



Department of  
Primary Industries  
Office of Water

# Draft Algal Risk Management Sub-Plan

Under the NSW Emergency Management Energy and  
Utility Services Supporting Plan

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*Draft Algal Risk Management Sub-Plan under the NSW Emergency Management Energy and Utility Services Supporting Plan*

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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (December 2013). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of the Department of Primary Industries or the user's independent adviser..

## AUTHORISATION

The NSW Algal Risk Management Sub-Plan has been prepared as a sub plan to the Energy and Utilities Supporting Plan to document the coordination arrangements for the management of algal blooms in NSW waters.

The sub plan is endorsed in accordance with the provisions of the *State Emergency and Rescue Management Act 1989*.

## RECOMMENDED.....

Coordinator

Energy and Utility Services Functional Area

Dated :

## ENDORSED.....

Chair State Emergency Management Committee

Dated :

## VERSION CONTROL

Proposals for amendments to the content of the algal management sub-plan are to be forwarded to :

Director, Water Evaluation Branch

NSW Office of Water

GPO Box 3889, Sydney, NSW, 2001

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## DISTRIBUTION

Readers of this document should confirm that they have the latest copy by checking the current version at [www.emergency.nsw.gov.au](http://www.emergency.nsw.gov.au)

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## Part 1 Introduction

### General

This plan describes the actions to be taken in order to minimise the impact of harmful algal blooms in water bodies in NSW. The NSW Office of Water, part the NSW Department of Trade and Investment (NSW T&I) oversees the NSW Algal Management Strategy. This Sub-Plan provides the operational framework for implementation of the Strategy.

This document should be read in conjunction with the NSW State Emergency Management Plan and the Energy and Utilities Supporting Plan (refer **Figure 1**).

Figure 1      Emergency Management Plans



### Aim

The purpose of the NSW Algal Risk Management Sub-Plan is to provide the mechanism for a whole-of-government approach to algal risk management by:

- providing a centralised system for the planning, monitoring, reporting and evaluation for algal risk management within NSW (Contingency Planning).
- assisting in the mitigation of the impact of algal blooms (Management Strategies).

### Scope

Freshwater, estuarine and marine algae can impact on water quality and can cause harm for people, stock, wildlife and domestic animals. Blue-green algae can produce potent liver and neurotoxins as well as skin irritants which may affect drinking water supplies and water bodies used for recreation. Toxic marine and estuarine algae can also affect recreational water use and can accumulate within fish and shellfish making consumption unsafe.

The Plan is intended to reduce the risk of harm to human or animal health that may be caused by contact with excessive growth of potentially toxic algae in water bodies.

### Principles

Underlying the sub-plan are a number of key principles:

1. The Strategy is a state wide whole-of-government approach to managing the risks associated with algal blooms.
2. The Strategy only pertains to algae that may be harmful to humans or animals.
3. Algal blooms are not a single issue water quality problem with a simple quick-fix solution. Algal blooms have a considerable complexity in their cause and effects. Algal growth is determined by many environmental factors (physical, chemical and biological) and has a wide range of social, economic and environmental impacts.
4. Minimising algal problems requires cost effective measures which address both the causes and the effects.

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5. Management measures must be implemented as part of an integrated catchment management approach which cuts across established agency and political boundaries.
  6. Management measures should be implemented where the benefits (social, economic and environmental) of minimising blooms and their impacts outweigh or equal the cost of control works or activities. Note that at times it may be appropriate to “live with the problem” by avoiding algal infested waters and using alternate water supplies.



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## Part 2 – Strategy

### 2.1 Prevention

The growth of algae is determined by many physical, chemical and biological factors. Environmental factors are continually interacting with one another in a very complex way and as such it is not always possible to attribute the occurrence of an algal bloom to any specific cause. When conditions prevail in which a particular factor becomes limiting to algal growth, then that factor will be the most important in determining the occurrence and nature of the bloom.

#### Water Quality Management

Nutrients, such as nitrogen and phosphorus are required for the growth of blue–green algae. Runoff and erosion from urban areas and fertilised agricultural areas, erosion from river banks and river beds, land clearing (deforestation), and sewage and industrial effluent are the major sources of phosphorus and nitrogen entering water ways.

The control of point and diffuse sources of nutrients from both urban and rural areas is necessary to reduce the risk of blooms.

A number of mechanisms exist to minimise the potential for nutrients to enter waterways and to reduce the nutrient concentrations in water bodies.

#### Catchment Action Plans

Catchment Action Plans are strategic, statutory plans that provide a framework for natural resource management in a catchment. These plans may include water quality management targets that reduce the risk of algal blooms.

#### Water Sharing Plans

Water sharing plans have been or are currently being prepared for all water sources in NSW. For regulated river water sharing plans with Environmental Contingency Allowances, water has been set aside for environmental flows and to assist in algal management.

For example, in the Hunter Regulated River Water Sharing Plan a total of 20,000 megalitres in Glenbawn and Glennies Creek water storages is to be reserved in an environmental contingency allowance account for release to assist in management of critical environmental events, such as algal blooms and chemical spills, and to provide flows at critical times for purposes such as fish migration or stony bed scouring.

#### Algal and nutrient control works

Significant work has occurred over the last 20 years to remove or mitigate impacts of discharges from sewage treatment plants and drains since these were first identified these as a major contributor to the input of nutrients and algae into waterways.. This has been achieved through improvements in technology and altering management practices. However ongoing management is still required to further minimise the potential impacts from nutrient inputs, mainly from stormwater drains.

Algal and nutrient control works, including artificial wetlands, have been constructed as part of the nutrient reduction program in NSW to reduce the amount of phosphorous and other nutrients entering the state's waterways from both urban and rural areas.. .

#### Best Management Practices (BMP)

The voluntary application sustainable land management practices by the agricultural industry.

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## 2.2 Preparation

### Emergency Management Plans

Emergency management operations are designed to be conducted on a decentralised basis at the local level first. The District and State levels of the emergency management structure are available to provide support and additional resources as required and to only assume operational control when a higher level of control is essential.

Coordination of emergency incidents may be carried out by combat agencies or by an Emergency Operations Controller. A functional area coordinator can be responsible for the coordination of functional area support and resources for emergency response and recovery operations.

The scale of algal incidents and level of response and coordination is shown in **Table 1**.

### Management of local incidents

In the context of algal management, each local water manager is responsible for their own water body. Local water managers are organisations such as water utilities and bulk water suppliers. This responsibility would include the preparation of an emergency plan, contacting all large water users (eg. council intakes), conducting monitoring and issuing warnings in the event of an algal bloom, including media releases.

Monitoring of most rivers in the event of a bloom is the responsibility of the NSW Office of Water apart from areas where a local land manager is providing access to the water (eg. boat ramps, parking, and picnic areas). In these circumstances the local land manager (eg. council) is responsible for monitoring and erection of signage as they are providing infrastructure to encourage active recreation in the water body.

The management of marine algal blooms depends on the scale of the bloom and whether the algal bloom is affecting beaches or fish and shellfish. Monitoring of marine blooms is the responsibility of NSW Food Authority or local councils where the blooms affect beaches and recreation.

### Multi-agency responses and coordination

A number of agencies may be involved in the detection, monitoring, analysis of algal blooms and the appropriate response. Management authorities therefore need to ensure that adequate communication occurs between agencies and within their own organisation to facilitate contingency responsibilities.

The NSW Office of Water oversee Regional Algal Coordinating Committees (RACCs) which provide support and information to all bodies involved in algal management across a region.

Where the scale or scope of an algal incident involves multiple agencies or has a significant community impact, the State Emergency Operations Controller may be briefed for situational awareness of a developing or potential algal event by the appropriate coordinator. Depending on the situation, the NSW emergency management structure may be engaged to coordinate or support response operations. State, regional and local emergency management responsibilities are shown in **Appendix 1**.

**Table 1 Scale of algal incidents and the appropriate level of response**

Algal extent of coverage	Coordinating Body	Response Procedure
Extreme	State Government	NSW State Emergency Management Plan (EMPLAN)
Inter-regional	EUSFAC	NSW Algal Risk Management Sub-Pan
Regional	Regional Algal Co-ordinating Committee	Regional Algal Contingency Plan
Local	Water supply authority / local government	Algal Contingency Plan (Water storage/ water supply)
Property	Landholder	Individual action

## Supporting Agencies

Under the NSW State Emergency Management Plan supporting organisations are government departments, statutory authorities, private or volunteer organisations that are willing to participate in an emergency response, recovery operation or provide specialist support under the direction of a relevant coordinating body. The agencies that support operation of this Algal Risk Management Sub-Plan in NSW are listed in **Appendix 2**.

## Regional Contingency Plans

The need for Regional Algal Contingency Plans was identified by the Algal Task Force in 1992 to provide a risk assessment framework to assist with effective management response to algal blooms. The plans aimed to minimise the impact of blooms by providing adequate warning to the public ensuring their health and safety in recreational situations and for stock and domestic use. These plans do not cover treated water for potable supply.

The Regional Algal Contingency Plans are intended as a communication framework to which water managers may add more specific information (eg. media contacts, landholder lists), or amend where appropriate. Regional Contingency Plans should, where possible, compliment State, District and Local Disaster Plans.

## Potable Water Supply Contingency Plans

Local water supply authorities are responsible for developing specific risk management frameworks or contingency plans for potable water supply.

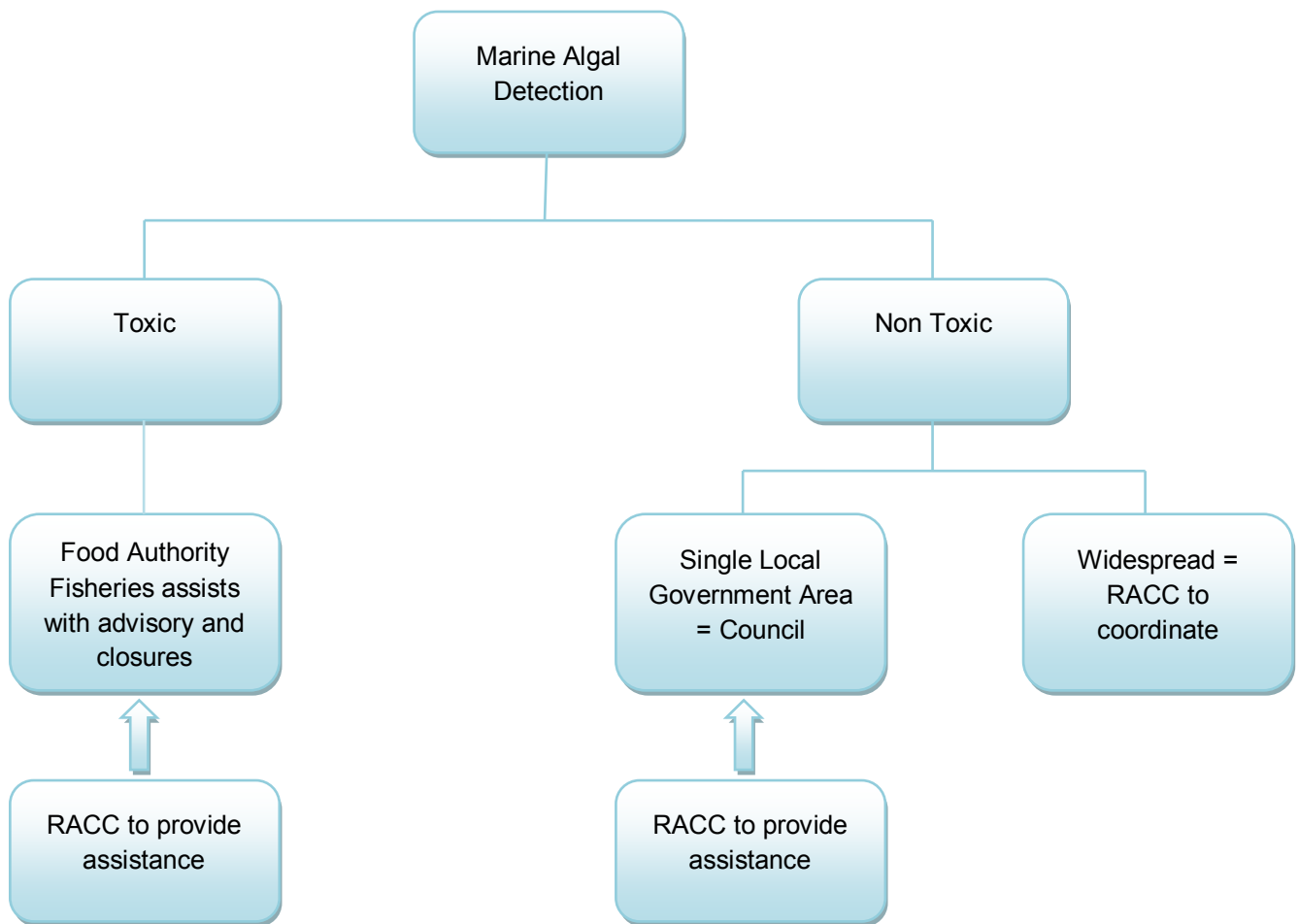
Potable water supply authorities should have their own specific risk management framework for the identification and management of blue-green algal blooms. This should be part of the drinking water management system which water suppliers must develop under the *Public Health Act 2010*.

## Marine Algae

The major route for human illness caused by toxic marine algae is through consumption of seafood and shellfish, as some species produce potent toxins that can accumulate in fish and shellfish. Incidents involving algae affected fish or shellfish are managed by the NSW Food Authority (refer **Figure 2**).

The most common route of direct contact with marine algae is when algal blooms move close to beaches. Some of the red tides seen along the east coast of NSW are caused by algae that cause bioluminescence at night but do not produce any toxins. They do however produce high levels of ammonia that could be irritating if concentrated. The decision to close a beach rests with the council, however the RACC will provide technical and communications support.

Figure 2 Marine Algal Management



### Regional Algal Coordinating Committees

The Regional Algal Coordinating Committees (RACCs) were established from a recommendation of the NSW Blue-Green Algal Task Force Final Report 1992 to be responsible for ensuring the monitoring, communications and implementation of responses, and algal training in the regions. RACCs are overseen by the NSW Office of Water.

There are currently nine Regional Algal Coordinating Committees in NSW comprising:

- Barwon Regional Algal Coordinating Committee
- Central West Regional Algal Coordinating Committee
- Far West Regional Algal Coordinating Committee
- Hunter Regional Algal Coordinating Committee
- Metropolitan and South Coast Regional Algal Coordinating Committee
- Murray Regional Algal Coordinating Committee
- Murrumbidgee Regional Algal Coordinating Committee
- North Coast Regional Algal Coordinating Committee
- Sunraysia Regional Algal Coordinating Committee.

The area covered by each committee is shown in **Figure 3**.

Figure 3 Map of Regional Algal Coordinating Committees



The roles and responsibilities of the RACCs are to:

- develop, coordinate and implement Regional Algal Contingency Plans, which set out procedures to effectively manage algal blooms
- co-operate with neighbouring regions and states, as appropriate, on algal management issues
- co-ordinate regional media relations and public information programs, (In a multi agency emergency under the control of an emergency operations controller, public information may be managed by the Public Information Functional Area Coordinator).
- work with Local and District Emergency Management Committees to ensure adequate planning and consequence management
- develop and co-ordinate regional algal monitoring systems
- co-ordinate and implement training in algae identification, monitoring and sampling in the region
- identify when an algal warning should be issued and which agency will issue statements of warnings and clearances.

## Advisory Groups

### State Algal Advisory Group

The State Algal Advisory Group (SAAG) reports to the NSW Office of Water and operates as an expert body providing guidance and advice in algal risk management issues, including:

- developing and implementing state algal management policy and strategies

- 
- providing guidelines for the development of Regional Algal Contingency Plans and monitoring their progress and facilitating inter-RACC cooperation and resourcing
  - liaison with organisations involved in algal management issues intrastate, interstate and internationally
  - developing state wide communication strategies, including media relations and public information, and providing models and guidelines for use in the regions
  - identifying and coordinating the development and implementation of state wide monitoring and testing procedures.

The SAAG comprises representatives from:

- NSW Office of Water (and chair) (NSW T&I)
- NSW Health
- NSW Food Authority (NSW T&I)
- NSW Department of Primary Industries (NSW T&I)
- NSW Division of Local Government (DPC)
- Energy and Utility Services Functional Area Coordinator (EUSFAC) (NSW T&I)
- Murray-Darling Basin Authority.

### **Algal Technical Advisory Group**

The Technical Advisory Group (TAG), established as a sub-group to the SAAG, provides scientific expertise on algal issues including:

- recommended standards for the identification of algal blooms
- review National Health and Medical Research Council Guidelines and propose state wide guidelines for algal management
- advise on the toxicity of algal species and potential impact on human health
- collaborate with other experts, universities and laboratories on algal risk management issues
- assist in the identification of algal knowledge and resource gaps
- identifying research needs on algal risk management issues.

The technical advisory group comprises representatives from but are not limited to:

- NSW Office of Water (and chair) (NSW T&I)
- NSW Health
- NSW Food Authority (NSW T&I)
- Office of Environment and Heritage (DPC)
- Sydney Catchment Authority
- Local government
- scientific experts from academic and other institutions.

## Part 3 - Concept of Operations

### 3.1 Response

The Regional Algal Contingency Plans outline various steps to be taken in the event of an algal bloom to ensure that duty of care has been exercised. This includes determining the level of use of a water body, the responsible management authority, level of monitoring required, alert trigger levels and the relevant associated actions. This process is documented in flow charts in each of the RACC plans.

In general, the process consists of monitoring for the presence of potentially toxic blue green or marine algae, an alert level framework that will indicate when algal levels may be hazardous and a communications protocol to ensure that the issue is brought to the attention of water users. In some cases, management authorities may initiate control actions in order to reduce algal levels in a particular area. The sequence of operations is shown in **Figure 4**.

Figure 4 Sequence of Operations



#### Monitoring

To ensure a risk based approach to algal management in NSW, continued monitoring of water systems during critical periods is required. Monitoring responsibility (refer **Table 2**) is based on the coordinating body and coverage of the algal bloom as described in section 2.2.

The Regional Algal Coordinating Committees coordinate algal monitoring programs during periods of critical risk and for algal blooms broader than a local incident .

Table 2 Monitoring responsibility for algal bloom

Affected water resource or use	Responsibility
Water storage body, draw off for water utility or bulk water supply	Water supply authority / local government
Recreational use (boat ramp, camping, picnic area etc)	Local land manager
Other river areas	NSW Office of Water
Beach or coastal area (non-toxic)	Local government
Beach or coastal area (toxic)	NSW Food Authority
Private Property storage	Landholder



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## Alert levels

Alert levels are used to determine the actions that need to be undertaken in respect to an algal incident.

## Drinking Water

The *Australian Drinking Water Guidelines* include guideline values for some algal toxins and notification triggers based on cell count and biovolume (2011 National Health and Medical Research Council, Natural Resource Management Ministerial Council).

Water Quality Research Australia Limited (WQRA) has developed an alert level framework for raw waters sourced for potable supply before treatment, or without treatment. This has been documented in *Management Strategies for Cyanobacteria (Blue-Green Algae) and their Toxins: a Guide for Water Utilities*. Research Report 74, June 2010. The alert level framework is consistent with the *Australian Drinking Water Guidelines*.

These alert levels have been adopted for raw waters sourced for potable water supply but may be updated as endorsed by the State Algal Advisory Group.

## Water used for recreation

The National Health and Medical Research Council (NHMRC) have developed alert levels for managing algal risks in recreational water. This has been documented in *Guidelines for managing risks in recreational water*. NHMRC, Australian Government 2008.

These alert levels have been adopted for recreational waters but may be updated as endorsed by the State Algal Advisory Group.

The guidelines cover freshwater as well as coastal and estuarine areas. The NHMRC algae guidelines for coastal waters for recreational uses are only based on a few species due to limited knowledge on toxic algae.

Some RACC plans have also adopted a “caution” alert status which has been developed as an interim communication framework where highly visual blooms elicit public and media inquiries, where sampling has occurred, but species not identified or where algal species are determined to be non-toxicogenic. This type of alert is normally triggered by a visual bloom.

## Stock Watering

The stock watering alert levels are those established by the Australian and New Zealand guidelines for managing water quality (ANZECC / ARMCANZ, 2000) with additional refinement from the South-East Queensland Water Corporation (Orr and Schneider, 2006) but with a change in the alert level for all cyanobacteria (other than *Microcystis aeruginosa* and *Anabaena circinalis*, for which specific guidelines exist) from 4 mm<sup>3</sup> L<sup>-1</sup> to 6 mm<sup>3</sup> L<sup>-1</sup> or as endorsed by the State Algal Advisory Group.

## Marine biotoxin management

The New South Wales Shellfish Program has developed the Marine Biotoxin Management Plan based on the principles set out in the Australian Shellfish Quality Assurance Program.

[http://www.foodauthority.nsw.gov.au/\\_Documents/industry\\_pdf/bmp\\_management\\_plan.pdf](http://www.foodauthority.nsw.gov.au/_Documents/industry_pdf/bmp_management_plan.pdf)

This plan specifies alert levels and associated actions when toxic algal species are detected in shellfish.

Harvest closures based on levels of algal toxins in seafood are cooperatively managed by the seafood industry, the Department of Primary Industries and the NSW Food Authority. The emergency powers of the Food Act (2003) can be used in certain circumstances, for example if toxin levels in seafood exceed international or draft Australian guidelines.



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## Communications

Consistency in the provision of public information and warning is fundamental in ensuring firstly that the community understands and secondly that they cooperate with any public warning issued.

### Signage and Media Releases

The warning signs displayed when an algal bloom is present in a water body should be consistent with the signage policy of the State Algal Advisory Group or Regional Algal Co-ordinating Committee.

Similarly media releases are issued in accordance with the guidelines developed by the State Algal Advisory Group or Regional Algal Co-ordinating Committee.

### Algal Hotline

The NSW Office of Water maintains a 1800 Algal Hotline that contains information about algal blooms in the state. This is published on all media releases and regional stakeholder weekly reports.

### Algal Website

The NSW Office of Water maintains a website that contains the latest algal information, alert levels, key contacts, reference manuals and contingency plans, with linkages to other natural resource and public health authorities websites involved in algal risk management.

## Control Strategies

There are a number of strategies that can be used for the control of algal blooms in water bodies:

### Flow management

Flow management, where it can be achieved, provides the first mechanism to minimise the potential occurrences of algal blooms. Algae prefer stable water conditions with low flows, long retention times, light winds and minimal turbulence. Increasing flow during periods of potential algal blooms or during algae blooms may assist in the dispersal of the algae and reduction of growth. Release of water from storages and weirs that can be manipulated for this purpose and in other cases restrictions on water extraction can aid in increasing flows.

### Cold water pollution / algal management protocols

On-river storages such as weirs and large dams may often provide conditions suitable for the growth of blue green algae. Water released from these dams and weirs can also cause cold water pollution impacts downstream. The larger and deeper the dam, the greater the risk of potential downstream impacts. Depending upon the dam infrastructure for release of water, the risk to downstream water can be minimised through operating procedures for mitigating of algae and/or cold water impacts. However algae tend to grow in summer and cold water pollution effects are also the strongest in summer. This requires a range of integrated monitoring and management protocols to successfully mitigate downstream impacts from both cold water pollution and algae.

### Artificial destratification of water storages

Algae typically occupy the thermally warm layer that occurs in the top of many water storages, lakes and weirs during the summer months. Artificial destratification involves increasing the circulation of water between the shallower and deeper layers of the reservoir. This can be achieved by introducing a plume of bubbles near the bottom of the reservoir or installing a propeller or impeller in or near the dam wall. A circulation pattern is set up that reduces the differences in temperature, oxygen and nutrients between the top and the bottom waters. This process is energy intensive and not practical for very deep storages.

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Artificial destratification can reduce algal growth by:

- Reducing the sediment phosphorus load available to the water column and so starving the algae of nutrients
- Mixing algae deeper into the water column and starving them of light.
- Increasing turbulence which disadvantages blue-green algae.

### **Chemical treatment of sources for drinking water**

An algicide is any chemical added to water which is toxic to algae. However, damage to algal cells can lead to the release of toxins into the surrounding water. Once in the water, toxins can pass more easily through the water treatment filters than the intact cells. It is also a lot more difficult to detect algal toxins than whole algal cells. The use of algaecides to control algal blooms is not recommended by Government Agencies and will only be used in emergency cases. The use of algaecides is not an effective long term solution to algal problems.

### **Treatment through water treatment plants**

The processes normally used to treat water supply for domestic and drinking purposes are not effective in removing toxins released from algal cells. If toxins are present, treatment enhancement is required for their effective removal. Some common treatment enhancements used are:

- Adsorption with powdered activated carbon,
- Adsorption with granular activated carbon filter downstream of normal filtration,
- Oxidation with ozone followed by biological activated carbon filtration downstream of normal filtration,
- Oxidation with chlorination

### **Treatment of farm dams**

Farm dams are vulnerable to blue-green algal blooms. Boiling or disinfectants will not make the water safe, although activated carbon filtration can absorb the toxins from the water.

If blue-green algae is suspected in a farm dam then the dam should be isolated to exclude stock. Care is needed if water contaminated by blue-green algae is to be used for irrigation.

Follow the recommendations in the Primefact sheet from the NSW Department of Primary Industries (at [http://www.dpi.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0006/103785/9400-Managing-blue-green-algae-in-farm-dams---Primefact-414.pdf](http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0006/103785/9400-Managing-blue-green-algae-in-farm-dams---Primefact-414.pdf)) or as amended) for the treatment of blue-green algae in farm dams.

### **Alternate water supplies**

Treatment of algal blooms by chemical, physical or biological control may not always be the best solution due to social, economic or environmental constraints. Identification of alternate water supplies for potable water or domestic and stock use may be necessary.

Alternate water supplies may take a number of forms, including changing to another uncontaminated reservoir (if possible), utilising groundwater sources and rainwater, or transporting water from other supplies.

Carted water from uncontaminated supplies is often used as an alternate supply but is expensive and usually provided for drinking and cooking purposes only. Note that during contamination town water supplies can still be used for flushing toilets, fire fighting and garden watering. Contaminated supplies should not be used for vegetable gardens.

Other sources may include filtered water (using filters specifically designed to remove algal toxins from water), farm dams, other reaches of the water body unaffected by the contamination and even commercially available bottled water.

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## Appendix 1 Division of responsibility for emergency management in NSW

The division of the State for emergency management purposes is based on emergency management regions. In each of these emergency management regions, a Regional Emergency Management Committee (REMC) has been established, which reflects the composition of the State Emergency Management Committee (SEMC) (where appropriate), and which is representative of the emergency management resources of the region.

The *State Emergency & Rescue Management Act 1989* establishes 11 Regional Emergency Management Committees (REMC) and Local Emergency Management Committees (LEMC) (based on Local Government Areas and emergency management regions) to undertake functions at these levels. The REMC and LEMCs are responsible for preparing plans in relation to the prevention of, preparation for, response to, and recovery from emergencies within the region.

Each level is supported by an Emergency Operations Controller (EOCON) who is a member of the NSW Police Force. The EOCON structure and roles are as follows:

### State Emergency Operations Controller (SEOCON)

The SEOCON is a member of the NSW Police Force Senior Executive Service, and is responsible for:

- establishing and controlling a State Emergency Operations Centre (SEOC)
- the control and coordination of emergency response operations at State level, for which the SEOCON is the designated Controller or where there is no designated Combat Agency
- supporting a Combat Agency that is primarily responsible for controlling the response to an emergency or assume control, if necessary to do so
- provide advice to the Minister regarding emergencies, including whether or not a declaration of a 'State of Emergency' may be necessary
- ensuring Initial Impact Assessments are completed following an emergency to inform recovery arrangements
- recommending to the Minister or Premier the formation of a Special Recovery Coordinating Committee in consultation with the SERCON (State Emergency Recovery Controller).

### Region Emergency Operations Controller (REOCON)

The Region Commander of Police for each Emergency Management Region is appointed as the REOCON.

- The REOCON is responsible for the overall control and coordination of emergency response operations at Region level for which the REOCON is the designated controller.
- The REOCON is also the designated controller where there is no designated Combat Agency, or where it is necessary to coordinate two or more local level operations which are controlled by Emergency Operations Controllers, or when directed by the SEOCON.

### Local Emergency Operations Controller (LEOCON)

The Local Emergency Operations Controller (LEOCON) is appointed for a local government area (or combined Local Government Authority areas) by the Region Emergency Operations Controller (REOCON).

- The person appointed must be a police officer stationed within the region in which the local government area is located and, in the opinion of the REOCON, must have experience in emergency management.

- 
- Local Council is required to provide executive support for the LEMC and the LEOCON in its area. These officers are termed Local Emergency Management Officers.

## Appendix 2. Supporting Agency Responsibilities

Supporting agencies roles and responsibilities for the operation of this Algal Risk Management Sub-Plan are shown in **Table 3**.

**Table 3 Summary of Supporting Agencies roles and responsibilities**

Agency / Department	Branch	Supporting Role
NSW Trade and Investment	Division of Resources and Energy	Sponsor the Energy and Utility Services Functional Area Coordinator; facilitate emergency management support through the functional area and State Emergency Management Committee members.
Department of Primary Industries	NSW Office of Water – Water Evaluation	Oversee the NSW algal management strategy, provide support to Regional Algal Coordinating Committees and algal advisory groups, carry out monitoring of rivers, liaison and communication of algal issues
	NSW Office of Water - Country Town Water Supply and Sewerage	Liaise with and provide advice to local water authorities.
	Fisheries NSW	Investigate fish kills, assist with advising fishers about food safety and/or implement fishing closures following receipt of food safety advice from relevant agencies and/or groups (and in the absence of progressive restrictive or other measures under any other available legislative provisions to address human health concerns in relation to the consumption of fish with risk of being contaminated). Advise RACC coordinator of fishing closure and any associated fishing advisory campaign. Collaboratively participate in the implementation of the NSW shellfish program marine biotoxin management plan.
	NSW Food Authority	Implement the NSW Shellfish Program Marine Biotoxin Management Plan, collect and despatch samples, and media releases as appropriate, advise RACC coordinator of algal issues.
	Local Land Services	Provide advice to landholders, develop catchment management plans, collect and despatch samples where possible.
	Crown Lands	Erect signs where appropriate, advise management authorities of issues.
Department of Premier and Cabinet	NSW Environmental Protection Authority	Advise authority responsible for the water body or RACC of algal issues that may be reported through the EPA Environment Line, or where pollution discharges may lead to algal blooms, assist with collection and despatch of samples where possible.
	Office of Environment and Heritage - Water, Wetland and Coasts Science Branch	Provide expert advice and identification of marine algal species for the RACC where possible
	Office of Environment and Heritage - Beachwatch	Advise management authority or RACC of algal issues, collect and despatch samples where possible, assist with communication via social media where an algal bloom may affect a swimming beach.
	Office of Environment and	Erect signs, advise tourism operators of algal

Agency / Department	Branch	Supporting Role
	Heritage - National Parks and Wildlife Service	problems, issue media releases, Advise RACC of algal issues, collect and despatch samples where possible
Roads and Maritime Services	Maritime	Advise management authority or RACC of algal issues, collect and despatch samples where possible.
NSW Health	Health Protection NSW, Public Health Units	Liaise with NSW Office of Water, water authorities and councils and provide advice on health aspects of water supplies
Water Management Agencies	Water Supply Authorities, Local Government, Water Corporations	Monitor algal levels, enact contingencies in accordance with the local algal contingency plan, Inform NSW Health in accordance with contingency plan, notify other authorities and users, erect signage and issue alerts where necessary. Advise RACC coordinator of algal issues
Local Government (Coastal Councils)		Monitor, collect and despatch samples, erect signs and issue media releases if necessary, close beaches if deemed necessary.
Sydney Institute of Marine Science or other Universities		Provide expert advice and identification of marine algal species where possible
NSW Police Force		Provide Emergency Operations Controller structure for major emergencies; provide for inter agency coordination where required; fulfil emergency management duties as per SERM Act in an emergency. Refer also to SEOCON, REOCON and LEOCON roles and responsibilities in appendix 1.

## NSW Trade and Investment

**Division of Resources and Energy** sponsors the Energy and Utility Services Functional Area Coordinator (EUSFAC).

- The Energy and Utility Services Functional Area comprises a Functional Area Coordinator (EUSFAC), who is sponsored by Trade & Investment (the Department). Participating organisations include public and private owners and operators of electricity, gas, petroleum, and water infrastructure, who provide utility services and whose support during significant events may be coordinated through EUSFAC.

EUSFAC and participating organisations:

- Contribute to the NSW Emergency Risk Management process through the identification of hazards, assessment of threats to supply continuity, and the taking of measures to avoid, mitigate or reduce the consequences of emergencies involving energy and utility supply chains.
- Within the scope and capability of EUSFAC and the public and private businesses participating organisations:
  - Undertake planning for emergency response and recovery operations.
  - Coordinate the provision of support to Combat Agencies and other Functional Areas.
  - Coordinate the supply of specialist advice to SEOCON, Combat Agencies and Functional Areas, from energy and utility providers; and provide input into resupply management planning.

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**NSW Office of Water** is the principal water management agency in NSW coordinating policy and implementing strategies for sustainable water resource management. In terms of algal management the NSW Office of Water currently oversees the algal risk management framework for fresh and marine waters and has a co-ordination or knowledge broker role that includes co-ordinating the State Algal Advisory Group (SAAG) and the Technical Advisory Group (TAG) as well as the Regional Algal Co-ordinating Committees (RACC). The Office of Water's responsibilities are:

- to provide RACC, SAAG and TAG co-ordination.
- to take a lead role in managing the risk of algal blooms in fresh waters by coordinating algal monitoring, management and public information (media and web based information) in surface waterways and storages where no other management organisation has a role.
- to liaise with other agencies affected by the algal bloom in order that an integrated risk management approach is taken.
- to perform a knowledge broker role and facilitate communication between regional stakeholders and the State body responsible for algal management and provide regular updates of algal management resource material.
- to identify knowledge gaps and encourage scientific research to provide new information to enhance algal management.
- to co-ordinate and manage weekly algal information on behalf of stakeholders and ensure that water users and other stakeholders are informed in addition to the Minister.

**Country Town Water Supply and Sewerage Branch** has the following responsibilities:

- to design, implement and monitor any necessary control measures.
- to liaise with affected water authorities.
- to liaise with and provide advice to local government and public health units on water treatment methods.
- to advise local government and public health units of any improvised water treatment systems that may be available.
- to advise the Energy and Utility Services Functional Area Coordinator of situations that may have significant impact on communities that may be an 'emergency' as defined under the *State Rescue and Emergency Management Act 1989* (as amended).

**Fisheries NSW** is the State's principal fisheries resource management agency and is responsible conserving, developing and sharing the fishery resources of the State for the benefit of present and future generations. This includes conservation of fish stocks, key fish habitats, threatened species, populations and ecological communities of fish and marine vegetation, as well as the promotion of ecological sustainable development, including the conservation of biological diversity.

Fisheries NSW has the following algal management responsibilities:

- to investigate reports of fish kills and inform management authorities if an algal bloom is implicated.
- to take algal samples for identification if algal bloom is suspected in fish kill investigations.
- assist with fisher information programs and implement fishing closures, when advised, and in the absence of progressing restrictive or other measures under any other available legislative provisions to address human health concerns.



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- to erect and remove Fisheries NSW fishing closure signage.
  - to advise RACC Co-ordinator / water manager of any closures with respect to marine or freshwater algae.
  - Collaboratively participate in the implementation of the NSW shellfish program marine biotoxin management plan.

**NSW Food Authority** is responsible for food safety in NSW, including primary produce and seafood industries. It is responsible for the safe production, processing, wholesale and distribution of foods for human consumption from primary production through to retail.

NSW Food Authority is divided into two areas of expertise that have different roles and responsibilities in algal management.

The NSW Shellfish Program (NSWSP) has the following responsibilities:

- to implement the NSW Shellfish Program Marine Biotoxin Management Plan (2011). The plan includes provision for harvest area closures and product recalls.
- to liaise with the shellfish farmer quality assurance committees regarding algal bloom management.
- to liaise with management authorities regarding bloom monitoring and responses to potential toxin accumulation in shellfish.
- to provide appropriate advice to the management authority to facilitate effective risk management of a bloom and its consequences on shellfish industry.
- to monitor algal cell numbers and toxins within oyster producing estuaries and take appropriate action to safeguard human consumption.
- to implement harvest closure when necessary and reopen harvest areas where satisfactory.
- to inform RACC Co-ordinator / management authority when a potentially toxic species forces a closure to a shellfish area due to confirmed toxin presence above the regulatory levels set out in the NSW shellfish program marine biotoxin management plan. Additionally to inform the management authority of the species involved and cell count so that a recreational warning can be issued.
- to inform RACC Co-ordinator / management authority when cell counts exceed phytoplankton action levels, if toxicity is confirmed or if a known recreational toxigenic species is implicated.
- to provide RACC Co-ordinator with updated information on marine algae shellfish triggers.
- to develop triggers for the shellfish industry with regard to freshwater algal toxins that can occur in coastal lakes (eg. microcystin, saxitoxin and nodularin). Advise management authorities of these triggers.
- to advise other programs within NSW Food Authority of the occurrence of algal blooms and or toxins.
- when necessary, to advise Fisheries NSW of the need for a fishing closure or closure on harvesting wild shellfish, advise RACC Co-ordinator / management authority.
- to implement product recall if necessary.
- to respond to media inquiries with respect to production and control of shellfish.

The Seafood Program has the following responsibilities:

- to develop the Seafood Safety Scheme.



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- to develop triggers for the seafood industry with regard to marine and freshwater algal toxins and advise management authorities of these triggers.
  - when advised by the management authority of the presence of freshwater potentially toxic species, collect prawns, yabbies, fish and other seafood to determine bioaccumulation of toxins and self cleansing mechanisms in order to identify appropriate triggers for closures and lifting of those closures, to safeguard human consumption.
  - when necessary, to advise Fisheries NSW of the need for a closure, advise management authority of this closure.
  - to implement product recall if necessary.
  - to respond to media inquiries with respect to the production and control of seafood.

**Local Land Services** has the following algal management responsibilities:

- to promote community education and provide advice to rural landholders.
- to investigate reports of sick or dead livestock (Livestock Health & Pest Authorities (LHPA)),
- to advise rural producers of practical prevention and management strategies, recognition of signs of toxicity in stock and methods of responding in the event of a problem with stock, including disposal of carcasses.
- to advise rural producers of the risks of irrigation and risk to livestock.
- to inform appropriate waterway management authorities of relevant information and developments.
- to advise farmers on how to manage and control algae in their farm dams in accordance with policies and strategies of other agencies.
- to work with the community to develop catchment management strategies to minimise nutrients entering waterways.
- to raise community awareness of the relationships between land management, catchment health and water quality.
- to encourage the development and adoption of best practice in all aspects of catchment management.
- to develop strategies that promote an integrated approach to improving catchment management and catchment health.
- to allocate funding in a way that reflects this strategic approach to improving catchment health.
- to collect algal samples for identification if bloom suspected during routine field work. Despatch to laboratory for identification of bloom and inform waterway management authority.

**Crown Lands** have the following responsibilities:

- to erect strategic warning signs, if deemed necessary as a result of receiving advice of a blue green algal bloom from other authorities, in Crown controlled areas (not managed by councils) that are used for recreation e.g.: ponds, wetlands, lakes, river reserves and coastal estuaries.
- to notify and keep informed other affected management authorities of any management actions and media releases.

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## Department of Premier and Cabinet (DPC)

**NSW Environmental Protection Authority** has the following algal management responsibilities:

- to advise on the whereabouts of licensed discharges that could lead to blue-green algal blooms in receiving waters.
- Where the EPA has a regulatory role in relation to water discharges from industry, any water discharges must not pollute waters unless in accordance with an Environment Protection Licence.
- to advise agencies on the disposal of contaminated water treatment wastes and dead stock.
- to advise authority responsible for the water body or RACC of community complaints and their responses from the Environment Line if suspect may be estuarine, marine or blue-green algae, if confidentiality is not an issue (note: EPA Environment Line will continue to provide an after hours contact for notification of marine and estuarine algal blooms (131 555)).
- to ensure that staff manning the EPA Environment Line are aware of algal contact numbers and information sources.
- to licence the use of algicides (and where appropriate algistats).

## Office of Environment and Heritage – Water, Wetland and Coasts Science Branch

- Provide expert advice and identification of marine algal species for the RACC where possible.

**Office of Environment and Heritage - Beachwatch** Program has the following algal management responsibilities:

- to coordinate the Beachwatch program, including reporting of Beachwatch results and informing management authorities of any marine algal issues.
- To Collect and despatch samples where possible.
- To assist with communication via social media where an algal bloom may affect a swimming beach.

**Office of Environment and Heritage - National Parks and Wildlife Service** has the following algal risk management responsibilities:

- to sample and monitor algal blooms in water bodies that they manage, including erection of appropriate warning signs.
- to issue media releases and advise local tourism centres and relevant tourism operators of the presence of blooms in their National Park.

## Roads and Maritime Services

**Maritime** has the following algal risk management responsibilities:

- to advise recreational and commercial vessel operators of areas and extent of bloom.
- to sample and report potential algal blooms to the RACC Co-ordinator or management authority where possible.
- to advise the RACC Co-ordinator or management authority and implement boating management strategies in order to limit recreational use in affected areas

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## NSW Health

NSW Health has the following responsibilities:

- participate in Regional Algal Coordination Committees.
- to provide technical advice with respect to algae and health issues.
- to liaise with NSW Office of Water regarding water treatment and associated issues.
- in consultation with NSW Office of Water and local government, to advise on the monitoring of public water supplies as needed.
- to liaise with and provide advice to doctors, hospitals, local governments and water supply authorities, media and the community.
- to monitor health aspects of alternative water supplies and public water supply systems.
- to inform management authorities of any changes to public health guidelines with respect to algae.
- if necessary, to take action with respect to unsafe water.

## Water Management Authorities

**Water Corporations** have the following responsibilities:

- to monitor blue-green algae in drinking water storages or as recommended by NSW Health, advise/inform customers with respect to drinking water issues.
- to enact contingencies as required in accordance with the Water Corporation's Blue-Green Algal Contingency and Operations Plan.
- to inform NSW Health of algal cell counts in accordance with contingency plan requirements.
- to inform other affected management authorities and monitor downstream of dam if algal cell counts in dam exceed guidelines, and dam is spilling.
- to inform management authority of potential algal incidences in rivers where STP discharges either affect nutrient status, contributing to blooms or where algal cells are discharged.
- to monitor the algal levels in these rivers downstream of the STP discharges during the length of the algal bloom and inform water users.
- to monitor algal levels in accordance with any Water Management Licence and in the event of an algal bloom.
- to notify RACC Co-ordinator and keep informed other affected management authorities of results.
- to erect signage in the event of a recreational red alert level being reached.

**State Water** has the following responsibilities:

- to monitor storage waters in accordance with its Operating Licence and any algal plan requirements.
- to erect signage in affected areas under State Water's control when a red alert for recreational usage is reached.
- to monitor downstream of storage if dam is spilling or discharging during alert levels.
- advise RACC Co-ordinator, to initiate communications as per the regional algal contingency plan of impending algal bloom or discharge containing algal cells.

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- to manage variable level off takes in accordance with dam operating protocols for algal management and thermal pollution based on algal monitoring and temperature information.
  - to enact Environmental Contingency Allowance or other environmental water provisions under the direction of NSW Office of Water or other water manager, if required.

**Water Supply Authorities** have the following responsibilities:

- to monitor blue-green algae in drinking water storages or as recommended by NSW Health or as outlined in the *Australian Drinking Water Guidelines*, advise/inform customers with respect to drinking water issues.
- to enact contingencies as required in accordance with the any local government Risk Management Plan and Operating Procedures.
- to inform NSW Health of algal cell counts in accordance with contingency plan requirements.
- to inform other affected management authorities and monitor downstream of dam if algal cell counts in dam exceed guidelines, and dam is spilling.
- notify RACC coordinator and keep informed other affected management authorities of results.

**Local Councils water supply and sewerage authorities** have the following responsibilities:

- to provide water treatment to NSW Office of Water specifications or advice.
- to report on operational problems to NSW Office of Water and health problems to NSW Health.
- to provide monitoring of own water supply storages and systems and forward results to NSW Health, in accordance with contingency plan requirements.
- following local public health unit advice, to arrange appropriate publicity about water quality and treatment including effects on water use and drinking supplies.
- to enact contingencies as required in accordance with council's blue-green algal contingency plan (All councils supplying domestic water should have their own contingency plan).
- to advise the District Emergency Operations Controller, who is the Police Region Commander, of situations that may have significant impact on communities that may be an "emergency" as defined under the State Rescue and Emergency Management Act 1989 (as amended).
- to monitor downstream of dam if algal cell counts in dam storages or weir pools exceed guidelines, and dam or weir is spilling.
- to inform downstream management authority of potential algal incidences in rivers where STP discharges either affect nutrient status, contributing to blooms or where algal cells are discharged.
- to monitor the algal levels in these rivers downstream of the STP discharges for the duration of the algal bloom and inform water users.
- to notify RACC Co-ordinator and keep informed other affected management authorities of results and management and when media release has to be issued based on operational water quality sampling in rivers.

**Local Councils land use management**

- to monitor and erect warning signs, if necessary, in Council controlled areas that are used for recreation (ie. ponds, wetlands, lakes, river reserves and coastal estuaries, beaches)

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- to sample any marine algal blooms that may occur within the surf zone and forward sample to Marine Science Unit of the OEH or other laboratory listed in the RACC plan for identification.
  - to close beaches if deemed necessary and advise local surf lifesaving branch .
  - liaise with local lifesaving branch if bloom is likely to impact upon weekend or public holiday activities.

## **NSW Police Force**

### **SEMC Representative**

Deputy Commissioner / State Emergency Operations Controller:

- Combat agency for Search and Rescue and Counter Terrorism activities and coordination in circumstances where no other agency has legislated responsibility during emergencies
- Protection of persons from injury or death and property from damage as per relevant sections of the NSW Police Act
- Maintenance of records detailing the circumstances of an emergency and recording any criminal or suspected criminal activity
- Taking appropriate action as per relevant legislation pertinent to the emergency.

### **Supporting agency role**

- Provision of policy support and conduct of training pertinent to Emergency Management to relevant agencies and the community.

Refer also to Appendix 1, EOCON structure, roles and responsibilities.

## **Sydney Institute of Marine Science and other Universities**

May provide the following:

- identification of estuarine and marine algae.
- report algal identification to management authority and RACC Co-ordinator.
- provide technical advice on estuarine and marine algal issues to management authorities, including the potential toxicity of a species or the occurrence of upwelling events that may trigger algal blooms.

### **Other authorities, agencies and community groups.**

Other authorities, agencies and community groups may be identified at a regional level and these would be identified in the Regional Algal Coordinating Committee's Contingency Plan.