Recognising disturbed acid sulfate soils

If at all possible, **DO NOT DISTURB** – acid sulfate soils (ASS) are benign when left in a waterlogged, undisturbed environment. Avoiding disturbance is often the most environmentally sustainable and economic option.

The impact of disturbing acid sulfate soils

Without proper management, disturbing ASS can have serious environmental, economic, engineering and health impacts and can constrain development, construction and other activities in affected areas. Detrimental effects can include:

- ecological damage to aquatic and wetland ecosystems
- effects on estuarine fisheries and aquaculture projects
- contamination of groundwater with arsenic, aluminium and heavy metals
- reduction in agricultural productivity due to soil degradation
- damage to infrastructure through the corrosion of concrete and steel pipes, bridges and other sub-surface assets
- potential threat to human and animal health.

Activities that may generate acid in certain areas are

- major earthworks – large scale excavations for canal developments and estates
- infrastructure earthworks – digging for clearways, roads and railways and excavating for sewerage pipes, power lines and drainage channels
- maintenance dredging – boating channels and canal estates
- drainage channels – digging channels to manage waterlogging in agricultural areas
- lowering of the groundwater table – from low rainfall and over use of groundwater.

Be aware of field indicators for ASS

Dominant vegetation in high ASS risk areas – tea tree, paperbark, salt sheoak, flooded gums, samphire, mangroves, saltcouch, *Phragmites* (a tall acid tolerant grass species) and swamp tolerant reeds and rushes.

Indicators of ASS disturbance – what to look for in soil

- stunted or dead vegetation
- acid scalds – bare patches appear where the top soil is salty or acid
- iron monosulfides – gooey black sediments formed in low oxygen environments
- jarosite – yellow mineral showing iron sulfides in ASS are oxidising and forming sulfuric acid.

Indicators of ASS disturbance – what to look for in water

- crystal clear water – high levels of aluminium can cause soil particles to drop to the bottom of waterways leaving the water clear
- yellow-brown water – indicates iron
- iron flocs – usually a red-brown or brown-yellow colour present throughout the water
- blue-green water – indicates soluble aluminium and iron
- milky-white water – also an indication of aluminium particles.

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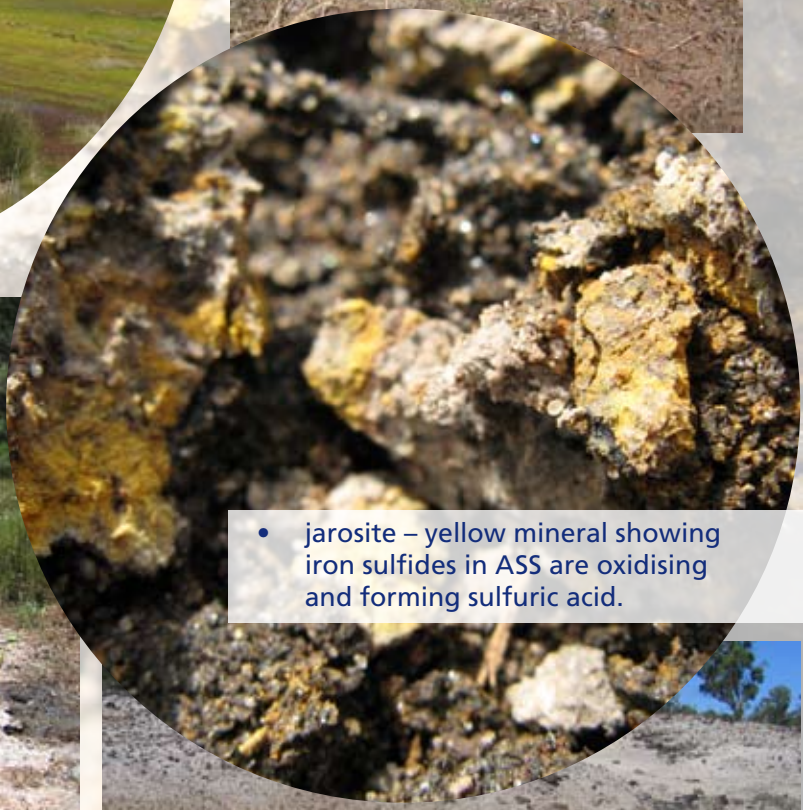

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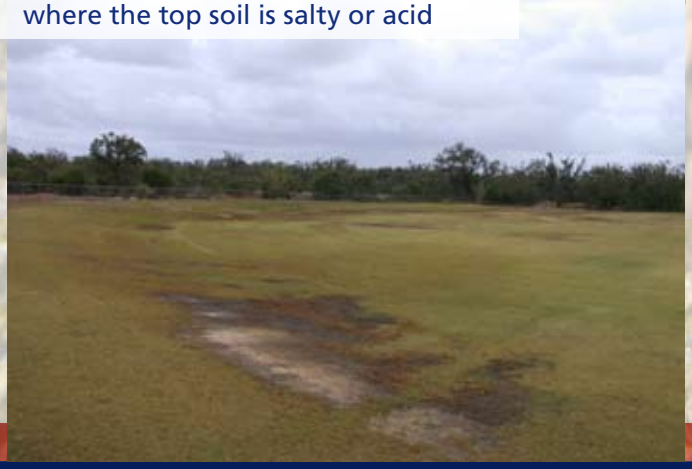

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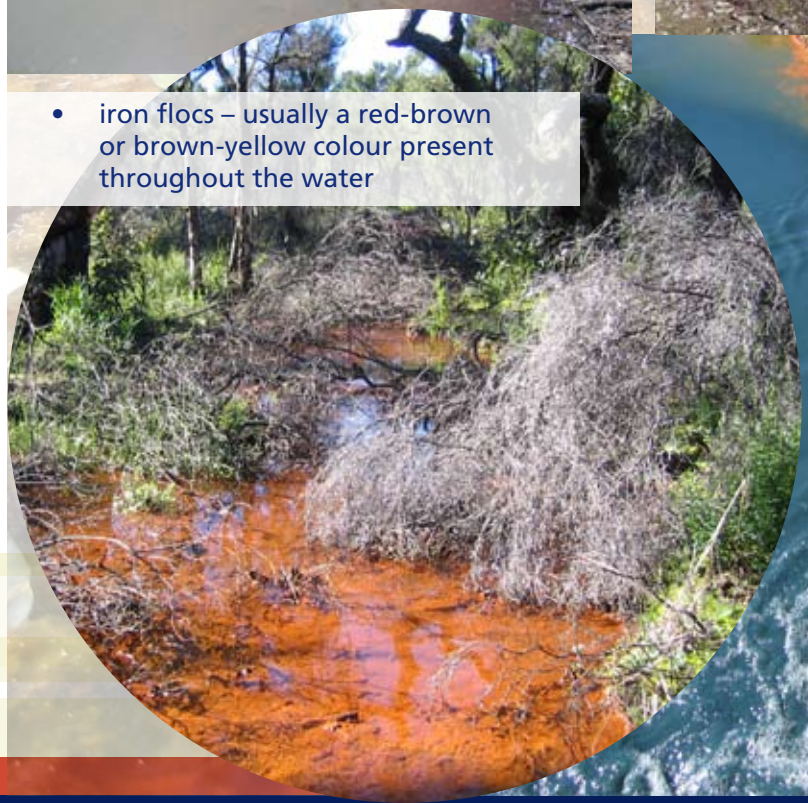

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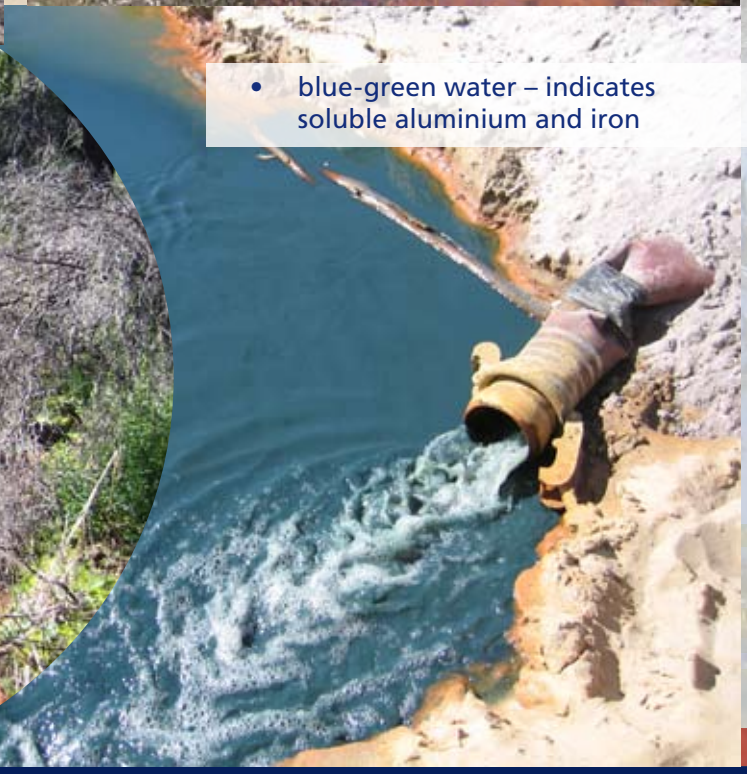

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Other possible indicators of ASS disturbance

- fish kills – acid water and heavy metals can kill fish and increase their susceptibility to disease
- damage to infrastructure – sulfuric acid can degrade concrete and steel leading to structural weakness and failure
- iron straining – rust-coloured iron stains on concrete structures and soil and oily-looking bacterial scums on affected water.

Simple management options for acid sulfate soils

Where disturbance of ASS is unavoidable, successful management requires a site-specific strategy developed using the findings of a detailed investigation. Basic remedial action may include:

- lime treatment – mixing adequate quantities of lime into exposed ASS or acidified water will neutralise the sulfuric acid produced
- building wide shallow drains – shallow drains allow removal of surface water while maintaining water table height.

More information

More detailed information and advice is available at
http://www.dec.wa.gov.au/ass

DEC has published a series of fact sheets and guidelines to help with the identification, investigation and management of ASS in Western Australia. More information is available by mail from the address below or by calling the Acid Sulfate Soils Section on 1300 762 982.

Acid Sulfate Soils Section
Department of Environment and Conservation
Locked Bag 104
Bentley Delivery Centre WA 6983

2007538