

BUSHFIRE RISKS IN GROUND SOILS

Information for Western Australian communities –
organic and acid sulfate soils.

SOILS AND BUSHFIRES

Soil is composed of a combination of minerals (sand, silt and clay) and organic material (partly decomposed plants and animals).

Different types of soils on the ground present challenges for firefighters who are fighting the fire as well as communities impacted by a bushfire.

WHAT ARE ORGANIC SOILS?

Organic soils can contain up to 90% organic material, and those with very high organic content are also known as peats.

Organic material helps soils to store moisture and nutrients and improves soil structure. For this reason, organic soils are highly valued for agricultural land, and areas of native bush growing on organic soil are becoming rare.

Organic soils are also important to the natural environment because they support a unique biodiversity.

HOW DO DIFFERENT TYPES OF SOIL INTERACT WITH BUSHFIRE?

Organic Peat Soils:

Organic soils catch fire very easily and can burn for many months. The matter in organic/peat soils that comes from plants and animals is like fuel for fires. Even after the visible fire is out, peat soils can keep smoldering underground. This hidden fire can cause flames to come back, making it harder to control the fire.

Peat fires can be challenging for firefighters. They might need special equipment to treat the fire because the fire can keep burning underground. The fire can start again even when it seems to be extinguished.

WHAT ARE ACID SULFATE SOILS?


Acid sulfate soils contain chemical compounds called iron sulfides, most commonly as a mineral called pyrite.

These soils are harmless when undisturbed, but react when exposed to air to form sulfuric acid.

This acidity releases elements such as metals and nutrients from the soil profile which can then be transported to waterways, wetlands and groundwater systems.

This can result in harmful environmental and economic impacts including the acidification of waterways and groundwater and the death of plants and animals.





After a fire, the soil can lose its plants and organic material, making it more likely to erode. This could make the ground unstable and of risk of collapsing beneath people and vehicles. Fires that have run underground can also burn tree roots which can destabilise trunks and increase the risk of falling trees.

Acid Sulfate Soils:

Disturbances to organic soils including fire or earthworks can allow oxygen to enter the soil which may trigger the reactions that create acid sulfate soils. It is very difficult to restore soils once they become acidic. The most effective management is prevention, by avoiding any unnecessary disturbances to potential acid sulfate soils.

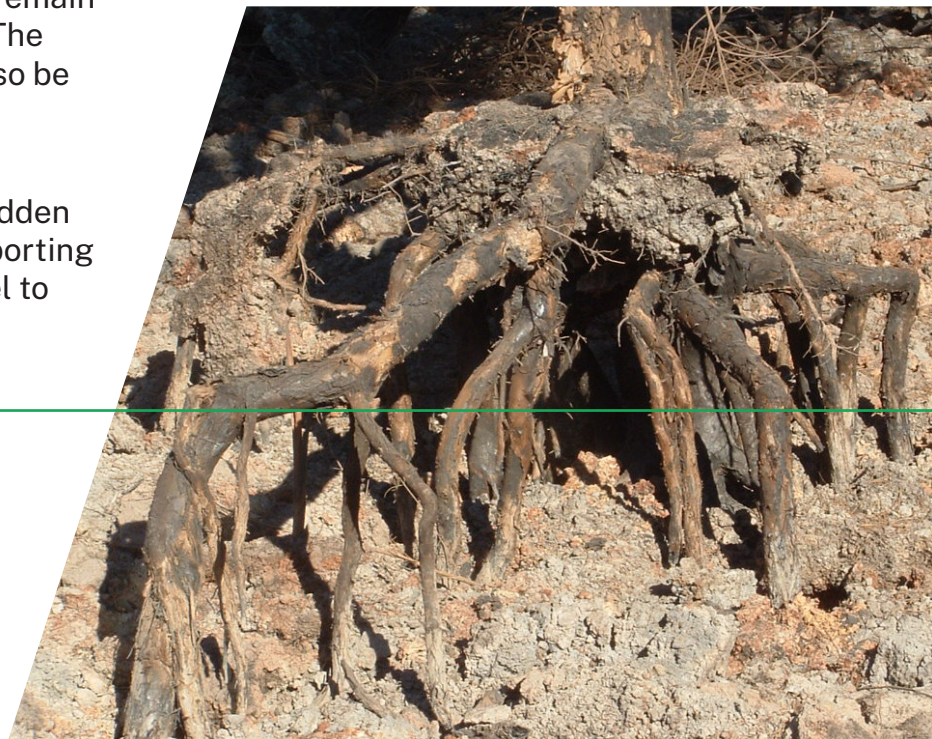
WHAT SHOULD I DO AFTER A FIRE HAS BURNED IN AN AREA WITH ORGANIC OR ACID SULFATE SOILS?

Staying safe:

- **Stay aware of hidden fires**
Be cautious of hidden fires in peat soils. Even after the main fire is out, the fire may continue to smolder. Report any signs of smoke or fire immediately by calling Triple Zero.
- **Avoid walking on blackened or charred ground**
The ground in peat soil areas may be unstable after the fire. Avoid walking on charred ground to prevent accidents or injuries. Stick to designated paths and follow safety instructions in the area.
- **Do not enter closed parks or walking trails**
Fires burning underground can appear away from the fire, for example, on the other side of parks and lakes. For this reason, parks or walking trails may remain closed to the public for some time. The ground around these areas could also be unstable.
- **Report hazards**
Report any fire hazards including hidden fires by calling Triple Zero. Early reporting helps emergency services personnel to address potential risks promptly.

Taking care of your local environment:

- **Avoid disturbance**
Prevention is key so avoid unnecessary disturbance of organic soils.
- **Consider water use**
If you have access to bore water, consider conserving water and follow guidelines for water usage. Excessive water extraction from rivers or wetlands can contribute to soil erosion.
- **Revegetation**
Planting native vegetation helps stabilise the soil, preventing erosion.
- **Stay connected with recovery efforts**
Stay informed and engaged with the community recovery efforts that will be led by your local government.





HOW DO FIREFIGHTERS MANAGE BUSHFIRES INVOLVING ORGANIC OR ACID SULFATE SOILS?

Water suppression:

Firefighters use sprinklers or water tankers to soak burning organic soils. But, because dry organic soils repel water, it is applied slowly. Firefighters must ensure they allow adequate time for the soil to absorb the water - about two litres per square metre at a time. Ph testing on soil is undertaken which provides firefighting crews with information on how best to manage the area.

Earthworks support:

If the fire is underground, firefighters might dig a narrow trench around the fire using a small digger. The trench doesn't have to go all the way to the water table, just deep enough to hit moist soil. Filling it with water or mineral soil can help stop the fire and reduce the chance of forming acid sulfate.

Burning out pockets:

If there's a chance the fire is moving into areas that haven't burned yet, firefighters might remove plants in the area to stop it. This needs planning and might involve setting up temporary equipment like bores, pump, and generators.

Public information:

These types of bushfire may take some time to put out so it's important to keep up to date with information on Emergency WA ([emergency.wa.gov.au](https://www.emergency.wa.gov.au)) or by calling 13 DFES (13 33 37). Always follow the advice in official warnings including understanding the risks associated with organic and acid sulfate soils. These types of fires also present a risk of more fires and smoke so if you see smoke or flames call Triple Zero.

**For further information,
contact environment@dfes.wa.gov.au**

