

Metropolitan / South Coast Regional  
Algal Coordinating Committee

REGIONAL ALGAL  
CONTINGENCY PLAN:  
MAY 1994



SER / NSW EPA

: 94/49. r

REGIONAL ALGAL CONTINGENCY PLAN  
MAY 1994 / Metropolitan/South Coast  
Regional Algal Coordinating Committee

941499-2

M 10327

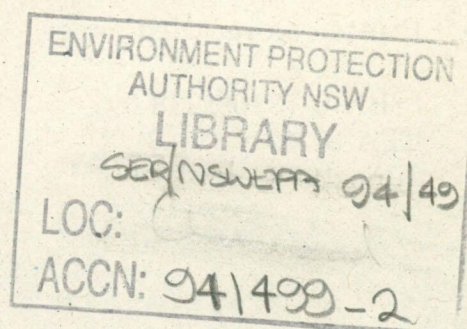
DATE DUE

BORROWER



Metropolitan / South Coast Regional  
Algal Coordinating Committee

REGIONAL ALGAL  
CONTINGENCY PLAN:  
MAY 1994





Published for the Metropolitan/South Coast Regional Algal Coordinating  
Committee by:

Environment Protection Authority  
Citadel Towers  
799 Pacific Highway  
PO Box 1135  
Chatswood 2057  
Phone: (02) 795 5000  
Fax: (02) 325 5678

Printed on recycled paper

ISBN 0 7310 1238 0  
EPA 94/49  
June 1994



## CONTENTS

<b>1 Introduction</b>	1
• Background	1
• NSW Blue-Green Algae Task Force Recommendations	2
• State Algal Coordinating Committee (SACC)	3
• Regional Algal Coordinating Committees (RACCs)	4
<b>2 Membership of the MSCRACC</b>	7
<b>3 Requirement of Regional Algal Bloom Contingency Plan</b>	10
• Contingency Plan Objectives	10
• Contingency Plan Review	10
<b>4 Water Uses in the Region</b>	11
• Hawkesbury River (Yarramundi to Wisemans Ferry)	11
<b>5 Monitoring</b>	13
• Overview	13
• Water Sampling and Counting	13
• Toxicity Testing	14
• Costs of Algal Blooms	14
<b>6 Public Alert and Warning Plan</b>	15
• Alert Levels (Algal Counts)	15
• Media Releases	15
• Warning Signs	16
<b>7 Communication and Information program</b>	18
• Regional Strategy	18
• Hawkesbury River (Yarramundi to Wisemans Ferry) Strategy	20
<b>Appendixes</b>	22



## 1 INTRODUCTION

### Background

The world's largest recorded riverine algal bloom developed in the Darling-Barwon River System in November and December 1991. The blue-green algal bloom extended for approximately 1,000 kilometres. Algal concentrations in some reaches of the river exceeded 600,000 cells/ml, with most samples containing algal toxins. Blue-green algal blooms were also present in the Windsor to Wisemans Ferry stretch of the Hawkesbury River in December 1991 and January 1992.

Given the serious implications of the Darling River bloom, the then Minister for Natural Resources announced the establishment of a Blue-Green Algae Task Force on 28 November 1991.

The membership of the Task Force consisted of NSW Government agencies including the Department of Water Resources (DWR) [chair], Environment Protection Authority (EPA), NSW Fisheries, NSW Agriculture, Department of Conservation and Land Management, Department of Health, NSW Public Works, Water Board and the Hunter Water Corporation; the Murray-Darling Basin Commission; and the Universities of Technology, Sydney and New England. A representative of total catchment management committees was also a member. The States of Queensland, Victoria and South Australia, the CSIRO and the Australian Water Resources Council were also included as observers.

The primary roles of the Task Force over its nine-month term were to:

- *"oversee the establishment of Regional Algal Coordinating Committees, monitor their operation, and facilitate resourcing and coordination of these committees where necessary*
- *review the problems associated with blue-green algae in NSW*
- *produce reports for the Minister for Natural Resources and the Natural Resources Subcommittee of Cabinet, including regular reports on algal blooms and responses during the 1991/92 summer, an interim report by end March on progress, and a final report by end August 1992."*



## NSW Blue-Green Algae Task Force Recommendations

The final report of the Task Force was released in September 1992 and contained recommendations for further action. Important recommendations related to the development of a State Algae Contingency Plan, as detailed below:

- *That the State Algae Contingency Plan, its proposed State and regional structure, and the roles and responsibilities . . . be adopted to minimise the impact of blue-green algal blooms*
- *That the State Algae Coordinating Committee direct the establishment of Regional Algae Coordinating Committees, provide guidelines for the development of Regional Algae Contingency Plans, monitor progress, and facilitate resourcing of regional committees*
- *That the nine Regional Algal Coordinating Committees be responsible for ensuring monitoring, communications, implementation of response(s), and training in their regions. These committees will liaise with and report to the State Algal Coordinating Committee, as they are only responsible for algal bloom contingency plans.*

The final report of the Task Force also stated:

- *A State Algae Contingency Plan is necessary for the effective management and control of algal bloom occurrence and impacts. Contingency planning is aimed not only at the provision of safe domestic water supplies, but also water supply for a range of other uses including industry, agriculture including livestock, tourism, recreation and environment. Contingency planning at State, regional and local levels requires a monitoring, communication, information and action framework.*

The contingency plan is being implemented via a hierarchy of one State and nine Regional Algal Coordinating Committees (one SACC and nine RACCs) which are charged with the task of developing and, when necessary, implementing Statewide and Regional Algae Contingency Plans. The purpose of this document is to prepare the Regional Algal Contingency Plan for the Metropolitan/South Coast Regional Algal Coordinating Committee.



### State Algal Coordinating Committee (SACC)

The first meeting of the State Algal Coordinating Committee was held on the 11 November 1992. The Committee was originally made up of:

J. Verhoeven (Chair)	Department of Water Resources (DWR)
I. Smalls	DWR
F. King	NSW Public Works
B. Johnston	Department of Conservation and Land Management
G. Richards	NSW Health
G. Noonan	Environment Protection Authority (EPA)
Dr V. Edge	NSW Agriculture
C. Baragry	Water Board
A. Thornton	Hunter Water Corporation (HWC)
R. Brown	State Rescue & Emergency Services Board (SRESB)
A/Prof D. Cheng	University of Technology (UTS)
Dr S. Burgin	University of Western Sydney
M. Tooth AM	Total Catchment Management (TCM)
A. Sinclair	TCM
Ross Brown	State Rescue & Emergency Services Board

The roles and responsibilities of the SACC are given by the final report of the Task Force. These are to:

- develop and implement State Algal Management Policy and strategies including the State Algae Contingency Plan
- direct the establishment of RACCs and provide guidelines for the development of Regional Algae Contingency Plans and the monitoring of their progress; and facilitate inter-RACC cooperation and resourcing
- plan and implement phases of the State's Nutrient Control Strategy through TCM
- liaise with organisations involved in algal management issues intrastate, interstate and overseas
- identify research needs on algal management issues and, where necessary, commission new research and disseminate research findings



Metropolitan/South Coast  
Regional Algal Coordinating Committee  
CONTINGENCY PLAN

---

- coordinate statewide media relations and public information strategies as appropriate, and provide models and guidelines for use in the regions
- develop and coordinate statewide algal and related water quality monitoring strategies
- monitor statewide the costs incurred as a result of algal blooms (including economic, social and environmental costs)
- identify and coordinate the development and implementation of statewide monitoring and testing procedures
- produce annual reports to the State Catchment Management Coordinating Committee and to the NSW Water Resources Council.

The SACC reports directly to the State Catchment Management Coordinating Committee (SCMCC).

### **Regional Algal Coordinating Committees (RACCs)**

Membership of the RACCs includes the Department of Water Resources, NSW Public Works, NSW Health, Environment Protection Authority, NSW Agriculture plus additional members such as Local Government, Water Boards, Hunter Water Corporation, TCM and others as necessary.

The regions are based on the six inland TCM regions with the coast divided into three broad regions based on those of the Department of Water Resources major surface water catchment divisions for the State (Figure 1).

The roles and responsibilities of the RACCs as given by the final report of the Task Force are to:

- develop, coordinate and implement algal bloom contingency strategies for each region in accordance with SACC guidelines
  - cooperate with neighbouring regions (and neighbouring States, as appropriate) on algal management issues
  - coordinate regional media relations and public information programs, with as far as possible, media attention focused on the regions and regional issues
-







Metropolitan/South Coast  
Regional Algal Coordinating Committee  
CONTINGENCY PLAN

---

- develop, coordinate and implement regional algae monitoring systems in accordance with SACC guidelines
- coordinate 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 warning and clearance
- monitor within the region the costs incurred as a result of algal blooms (including economic, social and environmental costs).



## 2 MEMBERSHIP OF THE MSCRACC

In December 1991, the Hawkesbury Algal Management Committee was formed to address the issue of the blue-green algae blooms in the Hawkesbury-Nepean River. The committee initially consisted of representatives from NSW Public Works, NSW Health, the Department of Water Resources, the Water Board, the Environment Protection Authority (formerly as the State Pollution Control Commission) and Hawkesbury and Baulkham Hills Councils. The committee was chaired by NSW Public Works.

In December 1992, the Hawkesbury Algal Management Committee became the Metropolitan/South Coast Regional Algal Coordinating Committee (MSCRACC) in line with the structure recommended in the State Blue-Green Algae Task Force report of August 1992. The committee has members from the EPA, Water Board, Department of Water Resources, NSW Agriculture, NSW Public Works, NSW Health, National Parks and Wildlife Service, the Councils of Baulkham Hills, Penrith and Hawkesbury, the Hawkesbury-Nepean Catchment Management Trust, and community/tourism representatives. The committee is chaired by the EPA and secretarial support is provided by NSW Public Works.

Details of contact information for each of the members of the committee is contained in Table 1.

Table 2 summarises the specific roles which have been designated to each of the members of the committee.



Metropolitan/South Coast  
Regional Algal Coordinating Committee  
CONTINGENCY PLAN

**Table 1 Agency Contact Information**

Name	Agency	Address	Phone	FAX
Peter Yates	EPA	799 Pacific Hwy Chatswood 2075	02 325 5666	02 325 5669
Sean Hardiman	EPA	Jacobs Street Bankstown 2200	02 795 5339	02 795 5004
Dr Bin Jalaludin	NSW Health	13 New Street, North Parramatta 2151	02 840 3591	02 840 3817
Craig Baragry	Water Board	122 Main Street Blacktown 2147	02 839 7475	02 839 7457
Lee Sharma	NSW Public Works	16-20 Edgeworth David Ave, Hornsby 2077	02 482 0444	02 477 3356
Jim Clarke	DWR	10 Valentine Ave, Parramatta 2124	02 895 7012	02 895 7255
Grahame Smith	National Parks and Wildlife Service	Wisemans Ferry Rd Cattai 2756	045 72 8404	045 72 8416
John Gillett	NSW Agriculture	299 George Street, Windsor 2756	045 77 0620	045 77 0650
Gary Hunt	Hawkesbury- Nepean Catchment Management Trust	68 Mileham Street, Windsor 2756	045 77 4243	045 77 4236
Ray Goddard	Baulkham Hills Council	Showground Road, Baulkham Hills 2151	02 634 0111	02 899 6565
David Wilson	Penrith Council	601 High Street, Penrith 2750	047 327 5523	047 31 1904
Ray Clifford	Hawkesbury Council	George Street, Windsor 2756	045 87 7000	045 77 6512
Brian Hardiman	Hawkesbury Tourism	P.O. Box 534 Windsor Sth 2756	045 88 5895	045 88 5896
Russ Hodgskin	Ski-Parks Association	Putty Road Wilberforce 2756	045 75 1955	045 75 1955



Metropolitan/South Coast  
Regional Algal Coordinating Committee  
CONTINGENCY PLAN

**Table 2 RACC Member Responsibilities**

AGENCY	RESPONSIBILITIES
Environment Protection Authority	Committee chairing, method development, monitoring and media releases
NSW Health	Advice on health-related issues
Water Board	Method development, monitoring
NSW Public Works	Secretarial, domestic water treatment
Dept of Water Resources	Abstraction, licence and alternative supply information
National Parks and Wildlife Service	Community liaison at NSW National Parks
NSW Agriculture	Advice on stock watering and irrigation
Hawkesbury-Nepean Catchment Management Trust	Community information dissemination, interdepartmental liaison
Baulkham Hills Council	Local community information dissemination, installation and maintenance of warning signs
Penrith Council	Local community information dissemination, installation and maintenance of warning signs
Hawkesbury Council	Local community information dissemination, installation and maintenance of warning signs
Hawkesbury Tourism	Liaison with recreation users and tourism associations
Ski-Parks Association	Commercial impacts on river users



### **3 REQUIREMENT OF REGIONAL ALGAL BLOOM CONTINGENCY PLAN**

A Regional Algae Contingency Plan is necessary for the effective management and control of algal bloom occurrence and impacts. Contingency planning is aimed not only at the provision of safe domestic water supplies, but also water supply for a range of other uses including industry, agriculture, livestock, tourism, recreation and the environment. Contingency planning requires a monitoring, communication, information and action framework.

#### **Contingency Plan Objectives**

The objective of this plan is to set out procedures to effectively manage and control algal blooms which develop within a region in order to minimise their occurrence and impact.

The Regional Algae Contingency Plan has been developed in accordance with general guidelines established by the Blue-Green Algae Task Force. The regional contingency plan incorporates a range of broad and specific measures such as:

- outlining the responsibilities of individual agencies (at a regional level) before, during and after an algal bloom
- establishing communication networks and briefing mechanisms to facilitate a coordinated response to the development of algal blooms in the region
- ensuring that local authorities have identified alternative water supplies for towns, Aboriginal communities and private supplies
- providing an inventory of available water treatment materials (e.g. activated carbon) or a mechanism for obtaining them rapidly from a statewide resource pool.

#### **Contingency Plan Review**

The contingency plan adopted by the MSCRACC will be reviewed annually at the May meeting.



#### **4 WATER USES IN THE REGION**

An important objective of the contingency plan is to identify potential users of contaminated waters and provide advice to these users on health-related issues of blue-green algal blooms.

The MSCRACC is responsible for the Metropolitan/South Coast Region of NSW and the contingency plan addresses this wide region. However the stretch of the Hawkesbury River between Yarramundi and Wisemans Ferry has been identified by the MSCRACC and the community as the area most commonly adversely affected by blue-green algae.

This chapter concentrates on addressing both water uses and users for the Hawkesbury River. The processes used for identification can be equally extended to the remainder of the Region as required.

It is important to note that the closure of water bodies contaminated by blue-green algae is not necessary. Rather, there is a need to provide sufficient warning against inappropriate use of contaminated water.

##### **Hawkesbury River (Yarramundi to Wisemans Ferry)**

The MSCRACC has identified the water uses/users that should avoid direct consumption and bodily contact with water affected by blue-green algae in this area. A database has been established providing information on the following aspects:

- 1 Town Water Supply
- 2 Domestic Water Supply: A list of households who draw water directly from the river. The Department of Water Resources has issued a press release/newspaper advertisement in the local newspapers on behalf of MSCRACC requesting users to provide their contact details. Land ownership information held by Hawkesbury and Baulkham Hills Councils has been used to supplement this information.
- 3 Industry: Water contaminated with blue-green algae is not thought to pose a risk to industrial uses/users in the area.



Metropolitan/South Coast  
Regional Algal Coordinating Committee  
CONTINGENCY PLAN

---

- 4 Agriculture: A list of agricultural activities in the area which could be adversely affected by the use of water contaminated by blue-green algae has been compiled.
- 5 Recreation: MSCRACC will compile a list of recreational activities and organisations in the area adversely affected by water contaminated by blue-green algae.
- 6 Aquatic Ecosystems: Toxic blue-green algae has the potential to harm or kill native fauna. There is only limited information available on this issue and no information available for the Hawkesbury River. MSCRACC will investigate wildlife deaths which occur when toxic blooms prevail. MSCRACC will liaise with the Wildlife Information and Rescue Service (WIRES) in these circumstances.
- 7 Alternative/Emergency Water Supplies: A list is being compiled on alternative water supplies, e.g. water carters, existing bores and establishing new bores, farm dams in excess of 7 megalitres, filtered water (Cattai National Park), preventative processes (alum and gypsum), and using clean reaches of rivers and/or other unaffected water bodies. It may be necessary to take water from one or more of these sources. Note: this component of the plan is far from complete and, whilst a major issue in contingency advice, will require some time before the MSCRACC reaches a stage where clear guidelines will be established describing the situations where alternative supplies are needed and how to advise on such needs.



## 5 MONITORING

### Overview

As the MSCRACC is responsible for advising the community of the density and extent of algal blooms, reliable, timely and accurate information is required. Ongoing monitoring of blue-green algal blooms and their toxicity is thus essential for the provision of advice to regional water users.

The Metropolitan/South Coast Region experiences blue-green algal blooms in a variety of water bodies, ranging from reservoirs, rivers, creeks, weir pools, artificial ponds and wetlands. Locations which experience regular or chronic blue-green algal bloom conditions within the region include:

- Centennial Park
- Botany Wetlands
- Manly Dam
- Hawkesbury River (particularly between Windsor and Wisemans Ferry).

Other areas which experience nuisance blooms within the Region include the waters behind Maldon Weir and Sharpes Weir (both popular recreational locations on the Nepean River) and Berrima Weir on the Wingecarribee River. Numerous farm dams and other small natural or artificial storages also experience algal problems which lead to deterioration of water quality and their uses as stock water supplies.

### Water Sampling and Counting

Sampling methods employed at locations regularly monitored for the presence and densities of blue-green algal blooms require consistent protocols in order to obtain representative estimates of algal densities at a given location. Standardised methods are required due to the high spatial and temporal variations in blue-green algal concentrations in water bodies. The MSCRACC is assisting in the development of suitable sampling methodologies to address problems such as the impacts of diurnal algal migrations and wind/tidal scum formation and their impact on the reliability of sample estimate results.

Where possible, water samples for algal counting are collected using an integrated column sampler replicated within each location. A subsample of the composited replicates is collected in 125ml dark bottles and preserved in Lugols solution. Samples are then counted using standard Lund, Utermöhl or other



Metropolitan/South Coast  
Regional Algal Coordinating Committee  
CONTINGENCY PLAN

---

counting cell techniques. Where possible, the provisions of the SACC Interim Protocol Alert Levels Framework for Blue-Green Algal Blooms (Appendix 1) will be employed.

Various laboratories provide algal identification and counting services on behalf of the MSCRACC. Results from approved laboratories are forwarded to the Chairman, Secretary and NSW Health's representative on the MSCRACC immediately they become available.

### **Toxicity Testing**

At this stage, the MSCRACC has adopted a strategy of regular toxicity testing of selected algal samples which have concentrations of blue-green algae greater than 15,000 cells/ml.

Generally, the toxicity of algal samples is determined using the mouse bioassay method, such as provided by the New England University, Armidale. However other techniques such as High Pressure Liquid Chromatography, Thin Layer Chromatography or Protein Phosphatase Inhibition may be used where appropriate.

### **Costs of Algal Blooms**

Blue-green algal blooms in the Metropolitan/South Coast Region result in both direct and indirect costs. Direct costs include the costs of monitoring and other testing, water treatment, alternative water supply costs, advertising community alerts through the media and the erection of signs and the loss or medical treatment of stock or humans consuming contaminated water. Indirect costs can, in some cases, be more significant in their effect on tourism and recreation. For example, the economic costs of algal blooms in the Hawkesbury River during 1991/92 was estimated at \$6.7m.

Due to the potentially high costs of algal blooms, all RACCs have been asked by the SACC to monitor costs, both direct and indirect. All committee members are requested to keep a record of costs associated with their area of responsibility. Protocols for this recording are in its infancy and will become a focus for 1994.



## **6 PUBLIC ALERT AND WARNING PLAN**

The Blue-Green Algae Task Force's final report documents the known impacts of blue-green algae on specific water uses. The Task Force recommends that humans and livestock avoid direct consumption and bodily contact with water contaminated by blue-green algae. As such, at this stage MSCRACC has adopted the Task Force's water quality guidelines.

### **Algal Levels (Algal Counts)**

#### *Potable water*

Domestic water suppliers or those using contaminated water for potable use will be alerted when known taste and odour-forming cyanobacteria exceed 2,000 cells/ml.

In these situations, water suppliers may need to consider alternative supplies, instituting taste and odour removal processes, repeating sampling procedures and performing toxicity testing. When potentially toxic blue-green algae exceeds 15,000 cells/ml, water providers will have to seek alternative water supplies or treat contaminated waters to remove toxins.

#### *Recreational waters*

The alert level for recreational waters is when potentially toxic cyanobacteria exceed 15,000 cells/ml.

At these levels warnings will be issued to water users to avoid direct bodily contact with the water. The water should also not be used for watering stock.

Water users should be advised to seek alternative water supplies or to treat contaminated waters appropriately.

### **Media Releases**

#### *Media spokesperson*

The Chairperson of the Committee is the spokesperson for all media releases. The Chairperson can, however, co-opt others on the committee to speak to the media. All media releases will be made on behalf of the MSCRACC.



Metropolitan/South Coast  
Regional Algal Coordinating Committee  
CONTINGENCY PLAN

---

*Input to media releases from members*

Committee members have the opportunity to review media releases prior to release. There may be times when due to time constraints it may not be possible to consult all members but these instances should be infrequent.

*Frequency of media releases*

All major and regional media—print, TV and radio—will be alerted. Media alerts will occur weekly as long as algal counts exceed alert levels. A media release will also be made when the threat diminishes. An example of a typical press release is given in Appendix 2.

**Warning Signs**

*Wording of signs*

The aim of the signs is to warn the community that waters may be contaminated with blue-green algae. There are two types of signs to be used by the MSCRACC to advise the community of blue-green algal blooms. The wording of the sign to be used in the Hawkesbury River mainstream has been determined by the relevant State Government ministers and is given in Appendix 3. A copy of the second generic sign to be used on other rivers and water bodies, such as lakes, wetlands or weir pools is given in Appendix 4.

*Location, erection and maintenance responsibilities*

Signs will be placed in strategic locations to maximise public awareness of the presence of blue-green algae. The erection and maintenance of warning signs is the responsibility of the local councils.

*Warning letters*

When blue-green algae exceed alert levels in a waterway, warning letters will be sent to identified householders or properties located along the contaminated reaches of the water body. The warning letters will be issued to foreshore residences and water abstracters once blue-green algal concentrations exceed 15,000 cells/ml for two consecutive weeks. The extent of coverage for the distribution of the letters will be determined by the Chairman of the RACC giving due consideration to such factors as algal densities and tidal movement. The intent and wording of the letters is similar to that of the signs.



Metropolitan/South Coast  
Regional Algal Coordinating Committee  
CONTINGENCY PLAN

---

Warning letters should ensure that untreated contaminated water is not to be:

- used for drinking or cooking
- used for swimming or other contact recreation
- used for bathing, showering or washing, or
- used for stock watering.

The letters should note that untreated contaminated water should not come into contact with plants grown for food. If vegetables, etc. have come into contact with untreated water, they should be thoroughly washed and rinsed with non-toxic water.

Distribution of the warning letters is the responsibility of local councils.



## 7 COMMUNICATION AND INFORMATION PROGRAM

### Regional Strategy

The MSCRACC has a communication and information strategy for the region based on the Blue-Green Algae Task Force's recommendation.

Three categories of information have been developed by the Task Force for use in contingency planning and this basis will be supplemented by work produced by the MSCRACC and the SACC. The three general categories are:

- information on blue-green algae for general community use
- information for people who may be affected by blue-green algae at some time in the future
- information and advice to assist people in dealing with blue-green algal blooms.

#### *Information on blue-green algae for general community use*

This includes:

- 1 A folding colour brochure with photographs titled Blue-Green Algal Blooms that has been prepared by the Hawkesbury Algal Management Committee (Appendix 5).
- 2 A fact sheet answering 20 of the most commonly asked questions on blue-green algae (Appendix P of the Task Force report and Appendix 6 in this Plan). It would be desirable for this to be available in a format for non-English speakers.
- 3 A broadsheet, in newspaper format, incorporating information from items 1 and 2 (above) together with general interest items and the main recommendations of the Task Force (Appendix 0 of the Task Force report).
- 4 The Summary Report of the Task Force final report, including a distillation of its major recommendations.
- 5 A short video illustrating the blue-green algae problem, its causes and effects (produced by the Murray-Darling Basin Commission [MDBC]).



6 A travelling display conveying similar information to items 1 and 2 (above).

[Note: A compilation of items 1-6 could be developed as a resource package for use in schools, colleges and the relevant user groups and organisations (as per MDBC proposed model)].

*Information for people who may be affected by blue-green algae in the future*

Items 1-6 (above) and:

- 7 An Algal Watch Kit, for use by Local Government, landholders, and TCM groups (as per the prototype recommended in the Task Force report which still remains to be developed).
- 8 Fish kill kits (as per the NSW Fisheries kit, described in Appendix Q of the Task Force report).
- 9 Guidelines for water supply operators (as per SA Scum File, also in production by Australian Water Resources Council).
- 10 Use of copper sulphate as an algicide (to be updated).
- 11 Use of gypsum and alum as an algicide (Appendix 7).

It is important to regularly update information with regard to items 10 and 11 with respect to the potential release of cyanobacterial toxins to the water column following the use of algicides in contaminated waters and the need for time to permit the degradation of these released toxins before the use of the treated water.

*Information and advice to assist people in dealing with blue-green algal blooms*

Items 1 and 9 (above) and:

- 12 Fact sheets for farmers (in preparation).
- 13 Standard press releases, community radio and TV announcements (Appendix 3).
- 14 EPA Pollution Line 325 5555 (hot line for emergencies).



15 Signs and warning notices (Appendices 3 & 4).

16 Media relations protocol (refer Chapter 6).

### **Hawkesbury River (Yarramundi to Wisemans Ferry) Strategy**

MSCRACC will apply the regional communication and information strategy to the Hawkesbury River between Yarramundi and Wisemans Ferry in the following way:

- MSCRACC will endeavour to influence all water users at high risk from blue-green algae through direct consumption and/or bodily contact. The committee will also endeavour to influence the broader community (including government agencies) on issues associated with blue-green algae.
- MSCRACC will primarily endeavour to influence the behaviour of the water users exposed to a high risk from blue-green algae so that they avoid direct consumption and/or bodily contact with contaminated water.
- MSCRACC will endeavour to raise the general community's awareness of blue-green algae.

The key groups within the group exposed to the highest risk are:

- domestic water consumers who rely on water pumped from this reach of the river
- persons who use this reach of the river to water their stock
- persons who use this reach of the river for active recreation activities, e.g. swimming, water skiing, boating, fishing, canoeing.

MSCRACC has developed an interim list of key organisations within these high-risk user groups. If deemed necessary, these organisations can be recruited to assist the committee to ensure that the various user groups are informed of the risks of blue-green algae to their activities and provide feedback on the committee's objectives.

The following actions have been taken over the winter and summer of the 1993 period as an interim measure:



Metropolitan/South Coast  
Regional Algal Coordinating Committee  
CONTINGENCY PLAN

---

- issue weekly press releases during periods of blue-green algae hazards
- maintain the (02) 325 5555 EPA 24-hour Pollution Line which water users can use to find out about the prevailing blue-green algae hazard
- write to all high-risk water consumers warning them of the hazards that blue-green algae poses to their activities
- establish blue-green algae warning signs indicating the prevailing hazard level at key sites along the affected reach of the river.



**APPENDIX 1**  
**SACC Interim Protocol**  
**Alert Levels Framework For Blue-Green Algal Blooms**  
**(issued 24 February 1994)**

**BACKGROUND**

Concern has been expressed about the validity of public warnings released when potentially toxic blue-greens exceed 15,000 cells/ml, the current State alert level for contact recreation, domestic and stock water consumption.

**INTERIM PROTOCOL**

**Case:** Single sample reveals count<sup>#</sup> of potentially toxic blue-green algae exceeding 15,000 cells/ml.

**Action:** Immediate repeat sampling at three locations near water usage area. If mean exceeds 15,000 cells/ml, issue warning.

Repeat sampling at weekly intervals at three locations or more. When numbers fall below 15,000, carry out immediate replicates. If confirmation of falling numbers below 15,000, issue a removal of restrictions notice in seven days.

<sup>#</sup> If counts performed by non-NATA laboratory (or equivalent) arrange for replicates to have confirmatory count by NATA-registered laboratory or equivalent.

**NOTES**

- Confirmatory toxicity tests by recognised laboratory (including mammalian bioassays) are desirable. Preferably a broad spectrum analysis rather than a single toxin analysis such as microcystin measured by HPLC.
- Provided confirmation of bloom species and density are carried out on at least 20% of samples by NATA laboratory, other testing can be carried out by experienced local personnel provided QC replicates are preserved.
- This interim protocol remains in place pending development of a State monitoring and alert protocol and information brochure by SACC's Algal Toxin Working Group.



**APPENDIX 2**  
**Typical RACC Media Release**

**News Release**

**WEEKLY ALGAL REPORT**

The EPA, on behalf of the Metropolitan/South Coast Regional Algal Coordinating Committee, today lifted the public health warning about blue-green algae in Lake Lyall near Lithgow, but reissued the warnings about blue-green algae in:

- a short section of the Hawkesbury River
- Farmers Creek at Lithgow
- the Botany wetlands and Centennial Park ponds
- Sooley and Pejar dams near Goulburn.

**Hawkesbury River**

The EPA Director of Sydney Regions, Peter Yates, said the EPA has reissued the public health warning about a blue-green algal bloom in the short section of the Hawkesbury River between Sackville and Leetsvale.

"This week the bloom is most dense at Leetsvale where the cell count is 116,000 cells per ml. Upstream the cell counts are 95,000 at Lower Portland and 37,000 at Sackville", Mr Yates said.

"The species of blue-green algae known as *Microcystis* predominates in the bloom. Toxicity tests, using the thin layer chromatography method, indicated the algae was moderately toxic.

"The Metropolitan/South Coast Regional Algal Coordinating Committee, which advises the EPA, has recommended that until further notice, people should avoid using the river between Sackville and Leetsvale for drinking, stock watering, or any other activities that involve direct body contact with the water", Mr Yates said.



Metropolitan/South Coast  
Regional Algal Coordinating Committee  
CONTINGENCY PLAN

---

### **Farmers Creek, Lithgow**

The EPA Director of Sydney Regions, Peter Yates, said the EPA has lifted the public health warning over Lake Lyall near Lithgow but reissued the warning for Farmers Creek up to the Geordie Street road-crossing.

Mr Yates said that although the bloom appears to be dissipating, the algal cell counts in the creek remain above 15,000 cells per ml, which is the benchmark at which public health warnings are issued.

"The Metropolitan/South Coast Regional Algal Coordinating Committee, which advises the EPA, has recommended that until further notice, people should avoid using the affected parts of the lake and the creek for drinking, stock watering, or any other activities that involve direct body contact with the water", Mr Yates said.

### **Botany Wetlands and Centennial Park Ponds**

The EPA Director of Sydney Regions, Peter Yates, reminded people of the continuing high levels of blue-green algae in the Botany Wetlands and Centennial Park ponds including the Willow Pond, Busbys Pond, One More Shot Pond, Duck Pond and Randwick Pond. A public health warning continues to apply to these waters.

"People should avoid using the wetlands and park ponds for any activities that involve direct body contact with the water and should not allow their pets, especially dogs, to swim in the waters", Mr Yates said.

### **Pejar and Sooley Dams near Goulburn**

The EPA Director of Sydney Regions, Peter Yates, said the EPA has reissued the public health warning for Pejar and Sooley dams near Goulburn.

The dams continue to experience levels of blue-green algae well over the 15,000 cells per ml benchmark.

"The Metropolitan/South Coast Regional Algal Coordinating Committee, which advises the EPA, has recommended that until further notice, people should avoid using the dams for drinking, stock watering, or any other activities that involve direct body contact with the water", Mr Yates said.



Metropolitan/South Coast  
Regional Algal Coordinating Committee  
CONTINGENCY PLAN

---

**General**

Mr Yates said the EPA will continue to monitor all known algal blooms while they persist. It will also investigate and identify any reported new algal blooms and will issue any necessary public health warnings.

\*\*\*\*\*

**Additional information:**

Peter Yates (EPA Director: Sydney Regions)

(bh) (02) 325 5666/(018) 463 204; (ah) (02) 451 9992

John Dengate EPA (bh) (02) 325 5578; (ah) (018) 200 636



**APPENDIX 3**  
**Generic Algal Warning Sign for Rivers**  
**(Example Shows Sign Proposed for the Hawkesbury River)**



# **BLUE-GREEN ALGAE WARNING**

**BLUE-GREEN ALGAE ARE PRESENT IN THE HAWKESBURY RIVER IN  
CONCENTRATIONS THAT MAY AFFECT HUMAN AND ANIMAL HEALTH. THE SECTIONS  
OF THE RIVER WHICH ARE AFFECTED ARE BETWEEN**

**AND**

- **DO NOT USE WATER FOR DRINKING OR WATERING STOCK**
- **AVOID DIRECT BODY CONTACT WITH AFFECTED WATERS**

**FOR FURTHER INFORMATION PHONE THE ENVIRONMENT PROTECTION AUTHORITY (EPA) ON (02) 325 5555**

**METROPOLITAN/SOUTH COAST REGIONAL ALGAL COORDINATING COMMITTEE**



APPENDIX 4  
Algal Warning Sign for Waterways Other Than Rivers in the Region



**METROPOLITAN / SOUTH COAST  
REGIONAL ALGAL CO-ORDINATING COMMITTEE**

**WARNING**

**THIS WATER MAY CAUSE ILL EFFECTS  
TO HUMANS AND ANIMALS**

**WATER IS CONTAMINATED BY BLUE-GREEN ALGAE AND IS  
UNFIT FOR HUMAN OR ANIMAL CONSUMPTION.**

**CONTACT MAY CAUSE SKIN AND EYE IRRITATION**

**DOG OWNERS ARE WARNED THAT BLUE-GREEN ALGAE IS  
ESPECIALLY TOXIC TO DOGS**

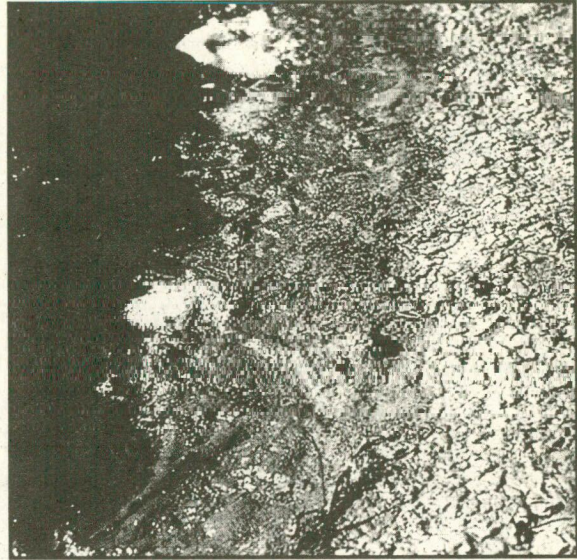
**FOR FURTHER INFORMATION PLEASE CONTACT  
ENVIRONMENT PROTECTION AUTHORITY PH 325.5555**



**APPENDIX 5**  
**Information Brochure by the Hawkesbury**  
**Algal Management Committee**



**BLUE-GREEN ALGAL BLOOMS**



**WHAT ARE BLUE-GREEN ALGAE**

Blue-green algae (also called cyano bacteria) are microscopic aquatic plankton that lives naturally in many inland waters, estuaries and the sea. In still water such as lakes, ponds, reservoirs and slow flowing rivers, these algae may multiply sufficiently in summer months to discolour the water so that it appears green, blue-green or greenish-brown.

During calm weather the blue-green algae can rise to the water surface to form a scum which may look like blue-green paint or jelly. The scum can be blown around the surface of the water and may thus appear at different places at different times. It may disappear and reappear on subsequent days and, as a result of wind action, it may accumulate on the shore-line. Sometimes these algae may release toxins into the water.

**Hawkesbury Algae**  
**Management Committee**







APPENDIX 6  
Blue-Green Algae Fact Sheet



***WHAT YOU NEED TO KNOW***



Metropolitan/South Coast  
Regional Algal Coordinating Committee  
CONTINGENCY PLAN



**WHAT ARE  
BLUE-GREEN ALGAE?**

Blue-green algae is the common name for several types of algae which have similar characteristics; one being that they sometimes add a blue-green tinge to water or form blue-green scums on the surface when present in excessive numbers. They are extremely small and are only visible under a high powered microscope as single cells, or small clumps of cells.

**WHY ARE 'BLUE-GREEN  
ALGAE A PROBLEM?**

They spoil water quality when present in large numbers by producing toxins, odours or thick scums. The toxins they produce are poisonous to humans, and may be deadly to livestock and pets. When algae decompose they may use up oxygen in water and cause fish kills.

**HOW DO I KNOW IF  
WATER CONTAINS  
BLUE-GREEN ALGAE?**



If you detect an unpleasant smell or taste, see surface scums or otherwise suspect the water contains blue-green algae, you should not use it until the algae have been identified.

**WHAT ARE THE EFFECTS OF 'BLUE-GREEN ALGAE  
TOXINS ON HUMAN HEALTH?**



- Skin contact through showering, bathing, swimming, water skiing, and other recreational activities may result in skin irritation and rashes, swollen lips, eye and ear irritation, sore throat, hayfever symptoms and asthma.
- Drinking water with blue-green algae in it may cause nausea, vomiting, abdominal pain, diarrhoea, liver complications and muscle weakness. The more water you drink, the sicker you may become.
- Visit your local doctor or hospital if you experience medical conditions that you think may have been caused by water with blue-green algae in it.



Metropolitan/South Coast  
Regional Algal Coordinating Committee  
CONTINGENCY PLAN

---

**CAN I DRINK WATER WITH BLUE-GREEN ALGAE IN IT ?**

No! The water needs to be filtered through activated carbon to remove any toxins. Toxins will not be removed by boiling, or by using household disinfectant.

**IF MY WATER HAS BLUE-GREEN ALGAE IN IT, WHAT ELSE CAN I USE ?**

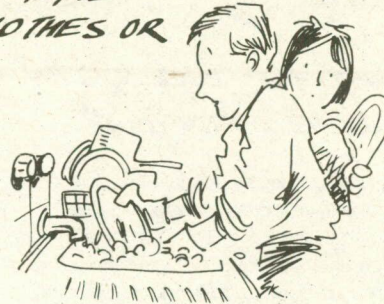
You can use good quality bore water, bottled, carted or tank water. Advice on the safety of alternative sources may be obtained from your local council or water authority.



**IS WATER WITH BLUE-GREEN ALGAE IN IT SAFE FOR WASHING CLOTHES OR DISHES ?**

Alternative water supplies should be used if possible. If there are no alternatives, take extra care by:

- Using rubber gloves when washing clothes and dishes.
- Rinsing dishes with uncontaminated water.
- Removing surplus water with a tea towel.
- If possible, give the laundry a final rinse with non-toxic water. Sun-drying clothes and storing them for a few days can also help.



**CAN I WATER FRUIT OR VEGETABLES WITH WATER WHICH HAS BLUE-GREEN ALGAE IN IT ?**

- Fruit and vegetables do not appear to take-up toxins. However, it is recommended that water with blue-green algae in it does not come into contact with plants being grown for food. This is especially so for salad vegetables.

- Before eating, vegetables should be thoroughly washed and rinsed with non-toxic water.



**CAN I COOK WITH WATER WITH BLUE-GREEN ALGAE IN IT ?**

No! Remember, boiling does not remove toxins from water.



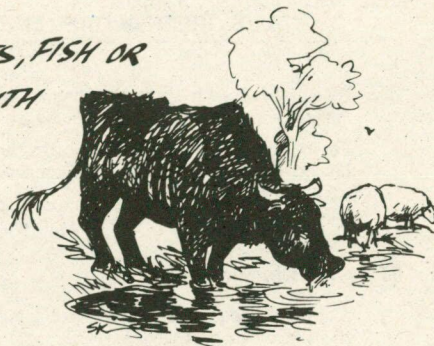


**CAN I EAT FISH, SHELLFISH AND  
YABBIES CAUGHT IN WATER WITH BLUE-  
GREEN ALGAE IN IT ?**

- You should not eat mussels, snails, yabbies and other shellfish, as they can concentrate toxins.
- More studies need to be done on the build-up of toxins in fish. The liver and gut of fish are likely to be poisonous. Other parts of the fish may be eaten, but they may taste muddy or earthy.

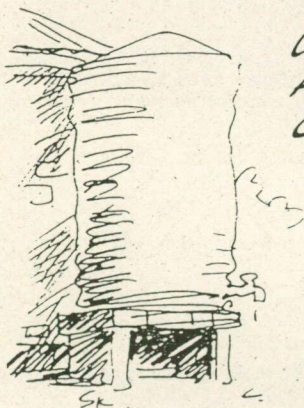
**CAN LIVESTOCK, PETS, FISH OR  
WILDLIFE DRINK WATER WITH  
BLUE-GREEN ALGAE IN IT ?**

Livestock deaths can occur as a result of drinking water heavily contaminated with blue-green algae. Pets can also be affected, particularly dogs. The effects on fish and wildlife need more research.



**CAN I USE CHEMICALS TO TREAT  
WATER WITH BLUE-GREEN ALGAE IN IT ?**

Algicides can be used to safeguard water for agricultural use in farm dams before algae blooms occur. You should never attempt to treat rivers, creeks or lakes with algicides (in this situation they may not work, are harmful to the environment and are illegal).



**CAN I USE WATER WITH BLUE-GREEN  
ALGAE IN IT IN MY EVAPORATIVE AIR  
COOLER ?**

- Yes, but use an alternative source of water if available.
- Hose down filter pads more regularly, and properly dispose of cooler scums and routine bleed-off water.

**FOR FURTHER INFORMATION CONTACT !**



APPENDIX 7  
Use of Gypsum and Alum

# RIVERWISE

ADVISORY NOTES FOR RURAL LANDHOLDERS FROM THE DEPARTMENT OF WATER RESOURCES

AGDEX 310/26

ISSN 1038 - 2283

---

## BLUE-GREEN ALGAE - EMERGENCY FARM WATER SUPPLIES

---

Blue-green algae, the potentially harmful organism that blooms in streams and large water storages in the hot summer months, can also be a problem in smaller farm dams.

For the farmer blue-green algae blooms can be a serious management problem, especially if the homestead or stock depend on the contaminated dam for drinking water.

Unlike streams, the algae cannot be cleared by "flushing flows", and it is not always possible to draw off uncontaminated water from beneath the algae, as can be done in large public storages.

### ● Safe Chemicals

Alum and gypsum, two inexpensive and readily available chemicals, can however be used to protect dams from blue-green algae.

Unlike some other chemicals used against blue-green algae, alum and gypsum protect water from blue-green algae but are less harmful to fish or plants or other organisms in dams.

Laboratory and field trials conducted at the University of Technology, Sydney showed that alum and gypsum dosing removes phosphorus, the algae's most important nutrient.

The scientists who made the study recommend the use of alum and gypsum to treat water for emergency livestock watering and human use. If the water is for humans technical assistance should be sought from the local council health department.

### ● Dosage and techniques

The recommended dose is 50 kilograms of alum and 50 kilograms of gypsum for each megalitre of water. Because of variations in water quality and algae, it is advisable to conduct a preliminary trial in a 44 gallon [sic] drum to establish the correct dosage.

Apply this treatment only in farm dams and similar small enclosed water bodies. Do not use it in streams or billabongs or other natural waterways.

This is the dosing procedure:

- Add granules of alum crystals (aluminium sulphate,  $Al_2(SO_4)_3$ ) to the water and mix well. Using a boat with an outboard motor is a suggestion.
- Let the water stand for a few hours, and add the gypsum granules.
- Let the water stand for at least 24 hours, or until it clears. If it does not clear within two days add 25 to 50 per cent of the recommended dosage of alum and gypsum to promote settling.
- After dosing, check the pH of the water with a swimming pool testing kit. The pH should be in the range 6-9. If it is not, allow the water to stand two days and check again.



## Metropolitan/South Coast Regional Algal Coordinating Committee CONTINGENCY PLAN

---

- The water should be useable for many months after dosing. But limit direct access of livestock and dose again if the dam is refilled.
- Ideally, dosing should be carried out before summer, and certainly before a bloom has developed.
- Cost will depend on the supplier of the gypsum and alum, but dosing one megalitre of water will cost about \$94 - \$70 for 50 kilograms of alum and \$24 for 50 kilograms of gypsum.
- Gypsum and alum can usually be bought from suppliers of agricultural chemicals.

---

Prepared by the New South Wales Department of Water Resources for the State Algal Coordinating Committee.  
From a paper by Associate Professor D. Cheng.

**HEAD OFFICE** Macquarie Tower 10 Valentine Avenue Parramatta NSW 2150 (PO BOX 3720 Parramatta NSW 2124) Telephone: (02) 895 6211 Fax: (02) 895 7281 **SOUTH COAST REGION** Macquarie Tower Level 11, 10 Valentine Avenue Parramatta NSW 2150 (PO BOX 3720 Parramatta NSW 2124) Telephone: (02) 895 7012 Fax: (02) 895 7756 also at our **BEGA OFFICE** Auckland Chambers Auckland Street Bega NSW 2550 (PO BOX 48 Bega NSW 2550) Telephone: (064) 92 3388 Fax: (064) 92 3439 **NORTH COAST REGION** 50 Victoria Street Grafton NSW 2460 (PO BOX 371 Grafton NSW 2460) Telephone: (066) 42 7799 (066) 43 1161 **BARWON REGION** Government Office Building Frome Street Moree NSW 2400 (PO BOX 486 Moree NSW 2400) Telephone: (067) 52 9781 Fax: (067) 52 4919 **HUNTER REGION** 3-5 Market Street Muswellbrook NSW 2333 Telephone: (065) 42 1222 Fax: (065) 43 4164 **LACHLAN REGION** 9 Spring Street Forbes NSW 2871 (PO BOX 136 Forbes NSW 2871) Telephone: (068) 52 1222 Fax: (068) 52 3419 **MACQUARIE-WESTERN REGION** 209 Cobra Street Dubbo NSW 2830 (PO BOX 717 Dubbo NSW 2830) Telephone: (068) 82 4855 Fax: (068) 82 5060 **LOWER MURRAY/DARLING REGION** 58 Mitchell Avenue Dareton NSW 2717 (PO BOX 380 Dareton NSW 2717) Telephone: (050) 27 4303 Fax: (050) 27 4769 **MURRUMBIDGEE REGION** Chelmsford Place, Wade Avenue Leeton NSW 2705 (PO BOX 156 Leeton NSW 2705) Telephone: (069) 53 3677 Fax: (069) 53 4468 **MURRAY REGION** 8-20 Edwardes Street Deniliquin NSW 2710 (PO BOX 205 Deniliquin NSW 2710) Telephone: (058) 81 2122 Fax: (058) 81 3465

© March 1993 Printed on Recycled Paper