

Grapevine recovery after fire



Introduction

This document provides information on the assessment and management of grapevines following fire damage, with a focus on supporting vine recovery and long-term vineyard viability. A chronological approach to post-fire actions is outlined, from immediate priorities through to longer-term management decisions. The information presented relates to vine structure, growth and productivity. Smoke taint in grapes or wine is covered in separate AWRI resources.

Fire damage to grapevines

Radiant heat and direct flame exposure from a fire moving through a vineyard may cause loss of foliage and shoots, damage to buds, cordons and trunks, and injury to the cambium tissue beneath the bark. The extent of vine injury depends on fire intensity and duration, which are influenced by factors such as wind conditions, fuel load and vine growth stage at the time of the fire. Heat can also damage irrigation and trellis systems.

Experimental work and more recent vineyard-scale assessments following bushfires have identified that making an assumption on the viability of a vine based on its appearance immediately after a fire, can be misleading. Even where bark is blackened, split or partially detached, internal tissue may remain alive and capable of supporting recovery once favourable growing conditions return.

Immediate management priorities

Where a vineyard is partially affected by fire or there is a reasonable likelihood of vine recovery, the highest management priority is restoration of irrigation. Fire-affected vines experience acute physiological stress, and adequate water availability is required to support resumption of growth processes, maintain transpiration and sustain basic metabolic function during the recovery phase. Irrigation infrastructure should be repaired as soon as practicable, and vine water status managed to minimise additional water stress while canopy recovery occurs.

Nutrient management should aim to support recovery without promoting excessive vegetative growth. Moderate nutrition additions are preferred where functional leaf area exists and during foliage re-establishment. Macro and micronutrients should be applied in proportions appropriate to vine demand, rather than elevated nitrogen inputs alone. Where irrigation systems are intact, nutrients applied via the drippers may be more effective in the early recovery phase than foliar applications, which rely on sufficient functional leaf area for uptake. Excessive nitrogen applications immediately after fire are unlikely to accelerate recovery and may exacerbate vine imbalance.

Vine recovery

Vine foliage regrowth after fire exposure occurs through the production of new shoots from surviving buds on canes, spurs or cordons, or from latent buds on vine trunks. The position and vigour of these new shoots provides a useful indicator of damage severity as well as recovery pathway (Table 1).

Table 1. A visual guide for the assessment of fire damaged vines.

Category	Description
Severe	<p>Extensive canopy and structural damage. Recovery depends on regrowth from basal or latent buds, and retraining or trunk replacement may be required.</p> <p style="text-align: right;">Image courtesy Tarita Furlan</p>
Moderate	<p>Significant canopy injury with regrowth from surviving shoots, cordons or trunk tissue. Recovery is likely, although vine productivity may be reduced in the short term.</p>
Minor	<p>Limited canopy injury, typically expressed as leaf scorch or marginal necrosis. Most foliage remains functional and recovery is expected with minimal intervention.</p> <p style="text-align: right;">Image courtesy Tarita Furlan</p>

Pruning and vine management post fire

Post-fire vineyard studies indicate that delaying decisions – particularly for trunk replacement or major vine restructuring, until the extent of vine recovery is clear, allows more accurate identification of vines that require intervention (Hamilton and Hinze, 2023). Immediate trunk removal can reduce carbohydrate reserves and weaken subsequent growth. Vine damage assessment should be delayed until the end of the growing season to enable informed decision-making to optimise vine recovery and future performance. A guide to assessing fire-damaged vines is provided in Table 1.

For vines assessed as having minor damage, established pruning systems can usually be maintained with limited modification. Retention of viable trunks, cordons and established spurs or canes supports foliage development and reserve replenishment. Shoot thinning or green trimming that would unnecessarily reduce leaf area should be avoided during the recovery phase.

For vines assessed as having moderate damage, retaining existing trunks and cordons where these structures remain viable, is generally preferred. Changes to the vine training system, for example, conversion between spur and cane pruning, are best avoided. Conservative pruning approaches, including standard spur or cane pruning, can support recovery while avoiding the costs and delays associated with trunk replacement. Trunk replacement is not recommended in these situations unless progressive decline becomes evident.

Vines assessed as having severe damage may require trunk replacement. Where retraining is undertaken, a single strong shoot should be selected and trained to form the new trunk in accordance with standard viticultural practice. Recovery to full production is likely to take several seasons, and costs should be expected to be higher than for less intensive management approaches.

Vines growing on rootstocks pose a challenge for reworking after fire damage. If the rootstock regrows, this may be left to redevelop a new trunk and a scion can be grafted onto this in the following year. Alternatively, if there is sufficient rootstock remaining after the damaged tissue is removed, a new scion can be grafted close to the ground level.

Yield and production impacts

The impact of fire on grapevine yield in the season of the fire event and in subsequent seasons, depends on the severity of damage to vines, foliage and bunches, and the management approach taken after the fire. Vines with 'minor' damage may return to near normal levels within one to two seasons, while those with 'moderate' damage may require two to three seasons for full recovery. Trunk replacement after 'severe' fire damage typically results in extended yield loss, with recovery to pre-fire yield levels taking multiple seasons (Scarlett et al., 2011).

Limiting the yield on vines recovering after fire exposure may be preferable compared to encouraging high yields which may compromise long-term carbohydrate accumulation, vine performance and delay return to full production.

Economic considerations

Management decisions following fire have significant economic implications. Vine training, trellis and irrigation repairs and replacement are major costs of fire recovery. Economic modelling reported in recent studies indicates that premature or unnecessary expenditure on structural intervention, such as vineyard repairs and replacement, can delay positive cash flow and extend the recovery period (Hamilton and Hinze, 2023).

For many vineyards, preserving viable vine structure and allowing time for recovery, delivers more favourable long term economic outcomes than immediate intensive remediation.

When should vines be removed?

Where individual vine damage is variable within a block, selective vine replacement may be preferable to whole-block replanting. This allows productive vines to be retained while replacing only those unlikely to recover and may be achieved by replanting or layering where appropriate.

Reviewing the spatial pattern of vine damage across a block is important to inform potential for full or partial block removal and replanting. The long-term economic viability of a vineyard block is often based on achieving uniform yield and/or quality targets which may be difficult to achieve in blocks extensively damaged by fire.

Summary

Effective grapevine recovery after fire exposure depends on prompt restoration of irrigation, appropriately timed and informed assessment of vine damage, and management responses proportionate to damage severity. Drawing on both established viticultural research and recent post fire vineyard experience, avoidance of unnecessary early structural intervention and allowance for re-accumulation of vine reserves are central to achieving resilient vineyards and economic recovery after fire.

Other considerations post fire damage to vineyards

Stay safe | Smoke and ash can be toxic. It is important to follow the advice of government agencies before re-entering an area damaged by fire and wear appropriate protective equipment, especially when handling burnt CCA-treated posts.

Written records | Accurate record-keeping is recommended to aid insurance claims and for other purposes. Maintain a detailed record of any damage incurred, significant dates and the remedial actions taken. Records may include photographs and the time taken to perform recovery activities.

Rubbish removal | Fire-damaged vineyard posts, wire and driplines should be separated and stockpiled. Contact your local Environmental Protection Agency for advice on disposal.

Contact

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Further reading

Information pack – Managing fire-damaged grapevines

(https://www.awri.com.au/information_services/information-packs/managing-fire-damaged-grapevines)

References

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Acknowledgements

This Grower Guide was supported by Wine Australia, with levies from Australia's grapegrowers and matching funds from the Australian Government. The AWRI is a member of the Wine Innovation Cluster in Adelaide, SA.