



Safe Drinking Water Act 2003

# 2008/2009 Annual Water Quality Report

Date: October 2009

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## 1 Introduction

This 2008/2009 Annual Report to the Secretary to the Department of Health (the Department), has been prepared to satisfy the annual reporting requirements of the *Safe Drinking Water Act (SDWA) 2003* and demonstrate Goulburn-Murray Water's ongoing commitment to safe drinking water by addressing threats to raw water quality. Appendix 1 details reporting requirements under the *Safe Drinking Water Act 2003* and *Safe Drinking Water Regulations 2005*.

The report is set out as follows:

- Section 2 Roles and responsibilities of Goulburn-Murray Water (G-MW) under the Safe Drinking Water Act 2003.
- Section 3 G-MW reporting against regulatory requirements.
- Section 4 Details additional activities that are undertaken by G-MW that benefit water quality in the catchment.

Members of the public requiring further information regarding the above matters can contact Francine Noble, Catchment Health Coordinator, during business hours on (03) 5833 5500 or by email [francinen@g-mwater.com.au](mailto:francinen@g-mwater.com.au). Water quality data collected by G-MW is available to the public via the Victorian Water Resources data warehouse site – [www.vicwaterdata.net](http://www.vicwaterdata.net).

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## 2 G-MW as a Water Storage Manager

Goulburn-Murray Water (G-MW) manages the bulk water delivery and transfer for around 70% of Victoria, or approximately 68,000 square km. G-MW operates 17 bulk water storages and an extensive network of water distribution channels pipelines and natural carriers to deliver raw water to its customers. Customers use their own infrastructure to take water from these supply systems via a pump, irrigation wheel or flume gate.

Water supplied by G-MW is not chlorinated or treated to improve its taste and odour and should never be considered fit for human consumption without being properly treated.

G-MW also provides bulk water in accordance with Bulk Water Entitlement Agreements to urban water corporations for treatment and supply to their customers in 86 towns scattered across northern Victoria and along the River Murray as far downstream as Merbein. The Bulk Water Entitlements deal with quantity of supply rather than quality. See Appendix 2 for a list of towns supplied. G-MW does not operate the reticulated supply systems within these towns. There are some settlements, eg Goulburn Weir and Kirwans Bridge, where residents may hold a water entitlement with G-MW but this use is not for human consumption.

G-MW recognises that water is supplied to regional urban water corporations for treatment and distribution for drinking water purposes. Our commitment to drinking water quality management is reflected in the corporate drinking water quality policy. This Policy requires G-MW to address threats to safe drinking water by the preparation and implementation, as resources allow, of Water Storage Manager Risk Management Plans.

The *Safe Drinking Water Act 2003* (Vic) requires water storage managers such as G-MW to prepare, implement, review and revise risk management plans (RMPs) in relation to its supply of water to any party who treats water for human consumption. Water corporations and other parties who treat water for human consumption are known as water suppliers under the SDWA.

For the purposes of the Act, a Victorian water corporation is a water storage manager if it releases water from the storage it manages to a water supplier; or permits the water supplier to take water directly from the water storage.

A Victorian water corporation may also be deemed to be a water storage manager if the water supplier has a right to take water from the water storage or from any point downstream of the water storage; and the water storage manager is aware that the water supplier may exercise that right.

Given that water from most of G-MW storages is used to supply drinking water somewhere across northern and western Victoria and along the River Murray, the spatial scope of such plans is enormous.

### 2.1 The Water Storage Manager Role

G-MW as a water storage manager supplies water in a number of different ways to regional water suppliers (Coliban Water, Central Highlands Water, North East Water, Goulburn Valley Water, Grampians Wimmera Mallee Water and Lower Murray Water).

Water can be supplied via the following:

- Directly from storages.
- From the outlet of storages (eg Bendigo supply from Lake Eppalock).
- Indirectly from rivers supplied by storages (eg Shepparton from Lake Eildon on Goulburn River).
- From channel systems (eg Tatura and towns in the Central Goulburn Irrigation Area) that might receive water supplies directly from storages or on river weirs.

Water storage managers need to consider risk management in terms of risks associated:

- Within the catchment to the storage
- Within the storage
- With the supply of water downstream of storages using natural carriers such as rivers and creeks, and
- With the supply of water from channel systems to each drinking water off take point.

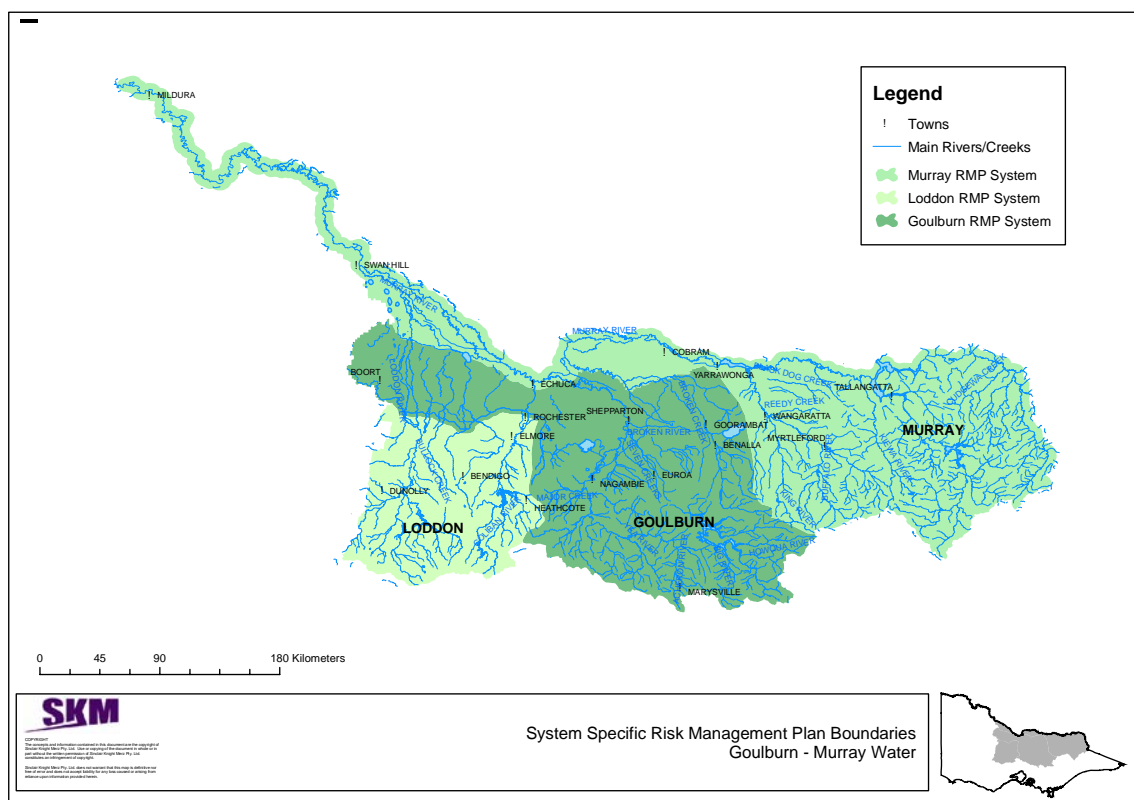
Safe Drinking Water Act Water Storage Manager Risk Management Plans (RMPs) have been prepared in accordance with the Act. Four plans have been prepared, namely:

- High Level Risk Management Plan – covering elements that are generic to all system specific plans.
- Three system specific plans for the Murray, Goulburn and Loddon systems, respectively (see Figure 1).

Copies of these risk management plans are available to the public on request to G-MW.

G-MW meets regularly with the urban water suppliers to discuss any issues arising from the above RMPs, including incident response, BGA blooms and water resource management.

**Figure 1 System boundaries for Goulburn-Murray Water Risk Management Plans**



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### 3 Report components required by Regulation

#### 3.1 Emergency, incidents or events

(a) information about actions taken by the water storage manager in respect of each emergency, incident or event that has arisen that has affected—

- (i) the quality of the water supplied for drinking purposes generally; and
- (ii) the quality of the water supplied where that supply posed a risk to human health; and

In order to understand incident information below, it should be noted that the catchments in northern Victorian where water may be harvested, are open to a variety of land and water based activities and are not, for example, closed to access and/or use such as Melbourne's catchments. These land use activities may include agriculture, aquaculture, forestry, industry, regional urban centres, townships, major transport infrastructure and recreation.

Within the 2008/2009 year, G-MW recorded 128 incidents of which 69 were regarded as potentially having the ability to affect the quality of water supplied to regional water corporation or potentially posed a risk to human health. None of these incidents were classed as emergencies. Each incident is handled using G-MW's incident response procedure which includes formal processes for communicating about, responding to and reviewing the incidents.

Figure 2 shows the breakdown of the 69 water quality related incidents recorded in 2008/2009. Details of these incidents are listed in Appendix 4.

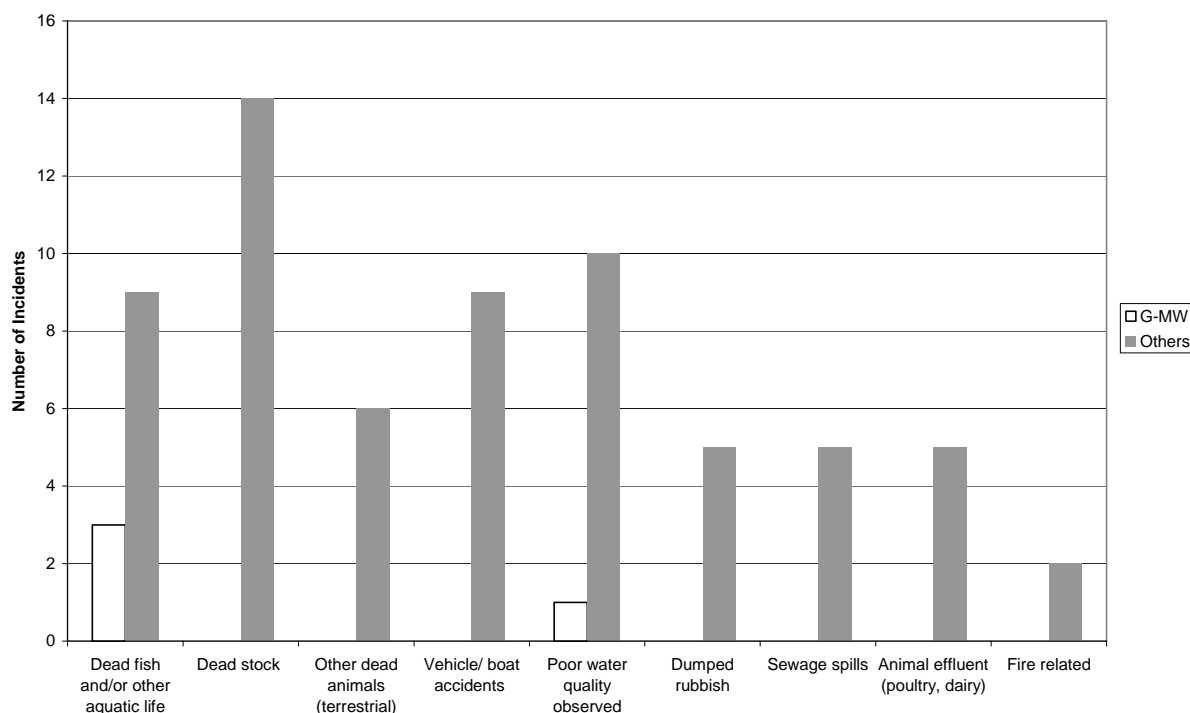


Figure 2: Types of incidents (n=69) reported to G-MW in 2008/2009 that potentially affected the quality of water supplied to drinking water suppliers or posed a risk to human health

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Of the 69 incidents, only four were related to G-MW works or operations during another relatively dry and hot year. The remaining 65 incidents were caused by person(s) unknown, landholders or regional water suppliers external to G-MW.

The most commonly reported incidents were dead animals in channels, both terrestrial and aquatic (n=32), vehicle or boat accidents (n=9) and poor water quality observed (n=11). The number of incidents related to dead stock (n=14) was higher than in 2007/08 (n=4), while the number of sewage spills (n=5) was similar to that reported in previous years.

Incidents resulting in poor water quality being observed involved the following types of activities or events:

- Turbid or discoloured plumes of water observed (3)
- Stock in waterways or channels (1)
- Algal blooms (2)
- Blackwater events that may result in low dissolved oxygen concentrations (3)
- Complaints from public about poor water quality due to low water levels (1).

### **3.2 Blue Green Algal (BGA) Blooms**

Blue green algal blooms regularly occur across G-MW's region and have the potential to affect drinking water supplies. G-MW is the local water manager for BGA blooms occurring in its storages. G-MW is also Regional convenor for blooms that affect more than 1 local water manager. Blooms in the River Murray are managed by NSW authorities with input from G-MW.

G-MW has developed its algal response plans in line with the state wide protocols set out in the Blue-Green Algae Circular for 2008/09. Blue Green Algal Response Plans have been prepared for all G-MW managed water bodies and for river basins. These plans provide guidance on the management of any blooms that occur, including notification of relevant stakeholders.

A Blue Green Algal Bloom Status Report is regularly circulated to a broad range of stakeholders including Department of Health, regional water suppliers and Shires.

All blooms that occurred in 2008/09 are listed in Appendix 3 and are summarised below.

#### **River Murray Bloom**

High levels of blue green algae developed in Lake Hume and then Lake Mulwala (Yarrowonga Weir) in early March 2009, leading to public health warnings to avoid contact with the raw water. In the following weeks, high levels of blue green algae were recorded in the River Murray between Lake Hume and Robinvale (Euston Weir). G-MW's Murray Valley Irrigation Area was also affected and customers were notified. Blue green algae levels started to decline in late April 2009, and had all fallen below high alert by 15 May 2009.

The overall response to the bloom was coordinated by Murray Regional Algal Coordinating Committee (MRACC), to which G-MW is an active member. There was high level of cooperation between all agencies involved at the operational level. MRACC issued media releases weekly regarding the status of the bloom. Additional information was also available via websites and telephone information services in both states. G-MW coordinated the Victorian response. Warning signs were located on access points to public lands along the River. No reports of adverse health affects due to the bloom were received.

Debriefing workshops with both Victorian and New South Wales agency stakeholders were held in June 2009. In general it was considered that the response was appropriate and effective. Some areas for improvement and clarification were identified. G-MW staff attended

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the National Algal Workshop in August 2009 where they shared their experiences with other agencies.

### **Other Alerts during 2008/09**

There were also isolated high alert algal blooms in Gunbower Creek lagoons during January 2009 and Lake Moodemere near Rutherglen in March 2009. Overall the number of high alerts algal blooms have decreased significantly over recent years.

In accordance with the 2008/09 BGA response plans, G-MW advised the Department of blue green algae blooms that may potentially affect public health via drinking water or recreational contact. The Department was notified of blooms likely to pose a risk to users under recreational guidelines for River Murray during 2008/09. The relevant regional water suppliers were also advised of the blooms in River Murray and other locations (Appendix 3). G-MW did not need to notify the Department under Section 22 during the 2008/09 year.

Further information regarding blue-green algae can be found on G-MW's website at [www.g-mwater.com.au](http://www.g-mwater.com.au), along with information regarding G-MW's responsibilities for blue green algae monitoring and reporting. Members of the public can access bloom information by calling G-MW's Blue Green Algae Hotline on (03) 5833 5785 or by contacting G-MW directly during business hours on (03) 5833 5500 or [reception@g-mwater.com.au](mailto:reception@g-mwater.com.au).

### **3.3 Issues arising from emergencies, incidents or events**

*(b) any issues that may have arisen out of the taking of the actions referred to in paragraph (a);*

G-MW continues to work with the regional water suppliers regarding their stakeholder and public notification protocols in the case of emergency discharges from wastewater treatment plants, which is an issue for G-MW.

During this period, G-MW was advised that two regional water businesses were granted emergency discharge licenses under Section 30A of the Environment Protection Act 1970 to discharge treated wastewater into waterways. Their onsite wastewater storage lagoons were full to capacity, as the regional water businesses could not meet their normal discharge conditions. There was not enough dilution flows available in the waterways due to the prolonged dry conditions. EPA required that the regional water businesses had to undertake water quality and quantity monitoring and that all downstream water users be informed of the situation. This water monitoring data was also made available to G-MW.

### **3.4 Summary of exemptions and undertakings**

*(c) a summary of every—*

*(i) exemption under section 8 of the Act and any condition imposed in relation to every exemption; and*

*(ii) written undertaking by the water storage manager accepted by the Secretary under section 30 of the Act; and*

G-MW has not required any exemptions under section 8 of the Act.

During 2008/2009, G-MW entered into an undertaking with the Department (accepted by the Secretary under section 30 of the Safe Drinking Water Act), to address one of the major non-compliance identified through the Safe Drinking Water Act audit in May 2008. This major non-compliance related to the risk from pathogenic and indicator organisms present in the water supply.

Actions taken to meet the requirements of this undertaking are outlined below.

In September 2008, G-MW met with its drinking water suppliers to discuss the 2008 audit findings and how we proposed to demonstrate that G-MW is managing the risk of pathogenic

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and indicator organisms such as *Cryptosporidium*, *Giardia* and *E. coli*. During these discussions, drinking water suppliers confirmed that their water treatment systems are designed to address the water quality risks identified in the risk management plans, including pathogens and indicator organisms.

After these meetings, G-MW sought and received confirmation from the drinking water suppliers that they have the following in place:

- (a) Appropriate monitoring programs for pathogenic and indicator organisms (*Cryptosporidium*, *Giardia*, and *E. coli*), the frequency of any monitoring, the laboratories used for analysis and whether they are NATA accredited.
- (b) Protocols for handling any exceedances of recommended health guidelines, or protocol for notifications under Section 22 of the Act, including notification to G-MW.
- (c) Appropriate treatment systems in place for the potential risks involved.

The information provided by the drinking water suppliers has been incorporated into our risk management plans.

In late January 2009, G-MW reported to the Secretary about the activities being undertaken to demonstrate that within G-MW's capacity as a water storage manager, G-MW is managing the risk of pathogenic and indicator organisms such as *Cryptosporidium*, *Giardia* and *E. coli* to drinking water supplies.

The Undertaking was successfully concluded in February 2009 but there is still ongoing work relating to the following activities related to the other audit findings:

- A training package has been prepared for rollout and the training Awareness Program, Register and Schedule has been updated until December 2009.
- Risk Management Plan audit and review schedule has been developed and updated until December 2009.
- Research and Development register requires regular review and updating.

In addition, G-MW also established a schedule of meeting dates with all drinking water suppliers for 2009. Water quality trends and potential actions that might be required to address these risks are discussed at these meetings. G-MW and the drinking water suppliers have also developed Memorandum of Understanding to document formally our commitment to ongoing liaison and information sharing.

In addition to currently reported suppliers, G-MW has now added Grampians Wimmera Mallee Water (GWMW) as a drinking water supplier from our systems for future reporting. GWMW takes water from the River Murray and from the Normanville Pipeline and the Waranga Western Channel for the supply of a number of towns outside G-MW's area of operation. A meeting was held with GWMW in early January to identify potential risks to water quality for these supplies and the identified risks are currently being included into the risk management plans.

### **3.5 Summary of processes to disinfect or treat water**

*(d) a summary of the process by which the water supplied by the water storage manager is disinfected or treated and any other processes applied to the water by the water storage manager, and any issues arising out of the application of those processes; and*

G-MW does not disinfect, treat or process any water supplied to its customers, as all water supplied by G-MW is not suitable for human consumption and customers are aware of this (see also Section 4.3).

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### **3.6 List of chemical or substances**

*(e) a list of all the chemicals and other substances, and any processes, used by a water storage manager to disinfect or treat the water supplied, or to be supplied, by it for drinking purposes; and*

G-MW does not supply water for drinking purposes and does not disinfect, treat or process any water for this purpose.

It should be noted that G-MW sometimes applies herbicides to vegetation adjacent to channels used to supply urban water. G-MW notifies the relevant drinking water supplier before this occurs.

### **3.7 Risk Management Plan audit findings and issues raised**

*(f) a summary of the findings of the most recent risk management plan audit and any issues that the approved auditor raised during the risk management plan audit.*

Under Section 11 of the *SDWA* 2003, the Department required G-MW to have its risk management plan audited by an approved auditor. The audit covered the period from 1 January 2006 to 31 December 2007 and was carried out in May 2008 by Sheree Feaver of Parsons Brinckerhoff Australia Pty Ltd.

G-MW received six major non-compliances and one minor non-compliance through the audit findings. These findings were reported in detail in G-MW 2007/08 Water Quality Annual Report to the Department and are not repeated here.

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## 4 Other Relevant Activities/Information

### 4.1 G-MW's Statement of Obligations

The Minister for Water has issued Goulburn Murray Water with a Statement of Obligations under the Water Industry Act 1994. G-MW undertakes various activities in order to meet these obligations, which can also benefit catchment water quality, namely:

- Responding to drought
- Research and development
- Regional and local government planning

These are briefly detailed below.

#### 4.1.1 Responding to Drought

During the ongoing dry conditions, G-MW has been liaising with Department of Sustainability and Environment (DSE), Catchment Management Authorities and regional water suppliers to share the limited water resources while minimizing adverse effects on the environment, town water supplies and rural water users. This work has focused predominantly on the Loddon, Campaspe and Broken River catchments.

As a result, additional water quality monitoring programs and coordination groups have been established to ensure that information is shared with relevant parties, including regional water suppliers like Coliban Water, Central Highlands Water, Goulburn Valley Water and North East Water. In some areas, notably the Goulburn and Campaspe systems, the monitoring programs have been expanded to include the effects of bushfire in the catchments.

The recent February 2009 fires affected parts of the Kiewa, Ovens, King, Goulburn, Campaspe and Loddon catchments. Since the fires, G-MW has worked with regional agencies and local government regarding raw water supplies in the fire affected areas. In the worst affected areas of the Goulburn and Campaspe systems, G-MW has been working with the CMAs, regional water businesses, to restore and upgrade water monitoring sites to provide real-time turbidity data as an early warning measure for poor quality runoff from the fire affected areas.

#### 4.1.2 Research and Development

During 2008/09, G-MW initiated several research programs to develop more effective monitoring tools for heavy metals, pesticides and herbicides. These monitoring tools will enable G-MW to understand the quality of water that we are delivering to our customers, and as a result, quantify the risks associated with these water quality parameters. Some of these programs are being undertaken in conjunction with CSIRO, universities, state government agencies, catchment management authorities and other water businesses. These programs are due to be completed during 2009/10.

G-MW also invested with various Cooperative Research Centres (e'Water, Irrigation Futures, Water Quality and Treatment) to understand how to manage aspects of our water systems more effectively. Many of the projects are ongoing for several years. The development of the Eppalock catchment model was completed during 2008/09, which enables G-MW (and others) to rank the sub-catchments in terms of their contributions of nutrients and sediments to the storage.

#### 4.1.3 Local Government Planning

G-MW assesses planning applications to meet a range of objectives, including the requirements of the Safe Drinking Water Act to minimize risks to water quality within our

catchments. Planning controls were identified as a key risk management control during the risk management plan development process. Under Section 55 of the *Planning and Environment Act 1987*, G-MW is a statutory referral authority for developments within any declared Special Water Supply Catchments and the irrigation areas. For all other areas, G-MW is only notified of any development applications as an interested or affected party under Section 52 of the *Planning and Environment Act 1987*.

G-MW assesses a large number of development applications to ensure that potential impacts on water quality are addressed by proponents and in 2008/2009, over 1200 applications were referred and assessed (Table 1). Substantial G-MW resources are applied to this function. During 2008/09, G-MW was involved in various projects (internal and external) to refine processes and reduce the number of applications referred, while at the same time ensuring that relevant applications receive appropriate scrutiny. Planning referrals received by G-MW since the implementation of the Safe Drinking Water Act 2003 are collated in Table 1.

**Table 1 Planning Referrals from Municipalities from 2004/05 to 2008/09**

<b>Municipality</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>
Alpine Shire	46	23	105	85	69
Ballarat	2	10	13	11	4
Benalla	2	4	6	11	20
Bendigo	64	33	58	58	51
Campaspe	27	27	131	106	108
Central Goldfields	20	11	10	11	7
DPCD (Alpine Resorts/ Mt Hotham)	16		2		2
EPA Works Approval		1	3	1	
Gannawarra	14	14	34	47	34
Hepburn	279	291	250	136	101
Indigo	43	30	18	8	5
Loddon	20	13	10	11	7
Macedon Ranges	142	95	87	101	124
Mansfield	38	18	30	46	74
Mildura	2	1	2	4	1
Mitchell	9	60	63	47	14
Moira	49	49	211	186	77
Moorabool			3	1	
Mount Alexander	91	78	80	72	85
Murrundindi	60	34	49	52	24
Pyrenees	4	3	11	5	10
Shepparton	157	98	197	169	174
Strathbogie	46	64	42	62	62
Swan Hill	10	12	19	26	18
Towong	22	33	48	65	69
Wangaratta	1	4	4	3	9
Wodonga	16	9	8	10	12
<b>Total</b>	<b>1,180</b>	<b>1,015</b>	<b>1,413</b>	<b>1,334</b>	<b>1161</b>

A list of the declared Special Water Supply Catchments can be found in Schedule 5 of the *Catchment and Land Protection Act* and there are several of these catchments in each of the system specific risk management plans.

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## 4.2 Multi Agency Response

G-MW has entered into waterway incident response agreements with its catchment partners in the Goulburn Broken and North East catchment regions. These agreements define the structures, roles and responsibilities for stakeholder agencies in relation waterway incident response, and provide agreed incident classification frameworks and communication protocols. There are also mechanisms for calling on response capability outside the catchment if a waterway incident exceeds the capacity of the partners to respond.

G-MW has met with the signatories of the Goulburn Broken and North East regional agreements to discuss preparedness and undertaking exercises to improve response and communications.

Whilst the Goulburn Broken and North East region agreements were finalised in 2007, an agreement for North Central region still has not been developed by stakeholder agencies. G-MW has met with the relevant staff of EPA and NC Catchment Management Authority, but no further progress has been made with the North Central regional agreement.

## 4.3 Advising Customers and Public about Non-potable Water Supplies

As all water supplied by G-MW is not suitable for human consumption, G-MW customers need to be aware of this. Following liaison with the Department and its water suppliers, G-MW has developed a management strategy to address supply of non-potable (non-drinking) water to its customers. Implementation of this strategy begun in 2007 and is available to the public upon request.

All G-MW customers are advised through an Information Statement that the water supplied by G-MW is untreated and is not suitable for drinking or food preparation. This includes any G-MW customers that provide a water supply to residential schemes, syndicates or co-operatives.

The Information Statement is available on G-MW website (<http://www.g-mwater.com.au>) and addresses the following aspects of G-MW's water supply system:

- Sources of water
- Nature of the catchments.
- Untreated (or raw) water
- Suitable uses
- Temporal changes in water quality
- Monitoring and data availability.
- Catchment management
- Incident response
- *Safe Drinking Water Act* 2003 requirements re customer notifications

In the event of an incident affecting water quality, G-MW notifies downstream customers and water suppliers (via letters, telephone and email) as well as preparing media statements for the general public. In the past, this approach has been used with other incidents such as BGA blooms and sewage spills.

## 4.4 Mexican (Yellow) Water Lily Infestation at Lake Nagambie

During the early 1990s, the Mexican (Yellow) Water Lily (*Nymphaea mexicana*) had become established in the Goulburn Weirpool. To manage the spread of the Mexican Waterlily, a steering committee of agency stakeholders and community members was established to oversee the assessment of various management options, particularly the mechanical harvesting and the use of herbicides. Both Goulburn Valley Water and the Department of Human Services were invited to participate on the steering committee because of the potential risks for water quality.

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During the 2008/09 period, G-MW has continued to trial different spraying regimes and monitor their effects on water quality, both during and after the spraying. G-MW is looking to optimise its spraying regime taking into account spraying efficacy and water quality effects.

Data collected to date is being analysed. Once completed, the prepared report will be circulated to the steering committee members for discussion.

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## Appendix 1      **Safe Drinking Water Act 2003 Requirements**

### 4.5 The Act

Section 26 of the *Safe Drinking Water Act 2003* states:

- (1) *A water supplier or water storage manager must give the Secretary a report, in respect of each financial year, on the issues relating to the quality of drinking water and regulated water that are specified by the regulations for the purposes of this section.*
- (2) *A water supplier or water storage manager must include in the report any other details that are required by the regulations or by the Secretary under sub-section (3).*
- (3) *The Secretary may, by written notice published in the Government Gazette, require water suppliers or water storage managers to include specified details in any report required by this section.*
- (4) *The water supplier or water storage manager must give the report to the Secretary no later than 31 October.*
- (5) *The water supplier or water storage manager must ensure that copies of the report are made available to the public on or after the day the report is given to the Secretary.*

### 4.6 Safe Drinking Water Regulations

The *Safe Drinking Water Regulations 2005* Sec 15(2) set out further requirements:

*15. Additional details to be included in annual reports of water suppliers or water storage managers*

*(2) For the purposes of section 26(1) and (2) of the Act, the required contents of the annual report of a water storage manager are—*

*(a) information about actions taken by the water storage manager in respect of each emergency, incident or event that has arisen that has affected—*

*(i) the quality of the water supplied for drinking purposes generally; and*

*(ii) the quality of the water supplied where that supply posed a risk to human health; and*

*(b) any issues that may have arisen out of the taking of the actions referred to in paragraph (a); and*

*(c) a summary of every—*

*(i) exemption under section 8 of the Act and any condition imposed in relation to every exemption; and*

*(ii) written undertaking by the water storage manager accepted by the Secretary under section 30 of the Act; and*

*(d) a summary of the process by which the water supplied by the water storage manager is disinfected or treated and any other processes applied to the water by the water storage manager, and any issues arising out of the application of those processes; and*

*(e) a list of all the chemicals and other substances, and any processes, used by a water storage manager to disinfect or treat the water supplied, or to be supplied, by it for drinking purposes; and*

*(f) a summary of the findings of the most recent risk management plan audit and any issues that the approved auditor raised during the risk management plan audit.*

## Appendix 2 Towns supplied from G-MW storages

### Towns supplied from G-MW managed storages – Murray system

Town	Storage / Source	Customer
BARMAH	River Murray	Goulburn Valley Water
BELLBRIDGE	Lake Hume (River Murray arm)	North East Water
BUNDALONG	Lake Mulwala Back Water (Ovens River arm)	North East Water
COBRAM	River Murray	Goulburn Valley Water
COHUNA	Gunbower Creek	Coliban Water
DARTMOUTH	Mitta Mitta River	North East Water
DEVENISH	Lake Mulwala	North East Water
ECHUCA	River Murray	Coliban Water
GUNBOWER	Taylor's Creek	Coliban Water
KATAMATITE	Channel No 7/3	Goulburn Valley Water
KERANG	Loddon River	Lower Murray Water
	River Murray	
	TIA 14/2 Channel	
KOONDROOK	River Murray	Lower Murray Water
LEITCHVILLE	Supply channel off Taylor's Creek	Coliban Water
	Gunbower Creek	
	TIA 5/1 Channel	
MILDURA	River Murray	Lower Murray Water
MILDURA WEST	River Murray	Lower Murray Water
MOYHU	King River	North East Water
MURRABIT	TIA 2/11/4 Channel (will become River Murray after June 2009)	Lower Murray Water
NATHALIA	Broken Creek	Goulburn Valley Water
NUMURKAH	Broken Creek	Goulburn Valley Water
WUNGHNU	Broken Creek	Goulburn Valley Water
OXLEY	King River	North East Water
PIANGIL	River Murray	Lower Murray Water
PICOLA	Channel No 9/9/9	Goulburn Valley Water
RED CLIFFS	River Murray	Lower Murray Water
ROBINVALE	River Murray	Lower Murray Water
RUTHERGLEN	River Murray	North East Water
WAHGUNYAH	River Murray	North East Water
ST JAMES	Lake Mulwala	North East Water
STRATHMERTON (via Cobram)	River Murray	Goulburn Valley Water
SWAN HILL	River Murray	Lower Murray Water
TALLANGATTA	Lake Hume / Mitta Mitta River	North East Water
TUNGAMAH	Lake Mulwala	North East Water
WALWA	River Murray	North East Water
WANGARATTA	King River (confluence with Ovens River)	North East Water
YARRAWONGA	Lake Mulwala (River Murray arm)	North East Water

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## Towns supplied from G-MW managed storages – Goulburn system

Location Supplied	Supply	Customer
ALEXANDRA	Goulburn River	Goulburn Valley Water
AVENEL	Goulburn River	Goulburn Valley Water
BIRCHIP*	Waranga Western Channel	Grampians Wimmera Mallee Water
BONNIE DOON	Lake Eildon, Brankeet Arm	Goulburn Valley Water
BOORT	Supply Channel off the Waranga Western Channel	Coliban Water
COLBINABBIN	Waranga Western Channel	Goulburn Valley Water
CONGUPNA	Goulburn River	Goulburn Valley Water
COROP	Waranga Western Channel	Goulburn Valley Water
DINGEE (R)	Supply Channel off Waranga Western Channel	Coliban Water
DOOKIE	East Goulburn Main Channel	Goulburn Valley Water
EILDON	Lake Eildon	Goulburn Valley Water
GIRGARRE	7/12/9 Channel	Goulburn Valley Water
GOULBURN WEIR (BAXTERS RD) #	Lake Nagambie	Goulburn Valley Water
KATANDRA WEST	3/25 Channel	Goulburn Valley Water
KIRWANS BRIDGE #	Lake Nagambie	Goulburn Valley Water
KYABRAM	Central Goulburn 9 Channel	Goulburn Valley Water
LOCKINGTON	Supply Channel off Waranga Western Channel	Coliban Water
MACORNA (R)	Supply Channel off Waranga Western Channel	Coliban Water
MERRIGUM	Central Goulburn 9 Channel	Goulburn Valley Water
MITIAMO (R)	Supply Channel off Waranga Western Channel	Coliban Water
MOLESWORTH	Goulburn River	Goulburn Valley Water
MOOROOPNA	Goulburn River	Goulburn Valley Water
MURCHISON	Goulburn River	Goulburn Valley Water
MYSIA (R)	Waranga Western Channel	Coliban Water
NAGAMBIE	Lake Nagambie	Goulburn Valley Water
NATHALIA	Broken Creek	Goulburn Valley Water
PYRAMID HILL	Supply Channel off Waranga Western Channel	Coliban Water
QUAMBATOOK*	Waranga Western Channel	Grampians Wimmera Mallee Water

<b>Location Supplied</b>	<b>Supply</b>	<b>Customer</b>
ROCHESTER	Campaspe River Campaspe No. 2 Channel Waranga Western Channel	Coliban Water
RUSHWORTH	Waranga Basin	Goulburn Valley Water
SEYMOUR	Goulburn River	Goulburn Valley Water
SHEPPARTON	Goulburn River	Goulburn Valley Water
STANHOPE	1/12/9 Channel	Goulburn Valley Water
STRATHBOGIE	Sevens Creek	Goulburn Valley Water
TALLAROOK	Goulburn River	Goulburn Valley Water
TALLYGAROPNA	Goulburn River	Goulburn Valley Water
TATURA	3/5A Channel	Goulburn Valley Water
TONGALA	19/28/9 Channel	Goulburn Valley Water
TOOLAMBA	Goulburn River	Goulburn Valley Water
WATERFORD PARK	Goulburn River	Goulburn Valley Water
WHYCHEPROOF*	Waranga Western Channel	Grampians Wimmera Mallee Water

(R) = Regulated supplies under the SDWA

\*Supply can either be from Goulburn or Loddon River water

# Part of settlement supplied by G-MW directly with water not suitable for human consumption.

### **Towns supplied from G-MW managed storages – Loddon system**

<b>Location Supplied</b>	<b>Storage /Supply</b>	<b>Customer</b>
AXEDALE	Via Bendigo Eppalock Reservoir	Coliban Water
AXEDALE	Waranga Western Channel	Coliban Water
BALLARAT	Newlyn Reservoir	Central Highlands Water
BENDIGO	Eppalock Reservoir	Coliban Water
BENDIGO	Malmsbury Reservoir	Coliban Water
BENDIGO	Waranga Western Channel	Coliban Water
BIRCHIP*	Waranga Western Channel	Grampians Wimmera Mallee Water
BRIDGEWATER	Loddon River	Coliban Water
GOORNONG	Campaspe River	Coliban Water

<b>Location Supplied</b>	<b>Storage /Supply</b>	<b>Customer</b>
HEATHCOTE	Eppalock Reservoir	Coliban Water
HEATHCOTE	Waranga Western Channel	Coliban Water
JARKLIN (R)	Serpentine Creek	Coliban Water
LAANECOORIE	Loddon River	Coliban Water
MARYBOROUGH	Tullaroop Reservoir	Central Highlands Water
MYSIA (R)	Waranga Western Channel	Coliban Water
QUAMBATOOK*	Waranga Western Channel	Grampians Wimmera Mallee Water
RAYWOOD	Eppalock Reservoir Waranga Western Channel	Coliban Water
ROCHESTER	Campaspe No. 2 Channel	Coliban Water
ROCHESTER	Campaspe River Waranga Western Channel	Coliban Water
SEBASTIAN (R)	Eppalock Reservoir	Coliban Water
SEBASTIAN (R)	Waranga Western Channel	Coliban Water
SERPENTINE	Serpentine Creek	Coliban Water
WYCHEPROOF*	Waranga Western Channel	Grampians Wimmera Mallee Water

(R) = Regulated supplies under the SDWA

\*Supply can either be from Goulburn or Loddon River water

### Appendix 3 Summary of Blue Green Algal Blooms during 2008/09

Basin/System	Storage or Waterway	Location	Bloom Start Date	Bloom End Date	Duration (days)	Maximum Alert Level	Comment
Ovens	Lake William Hovell		-	-		1	
Ovens	Lake Buffalo		-	-		1	
Broken	Lake Mokoan		-	-		NS (dry)	
Broken	Lake Nillahcootie		-	-		1	
Goulburn	Lake Eildon#		-	-		2	GVW notified via G-MW BGA status report
Goulburn	Greens Lake		-	-		1	
Goulburn	Goulburn Weirpool#		-	-		2	GVW notified via G-MW BGA status report
Goulburn	Waranga Basin#		-	-		1	
Campaspe	Lake Eppalock#		-	-		2	CW notified via G-MW BGA status report
Loddon	Cairn Curran Reservoir		-	-		1	
Loddon	Laanecoorie Reservoir#		-	-		2	
Loddon	Tullaroop Reservoir#					2	CHW notified via G-MW BGA status report
Loddon	Newlyn Reservoir#		-	-		2	
Loddon	Hepburns Lagoon					NS (dry)	
Upper Murray & Kiewa	Lake Dartmouth		-	-		1	
Upper Murray & Kiewa	Yarrowonga Weir#	entire lake	13 Mar 2009	15 May 2009	63	3	26 March 2009 Regional bloom declared in River Murray (Hume and Mulwala) until 15 May 2009 GVW/ NEW notified via BGA status report
Upper Murray & Kiewa	Murray Valley Irrigation Area#		13 Mar 2009	15 May 2009	63	3	Customers notified by media release and letters GVW/ NEW notified via BGA status report
Upper Murray & Kiewa	Blampied's Lagoon					NS (dry)	
Upper Murray & Kiewa	Lake Moodemere	entire lake	5 Mar 2009	-	?	3	Parks Vic contacted 5 March 2009 re biovolume of 14
Upper Murray & Kiewa	Torgannah Lagoon		-	-		2	

Basin/System	Storage or Waterway	Location	Bloom Start Date	Bloom End Date	Duration (days)	Maximum Alert Level	Comment
Torrumbarry Irrigation Area	<b>Kerang Lakes</b>	Reedy Lake	-	-		2	
Torrumbarry Irrigation Area	<b>Kerang Lakes</b>	Third Lake	-	-		2	
Torrumbarry Irrigation Area	<b>Kow Swamp System</b>		-	-		1	
Torrumbarry Irrigation Area	<b>Gunbower Creek System#</b>	<b>No 1 &amp; 4 lagoons</b>	8 Jan 2009	13 Mar 2009	64	3	CW notified via G-MW BGA status report
Torrumbarry Irrigation Area	<b>Lake Boga</b>					NS (dry)	
Torrumbarry Irrigation Area	<b>Loddon River</b>	Kerang Weir	-	-		1	
Torrumbarry Irrigation Area	<b>Macorna Main Channel #</b>		-	-		2	LMW notified via G-MW BGA status report
Lower River Murray	<b>Torrumbarry Weir</b>		-	-		2	LMW notified via G-MW BGA status report
Lower River Murray	<b>Mildura Weir#</b>		-	-		1	
Lower River Murray	<b>Lake Hawthorn</b>		-	-		NS (dry)	

Notes:

NS Not sampled

\* Blooms are defined as any blue-green algal outbreak that is at alert level 3.

# Waterbodies from which urban water authorities take their water supply.

## Appendix 4 Environmental incidents reported during 2008/09 related to water quality

Date	Incident	Level	Location	Cause
15-Jul-08	Submerged boat on Lake Eildon	Level 1	Reservoir	Transport accident
18-Aug-08	Emergency discharge from Epsom Wastewater Treatment Plant into Bendigo Creek, nr Bendigo.	Level 1	Unregulated waterway	Water Supplier
20-Aug-08	Dead fish in isolated pool of dried out channel, nr Shepparton	Level 1	Irrigation Channel	G-MW
21-Aug-08	Dairy effluent dam leaking into G-MW Channel- Cornish Road, Mooroopna	Level 1	Irrigation Channel	Landholder
2-Sep-08	Elevated turbidity due to rock armouring works nr Shepparton	Level 2	Irrigation Channel	G-MW
5-Sep-08	Dead animal in channel, nr Katandra West	Level 1	Irrigation Channel	Unknown
9-Sep-08	Dairy effluent discharge into drain, Montgomery Rd, Yarroweyah	Level 1	Irrigation Drain	Landholder
17-Sep-08	Dumped building materials nr Sheepwash Ck, Cobram	Level 1	Unregulated waterway	Person(s) unknown
18-Sep-08	Dead stock on G-MW land at Laanecoorie Reservoir	Level 1	Reservoir	Landholder
30-Sep-08	Dead cow in irrigation channel nr Cohuna	Level 1	Irrigation Channel	Landholder
17-Oct-08	Carp trapped in isolated pool of Campaspe R, nr Strathallan Rd bridge, Echuca	Level 1	Irrigation Channel	Natural occurrence
22-Oct-08	Dead Kangaroo in Central Goulburn channel, Echuca Road, north of Mooroopna	Level 1	Irrigation Channel	Unknown
24-Oct-08	Suspected black water event in Laanecoorie Reservoir	Level 1	Reservoir	Water Supplier
27-Oct-08	Pipe leaking recycled water from Daylesford Wastewater Treatment Plant into Jim Crowe Ck, Daylesford	Level 1	Unregulated waterway	Water Supplier
1-Nov-08	Complaint regarding water quality in channel, nr Shepparton	Level 1	Irrigation Channel	Natural occurrence
5-Nov-08	Identification of suspicious material- Lake Eppalock	Level 2	Reservoir	Person(s) unknown
11-Nov-08	Boating incident on Loddon River, nr Bridgewater	Level 1	Regulated waterway	Transport accident
12-Nov-08	Black water event in the Jack in the Box Creek, nr Wodonga	Level 1	Unregulated waterway	Water Supplier
12-Nov-08	Dead Redfin reported in channel, nr Mooroopna	Level 1	Irrigation Channel	Unknown
20-Nov-08	Dead Cow in Nine Mile Ck, between Karimba and Sharps Roads nr Wunghnu	Level 1	Unregulated waterway	Unknown
26-Nov-08	Dead carcasses dumped in drain, nr Daldy Rd, Shepparton	Level 1	Irrigation Drain	Unknown
3-Dec-08	Dead calf found in channel nr Tatura	Level 1	Irrigation Channel	Unknown
5-Dec-08	Potential blue-green algae bloom in Lake Eppalock	Level 1	Reservoir	Natural occurrence

Date	Incident	Level	Location	Cause
11-Dec-08	Dead fox in Central Goulburn 2/2 channel, nr Tatura	Level 1	Irrigation Channel	Unknown
16-Dec-08	Dead fox pups in CG 2 channel, nr Tatura	Level 1	Irrigation Channel	Unknown
17-Dec-08	Stolen vehicle in Campaspe River, nr Rochester	Level 2	Regulated waterway	Transport accident
22-Dec-08	Plume of murky water in the Goulburn River, nr Murchison	Level 1	Regulated waterway	Unknown
29-Dec-08	Dead cows (2) found nr Lakeside Boulevard, Eppalock	Level 1	Regulated waterway	Unknown
4-Jan-09	Dead animals in channel, nr Echuca Rd, north of Mooroopna	Level 1	Irrigation Channel	Unknown
5-Jan-09	Dead animal in channel (CG9) near Murray Valley Hwy, Wyuna	Level 1	Irrigation Channel	Unknown
13-Jan-09	Dead sheep in channel nr Shepparton	Level 1	Irrigation Channel	Landholder
13-Jan-09	Drying out of Lake Mokoan	Level 2	Reservoir	Natural occurrence
15-Jan-09	Car discovered in Cattanach Canal, nr Snipey Road, Nagambie	Level 1	Irrigation Channel	Transport accident
16-Jan-09	Chemical spray drums and pumping equipment on channel/ road reserve of Hopefield Rd, nr Pyramid Hill	Level 1	Irrigation Channel	Landholder
20-Jan-09	Ulcerations on silver perch in Goulburn River, nr Kotupna	Level 1	Regulated waterway	Natural occurrence
23-Jan-09	Cats dumped in CG 9 channel upstream of Murray Valley Hwy	Level 1	Irrigation Channel	Person(s) unknown
26-Jan-09	Fire on foreshore of Lake Eppalock nr Lake Shore Caravan Park	Level 2	Reservoir	Person(s) unknown
31-Jan-09	Dead redfin fish in channel, nr Kialla	Level 1	Irrigation Channel	Natural occurrence
1-Feb-09	Dead fish (mainly redfin) in channel upstream of Waranga Basin	Level 1	Irrigation Channel	Natural occurrence
2-Feb-09	Car in channel, nr Ryan/Finlay Roads, Wyuna East - Potential spill of low level radioactive material from soil moisture probe	Level 3	Irrigation Channel	Transport accident
2-Feb-09	Poor water quality discharge in Barkers Creek, nr Castlemaine	Level 1	Unregulated waterway	Industrial
2-Feb-09	Fish deaths in Yarrowonga main channel upstream and downstream of 8 Mile weir, nr Burramine	Level 1	Irrigation Channel	Natural occurrence
2-Feb-09	Fish trapped in downstream pit of outlet channel at Lake Mokoan	Level 1	Reservoir	G-MW
4-Feb-09	Dead fish reported in Howqua River, b/w Sheeppark Flat and 4 Mile Hut	Level 1	Unregulated waterway	Natural occurrence
5-Feb-09	Dead fish reported in Rose River, upstream of Buffalo Reservoir	Level 1	Unregulated waterway	Natural occurrence
8-Feb-09	Vehicle accident into channel - corner of South Boundary Rd and Lake Rd, Kyabram	Level 1	Irrigation Channel	Transport accident
10-Feb-09	Alleged death of fish & yabbies, & poor water quality in Spring Ck	Level 1	Unregulated waterway	Natural occurrence

Date	Incident	Level	Location	Cause
12-Feb-09	Cattle standing in Central Goulburn channel 11, nr Tongala affecting water quality,	Level 1	Irrigation Channel	Landholder
17-Feb-09	Impact on fish farms taking water from fire affected catchments	Level 1	Landholder property	Natural occurrence
25-Feb-09	Dead animals in channel cnr of Coomboona & Ross Roads, Coomboona	Level 1	Irrigation Channel	Unknown
27-Feb-09	BGA blooms in lagoons (No 1 and No 4 lagoons), nr Torrumbarry	Level 2	Regulated waterway	Natural occurrence
7-Mar-09	Waranga Western Channel - dead sheep	Level 1	Unregulated waterway	Unknown
16-Mar-09	Dead fish reported approximately 10 km downstream of Serpentine Weir	Level 2	Regulated waterway	G-MW
31-Mar-09	Shepparton - poultry effluent discharge to drain #4B/2	Level 2	Irrigation Drain	Landholder
6-Apr-09	Dead fox in plastic lined channel	Level 1	Irrigation Channel	Unknown
10-Apr-09	Boat sinking in Goulburn River, nr Mitchellstown Rd, Mitchellstown	Level 2	Unregulated waterway	Transport accident
10-Apr-09	House boat destroyed by fire, Barnewall Inlet, Eildon Reservoir	Level 2	Reservoir	Transport accident
15-Apr-09	Sewage spill into Lake Daylesford	Level 2	Reservoir	Water Supplier
17-Apr-09	Seepage from Effluent Lagoon at Howqua Caravan Park	Level 1	Reservoir	Landholder
24-Apr-09	Dead sheep in channel nr Pyramid Hill	Level 1	Irrigation Channel	Landholder
27-Apr-09	Dead Cow in Macorna Main Channel, nr Tragowel	Level 1	Channel	Unknown
1-May-09	Use of recreational vehicles on lake bed of Lake Eppalock	Level 2	Reservoir	Person(s) unknown
5-May-09	Spill of sewage into Southern Cross Creek, nr Echuca	Level 1	Unregulated waterway	Water Supplier
6-May-09	Dead fox in Central Goulburn channel 25/4,	Level 1	Irrigation Channel	Unknown
12-May-09	Syringes found in CG no 8 channel, Kyabram	Level 1	Irrigation Channel	Person(s) unknown
27-May-09	Syringes found in CG 34/9 channel, Kyabram	Level 1	Irrigation Channel	Person(s) unknown
29-May-09	Unauthorised long drop toilet installed on private land, Bognars Lane, Rocklyn	Level 1	Landholder property	Landholder
19-Jun-09	Effluent leaking into Torrumbarry channel 1 (Gunbower - Leitchville)	Level 1	Irrigation Channel	Landholder

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## Glossary of Terms

This section defines the terms used throughout the document.

<b>Term/Acronym</b>	<b>Description</b>
BGA	Blue Green Algae
E. coli	Escherichia coli
HLRMP's	High Level Risk Management Plans
SSRMP'S	System Specific Risk Management Plans
Water Suppliers	Water Suppliers, as defined under the <i>Safe Drinking Water Act 2003</i>