

# Post-bushfire water quality in farm dams and creeks



## Information relating to livestock health

There are a number of issues that may cause you concern regarding water quality and your livestock health after a bushfire. They include:

- copper chrome arsenic (CCA) treated timber ash – also known as permapipe
- sediment
- decomposing natural organic matter
- algae.

This information sheet is designed to take you through them, and their related management strategies.

## CCA treated timber

Ash from burnt CCA-treated timber has high levels of copper, chromium and arsenic. These are hazardous to livestock, so efforts to minimise water contamination should be a priority.

However, these substances occur naturally (e.g. in the soil) at low concentrations, so in most circumstances there is no risk to livestock. If only a small amount of this ash enters a dam after a fire, it is unlikely to cause any problems.

A preliminary investigation conducted by the state government at a property in the Cudlee Creek fire zone found very low levels of copper, chromium and arsenic in dam water even though there was a burnt CCA timber ash stockpile a short distance from the dam. Such low levels represented no risk to livestock health.

Water quality testing is recommended if a large amount of CCA timber ash has flowed into a dam or creek.

Please refer to the Cudlee Creek fire recovery web page for further information: [www.naturalresources.sa.gov.au/adelaidentlofyranges](http://www.naturalresources.sa.gov.au/adelaidentlofyranges)

Please refer to the *Australian and New Zealand Guidelines for fresh and marine water quality* (livestock section) for further information: [www.waterquality.gov.au/media/60](http://www.waterquality.gov.au/media/60)

## Management strategies

### *Controlling arsenic concentrations in water*

Control may be achieved by adding gypsum (calcium sulfate) to the water. The calcium in gypsum can create very insoluble calcium arsenate, which settles to the bottom of the water body i.e. dam and is rendered relatively harmless.





*Farm dam at a Charleston property, with hay bales being used for sediment control*

#### *Preventing CCA ash entering dams and creeks*

CCA ash may be mixed in with soil after a fire. Controlling CCA ash is similar to controlling fine sediment and soil erosion. This is best achieved by constructing sediment fences that follow contour lines in high-erosion risk areas.

## Sediment

In the initial period after fire, soil erosion may occur in some areas after rainfall, causing high levels of sediment accumulating in farm dams and creeks. However, high suspended sediment in water is not a concern for livestock.

**Water quality testing is not necessary.**

## Management strategies

Soil erosion can be reduced by using jute matting and other types of cover materials, although this is difficult if the affected area is large and steeply sloped.

Sediment fences can be used to capture sediment in surface runoff and help minimise it from entering dams and creeks.

The Adelaide and Mount Lofty Ranges Natural Resources Management Board has a fact sheet on *Bushfire recovery, erosion and water supply*:

**[www.naturalresources.sa.gov.au/adalaidemtoftyranges](http://www.naturalresources.sa.gov.au/adalaidemtoftyranges)**



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*Filamentous algae in a farm dam – unlike some species of blue-green algae, filamentous algae is not toxic to livestock*

## Decaying organic matter

Runoff from a burnt landscape can contain a large amount of naturally occurring organic matter that will decompose/decay rapidly in the water.

The decaying process is natural and can consume large volumes of dissolved oxygen (i.e. the water turns anaerobic). If this happens and the water remains anaerobic for a few days it can generate odours.

Yabbies and other animals can also become stressed and fish can die from a lack of oxygen.

Water quality impacts from decaying organic matter are unlikely to affect livestock health, although some animals may avoid drinking the water.

**Water quality testing is not necessary.**

### Management strategies

As the rate of organic material decaying slows down the water will naturally improve as dissolved oxygen levels increase.

If livestock continue to avoid the water, aerating is the most effective way to increase dissolved oxygen levels and make the water more palatable.

Aeration options may include:

- spraying water into the air
- bleeding air into the intake side of a pump
- agitating the water with propellers or paddles (but avoid stirring up the bottom sediments)
- cascading water over baffles into a settling tank.

## Algae and blue-green algae

The ash remaining after a bushfire contains high levels of plant nutrients (especially phosphorus).

Decomposing organic matter will also release nutrients into water. Those nutrients can trigger the growth of algae and also blue-green algae.



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## Algae

Algae are plants with a very simple cell structure, are mostly aquatic (living on, in or near water) and usually very small (microscopic) in size.

Many can form visible filaments (strings) and mats, and some can grow quite large and appear plant-like. Some algae may float or attach to rocks, shells and other plants.

Algal blooms can clog pipes and when they decay, the water can become anaerobic as described in the decaying organic matter section previously.

**Algae are not harmful to livestock.**

### Blue-green algae

Blue-green algae, known as cyanobacteria, are a form of aquatic bacteria. They are microscopic but can appear like pea soup or spilled green paint and create visible scums.

There are various types of blue-green algae. Some produce toxins that can be harmful to livestock.

Identifying blue-green algae can be difficult and trained expertise will be required to assist if there is some concern.

For further information, please refer to this WA web page on blue-green algae poisoning in livestock [www.agric.wa.gov.au/animal-welfare/blue-green-algae-poisoning-livestock](http://www.agric.wa.gov.au/animal-welfare/blue-green-algae-poisoning-livestock).

**Water quality testing is not recommended.**

Laboratory tests for blue-green algae may be warranted in rare instances, although sampling procedures are complicated and the results are not always informative.

### Management strategies

#### Prevention

There is some evidence to suggest that barley straw can prevent blue-green algal growth. Oat and wheat straw are not effective and will not work.

Barley straw releases chemicals that are active agents against *Microcystis* blue-green algae and this is the strain that is most likely to release a toxin that harmful to livestock.

The suggested method is to add approximately 50 grams of barley straw per square metre of surface area to a dam.

This releases enough naturally occurring chemicals to prevent blue-green algal activity from occurring for approximately six months.

When the surface layer of water is greater than 21°C, adding barley straw to an existing bloom may be effective within two weeks. However, barley straw is more effective as a preventative than a treatment for blooms.

Place the straw in coarse-weave bags (such as onion bags) and suspend the bags from floats, such as sealed large drink bottles, drums or a pontoon.

The floating straw bags will sink as the straw rots. Remove the straw at this stage, and spread it on paddocks away from the dam.

If there is an incoming flow of water, place the straw net where there is a continuous flow of water over and through the straw. This will help to keep the straw oxygenated and spread the active chemicals throughout the water surface.

### Treatment

Dosing with treatments such as gypsum (calcium sulfate) and ferric alum can reduce the phosphorus level in the water which can limit the growth of blue-green algae.

Dosing with an approved copper-based algicide (e.g. cupricide) to kill blue-green algae can be effective but only in offline farm dams – not in creeks. **Do not use copper sulfate.**

Using an algicide during a significant outbreak of blue-green algae will cause a large amount of organic matter to be released into the water.

Organic matter can rapidly decay, causing low dissolved oxygen conditions – refer to the management strategies on decaying organic matter.

### Further information

Managing blue-green algae on farms (WA)  
[www.agric.wa.gov.au/livestock-biosecurity/managing-blue-green-algae-farms-western-australia](http://www.agric.wa.gov.au/livestock-biosecurity/managing-blue-green-algae-farms-western-australia)

Managing blue-green algae in farm dams (NSW)  
[www.wsc.nsw.gov.au/uploads/795/managing-blue-green-algae-in-farm-dams.pdf](http://www.wsc.nsw.gov.au/uploads/795/managing-blue-green-algae-in-farm-dams.pdf)

### Contact information

#### Environment Protection Authority

P (08) 8204 2004  
Freecall 1800 623 445 (country)  
E [epainfo@sa.gov.au](mailto:epainfo@sa.gov.au)  
[www.epa.sa.gov.au](http://www.epa.sa.gov.au)

#### Natural Resources Adelaide and Mt Lofty Ranges

P (08) 8336 0901 (Black Hill)  
P (08) 8391 7500 (Mt Barker)  
[www.naturalresources.sa.gov.au/adelaidemtlofyranges](http://www.naturalresources.sa.gov.au/adelaidemtlofyranges)

#### Primary Industries and Regions SA

P (08) 8226 0995  
[www.pir.sa.gov.au](http://www.pir.sa.gov.au)

