



Government  
of South Australia



Australian Government

# MURRAY FUTURE

## Lower Lakes & Coorong Recovery

FACT SHEET

## Acid sulfate soils in the Lower Lakes

### At a glance

- Acid sulfate soils occur naturally and are not a problem if they are kept under water.
- Between 2009 to 2010 when water levels in the Lower Lakes were at their lowest, up to 20 000 hectares of acid sulfate soils were exposed.
- Exposed acid sulfate soils can form sulfuric acid and release heavy metals from the soil.
- When the soils are rewet, they can cause waterways to become acidic.
- This can impact on native plants and animals, agriculture, and livestock.

### What are acid sulfate soils?

Acid sulfate soils naturally occur in coastal and fresh water areas where there are large amounts of sulfate and organic material in the water.

As long as the soils are covered by water they are harmless to the environment. But if water levels drop and the soils are exposed to air, they react with oxygen to form sulfuric acid (the same acid as in a car battery) and can release heavy metals from the soil.

### Why acid sulfate soils are a problem in the Lower Lakes

Natural cycles of flooding and drying once flushed the small amounts of acid formed by the soils from the system.



Photo: Monitoring acid sulfate soils in the region

Controlling the River Murray's flow has resulted in a build up of acid sulfate soils.

When water levels in the region were at their lowest, in March 2009, up to 20 000 hectares of acid sulfate soils were exposed in the Lower Lakes.

Exposed acid sulfate soils can cause the soil and water to become very acidic. The acid can also release toxic metals such as manganese, aluminium, and arsenic from the soil.

When the soil is re-wet, through rainfall or increased river flow, the acid and metals can spread and affect large areas.

Acidification and high amounts of heavy metals in the water can cause native plants and animals to die, as well as affect agriculture and livestock.

## Keeping soils submerged

The main way to prevent acidification is to ensure acid sulfate soils are kept wet and not exposed to air.

Managing water levels in the Lower Lakes is one way that acid sulfate soils are being addressed.

This is done through purchasing environmental water, temporary flow regulators and, if necessary, pumping water into areas with low water levels.

## Helping nature

Bacteria in the soil can reverse the process of acid sulfate soils forming sulfuric acid. This is called bioremediation.

The bacteria use iron and organic matter, as well as sulfate in the acid to do this, so making sure these are available is very important.

Growing plants can create more organic matter and iron, but it is only one part of the longer-term bioremediation process.

If the water is too acidic then the bacteria will struggle. Adding finely ground limestone can neutralise acid released from exposed soils and help natural bioremediation take place.

## What to do if you discover exposed acid sulfate soils or acidic water

Direct contact with acid sulfate soils or acidic water should be avoided.

In extreme cases, direct contact with acid sulfate soils or acidic water can cause skin and eye irritation.

If you find an area of exposed acid sulfate soils on your property during times of low water levels, prevent the soil from being disturbed by people or animals and consider treatment and management options.

If you find exposed acid sulfate soils in a public area, you should not walk on or disturb the soil, and advise the local council as soon as possible.

If you are aware of areas where the soil has been exposed and then rewet, it is possible that the water may become acidic and should also be avoided by people and animals.

If you have concerns about water or soils that you think may be acidic, contact the Department of Environment and Natural Resources.

## Further information

### Department of Environment and Natural Resources

Coorong and Lower Lakes Recovery  
(08) 8204 1910  
cllmm@deh.sa.gov.au  
[www.environment.sa.gov.au/cllmm](http://www.environment.sa.gov.au/cllmm)

### CSIRO

(08) 8303 8511  
[www.clw.csiro.au/acidsulfatesoils](http://www.clw.csiro.au/acidsulfatesoils)

### Environment Protection Authority (EPA)

Site Contamination: acid sulfate soil materials, EPA guideline 638/07  
[www.epa.sa.gov.au](http://www.epa.sa.gov.au)

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