Managing blue-green algae blooms in farm dams

Blooms of blue-green algae (cyanobacteria) are common seasonal phenomena in farm dams and reservoirs across Queensland. They are most likely to occur when weather conditions are warm and there is an abundance of nutrients in the water.

Some species of blue-green algae have the potential to produce toxins and the most common freshwater ones in Queensland are:

- Cylindrospermopsis raciborskii
- Microcystis aeruginosa
- Anabaena circinalis.

Not so common are *Aphanizomenon ovalisporum* and *Nodularia spumigena*.

Blooms can contain many algae species of which one or more may be potentially toxic.

This fact sheet discusses the possible effects of blooms on livestock and offers simple management options to minimise the occurrence of blooms.

How does blue-green algae affect livestock?

Livestock may be adversely affected when they:

- drink water containing cyanobacterial cells
- eat mats of dried algae left along the shoreline
- drink water contaminated with toxins released from dead or ruptured cells.

Cyanobacteria are particularly hazardous when they accumulate as scums at the water's edge and stock are at risk of drinking water with high concentrations of cyanobacterial cells.

If poisoning occurs, animals may exhibit a variety of symptoms. Typically these can include:

- muscle weakness
- lethargy
- reduced or no feeding
- paleness
- mental derangement
- diarrhoea

In serious cases animals may suffer general distress, muscle tremors and coma upon which death follows within a few hours to a few days.

However not all blooms are toxic because:

- concentration of toxins may be low
- stock are not equally susceptible—species, age and sex affect an animal's susceptibility
- amount of toxin ingested may be small and/or countered by other food in the animal's gut.

There have been few toxicological trials carried out to determine safe levels of intake of cyanobacterial cells or toxins for domestic animals or livestock.

The Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) state that an increased risk to livestock health exists when cell concentrations of Microcystis aeruginosa exceed 11 500 cells per millilitre and/or concentrations of the toxin microcystin exceed 2.3 micrograms per litre (expressed as microcystin—LR toxicity equivalents).

At present there are insufficient data available to derive safe levels for the toxins produced by other species of cyanobacteria.

What should I do when I detect a bloom?

The presence of a bloom does not necessarily mean that animals will be poisoned, so the following steps should be taken to assess the risk:

1. Establish that animals are drinking the water or eating dried algae mats from the area where a bloom has been identified.
2. Have a suitably qualified laboratory examine a sample of the water from the dam. They can identify the cyanobacteria in the bloom and determine whether they are present in numbers large enough to constitute a risk (Note: Care should be taken to avoid direct contact with scums or suspect water while taking samples. Wear rubber gloves if taking samples and wash thoroughly with clean water following exposure).
3. If necessary, the laboratory may advise you that it would be appropriate to identify and measure the toxins in the water.

Since all blooms of cyanobacteria have the potential to be toxic and all livestock are susceptible, it is prudent to consider all blooms toxic until proven safe. In the interim, stock should be withdrawn from the water supply and an alternative source used.

Where an alternative source is not available and the bloom is floating and localised, it may be possible to allow stock to drink from an area on the upwind side of the bloom.

Note: It is not recommended to treat blooms with algicides or herbicides as they destroy the cyanobacterial cells, leading to a rapid release of toxins into the water. Algicides can also adversely affect fish, invertebrates, and aquatic plants.

How do I manage poisoned livestock?

There are no effective antidotes to cyanobacterial poisoning. If stock have only just consumed contaminated water, it may be helpful for a veterinarian to drench them with medicinal activated charcoal or bentonite to try to prevent absorption of any toxins. Activated charcoal is expensive and probably uneconomical to use on any but the most valuable livestock.

If animals die, post mortem examination by a veterinarian **as soon as possible after death** is highly recommended to try to establish if cyanobacteria were the cause. Specimens from the carcass will need to be sent to a veterinary laboratory.

Preventing blue-green algae blooms?

Strategies to prevent blue-green algae blooms should focus on reducing the amount of nutrients and sediments entering the dam. This can be achieved by:

- establishing or improving the growth of aquatic plants. Aquatic plants compete with the cyanobacteria for nutrients including nitrogen and phosphorus. Some aquatic plants suitable for farm dams is given in the following table.
- establishing vegetated buffer strips (perennial grasses and trees) up-stream and around the dam to intercept and trap nutrients and sediments.

Common name	**Scientific name**
Free-floating	
Red Azolla	*Azolla filiculoides*
Ferny Azolla	*Azolla pinnata*
Duckweeds	*Spirodela* spp. *Wolffia* spp. *Lemna* spp.
Floating with attached roots	
Water Primrose	*Ludwigia peploides* ssp. *montevidensis*
Nardoo	*Marsilea mutica*
Giant Waterlily	*Nymphaea gigantea*
Wavy Marshwort	*Nymphoides crenata*
Water Snowflake	*Nymphoides indica*
Swamp Lily	*Ottelia ovalifolia*
Sedges and Rushes	
Spike Rushes	*Eleocharis* spp.
Sedges	*Cyperus* spp. *Schoenoplectus* spp. *Lepironia* spp. *Baumea* spp.

NOTE: There are many introduced species of aquatic plants that are declared pests and should not be grown in farm dams. These include:

- Salvinia (Salvinia molesta)
- Water hyacinth (Eichhornia crassipes)
- Water lettuce (Pistia stratiotes)
- Cabomba (Cabomba caroliniana)
- Alligator weed (Alternanthera philoxeroides).

Further information on these pest species is available from your local office of Natural Resources and Water (NRW) or through the NRW web site at <www.nrw.qld.gov.au>.

Uncontrolled stock access to a dam can lead to problems with bank erosion, loss of aquatic plants and poor water quality.

A properly planned and constructed fence around the dam and buffer areas will provide an effective stock control. Limiting stock access to the dam may be done with the following options:

1. Providing watering points at the dam that have low risk of erosion and have been stabilised with a suitable material to prevent damage by trampling.
2. Fencing off the dam completely and piping the water from the dam to troughs in the paddock. This option is the most effective way of ensuring stock do not contribute to the reduction in water quality.

Management approaches as suggested above should be viewed as a long-term strategy for the improvement of water quality, reliability of supply for your livestock and reducing the incidence of blue-green algae blooms (Figure 1).

Further information

Your local office of Natural Resources and Water may be able to assist you further with this topic. If you suspect livestock poisoning contact your local Department of Primary Industries Veterinary Officer or The DPI Call Centre Phone: 13 25 23 (for the cost of a local call within Queensland) or your own local veterinarian.

See the following fact sheet W3—*Blue-green algae—general information*.

References

Australian and New Zealand Guidelines for Fresh and Marine Water Quality. (2000) Volume 3, Chapter 9, Primary Industries. ANZECC and ARMCANZ.

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For further information phone 13 13 04

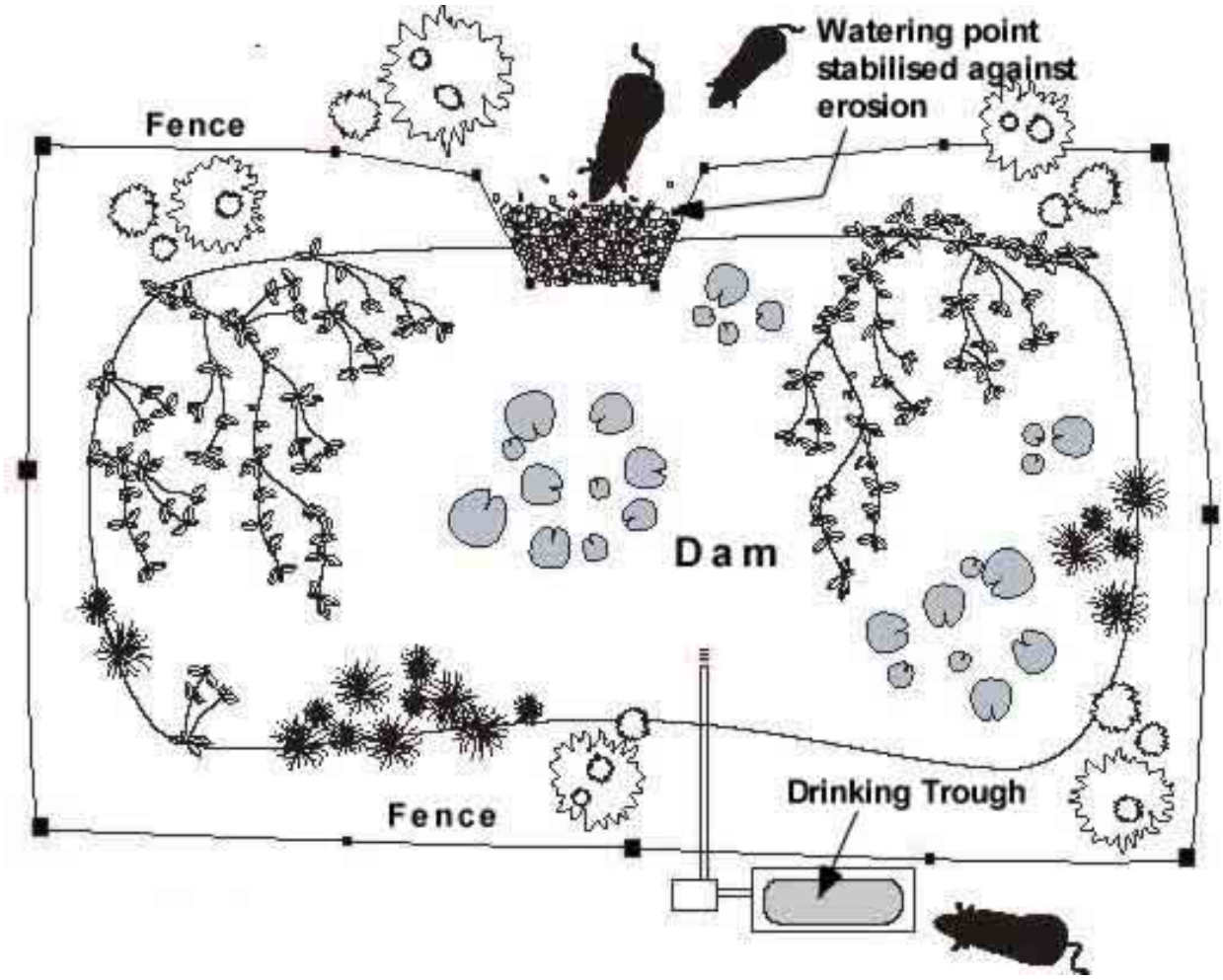

Figure 1 — Significant improvements in water quality, including the prevention of blue-green algae blooms, can be achieved by managing stock access to enhance the vegetation in and around your farm dam.

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