

SAMPLE BGA RISK MANAGEMENT PLAN

Distribution List

- *Local Water Manager to complete*

1. INTRODUCTION

1.1 OBJECTIVE

The objective of the Risk Management Plan (RMP) is to outline a coordinated approach to blue green algae (BGA) management within a local water manager's area of responsibility in order to protect public health and minimise social, environmental and economic impacts in the event of a local BGA Bloom. This document can be applied at either the single water body or the multiple water body level.

The Plan details the methodology of management of a local bloom specifying the roles and responsibilities of the Local Water Manager and other agencies to ensure consistent and effective management action before, during and after a BGA bloom.

1.2 LINKS WITH OTHER DOCUMENTS AND STRATEGIES

Emergency Management Act 1986 and the EMMV provide guidance in the management of incidents in Victoria. This plan adopts the framework of the Emergency Management Manual Victoria (EMMV) concepts of preparedness, response and recovery. This approach should be adopted by BGA Risk Management Plans for consistency and because it provides a robust framework for response to an event.

of incidents should be based on three key areas:

1. Prevention and Preparedness
2. Response
3. Recovery

The Plan also allows for the structure of the Regional Response Group to be compatible with the Australasian Inter-service Incident Management System (AIIMS). The AIIMS has been adopted by all major emergency management agencies in Victoria

This plan links with the DEPI Blue-Green Algae Circular (Victoria's BGA response framework); the risk management plans required for water storage managers (*Safe Drinking Water Act 2003*), and the relevant Regional Response Plan.

2. DEFINITIONS

Definitions to be consistent with DEPI Blue-Green Algae Circular.

- **Blue Green Algae Bloom**

An increase in algal numbers to such an extent as to: discolour the water, impart taste, odours, toxins and/or other compounds to the water, to adversely affect the other biotic components of the aquatic ecosystem (ie fish, birds, amphibians, etc) or generally render the water unsuitable for its intended use (ie drinking, irrigation, recreation, stock watering, ecosystem maintenance etc). (Queensland Harmful Algal Bloom Response Plan Version 1 Dec 2002)

- **Local Bloom**

Confined to a single water body.

Regional BGA Bloom – Affects multiple interconnected water bodies and algae is present at the public health alert levels as defined in the DEPI Blue-Green Algae Circular.

Drinking Water - Water that is intended for human consumption or for purposes connected with human consumption, such as the preparation of food or the making of ice for consumption or for the preservation of unpackaged food, whether or not the water is used for other purposes (*Safe Drinking Water Act 2003*).

- **Recreational Water Bodies**

Any areas where a significant number of people use the water for recreation (NHMRC 2008). The recreational trigger levels defined in the DEPI Blue-Green Algae Circular are based on primary contact recreation.

- **Primary Contact Recreation**

Includes all water-related activities where immersion in water is the intended action or probable outcome of the activity (for example swimming, water skiing, surfing or whitewater canoeing).

- **Incident Management Response (IMR) Levels**

MR Levels have been established for once a blue-green algae bloom is detected. Actions arising from these various levels are a response to the evaluation of the risk of the bloom to users.

Refer to Section 6 – Incident Management Response Levels for Drinking Water and Recreational Waters.

3. SCOPE

[List basins, water bodies covered by RMP (to be completed by Local Water Manager)]

[Tasks to develop this Risk Management Plan are listed in Appendix 1]

4. ROLES AND RESPONSIBILITIES

Roles and responsibilities to be consistent with DEPI Blue-Green Algae Circular.

4.1 SUMMARY OF ROLES AND RESPONSIBILITIES

The roles and responsibilities of all parties in the management of blue-green algae, based on the EMMV incident management approach is summarised in Figure 1 below.

Figure 1: Summary of BGA Coordination Roles and Responsibilities

	State-wide Coordinator DEPI	Regional Coordinator (RC)	Local Water Manager (LWM)	Support Agency
P R E V E N T I O N	Identify high risk water bodies/reaches with Regional coordinators	Liaise with CMAs and LWMs regarding water quality plans to reduce risk of algae blooms	Review BGA risk for water body /reach and determine and implement any preventative measures	CMAs develop Regional River Health Strategies
P P R E P A R E D N E S S	Maintain database of History of BGA blooms to monitor trends	RCs liaise with CMAs and others to encourage river and catchment improvement	Prepare and update RMPs annually	Tourism Victoria to assist with preparation of tourism industry for BGA blooms
	Annual update of DEPI BGA Circular	Prepare, update and distribute RCPs annually	Monitor and sample for BGA in accordance with RMP	DH provides input into to BGA Circular
	Ensure RCs have prepared and updated RCPs	Convene a pre-season RC meeting and undertake exercise to test RPs and RMPs	Participate in pre-season RCs meeting and undertake exercise to test plans	
	Assist RCs in allocation of LWMs if required			
R E S P O N S E	Monthly summary reports on significant blooms on (DEPI website)	Be informed of local blooms	Report to RC DEPI and DH on local blooms (where required)	DH, EPA, DEPI, CMAs members of RBRG
	Liaise with DH where required	Declare a bloom regional	Manage local blooms in accordance with RMP including monitoring, signage, media releases	DH provides advice on public health and seafood safety with respect to BGA
	Provide advice to Minister where required	Manage regional blooms in accordance with RCP	Notify the RC if a local bloom has or becomes a Regional bloom	DH is control agency for drinking water contamination in EMMV
		Convene Response Group	Participate in RBRG as required	Tourism Victoria provides contact in the relevant Regional Tourism Response and Recovery Group
		Appoint Incident Controller		
		Develop Communications Plan, Operations Plan Monitoring Plan		
		Report to DEPI and DH		
R E C O V E R Y	Ensure debrief report is prepared for blooms above public health alert level	Prepare debrief report for regional blooms	Prepare debrief report for blooms above public health alert level	DH assessment of social and environment impacts in accordance with EMMV
	Annual BGA report for season			

4.2 ROLES AND RESPONSIBILITIES IN THE RISK MANAGEMENT PLAN

Roles and responsibilities to be consistent with DEPI Blue-Green Algae Circular.

- **Department of Environment and Primary Industries**

Is the **Statewide Coordinator** for blue-green algae management. DEPI collects data on blue-green algae to monitor trends throughout the State to assist in the management of blue-green algae.

- **Regional Coordinators**

Oversee the management of local blooms, nominate local water managers and coordinate preparations for and the management of regional blooms. The Regional Coordination Plan is the framework, developed by the Regional Coordinator, to manage regional blooms. These plans should link with the relevant Risk Management and Incidence Response Plan in the region.

Refer Appendix 6 for list of Regional Coordinators for Local Water Manager's area of responsibility

A template for a standard Regional Coordination Plan is available from DEPI.

- **Local Water Managers (LWMs)**

Responsible for the management of blue-green algae blooms in a local water body. LWM's are responsible for developing a Risk Management Plan for water bodies under their responsibility and to monitor for signs of blue-green algae in accordance with this Plan. LWM's are also responsible for the development and implementation of Incident Response Plans. The Plans shall be reviewed annually and shall link to the Regional Coordination Plan.

5. BACKGROUND INFORMATION

[note this section can be organised for multiple water bodies under each subsection (as shown below) or for each waterbody to be discussed separately]

5.1 SITE DESCRIPTIONS

- Waterbody 1
- Waterbody 2
- Waterbody 3

5.2 BGA HISTORY

- Waterbody 1
- Waterbody 2
- Waterbody 3

5.3 POTENTIALLY AFFECTED USES AND USERS

- Waterbody 1
- Waterbody 2
- Waterbody 3

5.4 IMPACTS OF BGA

- Waterbody 1
- Waterbody 2
- Waterbody 3

6. RISK ASSESSMENT

[See Appendix 2]

6.1 SITE RISK ASSESSMENT

6.2 INCIDENT MANAGEMENT RESPONSE LEVEL

[See Appendix 2]

7. MONITORING

[Infill with information in Appendix 3]

7.1 PREAMBLE

Monitoring is an activity that is required year round, if an authority is to be fully prepared for management of blue-green algae. However, the monitoring should be scaled according to the location and the risks of algal bloom. Incident or regular visual surveillance may be all that is required at some times or in some locations where the risks of algal blooms are low but frequent (weekly) monitoring may be required at the outlet of a large water supply reservoir.

Staff should be trained professionally in the field sampling including collection, transportation and delivering samples. Samplers should also be trained in the process of visual surveillance and recording.

7.2 SITE LOCATION AND FREQUENCY

Site ID	Site Name and Description	Risk Level	Monitoring Regime

8 RESPONSE

[This section should be filled out for each water body in the system, though some common elements will exist – using framework in Appendix 4 and 5]

8.1 WATER BODY 1

Incident Organisation and Management Framework

Resources Deployed to the event

Sign Deployment

Management Responses

Other actions

8.2 SUBSEQUENT WATER BODIES

[Repeat for all water bodies using tables]

9. REPORTING OF BLUE GREEN ALGAE

Reporting to be consistent with DEPI Blue-Green Algae Circular.

9.1 NOTIFICATION TO DEPI AND REGIONAL COORDINATOR

Section 5.1 DEPI Blue-Green Algae Circular

When sampling and testing has confirmed the existence of blue-green algae at or in excess of a biovolume of 0.2 mm³/L, LWMs are asked to advise the Regional Coordinator and the DEPI.

A Blue-Green Algae Notification Form should be used for this notification. This form can be downloaded from the Our Water Our Future website:

www.ourwater.vic.gov.au/environment/blue-green-algae/blue-green-algae-circular or by contacting the DEPI Blue-Green Algae State Coordinator.

Local Blooms

When reporting local blooms, LWMs are requested to provide advice as to whether the bloom:

- ✎ has already been notified to DEPI and the information provided is an update on the bloom status
- ✎ is likely to become a regional problem
- ✎ has caused a water supply to be interrupted, public warnings to be issued or water bodies to close
- ✎ will or has resulted in the need to treat a water body with an algicide.

Regional Blooms

When reporting regional blooms Response Groups should provide advice, similar to a local bloom. Response Groups are asked to advise the Regional Coordinator and the DEPI.

9.2 ADDITIONAL NOTIFICATIONS

Section 5.3 DEPI Blue-Green Algae Circular

In some circumstances, blue-green algal blooms will need to be notified to other organisations, groups or individuals. This will depend on the use of the water body and density and nature of the bloom. These additional notifications are illustrated in the flowchart in Figure 3, and discussed in more detail in this section.

Drinking Water

Blue-green algal blooms in drinking water supplies that may pose a risk to public health or may result in widespread public complaint (for example through taste and odour) must be notified to the DHS using the notification arrangements under Section 22 of the SDWA. This notification should be made immediately via telephone (on 1300 761 874 during business hours or 1300 790 733 after hours) and followed up with written notification using the formal notification form (refer to Guidance Note No. 7: Notifications Required under the SDWA, available from www.health.vic.gov.au/environment/water/d-guidelines).

DHS must be notified when:

Water supplied for drinking¹ may place public health at risk due to one or more of the following:

- ↘ Total microcystins are detected at $\geq 1.3 \mu\text{g/L}$ (microcystin-LR toxicity equivalents)
- ↘ *Microcystis aeruginosa* is present at $\geq 5,000$ cells/mL
- ↘ Total combined biovolume of **known toxic** cyanobacterial species $\geq 0.4 \text{ mm}^3/\text{L}$
- ↘ Total combined biovolume of **all** cyanobacterial species $\geq 10 \text{ mm}^3/\text{L}$

OR

Blue-green algae are present in drinking water at levels that may cause widespread public complaint, for example through taste and odour.

Generally in Victoria, water storage managers (as defined under the SDWA) do not treat and supply drinking water to the public, and so may not be best placed to determine whether blue-green algae in the raw water for a drinking water supply may place public health at risk. This means that the water supplier (as defined under the SDWA) may be the most appropriate entity to notify DHS of blue-green algae incidents under Section 22.

A recommended framework for monitoring and managing blue-green algae in drinking water supplies can be found in *Cyanobacteria: Management and Implications for Water Quality* (published by the CRCWQT, 2006).

Recreational Water

Notifications are required when a blue-green algal bloom poses a health risk in water bodies used for primary contact recreation.

Blooms in recreational water bodies are considered to pose a potential public health risk, for primary contact recreation, when one or more of the following is true:

- ↘ *Microcystis aeruginosa* is present at $\geq 50,000$ cells/mL
- ↘ Total combined biovolume of known toxic cyanobacterial species is $\geq 4 \text{ mm}^3/\text{L}$
- ↘ Total combined biovolume of all cyanobacterial species is $\geq 10 \text{ mm}^3/\text{L}$
- ↘ Cyanobacterial scums are consistently present

In the case of these algal blooms, the following groups should be notified:

- ↘ Recreational users of the water body (for example, through signage or media, as appropriate).
- ↘ DHS (on 1300 761 874 during business hours).
- ↘ Relevant stakeholders (such as local government and recreation clubs).

Additional information on, and a framework of alert levels for monitoring and managing blue-green algae risks in recreational water bodies can be found in the *Guidelines for Managing Risks in Recreational Water* (NHMRC 2008).

¹ DHS does not need to be notified where:

- Drinking water is not, or has not been, supplied from the water body during the period where the algal bloom occurred (i.e. the water body has been isolated from supply).
- Drinking water treatment processes are in place that will effectively remove blue-green algal toxins or the potential cause of widespread public complaint.

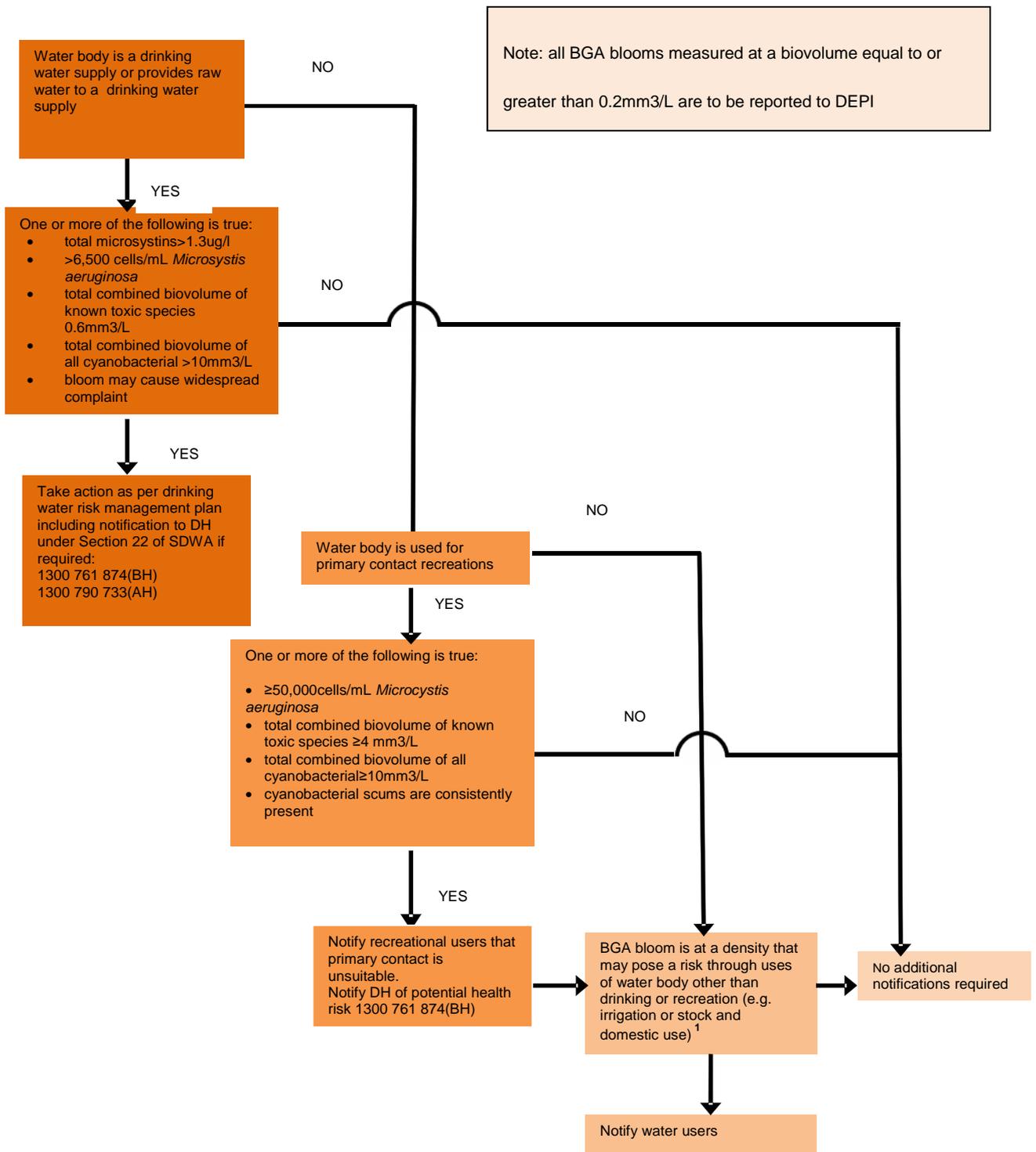
Other Water Supplies

There is currently not adequate data to set risk-based trigger levels for blue-green algae in water bodies used for other purposes, such as stock and domestic supplies or irrigation water. The LWM should undertake a risk assessment for blue-green algal blooms in these water bodies to determine whether the water is potentially hazardous. If it is considered that a risk may be posed due to the presence of blue-green algae, then all relevant users of the water should be notified.

The document Toxic Cyanobacteria Risk Assessment: Reservoir Vulnerability and Water Use Best Practice (Orr and Schneider, 2006), available from the SEQWater website (www.seqwater.com.au), can be used as a starting point for considering risks in these water bodies. However, it should be noted that the document was specifically developed for South East Queensland, and some assumptions may need to be adapted for local conditions.

For domestic water uses (such as showering and bathing, cooking or other kitchen purposes and domestic garden watering) Orr and Schneider recommend the use of the drinking water trigger levels for blue-green algae. While this is likely to be conservative, it can be used in the absence of a more detailed risk assessment for the specific scenario in question.

Figure 3: Notification Protocol for Blue-Green Algal Blooms (DEPI BGA Circular)



APPENDICES

APPENDIX 1: TASKS

PRESEASON PREPARATION

Initial Development of RMP

An initial Risk Management and Incident Response Plan should be developed by the Local Water Manager for the affected waters within their jurisdiction. This will include a section of the plan on the background condition at each water body and an initial risk assessment for each water body (see sections 6 and 7 below).

Annual Review of RMP

Local Water Managers shall annually review the Risk Management and Incident Response Plans and update them as required.

Pre-Season Meeting

Local Water Managers shall participate in a pre-season regional coordination meeting that shall be organised by the Regional Coordinator. The Local Water Manager shall discuss their Risk Management and Incident Response Plan(s) and their link to the Regional Coordination Plan during this meeting.

Provision of updated Plans

The Local Water Manager shall provide their Incident Response Plans to the Regional Coordinator.

RESPONSE

Once algae has been identified, monitoring and response shall occur according to the BGA Circular and detailed in Sections 8 and 9 respectively.

Debriefing (Recovery)

At the conclusion of a blue-green algae bloom, the Local Water Manager shall review the incident; evaluate the management of the bloom; and the efficiency of the RMP. These reviews may be very small for small blooms or more substantial for large events. This information is collated at the end of the BGA season (in time for the annual regional review held with the Regional Coordinator).

APPENDIX 2: RISK ASSESSMENT

Monitoring, planning and response for blue-green algal blooms and incidents should be based upon the risks of BGA problems and blooms at a particular water body. Risk analysis is designed to qualify the risks of blue-green algae blooms associated with particular water bodies. The process uses a qualitative analysis to describe the magnitude of the potential consequences and the likelihood that the consequences may occur. This form of analysis is broadly accepted for environmental purposes (Australian Standards, 2004) as a more quantitative process is not possible, because of the limited knowledge of ecosystem thresholds for blue-green algae blooms.

Risk is characterised by identifying the likelihood of an event (BGA blooms) multiplied by the consequence of that event. Likelihood (Table 1) and Consequence (Table 3) scales were derived from the Australian Drinking Water Guidelines (2004). The process is also consistent with the *Safe Drinking Water Act 2005*.

It is important to recognise that this approach provides a general guide only, as there can be problems associated with allocating a numerical value to a categorical ranking. For this reason, the risk rankings are considered as indicative only, with lines of logic being presented to facilitate examination of the decision-making.

BGA BLOOM LIKELIHOOD AND CONSEQUENCE

The likelihood of a blue-green algal bloom is broadly defined by the previous history of blooms, the level of nutrients in the water body, the depth of water (as a surrogate for temperature of the water body) and the degree of flow in the waterbody (Table 2). Table 2 can be utilised to assist in the assigning of a likelihood level (A - E) as defined in Table 1.

Table 1 – Qualitative measures of likelihood

Level	Descriptor	Example description
A	Almost certain	The event is expected to occur in most circumstances; several times a year to monthly
B	Likely	The event will probably occur in most circumstances; annually
C	Possible	The event should occur at some time; once in 5 to 10 years
D	Unlikely	The event could occur at some time; once in 50 years
E	Rare	The event may occur only in exceptional circumstances; once in 100 years

Table 2 – Qualitative factors of BGA Bloom likelihood

BGA Bloom Factor	High Likelihood of Blooms	Low Likelihood of Blooms
Previous bloom history	Many previous blooms	Few previous blooms
Nutrient levels	High nutrient levels	Low nutrient levels
Water depth (as a surrogate for temperature of the water body)	Shallow waters	Deep waters
Flow	Slow or no flow	Fast flowing system

Table 3 – Qualitative measures of consequence or impact

Level	Descriptor	Example description
1	Insignificant	Insignificant impact, little disruption to normal operation, low increase in normal operation costs. No media interest, stakeholder indifference, negligible impact on service delivery
2	Minor	Minor impact for small population, some manageable operation disruption, some increase in operating costs. Local press coverage, stakeholder aware of issue, corrective action required to restore service delivery
3	Moderate	Minor impact for large population, significant modifications to normal operation but manageable, operation costs increased, increased monitoring. State or multiple local press coverage, stakeholder actively expressing dissatisfaction, service restored after major intervention but within performable indicator levels
4	Major	Major impact for small population, systems significantly compromised and abnormal operation if at all, high level of monitoring required. National or repeated state press interest, stakeholder alarm or grave concern, service delivery interrupted failing performance indicators
5	Catastrophic	Major impact for large population, complete failure of systems. Repeated adverse state or national press coverage, enraged stakeholder or external intervention ordered by government, major failure to service delivery and considerable time to restore

SITE RISK ASSESSMENT

Risk is calculated by multiplying likelihood and consequence of a BGA Bloom in a water body by using the risk matrix (Table 4). So that even a water body with an almost certain likelihood of a bloom, with an insignificant consequence would have a moderate risk, the same risk as a water body with an unlikely likelihood but a moderate consequence.

Table 4 – Risk matrix

Likelihood	Consequences				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
A (Almost certain)	Moderate	High	Very High	Very High	Very High
B (Likely)	Moderate	High	High	Very High	Very High
C (Possible)	Low	Moderate	High	Very High	Very High
D (Unlikely)	Low	Low	Moderate	High	Very High
E (Rare)	Low	Low	Moderate	High	High

The use of this risk matrix will assist in determining which water bodies are at high/very high risk and the appropriate course of action to be taken.

The frequency and intensity of monitoring for water bodies with high or very high risk would need to be increased both during and outside bloom season.

INCIDENT MANAGEMENT RESPONSE LEVELS

A risk based approach to manage BGA blooms is underpinned by the Australian Drinking Water Guidelines (2004). We propose 3 levels of Incident Management Response (IMR) once a bloom has been detected. Therefore these IMR levels should be based on the consequences of the bloom (given the bloom has already been detected). Table 5 shows the IMR levels once a bloom exceeds the major consequence, then it is likely to be declared an emergency and would be dealt with through the Emergency Management Manual of Victoria.

Table 5 – Incident Management Response Level (based on consequence table in Australian Drinking Water Guidelines, 2004)

Consequence Level	Descriptor	Consequence Description	Incident Management Response Level
1	Insignificant	Insignificant impact, little disruption to normal operation, low increase in normal operation costs. No media interest, stakeholder indifference, negligible impact on service delivery	None
2	Minor	Minor impact for small population, some manageable operation disruption, some increase in operating costs. Local press coverage, stakeholder aware of issue, corrective action required to restore service delivery	1
3	Moderate	Minor impact for large population, significant modifications to normal operation but manageable, operation costs increased, increased monitoring. State or multiple local press coverage, stakeholder actively expressing dissatisfaction, service restored after major intervention but within performable indicator levels	2
4	Major	Major impact for small population, systems significantly compromised and abnormal operation if at all, high level of monitoring required. National or repeated state press interest, stakeholder alarm or grave concern, service delivery interrupted failing performance indicators	3

APPENDIX 3: MONITORING

[Infill with information such as below:]

PREAMBLE

Monitoring is an activity that is required year round, if an authority is to be fully prepared for management of blue-green algae. However, the monitoring should be scaled according to the location and the risks of algal bloom. Incident or regular visual surveillance may be all that is required at some times or in some locations where the risks of algal blooms are low but frequent (weekly) monitoring may be required at the outlet of a large water supply reservoir.

Staff should be trained professionally in the field sampling including collection, transportation and delivering samples. Samplers should also be trained in the process of visual surveillance and recording.

ALGAE COLLECTION FOR COUNTS

Blue-green algae can be patchy in space and time and being buoyant tend to accumulate near or at the shoreline on the leeward side (down-wind) of lakes and rivers or downstream bends of rivers.

Samples are generally collected by two methods:

- Grab samples
- Integrated Pipe samples

Integrated open water sampling tends to collect a more representative sample but sometimes grab samples are suitable if only species composition is required (after initial observation, for instance). Therefore sampling from a boat is preferred to fully achieve open water sampling. OHS procedures will be required when sampling and handling BGA samples.

ALGAE FOR TOXICITY TESTING

Samples for toxicity testing can be collected for qualitative or quantitative samples. Qualitative samples are usually collected from concentrated scums, by towing a phytoplankton net (10 – 50 µm mesh) from a boat or casting the net from the shoreline. The aim is to collect enough cells to determine if the algae is toxic. Quantitative toxin analysis samples are collected in the same manner as those taken for phytoplankton identification and enumeration and the volume of sample required will be notified by the laboratory (though at a half to one litre is required)

TREATMENT OF SAMPLES AFTER COLLECTION

Samples for identification and enumeration (counting) are generally preserved by adding Lugol's iodine preservative solution to the sample as soon as possible after collection. Sufficient Lugol's iodine solution should be added to render the sample a colour resembling weak tea (i.e. 0.5 mL Lugol's iodine per 100 mL of sample). A small sample of live cells should also be taken and provided to the laboratory to assist with identification. All samples (including for toxin analysis) should be kept cool and dark.

SAMPLING LOCATIONS AND FREQUENCY

Sampling and frequency will be determined by the local water manager following professional advice. Sampling locations depending on whether the waterbody is a lentic (still) or lotic (flowing). In

lentic water bodies (lakes, wetlands and reservoirs) are often best observed on both windward and leeward sides and sampled on leeward side in open water. River and streams (lotic sites) should be sampled in downstream open water reaches.

High risk locations should be sampled weekly during summer or when a bloom occurs but scaled down to monthly in winter or times when algal levels are low.

APPENDIX 4: Risk based management of BGA blooms for DRINKING WATER or RAW WATER (BULK WATER RESERVOIRS) supplies (DEPI 2008)

Incident Management Level (and characteristics of blooms)	Consequences of Bloom	Control Agency	Monitoring Required	Field Actions Required	Communication Response
1 Minor Bloom detected and $\geq 0.2 \text{ mm}^3 / \text{L}$ BioVolume	<ul style="list-style-type: none"> • May have waterway environmental or potential public health impacts. • Can be dealt with by on site resources of a single agency • There is no adverse publicity, injury, or environmental impacts • No involvement of the Emergency Services 	<ul style="list-style-type: none"> • Local Water Manager 	<ul style="list-style-type: none"> • Routine cell count monitoring • Visual Observations of extent and potential for off-site contamination 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Inform DEPI • Inform Regional Co-ordinator
2 Moderate $\geq 0.4 \text{ mm}^3 / \text{L}$ BioVolume Toxic BGA or >5000 cells/ml <i>Microcystis aeruginosa</i> or >1.3 $\mu\text{g}/\text{L}$ microcystins or >10 mm ³ /L BioVolume Total BGA And One location	<ul style="list-style-type: none"> • Adverse publicity • May have waterway environmental or potential public health impacts. • Can be dealt with by on site resources of a single agency 	<ul style="list-style-type: none"> • Local Water Manager 	<ul style="list-style-type: none"> • Increase monitoring BGA cell counts (frequency) • Toxicity testing • Visual Observations of extent and potential for off-site contamination 	<ul style="list-style-type: none"> • Erect Signs on Site • Alter treatment 	<ul style="list-style-type: none"> • Inform DHS • Inform DEPI • Inform Regional Co-ordinator • Notify other concerned agencies • Inform Press and users
3 Major $\geq 0.4 \text{ mm}^3 / \text{L}$ BioVolume Toxic BGA or >5000 cells/ml <i>Microcystis aeruginosa</i> or >1.3 $\mu\text{g}/\text{L}$ microcystins or >10 mm ³ /L BioVolume Total BGA and Many Locations	<ul style="list-style-type: none"> • Adverse publicity • Could involve substantial risk of serious injury or death, may have serious environmental impacts, or could have public health implications. • Executive level management of the issues and implications that may flow from the event. • Needs the resources of multiple agencies to deal with issues and actions 	<ul style="list-style-type: none"> • Regional Co-ordinator 	<ul style="list-style-type: none"> • Increase monitoring BGA cell counts (frequency and locations) • Toxicity testing • Visual Observations of extent and potential for off-site contamination 	<ul style="list-style-type: none"> • Erect Signs on Site • Alter management to avoid BGA • Alter treatment to reduce risk 	<ul style="list-style-type: none"> • Inform DHS • Inform DEPI • Inform Regional Co-ordinator • Notify other concerned agencies • Inform Press and users • Inform Public
Emergency Many Locations	<ul style="list-style-type: none"> • Catastrophic • As per Emergency Management Plan <p>Emergency due to the actual or imminent occurrence of an event which in any way endangers or threatens to endanger the safety or health of any person in Victoria or which destroys or damages, or threatens to destroy or damage any property in Victoria, including, without limiting the generality of the foregoing.</p>	<ul style="list-style-type: none"> • Dept of Human Services 	<ul style="list-style-type: none"> • As per Emergency Management Plan 	<ul style="list-style-type: none"> • As per Emergency Management Plan 	<ul style="list-style-type: none"> • As per Emergency Management Plan

The actions suggested here are intended to guide the response to blue-green algae. Due to the varying toxicity and treatment of different blue-green algae species, each individual case will require an investigation and action plan.

APPENDIX 5: Risk based management of BGA blooms for RECREATIONAL WATER supplies

Incident Management Level (and characteristics of blooms)	Consequences of Bloom	Control Agency	Monitoring Required	Field Actions Required	Communication Response
<p>1 Minor</p> <p>Bloom detected and $\geq 0.2 \text{ mm}^3/\text{L}$ Biovolume</p>	<ul style="list-style-type: none"> • May have waterway environmental or potential public health impacts. • Can be dealt with by on site resources of a single agency • There is no adverse publicity, injury, or environmental impacts • No involvement of the Emergency Services 	<ul style="list-style-type: none"> • Local Water Manager 	<ul style="list-style-type: none"> • Routine cell count monitoring • Visual Observations of extent and potential for off-site contamination 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Inform DEPI • Inform Regional Co-ordinator
<p>2 Moderate</p> <p>$\geq 4 \text{ mm}^3/\text{L}$ BioVolume Toxic BGA or $>50,000 \text{ cells/ml}$ <i>Microcystis aeruginosa</i> or $>10 \text{ mm}^3/\text{L}$ BioVolume Total BGA</p> <p>and One location</p>	<ul style="list-style-type: none"> • Adverse publicity • May have waterway environmental or potential public health impacts. • Can be dealt with by on site resources of a single agency 	<ul style="list-style-type: none"> • Local Water Manager 	<ul style="list-style-type: none"> • Increase monitoring BGA cell counts (frequency) • Toxicity testing • Visual Observations of extent and potential for off-site contamination 	<ul style="list-style-type: none"> • Erect Signs on Site 	<ul style="list-style-type: none"> • Inform DHS • Inform DEPI • Inform Regional Co-ordinator • Notify other concerned agencies • Inform Press and users
<p>3 Major</p> <p>$\geq 4 \text{ mm}^3/\text{L}$ BioVolume Toxic BGA or $>50,000 \text{ cells/ml}$ <i>Microcystis aeruginosa</i> or $>10 \text{ mm}^3/\text{L}$ BioVolume Total BGA</p> <p>and Many Locations</p>	<ul style="list-style-type: none"> • Adverse publicity • Could involve substantial risk of serious injury or death, may have serious environmental impacts, or could have public health implications. • Executive level management of the issues and implications that may flow from the event. • Needs the resources of multiple agencies to deal with issues and actions 	<ul style="list-style-type: none"> • Regional Co-ordinator 	<ul style="list-style-type: none"> • Increase monitoring BGA cell counts (frequency and locations) • Toxicity testing • Visual Observations of extent and potential for off-site contamination 	<ul style="list-style-type: none"> • Erect Signs on Site • Alter management to avoid BGA • Alter treatment to reduce risk 	<ul style="list-style-type: none"> • Inform DHS • Inform DEPI • Inform Regional Co-ordinator • Notify other concerned agencies • Inform Press and users • Inform Public

The actions suggested here are intended to guide the response to blue-green algae. Due to the varying toxicity and treatment of different blue-green algae species, each individual case will require an investigation and action plan.

APPENDIX 6

Regional Coordinators for Local Water Manager's area of responsibility

(to be completed by Local Water Managers)

APPENDIX 7

Water Testing Laboratories (NATA accredited)

(refer Appendix C DEPI Blue-Green Algae Circular)

(to be completed by Local Water Managers if required)

APPENDIX 8

BGA Notification Form (DEPI)

(refer DEPI website www.ourwater.vic.gov.au/environment/blue-green-algae/blue-green-algae-circular)

(to be completed by Local Water Managers)

APPENDIX 9

Materials and Equipment held by Local Water Managers

(to be completed by Local Water Managers if required)

APPENDIX 10

Media Outlets

(to be completed by Local Water Managers)

APPENDIX 11

Public Update Distribution List

(to be completed by Local Water Managers)