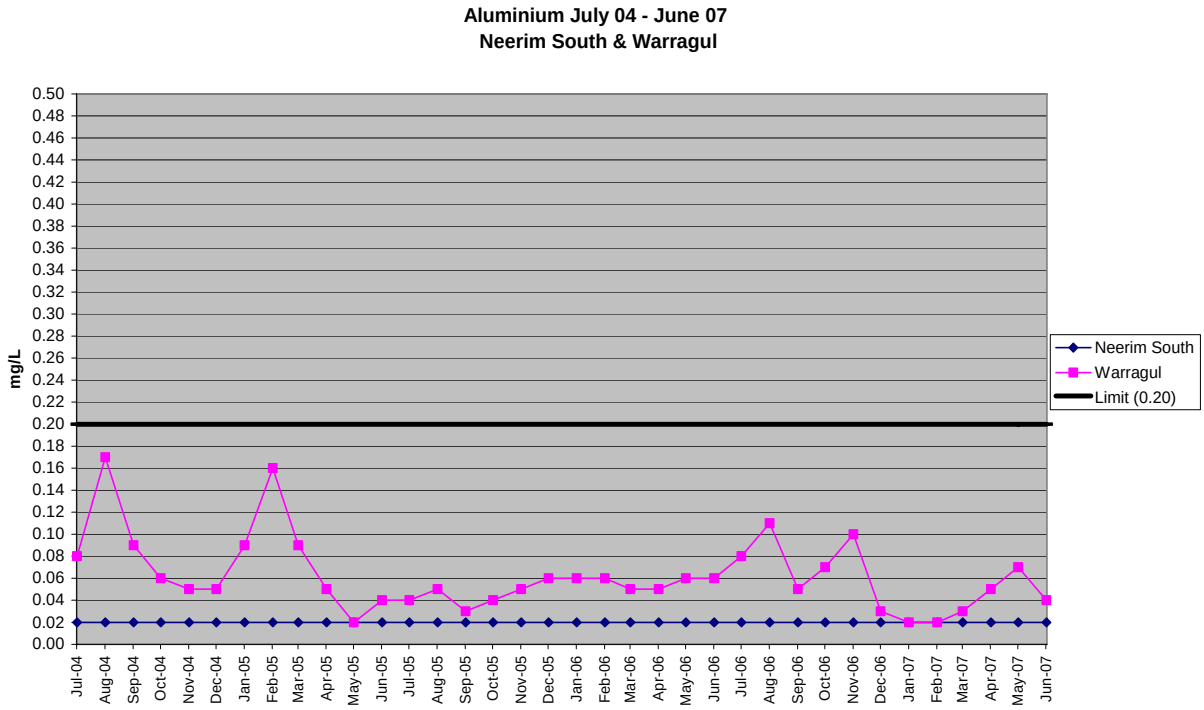
10.3.5 Morwell, Traralgon, Tyers, and Toongabbie



10.3.6 Rawson and Erica

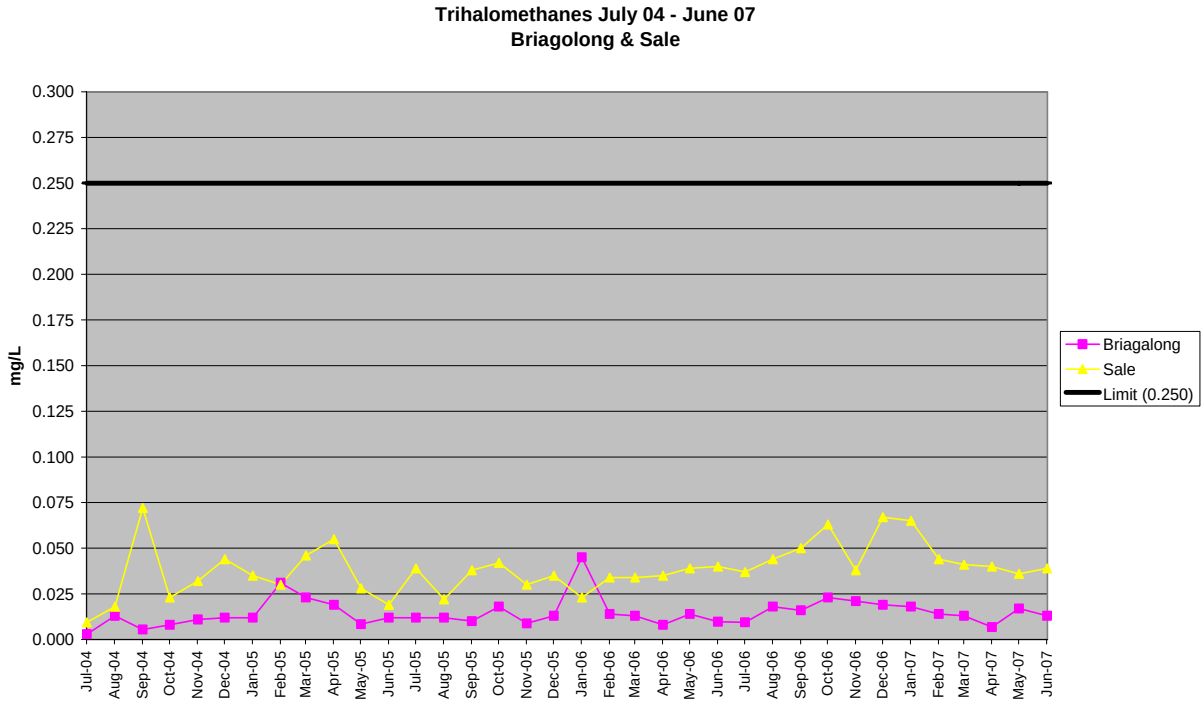


10.3.7 Neerim South and Warragul

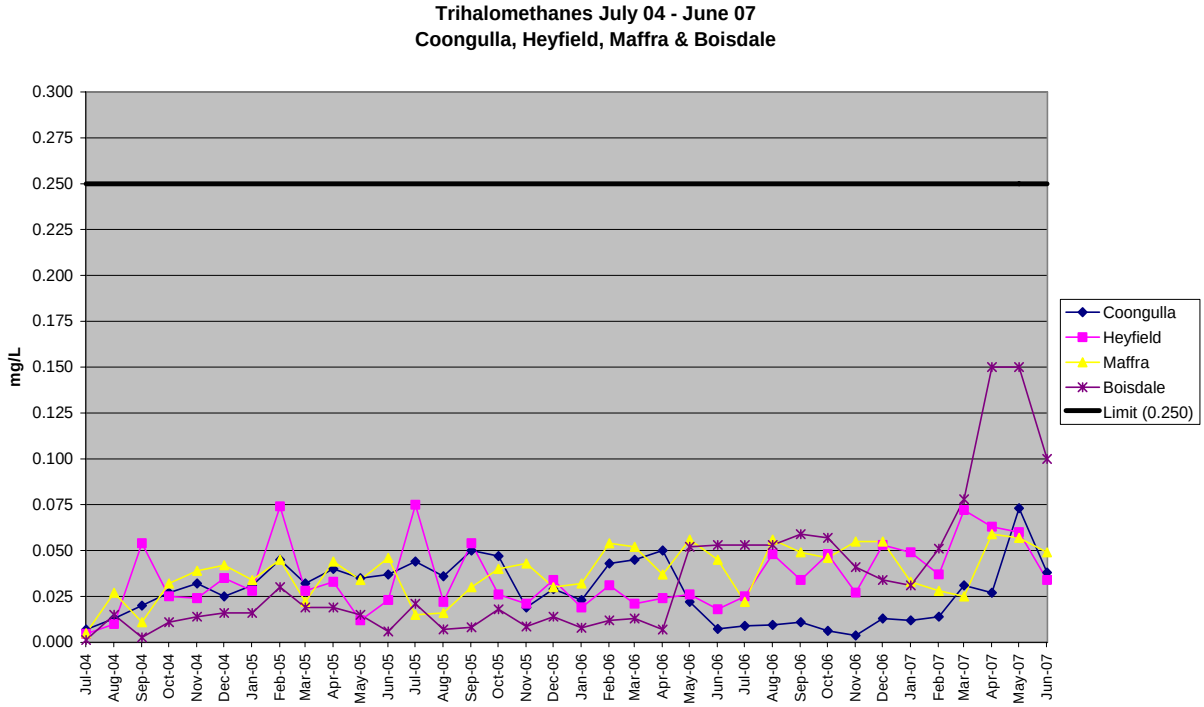


10.4 TRIHALOMETHANE TRENDS

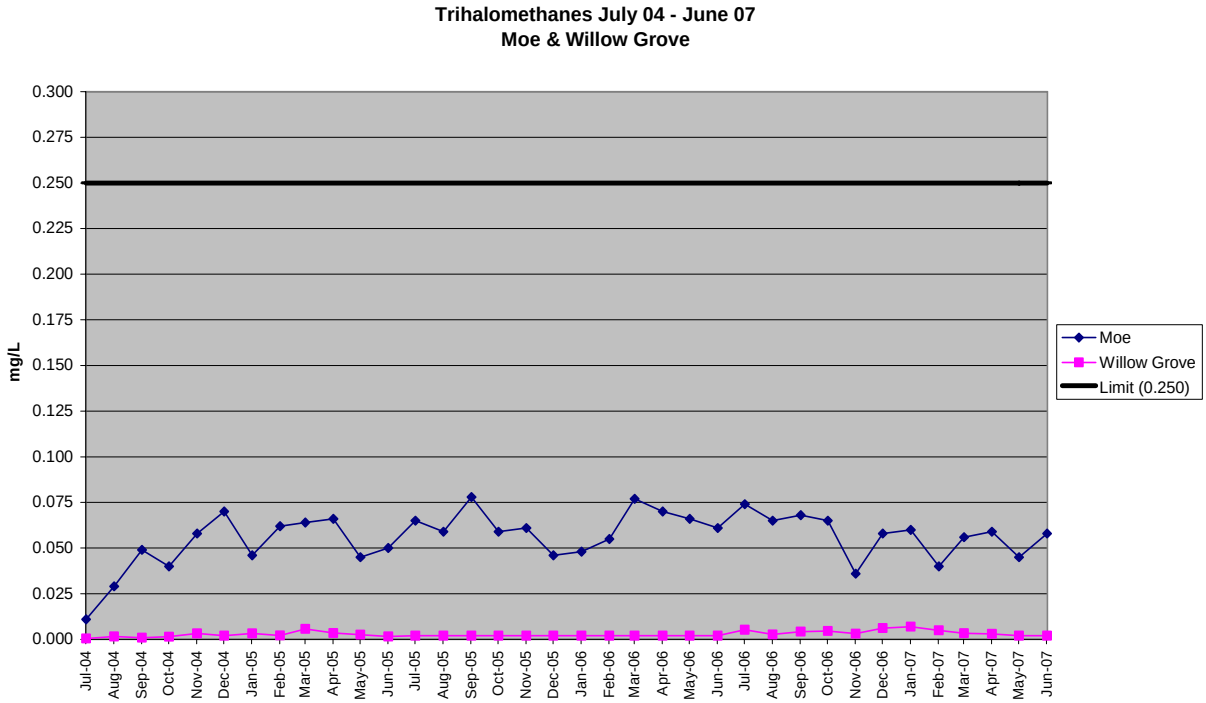
10.4.1 Briagolong and Sale



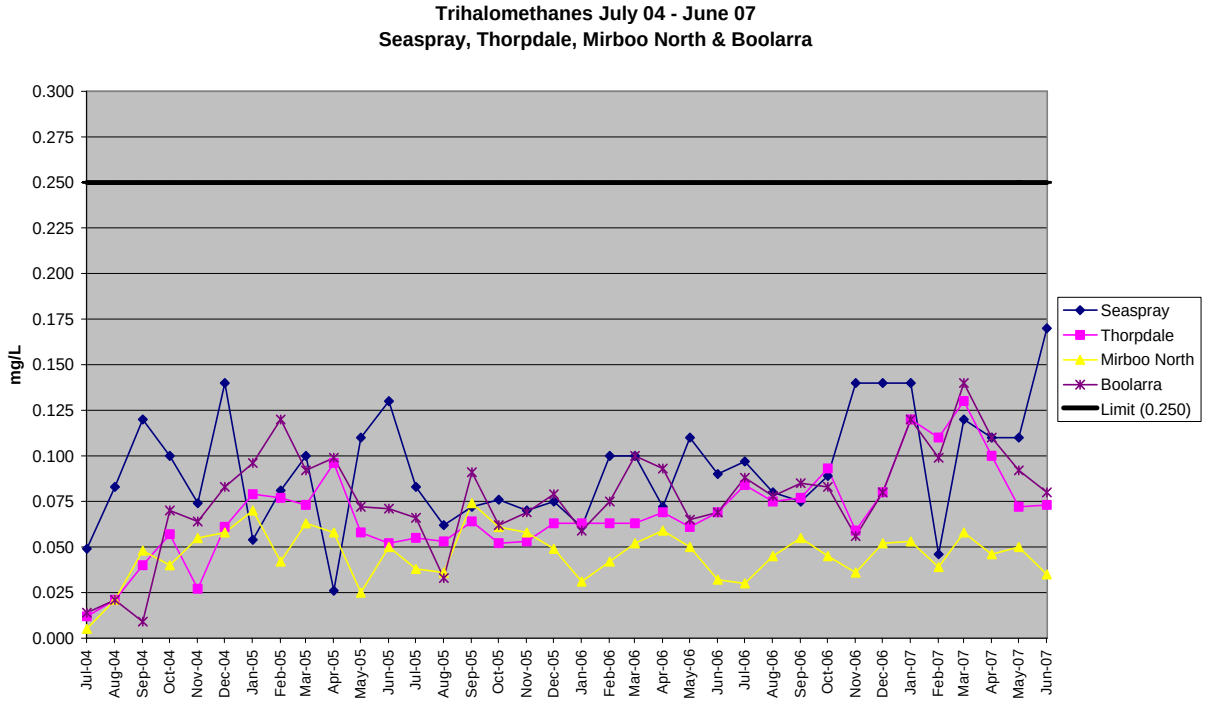
10.4.2 Coongulla, Heyfield, Maffra, and Boisdale



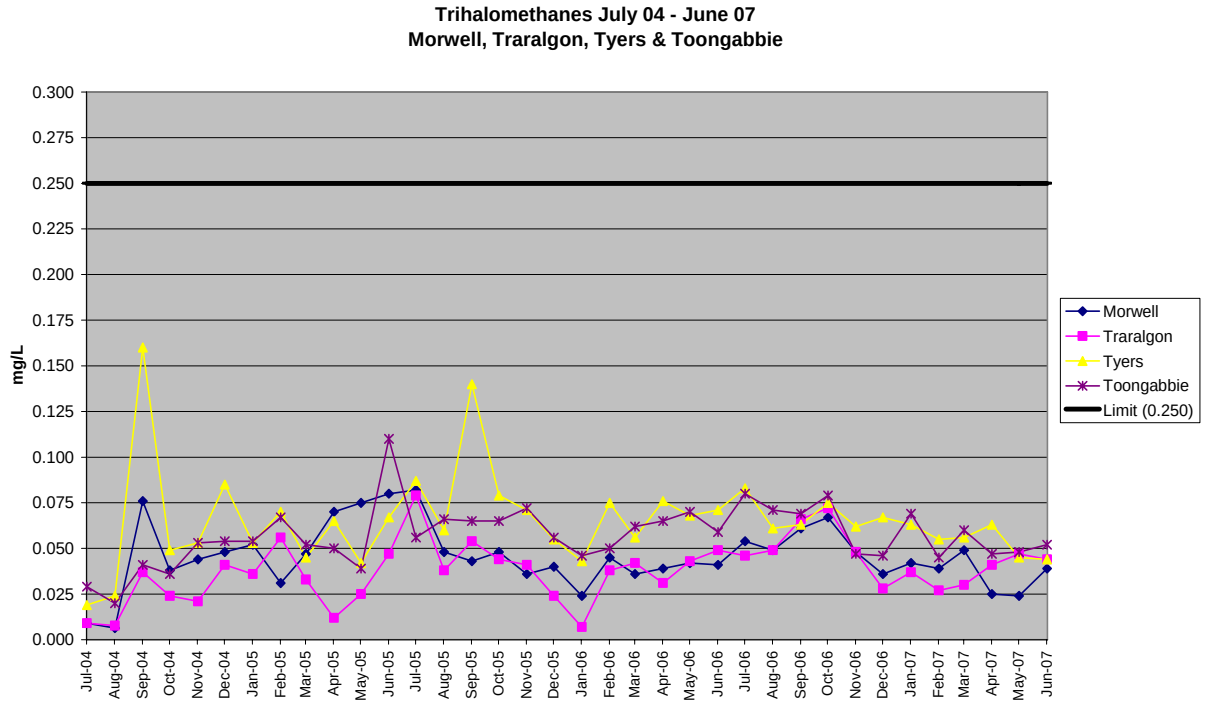
10.4.3 Moe and Willow Grove



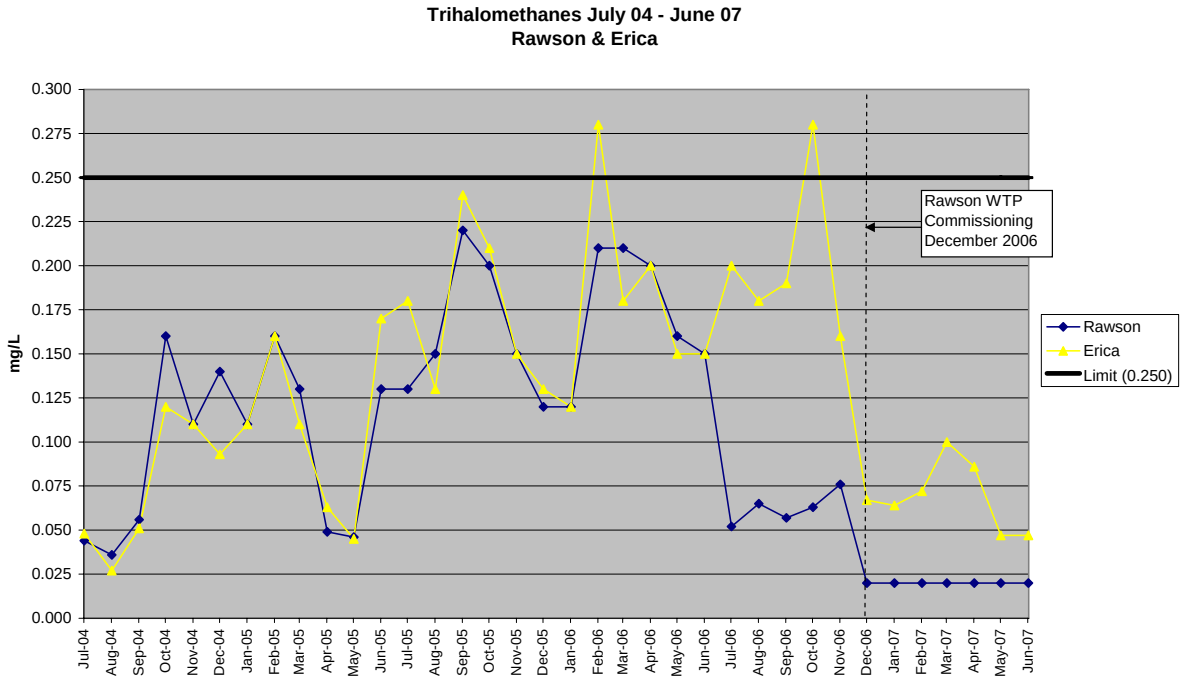
10.4.4 Seaspray, Thorpdale, Mirboo North, and Boolarra



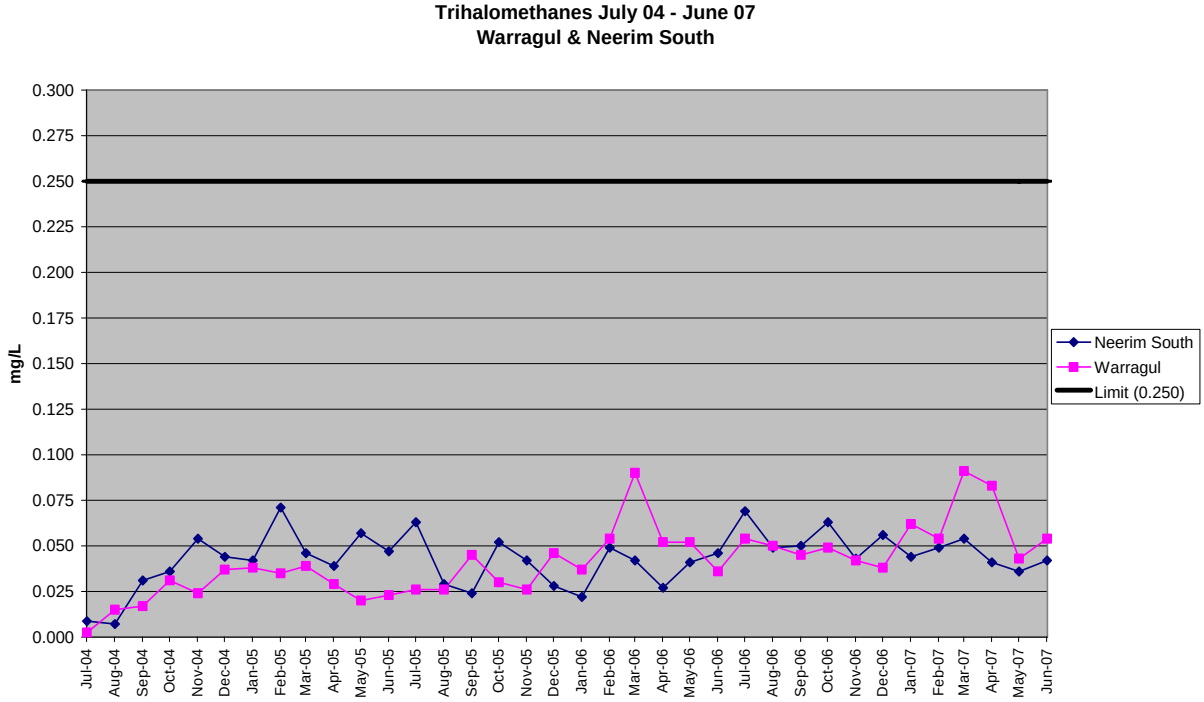
10.4.5 Morwell, Traralgon, Tyers, and Toongabbie



10.4.6 Rawson and Erica



10.4.7 Warragul and Neerim South



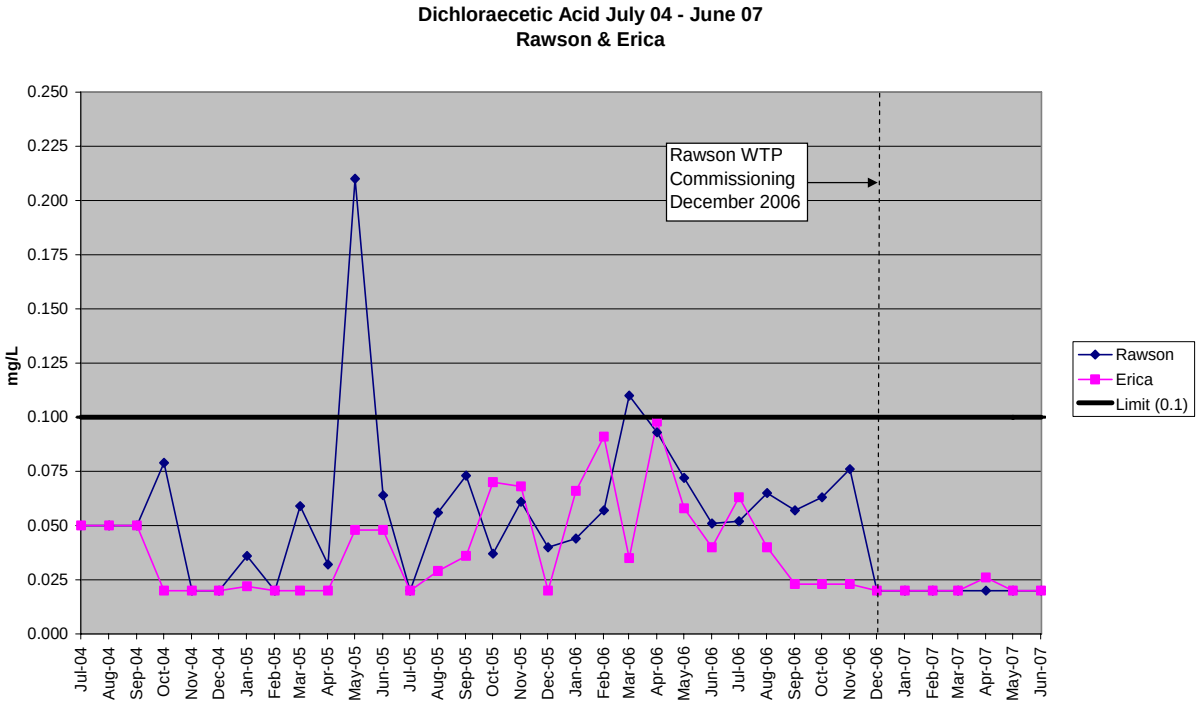
10.5 CHLOROACETIC ACID TRENDS

10.5.1 All localities

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

10.6 DICHLOROACETIC ACID TRENDS

10.6.1 Rawson and Erica

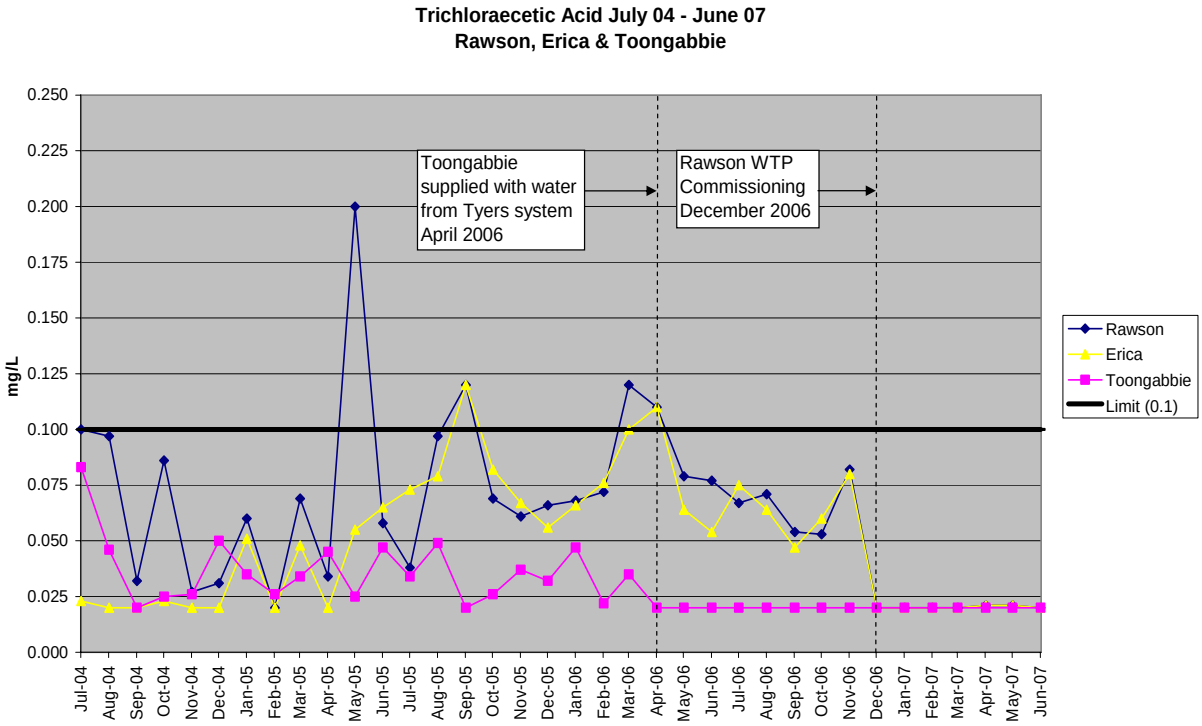


10.6.2 All other localities

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

10.7 TRICHLOROACETIC ACID TRENDS

10.7.1 Rawson, Erica and Toongabbie



10.7.2 All other localities

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