Snapshot of the acid sulfate soils research program

Extensive areas of acid sulfate soils were exposed in the Lower Lakes as a result of unprecedented low water levels over 2008 to 2010.

This resulted in soil acidification (pH < 4) over large areas.

Acidification of surface waters also occurred in some areas where acidity was transported from the soil.

In 2009, a research program was undertaken, to fill critical knowledge gaps and better inform decisions on how to manage the risk posed by acid sulfate soils in the Lower Lakes.

Five research areas were examined:

- the extent of acid sulfate soils in the region
- the rates of acidity generation
- assessment of acidity and metals generation, transport and the neutralisation processes
- the potential for acidity and metals to be mobilised following inundation with seawater compared to fresh water (using both laboratory and field studies)
- the acidification risk at a range of water levels, and following inundation with seawater and freshwater (using modelling).

Eight reports have been produced by the research program and are available on the Department for Environment and Natural Resources website.

Air quality monitoring was also undertaken to assess possible community health impacts from exposed acid sulfate soils. This report will be available shortly.

Research highlights

Highlights from the program to date are:

- there is an extensive and considerable long-term acid sulfate soil hazard in the Lower Lakes
- acidity was generated rapidly in drying sandy and clayey lake margins, which increased the risk of waterbody acidification when rewetting occurred
- the exposure of clay-rich sediments in the deeper parts of the lakes must be avoided due to large amounts of acid sulfate soils with a high potential to cause acidification
- the use of fresh water to keep sediments submerged is a lower risk to the environment than using seawater.

Photo: Currency Creek June 2009 (DENR 2009)

Managing acid sulfate soils in the region

The main management implications highlighted by the program to date are:

- some exposed sulfuric (pH<4) materials in acid sulfate soil "hotspots" can be managed or treated locally
- the risk of broad-scale lake acidification is reduced if minimum water levels are stabilised above 1.5 metres below sea level in Lake Alexandrina and 0.5 metres below sea level in Lake Albert. The risk substantially increases below these water levels and/or with prolonged time near these levels
- while adding seawater is a valid option to prevent drying out and acidification of submerged sediments, it is a higher risk compared to using freshwater, as more contaminants (acid and metals) will be mobilised from previously exposed soils
- following lake acidification, water quality could take months to years to recover. Recovery from soil acidification will take much longer and achieving previous conditions may not be possible.

The research program has been very successful in providing essential information to fill acid sulfate soils knowledge gaps. The results will be used to best manage the risk of acidification in the Lower Lakes.

Further information

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