

# Post-fire remediation



Figure 1: Log and brush weirs in minor gully.

## Many land managers are looking for ways to protect their land resources and waterways and initiate recovery following recent fires in Australia.

We all want some decent rain, but high intensity, high volume rainfall can cause further degradation through soil erosion and washing away any remaining organic material and ash into dams and other waterways. This has the potential to cause major issues with water quality that can affect the health of humans, stock and other plants and animals that rely upon this water.

## What can be done?

### Slow the flow of water across the land, particularly on sloping land.

This helps de-energise the water's flow across the land which in turn reduces erosion, captures any sediment and organic materials, and gives the water a better chance to infiltrate the soil.

There are a range of actions that can be used depending on the slope of the land, soil type, what materials and resources you have available, and how much time you have to implement them. Some resources mentioned might be difficult to source in certain fire effected circumstances.

Begin your remedial works on areas of importance or those at highest risk of further damage.

## Previous erosion sites

Look for signs of where previous erosion has occurred. The best place to conduct erosion control measures can often be upslope of the erosion area. It is also a good idea to cover any bare and eroded areas with organic material to provide some protection from further erosion.

## Contours

These can be made of mulch or other organic materials you have on hand.

- Roll out a **round bale of hay** using fallen log or branches to hold it in place.
- **Brush-packs**, as described by David Tongway (CSIRO) in the link below, can be made from tea-tree or other dense shrubs, or tree branches. If harvested properly most plants will re-sprout in due course.

<https://site.emrprojectsummaries.org/2016/03/06/brush-pack-experiment-in-restoration-how-small-changes-can-avoid-leakage-of-resources-and-underpin-larger-scale-improvements-for-restoration-and-rehabilitation/>

- If **compost** is available put this under the mulch or logs and branches to ensure contact with soil and protect from washing or blowing away
- Contours made of **soil** pushed up by a blade plough or similar tool. Be careful to get the contour correct or this could lead to channelling water and cause concentrated water to break through or run out the end, causing more erosion.

## Fallen logs + branches

Assuming that these are heavy enough not to be moved by flowing water, they can be utilised as a **hard barrier** aligned with the contour of the land, ie. placed across the slope. Make sure they have good contact with the soil and minimise how much water can get under the log by using organic materials to fill the gaps.

## Yeoman's plough

The reverse to a contour is deep ripping or using Yeoman's plough along the contour to direct water and any other material into the plough line. The challenge is if these fill up faster than the water can infiltrate into the soil profile causing it to overflow with the water continuing



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its downslope journey, carrying the soil and organic material with it, and potentially causing the same erosion problems.

### Small obstructions

It is generally better to create many small obstructions that slow the water flow rather than building one large obstruction. The purpose is to slow the water flow and allow it to leak through the structures, not to dam the water as this can lead to potential failure and erosion.

### Brush-packs

Brush-packs are structures that mimic the functioning of naturally occurring fallen branches. They slow overland flows at ground level and create wind turbulence up to a half a metre above them allowing them to capture airborne particles and materials. Typically they are made of branches, twigs and leaves.

Experimental brush-packs designed for maximum effect accumulate soil particles and trap plant litter, leading to improved nutrient cycling, increased soil health and permeability (Tongway & Ludwig 1996).

Brush-packs made from tree loppings can be used to arrest surface erosion and create micro-habitats for new plantings. The heavier woody material needs to be in contact with the soil surface across the full length of the branch and heavy enough to withstand any overland flow rates from rainstorms.

Begin constructing your brush-pack upslope where flow rates are lower and then progress towards the lower slopes. The brush-pack only needs to be about 1m wide in the upslope/downslope direction and then around 1.5 to 2m along the contour, or as long as you have material for. This makes all the material able to be placed manually. The brush-packs are intended to be leaky weirs, not dams.

It is also important to have about 40-50 cm height of "springy twigs" above the heavier branches both to create wind turbulence and prevent large herbivores like kangaroos from grazing new grass plants down to the ground. The springy twigs should still be attached to their branches. If the slopes are steep or animal disturbance is likely to be high, the branches could be secured in place

with hardwood stakes or pegs. Note however, that rabbits could still graze beneath the twigs and make the brush-pack a site for a warren, so consider rabbit control as part of the strategy.

### Who are we?

The Mulloon Institute is a not-for-profit organisation actively demonstrating and sharing innovative regenerative land management practices.

### Disclaimer

Where water flow is concerned there are substantial risks involved. While the information and images included are formulated in good faith, with the intention of raising awareness of landscape rehydration processes, the contents do not take into account all the social, environmental and regulatory factors which need to be considered before putting that information into practice. Accordingly, no person should rely on anything contained within this document as a substitute for specific professional advice.

Figure 2: Contour construction using logs.

