



QUEENSLAND HARMFUL ALGAL BLOOM RESPONSE PLAN

December 2002

FOREWORD

The Department of Natural Resources and Mines, Environmental Protection Agency, Queensland Health, Department of Primary Industries, Local Governments and water storage operators traditionally respond to a range of coastal, estuary and freshwater quality incidents within their standard roles, responsibilities and capabilities. These incidents have generally been localised and have not impacted on the community at large. The management of these has occurred through the application of standard operating procedures by each responding agency and informal inter-agency operating arrangements.

Recent events have highlighted the need for the Government to enhance its capacity to respond to potential harmful algal bloom (HAB) incidents. The nature of these blooms presents a threat to public and animal health and requires rapid, coordinated whole-of-government management.

The term “harmful algal blooms” is used to describe a diverse array of blooms of both microscopic and macroscopic algae occurring in fresh, estuarine and coastal waters. HABs produce potentially toxic effects on humans and other organisms, including fish and shellfish, nuisance conditions from odours and discolouration of waters and effects on ecosystems such as oxygen depletion and overgrowth of bottom habitats such as seagrass. The term “bloom” implies algal populations so dense as to be visible, however in some cases very low concentrations of microalgae may produce harmful effects.

This document (herein called the HAB Plan) builds on existing capabilities of responding agencies while recognising the special arrangements for managing potential HABs.

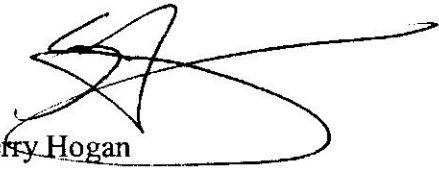
The HAB Plan is used by State agencies, Local Governments and water service operators to manage HAB incidents in Queensland.

The HAB Plan is a living document and will be validated through experience.

The HAB Plan was prepared under the guidance of the Queensland HAB Steering Committee.

AUTHORITY

The HAB Plan is endorsed by the Chief Executive Officers from the following agencies:



Terry Hogan
Director-General
Department of Natural Resources and Mines

Dated: 24/03/03



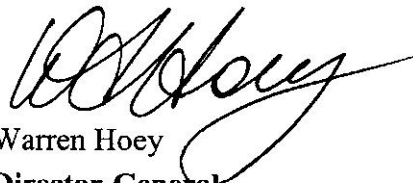
James Purtill
Director-General
Environmental Protection Agency

Dated: 13/3/03



Robert Stable
Director-General
Department of Health

Dated: 16 APRIL 2003



Warren Hoey
Director-General
Department of Primary Industries

Dated: 2/4/03



Greg Hallam
Executive Director
Local Government Association of Queensland

Dated: 2/4/03

TABLE OF CONTENTS

FOREWORD	1
AUTHORITY	2
PART ONE – INTRODUCTION	4
1.1 Objectives of the Plan	4
1.2 Application of the Plan	4
PART TWO – PRINCIPLES	5
PART THREE – AGENCY RESPONSIBILITIES	6
3.1 Overview of Agency Responsibilities	6
3.1.1 Agency Responsibilities	6
3.1.2 Environmental Protection Agency (EPA)	6
3.1.3 Queensland Health (QHealth)	6
3.1.4 Department of Natural Resources and Mines (NR&M)	6
3.1.5 Department of Primary Industries (DPI)	7
3.1.6 Local Governments (LGs)	7
3.1.7 Water Storage Operators (WSOs)	7
PART FOUR – OPERATIONAL COORDINATION	8
4.1 Response Coordination	8
4.2 Response Action Framework	9
4.3 HAB Operational Guidelines	9
PART FIVE - MEDIA AND PUBLIC INFORMATION	10
5.1 Event Information	10
5.2 Awareness Information	10
PART SIX – REVIEW	11
6.1 HAB Plan – Review and Maintenance	11
6.1.1 Responsibility for Reviews	11
6.1.2 Initial Reviews of Implementation	11
6.1.3 Ongoing Reviews	11
6.1.4 Amendments to the HAB Plan	11
6.1.5 Training	11
PART SEVEN – GLOSSARY	12

PART ONE - INTRODUCTION

The HAB Plan outlines the Queensland Government's contingency plan for responding to HAB incidents. HAB incidents are usually within the capacity of local response agencies such as the Environmental Protection Agency, Queensland Health, Department of Natural Resources and Mines, Department of Primary Industries, Local Governments and water storage operators. The incidents typically require minimal off-site management and coordination.

HABs are common seasonal phenomena occurring throughout Queensland in both fresh and coastal marine waters. The organisms responsible for these outbreaks include cyanobacteria (freshwater and marine), diatoms and dinoflagellates (see Glossary).

HABs are potentially toxic and may pose a direct threat to human and animal health. Consequently a HAB may have economic impacts (significant increase in water supply treatment costs or need to use alternate supplies) and social impacts (disrupt recreational use of the waterway). HABs may also have environmental effects on aquatic ecosystems.

Unfortunately there are no simple, field-based toxicity tests and so all HABs need to be treated with caution until their threat is confirmed. Uncertainty of the toxicity of a potential HAB event can cause local communities to be anxious and to seek urgent action from "the authorities". It may take up to 5 days to identify algae and/or toxins in water samples.

It is important that potential HABs are quickly referred to an appropriate "authority" for action. To provide certainty for the public on this issue, it is desirable to have clear separation of roles and responsibilities between various State agencies, Local Governments and water storage operators. Rapid response will help to allay any public anxiety in relation to potential HABs.

Public education and awareness of HABs will also assist communities to distinguish between potential HABs and harmless water quality or water-weed occurrences. As blooms do not occur frequently, it is difficult for local communities to place high priority on their prevention and management. Improved public understanding of the causes and health effects of HABs is desirable.

HABs are generally caused by a combination of conditions, including excess nutrients in the water. These conditions tend to occur in warmer months in farm dams, river pools, dam and weir storages, natural lakes and shallow estuaries. The high nutrient loads in the water body may be caused by sewage effluent, animal waste and agricultural fertilizers in the catchment. The greatest risk of HABs occur in early summer, following typically dry winter/ spring conditions and rising water temperatures.

1.1 OBJECTIVES OF THE PLAN

To outline a framework to guide a coordinated response by agencies, Local Governments and water storage operators to reduce the risk of HABs to humans, livestock and wildlife.

1.2 APPLICATION OF THE PLAN

The HAB Plan is to be used by any State agency, Local Government or water storage operator receiving an inquiry from the public regarding a possible HAB to ensure the incident is dealt with in a rapid and effective manner.

PART TWO - PRINCIPLES

The HAB Plan is underpinned by the following principles:

- Potential HAB incidents are treated as harmful until proven otherwise.
- Where necessary, the response to a potential HAB incident is a multi-agency response that recognises the role of the response agency in dealing with the incident in accordance with its procedures, with support as needed from the other agencies.
- Response is preferably provided by relevant response agency staff located nearest to the potential HAB, supported where necessary by state-wide expertise.
- Response should be as rapid as practicable, recognising the potential danger to humans, livestock and wildlife from extended exposure to a HAB.
- Response to potential incidents and any advice provided should be consistent across response agencies to ensure individuals and communities have confidence in the response framework.
- The HAB Plan is a dynamic document that is reviewed and maintained by the Queensland HAB Steering Committee on a regular basis.
- Training for potential HAB incidents is primarily the responsibility of response agencies. To ensure the effective coordination of response agencies to a potential HAB incident, training programs should involve all response agencies.

PART THREE – AGENCY RESPONSIBILITIES

3.1 OVERVIEW OF AGENCY RESPONSIBILITIES

3.1.1 Agency Responsibilities

Each agency has specific roles during the management of a HAB incident and is responsible for the safety, protection, training and management of its own personnel.

3.1.2 Environmental Protection Agency (EPA)

The EPA is the lead agency for administering the *Environmental Protection Act*. The Act provides for the protection of the environment from the effects of contaminants of all kinds. This includes the licensing and regulation of contaminant discharges that may cause or contribute to HABs. Many of the powers under the Act have been shared with Local Governments under delegation arrangements. Water quality standards are set in the *Environmental Protection (Water) Policy*. The EPA also administers the *Coastal Protection and Management Act*, *Marine Parks Act* and *Forestry Act* (part) which focus on the sustainable management of the State's coastal beaches and estuaries

In addition, EPA provides:

- bloom detection response measures, site inspections, assessment and evaluation of all HAB incidents in estuarine and marine environments
- monitoring and mapping of Lyngbya blooms as well as community and stakeholder information on Lyngbya (eg. web site, fact sheets, brochures, etc.)
- erection of information signage and HAB clean-up activities

3.1.3 Queensland Health (QHealth)

QHealth does not administer legislation specific to the management of HABs. QHealth is the key government agency responsible for advising on human and public health issues associated with HABs.

In summary, QHealth's response in the event of a HAB may include:

- the provision of advice on human, public health and analytical issues
- advice on the clinical management of affected and potentially exposed persons
- through QHealth hospital facilities the treatment and care of affected persons
- the provision of analytical services for the identification and enumeration of HABs (primarily freshwater) and the detection and quantification of HAB toxins (fresh and marine)
- provision of advice on appropriate signage to discourage entry into and use of an area affected by a HAB

3.1.4 Department of Natural Resources and Mines (NR&M)

NR&M is responsible under the *Water Act* for the management of the State's non-tidal waters and the regulation of water storage operators. It is also the lead agent for the management of catchment resources such as land and vegetation.

In addition, NR&M provides:

- detection response measures, site inspections, assessment and evaluation of HABs in unsupplemented freshwater systems
- analytical services for the identification and enumeration of HABs

-
- advice to individuals, the community, stakeholders and other government agencies on issues related to the monitoring of and management of freshwater HABs
 - community and stakeholder information (eg. web site, fact sheets, brochures)

3.1.5 Department of Primary Industries (DPI)

DPI is responsible under the *Primary Industries Act* for the sustainable management of the State's agriculture, aquaculture and grazing industries. DPI is also responsible under the *Fisheries Act* for the management and protection of the State's fishery resources.

In addition, DPI provides:

- advice on issues relating to animal (including fish) health and agriculture and HAB
- veterinary pathology services for investigating animal deaths
- monitoring of licensed oyster areas for marine biotoxins through the Queensland Shellfish Water Assurance Monitoring Program (QSWAMP). This Program includes a Biotoxin Contingency Plan for the Moreton Bay Oyster Industry and is a member of the Australian Shellfish Quality Assurance Program (ASQAP).

3.1.6 Local Governments (LGs)

LGs are responsible under the *Integrated Planning Act* for the planning and regulation of development activities to maintain local social, economic and environmental values. Also, LGs have the responsibility for local management of water quality issues as part of the *Environmental Protection Act* where LGs regulate of a number of environmentally relevant activities (ERAs). LGs may also elect to accept delegated responsibility for sections 31 and 32 of the *Environment Protection (Water) Policy*, which allows LGs to administer and enforce minor water pollution incidents, such as the run-off from building sites. Many LGs provide recreation facilities at ornamental lakes, water supply storages and along waterways.

In addition, LGs provide:

- local/regional contact for HAB enquires from the community
- erection of information signage and HAB clean-up activities in consultation with appropriate State government agencies
- waste disposal facilities (under *Environmental Protection Act* licence) for HAB material disposal

3.1.7 Water Storage Operators (WSOs)

WSOs are responsible under specific acts to operate water supply schemes including storages and associated distribution channels and pipelines. Some are required under licence (*Water Act*) to monitor water storages for HABs and to prevent the release of HABs into other waters (called supplemented streams). The main WSOs in Queensland are SunWater, Gladstone Area Water Board and SouthEast Queensland Water Corporation. Many LGs operate water supply storages.

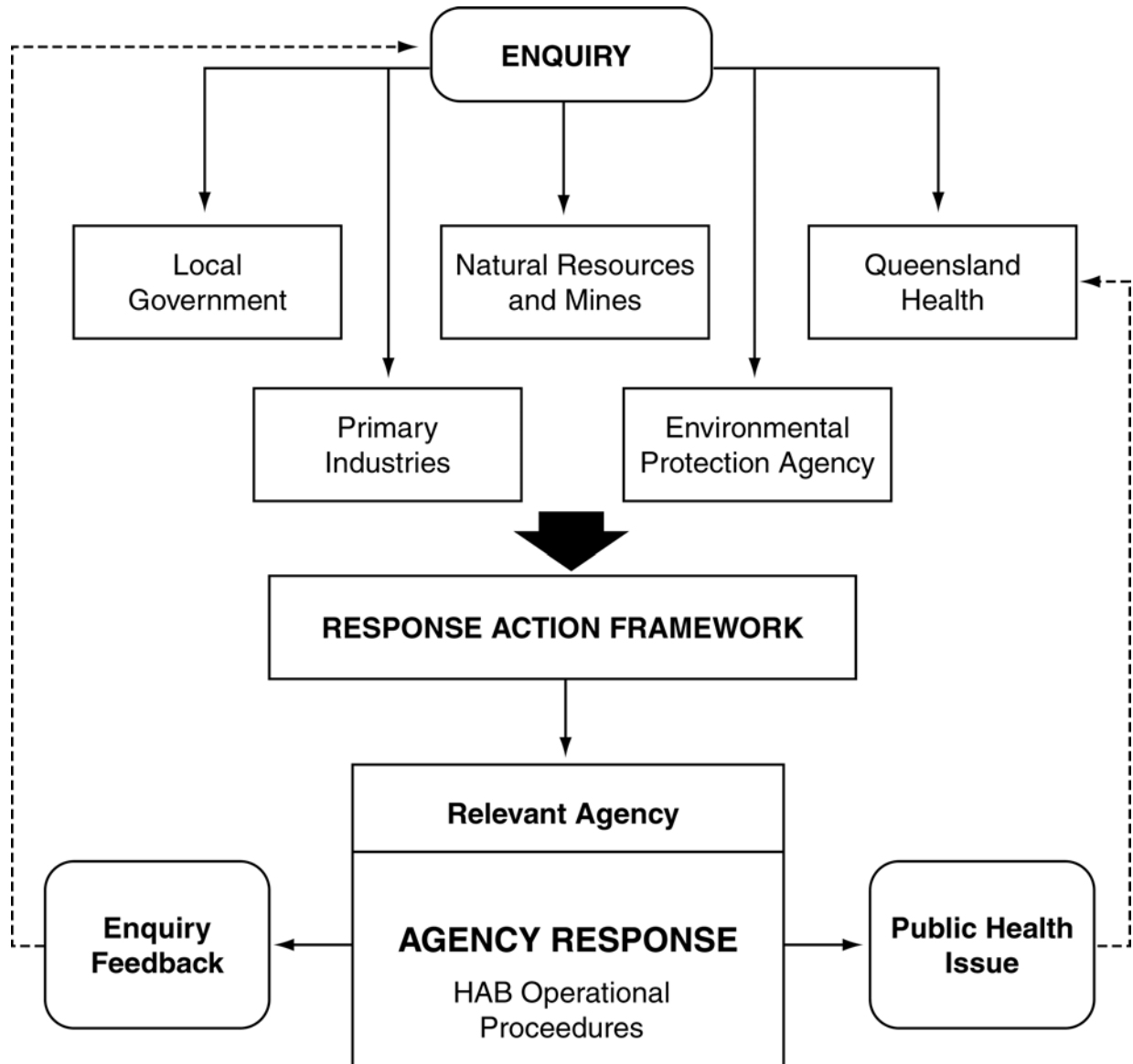
In addition, WSOs provide:

- routine monitoring of HAB in supplemented freshwater systems under their control (eg. reservoirs, weir pools, irrigation systems)
- information to their water users as required (eg. warning signs, press releases, phone messages)
- community and stakeholder information relating to their operations (eg. signage, web site, fact sheets, brochures)

PART FOUR – OPERATIONAL COORDINATION

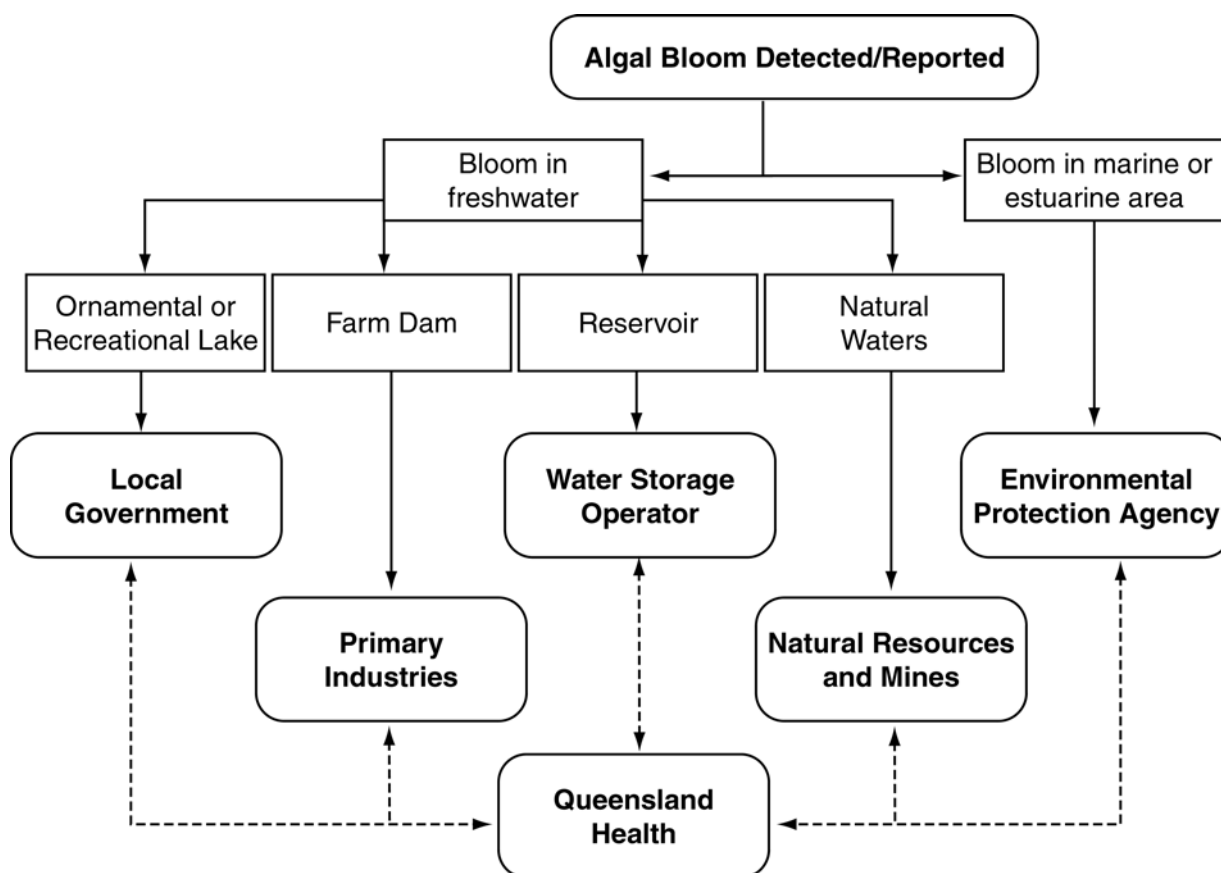
4.1 RESPONSE COORDINATION

The Response Coordination diagram below outlines the broad process within which a range of agencies can receive enquiries from the public in regard to a potential HAB incident. The process guides the enquiry to the relevant response agency for action or advice. Action may include investigation, analysis and, if the HAB is identified as a public risk, public warning.



4.2 RESPONSE ACTION FRAMEWORK

The Response Action Framework has been developed to assist agencies receiving enquiries to quickly and consistently identify the relevant response agency for action.



At times there will be situations where more than one agency will have primary responsibility to respond to a potential HAB incident, eg bloom in natural waters in a National Park. The *Queensland Harmful Algal Bloom Operational Procedures* (HAB Procedures) will outline appropriate linkages for a range of these situations.

4.3 QUEENSLAND HAB OPERATIONAL PROCEDURES

The *Queensland Harmful Algal Bloom Operational Procedures* have been developed to assist response agencies to consistently deal with public enquires. The major components of the procedures are:

- background information on harmful algal species
- a list of agency contact details for initiating a response to a HAB enquiry
- guidelines on preferred actions to respond to a potential HAB
- sampling, storage, transportation and analysis guidelines to determine the extent of a HAB
- a list of Government laboratories that are capable of diagnosing HAB samples
- risk assessment framework assessing urgency and severity of a HAB
- communication guidelines to advise the enquirer and, where necessary, the community of a HAB, including signage, warnings, etc

PART FIVE - MEDIA AND PUBLIC INFORMATION

5.1 EVENT INFORMATION

The response agency is responsible for informing the enquirer of the result of the HAB investigation. If the response agency believes that the HAB poses significant public risk, it will liaise with QHealth regarding the need for media warnings.

The community may be notified through one or more of the following channels:

- warning and information signs at beaches, jetties, lakes, reservoirs, river recreation sites, etc
- mainstream news media and advertising, including local newspaper, TV, radio, etc
- pre-recorded telephone information messages
- EPA/NR&M/DPI/QHealth websites; other relevant websites
- circulation of warning pamphlets

5.2 AWARENESS INFORMATION

HABs are not well understood by the general public, especially the causes of such blooms and their potential danger. Hence there is a need to raise community awareness of the potential risks of encountering a bloom and how to deal with a discovery. Also general information on the causes of HABs may help to mitigate future occurrences.

The responsibility for raising public awareness lies with the key State agencies and should be coordinated to minimise confusion and duplication.

Awareness may be delivered through one or more of the following channels:

- community newsletters and meetings
- specialist newsletters, eg Health Waterways Happenings
- brochures, posters, pamphlets
- EPA/NR&M/DPI/QHealth websites; other relevant websites
- displays at events
- awards

The strategic release of information, such as the onset of high risk periods, will maximise its effectiveness. For example, agencies could deliver the following information within their areas of responsibility:

- Just prior to high-risk periods, raise awareness through public media, newsletters and websites. Focus on the identification of HABs, the dangers they pose, and the local contact arrangements in this plan.
- All year round, raise general awareness of HABs through public media, newsletters and websites. Focus on the causes and practical measures to mitigate their re-occurrence.

PART SIX - REVIEW

6.1 HAB PLAN REVIEW AND MAINTENANCE

6.1.1 Responsibility for Reviews

The Queensland HAB Steering Committee is responsible for initiating and undertaking reviews of the HAB Plan and associated HAB Procedures. The Steering Committee consists of:

NR&M (convenor) – Manager, Water Monitoring and Information, Water Planning

QHealth – Manager, Environmental Health Unit, Public Health Services

EPA – Executive Manager, Parks and Forests Planning Unit, Environmental Planning

DPI – General Manager, Animal Health, Animal and Plant Health Service

LGAQ – Manager, Environment & Health Policy

6.1.2 Initial Reviews of Implementation

Initial reviews of the implementation of the HAB Plan and HAB Procedures will be undertaken at six months and 12 months after the HAB Plan is approved.

6.1.3 Ongoing Reviews

A review of the HAB Plan and HAB Procedures is to be conducted when:

- the HAB Steering Committee considers it necessary, based on specific or general experience in implementing the HAB Plan;
- the roles or responsibilities of any response agency is altered;
- new information or technology for dealing with HAB occurrences becomes available; or
- every two years regardless of the other review triggers mentioned above.

6.1.4 Amendments to the HAB Plan

Response agencies should submit proposed amendments of the HAB Plan (or HAB Procedures) to the HAB Steering Committee for its consideration. Following HAB Steering Committee endorsement, an amended HAB Plan will be submitted to signatory agencies for approval.

6.1.5 Training

Each response agency is responsible for the training of its own personnel to perform the roles and responsibilities assigned in the HAB Plan. NR&M will coordinate training programs across response agencies to improve efficiency of delivery and to ensure consistency.

PART SEVEN - GLOSSARY

For the purposes of the HAB Plan, the following terms have the associated meanings:

Bloom	an increase in algal numbers to such an extent as to: discolour the water, impart taste, odours, toxins and/or other compounds to the water, adversely affect the other biotic components of the aquatic ecosystem (i.e. fish, birds, amphibians, etc.) or generally render the water unsuitable for its intended use (i.e. drinking, irrigation, recreation, stock watering, ecosystem maintenance, etc.).
Benthic Microalgae	microscopic algae that inhabit sediment surfaces of interstitial water (between sediment grains); mostly diatoms or dinoflagellates.
Cyanobacteria	(formerly known as blue-green algae) a group of photosynthetic bacteria, some species of which commonly produce toxins and form nuisance blooms in Australian waterways.
Diatoms	a division of microalgae with species inhabiting both the water column and sediment surface, some of which are capable of producing toxins known to taint fish and shellfish products.
Dinoflagellates	a division of microalgae characterised by two flagella, some of which are responsible for “red tides”. Some autotrophic, others heterotrophs (cannot photosynthesise).
<i>Lyngbya majuscula</i>	Filamentous cyanobacteria capable of producing toxins.
Macroalgae	multicellular algae that are visible to the human eye; includes representatives from the green algae, red algae and brown algae.
Natural waters	include streams, rivers, wetlands etc., which do not have their flows supplemented by artificial means (i.e. through modifications associated with dams, weirs, irrigation channels, water extraction or supplementation, etc).
Ornamental and/or Recreational Lake	artificial lake or pond created as an ornamental feature in a park, garden, or housing estate.
Phytoplankton	microscopic, free-floating algae, which can occur as single cells, colonies, or filaments.
Reservoir	an impounded body of water, usually created through the placement of dams and weirs across the path of creeks and rivers. Usually created to store water for either potable or irrigation supply purposes.
Response agency	the government or non-government agency responsible for the direct or co-ordinated cross-agency response to a potential HAB notification. Response agencies are linked to specific HAB categories (i.e. marine, estuarine, freshwater, etc.) by either their legislative or licensed responsibilities and/or by their expertise and capacity to deal with potential HAB incidences.
Scum	dense accumulation of algal cells at or near the surface of the water forming a layer of distinct discolouration (green, blue, brown or red).
Water storage operator	body authorised under the <i>Water Act</i> to operate a water supply storage.