



REWILDING
SUDOESTE

**EMERGENCY
POST-FIRE
STABILIZATION
MEASURES**

EMERGENCY POST-FIRE STABILIZATION MEASURES

This small guide aims to present some immediate and general solutions to the main problems that arise after the passage of a large fire.

After a forest fire the complete absence of vegetation, the burnt wood and soil and the amount of ash on the ground are a problem for land stabilization.

The specific management measures to be applied after a fire must always be adapted to the local geographic, geological and environmental realities, and in accordance with the intentions of the land owners.

After a Fire

One of the biggest concerns after the smoke has cleared is the **risk of soil erosion**, due to the effects not only at the local level - such as **degradation of soil structure and loss of soil fertility** -, but also downstream of the burnt area - namely an **increased risk of flooding and contamination of water bodies by ash and sediment from upstream areas**.

Given the above, some **preventative measures** should be implemented even **before the first rains fall**.

I. Erosion control, treatment and protection of slopes

a) **OBSERVE**

Firstly, it is important to **identify the places most susceptible to erosion and torrential phenomena** (see Image 1):

- areas most exposed to wind (north and west facing slopes, ridges);
- areas with more sun exposure (south-facing slopes, sunny sites);
- areas with a steeper slope;
- areas that have been cleared of vegetation with heavy machinery (firebreaks).

b) MINIMIZE IMPACTS

In order to ensure the greatest possible soil protection, **disturbance of the topsoil should be minimized.**

Heavy machinery usage should be avoided, but if absolutely necessary then it is best to:

- **circulate according to contour lines;**
- **deposit any woody material on higher ground, again, respecting the contour lines,** in order to avoid a concentration of furrows (which may lead to greater runoff of water and soil).



Image 1 - Example of a slope to be preserved (Source: ICNF)

c) **CONSOLIDATE**

Simple, natural techniques can be used to control soil erosion and promote water retention:

- On **sloping areas, create barriers along the contour lines, using dead vegetation**, this will retain sediments and minimize water run-off, allowing better water infiltration (see image 2).
- **Fill the space** between the barriers **with mulch**, using existing litter if possible;
- You can also create **small ditches on contour to retain organic matter and water run-off**.



Image 2 - Example of measures to be applied on slopes/hillsides (Source: ICNF)

II. Prevention of contamination and siltation, Recovery of water lines

- a) Cut down or prune **dead trees that pose a threat to humans or surroundings** (when in doubt if the tree is alive wait for the growth of new shoots);
- b) Ensure the **cleaning and clearing of water lines and culverts**;
- c) The **use of machinery, the dragging of tree trunks or logs** must be **avoided** with in a minimum of **10 meters** on each **side of the water lines**;
- d) Increase stabilization by promoting the **natural regeneration** of **native vegetation on the river banks** whenever possible. Planting and seeding should only be used in exceptional cases (in the absence of a local seed bank or if a high pressure from invasive species is present).

III. Invasive species Management

Some invasive species are characterized by their fire-resistant seeds, and a few are even known to grow better after a fire. For example, most species of **Acacia** accumulate **seeds in the soil** (seed bank) in large numbers (sometimes many thousands per m²). These seeds can remain viable in the soil for many years and their germination is stimulated by fire. While **Hakea** create **arboreal seed banks** (seeds stay on the tree longer), which are also very numerous and the dispersion of the seeds is also stimulated by fire.

The high growth and/or dispersal rates of invasive plants present in burnt areas mean that in many situations they will establish more quickly than native species (natural regeneration or planted/sowed specimens). **Invasive plants** should be eliminated, using methodologies adapted to the context and resources available:

■ **Acacia** can be controlled by:

1. **debarking or “Ring-barking”** (removal of the bark around the tree at a minimum height of 50cm from the ground, this may not be possible if the tree is partially dry)
2. **cutting** (likely to re-shoot which will require further control);
3. **cutting** at 50cm **and debarking the stump** (leads to faster death of the tree and less sprouting if debarking is done well).
4. **manual removal** (larger specimens using machinery);
5. **continuous shoot removal**;
6. **cutting** with a **brush cutter** (only specimens below 20cm).



If control actions are delayed, it is essential that the invasive plants never grow large enough to form seeds again (cut or remove before first flowering). Otherwise, the cycle of regeneration will be recreated.

■ **Eucalyptus**¹ has a strong vegetative response after fire. So the most common post-fire management is to **cut down the burnt trees** and then **manage the stump regrowth (debarking, cutting, continuous removal of shoots)**, or **removing the stump** (when possible). Eucalyptus stands can also regenerate from seeds stored in the crown (in the fruit) or on the ground. In this situation they can be cut with a brush cutter (before they reach 20cm), pulled out manually, etc.

¹ Although officially not classified as invasive in Portugal, this species is included here as invasive because, on one hand, its invasive behavior has been observed in different situations throughout the country and, on the other hand, its wide distribution gives rise to a high propagation rate which constitutes an increased risk.

IV. Control of other species (*Pinus pinaster*)

Maritime pine is partially thermo-dehiscent (the seed opens with increasing temperature), and the seeds stored in the pine cones are the main source of post-fire regeneration, since the seed bank in the soil is scarce and short-lived.

Generally, there is abundant post-fire regeneration when mature stands are burnt.

Control of seedlings can be done by **cutting with a brush cutter** or removed **by hand** (thinner specimens) and **cutting of larger trees with a chainsaw**.

Contacts / more info

More info and resources at

www.rsw.org

Contact

floresta.aljezur@gmail.com

Useful links

ICNF - Gestão Pós Fogo

<https://www.icnf.pt/api/file/doc/177c38255fd8ed5c>

ICNF - Gestão de Fogos Rurais

<https://www.icnf.pt/oquefazemos/boaspraticas/defesadaflorestacontraincendios>

Terra Crua Design - “Guia de Intervenção Após Incêndios Florestais”

<https://terracruadesign.pt/2020/08/03/post-fire-interventions-what-to-do/>

Invasoras.pt - Plataforma de informação sobre plantas invasoras em Portugal

<https://Invasoras.pt>

Bibliography

- “Projetos de IC&DT no âmbito da Prevenção e Combate de Incêndios Florestais”; FCT; 2017
- Centro Ecologia Aplicada – Dr Baeta Neves; “FIREREG – Factores que determinam a variabilidade da regeneração pós-fogo em Pinus pinaster e Eucalyptus globulus em Portugal”;
- “Perspetivas de Gestão Pós-Fogo: Revisão da Literatura e Análise dos Discursos dos Agentes em Portugal”; Cristina Ribeiro, Sandra Valente, Luuk Fleskens, Jan Jacob Keizer e Celeste Coelho; 2020
- “Erosão do Solos após incêndios florestais: avaliação de medidas de mitigação aplicadas em vertentes e em canais”; António Bento Gonçalves, António vieira, Flora Ferreira Leite; Centro de Estudos em Geografia e Ordenamento do Território; Universidade do Minho
- “Efeitos da erosão acelerada em vertentes na sequência de incêndios florestais”; Jornadas Científicas sobre incêndios florestais, Coimbra, 1988
- ICNF; “RELATÓRIO DE ESTABILIZAÇÃO DE EMERGÊNCIA INCÊNDIO FLORESTAL DE CABANA MAIOR ARCOS de VALDEVEZ” ; 2016
- ICNF; “SARDEIRAS DE BAIXO OLEIROS | SERTÃ | PROENÇA-A-NOVA RELATÓRIO DE ESTABILIZAÇÃO DE EMERGÊNCIA PÓS-INCÊNDIO”; 2020
- ICNF; “SÃO MARCOS DA SERRA FARO | SILVES BEJA | ALMODÔVAR RELATÓRIO DE ESTABILIZAÇÃO DE EMERGÊNCIA PÓS-INCÊNDIO”; 2022
- “Ação de estabilização de emergência pós incêndio Medidas a curto prazo Mata Nacional de Leiria - Ribeiro de Moel”; 2017;
- “ESTUDO TÉCNICO ESTABILIZAÇÃO DE EMERGÊNCIA PÓS-FOGO”; Observatório Técnico Independente; AR; 2019