Water Health Partnership for Wales

Managing Public Health Risks from Freshwater Algal Blooms

Guidance for Wales

Issued September 2022

This guidance is intended to:

- Identify the main characteristics and health impacts of freshwater algal blooms;
- Outline the steps needed to investigate and manage blooms;
- Define the roles and responsibilities of stakeholders in response to blooms;
- Provide communications materials;
- Promote a consistent response to incidents.

What are algal blooms?

Algae occur naturally in inland waters, estuaries, and the sea. Most algal blooms in inland waters are caused by blue-green algae which are actually a type of bacteria, called cyanobacteria. These can form algal blooms and produce toxins which can kill wild animals, livestock and pets and can also cause ill health in people. Algal blooms in the sea are different and involve marine algae such as seaweeds and microscopic phytoplankton. Some marine species can produce toxins but toxic algal blooms in UK coastal waters are relatively rare. During the summer, it is common to see large blooms of a marine algae called *Phaeocystis* in coastal waters. This is a non-toxic algae but when the bloom breaks down, it can give off a smell of rotten eggs and form a creamy-brown foam that is often mistaken for sewage.

In freshwater, especially lakes, blue green algal blooms can be common and are often toxic. Blue-green algae are very small and cannot be seen with the naked eye unless in very large numbers. Favourable conditions for algal blooms are warm, stable and sunny conditions combined with a high level of nutrients in the water. Human activities that increase the amount of nutrients in a water body, such as agricultural runoff, can make algal blooms more likely. Excessive nutrient loading in our lakes and rivers can increase the risk and severity of algal blooms and once a water body becomes prone to algal blooms, there can be a predictable annual cycle in terms of the emergence, frequency, duration and magnitude of algal blooms. As our climate warms, we are also likely to see a greater chance of algal blooms in Wales.

Blue-green algae tend to increase in the spring, growing rapidly into the summer and may reach large enough numbers to become an algal bloom, resulting in a change in water colour (discoloured green, blue-green or green brown) and transparency. Many species are buoyant and gather at the surface, forming streaks, layers of scum or floating mats. Some species produce musty, earthy or grassy odours. When algal blooms die and decay, they use-up oxygen in water which can affect aquatic life, including fish. . There are no quick or easy remedies to control algae once they appear. Blooms are most common in summer but have been reported in spring and autumn and occasionally in the winter.

Algal blooms may cause

- scum or film on water or strandline
- discoloured water and/or reduced transparency
- decomposing algae (potentially causing low dissolved oxygen)
- human or animal health problems, including fish and animal kills

Unless stated otherwise, this guidance refers to the risks from freshwater blue-green algal blooms.

What are the health risks?

There are many species of blue-green algae in the UK and not all produce toxins. Some species with the potential to produce toxins may not produce them under certain environmental conditions. Therefore, it can be difficult to say if an algal bloom is toxic; this can only be confirmed by formal testing for known toxins. If toxins are produced, they can cause irritation of the eyes, nose and throat and some toxins can affect the liver (hepatotoxins) or the nervous system (neurotoxins).

People may be exposed to the toxins through skin contact (e.g. immersive activities such as swimming), by swallowing contaminated water or from breathing in contaminated water aerosol (e.g. when motor boating or water skiing). Where water is abstracted for drinking water, it is possible that the toxins may enter the water supply. However, the risk to public water supplies in the UK is very low because the water treatment process can remove any toxins. Private water supplies are more at risk if the supply comes from affected water, in which case an alternative supply will be needed. The toxins may also enter the food chain and people may be affected by eating contaminated food, such as fish or shellfish from bloom affected waters.

Ingesting or inhaling toxins may cause headaches, fever, diarrhoea and vomiting, blisters in the mouth and sore throat, gastro-enteritis, pneumonia and hepatoenteritis. Skin contact can cause rashes and irritation although these are usually mild and get better without treatment. Children are at greater risk than adults of developing problems because of their lower body weight.

Algal blooms can also affect recreation and tourism.

In Wales the testing for toxins is not routine and the production of toxins could vary between tests due to environmental conditions. Therefore, it is best to assume that any bloom is harmful.

Risk Assessment

When there is a report of an algal bloom, an initial assessment is required. This is typically led by Natural Resources Wales (NRW), the local authority or the owner of the water body and should consider:

- visual evidence of an algal bloom such as the water discolouration and the presence of scum
- reports of dead fish or animals
- reports of any human illness linked to the use of the water body
- extent of the bloom
- history of previous blooms or pollution incidents
- water use e.g. potable abstraction, private water supplies, water sports, crop irrigation;
- public interest e.g. high amenity waterbody
- Monitoring (see below)

Monitoring

Water samples should be collected to determine the algal species present and the number of cells. When blue green algae is confirmed and cell numbers exceed the trigger level of 20,000 cells per millilitre or 10ug chlorophyll per litre (based on WHO, 2009 [1]), relevant partners should be notified including the water body owner or manager, Local Authorities, Public Health Wales, and any water abstractors. NRW licences water abstractions (>20m^3) and holds the contact details of e.g., water companies, farmers, industry etc. It may also be necessary to notify other stakeholders including Welsh Government / DEFRA, Food Standards Agency and Animal Health.

Regular monitoring is important as the cells numbers can fluctuate due to environmental conditions and bloom breakdown and should continue until below trigger level of 20,000 cells per millilitre on two consecutive weekly samples.

Responding to an Algal Bloom

If the risk assessment confirms the presence of any algal bloom and/or the trigger level are exceeded, an incident management team (IMT) should be formed. This should be chaired by either NRW or the Local Authority (depending on who has responsibility for the water body) and should include a health representative such as Public Health Wales and the local Health Board. It should also include the water body owner and, where appropriate, the water company. If there is no local incident response plan, guidance is available from Public Health Wales[1].

The IMT should consider:

- The potential for human and animal exposure and associated risks/impacts
- Actions needed to manage the situation and minimise public health risk
- Risk communication and messages for the public
- Water sampling/monitoring
- Consequences of intervention e.g. downstream impacts upon shellfish beds and water abstractions.

An IMT may not be required where there are already agreed processes in place to protect public health e.g. for waterbodies with a history of bloom management. Where an IMT is not required this should be communicated along with actions taken, to other stakeholders that would otherwise form the IMT.

[1] Managing Public Health Risks from Environmental Incidents: Guidance for Wales

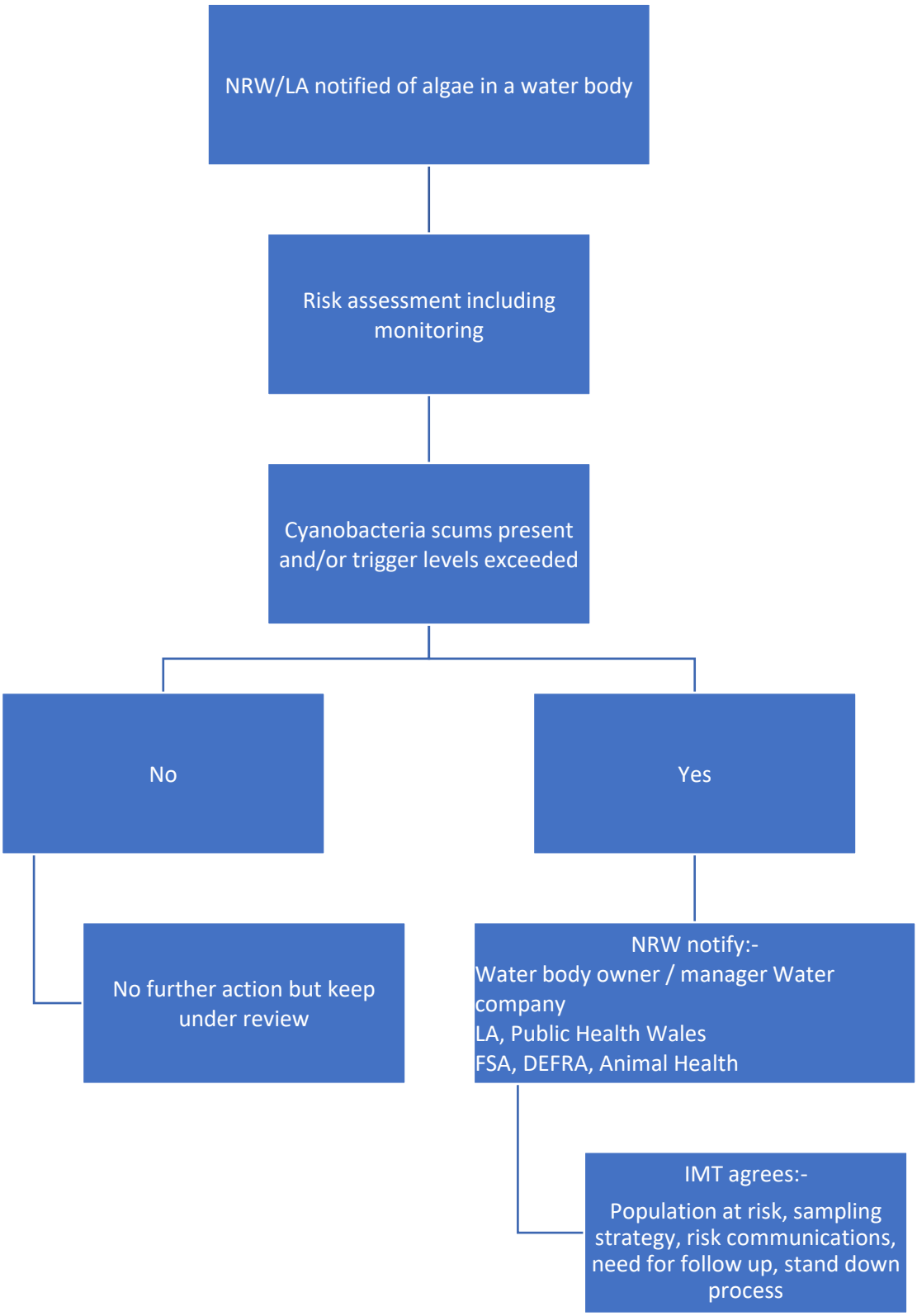

Figure 1:- Summary response process

Roles and responsibilities

Natural Resources Wales:

- Identify and confirm if potentially harmful or nuisance species occur at or above trigger values
- Inform other stakeholders of algal bloom above trigger levels

Water body owner:

- Warn water users of potential risks;
- Take decisions relating to closure (and re-opening) of facilities, including public access.

Local Authority (LA):

- Where no responsible owner is identified, warn water users and erect bilingual signage

Public Health Wales (PHW):

- Provide specialist information, advice and support to the risk assessment
- Identifying possible exposure pathways;
- Advising on and assess potential health risks;
- Advise on action and the need for public health follow up;
- Liaising with other NHS bodies, including Health Boards, as appropriate;
- Advise on risk communication.

DEFRA / Welsh Government (DEFRA /WG):

- Safeguard the environment and ensure supplies of essential foodstuffs and water by protecting the interests of the agriculture, fishing, food and water industries

Foods Standards Agency (FSA):

- Lead on all issues relating to food safety including animal feed;
- Determine potential contamination of the food chain and implementation of countermeasures.

Animal Health:

- Ensures that animals with access to affected water sources are removed or provided with alternative sources of water.
    - This can involve operational partnerships with Local Authorities, the National Farmers Union and landowners and farmers

Water Company:

- Manages risks to their potable supply network.
- Protects users of any water company owned water bodies.

Minimising health risks

Not all algal blooms are a health risk, but it is not possible to tell by looking at the bloom. It is best to assume that any bloom is harmful and the public advised as follows:

- Avoid contact with the water, but to wash their hands and face with fresh water immediately if they are in contact with it.
- No swimming or other activities where there is a high risk of immersion
- Areas with obvious algal blooms such as the presence of scum should be avoided entirely
- Do not allow pets or animals in to the water
- Lower risk activities such as rowing and fishing etc. should be subject to a risk assessment
- To abide by warning notices
- To seek medical advice if they become ill after exposure to affected water

Incident communications and advice

The following documents may be used in incident response.

Letter to health care professionals

Press release (new incident)

Warning notice

Press release (end of incident)

GIG CYMRU NHS WALES | Iechyd Cyhoeddus Cymru Public Health Wales

[*insert date*]

Dear Colleague,

Re: Algal bloom at *XXXX*

Natural Resources Wales (NRW) has recorded a blue-green algal bloom (cyanobacteria) in *[insert name of affected water body]* and it is likely that it will be affected for some time.

Cyanobacteria can be toxic to humans on contact, inhalation or ingestion. Symptoms may include redness and blistering of the skin and mouth, abdominal pain, vomiting, diarrhoea, headache, fever and sore throat. Rarely the toxins can affect the liver and nervous system. Children may be at greater risk than adults.

If you need any advice on the management of symptomatic patients who may have been exposed to the water please contact the National Poisons Information Service.

If you think any of your patients may have been affected, we would be grateful if you inform Environmental Public Health at Public Health Wales (publichealth.environment@wales.nhs.uk **and** chemicalscardiff@ukhsa.gov.uk).

Yours faithfully,

Blue-Green algae at xxxx

Blue-green algae has been identified at xxxx and water related activities are restricted.

Blooms of blue-green algae (also known as *cyanobacteria*) can occur naturally in inland waters, and cannot be removed or treated. It develops in warm water so is more common in spring and summer and may take some time to disappear. It may also come back again in the same year. The algae can cause skin rashes and irritation, nausea, vomiting, stomach pains, fever and headache.

People are advised:

- not to be in contact with or swim in the water
- not to eat fish caught in the water
- not to allow pets or livestock to come into contact with the water
- to take notice of any warning signs

Anyone who has come into contact with water containing an algal bloom should wash with fresh water immediately.

Anyone who has come into contact with affected water and become ill should seek medical attention.

Contact details for further advice: *[insert Local Authority name and number]*

Standard warning sign

WARNING!

RHYBUDD!

This water is contaminated with potentially toxic algae which may harm human and animal health.

You are advised:

- not to be in contact with, swallow or swim in the water
- not to eat fish caught in the water
- not to allow pets or livestock to come into contact with the water
- to act on warning notices

Anyone who has come into contact with the water should was with fresh water immediately.

Anyone who has come into contact with the water and become ill should obtain medical attention.

For further advice please contact [insert Local Authority name and number]

[*Insert Welsh text*]

Standard press release – end of incident

Blue Green Algal bloom at xxxx now over

Following the identification of an algal bloom (cyanobacteria), at xxxx, levels have now subsided and water related restrictions have been lifted.

The algal bloom blue-green algae (cyanobacteria), at xxxx is a natural occurrence which occurs from time to time during warm conditions. It is possible that it may return.

* For further information, contact {*local authority]* on [*contact details*]

* To report an algal bloom call Natural Resources Wales 24 hour hotline on 0300 065 3000

Further information

Natural Resource Wales (2022) B*lue-green Algae* [online], Natural Resource Wales [Accessed September 2022]. Available from: https://cdn.naturalresources.wales/media/686163/blue-green-leaflet-dl.pdf

Natural Resource Wales (2021) *Good farming practice*: [online], Natural Resource Wales [Accessed September 2022]. Available from: https://naturalresources.wales/guidance-and-advice/business-sectors/farming/good-farming-practice/?lang=en

Public Health Wales (2017) *Managing Public Health Risks from Environmental Incidents: Guidance for Wales* [online] Public Health Wales [Accessed September 2022) Available from: https://phw.nhs.wales/services-and-teams/environmental-public-health/acute-environmental-incident-management/

Scottish Government Health and Social Care Directorates (2012) *Cyanobacteria (Blue-Green Algae) in Inland and Inshore Waters: Assessment and Minimisation of Risks to Public Health* [online,] Scottish Government Health and Social Care Directorates Blue-Green Algae Working Group, Scottish Government Health and Social Care Directorates [Accessed September 2022] Available from: http://www.gov.scot/Resource/0039/00391470.pdf

The Centre for Environment, Fisheries and Aquaculture Science (2021) *HABS Surveillance Programmes and Monitoring* [online] The Centre for Environment, Fisheries and Aquaculture Science [Accessed September 2022] Available from: https://www.cefas.co.uk/cefas-data-hub/food-safety/habs-surveillance-programmes-and-monitoring/

World Health Organisation (2021) Guidelines on recreational water quality: Volume 1 coastal and fresh waters [online] World Health Organisation [Accessed September 2022] Available from: https://www.who.int/publications/i/item/9789240031302

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