

Fire damage to soils sets back bushfire recovery

August 25 2015, by Robyn Mills

Soils in areas hit by bushfires like the Sampson Flat fire may take several years to recover, say University of Adelaide soil scientists starting a new study into the effects of bushfires on soils.

"Bushfire not only burns the vegetation above ground, but also organic matter in the soil," says Professor Petra Marschner, soil scientist with the University's School of Agriculture, Food and Wine.

"Nearly all organic carbon and nitrogen on the surface and top few centimetres of the soil is lost during bushfires. Since most [soil organisms](#) live in these layers, many are killed during the [fire](#).

"Natural ecosystems rely on soil processes where leaves and other organic material are broken down by organisms such as beetles, ants, earthworms, bacteria and fungi, releasing nutrients into the soil to be taken up by again by plants. Fire interrupts this cycle.

"The question we are trying to answer is how long it takes before soil processes are restored to levels prior to the fire. This is likely to be influenced by several factors such as fire intensity, soil and vegetation type and climate with a hot fire, like parts of Sampson Flat, having stronger and longer lasting effects than a cooler fire."

PhD student Erinne Stirling is comparing [soil samples](#) from both pine and native forests taken from low-intensity burn, high-intensity burn and unburnt areas at six sites in the Sampson Flat region to analyse the effect

of the fire on the soil. She will assess changes over the next three years and will also sample at different times during the year to assess seasonal effects.

"Soils change throughout the year and have different properties in the winter when it's cool and wet compared to the hot and dry summer," Ms Stirling says.

Ms Stirling is measuring the amount of organic matter in the soil, the amount of CO₂ that's released (which gives an estimate of microbe activity) and the availability of nitrogen and phosphorus.

"By studying nutrient cycling in soils after the fire, we will have a clearer understanding of how long it takes for soil functions to recover and what factors influence the recovery," says Professor Marschner. "By linking this to plant recovery, we can better understand why plants and ecosystems recover more slowly in some areas than in others.

"Understanding the link between [soil](#), plant and ecosystem recovery will help in the development of management strategies to aid regeneration of plant and animal species and maintain diversity."

Provided by University of Adelaide

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