

Blue-Green Algae Emergency Response Plan

The Department of Energy, Environment and Climate Action



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Photo credit

Rob Considine, Barwon River

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it.

We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

DEECA is committed to genuinely partnering with Victorian Traditional Owners and Victoria's Aboriginal community to progress their aspirations.



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2.0	22/01/2026	22/01/2026	Combined Algal Response Plan and BGA Circular contents	Senior Policy Officer Planning and Preparedness	Executive Director, Water Security and Resilience

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1 Summary

A Blue-green Algae (BGA) emergency occurs when a bloom reaches levels that may have negative impacts on a waterway, local environment or public health. It is essential to consider potential consequences to decide the appropriate level of response required and to engage the relevant support agencies (detailed in the State Emergency Management Plan (SEMP) based on sectors and services impacted). The SEM identifies the Department of Energy, Environment and Climate Action (DEECA or the Department) as the Control Agency for response to BGA incidents (excluding marine).

The triggers for the levels of responses and the appropriate entity for managing this is summarised below.

Incident levels and triggers

Incident level	Responsibility for response	Arrangements	Triggers
Level 1 Local bloom	Local Water Manager	Local Water Manager to activate the risk management plan or manage the event as Business as Usual (BAU)	<ul style="list-style-type: none"> confined to a single water body; and unlikely to spread to another water body; and unlikely to have consequences beyond the immediate vicinity; and under the management or ownership of a single entity; and most appropriately managed within the water manager or landowner's business as usual" arrangements; and does not meet the definition of regional bloom. <p>Seafood:</p> <ul style="list-style-type: none"> health guideline values not exceeded.
Level 2 Regional bloom	BGA Bloom Regional Coordinator Local Water Manager	Regional Coordinator to activate the Regional Coordination Plan	<ul style="list-style-type: none"> affects multiple interconnected water bodies; or has the potential to escalate to a <i>Class 2 Emergency</i>; or when a decision is made by DEECA Agency Command (in consultation with the BGA Bloom Regional Coordinator and State Coordinator) that a local bloom or blooms should be managed as a regional bloom. <p>Seafood (Gippsland Lakes):</p> <ul style="list-style-type: none"> health guideline values exceeded; and does not meet triggers for Class 2 Emergency.
Level 3 Class 2 State Emergency	The Department	The Department Secretary may appoint a Class 2 State Controller. The Department, supported by emergency services, establish response arrangements at the local, regional and state level.	<ul style="list-style-type: none"> large and complex; or has the potential to cause or is causing extensive damage to the environment; or has the potential to have or is having significant adverse consequences for the Victorian community, a part of the Victorian community, or the Victorian economy; or a decision is made by the Department State Agency Commander (in consultation with the Regional Agency Commander (RAC), the BGA Bloom Regional Coordinator and State Coordinator) that a Regional bloom should be managed as a Class 2 Emergency; or at the request of the Emergency Management Commissioner; or As determined by the DEECA Secretary as the Control Agency Officer in Charge (CAOiC).

Once a bloom occurs, the responsible entity must notify the relevant agencies based on the BGA levels highlighted in the below table. The notifications are tied to the consequences for different types of water bodies including drinking water (and regulated water), recreational water and water bodies with commercial seafood in it (e.g. the Gippsland Lakes).

A BGA bloom emergency is only considered to be a State significant risk when it:

- is a large and complex event covering multiple regions or requiring multiple agencies; or
- has the potential to cause or is causing extensive damage to the environment; or
- has the potential to have or is having significant adverse consequences for the Victorian community, a part of the Victorian community of the Victorian economy, including agriculture.

A State significant risk is considered rare for Victoria with very few waterways possible of reaching this level of consequence management required. The most likely waterways for this to occur are the Murray River (managed by NSW Water) and Gippsland Lakes.

Notification requirements

Triggers	Consequences	Actions	Recipient
Any water body with either <ul style="list-style-type: none"> BGA at or in excess of a biovolume of 0.2 mm³/L; or Observable BGA scums. 	A potential bloom of note has occurred.	Possible increased monitoring required and warnings / signage.	Notification made via the Algal Blooms Module . <ul style="list-style-type: none"> Regional Coordinator
Water supplied for drinking ¹ with any one or more of the following: <ul style="list-style-type: none"> Total combined bio-volume of known toxic BGA species ≥ 0.6 mm³/L; Total combined bio-volume of all BGA species ≥ 10 mm³/L; BGA is present in drinking water at levels that may cause widespread public complaint, e.g. through taste and/or odour; or BGA is present in concentrations that the water agency believes may pose a risk to public health 	A significant bloom has occurred which impacts drinking water.	Responsible party* should undertake activities as outlined in their relevant Plans, including to comply with the SDWA.	Notification via email or phone: <ul style="list-style-type: none"> DEECA (SDO Water), Regional Coordinator, DH (Health Regulator)
Recreational water bodies when any one or more of the following occurs: <ul style="list-style-type: none"> Total combined biovolume of known toxic BGA species is ≥ 4 mm³/L; Total combined biovolume of all <i>cyanobacterial</i> species is ≥ 10 mm³/L; or BGA scums are consistently present². 	A significant bloom has occurred which impacts recreational water users.	Responsible party* should undertake activities as outlined in their relevant Plans, including to comply with the Guidelines for Managing Risks in Recreational Water.	Notification via email or phone: <ul style="list-style-type: none"> DEECA (SDO Water), Regional Coordinator, DH (Office of the Chief Health Officer), Recreational users (e.g. through signs)
Commercial Seafood when confirmation that a toxin producing species has reached a biovolume of ≥ 0.4 mm ³ /L at two or more sites within one week. Note: see <i>Protocol for managing the risk to seafood safety from harmful algal blooms in the Gippsland Lakes 2017-2020</i> for detailed health guideline values for BGA toxins in seafood (fish, prawns and mussels/molluscs).	A significant bloom has occurred which impacts seafood safety.	Responsible party* should undertake activities as outlined in their relevant Plans, including to comply with Seafood Safety Protocols.	Notification via email or phone: <ul style="list-style-type: none"> DEECA (SDO Water), Regional Coordinator, DH (Office of the Chief Health Officer), DJSIR, PrimeSafe, EPA

*Responsible Party is based on the BGA bloom level and possible consequences as outlined in section 8.3.

- Drinking Water triggers are based on BGA sampling from the untreated source water, not the treated drinking water. If treated Drinking Water contaminated by cyanobacterial or algal toxins this needs to be reported to DH under section 22 of the *Safe Drinking Water Act 2004* (Vic).
- Decisions should be based on the extent of scum; whether the scum consists of a known or potential toxin producing BGA species; and whether scum is present in close proximity to a known major recreational area.

2 Introduction

2.1 Purpose

The BGA Emergency Response Plan (the Plan) has been developed to assist the Victorian Department of Energy, Environment and Climate Action (DEECA, or the Department), and the Victorian water sector in managing its obligations associated with blue-green algae (BGA) incidents. The SEMP names the Department as the Control Agency for response to BGA incidents (excluding marine). Additionally, the Department has obligations under the SEMP for the mitigation of BGA blooms including to develop policy for BGA management in Victoria and to collect data on BGA blooms.

2.2 Objectives

The objectives of the Plan are to:

- Minimise the impact of BGA blooms where possible, on waterways, public health and safety, animal health and safety, industry and local amenity.
- Provide direction with respect to role clarity and responsibilities, including command and control arrangements and consequence management for different levels of BGA bloom incidents.
- Provide guidance on arrangements for BGA blooms under different scenarios.
- Ensure an integrated, coordinated, consistent and scalable response across the Department and the water sector.
- Provide guidance for Regional Coordinators and Local Water Managers on their obligations for BGA blooms.

2.3 Scope

The Plan includes:

- Descriptions of potential risks and consequences of BGA blooms to the social (particularly human health), economic and natural environments.
- The positions with accountability and the agencies responsible for managing a response.
- Consequences for each activation level of local, regional and state based arrangements.
- The multi-agency management arrangements at local, regional, state and interstate level.
- Information on the implications of climate change for response to BGA blooms.
- Links to sources of information for further detail in relation to BGA.

The Plan applies to all Victorian water bodies accessible to the public or waterways that discharge into publicly accessible water bodies such as rivers, streams, wetlands (including Ramsar wetlands), lakes, estuaries, water supply storages, irrigation channels and drains, wastewater treatment plant storages, ornamental lakes, stormwater and recycled water storages and treatment wetlands.

The Murray River is a New South Wales (NSW) waterway that receives flows from Victorian waterways. The river provides water to many Victorian towns, agricultural industries and recreational pursuits. A BGA bloom in the Murray River has the potential to have significant consequences on Victorian communities, economies and ecological systems including Ramsar wetlands. The Plan includes the arrangements for the Victorian response including the management of the consequences in Victoria from a bloom in the Murray River.

2.3.1 Out of scope

The Plan does not apply to the following:

- Waterways on private land unless there is discharge to public waterways or the water body is used by the public for primary or secondary contact recreational purposes.
- Closed waterways such as water storages/tanks and lakes, unless there is discharge to other waterways or the water body is used by the public for primary or secondary contact recreational purposes.

- Harmful algal blooms that do not contain BGA. These include dinoflagellates (red tides).
- Marine and coastal waters.
- Seafood safety and horticultural produce impacted by toxic algal blooms which is the responsibility of the Department of Health.

An example of an excluded waterway would be a wastewater lagoon that is not discharging, and therefore a bloom in the lagoon would not be reportable.

2.4 Audience

The Plan is targeted at the Department, and portfolio and partner agency emergency management personnel. This includes Water Corporations (WCs), Catchment Management Authorities (CMAs) and delegated land managers and water managers. Other primary audiences include those assisting in the management of the consequences of BGA blooms, such as local government, health, tourism and agriculture agencies.

The wider community is not the primary audience. However, community members may find the contents of the Plan informative.

2.5 Authorising environment

The *Emergency Management Act 2013* (Vic) is the authorising legislation for the management of emergencies in Victoria.

The SEMP is prepared under Section 53 of the *Emergency Management Act 2013* (Vic). The SEMP outlines arrangements for the coordinated response to emergencies by all agencies and details the roles that different organisations play in Victoria's emergency management arrangements. The Department is appointed as the Control Agency for BGA blooms.

The *Water Act 1989* (Vic) applies to water in Victoria and includes powers, functions and duties of the Minister for Water (the Minister), WCs and CMAs. Section 41 of the *Water Industry Act 1994* (Vic) provides the Minister with the power to issue a Statement of Obligations (SoO) specifying WCs' obligations, including in relation to managing emergencies.

In the SoO, issued by the Minister, part 6-4 Blue Green Algal Blooms sets out the responsibilities for all WCs with respect to reporting BGA events. The SoO also identifies the following Regional Coordinator responsibilities for applicable WCs:

Section 186A of the *Water Act 1989* (Vic) provides the Minister with the power to issue a Statement of Obligations (SoO) specifying CMAs' obligations, including in relation to managing emergencies. Under the SoO, the Authority shall participate in regional contingency planning for blue green algal blooms and respond according to the roles assigned to it in these plans.

2.6 Activation of the Plan

The arrangements in the Plan apply on a continuing basis and, as such, do not require formal activation. The response level will be escalated and de-escalated in accordance with the Plan.

2.7 Acknowledgement of Traditional Owners and First Peoples

DEECA is committed to genuinely partnering and meaningfully engaging with Victoria's Traditional Owners and First Peoples to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations. DEECA ensures that rights of Traditional Owners are preserved, restored and strengthened and does not diminish the rights that have been secured to date.

The following Principles³ have been developed to guide and be considered before, during and after a major emergency:

Know and respect people's rights

It is important that rights, including those recognised under the United Nations Declaration on the Rights of Traditional Owners and First Peoples, are not neglected or dismissed in emergency situations.

Foreground connection with Country

Traditional Owners and First Peoples and communities have deep connections to Country which should be respected and prioritised.

Work within existing community governing institutions

Knowing and working within community-controlled organisations and institutions respects existing arrangements and is critical for working with communities effectively.

Provide a safe and welcome environment for Elders

As community leaders and knowledge holders, Elders should be engaged early and respectfully and feel safe and welcome throughout a major emergency.

Acknowledge the sanctity of family

Family and kinship are essential to Traditional Owners and First Peoples' cultural identity and it's important that this is acknowledged and respected.

Relieve anxiety, don't add to it

Emergencies are stressful for anyone involved, however, it's important that people are given information in a calm and respectful way so that they can make informed decisions.

2.8 Review

The Plan is current at the time of publication and remains in effect until modified, superseded or withdrawn.

The Plan will be reviewed and updated not less than every three years. Consideration will be given to an earlier revision:

- Where revisions are required following a major emergency or exercise;
- Following a substantial change to the relevant legislation or arrangements; and/or
- In the event that important changes or corrections have been identified outside the review cycle.

3 Defining and categorising BGA emergencies

3.1 Blue-green algae

BGA or cyanobacteria are not true algae, but are a type of photosynthetic bacteria. They are a natural part of most aquatic environments and are found in streams, lakes, estuaries and the sea. Individual cells are very small and can be present in a water body without being visible.

3.2 BGA blooms

A BGA bloom is an increase in BGA concentrations to such an extent that it may discolour the water, impart taste, musty odours, toxins, and/or other compounds into the water, at concentrations that adversely affect

³ The Australian Institute for Disaster Resilience, Planning Evacuations with Indigenous Communities, (2023), East Melbourne, p. 1

the other biotic components of the aquatic ecosystems, or generally render the water unsuitable for its intended use.

During favourable environmental conditions (warm weather; elevated nutrient loads including phosphorus and nitrogen; low turbidity; optimal light intensity; and low flows or stable water conditions) BGA can increase rapidly resulting in a bloom. Blooms have historically been more prevalent during warmer periods, but they can occur all year round and without prior warning.

Some species of BGA produce toxins that have serious health implications for humans and animals (including livestock) if the toxins are consumed, inhaled or come into contact with the skin. The factors or conditions that trigger particular species to produce toxins at any point in time, or at a specific location is not well understood due to complexity and multitude of characteristics and conditions influencing particular species. As a result, human and animal health messaging associated with BGA blooms must emphasise the need for precautions to be taken to avoid inadvertent contact with toxins.

There is generally little effective means of reducing the extent or concentration of BGA blooms in large bodies of water once a bloom has occurred. A response to a bloom will largely be about warnings, broader communication, monitoring and managing consequence until environmental conditions change and the bloom dissipates.

3.3 BGA bloom emergency

A BGA emergency occurs when a bloom reaches levels that may negatively impact a waterway, the local environment, public health or the economy. This can be due to contact with the water, such as through recreational activities (primary and secondary), or through consumption by drinking water that has been contaminated by either BGA, or any toxins they have produced.

The specific levels for when a local or higher BGA emergency occurs are detailed in Table 2, section 8.1 where the consequence is a significant bloom (i.e. all instances except the first row).

3.4 Categorising a BGA emergency

BGA emergencies are categorised using the Australasian Inter-Service Management System (AIIMS) framework to provide a scalable response to emergency management based on the potential or realised consequences of the event. These are summarised in Table 1 below which considers recreational and drinking water and includes the seafood triggers. Incidents which prevent drinking water from being supplied due to toxic water supply should be considered under 40.4.3.7.PLN Water and Wastewater Service Disruption Response Plan. It should be noted that not all BGA incidents and blooms turn into emergencies and are capable of being managed locally as indicated below.

Table 1: Emergency management arrangements and triggers for BGA incidents and blooms

Incident level	Responsibility for response	Arrangements	Triggers
Level 1 Local bloom	Local Water Manager	Local Water Manager to activate the risk management plan or manage the event as Business as Usual (BAU)	<ul style="list-style-type: none"> confined to a single water body; and unlikely to spread to another water body; and unlikely to have consequences beyond the immediate vicinity; and under the management or ownership of a single entity; and most appropriately managed within the water manager or landowner's business as usual" arrangements; and does not meet the definition of regional bloom. <p>Seafood:</p> <ul style="list-style-type: none"> health guideline values⁴ not exceeded.

4. See Protocol for managing the risk to seafood safety from harmful algal blooms in the Gippsland Lakes 2017-2020 for health guideline values for cyanobacterial toxins in seafood.

Incident level	Responsibility for response	Arrangements	Triggers
Level 2 Regional bloom ⁵	BGA Bloom Regional Coordinator Local Water Manager	Regional Coordinator to activate the Regional Coordination Plan	<ul style="list-style-type: none"> affects multiple interconnected water bodies; or has the potential to escalate to a <i>Class 2 Emergency</i>; or when a decision is made by DEECA Agency Command (in consultation with the BGA Bloom Regional Coordinator and State Coordinator) that a local bloom or blooms should be managed as a regional bloom. <p>Seafood (Gippsland Lakes):</p> <ul style="list-style-type: none"> health guideline values exceeded; and does not meet triggers for Class 2 Emergency.
Level 3 Class 2 State Emergency	The Department	The Department Secretary may appoint a Class 2 State Controller. The Department, supported by emergency services, establish response arrangements at the local, regional and state level.	<ul style="list-style-type: none"> large and complex; or has the potential to cause or is causing extensive damage to the environment; or has the potential to have or is having significant adverse consequences for the Victorian community, a part of the Victorian community, or the Victorian economy; or a decision is made by the Department State Agency Commander (in consultation with the RAC, the BGA Bloom Regional Coordinator and State Coordinator) that a Regional bloom should be managed as a Class 2 Emergency; or at the request of the Emergency Management Commissioner; or As determined by the DEECA Secretary as the Control Agency Officer in Charge (CAOIC).

4 Consequences

A BGA incident may have various impacts on communities. It is essential to consider potential consequences and engage support agencies (detailed in the SEMP based on sectors and services impacted) in planning and response.

Consequences may include:

- Decline in water quality with the potential to impact human health from drinking, contact, recreation or other indirect routes such as consumption of contaminated fish or the fouling of water by fish deaths;
- A significant impact on livestock health and welfare, ranging from toxin-causing sudden deaths to subclinical disease and longer-term production losses.
- Economic loss and potential decline of community well-being due to the impact on agricultural land, livestock, horticulture, commercial and recreational fishers, tourism and/or business;
- The psychosocial impact on individuals and community potentially increasing the vulnerability of specific groups (e.g. farmers and their families, children, drought affected communities, communities impacted by previous emergencies and tourism operators); and
- Fish deaths and potential loss of biodiversity.

The roles of agencies assisting in the management of consequences, leading or supporting response, relief and recovery are summarised in section 8.3 below.

4.1 State significant risk

A BGA bloom emergency can be considered a State significant risk when it:

- When a biovolume exceed either the listed Drinking Water or Recreational Water triggers, and meets any of the criteria for a regional bloom, the Regional Coordinator shall convene a meeting with DEECA, DH, LWM's, AgVic, and other relevant stakeholders to facilitate the declaration of a Regional Bloom.

- Is a large and complex event covering multiple regions or requiring multiple agencies; or
- has the potential to cause or is causing extensive damage to the environment; or
- has the potential to have or is having significant adverse consequences for the Victorian community, a part of the Victorian community or the Victorian economy.

A State significant risk is considered rare for Victoria, with very few waterways possible of reaching the required level of consequence management. The most likely waterways for this to occur are the Murray River (managed by NSW Water) and the Gippsland Lakes.

4.2 Implications of climate change for BGA emergencies

Victoria is experiencing the impacts of climate change, and it can be expected that the climate will continue to change with implications for waterways and emergency management.

Climate change is considered a risk multiplier for emergency management that may increase the likelihood, frequency, or consequences posed by BGA blooms. Increases in average temperatures, combined with exhibited reductions in rainfall are already changing the likelihood and prevalence of BGA events.

Between 2006-2016, the Murray River experienced four major BGA blooms, having had none since BGA monitoring began in 1978⁶. Additionally, the Victorian peak BGA season is getting longer, with more blooms both establishing in and surviving longer through the winter months.

In the future, the increasing intensity of rainfall events will increase nutrient inputs into rivers while prolonged droughts will result in lower water levels. Both factors, combined with rising average temperatures will increase the likelihood of more frequent and prolonged BGA events⁷. This can also give rise to the occurrence of a broader range of BGA species appearing in bloom concentrations.

During emergencies, response teams may experience unprecedented conditions both in the scale and intensity of events. To manage this, response teams should be ready for a rapid scale up in response resources and be able to sustain this over longer periods of time. In addition, response planning should incorporate an assessment of multiple contingencies, scenarios with consequences potentially beyond the norm, and a broad range of response options for consequence management.

5 Introduction to arrangements

5.1 Shared responsibility

The SEMP recognises that emergency management is the shared responsibility of all Victorians, not just the emergency management sector. The responsibility for managing emergency risks is shared across government, industry, community and risk owners. Risk owners are any person or entity with the authority to manage a particular risk and who are accountable for doing so. Managing emergency risk needs to occur with high levels of collaboration, not just throughout the emergency management cycle, but also at all levels from local, to regional, to State.

5.1.1 State

The State arrangements for emergency management are defined under the SEMP with emergencies and areas of consequence management assigned to the relevant entities.

DEECA is the Control Agency for BGA emergencies and develops the policy for BGA management in Victoria. The Department also collects data on BGA to monitor trends throughout the State which assists with the possible management of BGA blooms. During a Level 3 BGA bloom, the Department will co-ordinate

6. A synthesis of findings from the Victorian Climate Initiative (VicCI), Hope, P, Timbal, B, Hendon, H, Ekström, M, Potter, N. 2017, Bureau of Meteorology, Australia.

7. The role of climate change in the occurrence of algal blooms: Lake Burragarang, Australia, Vilhena, L. C., Hillmer I, Imberger, J, 2010, Access date: 5 June 2019 (<https://aslopubs.onlinelibrary.wiley.com/doi/pdf/10.4319/lo.2010.55.3.1188>)

management activities so that all relevant stakeholders can perform their respective roles and responsibilities at the regional level.

The Department gains oversight of BGA management across the State and supports a coordinated approach through the State Coordinator for Blue-green algae. The State Coordinator is responsible for overseeing and coordination of BGA management for the State, through working with the appointed Regional Coordinators. This is primarily achieved through the development of this Plan and the pre-season BGA state coordination meeting.

The SEMP identifies the Department of Health (DH) as a support agency for BGA blooms. DH provides advice about the potential public health impacts of BGA blooms and administers the Victorian *Safe Drinking Water Act 2003* (Vic) (SDWA). Under the SDWA, water agencies have obligations to notify DH of the supply of non-complying drinking water and report known or suspected contamination of drinking water. This includes water supplied or to be supplied for drinking purpose that:

- a) may be the cause of an illness; or
- b) may be the means by which an illness is being, has been or will be, transmitted; or
- c) may contain any pathogen, substance, chemical or blue-green algae toxin, whether alone or in combination, at levels that may pose a risk to human health; or
- d) may cause widespread public complaint.

These obligations are set out in sections 18 and 22 of the SDWA.

Information on harmful algal blooms, including advice relating to seafood contaminated with algal toxin(s) can be found on the Better Health Channel: <https://www.betterhealth.vic.gov.au/health/healthyliving/Harmful-algal-blooms>.

DEECA (Agriculture Victoria) provides advice about the potential agricultural impacts of BGA blooms. This advice can be accessed via the Agriculture Victoria website (<https://agriculture.vic.gov.au/farm-management/water/blue-green-algae-in-water/managing-bluegreen-algae-in-farm-water-supplies>).

5.1.2 Regional

The Secretary of the Department has appointed WCs as Regional Coordinators. The Department is considered the Regional Coordinator for any areas not covered by the appointed WCs. A list of the Regional Coordinators and their respective areas can be found in 10Appendix B.

The Regional Coordinator is responsible for overseeing and the coordination of BGA management for their region, through working with Local Water Managers. This is primarily achieved through the development of the BGA Regional Coordination Plan. These Plans can be found on the Emergency Management Common Operating Picture (EM-COP) and on the Water Intelligence Platform⁸.

Regional Coordinators will directly, or by appointing an Incident Controller and Incident Management Team, fulfil the responsibilities identified in sections 8.3.2 and 8.3.3 of this Plan.

5.1.3 Local

Local Water Managers are responsible for managing BGA blooms in their local water bodies. A Local Water Manager's main role in BGA is to minimise impacts of the bloom including public health risks. This is done by working with Regional Coordinators, developing local BGA Risk Management Plans and working with stakeholders such as CMAs and the local community to maintain the waterway health and public safety.

Local Water Managers are allocated by the Regional Coordinator for the purposed of managing BGA in the specified water body and should be detailed in the Regional Contingency Plan. This needs to be agreed upon by the proposed Local Water Manager with DEECA facilitating the mediation process between the respective parties in the event of a dispute over roles and responsibilities.

⁸ The Water Intelligence Platform includes the Algal Bloom Module in FloodZoom <https://www.floodzoom.vic.gov.au>

A Local Water Manager in the context of this management framework does not imply any other waterway/water body management responsibilities, although many Local Water Managers in the algal context may have other roles in water body management.

A Local Water Manager is generally the agency with on ground management responsibilities for a particular water body. This can include:

- Government of public bodies who manage the specific water health such as Catchment Management Authorities.
- The Local Government Authority for the area.
- Entities appointed by the Minister for Environment under the *Crown Land (Reserves) Act 1978* (Vic). These can be specific public entities such as Parks Victoria and Local Government or Departments, or they can be a Committee of Management consisting of multiple public entities as defined under the Act.
- The agency responsible for public health in the area.

5.2 Linkages to other arrangements.

The Plan reflects applicable legislation, the arrangements in the SEMP, the strategic direction for emergency management in Victoria and the accepted State practice for managing emergencies. The arrangements in the SEMP have not been repeated in this Plan unless necessary to ensure context and readability.

5.2.1 Port Phillip Bay and marine arrangements

The Port Phillip Bay Marine Algal Bloom Response Protocol (Port Phillip Protocol) details specific arrangements for managing marine algae blooms in Port Phillip Bay (available on the Algal Bloom Module).

The triggers in Table 1 to determine a Local, Regional or State Class 2 Emergency response also apply to Port Phillip Bay.

5.2.2 Murray River

Management of the Murray River falls under the jurisdiction of New South Wales (NSW) WaterNSW. However, as the Murray River is the water supply source to many Victorian towns and regional cities and receives flows from Victorian waterways, effective management of high algal blooms depends upon collaborative and agreed arrangements. The Victorian Regional Coordinators and Local Water Managers are members of the Murray and Sunraysia Regional Algal Coordination Committee (RACC). If an algal bloom in Victoria poses a risk to the Murray River, representatives from the relevant water managers in NSW will be actively engaged in the Regional Response Group.

Local Water Managers are to keep relevant interstate coordinators up to date with algae results when available for shared waterways or sites that discharge into waterways in other State jurisdictions. Interstate algae coordinators shall be provided authorised access to additional notifications via the algae module. The level of authorised access shall be determined by the Department and shall be relevant to the delegated authority within the interstate jurisdictions.

When BGA bloom levels in the Murray River are above the trigger level, WaterNSW informs all stakeholders. Information on BGA alerts published by WaterNSW can be found on their website on either the [Algal Alerts NSW Map](#)⁹ or through [WaterInsights](#)¹⁰. Through WaterInsights users can subscribe to notifications of algal alerts in their preferred region. WaterNSW has produced a “Guidelines to Management response to harmful algal blooms” for application in the Murray and Sunraysia Region.

Upon receipt of advice regarding deterioration in water quality or an event that is likely to cause adverse impacts in reservoirs, a Murray Darling Basin Authority (MDBA) staff member shall seek advice from the

⁹ [Algal Alerts NSW map - WaterNSW](#)

¹⁰ <https://waterinsights.watnsw.com.au>

state agency which is primarily responsible for response. MDBA shall note the actions taken by the contracting government and contact the default Emergency Manager to consider any requirement to change releases (refer to section 4.5 Major contamination of a waterway or storage in the *River Murray Emergency Action Plan*).

Regardless of the Murray's tenure as a NSW waterway, the potential consequences of an algal bloom on Victorian tributaries and/or communities are significant. Victorian response arrangements will be triggered as described in section 8.

5.2.3 South Australia

If a BGA bloom is likely to impact on South Australian waters, the relevant Local Water Manager or Incident Controller will notify South Australia Health through public.health@health.sa.gov.au.

6 Mitigation

6.1 Responsibilities under the SEMP

The Department has responsibilities under the SEMP for mitigation of BGA blooms through the following activities

- Develop policy for blue-green algae management in Victoria
- Collect data on blue-green algae blooms

The Department has developed this Plan, along with other supporting documentation including an example Regional Contingency Plan to support the sector in the management of BGA incidents and emergencies.

Data is collected on historical BGA blooms through the Water Intelligence Platform where algal blooms are recorded by Regional Coordinators and relevant Local Water Managers. Data on possible current or emerging blooms is reported additionally on the statewide risk assessment tool. These are both covered in detail in section 7.1.2.

6.2 Regional obligations and opportunities

The factors which lead to BGA blooms are varied and complex with many of them being environmental (e.g. sunlight levels, water temperature, water stability), making it very difficult to mitigate and prevent blooms. However, nutrient levels in the water can be managed more effectively in many cases. For example, where agricultural runoff cause blooms, due to elevated levels of nitrogen and phosphorous present in the water.

CMAs, under the Catchment Management Framework, develop catchment management strategies that should consider improvements to land use such as working with local communities to adopt agricultural practices that reduce the risk of nutrient and soil loss. This in turn prevents the soil and nutrients from ending up in the waterways, reducing excess nutrients for BGA to feed off. These nutrients can be further reduced through aquatic and riparian weed control (including willow removal), the establishment of vegetation along riverbanks and excluding stock access to waterways..

These strategies which focus on general waterway health are also effective for the long term reduction in BGA bloom frequency and severity. Along some waterways (e.g. waterways that have experienced large scale clearance of native vegetation), these strategies may take decades to achieve BGA reduction due to legacy nutrients within the waterway.

Regional Coordinators have opportunities to liaise with CMAs, WCs, Local Government, AgVic and others, to encourage river and catchment improvement works to be carried out in areas that may reduce the risk of BGA blooms. As many Regional Coordinators are also WCs, this aligns with the entity's goals of cleaner waterways and safer source water for providing the Victorian Community with drinking water. This additionally aligns with the Australian Drinking Water Guidelines established under the SDWA which requires the need to maintain robust barriers to potential contamination of waters, incorporating a preventative strategy from catchment to consumer. Catchment management and source water protection provides the first barrier for the protection of drinking water quality.

6.3 Local obligations and opportunities

Local Water Managers with responsibilities for local waterways also can engage with and contribute to waterway health works and education pieces organised by CMAs and Regional Coordinators. At the local level this can be achieved primarily through community and industry awareness and engagement of the impacts of nutrient levels in the soil and benefits of both waterway health and reducing loss of nutrients from their agricultural land.

In high-risk waterways there may also be opportunities for reducing the likelihood or severity of blooms through specific targeted measures. There are multiple newer or emerging technologies that show signs of reducing BGA in waterbodies through various mechanisms. These should be assessed by the Local Water Managers with the costs and benefits assessed before committing to potential long term BGA mitigation strategies.

7 Preparedness

7.1 State coordination and preparedness

The Department ensures a coordinated BGA preparedness across the State through a variety of activities including organising pre-season meetings, maintaining a list of active and historical blooms for trend analysis and the identification of high-risk water bodies, providing a risk assessment tool for large water bodies and ensuring its own capability and capacity. It also liaises with interstate and other agencies to maintain and disseminate information to provide best practice in managing BGA.

7.1.1 Pre-season meetings

While BGA can occur all year round, the peak season is considered to begin in late spring through to autumn, with pre-season preparedness meetings occurring at all levels of emergency management.

The State Coordinator for BGA Convenes the pre-season BGA state coordination meeting with the Regional Coordinators. This includes risk outlooks, discussions on preparedness and confirming that Regional Coordinators have updated Regional Coordination Plans and have the capacity to carry out the response activities.

Additionally, Regional Coordinators can organise pre-season meetings on a regional basis with relevant Local Water Managers. This can include ensuring that Local Water Managers have prepared and updated BGA Risk Management Plans and that both Local Water Managers and Regional Coordinators have the capabilities to enact their Coordination Plans.

7.1.2 State BGA monitoring and risk assessment

The Department maintains the web-based Water Intelligence Platform with access provided to relevant stakeholders in BGA management including Regional Coordinators and Local Water Managers. Within this platform, the Algal Blooms Module provides a central location for BGA management in Victoria. Local Water Managers and Regional Coordinators can record BGA test results for a water body using this module.

The module automatically sends notification to the Department, DH and Regional Coordinators when a bloom is recorded. The dashboard page lists all the current blooms, and they are represented via a mapping function.

7.1.3 Capability and capacity planning

The Department will use its own portfolio resources to manage the direct response to a Level 3 – Class 2 BGA bloom. Agencies from across government (broadly described in the SEMP) will be requested to provide

specific operational and technical expertise and assistance, particularly with respect to consequence management.

Specific response arrangements for Level 1, Level 2 and Level 3 - Class 2 emergencies detailed in section 8 below indicates the source of resources within the portfolio, including local waterway/land managers, WCs and Department staff.

Incident management personnel may be drawn from outside the portfolio from agencies such as local government authorities, committees of management, CMAs, and subject matter experts or the Department of Jobs, Skills, Industry and Regions (DJSIR) by mutual agreement to share learning access local knowledge or assist with managing resource demand.

There are pre-existing mutual aid arrangements between various WCs to assist each other during times of emergency. These arrangements are managed by the individual WCs. There are also state arrangements for mutual aid in Victoria, which the Department can activate for additional assistance during an emergency. This results in a mutual aid cell run by a WC or the Department to manage requests for specialist WC personnel and equipment.

7.2 Regional Contingency Plans

Regional Coordinators must have in place a BGA Regional Coordination Plan (referred to as the Contingency Plan in the SoO) for their area outlining the approach to protect public health and minimise social, environmental and economic impacts.

The Regional Contingency Plan needs to cover the methodology of preparing for and managing a regional BGA bloom. This includes:

- The roles and responsibilities of the Regional Coordinator, Local Water Managers and other agencies to ensure a consistent and effective response before, during and after a BGA bloom.
- The reporting process and requirements for a bloom.
- The control arrangements and response activities required by the agency in a regional bloom.
- Identify all Local Water Managers and the water bodies they are responsible for.
- Identifying stakeholders and potential agencies for the Response Group to manage a regional BGA bloom.

The Regional Coordination Plan should be reviewed and updated at the start of each BGA season. A copy of the plan shall be sent to the Department bluegreen.algae@deeca.vic.gov.au and uploaded to the Algal Blooms Module

A sample BGA Regional Coordination Plan, incorporating the principles of risk management and broadly consistent with the SEMP framework, can be found on the Algal Blooms Module and the Department's [website](#). Regional Coordinators are requested to consider this template when preparing or updating BGA Regional Coordination Plans.

Local Water Managers should be familiar with the BGA Regional Coordination Plans for managing regional BGA blooms in their area and be aware of the extent of their roles and responsibilities in the plan.

7.3 Local BGA preparedness

7.3.1 Risk Management Plans

Local Water Managers should develop BGA Risk Management Plans for water bodies under their responsibility and monitor the water bodies for BGA accordingly, to ensure early detection and management of BGA blooms. BGA Risk Management Plans should link to the Regional Coordination Plan established by the Regional Coordinators.

Where a water body is used to supply drinking water, BGA Risk Management Plans must interface with, or be included in the Risk Management Plan that has been developed to comply with the SDWA.

Existing BGA Risk Management Plans which incorporate principles of risk management, and are compatible with the SEMP framework, can be found on the Algal Blooms Module. These Plans can serve as templates

for developing new Plans and provide examples of how BGA is managed in other jurisdictions. BGA Risk Management Plans should also provide advice for Local Water Managers on how to conduct risk-based planning for BGA management. Local Water Managers are requested to consider using this template when preparing or updating plans.

Local Water Managers should update their BGA Risk Management Plans annually and take account any changes to organisations both within and outside of the water sector and linkages to state-wide and municipal emergency management planning strategies and developments. They should also consider the best way for their BGA Risk Management Plans to be linked to the SEMP, Municipal Emergency Management Plans and any other related planning instruments.

These Risk Management Plans should be regularly tested and ensure staff are adequately trained to carry out the responsibilities in the plans as well as any activities required in the Regional Coordination Plans.

7.3.2 Waterway monitoring

Monitoring regimes should be documented in local BGA Risk Management Plans and initiated either by risk or the observed/reported presence of BGA. These regimes should include testing for the presence and/or concentration (biovolume) of various species of BGA as well as visual observations. For example, drinking water suppliers have source water risk management and monitoring plans that enable identification of a BGA bloom and effective management of the risk. Decisions to establish or increase the frequency of a monitoring regime are informed by the history of blooms in any location and the potential consequences.

Monitoring, beyond visual observations, is done by manual sampling and laboratory analysis. The testing of samples to determine species and toxicity such as Quantitative PCR (qPCR) testing should be undertaken by National Association of Testing Authorities (NATA) accredited laboratories. Three to seven days may be required to process samples and receive results.

BGA Bloom Risk Management Plans outline monitoring regimes in their area of responsibility. In water bodies with histories of blooms and monitoring regimes in place, BGA at or in excess of a biovolume of 0.2mm³/L may trigger an increase in the monitoring regime.

It is important to be aware of the differences between BGA biovolume and cell count when sampling and testing, especially when using the biovolume calculator provided on the Algal Bloom Module. More information can be found in 10Appendix G.

8 Response

8.1 Notification and classification

Table 2 lists the mandatory notifications to the Department, the Regional Coordinator and where relevant DH, DJSIR, PrimeSafe and EPA. They should also be used to trigger decision-making regarding appropriate warnings to the public – see section 8.2.

The notifications should be made by the Local Water Manager and updated as status changes in the Algal Blooms Module or email as required. Similarly, the Incident Controller will confirm and update the status if the incident escalates to a Class 2 Emergency. Notifications made by Water Corporations should be consistent with both this Plan and *40.0.3.1.PLN Water Corporation and DEECA Incident Notification Protocol*.

Under the SDWA, DH must be made aware of non-complying drinking water or known or suspected contamination of drinking water. These obligations are set out in sections 18 and 22 of the SDWA. Further information is available on the DH Website: www.health.vic.gov.au/water/drinking-water-notifications

The presence of BGA is considered a bloom when the relevant conditions in Table 2 are met:

Table 2: Triggers for notifications

Triggers	Consequences	Actions	Recipient
Any water body with either: <ul style="list-style-type: none"> BGA at or in excess of a biovolume of 0.2mm³/L; or <i>Observable cyanobacterial scums</i>. 	A potential bloom of note has occurred.	Increased monitoring required and possible warnings / signage.	Notification made via the Algal Blooms Module . <ul style="list-style-type: none"> Regional Coordinator
Water supplied for drinking ¹¹ with any one or more of the following: <ul style="list-style-type: none"> Total combined bio-volume of known toxic <i>cyanobacterial</i> species ≥ 0.6 mm³/L; Total combined bio-volume of all <i>cyanobacterial</i> species ≥ 10 mm³/L; BGA is present in drinking water at levels that may cause widespread public complaint, e.g. through taste and/or odour; or BGA is present in concentrations that the water agency believes may pose a risk to public health. 	A significant bloom has occurred which impacts drinking water.	Responsible party* should undertake activities as outlined in their relevant Plans, including to comply with the SDWA.	Notification made via email or phone call: <ul style="list-style-type: none"> DEECA (SDO Water), Regional Coordinator, DH (Health Regulator)
Recreational water bodies when any one or more of the following occurs: <ul style="list-style-type: none"> Total combined biovolume of known toxic <i>cyanobacterial</i> species is ≥ 4 mm³/L; Total combined biovolume of all <i>cyanobacterial</i> species is ≥ 10 mm³/L; or <i>Cyanobacterial</i> scums are consistently present¹². 	A significant bloom has occurred which impacts recreational water users.	Responsible party* should undertake activities as outlined in their relevant Plans, including to comply with the Guidelines for Managing Risks in Recreational Water.	Notification made via email or phone call: <ul style="list-style-type: none"> DEECA (SDO Water), Regional Coordinator, DH (Officer of the Chief Health Officer), Recreational users (e.g. through signs)
Commercial Seafood when confirmation that a toxin producing species has reached a biovolume of ≥ 0.4 mm ³ /L at two or more sites within one week.	A significant bloom has occurred which impacts seafood safety.	Responsible party* should undertake activities as outlined in their relevant Plans, including to comply with Seafood Safety Protocols.	Notification made via email or phone call: <ul style="list-style-type: none"> DEECA (SDO Water), Regional Coordinator, DH (Office of the Chief Health Officer), DJSIR, PrimeSafe, EPA

*Responsible Party is based on the BGA bloom level and possible consequences as outlined in section 8.3.

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11. Drinking Water triggers are based on cyanobacterial sampling from the untreated source water, not the treated drinking water. If treated Drinking Water contaminated by cyanobacterial or algal toxins this needs to be reported to DH under section 22 of the *Safe Drinking Water Act 2004* (Vic).
12. Decisions should be based on the extent of scum; whether the scum consists of a known or potential toxin producing cyanobacterial species; and whether scum is present in close proximity to a known major recreational area.

8.1.1 A non-emergency BGA bloom (incident)

When sampling and testing has confirmed the existence of all BGA at or in excess of a biovolume of 0.2mm³/L, or BGA can be observed visually, Local Water Managers are required to advise the Regional Coordinator through the Water Intelligence Platform Algal Blooms Module. Blooms of this size are still an incident, however not considered an emergency.

When recording new BGA data on a waterbody directly into the Algal Blooms Module for the first time, it will automatically notify the Department and the designated Regional Coordinator.

When reporting local BGA blooms, Local Water Managers are requested to provide the following details:

- Species (if known)
- Biovolume
- Name of water body
- Actions taken to date

When updating existing blooms Local Water Managers are asked to enter BGA bloom updates as new results become available and when the BGA bloom has ceased.

When logging blooms also consider:

- Whether the bloom is likely to become a regional problem;
- If the bloom has caused a water supply to be interrupted, public warnings to be issued or water bodies to be closed; and
- Whether treatment is required.

8.1.2 Drinking water

Under the SDWA, DH must be notified of circumstances where drinking water supplied to the public does not meet the State's water quality standards, and/or when there is known or suspected contamination of drinking water. These notifications and reports are required to be made under section 18 and section 22 respectively. The trigger levels for reporting are detailed in the Water Supplied for drinking section of Table 2.

This requirement is in place to protect public health and to ensure that relevant corrective and preventative actions are taken, to provide the public with safe drinking water.

Water agencies risk management plans are required to include the management of harmful algal blooms. This includes communication protocols between water storage managers and water suppliers, and reporting arrangements to DH.

A recommended framework for monitoring and managing BGA in drinking water supplies can be found in *Management Strategies for Cyanobacteria (Blue-Green Algae): A Guide for Water Utilities (Water Quality Research Australia 2010)*.

8.1.3 Regulated water

Regulated water, as defined under SDWA, is water supplied by water agencies that is not drinking water but may be mistaken as being drinking water. Water agencies supplying regulated water are required to take all reasonable steps to ensure that recipients of the water are aware of the health risk that may arise from use of the water.

WC risk management plans must detail how public health risk is managed in relation to the water supplied, including regulated water. This may include advising recipients of potential dermal irritation risk when harmful algae are present in regulated water supplies. Regulated water may be the only water supply available to some households and private water treatment processes may be in place but they may potentially be inadequate to deal with toxic BGA. As such, the regulated water notifications triggers match those of "Water Supplied for drinking" in Table 2.

8.1.4 Recreational water

Notifications are required when a BGA bloom poses a public health risk in water bodies used for primary and secondary contact recreation.

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

- Recreational users of the water body (for example, through signage (10Appendix E) or media (10Appendix F), as appropriate).
- DH including details of the actions taken to inform recreational users of the waterbody of the bloom.
- Relevant stakeholders (such as local government, tourism bodies and recreation clubs).
- EPA 1300 372 842 and WQForecasting@epa.vic.gov.au.

Additional information on monitoring and managing BGA risks in recreational water bodies can be found in the *Guidelines for Managing Risks in Recreational Water* (National Health and Medical Research Council, 2008¹³).

During a BGA bloom, warning signs should remain in place until two consecutive results from representative samples confirm that levels of BGA have fallen below the recreational water BGA levels. Sample results should be taken at a minimum of seven to ten days apart for testing. *Guidelines for Managing Risks in Recreational Water* (NHMRC 2008).

Warning signs should not be removed if scum continues to be present.

8.2 Emergency information and warnings

A critical task of any response to a BGA bloom incident is providing appropriate warnings and advice to the community and domestic users. Table 2 lists the triggers for mandatory notifications to the Department, BGA Regional Coordinators and DH. They should also be used to trigger decision making regarding appropriate warnings to the public.

Joint Standard Operating Procedure (JSOP) J04.02 – Incident Public Information and Warnings, is available from the EM-COP library and provides detailed guidance for the provision of timely, relevant and tailored community information and warnings before, during and after emergencies.

Appendix E of this Plan provides sample signage (to be varied in consultation with the Incident Management Team (IMT) for any location) for posting at access points to the site / waterway. 10Appendix F provides a sample Media Release (to be varied as required).

8.3 Control and coordination

The management of a BGA bloom incident is based on the emergency management principles described in the SEMP. Emergency management within Australia uses AIIMS which provides for a scalable response and outlines the key roles to be filled, and functions performed by the IMT.

The scale and potential consequence of any BGA bloom will determine accountability for response at local, regional and state levels. Triggers specified in Table 1 provide for appropriate escalation (and de-escalation) between each tier.

8.3.1 Level 3 – State

While the Department is the Control Agency for a State Level 3 blue-green algal bloom emergency, there are many other agencies involved in a state level response. DH and DEECA (Agriculture Victoria) both have detailed obligations under the SEMP with many others involved based on the consequence management. Table 3 below details some of the involved agencies and their response activities. Specific response roles, in particular, those run by the Department are outlined in 10Appendix D.

¹³ <https://nhmrc.gov.au/about-us/publications/guidelines-managing-risks-recreational-water>

Table 3: Agency Response Activities

Agency	Role	Response Activities
DEECA	Control	<ul style="list-style-type: none"> Participates as a member of Response Groups at the regional level. Liaises with DH. Obtains technical advice and information/advice for Local Water Managers. Advises the relevant Minister, where required. During a Level 3 BGA bloom, the Department undertakes their Control Agency responsibilities to manage the incident, including coordination of the local and regional responses. The Secretary as the CAOIC appoints a State Controller to oversee the event.
DH	Support	<ul style="list-style-type: none"> Participates as a member of Response Groups. Provides advice on public health issues relating to BGA including advice on seafood safety on the Better Health Channel (Better Health Channel Harmful-algal-blooms). Is the control agency for retail food contamination and drinking water contamination. Provides advice to the Minister for Health, where required. During a level 3 BGA bloom, lead and coordinate the health sector response at the local, regional and state level. Consequence management related to the health impacts of BGA, including delivery of relief and recovery activities as required including mental health support .
Agriculture Victoria (DEECA)	Support	<ul style="list-style-type: none"> Participates as a member of Response Groups. Provides advice on agricultural issues relating to BGA. Provides advice for producers with respect to the irrigation of crops and water supply to livestock. Provides advice for owners of companion animals. Provides advice to the Minister of Agriculture as required.
Regional Coordinator	RCC lead	<ul style="list-style-type: none"> Manages the BGA bloom at a regional level in line with their activities listed in section 8.3.2 below.
Local Water Manager	IMT	<ul style="list-style-type: none"> IMT lead from a local level including main operational work. Member of the Response Group where relevant.
Water Corporations	RCC / IMT	<ul style="list-style-type: none"> IMT lead when the bloom occurs in a Water Corporation managed waterway. Member of the Response Group where relevant.
DJSIR – Fisheries and Tourism	Support	<ul style="list-style-type: none"> Consequence management if the bloom impacts commercial fisheries. Consequence management if the bloom impacts major tourism locations.
PrimeSafe	Regulator	<ul style="list-style-type: none"> Regulation of seafood safety of commercial seafood under the <i>Seafood Safety Act 2003</i> (Vic).
Local Government	Support	<ul style="list-style-type: none"> Works with local community to assist public safety and communication. Member of the Response Group where relevant.
Catchment Management Authorities	Support	<ul style="list-style-type: none"> Supports with catchment management activities to maintain waterway and riparian health Member of the Response Group where relevant.

Subject to the likely consequences of the bloom, the Incident Controller may seek representatives of the above as members of the Incident Management Team (IMT) or Regional Emergency Management Team (REMT) as appropriate, to access technical advice, prioritise action and facilitate coordination.

The State response to major emergencies is coordinated by Emergency Management Commissioner who manages this through the following six key teams:

- State Coordination Team (SCOT)
- State Control Team (SCT)
- State Emergency Management Team (SEMT)

- Emergency Management Joint Public Information Committee (EMJPIC)
- State Emergency Recovery Committee (SERC)
- The Executive

The Class 2 State Controller is a member of SCOT and SEMT. The Department SAC, a Department water portfolio representative and most of the agencies listed in Table 3 above are members of SEMT.

During a large-scale emergency, the Victorian Government's Security and Emergency Management Committee of Cabinet (SEMC) provides whole of government ministerial oversight. The State Crisis and Resilience Council (SCRC) provides SEMC with assurance that the broad social, economic, built and natural environmental consequences of the emergency are being addressed at a whole of government level. The SCRC also has responsibility for the oversight of the development of a whole of government communications strategy for the approval of SEMC. However, neither the SEMC nor SCRC have an operational response role.

8.3.2 Level 2 – Regional

The Regional Coordinator is responsible for the oversight and management of regional blooms, in line with their Regional Coordination Plan. They achieve this through the appointment of a Response Group and an Incident Management Team.

The Regional Coordinator receives reports on local blooms from the Local Water Manager and declares when a local bloom becomes a regional bloom. In the event of a dispute between Regional Coordinators and Local Water Managers regarding if a bloom is Regional in nature, the Department decides through consultation with DH and all impacted parties if a regional bloom is to be declared.

Once a regional bloom occurs, the Regional Coordinator may appoint an Incident Controller from their own agency or keep the Incident Controller appointed by the Local Water Manager.

Response activities overseen by the Regional Coordinator through the control arrangements include:

- Through the IMT and Response Group, the Regional Coordinator will manage regional blooms in accordance with the Regional Coordination Plan and this Plan, including:
- In line with the triggers identified in Table 2, informs the Department, DH and where necessary Interstate Coordinators of regional BGA blooms.
- Taking all reasonable steps to ensure that the recipients or users of the water (including recreation, tourism, domestic and agriculture sectors) are made aware of the hazard by way of signage, media releases or direct communication.
- Consider a temporary closure of the water body when necessary for public safety in line with the *Water Act 1989* (Vic) or the *Water (Recreational Area) Regulations 2023* (Vic) as relevant.
- Instigates / coordinates the implementation of an ongoing monitoring regime throughout the bloom.
- Convenes and chairs the Response Group.
- Reports to the Department and DH on the management of regional BGA blooms.
- Coordinates ongoing monitoring of regional BGA blooms.
- Document and record all actions taken.
- Informs all relevant stakeholders of the reasons why a regional bloom has or has not been declared.

In the event that a Regional Coordinator is unable to fulfill the requirements of the role, a Regional Controller may be activated by the Department to act in their stead.

8.3.2.1 Response Groups

Response Groups are formed to manage a regional BGA bloom on behalf of the Regional Coordinator. The Regional Coordinator is responsible for convening and chairing the Response Groups, which should include stakeholder agencies that have responsibilities or an interest in the area affected by a regional BGA bloom. This could include, but not limited to the Department, DH, EPA, Local Government, Parks Victoria, CMAs and representatives from relevant Registered Aboriginal Parties.

Further advice on Response Groups is provided in the sample BGA Regional Coordination Plan found on the BGA resources page of the Department website and on the Algal Blooms Module. Details include information

on a preferred structure and potential members of a Response Group, based on the SEMP and Australasian Inter-Service Incident Management System (AIIMS).

8.3.3 Level 1 – Local

Response at the local level is managed by the Local Water Manager and focuses primarily on the operational activities and public messaging. Even in a regional or State level bloom, these activities will likely be done by, or in consultation with the relevant Local Water Managers.

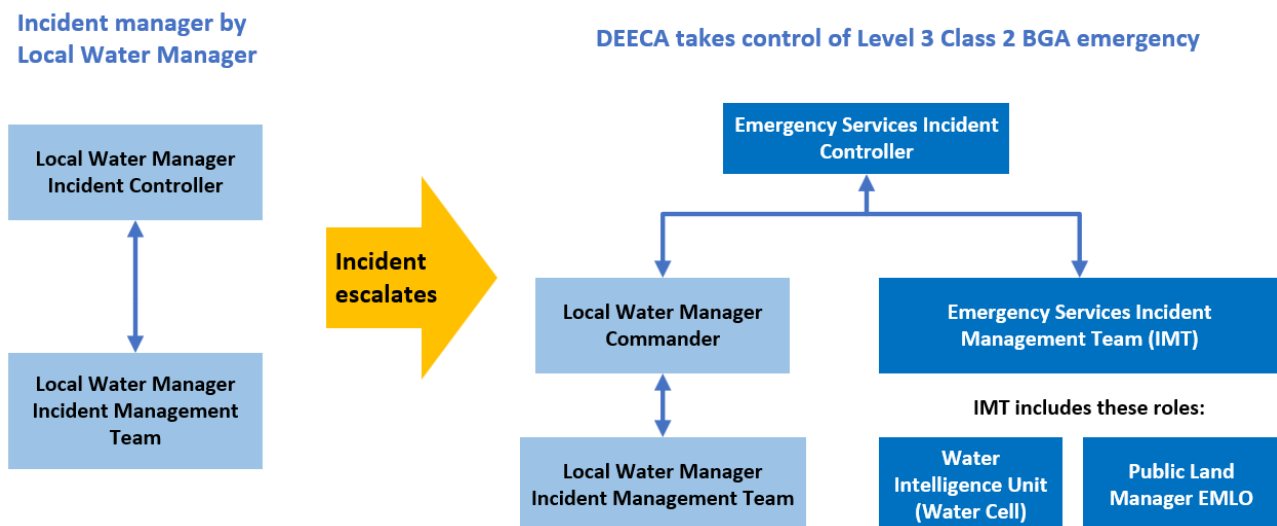
When a Level 1, local bloom occurs, the response activities overseen by the Local Water Managers are:

- In line with the triggers identified in Table 2, informs the Regional Coordinator, the Department, DH and where necessary Interstate Coordinators of local BGA blooms.
- Manages local BGA blooms in accordance with the BGA Risk Management Plan and this Plan, including monitoring, signage and media releases.
- Documents and records all actions taken.
- Notifies the Regional Coordinator and State Coordinator if a local BGA bloom could become a regional BGA bloom.
- Support and where appropriate, participate in the response to regional blooms or Class 2 Emergencies, at the request of the Regional Coordinator or Incident Controller.
- Consider a temporary closure of the water body when necessary for public safety in line with the *Water Act 1989* (Vic) or the *Water (Recreational Area) Regulations 2023* (Vic) as relevant.

8.4 Transfer of Control

In cases where a Level 1 local bloom or Level 2 regional bloom escalates to a state Level 3 Class 2 emergency, the responsibility for managing the bloom shifts from the Local Water Manager / Regional Coordinator to The Department. A transfer of control to the Department / Emergency Services Incident Controller is required for most cases. An example of the process is illustrated in Figure 1 below.

Figure 1: Level 1 or 2 to Level 3 Transfer of Control example



8.5 Consequence management

Once a BGA bloom has begun, there are often not many options available to reduce or eliminate the bloom. What options are available tend to be costly or have their own negative impacts to the environment and community such as the use of algaecides.

Response activities instead focus on consequence management and keeping the public safe. This is primarily achieved with recurring and visible public messaging aiming to minimize interaction from contaminated water by members of the public or their pets.

The main forms of communication are warning signs that can be erected around the contaminated water body with a sample sign template found in 10Appendix E. Signs should be highly visible and provide clear messages and instructions to be effective. They are intended as a final warning for anyone who has not seen or heard other forms of public messaging. These messages should focus on protection of life and safety in line with the principles of emergency management.

Other consequent management such as tourism or business impacts are managed by the responsible agencies, through the Incident, Regional or State Control Centre and relevant coordination teams, based on the severity and subsequent activation level.

8.6 Use of algaecides

Use of an algaecide in any water body that is used for as a source for drinking water supply must not occur before consultation has been undertaken with the relevant drinking water supply agency and DH Health Regulator. The use of algaecides in fresh or estuary water bodies not used for drinking should also be properly assessed before being used as they can often lead to more consequences in the ecology.

Local Water Managers should only use appropriately registered (or permitted) products for the control of BGA. Provided the product is used in accordance with the approved label instructions, no permit is required. If the product is not going to be used in accordance with the approved label instructions, refer to Australian Pesticides & Veterinary Medicines Authority (APVMA) website for information relating to the registration and issue of permits for algicides.

Local Water Managers who are water suppliers or water storage managers under the *SDWA* are also reminded that their risk management plan under the *SDWA* must include details of procedures to control any residue or chemical by-products imparted to drinking water, as a result of the addition of chemicals to water supplied for drinking purposes (*Regulation Part 2, s.6(h)(ii) of the Safe Drinking Water Regulations 2025* (Vic)).

This means that where an algaecide has been applied in any water body normally used as a source of drinking water, the Local Water Manager needs to ensure that their procedure for returning the water body to supply includes an assessment of safe levels of any algaecide residue or chemical by-products that could be transferred to the drinking water supply.

Information on the use of agricultural chemicals registered for the control of BGA blooms is available from DEECA (Agriculture Victoria) Chemicals Standards Officers on 138 186 or via the [Agriculture Victoria website](#)¹⁴.

9 Recovery

9.1 Social, economic, built and natural recovery

Aspects of the recovery phase, such as planning, can occur at the same time as the response phase. Depending on the incident, recovery activities may include ongoing consequence management. Incidents could have direct or indirect impacts across these recovery environments of social, economic, built and natural. It is important to consider all the various consequences of the event when recovering.

The principle of build back stronger in recovery leads straight into the mitigation phase of BGA with activities like healthy revegetation of the waterways and working with local communities enhancing the overall emergency management cycle.

Specific recovery areas are covered by the relevant portfolio entity through and outside of the emergency management framework. This can include but it is not limited to DEECA (Agriculture Victoria) assessing

¹⁴ <https://agriculture.vic.gov.au/farm-management/water/blue-green-algae-in-water/managing-bluegreen-algae-in-farm-water-supplies>

agricultural impacts of the bloom and working with locals to support their recovery, or DH assessing the social impacts in accordance with the SEMP and public health principles.

9.2 De-escalation

Response arrangements (including warnings) for any water body or part of any water body will remain in place until at least two consecutive test results, at least 7 days apart, that confirm the BGA levels are below the bloom thresholds.

Subject to above, the State Controller will decide when to deescalate a Class 2 Emergency to a Regional bloom and similarly, the BGA Bloom Regional Coordinator will decide when to deescalate a Regional bloom to a Local bloom as the incident level triggers are no longer met resulting from:

- a contraction of the geographic extent of the bloom;
- reduced potential consequences of the bloom; and
- recovery arrangements are in place.

10 Lessons and evaluation

The Victorian emergency management sector supports a culture of continuous improvement to enhance the response the future incidents and reduce the impact to community. This is done through a variety of methods including exercising existing plans, conducting After Actions Reviews, and supporting the Lessons Management Framework in line with the Emergency Management Framework.

After an event has occurred which required activation, all parties involved in the management of the event should be invited to the lessons management process (usually through an After Action Review), including providing input into the response activities and plans that were activated to allow for continuous improvement.

Improvements and lessons learned should be disseminated across the sector and to all relevant stakeholders to enhance continuous improvements at all levels of responsibility.

Appendix A Glossary

AIIMS	Australasian Inter-service Management System
BGA	Blue-green algae
CAOiC	Control Agency Officer in Charge
CMA	Catchment Management Authority
DEECA	Department of Energy, Environment and Climate Action
DH	Department of Health
DJSIR	Department of Jobs, Skills, Industry and Regions
EM-COP	Emergency Management Common Operating Picture
EMC	Emergency Management Commissioner
EMJPIC	Emergency Management Joint Public Information Committee
EMLO	Emergency Management Liaison Officer
EMV	Emergency Management Victoria
EPA	Environment Protection Authority
IMT	Incident Management Team
JSOP	Joint Standard Operating Procedure

MDBA	Murray Darling Basin Authority
NATA	National Association of Testing Authorities
NHMRC	National Health and Medical Research Council
NSW	New South Wales
qPCR	Quantitative PCR
RAC	Regional Agency Commander
RACC	Regional Algal Coordination Committee
SAC	State Agency Commander
SC	State Controller
SCC	State Control Centre
SCOT	State Coordination Team
SCRC	State Crisis and Resilience Council
SCT	State Control Team
SDO Water	State Duty Officer Water
SDWA	<i>Safe Drinking Water Act 2003</i> (Vic)
SEMP	State Emergency Management Plan
SEMT	State Emergency Management Team
SoO	Statement of Obligations
SRC	State Response Controller
Water Cell	Water Intelligence Unit
WC	Water Corporation

Appendix B Regional Coordinators

Figure 2: Regional Coordinator Boundaries

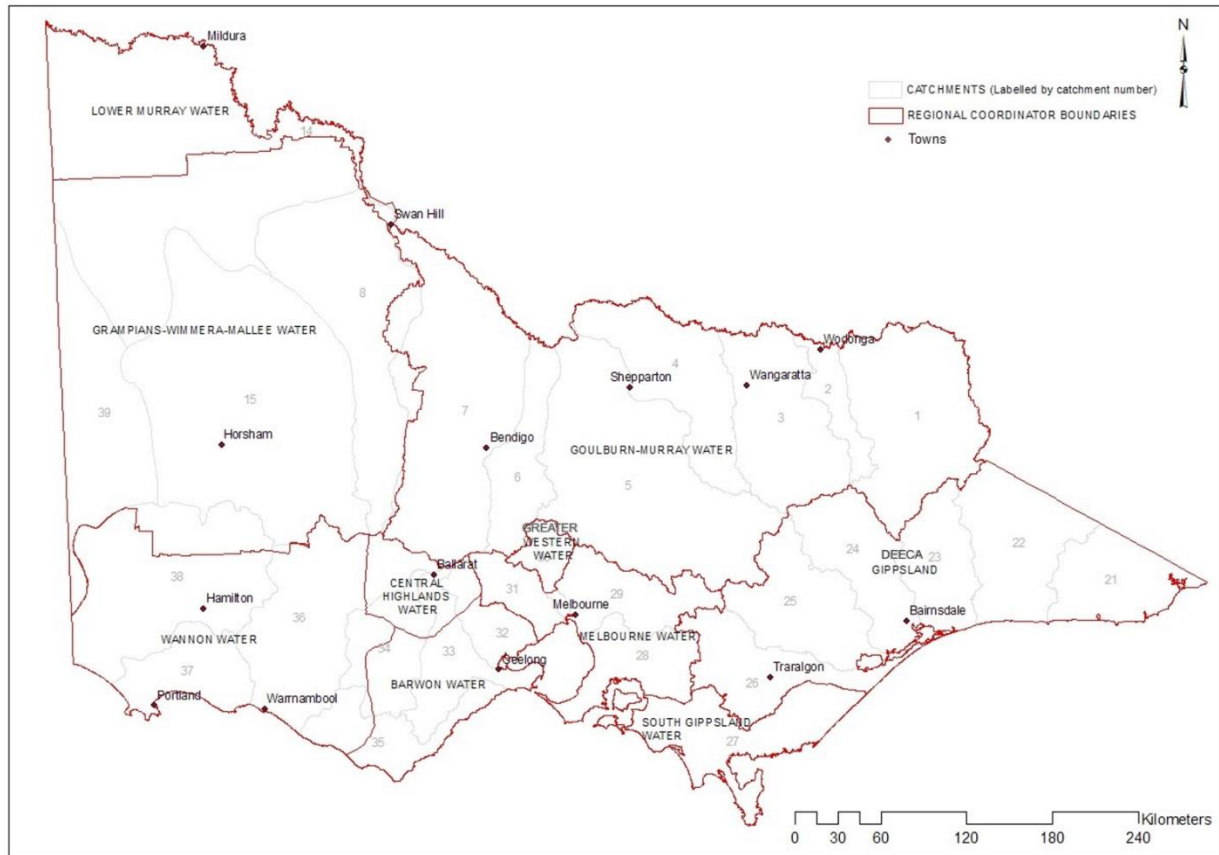


Table 4: Regional Coordinator Boundaries

Regional Coordinator	Drainage Basin or Area
Goulburn-Murray Water	1, 2, 3, 4, 5, 6, 7, Pt 8
Grampians Wimmera Mallee Water	Pt 8, Pt 14, 15, Pt 38, 39
Lower Murray Urban & Rural Water	Pt 14
DEECA Water and Catchments Group (<i>Under review</i>)	21, 22, 23, 24, Gippsland Lakes, 25, 26
South Gippsland Water	27
Melbourne Water	28, 29, Pt 30, 31
Greater Western Water	Pt 30
Barwon Water	Pt 32, Pt 33, Pt 34, Pt 35
Central Highlands Water	Pt 32, Pt 33, Pt 34, Pt 36
Wannon Water	Pt 34, Pt 35, Pt 36, 37, Pt 38

Appendix C Agency contact details

Table 5: State Contact Details

Company	Contact Person	Email	Telephone
Department of Energy, Environment & Climate Action	BGA State Coordinator	bluegreen.algae@deeca.vic.gov.au ;	
Department of Health Health Regulator (drinking water), Office of Chief Health Officer (for non drinking water issues), Emergency Management	Health Regulator Office of the Chief Health Officer Emergency Management Branch	Business Hours: Health Regulator water@health.vic.gov.au Business Hours: Office of Chief Health Officer OfficeofCHO@health.vic.gov.au Business Hours: Emergency Management Branch dhemergencymanagement@health.vic.gov.au	Emergency After Hours: 1300 790 733
WaterNSW	RACC coordinator for the Murray and Sunraysia	racc@waternsw.com.au ;	1300 662 077
Department of Energy, Environment & Climate Action	Customer Service Centre	customer.service@deeca.vic.gov.au ;	136 186
DEECA (Agriculture Victoria)	State Agency Commander - Agriculture	Sccvic.scmdr.ag@scc.vic.gov.au ; agvic.emergencymanagement@agriculture.vic.gov.au ;	
Environment Protection Authority (EPA) Victoria	Pollution Hotline	contact@epa.vic.gov.au ;	1300 EPA VIC (1300 372 842)

Appendix D Emergency management roles

D. I DEECA State Duty Officer - Water (SDO Water)

The SDO - Water provides updates on water emergencies to the State Agency Commander (SAC), the Department executives, and the office of the Minister for Water. The SDO Water is available 24/7 and is the first point of contact for water related incidents where the Department is the Control Agency or a relevant Support Agency.

The SDO Water contact details can be found in *40.0.3.1.SOP Water Corporation and DEECA Incident Notification Protocol*

D. II The Water Intelligence Unit (Water Cell)

DEECA's Water Intelligence Unit (more commonly called the 'Water Cell') can be activated from the SCC during a Class 1 or Class 2 event that impacts the water sector, either directly or indirectly. The Water Cell forms part of the response to water incidents and emergencies, to support when activated.

D. III Emergency Management Commissioner (EMC)

Under the *Emergency Management Act 2013* (Vic), the EMC has legislated management responsibilities across major emergencies, except for terrorism-related emergencies. These include response coordination, ensuring effective control arrangements are established, consequence management and recovery coordination.

D. IV The Department Agency Commanders

The State Agency Commanders (SAC) notifies the Emergency Management Commissioner (EMC) of significant events and coordinates with the SC and Regional Agency Commanders (RACs) in Level 2 and Level 3 emergencies. The RAC monitors BGA bloom incidents, advises on escalation, and coordinates with Regional Controllers.

The State Agency Commander duty statement 20-WI-2.3.2 and Regional Agency Commander duty statement 20-WI-2.3.2.2 are available on Tarnook.

D. V Class 2 State Controller (SC)

During a Level 3, large scale event, a Class 2 State Controller (SC) is appointed by the Control Agency Officer in Charge (CAOIC), which is Department Secretary. The SC leads and coordinates the emergency response, oversees information dissemination, risk management, and ensures integration with recovery efforts.

D. VI Incident Controller

The Incident Controller (IC) is appointed by the SC, the Class 2 Regional Controller or the BGA Regional Coordinator. The IC directs incident response, sets objectives, communicates with communities and stakeholders, and ensures recovery and relief services.

D. VII Class 2 Regional Controller

The Regional Controller is appointed by the SC or the RAC. The Regional Controller supports the SC by monitoring response effectiveness, issuing community warnings, and working with regional emergency teams.

D. VIII Water Corporation Commander

The Water Corporation Commander is responsible for command of Water Corporation resources and participates in the Incident Management Team or the Regional Management Team.

The Commander is not responsible for control of the incident and is not responsible for issuing community warnings. That responsibility resides with the Incident Controller. Note however that, in consultation with the emergency services communications team, the Commander may issue information to Water Corporation customers about outages and related matters.

When an emergency is managed solely within a Water Corporation, the Water Corporation Commander and Incident Controller are the same role. They become separated when the IMT is managed outside of the water corporation. Section 8.4 discusses how a Water Corporation IMT transfer's control once a bloom exceeds their span of control.

D. IX Water Corporation EMLO

The Emergency Management Liaison Officer (EMLO) serves as a communication bridge between the Water Corporation and emergency services, updating on disruptions, asset locations, and control transfers, and ensuring reports are properly attributed and communicated to relevant agencies.

Appendix E Sample BGA warning sign

An example of a BGA warning sign is provided below. Warning signs do not need to follow this exact format, however they do need to indicate

- A clear warning that Blue-Green Algae is present in the water

- Direct the public to avoid contact with the water and consider including specific activities that should be avoided
- Who erected the sign and where to go for further information

Figure 3: Sample BGA warning sign



Appendix F Sample Media Release Template

Date:

Media Contact:

BLUE-GREEN ALGAE WARNING FOR *(INSERT WATER BODY NAME)*

(Insert Local Water Manager Name) announced that a blue-green algae (BGA) bloom is currently affecting *(insert Water body name)*.

The public is advised not to swim in and to avoid any direct contact with blue-green algae affected water.

Direct contact with BGA can cause allergic reactions such as skin rashes, itchiness, or sore eyes, ears and nose. If swallowed, BGA affected water can cause gastroenteritis, nausea or vomiting.

People who come in to contact with BGA contaminated water should wash immediately in fresh water. Seek medical advice if experiencing illness after contact with BGA affected water.

Any fish harvested from BGA affected water should have gills and guts removed prior to cooking. People should not eat whole fish, or shellfish or crustaceans collected from the *(Insert water body name)*. The type of BGA affecting *(insert water body name)* produces toxins that can concentrate in shellfish and crustaceans and accumulate in the liver and internal organs of fish. Ingesting BGA toxins can lead to serious illness.

Water from the affected water body should not be used for drinking, cooking or other domestic uses. Boiling the affected water will not make it safe for use.

For any health issues experienced after contact with BGA affected water please seek medical advice immediately.

Irrigators are encouraged to take extra care to avoid spray drift, the pooling of water and inhaling mist from BGA affected water. Affected water should not be sprayed onto leafy vegetables or florets or allowed to flood pastures.

Livestock should not drink from BGA contaminated water and should be kept off land irrigated or flooded with BGA affected water for at least 7 days. It is important for all livestock owners to have access to an alternate water supply if their primary water supply becomes contaminated with a toxic algal bloom.

Pet owners should prevent pets from drinking or having direct contact with contaminated water.

Visitors to the area are advised that they can still enjoy other recreational activities such as bushwalking and sightseeing around the water body.

There are many land-based activities in the region to try. Please contact or visit local tourist information outlets for more information.

Members of the public are asked to report any potential BGA blooms to their Local Water Manager on *(insert telephone number)*

Media please note:

For media enquiries please contact *(insert name)* on *(insert phone number)*

Appendix G Biovolume versus cell count

BGA species range dramatically in size, shape and toxicity. Quantifying BGA in terms of cell numbers alone may hence be misleading. Calculation of biovolume provides a more accurate measure of cell density and toxin concentrations. Individual algal cell volumes can either be directly measured by analytical laboratories, or alternatively standards cell volumes are provided in the biovolume calculation tool available on the BGA resources page on the Algal Blooms Module.

Standard reference algal cell volumes used within the calculator are based upon cyanobacteria from Australian freshwaters - taken from the National Protocol for the Monitoring of Cyanobacteria and their Toxins in Surface Fresh Waters (NRMMC 2005). The Biovolume calculator is not intended to replace laboratory analysis and where a NATA accredited laboratory is engaged to undertake the analysis and has accurately measured the mean cell volume specific to that sample, then the uniquely measured value can be used in preference to the standards.

Certain strains of BGA produce toxins that will specifically target major organs such as the kidneys, liver or the nervous system. Table 6 contains the current species in Victoria that are considered to be able to produce these toxins.

Table 6: Known toxic species in Victoria

Known toxic species
<i>Chrysosporum bergii</i>
<i>Dolichospermum circinale</i>
<i>Fischerella</i> sp.
<i>Limnothrix</i> sp.
<i>Lyngbya wollei</i> / <i>Microseira wollei</i>
<i>Microcystis aeruginosa</i>
<i>Microcystis flos-aquae</i>
<i>Nodularia spumigena</i>
<i>Raphidiopsis mediterranea</i>
<i>Raphidiopsis raciborskii</i>
<i>Umezakia ovalisporum</i>

Blue-green algae are identified and enumerated using light microscopy by looking for unique distinguishing features specific to that species. When these features are not present commercial laboratories are unable to provide a species identification and a genus may be reported. Often BGA are needs to be grouped to a higher level such as Family because they share identifying features and can't be separated with confidence. If the BGA is reported Genus, Family or Group and has the potential to contain a species which are known to be toxic in Australia, then it must be assumed the BGA is known toxic. Guidance on commonly used group already being used in Victoria that currently considered toxic are contained within Table 7. There may be other groups that fit this criteria and care needs to be taken when viewing laboratory reports.

Table 7: Known toxic groups in Victoria

Known toxic species	Considered toxic as it may contain
Aphanizomenonaceae Family - Coiled (<6µm)	<i>Dolichospermum circinale</i>
Aphanizomenonaceae Family - Straight	<i>Chrysosporum bergii</i> , <i>Raphidiopsis mediterranea</i> , <i>Raphidiopsis raciborskii</i> & <i>Umezakia ovalisporum</i>
<i>Dolichospermum</i> Coiled - Large (>6µm)	<i>Dolichospermum circinale</i>
<i>Dolichospermum</i> Coiled - Small (<6µm)	<i>Dolichospermum circinale</i>
<i>Limnothrix</i> / <i>Geitlerinema</i> / <i>Anagnostidinema</i>	<i>Limnothrix</i> sp.
<i>Microcystis</i> sp.	<i>Microcystis aeruginosa</i> & <i>Microcystis flos-aquae</i>
<i>Microcystis flos-aquae</i> (medium)	Medium sized <i>Microcystis flos-aquae</i>
<i>Microcystis flos-aquae</i> (large)	Large sized <i>Microcystis flos-aquae</i>
<i>Oscillatoriales</i> (iauv 1,001-5,000)	<i>Lyngbya wollei</i>
<i>Oscillatoriales</i> (iauv 5,001-10,000)	<i>Lyngbya wollei</i>
<i>Oscillatoriales</i> (iauv 10,001-30,000)	<i>Lyngbya wollei</i>
<i>Raphidiopsis</i> sp.	<i>Raphidiopsis mediterranea</i> & <i>Raphidiopsis raciborskii</i>

Where the dominant species, or the total combined potentially toxic species in a bloom, are listed as known toxic species in Table 7 or Table 8 and exceed the drinking water trigger, samples shall be taken for quantitative toxin analysis and analysed by a NATA accredited laboratory. Consideration shall be given to toxin analysis for all blooms in excess of biovolumes of 4 mm³/L in consultation with the relevant Government stakeholder. Alternative emerging technology, such as quantitative PCR gene analysis should be considered when assessing toxicity.

Appendix H References and Links

Table 8: References and links

Doc ID	Doc type	Doc title
40.4.3.7	Plan	Water and Wastewater Service Disruption Response Plan
40.4.1.1	Plan	The State Emergency Management Plan
40.0.3.1	Standard Operating Procedure	Water Corporation and DEECA Incident Notification Protocol
-	-	Port Phillip Bay Marine Algal Bloom Response Protocol
-	-	River Murray Emergency Action Plan
-	-	Management Strategies for Cyanobacteria (Blue-Green Algae): A Guide for Water Utilities (Water Quality Research Australia 2010)
-	-	<u>Guidelines for managing risks in recreational water</u>
J04.02	Joint Standard Operating Procedure	Incident Public Information and Warnings
20-WI-2.3.2	Work Instruction	The State Agency Commander duty statement
20-WI-2.3.2.2	Work Instruction	Regional Agency Commander duty statement