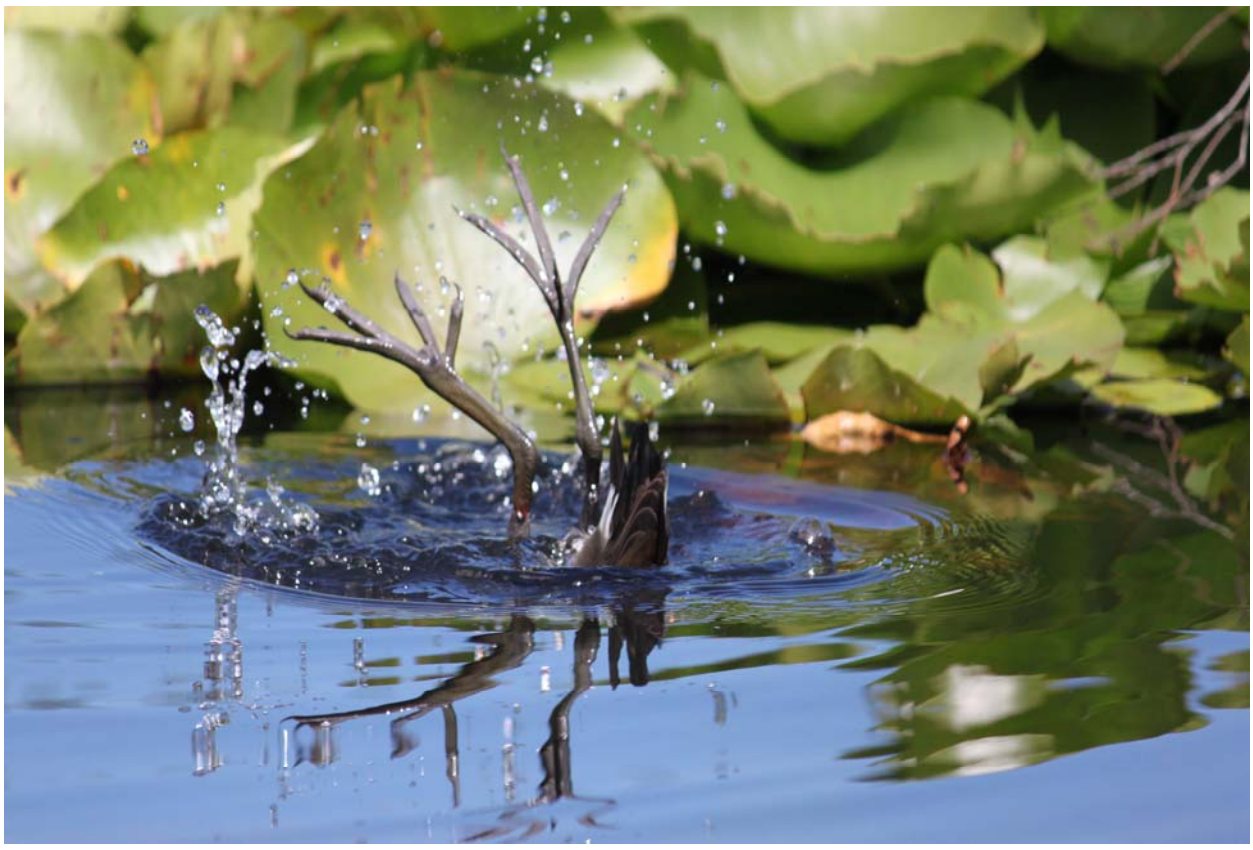
GIPPSLAND WATER

# Gippsland Water 2010-11 Annual Report on Drinking Water Quality



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**Cover Photograph**: Winner of Gippsland Water's - National Water Week Photo Competition - Adult category, themed around "Water in Gippsland" – taken by Mathew Fowler of Traralgon, Titled "Bobble Duck", a remarkable photograph that captures a bird in dive motion.

# EXECUTIVE SUMMARY

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

The SDWA came into effect on 1 July 2004 and is the first Act in Victoria to deal specifically with the regulation of drinking water supplies.

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

A region-wide water quality monitoring program tests the quality of the drinking water present at customer taps in accordance with the Safe Drinking Water Regulations 2005 (SDWR). A summary of the results for the reporting period of July 2010 to June 2011 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).

Gippsland Water successfully complied with the obligations imposed by section 7(1) of the SDWA during the 2010-11 reporting period.

As part of Gippsland Water's drinking water quality monitoring program over 12,000 tests were performed on samples taken from customer taps against the requirements of the SDWA. Of all the samples, one was found to be non-compliant for *Escherichia coli* (*E. coli* ) - (Traralgon, March 2011). Follow up investigations and immediate actions identified that this result did not represent a risk to public health.

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

Gippsland Water supplies 65,202 properties with water and received 182 complaints regarding water quality (discoloured, air in water, blue water, suspected illness, taste, odour, and other) during the reporting period. Gippsland Water's extensive customer complaint response procedure ensures all complaints are responded to effectively and in a timely manner. There have been no outstanding or major issues arising from the customer complaints process.

Gippsland Water will continue to strive to improve its water treatment and management processes to ensure our customers are supplied with water that is safe and complies with the requirements of the SDWA, associated regulations and the *Australian Drinking Water Guidelines 2004* (ADWG).

# 1 INTRODUCTION

## 1.1 CHARACTERISATION OF THE SYSTEM

The Central Gippsland Region Water Corporation, trading as Gippsland Water, was constituted on 21 December 1994 under the *Water Act 1989*.

Gippsland Water is the second largest regional water corporation in Victoria in terms of revenue earned and is the largest in terms of the total volume of water supplied and wastewater collected. It manages 17 water treatment plants, 14 wastewater treatment plants and two ocean outfalls.

Gippsland Water provides water and wastewater services to customers in the central Gippsland region of Victoria. Its geographic region stretches from Drouin in the west to Stratford in the east, and from Mirboo North in the south to Rawson and Briagolong in the north.

Gippsland Water manages five business streams, one of which is the provision of water services. Its region consists of 42 towns with approximately 65,202 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 (SDWR).

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

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

### Our mission

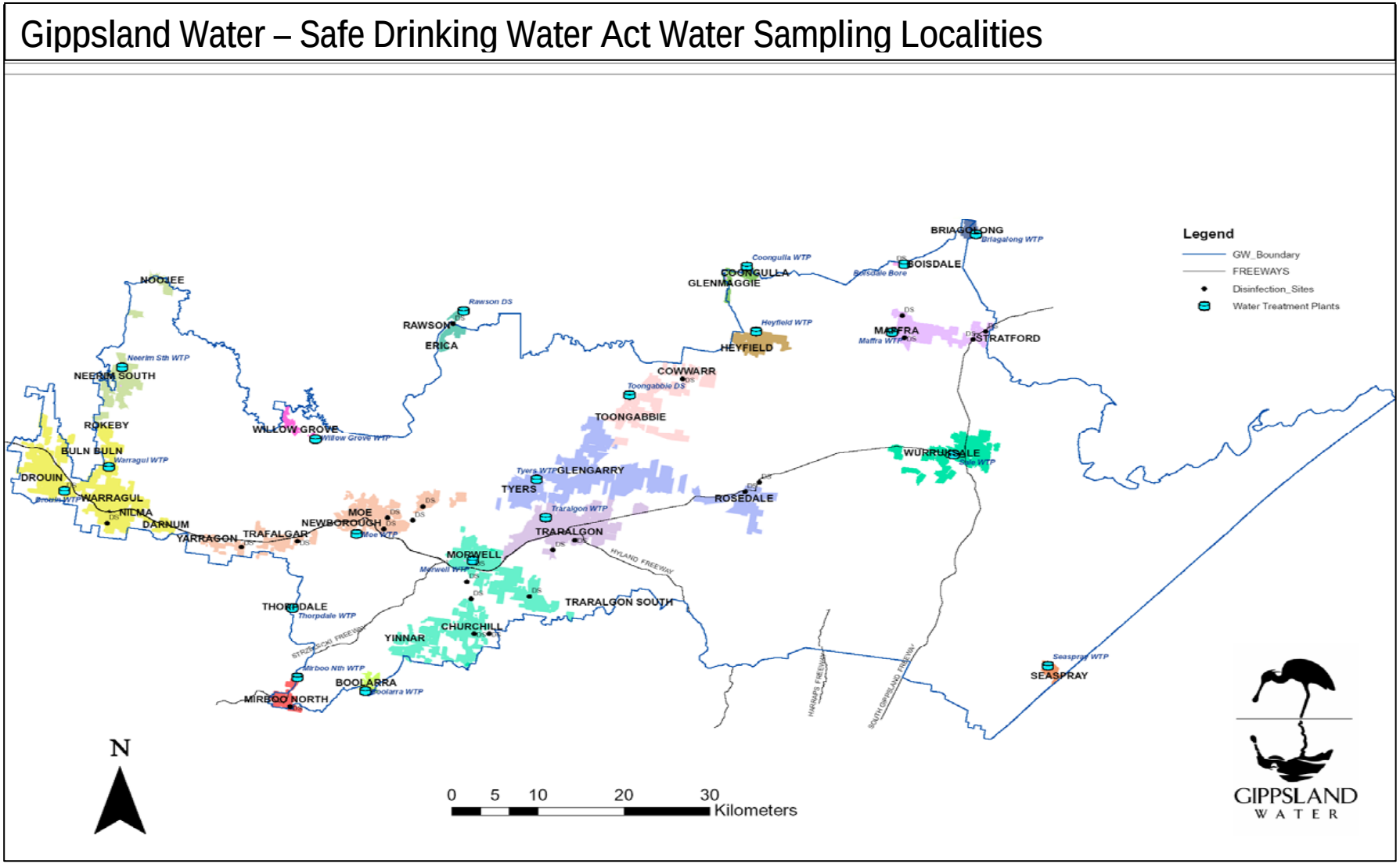
We will manage the resources in our care in a manner that secures social, environmental and economic benefits to our customers, stakeholders and the Gippsland region.

### Our vision

We will deliver value in sustainable water and waste management within central Gippsland.

### 1.1.1 Map of the Gippsland Water system

**Figure 1: Overview of water supply system operated by Gippsland Water**



### 1.1.2 Source of water

Gippsland Water operated 17 water treatment systems supplying 35 water sampling localities and 42 towns in 2010-11. The water for these systems is sourced from a variety of water supplies including stream off-takes, reservoirs, and groundwater (bore water). The table below provides information on where the raw water is sourced for each water sampling locality, and identifies the raw water storage - if one exists prior to each water treatment plant.

**Table 1: Gippsland Water Locality Water Source and Water treatment process**

| Locality | Population[1] | Source water | Storage | Water Treatment Plant | Treatment process | Added substances | Comments |
|---|---|---|---|---|---|---|---|
| Maffra | 5390 | Macalister River | N/A | Maffra | Coagulation, Flocculation<br>Primary Solids Separation - (Clarification)<br>Secondary Solids Separation - (Sand Filters)<br>Primary and Secondary Disinfection, pH Correction, Fluoridation | Soda Ash<br>Hydrofluorosilicic acid<br>Alum<br>Polymer LT22, PACl-23,<br>Chlorine (gas)<br>Sodium Hypochlorite<br>Powdered Activated Carbon (PAC) | PAC use as required to treat for taste and odour compounds. PACl-23 is used as required, to treat highly turbid waters. |
| Stratford | 2130 | | | | | | |
| Boisdale | 90 | | | | | | |
| Boolarra | 710 | Walkley Creek<br>O'Gradys Creek (supplementary supply) | Boolarra Raw water basin | Boolarra | Coagulation<br>Primary Solids Separation – (Plate Clarifier)<br>Secondary Solids Separation – (Dual Media Filter)<br>Disinfection, pH Correction | Alum<br>Chlorine (gas)<br>Soda Ash | |
| Briagolong | 930 | Bore (Freestone Creek Aquifer) | N/A | Briagolong | Coagulation, Flocculation<br>Primary and Secondary Filtration<br>Disinfection, pH Correction | PFS (Polymerised Ferric Sulphate)<br>Polymers 1115 and 1160<br>Sodium Hypochlorite<br>Soda Ash | |
| Morwell | 16540 | Tyers River | Moondarra | Morwell | Coagulation, Flocculation<br>Primary Solids Separation (Clarification), Secondary Solids Separation – (Sand Filters), Primary and Secondary Disinfection, pH Correction, Fluoridation | Soda Ash<br>Alum, Polymer LT20<br>Chlorine (gas)<br>Sodium Hypochlorite<br>Sodium Fluoride *<br>Calcium Hypochlorite | |
| Churchill | 5420 | | | | | | |
| Yinnar | 1100 | | | | | | |
| Jumbuk | 380 | | | | | | |
| Traralgon South/Hazelwood North | 2370 | | | | | | |

**Table 1 (cont.): Gippsland Water Locality Water Source and Water treatment process**

| Locality | Population[1] | Source water | Storage | Water Treatment Plant | Treatment process | Added substances | Comments |
|---|---|---|---|---|---|---|---|
| Tyers/Glengarry | 2290 | Tyers River | Moondarra | Tyers | Coagulation, Flocculation<br>**Plant 1**<br>Primary and Secondary Filtration<br>Primary and Secondary Disinfection, pH Correction<br>**Plant 2**<br>Primary Solids Separation (Dissolved Air Flotation)<br>Secondary Solids Separation (Dual Media Filters)<br>Tertiary Solids Separation (Micro Membrane Filtration) | Soda Ash<br>Alum<br>Polymers 1115 and 1160<br>Sodium Hypochlorite<br>Calcium Hypochlorite | |
| Rosedale | 1850 | | | | | | |
| Toongabbie | 960 | | | | | | |
| Cowwarr | 370 | | | | | | |
| Traralgon | 29490 | Tyers River | Moondarra | Traralgon | Coagulation, Flocculation<br>Primary Solids Separation - (Dissolved Air Flotation)<br>Secondary Solids Separation - (Dual Media Filters)<br>Primary and Secondary Disinfection, pH Correction, Fluoridation | Soda Ash, Alum<br>Polymer LT20<br>Chlorine (gas)<br>Sodium Hypochlorite<br>Sodium Fluoride * | |
| Warragul (including Nilma, Darnum, Drouin East) | 16210 | Pederson Weir (Tarago River) Tarago Reservoir - (supplementary supply) | Tarago Reservoir (supplementary supply) | Warragul | Coagulation, Flocculation<br>Primary Solids Separation - (Dissolved Air Flotation)<br>Secondary Solids Separation - (Dual Media Filters)<br>Primary and Secondary Disinfection, pH Correction,<br>Fluoridation | Lime Alum,<br>Polymer LT20<br>Chlorine (gas)<br>Sodium Hypochlorite<br>Sodium Fluoride * | |
| Warragul South | 820 | | | | | | |
| Drouin | 11000 | | | | | | |
| Rokeby/Buln Buln | 490 | | | | | | |
| Coongulla/ Glenmaggie | 310 | Macalister River | Lake Glenmaggie | Coongulla | Coagulation, Flocculation<br>Primary and Secondary Filtration<br>Disinfection,<br>pH Correction,<br>Granular Activated Carbon (GAC) Filtration | Soda Ash<br>Alum 90,<br>Polymers 1190, 1115 (1160)<br>Sodium Hypochlorite | |

**Table 1 (cont.): Gippsland Water Locality Water Source and Water treatment process**

| Locality | Population[1] | Source water | Storage | Water Treatment Plant | Treatment process | Added substances | Comments |
|---|---|---|---|---|---|---|---|
| Rawson | 350 | Trigger Creek | Amours Basins | Rawson | Coagulation, Flocculation<br>Primary Solids Separation - (Dissolved Air Flotation)<br>Secondary Solids Separation - (Dual Media Filters)<br>Primary and Secondary Disinfection, pH Correction | Soda Ash<br>Polymer 1160, PACl / Ferric Chloride<br>Sodium Hypochlorite | Coagulant changed from PACl to Ferric Chloride in May 2010 |
| Erica | 230 | | | | | | |
| Heyfield | 2130 | Thomson River | Heyfield Raw water storage | Heyfield | Coagulation, Flocculation<br>Primary and Secondary Filtration<br>Disinfection, pH Correction | PFS, Polymers 1115 and 1160,<br>Chlorine (gas)<br>Soda Ash, Alum 90 | Alum 90 coagulant used during poor /dirty raw water periods. |
| Mirboo North | 1980 | Little Morwell River | N/A | Mirboo North | Coagulation, Flocculation<br>Primary Solids Separation - (Dissolved Air Flotation)<br>Secondary Solids Separation - (Dual Media Filters)<br>Primary and Secondary Disinfection, pH Correction | Soda Ash<br>PASS, Polymer LT20<br>Chlorine (gas)<br>Sodium Hypochlorite | |
| Moe | 11510 | Tanjil River and Narracan Creek | N/A | Moe | Coagulation, Flocculation<br>Primary Solids Separation - (Clarification)<br>Secondary Solids Separation - (Sand Filters & Dual Media Filters)<br>Primary and Secondary Disinfection, pH Correction, Fluoridation | Alum, Polymer LT20<br>Chlorine (gas)<br>Lime, Soda Ash<br>Sodium Hypochlorite<br>Sodium Fluoride *<br>Carbon Dioxide | |
| Newborough | 7250 | | | | | | |
| Yallourn North | 1590 | | | | | | |
| Trafalgar | 3700 | | | | | | |
| Yarragon | 1450 | | | | | | |
| Neerim South | 1460 | Tarago River | Tarago Reservoir | Neerim South | Coagulation, Flocculation<br>Primary and Secondary Filtration<br>Chlorination and Chloramination<br>Disinfection, pH Correction | Soda Ash PFS, Polymers 1115 and 1160<br>Sodium Hypochlorite<br>Ammonia (Noojee system only) | |
| Noojee | 350 | | | | | | |
| Sale/Wurruk | 17080 | Bore (Boisdale Aquifer) | N/A | Sale | Aeration, Chemical Oxidisation, Precipitation<br>Primary Solids Separation - (Sedimentation)<br>Secondary Solids Separation - (Dual Media Filters)<br>Disinfection, Fluoridation | Lime<br>Potassium Permanganate<br>Chlorine (gas),<br>Sodium Fluoride * | |

**Table 1 (cont.): Gippsland Water Locality Water Source and Water treatment process**

| Locality | Population[1] | Source water | Storage | Water Treatment Plant | Treatment process | Added substances | Comments |
|---|---|---|---|---|---|---|---|
| Seaspray | 240 | Merrimans Creek | N/A | Seaspray | Coagulation, Flocculation<br>Primary and Secondary Filtration<br>Disinfection, pH Correction | Soda Ash, Alum 90, Polymers 1115, (1160)<br>Sodium Hypochlorite | |
| Thorpdale | 240 | Easterbrook Creek | Thorpdale raw water storage | Thorpdale | Coagulation, Flocculation<br>Primary Solids Separation - (Clarification)<br>Secondary Solids Separation - (Dual Media Filters)<br>Disinfection, pH Correction | Alum<br>Soda Ash<br>Sodium Hypochlorite | |
| Willow Grove | 360 | Tanjil River | Blue Rock Lake | Willow Grove | Coagulation, Flocculation<br>Secondary Solids Separation - (Dual Media Filter)<br>Chloramination Disinfection<br>pH Correction | Soda Ash<br>Alum, Polymer 1115 and 1160<br>Sodium Hypochlorite<br>Ammonia | |

1. The listed populations are for the water sampling localities calculated using 2006 census data to calculate the number of persons per dwelling per locality and then multiplying it with Gippsland Water's 2010-11 figures for number of connections. Figures have also been rounded to the nearest 10.
2. * Sodium Fluoride - (dissolvable PVA bag)

# 2 WATER TREATMENT AND QUALITY MANAGEMENT SYSTEMS

The regulatory environment in which Gippsland Water operates is to provide safe drinking water at **all** times. Safe drinking water is water that does not cause illness in those who consume it. To achieve this, the water must be free of pathogens and free of harmful chemicals.

The regulatory environment that provides guidance in the production of safe drinking water consists of:

- Victorian *Safe Drinking Water Act 2003*
- *Australian Drinking Water Guidelines 2004*
- Victorian Safe Drinking Water Regulations 2005
- Code of Practice for Fluoridation of Drinking Water Supplies 2009

## 2.1 WATER TREATMENT

Gippsland Water operates 17 water supply systems, with 17 water treatment plants (WTP), supplying 35 localities (42 towns).

The source waters are treated prior to distribution to Gippsland Water's customers with the objective of providing safe drinking water at all times. The treatment varies for each water supply system with the specific treatment process dependent on the quality and risks of the source water.

Table 1 identifies the regular treatment process for each of the water localities and lists the added substances and any periodic treatment activities.

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

### 2.1.1 Lime / Soda Ash Addition

To ensure the pH level in the raw water before treatment chemicals are added and filtered water after treatment is within the required ranges, lime or soda ash is added. Lime or soda ash is added to the raw water to adjust the pH to ensure the optimum the chemical reaction occurs in the coagulation / flocculation process.

Lime or soda ash is also added to the water before it leaves the water treatment plant to maintain the pH in the desired range to optimise the effectiveness of disinfection chlorinated systems and to minimise the risk of corrosion and improve water taste.

### 2.1.2 Coagulation / 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.

### 2.1.3 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.

### 2.1.4 Membrane Filtration

Membrane filtration is used to remove suspended solids and some colloidal matter from the source water. The water is pumped through the filter membrane trapping suspended solids in the process. The concentrate (material that does not pass through the membrane) is periodically removed to waste to prevent the blocking of the membrane filters.

### 2.1.5 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.

Another method used utilises Dissolved Air Flotation and Filtration (DAFF) which relies on the injection of microscopic air particles into the water stream, causing the flocculated particles to float to the surface. These particles are then drawn off the surface and off the filtration tank and removed to waste. The clear water then is filtered, as above, through graded filter media.

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.

### 2.1.6 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 disinfectant also ensures that the water remains disinfected once it leaves the water treatment plant until it arrives at the customer’s tap.

In Gippsland Water's service area, chlorination is the most commonly used disinfectant because of its reliability and cost effectiveness. Chlorine is the most widely used disinfectant for water supplies in the world. The other disinfection treatment processes used in our region is chloramination.

### 2.1.7 Fluoridation

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

## 2.2 SYSTEM ISSUES FOR 2010-11

During the 2010-11 monitoring period, the following issue occurred in the Gippsland Water water supply system;

- Traralgon Water reticulation *E. coli* March 2011

This event was reportable under Section 22 of the SDWA and as such is detailed in Section 4 of this report.

# 3 QUALITY OF DRINKING WATER 2010-11

The SDWR 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 ADWG prepared by the National Health and Medical Research Council (Section 10).

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

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

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

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

**Turbidity** – Turbidity is caused by the presence of fine suspended matter such as clay, silt, colloidal particles, algae and other microscopic organisms in the water. In high levels, this

matter gives the water the appearance of being dirty, muddy or milky. Turbidity is best removed by coagulation and filtration treatment processes.
Results from samples taken at customer taps that exceed the maximum level of this parameter are reported to DH under SDWA reporting requirements.

## 3.1 *ESCHERICHIA COLI* (*E. COLI*) RESULTS

### 3.1.1 *E. coli* results

Compliance under the SDWR requires at least 98% of all samples of drinking water collected within a locality in any 12 month period to contain no *E. coli* organism/100ml of drinking water. All Gippsland Water sites achieved compliance with this standard for the 2010-11 reporting period.

**Table 2: *E. coli* results for localities 2010-11**

| Locality | Sampling Frequency | No. of samples* | No. of Non complying results | Max result | % with no *E. coli* | Complying (Yes/No) |
|---|---|---|---|---|---|---|
| Boisdale | Weekly | 52 | 0 | 0 | 100% | Yes |
| Boolarra | Weekly | 52 | 0 | 0 | 100% | Yes |
| Briagolong | Weekly | 52 | 0 | 0 | 100% | Yes |
| Churchill | Weekly | 52 | 0 | 0 | 100% | Yes |
| Coongulla-Glenmaggie | Weekly | 52 | 0 | 0 | 100% | Yes |
| Cowwarr | Weekly | 52 | 0 | 0 | 100% | Yes |
| Drouin | Weekly | 64 | 0 | 0 | 100% | Yes |
| Erica | Weekly | 52 | 0 | 0 | 100% | Yes |
| Heyfield | Weekly | 52 | 0 | 0 | 100% | Yes |
| Jumbuk | Weekly | 52 | 0 | 0 | 100% | Yes |
| Maffra | Weekly | 52 | 0 | 0 | 100% | Yes |
| Mirboo North | Weekly | 52 | 0 | 0 | 100% | Yes |
| Moe | Weekly | 104 | 0 | 0 | 100% | Yes |
| Morwell | Weekly | 76 | 0 | 0 | 100% | Yes |
| Neerim South | Weekly | 52 | 0 | 0 | 100% | Yes |
| Newborough | Weekly | 52 | 0 | 0 | 100% | Yes |
| Noojee | Weekly | 52 | 0 | 0 | 100% | Yes |
| Rawson | Weekly | 52 | 0 | 0 | 100% | Yes |
| Rokeby-Buln Buln | Weekly | 52 | 0 | 0 | 100% | Yes |
| Rosedale | Weekly | 52 | 0 | 0 | 100% | Yes |
| Sale-Wurruk | Weekly | 76 | 0 | 0 | 100% | Yes |
| Seaspray | Weekly | 52 | 0 | 0 | 100% | Yes |
| Stratford | Weekly | 52 | 0 | 0 | 100% | Yes |
| Thorpdale | Weekly | 52 | 0 | 0 | 100% | Yes |
| Toongabbie | Weekly | 52 | 0 | 0 | 100% | Yes |
| Trafalgar | Weekly | 52 | 0 | 0 | 100% | Yes |
| Traralgon | Weekly | 104 | 1** | 4 | 99.1% | Yes |
| Traralgon South-Hazelwood North | Weekly | 52 | 0 | 0 | 100% | Yes |
| Tyers-Glengarry | Weekly | 76 | 0 | 0 | 100% | Yes |
| Warragul | Weekly | 76 | 0 | 0 | 100% | Yes |
| Warragul South | Weekly | 52 | 0 | 0 | 100% | Yes |
| Willow Grove | Weekly | 52 | 0 | 0 | 100% | Yes |
| Yallourn North | Weekly | 52 | 0 | 0 | 100% | Yes |
| Yarragon | Weekly | 52 | 0 | 0 | 100% | Yes |
| Yinnar | Weekly | 52 | 0 | 0 | 100% | Yes |

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

** Two samples collected during the reporting period recorded positive results for *E. coli*. One sample was located at a customer tap, the other sample was located at the Water Treatment Plant. Under the reporting guidelines, only the sample taken at the customer tap is taken into consideration when reporting percentage (%) compliance. If the second sample is taken into statistical consideration, the percentage compliance is 98.1% which still meets the SDWR requirements.

### 3.1.2 Actions taken in relation to non-compliance

During the 2010-11 reporting period, one water sampling locality recorded two positive *E. coli* results during the one sampling event.

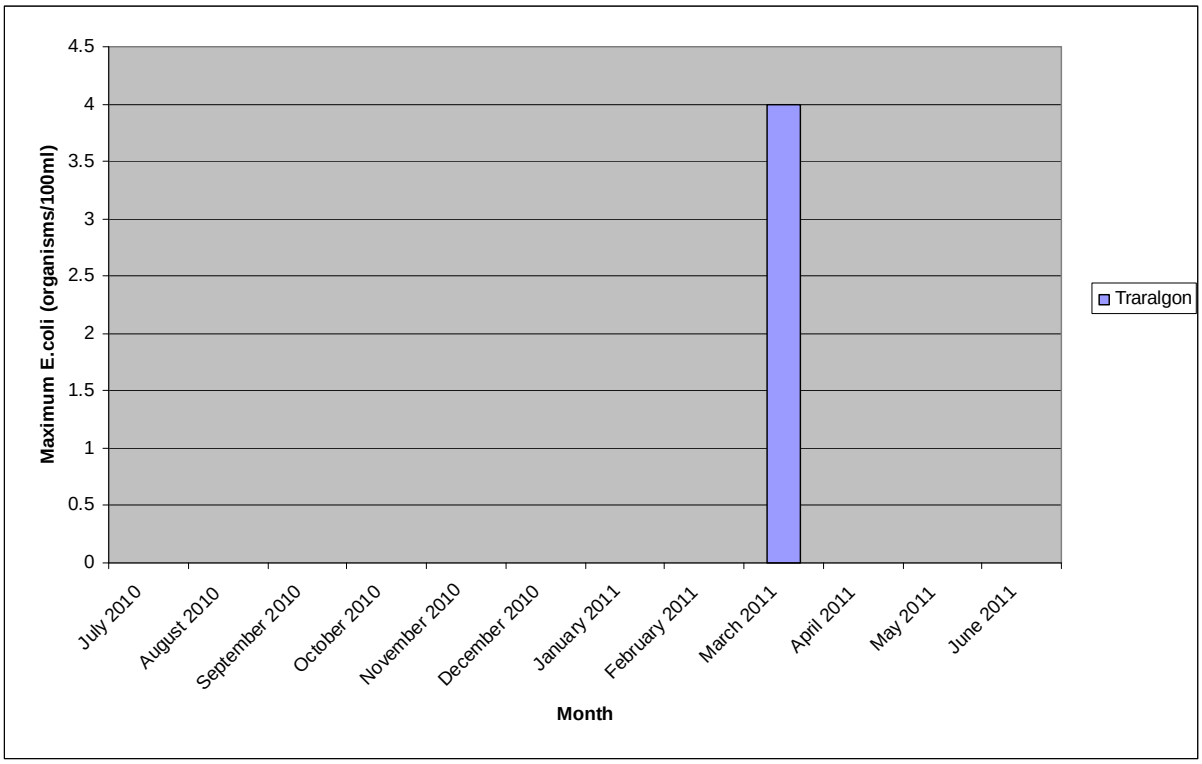
In March 2011, two *E. coli* non-compliance results were recorded in the Traralgon sampling locality, (same sampling event) with results of 1 and 4 organisms /100mL in the respective samples above the limit of 0 organisms/100mL. One sample was located at a customer tap, the other located at the Water Treatment Plant.

Compliance with the SDWR for *E. coli* results was achieved in the Traralgon sampling area even though positive results were recorded. The SDWR (2005) require at least 98% of all samples collected in any 12 month period to contain no *E. coli*. The percentage compliance for the Traralgon sampling area for the reporting period was 99.1%. As per the reporting guidelines, only the customer tap non-compliance sample is taken into statistical consideration. If both samples are considered, the percentage (%) compliance for the Traralgon sampling area would be 98.1%, which is still compliant with the requirements of the SDWR.

Gippsland Water investigated the positive results and identified the cause as either sample contamination at the point of collection at the time of sampling, either due to contamination of the sample bottle or inadequate disinfection of the sampling equipment. Additional sampling training was provided to the water quality samplers and the techniques audited against established procedures for compliance. Additional samples were collected within the reticulation immediately after the positive results were reported. None of the repeat samples indicated the presence of *E. coli*.

The figure below gives a 12-month trend for the Traralgon township supplied with treated water from the Traralgon water treatment plant.

**Figure 2: Maximum Result For *E. coli* (organisms/100ml) for 2010-11 for Traralgon**



## 3.2 CHLORINE BASED DISINFECTION BY-PRODUCT CHEMICALS

### 3.2.1 Chloroacetic acid results

For compliance with the SDWR, a sample result must not exceed 0.15 mg/L for chloroacetic acid. All Gippsland Water sites achieved 100% compliance with this standard for the 2010-11 reporting period.

**Table 3: Chloroacetic acid results for all localities 2010-11**

| Locality | Frequency of sampling | No. of samples | No. of non complying samples | Max (mg/L) | Min (mg/L) | Complying (Yes/No) |
|---|---|---|---|---|---|---|
| Boisdale | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Boolarra | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Briagolong | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Churchill | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Coongulla-Glenmaggie | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Cowwarr | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Drouin | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Erica | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Heyfield | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Jumbuk | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Maffra | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Mirboo North | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Moe | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Morwell | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Neerim South | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Newborough | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Noojee | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Rawson | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Rokeby-Buln Buln | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Rosedale | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Sale-Wurruk | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Seaspray | Monthly | 12 | 0 | 0.006 | <0.005 | Yes |
| Stratford | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Thorpdale | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Toongabbie | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Trafalgar | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Traralgon | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Traralgon South-Hazelwood North | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Tyers-Glengarry | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Warragul | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Warragul South | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Willow Grove | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Yallourn North | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Yarragon | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Yinnar | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |

#### 3.2.1.1 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

### 3.2.2 Dichloroacetic acid results

For compliance with the SDWR, a sample result must not exceed 0.1 mg/L dichloroacetic acid. All Gippsland Water sites achieved 100% compliance with this standard for the 2010-11 reporting period.

**Table 4: Dichloroacetic acid results for all localities 2010-11**

| Locality | Frequency of sampling | No. of samples | No of non complying samples | Max (mg/L) | Min (mg/L) | Complying (Yes/No) |
|---|---|---|---|---|---|---|
| Boisdale | Monthly | 12 | 0 | 0.008 | <0.005 | Yes |
| Boolarra | Monthly | 12 | 0 | 0.011 | <0.005 | Yes |
| Briagolong | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Churchill | Monthly | 12 | 0 | 0.006 | <0.005 | Yes |
| Coongulla-Glenmaggie | Monthly | 12 | 0 | 0.007 | <0.005 | Yes |
| Cowwarr | Monthly | 12 | 0 | 0.013 | <0.005 | Yes |
| Drouin | Monthly | 12 | 0 | 0.029 | <0.005 | Yes |
| Erica | Monthly | 12 | 0 | 0.008 | <0.005 | Yes |
| Heyfield | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Jumbuk | Monthly | 12 | 0 | 0.007 | <0.005 | Yes |
| Maffra | Monthly | 12 | 0 | 0.006 | <0.005 | Yes |
| Mirboo North | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Moe | Monthly | 12 | 0 | 0.008 | <0.005 | Yes |
| Morwell | Monthly | 12 | 0 | 0.008 | <0.005 | Yes |
| Neerim South | Monthly | 12 | 0 | 0.010 | <0.005 | Yes |
| Newborough | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Noojee | Monthly | 12 | 0 | 0.011 | <0.005 | Yes |
| Rawson | Monthly | 12 | 0 | 0.011 | <0.005 | Yes |
| Rokeby-Buln Buln | Monthly | 12 | 0 | 0.008 | <0.005 | Yes |
| Rosedale | Monthly | 12 | 0 | 0.007 | <0.005 | Yes |
| Sale-Wurruk | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Seaspray | Monthly | 12 | 0 | 0.013 | <0.005 | Yes |
| Stratford | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Thorpdale | Monthly | 12 | 0 | 0.008 | <0.005 | Yes |
| Toongabbie | Monthly | 12 | 0 | 0.013 | <0.005 | Yes |
| Trafalgar | Monthly | 12 | 0 | 0.009 | <0.005 | Yes |
| Traralgon | Monthly | 12 | 0 | 0.007 | <0.005 | Yes |
| Traralgon South-Hazelwood North | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Tyers-Glengarry | Monthly | 12 | 0 | 0.013 | <0.005 | Yes |
| Warragul | Monthly | 12 | 0 | 0.013 | <0.005 | Yes |
| Warragul South | Monthly | 12 | 0 | 0.005 | <0.005 | Yes |
| Willow Grove | Monthly | 12 | 0 | 0.005 | <0.005 | Yes |
| Yallourn North | Monthly | 12 | 0 | 0.005 | <0.005 | Yes |
| Yarragon | Monthly | 12 | 0 | 0.009 | <0.005 | Yes |
| Yinnar | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |

#### 3.2.2.1 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

### 3.2.3 Trichloroacetic acid results

For compliance with the SDWR, a sample result must not exceed 0.1 mg/L trichloroacetic acid. All Gippsland Water sites achieved 100% compliance with this standard for the 2010-11 reporting period.

**Table 5: Trichloroacetic acid for all localities 2010-11**

| Locality | Frequency of sampling | No. of samples | No. of non complying samples | Max (mg/L) | Min (mg/L) | Complying (Yes/No) |
|---|---|---|---|---|---|---|
| Boisdale | Monthly | 12 | 0 | 0.017 | 0.007 | Yes |
| Boolarra | Monthly | 12 | 0 | 0.009 | <0.005 | Yes |
| Briagolong | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Churchill | Monthly | 12 | 0 | 0.027 | 0.008 | Yes |
| Coongulla-Glenmaggie | Monthly | 12 | 0 | 0.017 | <0.005 | Yes |
| Cowwarr | Monthly | 12 | 0 | 0.035 | 0.013 | Yes |
| Drouin | Monthly | 12 | 0 | 0.023 | 0.009 | Yes |
| Erica | Monthly | 12 | 0 | 0.012 | 0.007 | Yes |
| Heyfield | Monthly | 12 | 0 | 0.007 | <0.005 | Yes |
| Jumbuk | Monthly | 12 | 0 | 0.028 | 0.014 | Yes |
| Maffra | Monthly | 12 | 0 | 0.012 | <0.005 | Yes |
| Mirboo North | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Moe | Monthly | 12 | 0 | 0.007 | <0.005 | Yes |
| Morwell | Monthly | 12 | 0 | 0.019 | <0.005 | Yes |
| Neerim South | Monthly | 12 | 0 | 0.010 | <0.005 | Yes |
| Newborough | Monthly | 12 | 0 | 0.007 | <0.005 | Yes |
| Noojee | Monthly | 12 | 0 | 0.008 | <0.005 | Yes |
| Rawson | Monthly | 12 | 0 | 0.011 | 0.006 | Yes |
| Rokeby-Buln Buln | Monthly | 12 | 0 | 0.018 | 0.008 | Yes |
| Rosedale | Monthly | 12 | 0 | 0.026 | 0.012 | Yes |
| Sale-Wurruk | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Seaspray | Monthly | 12 | 0 | 0.018 | <0.005 | Yes |
| Stratford | Monthly | 12 | 0 | 0.014 | 0.005 | Yes |
| Thorpdale | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Toongabbie | Monthly | 12 | 0 | 0.033 | 0.013 | Yes |
| Trafalgar | Monthly | 12 | 0 | 0.009 | <0.005 | Yes |
| Traralgon | Monthly | 12 | 0 | 0.013 | 0.005 | Yes |
| Traralgon South-Hazelwood North | Monthly | 12 | 0 | 0.022 | 0.011 | Yes |
| Tyers-Glengarry | Monthly | 12 | 0 | 0.025 | 0.013 | Yes |
| Warragul | Monthly | 12 | 0 | 0.020 | 0.006 | Yes |
| Warragul South | Monthly | 12 | 0 | 0.025 | 0.006 | Yes |
| Willow Grove | Monthly | 12 | 0 | <0.005 | <0.005 | Yes |
| Yallourn North | Monthly | 12 | 0 | 0.010 | <0.005 | Yes |
| Yarragon | Monthly | 12 | 0 | 0.011 | <0.005 | Yes |
| Yinnar | Monthly | 12 | 0 | 0.030 | 0.014 | Yes |

#### 3.2.3.1 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

### 3.2.4 Trihalomethanes (THM) results

For compliance with the SDWR, a sample result must not exceed 0.25 mg/L trihalomethane. All Gippsland Water sites achieved 100% compliance with this standard for the 2010-11 reporting period.

**Table 6: Trihalomethanes results for all localities for 2010-11**

| Locality | Frequency of sampling | No. of samples | No. of non complying samples | Max (mg/L) | Min (mg/L) | Complying (Yes/No) |
|---|---|---|---|---|---|---|
| Boisdale | Monthly | 12 | 0 | 0.046 | 0.024 | Yes |
| Boolarra | Monthly | 12 | 0 | 0.091 | 0.043 | Yes |
| Briagolong | Monthly | 12 | 0 | 0.009 | 0.003 | Yes |
| Churchill | Monthly | 12 | 0 | 0.130 | 0.036 | Yes |
| Coongulla-Glenmaggie | Monthly | 12 | 0 | 0.053 | 0.019 | Yes |
| Cowwarr | Monthly | 12 | 0 | 0.110 | 0.041 | Yes |
| Drouin | Monthly | 12 | 0 | 0.081 | 0.030 | Yes |
| Erica | Monthly | 12 | 0 | 0.044 | 0.021 | Yes |
| Heyfield | Monthly | 12 | 0 | 0.043 | 0.014 | Yes |
| Jumbuk | Monthly | 12 | 0 | 0.130 | 0.043 | Yes |
| Maffra | Monthly | 12 | 0 | 0.052 | 0.015 | Yes |
| Mirboo North | Monthly | 12 | 0 | 0.072 | 0.028 | Yes |
| Moe | Monthly | 12 | 0 | 0.068 | 0.021 | Yes |
| Morwell | Monthly | 12 | 0 | 0.057 | 0.019 | Yes |
| Neerim South | Monthly | 12 | 0 | 0.053 | 0.020 | Yes |
| Newborough | Monthly | 12 | 0 | 0.066 | 0.026 | Yes |
| Noojee | Monthly | 12 | 0 | 0.029 | 0.019 | Yes |
| Rawson | Monthly | 12 | 0 | 0.033 | 0.016 | Yes |
| Rokeby-Buln Buln | Monthly | 12 | 0 | 0.081 | 0.029 | Yes |
| Rosedale | Monthly | 12 | 0 | 0.110 | 0.038 | Yes |
| Sale-Wurruk | Monthly | 12 | 0 | 0.027 | 0.015 | Yes |
| Seaspray | Monthly | 12 | 0 | 0.140 | 0.048 | Yes |
| Stratford | Monthly | 12 | 0 | 0.052 | 0.027 | Yes |
| Thorpdale | Monthly | 12 | 0 | 0.074 | 0.032 | Yes |
| Toongabbie | Monthly | 12 | 0 | 0.100 | 0.037 | Yes |
| Trafalgar | Monthly | 12 | 0 | 0.079 | 0.025 | Yes |
| Traralgon | Monthly | 12 | 0 | 0.041 | 0.017 | Yes |
| Traralgon South-Hazelwood North | Monthly | 12 | 0 | 0.064 | 0.037 | Yes |
| Tyers-Glengarry | Monthly | 12 | 0 | 0.081 | 0.040 | Yes |
| Warragul | Monthly | 12 | 0 | 0.093 | 0.023 | Yes |
| Warragul South | Monthly | 12 | 0 | 0.084 | 0.042 | Yes |
| Willow Grove | Monthly | 12 | 0 | 0.005 | <0.001 | Yes |
| Yallourn North | Monthly | 12 | 0 | 0.075 | 0.036 | Yes |
| Yarragon | Monthly | 12 | 0 | 0.110 | 0.048 | Yes |
| Yinnar | Monthly | 12 | 0 | 0.140 | 0.052 | Yes |

#### 3.2.4.1 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

Although compliant for the reporting period, works to decrease the THM levels produced at the Seaspray Water Treatment Plant have commenced. These works will involve the installation of activated carbon treatment as well as refurbishment of the filter. These works are expected to be completed in November 2011. To ensure continuation of supply for Seaspray during these works, water will be carted from Sale to supply the Seaspray reticulation.

## 3.3 OZONE BASED DISINFECTION BY-PRODUCT CHEMICALS

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

## 3.4 ALUMINIUM

### 3.4.1 Aluminium results

For compliance with the SDWR, a sample result must not exceed a maximum of 0.2mg/L aluminium (acid soluble) in drinking water. Gippsland Water recorded one exceedance for aluminium in the 2010-11 reporting period with all other sites achieving 100% compliance.

**Table 7: Aluminium results for all localities in 2010-11**

| Locality | Frequency of Sampling | No. of Samples | No. of non complying samples | Max (mg/L) | Min (mg/L) | Complying (Yes/No) |
|---|---|---|---|---|---|---|
| Boisdale | Monthly | 12 | 0 | 0.02 | <0.01 | Yes |
| Boolarra | Monthly | 12 | 0 | 0.02 | <0.01 | Yes |
| Briagolong | Monthly | 12 | 0 | 0.04 | <0.01 | Yes |
| Churchill | Monthly | 12 | 0 | 0.03 | 0.01 | Yes |
| Coongulla & Glenmaggie | Monthly | 12 | 0 | 0.03 | 0.01 | Yes |
| Cowwarr | Monthly | 12 | 0 | 0.05 | <0.01 | Yes |
| Drouin | Monthly | 12 | 0 | 0.05 | 0.02 | Yes |
| Erica | Monthly | 12 | 0 | 0.06 | <0.01 | Yes |
| Heyfield | Monthly | 12 | 0 | <0.01 | <0.01 | Yes |
| Jumbuk | Monthly | 12 | 0 | 0.04 | 0.01 | Yes |
| Maffra | Monthly | 12 | 0 | 0.02 | <0.01 | Yes |
| Mirboo North | Monthly | 12 | 0 | 0.02 | <0.01 | Yes |
| Moe | Monthly | 12 | 0 | 0.08 | <0.01 | Yes |
| Morwell | Monthly | 12 | 0 | 0.04 | 0.01 | Yes |
| Neerim South | Monthly | 12 | 0 | <0.01 | <0.01 | Yes |
| Newborough | Monthly | 12 | 0 | 0.05 | <0.01 | Yes |
| Noojee | Monthly | 12 | 0 | <0.01 | <0.01 | Yes |
| Rawson | Monthly | 12 | 0 | 0.06 | <0.01 | Yes |
| Rokeby & Buln Buln | Monthly | 12 | 0 | 0.05 | 0.02 | Yes |
| Rosedale | Monthly | 12 | 0 | 0.04 | <0.01 | Yes |
| Sale/Wurruk | Monthly | 12 | 0 | 0.01 | <0.01 | Yes |
| Seaspray | Monthly | 12 | 0 | 0.03 | 0.01 | Yes |
| Stratford | Monthly | 12 | 0 | 0.01 | <0.01 | Yes |
| Thorpdale | Monthly | 12 | 0 | 0.04 | <0.01 | Yes |
| Toongabbie | Monthly | 12 | 0 | 0.04 | 0.01 | Yes |
| Trafalgar | Monthly | 12 | 0 | 0.07 | <0.01 | Yes |
| Traralgon | Monthly | 12 | 0 | 0.05 | 0.02 | Yes |
| Traralgon South & Hazelwood North | Monthly | 12 | 0 | 0.07 | 0.01 | Yes |
| Tyers & Glengarry | Monthly | 12 | 0 | 0.05 | 0.01 | Yes |
| Warragul | Monthly | 12 | 0 | 0.07 | 0.02 | Yes |
| Warragul South | Monthly | 12 | 0 | 0.06 | 0.03 | Yes |
| Willow Grove | Monthly | 12 | 0 | 0.05 | 0.01 | Yes |
| Yallourn North | Monthly | 12 | 0 | 0.03 | <0.01 | Yes |
| Yarragon | Monthly | 12 | 0 | 0.05 | 0.01 | Yes |
| Yinnar | Monthly | 12 | 0 | 0.05 | 0.01 | Yes |

#### 3.4.1.1 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

## 3.5 TURBIDITY

### 3.5.1 Turbidity results

For compliance with the SDWR, 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). All Gippsland Water sites achieved 100% compliance with this standard for the 2010-11 reporting period.

**Table 8: Turbidity results for all localities in 2010-11**

| Locality | Frequency of Sampling | No. of Samples | No. of non complying samples | Max (NTU) | Min (NTU) | 95% UCL of mean* | Complying (Yes/No) |
|---|---|---|---|---|---|---|---|
| Boisdale | Weekly | 52 | 0 | 0.4 | 0.1 | 0.2 | Yes |
| Boolarra | Weekly | 52 | 0 | 0.7 | 0.1 | 0.2 | Yes |
| Briagolong | Weekly | 52 | 0 | 0.4 | 0.1 | 0.1 | Yes |
| Churchill | Weekly | 52 | 0 | 0.7 | 0.1 | 0.2 | Yes |
| Coongulla & Glenmaggie | Weekly | 52 | 0 | 1.2 | 0.1 | 0.3 | Yes |
| Cowwarr | Weekly | 52 | 0 | 1.9 | 0.1 | 0.2 | Yes |
| Drouin | Weekly | 52 | 0 | 0.4 | 0.1 | 0.2 | Yes |
| Erica | Weekly | 52 | 0 | 0.7 | 0.1 | 0.2 | Yes |
| Heyfield | Weekly | 52 | 0 | 0.4 | 0.1 | 0.2 | Yes |
| Jumbuk | Weekly | 52 | 0 | 1.8 | 0.1 | 0.2 | Yes |
| Maffra | Weekly | 52 | 0 | 0.5 | 0.1 | 0.2 | Yes |
| Mirboo North | Weekly | 52 | 0 | 2.7 | 0.1 | 0.3 | Yes |
| Moe | Weekly | 52 | 0 | 0.6 | 0.1 | 0.2 | Yes |
| Morwell | Weekly | 52 | 0 | 0.8 | 0.1 | 0.2 | Yes |
| Neerim South | Weekly | 52 | 0 | 0.5 | 0.1 | 0.2 | Yes |
| Newborough | Weekly | 52 | 0 | 1.1 | 0.1 | 0.2 | Yes |
| Noojee | Weekly | 52 | 0 | 0.7 | 0.1 | 0.2 | Yes |
| Rawson | Weekly | 52 | 0 | 0.7 | 0.1 | 0.2 | Yes |
| Rokeby & Buln Buln | Weekly | 52 | 0 | 0.3 | 0.1 | 0.1 | Yes |
| Rosedale | Weekly | 52 | 0 | 2.4 | 0.1 | 0.4 | Yes |
| Sale/Wurruk | Weekly | 52 | 0 | 0.2 | 0.1 | 0.1 | Yes |
| Seaspray | Weekly | 52 | 0 | 1.4 | 0.1 | 0.4 | Yes |
| Stratford | Weekly | 52 | 0 | 0.6 | 0.1 | 0.2 | Yes |
| Thorpdale | Weekly | 52 | 0 | 0.6 | 0.1 | 0.3 | Yes |
| Toongabbie | Weekly | 52 | 0 | 0.6 | 0.1 | 0.2 | Yes |
| Trafalgar | Weekly | 52 | 0 | 1.0 | 0.1 | 0.2 | Yes |
| Traralgon | Weekly | 52 | 0 | 0.3 | 0.1 | 0.1 | Yes |
| Traralgon South & Hazelwood North | Weekly | 52 | 0 | 0.5 | 0.1 | 0.1 | Yes |
| Tyers & Glengarry | Weekly | 52 | 0 | 0.3 | 0.1 | 0.1 | Yes |
| Warragul | Weekly | 52 | 0 | 0.4 | 0.1 | 0.1 | Yes |
| Warragul South | Weekly | 52 | 0 | 1.3 | 0.1 | 0.2 | Yes |
| Willow Grove | Weekly | 52 | 0 | 0.6 | 0.1 | 0.2 | Yes |
| Yallourn North | Weekly | 52 | 0 | 0.7 | 0.1 | 0.2 | Yes |
| Yarragon | Weekly | 52 | 0 | 0.9 | 0.1 | 0.2 | Yes |
| Yinnar | Weekly | 52 | 0 | 0.5 | 0.1 | 0.2 | Yes |

*In order to calculate the mean, standard deviation and confidence levels results <0.1 NTU were rounded up to 0.1 NTU

#### 3.5.1.1 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

## 3.6 FLUORIDE

Fluoride testing has been performed in the water supply systems where fluoride is artificially added to the water (supplies of Maffra, Warragul, Sale Traralgon, Morwell and Moe).

Gippsland Water has sampled localities on a weekly basis even though some of the localities listed in table 10 require monthly samples according to section 5.1.4 of the Code of Practice for Fluoridation of Drinking Water Supplies (i.e. if a fluoride plant supplies five or more water sampling localities then the authority must take a sample each month from a water sampling point in each water sampling locality supplied from those plant such that a sample is collected from the distribution system at least once per week).

### 3.6.1 Fluoride results

Based on health considerations, no single sample concentration of fluoride in drinking water should exceed 1.5 mg/L, and the average level of fluoride should not exceed 1.0 mg/L. All Gippsland Water sites achieved 100% compliance with this standard for the 2010-11 reporting period.

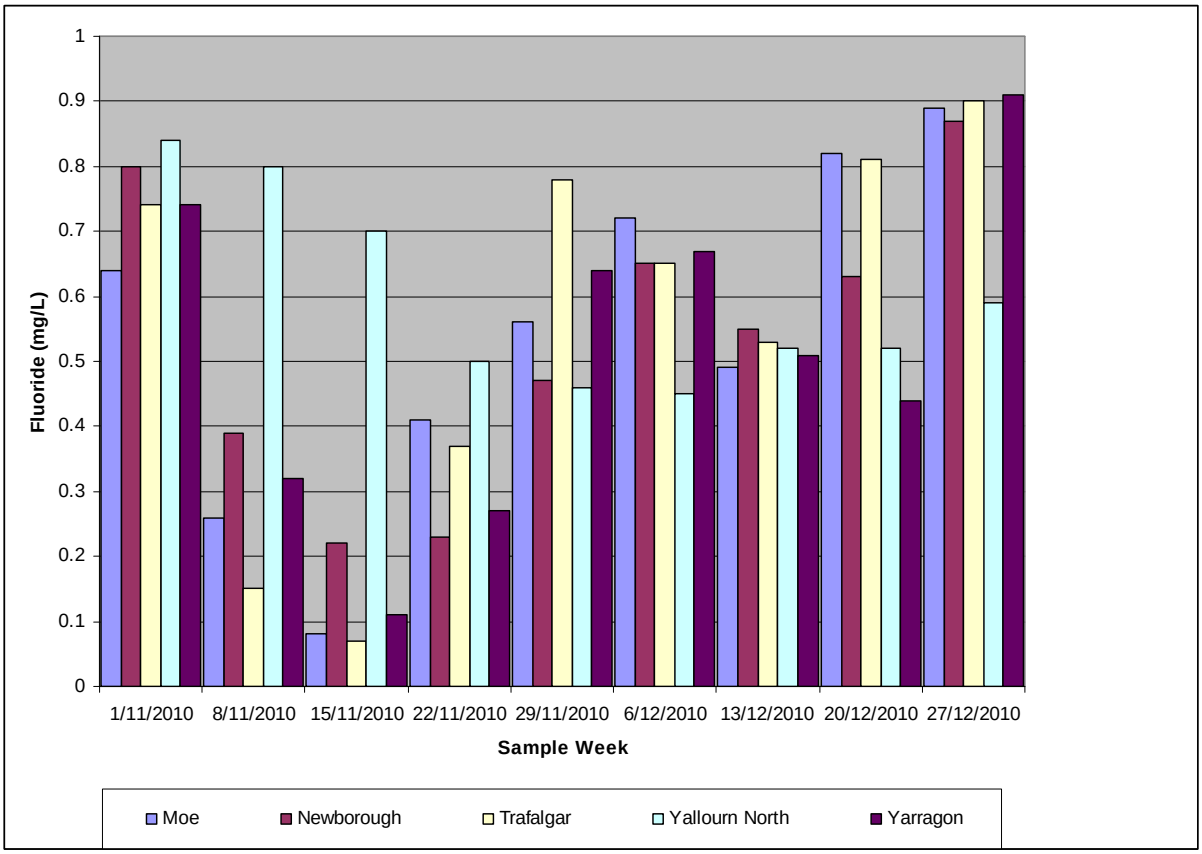
**Table 9: Fluoride results for all fluoridated localities in 2010-11**

| Treatment Plant | Locality | Required Frequency of Sampling | Actual No. of Samples | Max (mg/L) | Min (mg/L) | Average (mg/L) | Complying (Yes/No) |
|---|---|---|---|---|---|---|---|
| Maffra | Boisdale | Weekly | 52 | 0.88 | 0.52 | 0.76 | Yes |
| | Maffra | Weekly | 52 | 0.92 | 0.08 | 0.73 | Yes |
| | Stratford | Weekly | 52 | 0.86 | 0.48 | 0.73 | Yes |
| Morwell | Churchill | Monthly | 52 | 1.0 | 0.51 | 0.85 | Yes |
| | Jumbuk | Monthly | 52 | 1.0 | 0.66 | 0.85 | Yes |
| | Morwell | Monthly | 52 | 1.0 | 0.20 | 0.84 | Yes |
| | Traralgon South/ Hazelwood North | Monthly | 52 | 1.0 | 0.57 | 0.86 | Yes |
| | Yinnar | Monthly | 52 | 0.97 | 0.67 | 0.86 | Yes |
| Moe | Moe | Monthly | 52 | 0.95 | 0.08 | 0.71 | Yes |
| | Newborough | Monthly | 52 | 0.94 | 0.09 | 0.71 | Yes |
| | Trafalgar | Monthly | 52 | 0.94 | 0.07 | 0.71 | Yes |
| | Yallourn North | Monthly | 52 | 0.93 | 0.32 | 0.70 | Yes |
| | Yarragon | Monthly | 52 | 1.0 | 0.10 | 0.69 | Yes |
| Sale | Sale/Wurruk | Weekly | 52 | 0.96 | 0.74 | 0.85 | Yes |
| Traralgon | Traralgon | Weekly | 52 | 1.1 | 0.33 | 0.83 | Yes |
| Warragul | Drouin | Weekly | 52 | 1.1 | 0.86 | 0.95 | Yes |
| | Rokeby/Buln Buln | Weekly | 52 | 1.1 | 0.78 | 0.95 | Yes |
| | Warragul | Weekly | 52 | 1.1 | 0.82 | 0.94 | Yes |
| | Warragul South | Weekly | 52 | 1.0 | 0.86 | 0.95 | Yes |

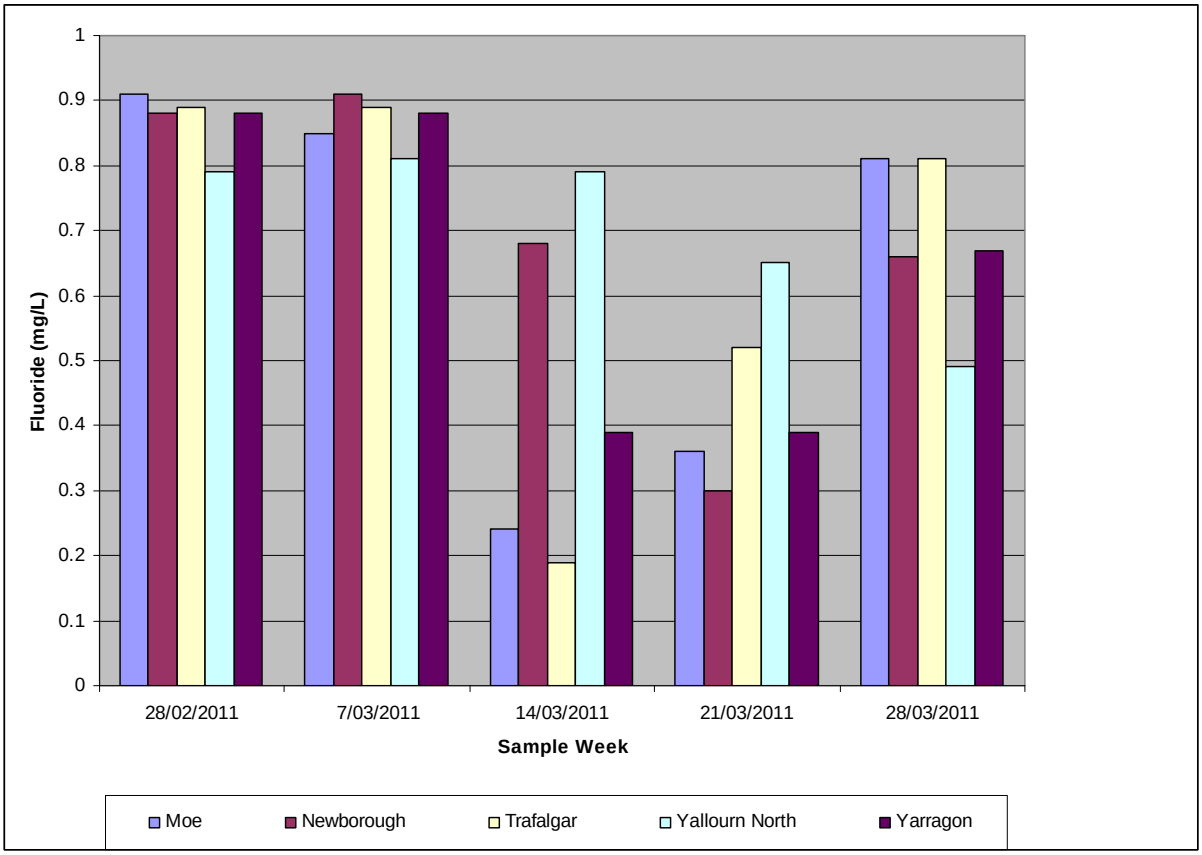
#### 3.6.1.1 Actions taken in relation to non-compliance

The fluoride dosing system at the Moe water treatment plant was turned off within the reporting period between 2nd to 19th November 2010 and 10th to 18th March 2011 due to issues with the delivery system, as corresponded to DH on 7th November 2010 and 10th March 2011 respectively. During this period, non fluoridated water was supplied to the localities for the Moe water treatment plant as presented in the figure below.

## Figure 3: Fluoride (mg/L) for November - December 2010 for the localities supplied by Moe WTP




## Figure 4: Fluoride (mg/L) for March 2011 for the localities supplied by Moe WTP



Since the fluoride product is supplied in Polyvinyl Alcohol (PVA) dissolvable bags at 5 of the 6 fluoridated water supply systems, PVA monitoring was undertaken in the reticulation systems of the following localities on a monthly basis between July to December 2010 then quarterly (3 monthly) between January to June 2011, to assess any product carry over from the fluoridation process. All Gippsland Water sites tested achieved compliance with the guideline limits for the 2010-11 reporting period.

**Table 10: Polyvinyl Alcohol results for fluoridated systems in 2010-11**

| Treatment Plant | Frequency of Sampling | No. of Samples | Max (mg/L)* |
|---|---|---|---|
| Moe | Monthly | 8 | <0.01 |
| Morwell | Monthly | 8 | <0.01 |
| Sale | Monthly | 8 | <0.01 |
| Traralgon | Monthly | 8 | <0.01 |
| Warragul | Monthly | 8 | <0.01 |

*Results of <0.01 mg/L are at the detection limit for this parameter.

## 3.7 WATER TREATMENT PROJECTS & PROGRAMS UNDERTAKEN

During the 2010-11 reporting period Gippsland Water undertook a number of works, programs or projects to ensure that continual improvements were made to ensure the ongoing provision of safe drinking water to its customers. These included:

- Ongoing water treatment plant filter upgrades and refurbishment program
- Ongoing treated water basin storage inspection and cleaning program
- Upgrade of remote disinfection sites and replacement of chlorine gas with sodium hypochlorite
- Raw water storage basin coverage to reduce algal growth and water quality issues associated with treatment and taste and odour
- Refurbishment of water treatment clarifiers for greater operational control and security of supply
- Upgrade of raw water pump stations for ongoing security of supply.

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

### 3.8.1 Overall results

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

**Table 11: Other sampled parameter results for all localities in 2010-11**

| Parameter | Frequency of sampling | No. samples | Results According to ADWG values | | |
|---|---|---|---|---|---|
| | | | Recommended value | Result | Locality |
| Nitrite | Weekly (3 Localities) | 144 | ≤ 3 mg/L | All results below ADWG health guideline values. | |
| Mercury | Quarterly | 140 | ≤ 0.001 mg/L | | |
| Chromium | Quarterly | 140 | ≤ 0.05 mg/L | | |
| Cadmium | Quarterly | 140 | ≤ 0.002 mg/L | | |
| Nitrate | Quarterly | 140 | ≤ 50 mg/L | | |
| Nickel | Annually | 35 | ≤ 0.02 mg/L | | |

Monitoring for other parameters such as radiological, pesticides, protozoan organisms is conducted routinely. A complete list of raw water parameters monitored is contained in Appendix 1. Additional monitoring is performed on a risk basis and as the need arises.

The following table contains Blue Green Algae (BGA) monitoring undertaken across Gippsland Water storages based on visual and water quality triggers. Major raw water supply/storages are routinely monitored for BGA as part of the routine catchment monitoring program.

**Table 12: Routine BGA monitoring for raw water supplies in 2010-11**

| Location | Jul '10 | Aug '10 | Sept '10 | Oct '10 | Nov '10 | Dec '10 | Jan '11 | Feb '11 | Mar '11 | Apr '11 | May '11 | Jun '11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maffra Weir | | | | | 1 | | | 1 | | | | |
| Heyfield Raw Water Storage | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Boolarra Raw Water Storage | | | | | 1 | | | 1 | | | | |
| Thorpdale Raw Water Storage | | | | 1 | 1 | 1 | 1 | 1 | | | | |
| Neerim South Tarago Reservoir | | | | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Rawson Amours Basin | | | | 1 | | | | 1 | | | | |
| Blue Rock Lake | ***As required (Southern Rural Water BGA Program)*** | | | | | | | | | | | |
| Lake Glenmaggie | ***As required (Southern Rural Water BGA Program)*** | | | | | | | | | | | |
| Tarago Reservoir | ***As required (Melbourne Water BGA Program)*** | | | | | | | | | | | |
| Moondarra Surface | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Moondarra Pipe line | 1 | 1 | 1 | 1 | | | | | | 1 | 1 | 1 |
| Moondarra Upper reaches | ***As required*** | | | | | | | | | | | |

### 3.8.2 Manganese

Manganese can be naturally present in either soluble or insoluble forms in water. When concentrations exceed the aesthetic guideline of 0.1 mg/L, manganese can create unacceptable tastes in water, as well as stain fixtures and laundry. Compliance is measured against the health guideline value of 0.5 mg/L in ADWG. Gippsland Water sites achieved 100% compliance against manganese guideline values.

**Table 13: Manganese results for all localities in 2010-11**

| 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 | 0.022 | 0.001 | Yes |
| Briagolong | Monthly | 12 | <0.001 | <0.001 | Yes |
| Churchill | Monthly | 12 | <0.001 | <0.001 | Yes |
| Coongulla & Glenmaggie | Monthly | 12 | 0.008 | 0.002 | Yes |
| Cowwarr | Monthly | 12 | 0.001 | <0.001 | Yes |
| Drouin | Monthly | 12 | 0.003 | <0.001 | Yes |
| Erica | Monthly | 12 | 0.011 | 0.002 | Yes |
| Heyfield | Monthly | 12 | 0.005 | 0.002 | Yes |
| Jumbuk | Monthly | 12 | 0.001 | <0.001 | Yes |
| Maffra | Monthly | 12 | 0.003 | <0.001 | Yes |
| Mirboo North | Monthly | 12 | 0.002 | <0.001 | Yes |
| Moe | Monthly | 12 | 0.016 | 0.001 | Yes |
| Morwell | Monthly | 12 | 0.002 | <0.001 | Yes |
| Neerim South | Monthly | 12 | 0.005 | 0.002 | Yes |
| Newborough | Monthly | 12 | 0.008 | <0.001 | Yes |
| Noojee | Monthly | 12 | 0.012 | 0.002 | Yes |
| Rawson | Monthly | 12 | 0.003 | 0.002 | Yes |
| Rokeby & Buln Buln | Monthly | 12 | 0.001 | <0.001 | Yes |
| Rosedale | Monthly | 12 | 0.004 | <0.001 | Yes |
| Sale/Wurruk | Monthly | 12 | 0.001 | <0.001 | Yes |
| Seaspray | Monthly | 12 | 0.019 | 0.002 | Yes |
| Stratford | Monthly | 12 | <0.001 | <0.001 | Yes |
| Thorpdale | Monthly | 12 | 0.041 | 0.002 | Yes |
| Toongabbie | Monthly | 12 | <0.001 | <0.001 | Yes |
| Trafalgar | Monthly | 12 | 0.006 | 0.001 | Yes |
| Traralgon | Monthly | 12 | 0.003 | <0.001 | Yes |
| Traralgon South & Hazelwood North | Monthly | 12 | <0.001 | <0.001 | Yes |
| Tyers & Glengarry | Monthly | 12 | 0.002 | <0.001 | Yes |
| Warragul | Monthly | 12 | 0.002 | <0.001 | Yes |
| Warragul South | Monthly | 12 | 0.001 | <0.001 | Yes |
| Willow Grove | Monthly | 12 | 0.019 | 0.001 | Yes |
| Yallourn North | Monthly | 12 | 0.002 | <0.001 | Yes |
| Yarragon | Monthly | 12 | 0.021 | <0.001 | Yes |
| Yinnar | Monthly | 12 | <0.001 | <0.001 | Yes |

### 3.8.3 Lead

Lead can be present in drinking water as a result of dissolution from natural sources or from household plumbing. Based on heath considerations in the ADWG, concentrations of lead in drinking water should not exceed 0.01 mg/L. Gippsland Water sites achieved 100% compliance against lead guideline values.

**Table 14: Lead results for all localities in 2010-11**

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

### 3.8.4 Copper

Copper is present in raw water supplies at very low concentrations. Copper can be found in higher concentrations in drinking water as a result of corrosion of copper pipes and fittings. Based on heath considerations in the ADWG concentrations of copper in drinking water should not exceed 2 mg/L. The aesthetic guideline value is 1 mg/L. Gippsland Water sites achieved 100% compliance against both copper guideline values.

**Table 15: Copper results for all localities in 2010-11**

| Locality | Frequency of Sampling | No. of Samples | Max (mg/L) | Min (mg/L) | Complying (Yes/No) |
|---|---|---|---|---|---|
| Boisdale | Quarterly | 4 | 0.006 | 0.003 | Yes |
| Boolarra | Quarterly | 4 | 0.011 | 0.002 | Yes |
| Briagolong | Quarterly | 4 | 0.009 | 0.005 | Yes |
| Churchill | Quarterly | 4 | 0.006 | <0.001 | Yes |
| Coongulla & Glenmaggie | Quarterly | 4 | 0.006 | <0.001 | Yes |
| Cowwarr | Quarterly | 4 | 0.003 | <0.001 | Yes |
| Drouin | Quarterly | 4 | 0.015 | 0.001 | Yes |
| Erica | Quarterly | 4 | 0.015 | 0.002 | Yes |
| Heyfield | Quarterly | 4 | 0.043 | 0.013 | Yes |
| Jumbuk | Quarterly | 4 | 0.005 | 0.002 | Yes |
| Maffra | Quarterly | 4 | 0.030 | 0.006 | Yes |
| Mirboo North | Quarterly | 4 | 0.075 | 0.003 | Yes |
| Moe | Quarterly | 4 | 0.009 | 0.005 | Yes |
| Morwell | Quarterly | 4 | 0.059 | <0.001 | Yes |
| Neerim South | Quarterly | 4 | 0.048 | 0.028 | Yes |
| Newborough | Quarterly | 4 | 0.009 | 0.002 | Yes |
| Noojee | Quarterly | 4 | 0.018 | 0.003 | Yes |
| Rawson | Quarterly | 4 | 0.008 | <0.001 | Yes |
| Rokeby & Buln Buln | Quarterly | 4 | 0.005 | 0.003 | Yes |
| Rosedale | Quarterly | 4 | 0.001 | <0.001 | Yes |
| Sale-Wurruk | Quarterly | 4 | 0.002 | <0.001 | Yes |
| Seaspray | Quarterly | 4 | 0.009 | 0.005 | Yes |
| Stratford | Quarterly | 4 | 0.007 | 0.001 | Yes |
| Thorpdale | Quarterly | 4 | 0.014 | 0.002 | Yes |
| Toongabbie | Quarterly | 4 | 0.011 | 0.004 | Yes |
| Trafalgar | Quarterly | 4 | 0.009 | 0.002 | Yes |
| Traralgon | Quarterly | 4 | 0.015 | 0.002 | Yes |
| Traralgon South & Hazelwood North | Quarterly | 4 | 0.003 | 0.001 | Yes |
| Tyers & Glengarry | Quarterly | 4 | 0.012 | 0.003 | Yes |
| Warragul | Quarterly | 4 | 0.002 | <0.001 | Yes |
| Warragul South | Quarterly | 4 | 0.015 | <0.001 | Yes |
| Willow Grove | Quarterly | 4 | 0.021 | 0.006 | Yes |
| Yallourn North | Quarterly | 4 | 0.015 | 0.001 | Yes |
| Yarragon | Quarterly | 4 | 0.004 | 0.001 | Yes |
| Yinnar | Quarterly | 4 | 0.003 | <0.001 | Yes |

## 3.9 AESTHETICS

### 3.9.1 pH results

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

**Table 16: pH results for all localities in 2010-11**

| Locality | Frequency of Sampling | No. of Samples | Max (mg/L) | Min (mg/L) |
|---|---|---|---|---|
| Boisdale | Weekly | 52 | 7.9 | 7.0 |
| Boolarra | Weekly | 52 | 7.4 | 6.8 |
| Briagolong | Weekly | 52 | 7.8 | 7.1 |
| Churchill | Weekly | 52 | 8.3 | 7.2 |
| Coongulla & Glenmaggie | Weekly | 52 | 9.2 | 7.3 |
| Cowwarr | Weekly | 52 | 8.9 | 7.1 |
| Drouin | Weekly | 52 | 7.9 | 6.8 |
| Erica | Weekly | 52 | 8.8 | 6.9 |
| Heyfield | Weekly | 52 | 7.9 | 6.9 |
| Jumbuk | Weekly | 52 | 8.1 | 7.2 |
| Maffra | Weekly | 52 | 7.9 | 6.8 |
| Mirboo North | Weekly | 52 | 8.2 | 6.7 |
| Moe | Weekly | 52 | 7.8 | 6.6 |
| Morwell | Weekly | 52 | 8.8 | 7.0 |
| Neerim South | Weekly | 52 | 7.4 | 6.8 |
| Newborough | Weekly | 52 | 7.8 | 6.5 |
| Noojee | Weekly | 52 | 8.8 | 7.1 |
| Rawson | Weekly | 52 | 8.0 | 6.9 |
| Rokeby & Buln Buln | Weekly | 52 | 8.3 | 6.8 |
| Rosedale | Weekly | 52 | 9.1 | 7.3 |
| Sale/Wurruk | Weekly | 52 | 9.0 | 7.5 |
| Seaspray | Weekly | 52 | 8.9 | 7.2 |
| Stratford | Weekly | 52 | 7.8 | 7.1 |
| Thorpdale | Weekly | 52 | 8.8 | 7.0 |
| Toongabbie | Weekly | 52 | 7.7 | 7.0 |
| Trafalgar | Weekly | 52 | 7.8 | 7.1 |
| Traralgon | Weekly | 52 | 7.6 | 6.9 |
| Traralgon South & Hazelwood North | Weekly | 52 | 9.1 | 7.2 |
| Tyers & Glengarry | Weekly | 52 | 8.9 | 7.1 |
| Warragul | Weekly | 52 | 8.9 | 6.9 |
| Warragul South | Weekly | 52 | 9.1 | 7.0 |
| Willow Grove | Weekly | 52 | 7.8 | 6.6 |
| Yallourn North | Weekly | 52 | 8.4 | 6.8 |
| Yarragon | Weekly | 52 | 9.4 | 7.3 |
| Yinnar | Weekly | 52 | 8.4 | 7.2 |

Some systems have experienced elevated pH results, as a result of long residence of water in the reticulation, cement-lined pipes in parts of the reticulation and reduced flushing programs due to the permanent water saving rules in place.

ADWG states that cement mortar lined pipes can significantly increase the pH and a value up to 9.2 may be tolerated provided monitoring indicates no deterioration in the microbiological quality.

### 3.9.2 Iron results

Iron can become apparent in taste in water at about 0.3 mg/L and above. High concentrations can give water a rust-brown appearance and cause staining of laundry and plumbing fittings. Based on aesthetic considerations the concentration in the ADWG, of iron in drinking water should not exceed 0.3 mg/L however no health-based guideline value has been set for iron.

**Table 17: Iron results for all localities in 2010-11**

| Locality | Frequency of Sampling | No. of Samples | Max (mg/L) | Min (mg/L) | Complying (Yes/No) |
|---|---|---|---|---|---|
| Boisdale | Monthly | 12 | <0.02 | <0.02 | Yes |
| Boolarra | Monthly | 12 | 0.03 | <0.02 | Yes |
| Briagolong | Monthly | 12 | 0.02 | <0.02 | Yes |
| Churchill | Monthly | 12 | 0.02 | <0.02 | Yes |
| Coongulla & Glenmaggie | Monthly | 12 | 0.06 | <0.02 | Yes |
| Cowwarr | Monthly | 12 | 0.03 | <0.02 | Yes |
| Drouin | Monthly | 12 | <0.02 | <0.02 | Yes |
| Erica | Monthly | 12 | 0.30 | 0.03 | Yes |
| Heyfield | Monthly | 12 | 0.04 | <0.02 | Yes |
| Jumbuk | Monthly | 12 | 0.08 | <0.02 | Yes |
| Maffra | Monthly | 12 | <0.02 | <0.02 | Yes |
| Mirboo North | Monthly | 12 | 0.02 | <0.02 | Yes |
| Moe | Monthly | 12 | <0.02 | <0.02 | Yes |
| Morwell | Monthly | 12 | 0.11 | <0.02 | Yes |
| Neerim South | Monthly | 12 | 0.09 | <0.02 | Yes |
| Newborough | Monthly | 12 | 0.02 | <0.02 | Yes |
| Noojee | Monthly | 12 | 0.11 | <0.02 | Yes |
| Rawson | Monthly | 12 | 0.10 | 0.02 | Yes |
| Rokeby & Buln Buln | Monthly | 12 | 0.03 | <0.02 | Yes |
| Rosedale | Monthly | 12 | 0.02 | <0.02 | Yes |
| Sale/Wurruk | Monthly | 12 | <0.02 | <0.02 | Yes |
| Seaspray | Monthly | 12 | 0.10 | <0.02 | Yes |
| Stratford | Monthly | 12 | <0.02 | <0.02 | Yes |
| Thorpdale | Monthly | 12 | 0.11 | <0.02 | Yes |
| Toongabbie | Monthly | 12 | <0.02 | <0.02 | Yes |
| Trafalgar | Monthly | 12 | 0.02 | <0.02 | Yes |
| Traralgon | Monthly | 12 | 0.04 | <0.02 | Yes |
| Traralgon South & Hazelwood North | Monthly | 12 | <0.02 | <0.02 | Yes |
| Tyers & Glengarry | Monthly | 12 | <0.02 | <0.02 | Yes |
| Warragul | Monthly | 12 | 0.03 | <0.02 | Yes |
| Warragul South | Monthly | 12 | 0.04 | <0.02 | Yes |
| Willow Grove | Monthly | 12 | <0.02 | <0.02 | Yes |
| Yallourn North | Monthly | 12 | 0.05 | <0.02 | Yes |
| Yarragon | Monthly | 12 | <0.02 | <0.02 | Yes |
| Yinnar | Monthly | 12 | 0.18 | <0.02 | Yes |

## 3.10 ANALYSIS OF RESULTS

### 3.10.1 Comparison to previous years

The water quality standards required under the SDWR have been represented as trend data over the previous three financial years. This information allows for a comparison of data for the major towns.

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

**Table 18: Compliance by locality and population**

| | Percentage by Locality | | | Percentage by Population | | |
|---|---|---|---|---|---|---|
| **Parameter** | **2008-2009** | **2009-2010** | **2010-2011** | **2008-2009** | **2009-2010** | **2010-2011** |
| Aluminium | 97.15% | 97.14% | 100% | 99.75% | 99.77% | 100% |
| Chloroacetic Acid | 100% | 100% | 100% | 100% | 100% | 100% |
| Dichloroacetic Acid | 100% | 100% | 100% | 100% | 100% | 100% |
| *E. coli* | 100% | 100% | 100% | 100% | 100% | 100% |
| Trichloroacetic Acid | 100% | 100% | 100% | 100% | 100% | 100% |
| Trihalomethanes | 100% | 100% | 100% | 100% | 100% | 100% |
| Turbidity | 100% | 100% | 100% | 100% | 100% | 100% |

# 4 EMERGENCY / INCIDENT MANAGEMENT

## 4.1 EMERGENCY / INCIDENT MANAGEMENT

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

Two samples of positive *E. coli* were recorded for the Traralgon locality in March 2011. (Refer to Section 3.1.2).

Gippsland Water investigated the positive results and identified the cause as either sample contamination at the point of collection at the time of sampling, either due to contamination of the sample bottle or inadequate disinfection of the sampling equipment.

Additional sampling training was provided to the water quality samplers and the techniques audited against established procedures for compliance

DH was notified of this incident under a SDWA section 22 notification. The 2010-11 Events and Incidents are summarised below.

**Table 19: Summary of incidents and actions taken under Section 22**

| 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 | 17/03/2011 (1 day) | Traralgon Water Reticulation | *E. coli* detected in drinking water (4 orgs/100mL) | Traralgon Water Reticulation | Department of Health (DH) Notification under section 22 SDWA.<br>Extensive flushing undertaken throughout the reticulation network and additional monitoring of water quality parameters undertaken during and after the event.<br>All subsequent reticulation monitoring was compliant.<br>Refresher training of sampling staff undertaken. | No |

### 4.1.1 Other Events Not Reportable

There were no other events to note for the reporting period of 2010-11.

# 5 COMPLAINTS

## 5.1 WATER QUALITY COMPLAINTS

A summary of customer complaints received by Gippsland Water relating to the quality of drinking water supplied is reported below.

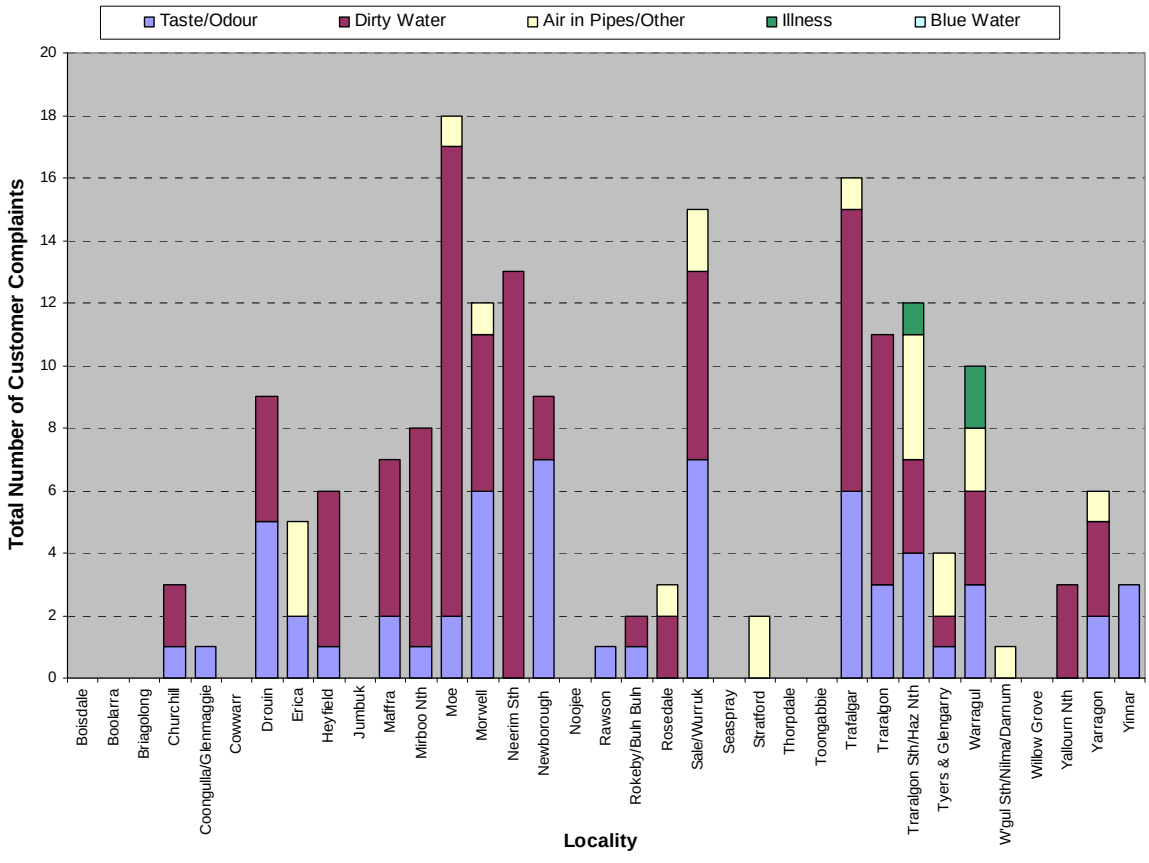
Gippsland Water records and reports on customer complaints relating to dirty water, taste and odour problems, suspected illness/health concerns, blue water, and appearance of air-filled or “white” water received from the tap.

**Table 20: Water quality complaints per 100 customers supplied**

| Type of Complaint | 2010-11 | | 2009-2010 | 2008-2009 | 2007-2008 |
|---|---|---|---|---|---|
| | No. of Complaints | Complaints per 100 customers | Complaints per 100 customers | Complaints per 100 customers | Complaints per 100 customers |
| Discoloured water | 59 | 0.148 | 0.192 | 0.116 | 0.162 |
| Taste / odour | 97 | 0.090 | 0.075 | 0.113 | 0.091 |
| Blue water | 0 | 0.000 | 0.009 | 0.000 | 0.005 |
| Air in water | 21 | 0.032 | 0.043 | 0.042 | 0.039 |
| Suspected illness | 3 | 0.005 | 0.002 | 0.019 | 0.025 |
| Other | 0 | 0.000 | 0.000 | 0.000 | 0.012 |
| Total | 180 | 0.276 | 0.321 | 0.290 | 0.334 |

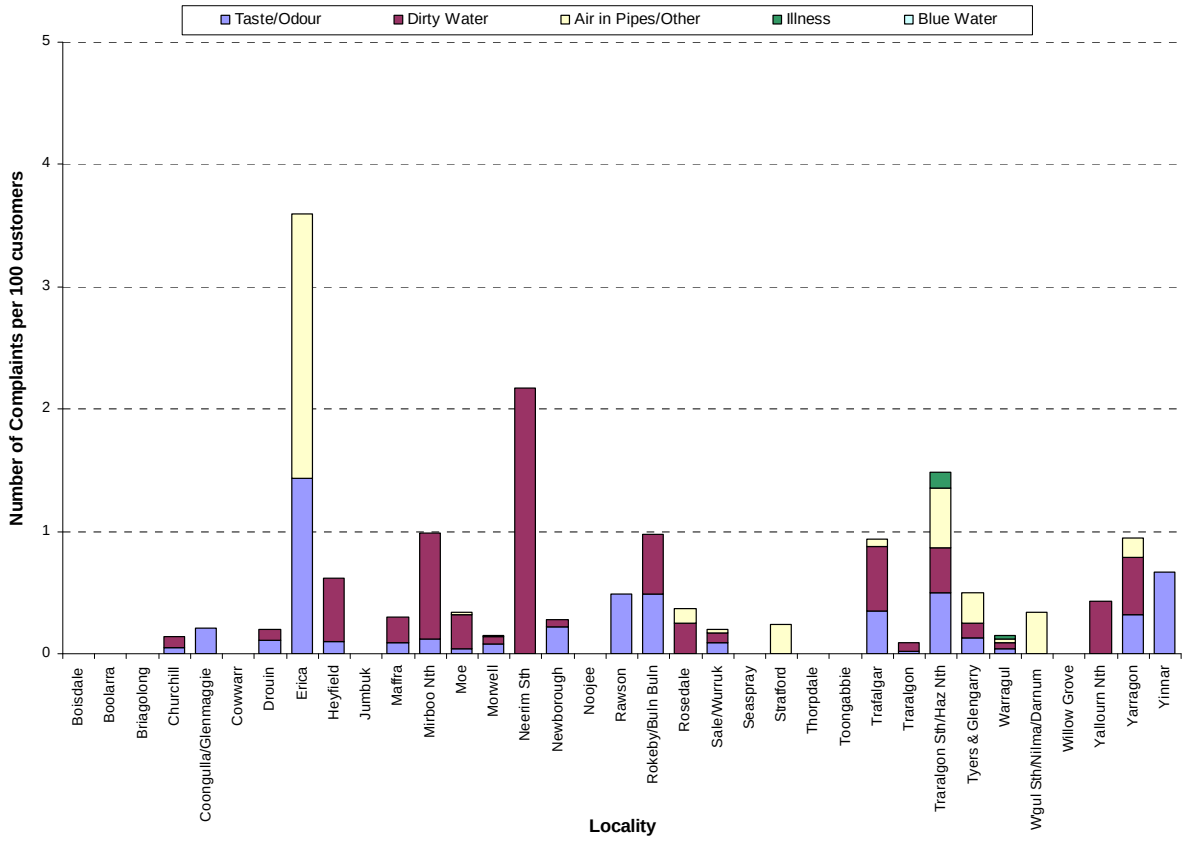
The total number of complaints received by Gippsland Water is presented below by type and locality.

**Figure 5: Total Customer Complaints for 2010-11**



When calculating the number of complaints per 100 customers, there are no localities within Gippsland Water's supply district which exceed 10 complaints per 100 customers as represented in the figure below.

**Figure 6: Customer Complaints per 100 customers for 2010-11**



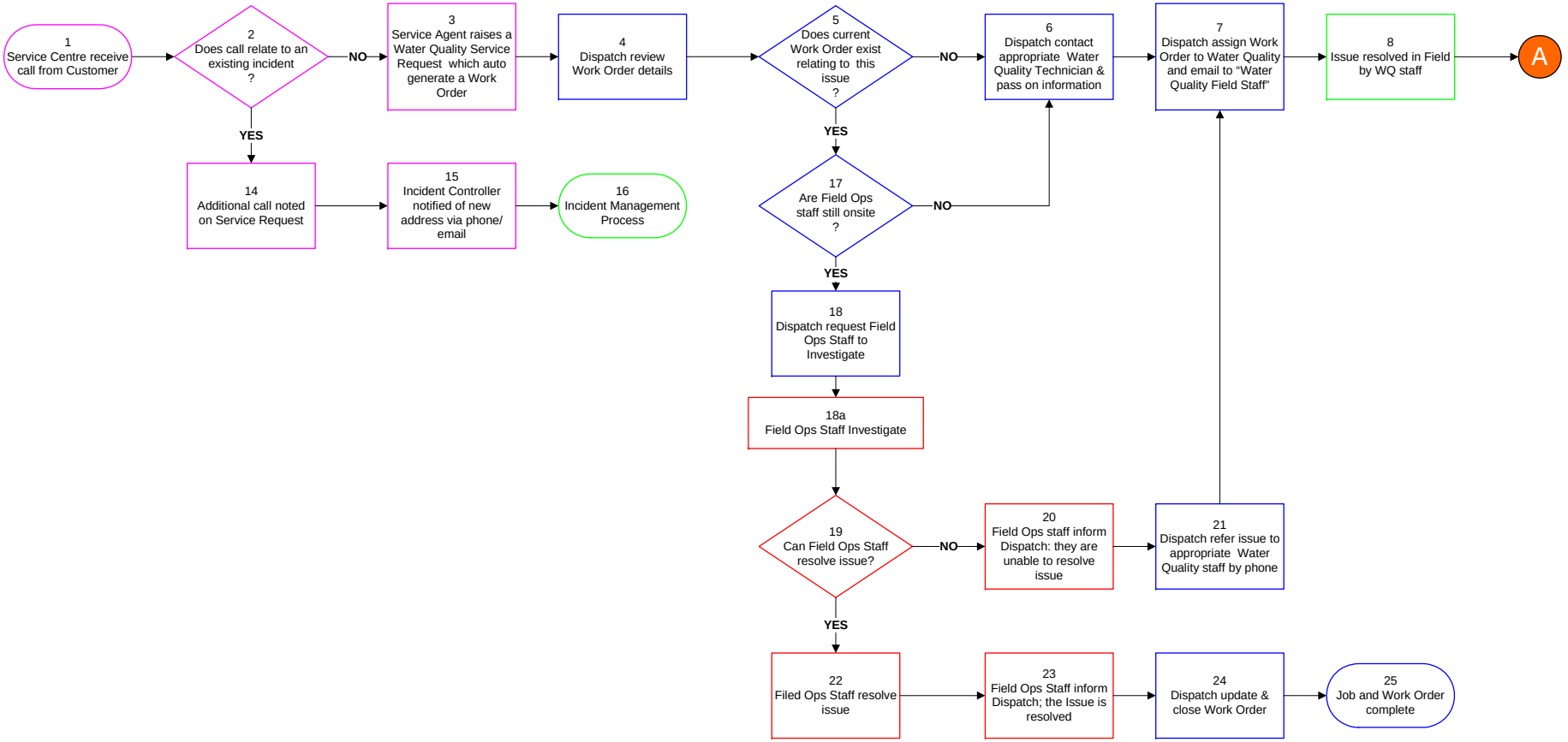

## 5.2 A SUMMARY OF THE CUSTOMER COMPLAINT PROCESS

Customer complaints are managed according to the following summary 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 if necessary to determine details of the water quality problem.
- For complaints associated with taste and odour, dirty water, and air in pipes, field measurements are performed, the reticulation system is typically flushed then field measurements are taken again to verify the problem has been corrected.
- Follow up contact may be made with the customer to determine if they are satisfied with the quality of service or alternatively a standard Gippsland Water contact card is left with the customer. 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.

This procedure is presented in more detail in the figure below.

## Figure 7: Water Quality Complaints Resolution Procedure



# 6 RISK MANAGEMENT

Gippsland Water's Water Quality Risk Management Plan (RMP) was audited in November 2009 for compliance with section 7(1) of the SDWA. The audit period was January 2009 to November 2009. The auditor found that Gippsland Water complied with the obligations of the Act, and seven opportunities for improvement as minor non-compliances were identified (Table 21).

Gippsland Water developed outcomes for the seven opportunities for improvement during the 2010-11 reporting period. By the end of the reporting period, all proposed outcomes actioned were completed as part of the Risk Management Review process.

The next audit of the Water Quality Risk Management Plan for compliance with section 7(1) of the SDWA will be conducted between August 2011 and April 2012.

**Table 21: Risk Management Plan Opportunity for Improvements**

| Continuous Improvement Opportunity | Action Completed |
|---|---|
| Need to formalise who reviews the updated plans. This action can be simply done by recording the information in the appropriate column and the method of revision e.g. requested via email. | Completed<br><br>The template document was changed to include a review table and will be incorporated in the latest risk management review. |
| Quantification of catchment water quality risks.<br><br>Improved mapping, and based on such mapping review of risks to groundwater recharge areas.<br><br>Risk scoring system is currently aligned with the corporate process but could benefit from being expanded to be align with ADWG requirements.<br><br>Suggest putting a clear statement in Table 1 showing that Toxins and Radiological hazards are clearly identified. | These items have been included in the Drinking Water Catchment 5 year management plan 2009-2014 and will be revised in the next latest management review. |
| The lack of availability of monthly calibration records on the day of the audit, combined with some significant drift between calibrations, and the use of single rather than two point calibrations, were considered to constitute an opportunity for improvement since these issues applied to critical limit turbidity monitoring instruments. | Completed<br><br>Process implemented with our mechanical and electrical contractor to complete calibrations in triplicate and centralise calibration records.<br><br>Preparation of standardised calibration procedures has commenced and will continue to progress. |
| For distribution diagrams, make sure that direction of water flow is more specific. | Completed |
| Position title on the intranet also needs to be updated to match that in the generic risk management plan. | Completed |

**Table 21 (cont.): Risk Management Plan Opportunity for Improvements**

| Continuous Improvement Opportunity | Action Completed |
|---|---|
| Inspection kits were noted as being 'out of date' during the store inspection as well as rusting of Gibault connecters and parts not being available for a water main repair when required. | Completed<br>The inspection kit in question was for a waste water site and it and the Gibault have been disposed of. |
| Continue to resource and support the existing broad program of improving the reliability and quality of the telemetry systems. | Ongoing<br>These items will be incorporated in the Gippsland Water corporate plan and labour resource model. |
| Review the approach used to operationally monitor the integrity of the vermin-proofing and security barriers on tank roofs that are difficult to access, particularly for tanks with low disinfectant residuals, and develop a systematic approach that is considered to reduce water safety risks to acceptable levels. | Ongoing<br>Tank condition assessment process has been developed by Gippsland Water's planning and development group. This process will be used to assess and prioritise works based on risk. |
| Review the need for a specific procedure to manage water quality risks arising due to burst main repairs. | Liaison with other water suppliers has commenced and an industry review of the new WSA03 standards is occurring. |
| Place signage on all chemical filling points. | Completed<br>This item has been added to each WTP site improvement plans. |
| Remove the filter housing on the turbidity line at Moe WTP unless it is there for a good reason. | Completed |
| Align limiting numerical values stated in the RMP, SCADA and the alert limit tables. This particularly applied to critical limit if applying `the definition literally, as per the ADWG. | Completed<br>These items were incorporated in the latest risk management review. |
| Suggest that GW looks at requesting raw data from MW to allow results to be input into water quality database and analysed together with Gippsland Water's data.<br>Suggest that GW requests MW to provide it with exceedance results or incidents rather than all data.<br>Suggest that Gippsland Water feeds back its WTP intake limits to Southern Rural Water. | These items will be discussed with MW. They currently provide data to GW in report format on a quarterly basis, associated with Tarago Reservoir. |

**Table 21 (cont.): Risk Management Plan Opportunity for Improvements**

| Continuous Improvement Opportunity | Action Completed |
|---|---|
| Keep ensuring that operators and all staff are kept up to date with WQ training and the importance of maintaining WQ at all times.<br><br>Suggest that Treatment Training/Field Operations Matrices are put on TRIM for ease of access.<br><br>Ensure that emergency management training schedule is resumed | Completed<br><br>Compliance with the Department of Health Victorian Framework for Water treatment Operator Competencies – Best Practice Guidelines and Water Industry Certification Scheme is currently being implemented.<br><br>Emergency management training has been undertaken and will be implemented on an ongoing basis. |

The next round of the Safe Drinking Water Regulations 2005 Risk Management Plan certification is scheduled to be undertaken between August 2011 and April 2012

# 7 UNDERTAKINGS UNDER SECTION 30 OF THE SDWA

Gippsland Water has no undertakings relevant to the 2010-11 reporting year.

# 8 EXEMPTIONS UNDER SECTION 20 OF THE SDWA

Gippsland Water has no exemptions relevant to the 2010-11 reporting year.

# 9 VARIATION IN AESTHETIC STANDARDS

Gippsland Water has no variations in aesthetic standards sought under section 19 of the SDWA.

# 10 REGULATED WATER

Gippsland Water does not manage any regulated water supplies.

# 11 GLOSSARY OF TERMS

| | |
|---|---|
| ADWG | *Australian Drinking Water Guidelines 2004* prepared by National Health and Medical Research Council. |
| DH | Department of Health formerly known as DHS (Department of Human Services) |
| Detection limit | The lowest concentration of analytical parameter in the sample that can be detected by the process laboratory. |
| Drinking Water Supply systems | Towns supplied with water from a common water source (WTP, supply mains and reticulation pipe-work). |
| *E. coli* | *Escherichia coli*. |
| Locality | Under the SDWR, a specified area that is supplied with drinking water by a water supplier. |
| mg/L | Milligram per litre. |
| NTU | Nephelometric Turbidity Units. |
| Properties | A registered customer connection to the drinking water supply. |
| RMP | Risk Management Plan |
| SCADA system | Supervisory control and data acquisition system |
| SDWA | *Safe Drinking Water Act 2003* Act No.46/2003. |
| SDWR | Safe Drinking Water Regulations 2005 S.R No.88/2005. |
| Source Water | Raw water supply for town, prior to treatment. |
| THM | Trihalomethane. |
| WTP | Water Treatment Plant. |
| 100mL | 100 millilitres. |
| < | Less than. |
| > | Greater than. |
| ≤ | Less than or equal to. |
| ≥ | Greater than or equal to. |
| <1 MPN/100ml | Reporting for *E. coli* where the detection limit is less then 1 most probable number of *E. coli* organism per 100ml. |

# 12 FURTHER INFORMATION

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

# 13 REFERENCES

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

Department of Health *2010-11 Annual report format - Drinking Water Regulation Guidance Note 12 June 2010*

Safe Drinking Water Act 2003 No.46/2003

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

Code of Practice for Fluoridation of Drinking Water Supplies *Health (Fluoridation) Act 1973* Department of Human Services (March 2009)

# APPENDIX 1: RAW WATER MONITORING

<table>
<tr><th rowspan="2">Locality</th><th rowspan="2">Source water</th><th colspan="3">Nature of Other Raw Water Monitoring Programs</th></tr>
<tr><th>Weekly/Fortnightly</th><th>Monthly</th><th>Annual / Quarterly</th></tr>
<tr>
<td>Morwell<br>Churchill<br>Yinnar<br>Jumbuk<br>Traralgon South/Hazelwood North</td>
<td rowspan="3">Moondarra Res via Tyers River</td>
<td rowspan="8"><u>Physicals</u><br>• Absorbance (254nm)<br>• Colour True (465nm)<br>• Dissolved Oxygen<br>• SUVA (245nm)<br>• Turbidity<br>• Electrical Conductivity @25$^{o}$C<br>• pH<br><br><u>Microbiological</u><br>• Escherichia coli<br>• Total Coliforms<br>• Heterotrophic Plate Count</td>
<td rowspan="8"><u>Physicals</u><br>• Alkalinity Bicarbonate as $CaCO_3$<br>• Alkalinity Total as $CaCO_3$<br>• Dissolved Organic Carbon (DOC)<br>• Total Organic Carbon (TOC)<br>• Total Dissolved Solids (TDS)<br>• SUVA (245nm<br>• Chlorophyll a<br><br><u>Chemical Inorganic</u><br>• Ammonia as N<br>• Bromide<br>• Chloride<br>• Fluoride<br>• Nitrate as N<br>• Nitrite as N<br>• Organic Nitrogen as N<br>• Phosphorous, Reactive as P<br>• Phosphorous Total as N<br>• Sulphate<br>• Total Kjeldahl Nitrogen as N<br>• Total Nitrogen as N</td>
<td rowspan="8"><u>Physicals*</u><br>• Total Dissolved Solids (TDS)<br>• Suspended Solids<br><br><u>Chemical Inorganic</u><br>• Cyanide<br>• Dissolved Organic Carbon (DOC)<br>• Total Organic Carbon (TOC)<br>• Bromide<br>• Fluoride<br><br><u>Metals*</u><br>• Aluminium Total<br>• Arsenic Total<br>• Selenium<br>• Cadmium Total<br>• Copper Total<br>• Lead Total<br>• Mercury<br>• Zinc Total<br><br><u>Pesticides, Herbicides and Chemical Organics**</u><br>• 2,4,5 T (Herbicide)<br>• 2,4,5 TP (Silvex)<br>• 2,4,6- T<br>• 2,4 D<br>• 2,4 DB<br>• Aldrin<br>• Ametryn<br>• Atrazine<br>• BHC (beta)</td>
</tr>
<tr><td>Traralgon</td></tr>
<tr><td>Tyers/Glengarry<br>Rosedale<br>Cowwarr<br>Toongabbie</td></tr>
<tr><td>Maffra</td><td rowspan="3">Macalister River</td></tr>
<tr><td>Stratford</td></tr>
<tr><td>Boisdale</td></tr>
<tr><td>Boolarra</td><td>Walkley Creek<br>O'Gradys Creek<br>(supplementary supply)</td></tr>
<tr><td>Briagolong</td><td>Bore (Freestone Creek Aquifer)</td></tr>
<tr><td>Warragul<br>(including Nilma, Darnum, Drouin East)</td><td rowspan="4">Pederson Weir (Tarago River)<br>Tarago Reservoir -<br>(supplementary supply)</td></tr>
<tr><td>Warragul South</td></tr>
<tr><td>Drouin</td></tr>
<tr><td>Rokeby/Buln Buln</td></tr>
</table>

| Locality | Source water | Nature of Other Raw Water Monitoring Programs | | |
|---|---|---|---|---|
| | | Weekly / Fortnightly | Monthly | Annual / Quarterly |
| Coongulla/ Glenmaggie | Macalister River | | **Metals**<br>• Aluminium Total<br>• Arsenic Total<br>• Calcium Total<br>• Cadmium Total<br>• Copper Total<br>• Iron Total<br>• Iron Soluble<br>• Lead Total<br>• Mercury<br>• Potassium<br>• Magnesium<br>• Manganese Total<br>• Manganese Soluble<br>• Selenium<br>• Zinc Total<br><br>**Chlorophenols (Sale Bores Only)**<br>• 2,3,4,5 Tetrechlorophenol<br>• 2,3,5,6 Tetrachlorophenol<br>• 2,4-Dichlorophenol<br>• 2,6-Dichlorphenol<br>• 2-Chlorophenol<br>• 4-Chloro-3-Methylphenol<br>• Total Phenols (Halogenated)<br>• Pentachlorophenol<br>• 2,4,5-Trichlorophenol<br>• 2,4,6 Trichlorophenol | • BHC (delta)<br>• Bifenthrin<br>• Chlordane (alpha)<br>• Chlordane (gamma)<br>• Chloropyrifos<br>• Chlopyralid<br>• Coumaphos<br>• Cyfluthrin<br>• Cypermethrin<br>• DDD<br>• DDE<br>• DDT<br>• Deltametrhrin<br>• Demoton-S<br>• Diazinon<br>• Dicamba<br>• Dichlorprop<br>• Dichlorvos<br>• Deildrin<br>• Dinoseb<br>• Endosulfan (alpha)<br>• Endosulfan (beta)<br>• Endosulfan Sulphate<br>• Eldrin<br>• Eldrinaldehyde<br>• Endrin Ketone<br>• ENP<br>• Fensulfothion<br>• Fenthion<br>• Fenvalerate<br>• HCB<br>• Heptachlor<br>• Heptachlor Epoxide<br>• Haxazinone |
| Rawson | Trigger Creek | | | |
| Erica | | | | |
| Heyfield | Thomson River | | | |
| Mirboo North | Little Morwell River | | | |
| Moe | Tanjil River and Narracan Creek | | | |
| Newborough | | | | |
| Yallourn North | | | | |
| Trafalgar | | | | |
| Yarragon | | | | |
| Neerim South | Tarago River | | | |
| Noojee | | | | |
| Sale/Wurruk | Bore (Boisdale Aquifer) | | | |
| Seaspray | Merrimans Creek | | | |
| Thorpdale | Easterbrook Creek | | | |

| Locality | Source water | Nature of Other Raw Water Monitoring Programs | | |
|---|---|---|---|---|
| | | Weekly / Fortnightly | Monthly | Annual / Quarterly |
| Willow Grove | Tanjil River | | | • Lindane<br>• Malathion<br>• MCPA<br>• MCPB<br>• Mecoprop<br>• Methoxychlor<br>• Monocrotophos<br>• Parathion<br>• Permathrin<br>• Phorate<br>• Picloram<br>• Premeton<br>• Prometryn<br>• Propazine<br>• Prophos<br>• Ronnel (Fenchlorfos)<br>• Simazine<br>• Simetryn<br>• Stirofos<br>• Terbuthylazine<br>• Terbutryn<br>• Tetraethyldithiopyrphos<br>• Trichlorinate<br>• Triclopyr<br>• Tukuthion<br><br>**Radiological**<br>• Gross Alpha Activity<br>• Gross Beta Activity<br><br>**Microbiological**<br>• *Cryptosporidium spp*<br>• *Giardia spp* |

*Reduced frequency of monitoring in some catchments based on risk profile
** Note all Pesticides, Herbicides and Chemical Organics results were within recommended ADWG limits
Not all parameters were measured at all localities or source waters.
Purpose of Monitoring - Risk Management within Catchment and Raw Water Supply Systems
Comprehensiveness (Frequency ) – Weekly, Fortnightly, Monthly, Quarterly and Annual Monitoring or as Risks Identified