



Policy Title	Mannus Lake Blue-Green Algae Management Policy
Policy Category	Public
Number & Version	SVC-ENG-PO-078-01
Policy Owner	Asset Planning and Design
Approval by	
Effective date	October 2019
Date for review	October 2020

1. STRATEGIC PURPOSE

This policy guides Snowy Valleys Council's (Council) management and response to Blue Green Algae (BGA) outbreaks in Mannus Lake.

2. POLICY STATEMENT

Council is committed to the effective management of algal blooms in Mannus Lake, which protects public health and meets the *National Health and Medical Research Council Guidelines for Managing Risk in Recreational Water*.

Council is required to manage algal blooms under approval conditions for the operation of Mannus Lake. *The Department of Industry: Water (DOI: Water) Condition 34* of Council's approval to operate Mannus Lake (Lot 2 //608847) states:

If an algal scum is visually observed, the approval holder (Snowy Valleys Council) must undertake water sampling and testing. If the analysis reveals toxic levels, the approval holder must erect appropriate warning signs and provide the NSW Office of Water with a copy of water testing results.

This policy is used to determine the general response levels and the actions required during an algal bloom in Mannus Lake.

3. DEFINITIONS

Cyanobacteria (BGA)	Bacterial photosynthetic autotrophs that form a common and naturally occurring component of most-aquatic ecosystems. These bacteria are a concern for public health, as some types produce toxins that have harmful effects on tissues, cells or organisms.
Operational Monitoring	A planned sequence of measurements and observations to assess and confirm that individual barriers and preventative strategies are functioning properly and effectively.

Hazard	A source of potential harm or a situation with a potential to cause harm; that can exist as a biological, chemical or physical agent.
RACC	Regional Algal Coordinating Committee (WaterNSW).
NATA	National Association of Testing Authorities

4. CONTENT

4.1 Identifying and Responding to a BGA Bloom

A BGA bloom requires a quick, efficient and well-planned response to communicate to affected communities the presence and caution necessary relating to BGA.

Council undertakes sampling, as part of operational monitoring, for the purposes of identifying BGA species and cell counts. Algal species, cell counts and biovolumes are reported along with the total cell count for potentially toxic species.

A total biovolume greater than 0.04 mm³/L raises an exception which Council uses to establish a response level (See Section 4.2). The Algal bloom action plan summarises the actions required for each response level (See Section 4.3)

The identification of the BGA species is important as it enables a targeted response and a more accurate assessment of potential toxicity. After a bloom is controlled, Council will review the response effort.

4.2 Classification of Response Levels

Response is based on a three-tier alert level framework, which is a monitoring and management action sequence that Council uses for a graduated response to the onset and progress of cyanobacterial bloom in Mannus Lake. Council uses representative sampling for monitoring purposes.

Potential Toxin Producer (PTP) biovolume are the primary assessment criterion. The alert levels are shown in Table 1.

Algal blooms will be monitored in Mannus Lake by Council. The development of a BGA bloom is related to water temperature, nutrient levels and the stratification of water within the lake.

4.3 Response Level Flow Chart

Figure 1 shows the general sequence of actions required to determine the BGA response level and the corresponding actions.

Alerts may be downgraded to the Green level when two consecutive samples meet the requirements for a Green level. The recovery procedure is then to be applied when the BGA bloom has subsided.

This approach allows for a staged response to the presence of cyanobacteria in recreational waters, as it links the results from the monitoring program with the actions in the different alert levels. The alert levels signal the potential for hazard and the appropriate actions, such as additional sampling and eventual warning to users, when a guideline value is exceeded.

Table 1 Response Levels and Actions (Summary)

Green Level (Surveillance Mode)	Amber Level (Alert Mode)	Red Level (Action Mode)
<p>≥ 500 to < 5000 cells/mL <i>M. aeruginosa</i>; Or *Biovolume equivalent of > 0.04 to < 0.4 mm³/L for the combined total or all cyanobacteria.</p>	<p>≥ 5000 to < 50,000 cells/mL <i>M. aeruginosa</i> Or *Biovolume equivalent of > 0.4 to < 4 mm³/L for the combined total or all cyanobacteria, where a known PTP is dominant in the total biovolume (75% or more of total biovolume) Or Biovolume equivalent of > 0.4 to < 10 mm³/L for the combined total or all cyanobacteria, where known PTPs are not present.</p>	<p>≥ 50000 cells/mL <i>M. aeruginosa</i> Or *Biovolume equivalent of > 4 mm³/L for the combined total or all cyanobacteria, where a known PTP is dominant in the total biovolume (75% or more of total biovolume) Or Biovolume equivalent of > 10 mm³/L for the combined total or all cyanobacteria, where known PTPs are not present. Monitoring Requirements: Warning to be issued that the water body is considered unsafe for primary contact recreation.</p>
<p>Monitoring Requirements: Routine sampling to measure cyanobacteria levels.</p>	<p>Monitoring Requirements: Increase sampling to enable the risks to users to be more accurately assessed.</p>	<p>Monitoring Requirements: As per Amber. Warning to be issued, indicating that the water body is considered unsafe for primary contact recreation, domestic and stock use.</p>

4.4 Management

Providing adequate information to the public on the cyanobacterial risk associated with Mannus Lake is important. It allows the public to avoid the hazard and to understand the symptoms potentially caused by exposure and identify their cause.

Warnings to the public may be provided through local news media, Facebook, Council's website and warning signage adjacent to the affected areas.

4.5 Monitoring Techniques

Regular monitoring of Mannus Lake allows for the effective management of a BGA outbreak through early detection. Any change that occurs, affecting the appearance and odour of the lake, coupled with current seasonal and weather conditions, could represent the initial stages of an algal bloom.

Council will monitor Mannus Lake for algal growth annually, with extra sampling between the months of October through to March.

Monitoring will be achieved through a variety of measures:

- Collecting samples and having them tested for BGA presence;
- Visual monitoring for the presence of small algal colonies floating on the surface of the lake, the colour of the water and/or the presence of a film on the surface;
- Awareness of past, present and forecast weather conditions;
- Operator performing an odour based assessment, for example, earthy, musty and grassy type odours represent certain species of BGA.
- All persons involved in the monitoring process should be appropriately trained and have a good understanding of the process and methods used to monitor the Lake.

The procedure for collecting the sample is set out below:

- The operator must take the sample from the same location, at the same site, each time; samples are collected from just below the surface of the water;
- The samples must be sent away the same day as collection occurs, to prevent the degradation of the algae;

The results received will be used to determine the Response Level and the actions required.

Council will engage a National Association of Testing Authorities (NATA) accredited laboratory to perform testing services involving the identification and enumeration of blue green algae species.

The NATA accredited laboratory will report cell counts for potentially toxic species, from which Council will determine the classification and thus determine an appropriate Alert level response. Where a red level is reached, concurrence with WaterNSW is required.

Council will notify relevant landholders that may be affected by the contaminated water and publish all water alert levels on its website under the *Environmental Monitoring* page.

4.6 Warning Signage

The posting of warning signs during a bloom is an appropriate method advising water users that the water contact is to be avoided and of the alert level.

Where a red alert level is reached, Council will erect warning signs at appropriate places. These signs will be located at public access points where they are most obvious to user groups.

4.7 Alternative Water Sources

Subject to satisfying eligibility requirements, Council will provide limited water for domestic and stock use to directly affected landholders; application forms are available on Council's website.

This water is provided under Section 356 of the Local Government Act.

5. RESPONSIBILITIES /ACCOUNTABILITIES

Councillors

Councillors are responsible for:

- Reviewing and approving the Mannus Lake Blue-Green Algae Policy, as required;
- Reviewing and approving Council's budget annually;

- The overall responsibility for management of Mannus Lake incidents; however, this responsibility is delegated to the relevant director or employees.

Council Executive – General Manager and Director Assets and Infrastructure

Overall responsibility for management and resourcing of the water and infrastructure works departments.

All Managers and Employees

Council employees involved in the operational monitoring of Mannus Lake outflow release are responsible for understanding, implementing, maintaining and continuously improving the Mannus Lake BGA management.

In accordance with Section 356 of the Local Government Act 1993, Council will supply and deliver potable water to affected downstream residents who have no alternative domestic water source. This supply will be capped at 13kL per fortnight per household.

Council has the right to review, vary or revoke this policy.

6. ASSOCIATED LEGISLATION

The Department of Industry: Water (DOI: Water) Condition 34

The Department of Industry: Water (DOI: Water) Blue-Green Algae Management Protocols -2014

Section 356 of the Local Government Act 1993

7. ASSOCIATED COUNCIL DOCUMENTS

1. Operational Response Procedure for the management of Blue Green Algae in Mannus Lake (to be produced).
2. Blue Algae Event Assistance Application for Mannus Lake.

8. HISTORY

Action	Name	Policy Number	Resolution Date	Resolution Number

Figure 1: Basic Mannus Lake BGA Action Plan

