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Department of Primary Industries and Regional Development, Western Australia

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# Wind erosion control after fire in Western Australia

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## First steps after a fire

Act to limit further erosion:

- Remove livestock and keep them off burnt paddocks: they can be put into a confinement feeding area, an unburnt paddock or agisted.
- Minimise vehicle traffic on burnt areas
- Protect highly susceptible and valuable areas, such as house, garden, sheds, yards, gateways and laneways with binding spray, clay, gravel, old hay, or straw to give a full cover. A dust-free living and working environment is particularly important after a fire.

Leave burnt residue on roadsides, revegetation and bush areas to decrease the risk of wind erosion.



**Image 1: Signs of wind erosion in the Dalwallinu area.**

## Protect valuable infrastructure and susceptible soils

### Summer rain and cover crops on burnt, broad areas (crop or pasture)

- Check if a cover crop is needed: crop crowns or good pasture roots surviving the fire may provide enough protection. If erosion is starting, choose from the options below.
- About 10 mm of rain on sands and 15–20 mm on loams is enough to germinate cereal seed. This is more likely in southern and coastal areas. For areas unlikely to get summer rain, see the next section on claying.
- Delay spraying any summer weeds on burnt or eroded areas until there is about 50% cover. These weeds will help stabilise the soil. Seek local advice on timing of weed control.
- Use on-farm smoke- or fire-affected cereal seed if available. Test for germination and adapt the seeding rate to allow for reduced germination. Cereals are less damaged by sandblasting than are broad-leaf crops. There is evidence that barley establishes better than wheat as a broadcast crop.
- Top-dress cereals at normal rates if possible. Lower rates (half to one-third of normal rates) will achieve surface cover, but there is little margin for error.
- Broadcast seed: it is faster than drilling and causes less soil disturbance.
- Soil disturbance can be minimised by spreading from tramlines or spraying-tracks. You may not get 100% coverage, but the strips that miss out on seed should be protected by those that do receive seed. Contract spreading is available to do this.

### Claying, gravel and sprays to protect the surface

- Claying is a good option on sands that also suffer from water repellence. Do not use delving or other soil disturbance to bring clay to the surface – these operations greatly increase the risk of wind erosion. Claying is expensive when done at the higher rates and has technical risks. We recommend you get advice from a professional or experienced operator before choosing this option.
- Clay rich subsoil should be spread at rates of 75–100 t/ha to control wind erosion; These clay rates are lower than traditionally employed in claying operations for agronomic benefit, and farmers should consider their individual circumstances to decide whether they should enact a standard claying operation for improved agronomy higher rates are recommended to give the long-term benefits of reduced water repellence, improved water and nutrient-holding capacity, improved pasture use, and reduced risk from frosting in some circumstances.
- Leave clay on the surface over the summer when wind erosion risk is highest and incorporate the clay into the top 5–10 cm before seeding. Incorporation is needed to prevent clay forming a surface crust that reduces seedling establishment and water infiltration.
- Gravel can be spread at the same rates as clay spreading to get a stable surface. Gravel is preferred over clay on very susceptible and difficult areas like water trough aprons and at gates where livestock tend to congregate. Gravelled areas will drain well when it starts raining.
- Chemical stabilisers (e.g. hydromulch, DustBloc®, Dustex®, Gluon™) will give short-term dust control. These chemicals are expensive (>\$1,000/ha). Dustex® and Gluon™ require water at 1 litre per square metre (10,000 L/ha). Note that the crust they form is easily broken by any form of traffic.

## How about cultivating to reduce the risk of erosion?

We generally do not recommend cultivating to bring clods to the surface. We also do not recommend creating artificial rills (scraping ditches and ridges) to reduce windspeed right at the surface, and to trap moving soil particles. Why? Because many of our agricultural soils are too sandy to produce stable clods. Also, soil disturbance of burnt areas increases wind erosion hazard and risks losing more of the valuable nutrients present in ash.

Delving or ploughing moist soils to lift large enough clay clods (more than 2 cm in diameter) can protect the soil from more erosion by reducing wind speeds at the soil surface. However, cultivation will increase the likelihood and impact of wind erosion if good-practice guidelines are not followed.

## At the break of season

### Pasture recovery at break of season

Fire-affected paddocks usually recover slowly because fire removes seed reserves of grasses. The lower nutrient (especially nitrogen) status of burnt areas favours weedy species. And, because most groundcover has been removed, the paddock is more susceptible to erosion at the break of season.

We recommend that you:

- Defer grazing until there is about 1000 kg/ha of securely germinated pasture dry matter and at least 50% groundcover.
- Continue supplementary feeding of sheep in areas with intrinsic resistance to wind erosion because of a high gravel or stone content at the surface.
- Establish cover crops on the most susceptible areas, and where erosion has occurred, then graze these after sufficient ground cover has grown. Exclude stock during establishment, to allow pasture plants to develop sufficient root systems to recover quickly after grazing.
- Carrying capacity may be reduced for the first season and it may take 2 to 3 years to achieve full production from severely burnt annual pastures.

### Cover crops to reduce wind erosion risk in pastures

Annual pastures might be slow to produce adequate ground cover after a fire. Sowing fast-growing cereals such as millet can reduce the risk of wind and water erosion if established early and in safe conditions. Cereals should be top-dressed or broadcast on soil prone to wind erosion but can be seeded with minimum tillage on stable soils (friable loams and clays that have sufficient moisture).

### Some guidelines for fire-recovery cover crops

- Cereals can withstand sandblasting better than most other crops.
- A seeding rate of about 30 kg/ha of cereal seed is generally adequate.
- Oats produce more stubble than wheat or barley and are the preferred option for a cover crop.
- Do not start grazing until there is a minimum of 800 kg/ha dry matter and at least 50% groundcover.
- Aim to have a minimum of 50% groundcover over the following summer.

## Cropping eroded areas

We recommend establishing cereals with minimum soil disturbance on eroded areas. Cereals have better tolerance to sandblasting than lupins, canola and peas.

Eroded areas may need additional nutrients, so consult an agronomist on the need to do a soil test.

Eroded areas that are sown to crop should be excluded from grazing until sufficient soil organic carbon has accumulated again in topsoil. These areas are likely safe to graze when the growth patterns of crops are similar on past eroded areas and areas not subjected to erosion.

## Water supply

### Dams and soaks

Wind and water erosion following a fire can reduce the water quality in dams by blowing or washing ash and soil into the water. Nutrients in the soil and ash could lead to bacteria and algae growing in the water and reduced suitability for livestock.

More information is available on the DPIRD website.

### Creek lines

Soil washed from burnt paddocks can cause sedimentation and blocking of creek lines. There is no cheap and easy way to prevent this, but earthworks can reduce the problem of future erosion ending up in the creek. DPIRD recommends integrated surface water management to reduce erosion and sedimentation risks.

### Being prepared for fire

Fires are a seasonal hazard in the agricultural areas of the south-west of Western Australia. We recommend managers develop a preventative program and a recovery program to prepare for fire and wind erosion.

### Reducing fire risk

Learn more about reducing the likelihood and impact of fire on farms by visiting the DPIRD website.

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